

COMMONWEALTH OF VIRGINIA  
STATE CORPORATION COMMISSION

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COMMONWEALTH OF VIRGINIA, *ex rel.*

STATE CORPORATION COMMISSION

CASE NO. PUR-2023-00066

In re: Virginia Electric and Power Company's  
Integrated Resource Plan filing pursuant to  
Va. Code § 56-597 *et seq.*

**REPORT OF A. ANN BERKEBILE, SENIOR HEARING EXAMINER**

December 8, 2023

This State Corporation Commission ("Commission") case involves the 2023 Integrated Resource Plan ("2023 IRP") of Virginia Electric and Power Company ("Dominion" or "Company"). While Dominion's 2023 IRP focuses upon the imminent addition of new natural gas generation units, the Company failed to provide in its 2023 IRP more comprehensive information concerning its ability to overcome the Commonwealth's current statutory presumption against new carbon-emitting generation unit approvals. For this reason, I do not recommend the Commission find the 2023 IRP to be reasonable and in the public interest.<sup>1</sup> I do not, however, find that numerous other alleged infirmities in the 2023 IRP identified by various case participants warrant a recommendation that the 2023 IRP is not reasonable and in the public interest.

The Commission has not yet specifically addressed the implications of the current statutory approval hurdles for carbon-emitting generation in the context of an IRP. Therefore, I recognize that the Commission could, in the exercise of its discretion and authority, reach a different conclusion regarding such implications in this case. Similarly, depending upon the weight that the Commission gives to various factors and evidence, and its interpretation and application of relevant statutory provisions, I recognize that the Commission could reach conclusions differing from those expressed in this Report concerning the alleged infirmities identified by certain case participants.

Finally, this Report includes various recommendations for future actions of the Company relative to IRPs and for future associated proceedings.

**HISTORY OF THE CASE**

Pursuant to § 56-599 D of the Code of Virginia ("Code"), Dominion filed its 2023 IRP (including two Virginia-specific addenda) with the Commission on May 1, 2023, seeking a Commission determination that the Company's 2023 IRP is reasonable and in the public interest. With its 2023 IRP, Dominion filed a Motion for Entry of a Protective Order and Additional Protective Treatment ("ES Motion"), along with a proposed protective order ("Proposed PR

<sup>1</sup> This recommendation is based on my evaluation of the adequacy of the planning information presented by Dominion in this case and does not implicate whether such generation should be approved – which would be an issue for a different Commission case.

Order”) for the Commission’s consideration. Paragraph 7 of the Proposed PR Order included new proposed procedures for challenging the confidentiality of information in this case (not previously adopted by the Commission).

On May 23, 2023, the Commission issued its Order for Notice and Hearing (“Procedural Order”) establishing procedures relative to its consideration of Dominion’s 2023 IRP. Among other things, the Procedural Order scheduled a public hearing to begin September 18, 2023, with public witness testimony being provided telephonically on September 18, 2023 (during the “Public Witness Session” portion of the hearing) and with the remainder of the hearing commencing in the Commission’s courtroom on September 19, 2023; established various filing deadlines, including a deadline of June 13, 2023, for the Company to file testimony and exhibits supporting the 2023 IRP or, in the alternative, a document identifying Dominion’s witnesses supporting various portions of the 2023 IRP; and appointed a Hearing Examiner to conduct all further proceedings in this matter on behalf of the Commission.<sup>2</sup>

On May 23, 2023, a Hearing Examiner’s Protective Ruling and Additional Protective Treatment for Extraordinarily Sensitive Information (“May 23 PR Ruling”) was entered establishing procedures for the protection of confidential and extraordinarily sensitive information in this proceeding. Although the May 23 PR Ruling did not adopt Dominion’s proposed additional procedures for confidentiality challenges, it represented that such procedures were being taken under advisement and established a schedule for the filing of pleadings associated with such procedures.

On May 26, 2023, the Company filed a Motion to Modify Order for Notice and Hearing and for Expedited Consideration (“Electronic Service Motion”). Specifically, Dominion requested modification of Ordering Paragraphs (9) and (10) of the Procedural Order to authorize the required service upon local officials to be achieved electronically.<sup>3</sup> By Ruling dated May 30, 2023, the Electronic Service Motion was granted.<sup>4</sup>

Following the receipt and consideration of pleadings filed relative to the new confidentiality procedures proposed by Dominion in the ES Motion, a Ruling was entered on July 24, 2023, declining to adopt certain additional confidentiality challenge procedures proposed by the Company but modifying the May 23 PR Ruling to include a good faith conferring requirement associated with confidentiality challenges.

Timely notices of participation were filed in this case by Appalachian Voices; the Office of the Attorney General, Division of Consumer Counsel (“Consumer Counsel”); Sierra Club; Clean Virginia; Virginia Committee for Fair Utility Rates (“Committee”); Microsoft Corporation (“Microsoft”); Amazon Data Services, Inc. (“Amazon Data”); the Data Center Coalition (“DCC”); Advanced Energy United (“AEU”); and the Board of Supervisors for the County of Culpeper, Virginia (“Culpeper”).

<sup>2</sup> The Procedural Order also directed Dominion to provide notice of the 2023 IRP. Proof of Notice was admitted as Exhibit (“Ex.”) 1 in this case.

<sup>3</sup> Electronic Service Motion at 2.

<sup>4</sup> By Rulings dated June 2 and June 13, 2023, the Senior Hearing Examiner also granted *pro hac vice* motions authorizing the participation of Mary Lynne Grigg, Esquire, and Dorothy E. Jaffee, Esquire, in this case.

### *Written Comments*

Almost 200 written comments were timely submitted in connection with the 2023 IRP.<sup>5</sup> Approximately 159 written comments criticized the 2023 IRP and/or the Company for perceived failures in Dominion's attempts to comply with the Virginia Clean Economy Act ("VCEA")<sup>6</sup> and deficiencies in the Company's plans for the utilization of renewable/clean energy resources. In contrast, approximately 32 written comments appeared to support Dominion's retention of fossil resources in its portfolio because of issues relating to reliability, cost, and siting. Certain comments also raised issues relative to ratepayer costs.<sup>7</sup>

Of particular note, the Piedmont Environmental Council ("PEC"), through its Director of Land Use, Julie Bolthouse, provided a written comment dated September 11, 2023, wherein PEC expressed concerns regarding the 2023 IRP's focus on the data center industry and the overall development of data centers in Virginia. Among other things, PEC cautioned that the Commission should not place the burden of extensive data center-related infrastructure on ratepayers. PEC also recommended that the 2023 IRP be rejected; that an independent analysis be required focusing upon land use approvals and power demands for the full buildout of data centers; and that the Commission direct a new 15-year plan in keeping with state law and policies.

In contrast to the significant number of written comments disfavoring the continued operation/new construction of fossil generation facilities, Stephen Haner with the Thomas Jefferson Institute for Public Policy submitted a written comment dated August 30, 2023, wherein he asserted the Company's plan to retain for the foreseeable future most of its natural gas generation, and perhaps some of its coal generation, is reasonable and prudent given the need to maintain reliability as solar and wind assets increase. Among other things, Mr. Haner highlighted recent comments from PJM Interconnection, L.L.C. ("PJM"), to the United States Environmental Protection Agency ("EPA"), raising concerns regarding efforts to remove fossil resources from the generation mix. He also highlighted concerns of the Commission's Staff ("Staff") regarding the effective load carrying capability ("ELCC") capacity of solar facilities and capacity factors of solar and wind and the questionable ability of demand side management ("DSM") programs to sufficiently reduce demand. Moreover, he maintained information

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<sup>5</sup> Over twenty written comments were not filed until after the deadline established by the Procedural Order. The majority of these comments opposed the 2023 IRP and/or Dominion's plans relative to fossil fuel/thermal generation. One of these comments was electronically submitted after 5 p.m. on September 12, 2023, by the National Resources Defense Council ("NRDC"). In its comments, NRDC opposed the 2023 IRP, recommended the Commission require the Company to file a single plan for evaluation as its IRP going forward, and provided alternative modeling considering state and federal regulatory requirements and supporting an alternative least-cost path for Virginia's energy future. Additionally, Senator Creigh Deeds submitted a letter to the Commission on September 18, 2023, wherein he opposed the 2023 IRP.

<sup>6</sup> 2020 Va. Acts chs. 1193, 1194.

<sup>7</sup> See, e.g., Comment of Cary Nunnally dated August 22, 2023, expressing frustration regarding energy costs; Comment of Natalie Pien (on behalf of the PEC, Chesapeake Climate Action Network, and Sierra Club Great Falls Group) dated September 5, 2023, opposing the 2023 IRP, in part, because it is designed to support the data center industry and maintaining Dominion's ratepayers should not be required to pay for the infrastructure to meet the "enormous data center energy demand;" Comment of Elena Schlossberg dated September 12, 2023, raising concerns regarding ratepayer responsibility for data center infrastructure costs. See also Comment of PEC dated September 11, 2023 (discussed above).

provided in this case shows the retention of thermal resources is the lowest-cost approach for the Company to meet its obligations.

In addition, the Virginia Department of Energy (“VDOE”), through its Director, Glenn Davis, submitted a written comment dated September 12, 2023, wherein VDOE emphasized the importance of considering reliability when evaluating the 2023 IRP. Among other things, VDOE highlighted concerns raised by PJM regarding intermittent resources and emphasized the importance of evaluating grid resources as intermittent generation increases in the available generation mix. VDOE also recognized the statutory exemption from deficiency payments which is authorized when the Commission concludes natural gas generation is necessary for reliability and suggested that the Commission should consider lower ELCC limits for resources to be viewed as viable for meeting certain critical scenarios.

Furthermore, LS Power Development, LLC (“LS Power”), through its president, Nathan E. Hanson, submitted a written comment dated September 12, 2023. LS Power explained that it operates as an independent power developer in PJM and maintained that consumers benefit from robust competition in the power sector. LS Power also noted that Dominion operates in PJM’s competitive market and explained that PJM’s reserve margin is higher than the Company’s target reserve margin. LS Power agreed with Dominion’s assessment that gas generation offers an affordable path to the transition to a zero-carbon scenario but disagreed with the Company’s representation that non-utility generators are unavailable to help Dominion meet its resource needs. LS Power also maintained that non-utility generators are cost competitive, risk-reducing, and offer flexibility. Moreover, LS Power suggested the Company should consider the utilization of existing resources rather than building additional Dominion-owned generation.

### *Hearing*

Three witnesses testified during the Public Witness Session on September 18, 2023.

The remainder of the hearing was convened on September 19, 2023, as scheduled, in the Commission’s courtroom. Vishwa B. Link, Esquire; Mary Lynne Grigg, Esquire; Nicole M. Allaband, Esquire; and Lisa R. Crabtree, Esquire; appeared on behalf of Dominion. William H. Chambliss, Esquire; Arlen K. Bolstad, Esquire; and Kiva Bland Pierce, Esquire; appeared on behalf of Staff. Nathaniel H. Benforado, Esquire; William C. Cleveland, Esquire; and Rachel James, Esquire; appeared on behalf of Appalachian Voices. Evan D. Johns, Esquire; and Dorothy E. Jaffe, Esquire; appeared on behalf of Sierra Club. William T. Reisinger, Esquire, appeared on behalf of Clean Virginia. Christian F. Tucker, Esquire, appeared on behalf of the Committee. Cody T. Murphey, Esquire, appeared on behalf of DCC. Jasdeep S. Khaira, Esquire, appeared on behalf of AEU. John E. Farmer, Jr., Esquire; and R. Scott Herbert, Esquire; appeared on behalf of Consumer Counsel. Microsoft, Culpeper, and Amazon Data did not appear at the hearing.

In accordance with the Senior Hearing Examiner’s directive, post-hearing briefs were filed on October 24, 2023, by the Company, Staff, Appalachian Voices, Consumer Counsel,

Sierra Club, Clean Virginia, the Committee, DCC, and AEU.<sup>8</sup> These case participants also provided a Joint Issues Matrix on October 24, 2023.

## **SUMMARY OF THE RECORD**

### *2023 IRP*

As represented in the 2023 IRP, Dominion serves approximately 2.7 million electric customers in Virginia and North Carolina with a combined service territory in these two states of approximately 30,000 square miles.<sup>9</sup> Dominion also indicated in the 2023 IRP that the Company is a member of PJM, a regional transmission organization in the Mid-Atlantic region of the United States.<sup>10</sup> Furthermore, the Company represented that the 2023 IRP was prepared for its service territories in Virginia and North Carolina, which are both within the PJM region.<sup>11</sup>

According to the Company, the 2023 IRP encompasses the 15-year planning period beginning in 2024 and continuing through 2038 ("Planning Period"), using 2023 as the base year, and is meant for use as a long-term planning document based on a "snapshot in time" of current technologies, market information, and projections.<sup>12</sup> Furthermore, in certain portions of the 2023 IRP, Dominion evaluated the longer 25-year period of 2024 to 2048 ("Study Period").<sup>13</sup> The 2023 IRP addressed the 2023 PJM load forecast, which includes a significant increase in the expected peak and energy demand in the Dominion Energy Zone ("DOM Zone") over the Planning Period, with annual peak and energy load growth of nearly 5% and 7%, respectively, over the next decade. According to the Company, the increase is driven primarily by data centers and, to a lesser extent, electrification in both the Company's service territory and in other service areas within the DOM Zone.<sup>14</sup>

Dominion also represented in the 2023 IRP that the Company is transforming its distribution grid to provide: (i) an enhanced platform for distributed energy resources ("DERs") and targeted DSM programs; (ii) more secure and reliable service, leading to the increased availability of DERs; and (iii) more ways for customers to save energy and money through DSM programs and other rate filings. Additionally, the Company highlighted its approval of new customer offerings in Virginia to support and incentivize the installation of charging infrastructure for electric vehicles ("EVs"), including an offering to support fleet electrification.<sup>15</sup>

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<sup>8</sup> See Post-Hearing Brief of Virginia Electric and Power Company ("Dominion Brief"); Post-Hearing Brief of the Staff of the State Corporation Commission ("Staff Brief"); Post-Hearing Brief of Appalachian Voices ("Appalachian Voices Brief"); Post-Hearing Brief of the Office of the Attorney General, Division of Consumer Counsel ("Consumer Counsel Brief"); Post-Hearing Brief of Sierra Club ("Sierra Club Brief"); Post-Hearing Brief of Clean Virginia ("Clean Virginia Brief"); Post-Hearing Brief of the Virginia Committee for Fair Utility Rates ("Committee Brief"); Post-Hearing Brief of the Data Center Coalition ("DCC Brief"); and Post-Hearing Brief of Advanced Energy United ("AEU Brief").

<sup>9</sup> Ex. 2 (2023 IRP), at 1. The version of the 2023 IRP entered as an exhibit in this case includes various corrections submitted by the Company following its initial submission on May 1, 2023.

<sup>10</sup> *Id.*

<sup>11</sup> *Id.*

<sup>12</sup> *Id.*

<sup>13</sup> *Id.*

<sup>14</sup> *Id.* at 2.

<sup>15</sup> *Id.*

Dominion presented five alternative plans (“Alternative Plans”) in the 2023 IRP to meet the needs of customers in the future under different scenarios, which, according to the Company, were designed using constraint-based least-cost planning techniques and proven technologies. Dominion also represented in the 2023 IRP that the Alternative Plans utilized the load forecast prepared by PJM; assumed a capacity factor for solar resources based on the lower of the design capacity factor or the three-year average of the Company's existing solar facilities in Virginia; and assumed that Virginia will exit the Regional Greenhouse Gas Initiative (“RGGI”) before January 1, 2024. Additionally, the Company presented sensitivities on all Alternative Plans showing higher costs to customers if Virginia remains in the RGGI.<sup>16</sup>

The Company described the Alternative Plans as follows:<sup>17</sup>

- Alternative Plan A: This Alternative Plan presents a least-cost plan that meets only applicable carbon regulations and the mandatory renewable energy portfolio standard program (“RPS Program”) requirements of the VCEA. The Company presented this Alternative Plan to comply with prior Commission and North Carolina Utility Commission orders and for cost comparison purposes only. Dominion also emphasized that Alternative Plan A does not meet the development targets for solar, wind, and energy storage resources in Virginia established through the VCEA.
- Alternative Plan B: This Alternative Plan includes the significant development of solar, wind, and energy storage envisioned by the VCEA, petitioned for approval by 2035 and built by 2038. Alternative Plan B includes the development of six new small modular reactors (“SMRs”) starting in 2034 and a second offshore wind project, providing carbon free power. This plan requires an increase in the Company’s ability to import capacity and energy by 2040. Alternative Plan B also preserves existing generation and includes several new gas combustion turbines (“CTs”) to address future energy and system reliability needs.
- Alternative Plan C: This Alternative Plan, like Alternative Plan B, preserves existing generation to address future system reliability, stability, and energy independence issues, with identical assumptions regarding the retirement of existing Company-owned carbon-emitting generation. Alternative Plan C differs from Alternative Plan B in that all new generation resources were selected on a least-cost optimization basis without regard for the development targets for solar, wind, and energy storage resources in Virginia established through the VCEA.
- Alternative Plan D: This Alternative Plan uses similar assumptions as Alternative Plan B but retires all Company-owned, carbon-emitting generation by the end of 2045, resulting in zero carbon dioxide (“CO2”) emissions from the Company’s fleet in 2046. In order to retire all carbon-emitting units by the end of 2045, the Company represented that it would need to build and buy significant incremental capacity to reliably meet customer load.

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<sup>16</sup> *Id.* at 2-3.

<sup>17</sup> *Id.*

Alternative Plan D contemplates the Company building over 4,500 megawatts (“MWs”) of incremental energy storage and more than 3,000 MWs of incremental SMRs to meet this need when compared to Alternative Plan B. According to the Company, even with these additional resources, Alternative Plan D results in the Company purchasing 10,800 MWs of capacity in 2045 and beyond, raising significant concerns about system reliability and energy independence, including over-reliance on out-of-state capacity to meet customer needs. Dominion also represented that this Alternative Plan would require a substantial increase in energy purchase limits. Additionally, the Company asserted that over time as more renewable energy and energy storage resources are added to the system and as other technology advances, the Company will continue gaining knowledge about the impact of such system changes to assess the ability of an Alternative Plan D approach to maintain system reliability.

- Alternative Plan E: This Alternative Plan is like Alternative Plan D in retiring all Company-owned carbon-emitting generation by the end of 2045. Alternative Plan E differs from Alternative Plan D in that all new generation resources were selected on a least-cost optimization basis without regard for the development targets for solar, wind, and energy storage resources in Virginia established through the VCEA. Dominion represented that, like Alternative Plan D, Alternative Plan E would require the Company to build and buy significant incremental capacity and energy to reliably meet customer load. Dominion also asserted that over time as more renewable energy and energy storage resources are added to the system, the Company will continue gaining knowledge about the impact of such system changes to assess the ability of an Alternative Plan E approach to maintain system reliability.

Furthermore, Dominion provided the following high-level summary of the Alternative Plans. The MW figures below represent incremental resource additions to the Company’s existing generation and approved generation under construction, including nearly 2,600 MWs of offshore wind:<sup>18</sup>

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<sup>18</sup> *Id.* at 4.

**Executive Summary Table: 2023 Plan Results**

	<b>Plan A</b>	<b>Plan B</b>	<b>Plan C</b>	<b>Plan D</b>	<b>Plan E</b>
<b>NPV Total (\$B)</b>	\$109.70	\$127.70	\$127.20	\$140.90	\$138.00
<b>Approximate CO<sub>2</sub> Emissions from Company in 2048 (Metric Tons)</b>	43.8 M	35.9 M	36 M	0 M	0 M
<b>Solar (MW)</b>	10,800 15-yr 19,800 25-yr	10,875 15-yr 19,875 25-yr	10,800 15-yr 19,800 25-yr	10,875 15-yr 23,955 25-yr	11,094 15-yr 24,294 25-yr
<b>Wind (MW)</b>	3,040 15-yr 3,220 25-yr	3,040 15-yr 3,220 25-yr	3,040 15-yr 3,220 25-yr	3,040 15-yr 3,220 25-yr	3,040 15-yr 3,220 25-yr
<b>Storage (MW)</b>	1,050 15-yr 3,960 25-yr	2,370 15-yr 5,190 25-yr	2,220 15-yr 5,220 25-yr	2,370 15-yr 9,780 25-yr	2,910 15-yr 10,350 25-yr
<b>Nuclear (MW)</b>	-- 15-yr -- 25-yr	804 15-yr 1,608 25-yr	804 15-yr 1,608 25-yr	1,608 15-yr 4,824 25-yr	1,072 15-yr 4,288 25-yr
<b>Natural Gas Fired (MW)</b>	5,905 15-yr 9,300 25-yr	2,910 15-yr 2,910 25-yr	2,910 15-yr 2,910 25-yr	970 15-yr 970 25-yr	970 15-yr 970 25-yr
<b>Retirements (MW)</b>	-- 15-yr -- 25-yr	-- 15-yr -- 25-yr	-- 15-yr -- 25-yr	-- 15-yr 11,399 25-yr	-- 15-yr 11,399 25-yr

According to Dominion, and as demonstrated in the table replicated above, all Alternative Plans show significant solar, wind, and energy storage development over the 25-year Study Period. Additionally, Alternative Plans B through E include development of SMRs. The Company further represented that, due to an increasing load forecast, and the need for dispatchable generation, the Alternative Plans contemplate additional natural gas-fired resources and preserve existing carbon-emitting units beyond statutory retirement deadlines established in the VCEA. Dominion emphasized that the VCEA explicitly authorizes the Company to petition the Commission for relief from these requirements on the basis that the unit retirements would threaten the reliability or security of electric service to customers. Additionally, Dominion asserted that if the Company ultimately retires all carbon-emitting generation by the end of 2045, as shown in Alternative Plans D and E, significant incremental wind, solar, nuclear, and energy storage resources are needed. Dominion also indicated that, while all Alternative Plans incorporate only known technologies, the Company fully expects new technologies could take the place of today's technologies over the 15-year Planning Period and the 25-year Study Period.<sup>19</sup>

<sup>19</sup> *Id.*



With its 2023 IRP, the Company also provided a reference index identifying the sections of the 2023 IRP that, according to Dominion, comply with the Code, Commission IRP guidelines, and the requirements of prior Commission orders.<sup>20</sup>

*Public Witnesses*

**Shawn Avery**, President and Chief Executive Officer (“CEO”) of the Hampton Roads Workforce Council, highlighted increased demand expectations and maintained it is important for businesses to have economical access to energy as we work toward zero carbon. He supported the 2023 IRP as a “comprehensive proactive approach to ensuring this energy access” and believes the measures outlined in the 2023 IRP “will safeguard our power supply and prepare the grid for growth.”<sup>21</sup>

**Bryan Stephens**, President and CEO of the Hampton Roads Chamber of Commerce, explained that his organization recognizes the importance of access to affordable, reliable, and clean energy. He supported the 2023 IRP as a means of addressing current and future demand through the utilization of “all available power generation resources as we build clean energy capacity.” He also recognized progress in the development of clean energy capacity through the Coastal Virginia Offshore Wind Project and maintained such project was providing for significant economic growth in his region. He encouraged the Commission to approve the 2023 IRP.<sup>22</sup>

**John Kwapisz** highlighted various publications, including a book entitled *Green Breakdown, the Coming Renewable Energy Failures*, as well as a documentary and articles which he referenced in written comments filed with the Commission, as providing information concerning the harms of renewable energy development. He also asserted that a number of European countries have experienced outages and brownouts because over-reliance on renewable resources and have elected to start focusing on nuclear energy. Furthermore, he suggested that mandates supported by “climate alarmists” will negatively impact current standards of living and challenged the factual basis supporting claims of dangerous global warming. He encouraged the Commission to “adopt” Alternative Plan B or C in the 2023 IRP as a means of protecting the interests of the people of Virginia.<sup>23</sup>

*Dominion’s IRP Supporting Witnesses*

In accordance with the Procedural Order, Dominion identified the following witnesses to appear and offer testimony in support of the 2023 IRP: **Shane T. Compton**, the Company’s Director of Integrated Strategic Planning; **Abhijit Rajan**, the Company’s Manager of Energy Market Quantitative Analysis and Load Forecast; **Michael T. Hubbard**, the Company’s Manager of Energy Conservation; **Katelynn A. Vance, PhD**, the Company’s Manager of Electric Transmission Planning and Strategic Initiatives; and **Augustus Johnson, IV, P.E.**, the Company’s Director of Electric Distribution Grid Planning and Asset Management.

<sup>20</sup> Ex. 2 (2023 IRP), Reference Index.

<sup>21</sup> Tr. (Avery), at 13-15.

<sup>22</sup> Tr. (Stephens), at 18-20.

<sup>23</sup> Tr. (Kwapisz), at 24-28.

**Mr. Compton** adopted and sponsored the introduction and executive summary of the 2023 IRP. He also sponsored the following portions of the 2023 IRP: Chapter 1, Introduction, Sections 1.2 through 1.4, 1.6, 1.7, 1.9, and 1.10 describing emerging policy, market, regulatory, and technical developments (considered by Dominion as part of its planning process); Chapter 2, Introduction, Sections 2.1, 2.2, and 2.4 to 2.6 (including Appendices 2A and 2B) presenting the results of the Company's integrated planning process, including Dominion's current capacity and energy positions, the Alternative Plans presented to meet the Company's future capacity and energy needs, the net present value ("NPV") of each Alternative Plan, the consolidated bill analysis of each Alternative Plan, and the sensitivity analyses; Chapter 3, Introduction, Section 3.1 (including Appendices 3A and 3B) describing the Company's Short-Term Action Plan for generation; Chapter 4, Introduction, Sections 4.2 through 4.12 (including Appendices 4I through 4O) describing and providing various generation planning assumptions used for the 2023 IRP; Chapter 5 (including Appendices 5A through 5T) providing an overview of Dominion's existing supply-side generation, generation resources under construction or development, the Company's analysis of future supply-side generation, and discussing solar development challenges; Chapter 9, Sections 9.1, 9.3, and 9.4 providing additional information responsive to Commission requirements; and Va. Addendum 1 detailing Dominion's residential bill analysis included with the 2023 IRP. Additionally, Mr. Compton co-sponsored with Company witness Rajan Chapter 1, Section 1.1 of the 2023 IRP relating to Dominion's load forecast and energy transition risks.<sup>24</sup>

When cross-examined by Appalachian Voices, Mr. Compton acknowledged that Alternative Plan A does not meet the retirement or zero carbon capacity procurement requirements of the VCEA; indicated that Alternative Plan A assumes Virginia's exit from RGGI by the end of 2023 (in base modeling); represented that Alternative Plan A does not assume a federal carbon price until 2036; acknowledged that Alternative Plan A does not procure enough RECs to satisfy VCEA RPS Program targets but, instead, assumes a REC deficiency; agreed that Alternative Plan A is least-cost optimized; confirmed that Alternative Plan A assumes 9,300 MWs of natural gas capacity over the Study Period despite the VCEA's 2045 retirement requirement (and without including a case-by-case/unit-by-unit retirement exemption analysis); and agreed that Alternative Plan A contemplates an additional new 485 MW gas unit coming online in 2043 (two years before the VCEA's 2045 retirement deadline).<sup>25</sup> Regarding Alternative Plan B, Mr. Compton agreed that Alternative Plan B does not meet the VCEA's retirement requirement; acknowledged that Alternative Plan B assumes (in the base modeling) Virginia's exit from RGGI by the end of 2023; confirmed that Alternative Plan B does not procure enough RECs or zero carbon capacity to meet VCEA requirements; acknowledged that Alternative Plan B does not follow least-cost optimization until 2035; and agreed that Alternative Plan B does not achieve zero carbon emissions during the Planning or Study Periods.<sup>26</sup> Similarly, Mr. Compton acknowledged that Alternative Plan C does not comply with the VCEA's retirement requirements; agreed that Alternative Plan C assumes (in base modeling) Virginia's exit from RGGI by 2023; confirmed that Alternative Plan C does not comply with the VCEA's zero carbon capacity procurement targets; and acknowledged that Alternative Plan C

<sup>24</sup> Ex. 3 (Compton Direct), at 1.

<sup>25</sup> Tr. (Compton), at 109-115.

<sup>26</sup> *Id.* at 115-116.

does not achieve zero carbon emissions during the Planning and Study Periods.<sup>27</sup> Additionally, he confirmed yearly CO<sub>2</sub> emissions of at least 35 million metric tons associated with Alternative Plans A, B, and C (reflected on Figure 2.2.6 of the 2023 IRP) by 2048 absent technological developments facilitating carbon reductions.<sup>28</sup> He suggested that Alternative Plans D and E reflect how the Company can achieve zero emissions by taking Alternative Plans B or C and making them net zero through additional capital investment converting new CTs (directed for inclusion in the modeling) to being 100% hydrogen-capable.<sup>29</sup> More specifically, he indicated that the modeling for Alternative Plans D and E includes a \$500 per kW cost for CT conversions to hydrogen but did not include hydrogen fuel costs in its analysis.<sup>30</sup>

Mr. Compton next responded to questioning from Sierra Club relating to the environmental regulations referenced in Appendix 5L to the 2023 IRP. He generally agreed that the Mercury and Air Toxic Standards (“MATS Rules”) are likely to require some capital investment at Dominion’s Mt. Storm generating plant but he was unsure if the cost of compliance with the MATS Rules was incorporated into Dominion’s dispatch model.<sup>31</sup> Additionally, he confirmed that compliance with Section 111 of the Clean Air Act (“Section 111 Rules”), which was proposed in the spring of 2023, was not included into the Company’s 2023 IRP cost assumptions.<sup>32</sup>

During cross-examination by Consumer Counsel, Mr. Compton confirmed the Company will identify/present the benefits it seeks for projects under the Inflation Reduction Act (“IRA”) or the Infrastructure Investment and Jobs Act when it files for a certificate of public convenience and necessity (“CPCN”) for a new facility or requests associated cost recovery and agreed Dominion will seek to maximize such benefits.<sup>33</sup> With regard to the bill impact analyses provided with the 2023 IRP, he agreed that the methodology previously directed by the Commission (“Directed Methodology”) requires the use of class allocation factors across time and no sales growth.<sup>34</sup> He then acknowledged the bill analysis divergence resulting from the Directed Methodology and the Company’s preferred methodology (“Company Methodology”), which considers sales growth.<sup>35</sup>

On redirect, Mr. Compton confirmed that Dominion ran sensitivities accounting for RGGI participation associated with the Alternative Plans, despite the Company’s assumption that Virginia will exit RGGI at the end of 2023.<sup>36</sup> He also confirmed that the modeling for Alternative Plan E did not force the inclusion of CTs but, instead, indicated Alternative Plan E is

<sup>27</sup> *Id.* at 116-118.

<sup>28</sup> *Id.* at 118-119.

<sup>29</sup> *Id.* at 119-120.

<sup>30</sup> *Id.* at 120-123. Although Mr. Compton initially indicated that the \$500 per kW CT conversion cost was included in the analysis of all of the Alternative Plans, he subsequently confirmed that such cost was only included relative to Alternative Plans D and E. *See id.* at 122, 139-142; 581-583.

<sup>31</sup> *Id.* at 128-129. On redirect, Mr. Compton clarified that proposed updates to the MATS Rules referenced in Appendix 5L to the 2023 IRP were not published until April 15, 2023 – with the 2023 IRP being filed on May 1, 2023. *Id.* at 144-145.

<sup>32</sup> *Id.* at 129-130.

<sup>33</sup> *Id.* at 131.

<sup>34</sup> *Id.* at 132.

<sup>35</sup> *Id.* at 134-137.

<sup>36</sup> *Id.* at 138.

least-cost optimized.<sup>37</sup> Additionally, he confirmed his understanding that Alternative Plan A complied with the Commission's directive in the *2020 IRP Order*<sup>38</sup> for a VCEA plan including applicable carbon regulations and RPS Program requirements.<sup>39</sup>

**Mr. Rajan** adopted and sponsored Chapter 4, Section 4.1 (including Appendices 4A to 4H) of the 2023 IRP describing and providing the generation planning assumptions relating to the load forecast used for the 2023 IRP. Additionally, he adopted and co-sponsored with Company witness Compton Chapter 1, Section 1.1 of the 2023 IRP describing significant developments associated with the load forecast and energy transition risks.<sup>40</sup>

**Mr. Hubbard** adopted and sponsored the following portions of the 2023 IRP: Chapter 3, Section 3.2 describing the Company's Short-Term Action Plan concerning DSM; and Chapter 6 (including Appendices 6A through 6P) describing Dominion's DSM planning process and proposed DSM programs that have been approved and rejected by the Commission; and the Company's energy efficiency-related analysis provided in accordance with the Grid Transformation Security Act of 2018 ("GTSA").<sup>41</sup>

**Dr. Vance**<sup>42</sup> supported portions of the 2023 IRP concerning the Company's transmission resources, transmission process, and system reliability analysis. Specifically, she adopted and sponsored the following portions of the 2023 IRP: Chapter 1, Section 1.5 describing significant developments related to federal interconnection queue reform; Chapter 2, Section 2.3 summarizing the results of Dominion's transmission system reliability analysis associated with the retirement of all Company-owned carbon-emitting generation in 2045, as detailed further in Section 7.5; Chapter 3, Section 3.3 (including Appendix 3C) describing Dominion's Short-Term Action Plan regarding transmission; and Chapter 7 (including Appendix 7A) summarizing the Company's transmission planning process, identifying current and future transmission projects, and providing the results of Dominion's system reliability analysis discussing potential issues related to retiring generation units that emit CO<sub>2</sub> as a byproduct of combustion by 2045.<sup>43</sup>

When cross-examined by Appalachian Voices, Dr. Vance indicated that the Company completed a high-level reliability assessment of its transmission system after deciding not to model VCEA contemplated retirements of its carbon-emitting fleet in Alternative Plans A, B, and C.<sup>44</sup> Furthermore, when asked about a line item on Figure 2.4.1 in the 2023 IRP, which includes transmission costs, Dr. Vance indicated such transmission costs are based on what may

<sup>37</sup> *Id.* at 139.

<sup>38</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 (Feb. 1, 2021) ("*2020 IRP Order*").

<sup>39</sup> Tr. (Compton), at 143-144.

<sup>40</sup> Ex. 5 (Rajan Direct), at 1.

<sup>41</sup> Ex. 6 (Hubbard Direct), at 1. *See also* 2018 Va. Acts ch. 296. At the hearing, Mr. Hubbard also explained and corrected some language on page 104 of the 2023 IRP relating to qualifications for the Company's Residential Income and Age-Qualifying Home Improvement Program. Tr. (Hubbard), at 150-151.

<sup>42</sup> Although the sections of the 2023 IRP referenced in this paragraph were initially supported by Mathew A. Parker, the Company's Director of Electric Transmission System Operations, Dr. Vance sponsored them at the hearing. Tr. (Vance), at 155-156.

<sup>43</sup> Ex. 7 (Vance/Parker Direct), at 1.

<sup>44</sup> Tr. (Vance), at 157-159.

be expected related to transmission reliability.<sup>45</sup> She also agreed that while the IRP process identifies transmission problems, it does not identify a specific solution to each transmission problem with a specific cost.<sup>46</sup> Similarly, she agreed that on the generation side the Company's IRP model proposes generic resources that are not location specific.<sup>47</sup>

**Mr. Johnson** supported sections of the 2023 IRP describing the Company's distribution resources, distribution planning process, and various distribution-related initiatives. Specifically, he adopted and supported the following portions of the 2023 IRP: Chapter 1, Section 1.8 outlining the need for a modern distribution grid; Chapter 3, Section 3.4 describing Dominion's Short-Term Action Plan concerning distribution; Chapter 8 (including Appendix 8A) summarizing the Company's distribution planning process and current distribution grid initiatives; Chapter 9, Section 9.2 providing additional information responsive to Commission requirements; and VA Addendum 2 constituting Dominion's Grid Transformation Plan document (also filed in Case No. PUR-2023-00051).<sup>48</sup>

#### *Sierra Club*

Sierra Club presented the testimony of **Devi Glick**, Senior Principal at Synapse Energy Economics, Inc. ("Synapse"), an energy and environmental consulting firm; and **William M. Shobe, PhD**, Professor of Public Policy at the University of Virginia's Batten School of Leadership and Public Policy.

**Ms. Glick** reviewed Dominion's 2023 IRP and evaluated the Company's final portfolios, modeling methodology, and input assumptions. She also presented Synapse's 111(d)-Compliant Clean Energy scenario which, according to Ms. Glick, meets Dominion's high load forecast, while also complying with the VCEA and, relative to what she perceived as the Company's preferred plan, provides for an earlier retirement of the Clover, Mt. Storm, and Virginia City Hybrid Energy Center ("VCHEC") power plants; builds substantially less new gas capacity; emits less CO<sub>2</sub>; and results in lower costs to ratepayers.<sup>49</sup>

Ms. Glick recognized that Dominion's projections for data center load are driving it to maintain existing coal and gas plants throughout the Planning Period and acknowledged the RPS requirements of the VCEA grow as load grows, requiring the Company to build a substantial quantity of new renewables to avoid a RPS compliance penalty. She also noted that Dominion's Alternative Plan B contemplates the Company's continued operation of the Clover, Mt. Storm, and VCHEC coal plants throughout the Planning Period, fails to meet RPS requirements, and

<sup>45</sup> *Id.* at 159.

<sup>46</sup> *Id.* at 163-164.

<sup>47</sup> *Id.* at 164. When questioned by Staff and on redirect by Company counsel, Dr. Vance also explained her understanding of Dominion's responses to certain discovery requests relating to transmission costs considered in the 2023 IRP. Tr. (Vance), at 165-170. See also Ex. 8 (Company Responses to Staff 6-155 and 6-156) and Ex. 9 (Company Response to Staff 4-109). Among other things, Dr. Vance suggested Dominion's discovery responses showed its transmission cost analysis included cost estimates that were location/unit-specific. *Id.* at 169-170.

<sup>48</sup> Ex. 10 (Johnson Direct), at 1.

<sup>49</sup> Ex. 24 and 24C/ES (Glick Direct), at 3. Although public, confidential, and extraordinarily sensitive versions of certain exhibits were admitted into the record of this case, only public information contained in such exhibits is specifically referenced herein.

does not meet the 2045 retirement requirement in the VCEA. In contrast, she testified that Synapse's modeling shows retiring Clover, VCHEC, and Mt. Storm earlier than contemplated in Alternative Plan B results in lower CO<sub>2</sub> emissions and a reduction of ratepayer costs of between \$1.8 and \$7.7 billion over the Study Period when the EPA's newly proposed the Section 111 Rules are considered. Additionally, Mr. Glick maintained Dominion imposed strict yearly build limits on the quantity of solar photovoltaic ("PV") and battery storage in its modeling without justification; erroneously calculated its RPS requirements and understated its RPS penalties by approximately \$1 billion; and modeled substantially lower costs for building and operating new gas plants and maintaining existing coal plants than are likely to be necessary given the Section 111 Rules. Based upon her findings, Ms. Glick recommended that Dominion revise its 2023 IRP to address the shortcomings she identified. In particular, she recommended modeling of Section 111 Rule requirements, including the cost of installing carbon capture and storage ("CCS"). Additionally, she recommended that the Company begin issuing all-source requests for proposals ("RFPs") geared toward obtaining as much new renewable energy as possible in the near term.<sup>50</sup>

When analyzing the 2023 IRP, Ms. Glick focused on Alternative Plans B and D, both of which comply with the VCEA's renewable build limits. However, she recognized that while Alternative Plan D contemplates the retirement of all carbon-emitting resources by 2045, Alternative Plan B contemplates no retirements of coal or gas plants beyond Yorktown 3 and Chesterfield 5 and 6 (1,804 MWs of capacity). She noted that while the Company modeled the retirement of more capacity (3,000 MWs) in its 2020 IRP, Dominion now plans to keep its gas and coal plants online to provide energy and capacity to meet its growing data center load, despite conflicting with the VCEA retirement requirement and despite the Company's ten-year NPV analysis showing that the Rosemary and VCHEC plants have negative ten-year cash flows. Additionally, Ms. Glick provided an overview of the portfolio of resources, chosen by PLEXOS and added to Alternative Plan B to meet VCEA's target of 16,100 MWs of solar and/or onshore wind resources and 2,700 MWs of storage by 2038. Among other things, she recognized the Company utilization of PLEXOS to optimize retirement dates for existing fossil resources as an improvement to the approach utilized in the 2020 IRP. Nevertheless, she cautioned that optimization does not automatically generate alternative portfolios that maintain reliability without materially increasing costs to ratepayers and opined that the level of uncertainty and risk inherent in the Company's assumptions must also be critically evaluated. Furthermore, she suggested Dominion should have tested an earlier retirement scenario and asserted that the use of slightly different assumptions, such as a relaxed build limit not constraining resources added in later years, could result in an alternative portfolio at a lower cost than Dominion's optimized portfolio.<sup>51</sup>

Ms. Glick next addressed her Synapse modeling relative to the 2023 IRP. She explained that she utilized the EnCompass capacity optimization and dispatch model to analyze three scenarios: (i) a baseline scenario (considering Dominion's Alternative Plan B resource additions and retirements); (ii) an alternative clean energy optimized scenario ("Synapse Optimized" scenario) not complying with Section 111 Rules but increasing build limits for solar PV and

<sup>50</sup> *Id.* at 4-7. Ms. Glick also recognized that Dominion's modeling considered the impacts of the IRA, which provides tax incentives for renewables and battery storage, but did not model the Section 111 Rules because they were only recently proposed. *Id.* at 7-8.

<sup>51</sup> *Id.* at 7-14.

battery storage, building a third tranche of offshore wind, testing earlier retirement dates for the Clover and VCHEC plants, and considering MATS Rule compliance costs at Mt. Storm; and (iii) a clean energy scenario that is compliant with Section 111 Rules ("111(d)-Compliant Clean Energy" scenario). She also testified that she retained as many of Dominion's assumptions as possible in her analysis (including the Company's peak and annual energy, load shape, reserve margin, two offshore wind project additions, distributed solar additions, commodity prices, resource capacity values, resource maximum capacity factors, resource capital costs, and thermal unit capital costs) to ensure her results were comparable to the Company's. However, she relaxed Dominion's constraints on renewable build limits. Because Ms. Glick believes Dominion's solar PV and battery storage cost projections are too high, she also conducted a sensitivity utilizing lower solar and storage capital costs.<sup>52</sup>

Regarding her consideration of retirements, Ms. Glick noted that Dominion's model did not chose to retire the VCHEC, Clover, and Mt. Storm plants during the Study Period. In contrast, the Synapse Optimized scenario model chose to retire VCHEC in 2027 but did not chose to retire Clover and Mt. Storm before 2040 (given the Company's load growth projections and because this scenario did not consider the Section 111 Rules). Nevertheless, Ms. Glick maintained the results of the Synapse Optimized scenario model are not very useful because Dominion will not be able to run its coal plants through 2045 without changing its operations and making substantial investments to comply with the Section 111 Rules. She also indicated that her 111(d)-Compliant Clean Energy scenario model assumed Clover's retirement by 2032 to avoid Section 111 investments and Mt. Storm's reduced capacity factor and staggered retirement by 2035 to avoid CCS investments. Additionally, she discussed the results of Dominion's 10- and 25-year cash flow analysis of its existing units showing VCHEC's negative cash flow (-\$119 to -\$305 million over next 10 years under the low, base, and high-capacity forecasts) and Clover and Mt. Storm's negative cash flows under a low-capacity price forecast. Moreover, she described the risks of keeping VCHEC, Clover, and Mt. Storm online beyond 2045, including an assertion that coal units become more costly to maintain as they age.<sup>53</sup>

Ms. Glick next compared the resource additions contemplated in Dominion's Alternative Plan B to those considered in the Synapse Optimized and 111(d)-Compliant Clean Energy scenarios. She explained that the Synapse scenarios retire more coal and build more clean energy than Alternative Plan B because the relaxation of solar and battery storage build requirements. She also maintained that her use of the National Renewable Energy Laboratory ("NREL")'s Annual Technical Baseline ("ATB") cost assumptions, which she opined are more realistic than the Company's cost assumptions, caused her model to build less gas capacity and more solar PV and battery storage as part of the least-cost resource mix in the Synapse scenarios. Additionally, she provided the following table showing how the resource additions contemplated by Alternative Plan B and the 111(d)-Compliant Clean Energy scenarios differ by year:

<sup>52</sup> *Id.* at 14-19.

<sup>53</sup> *Id.* at 20-24. Ms. Glick's discussion of the risks of keeping coal plants online beyond 2045 includes her consideration of confidential capacity factor and forced outage information provided by the Company. *See* Ex. 24C/ES (Glick Direct), at 23-25 (Confidential Figure 2 and Confidential Table 5). Furthermore, at the hearing, Ms. Glick acknowledged an error in her Extraordinarily Sensitive Figure 1 relating to NREL, ATB solar and storage capital costs, shown on page 20 of her prefiled testimony. Sierra Club provided an exhibit correcting this error. *See* Ex. 26ES. *See also* Ex. 25 (Sierra Club responses to Dominion 5-47, 52, 55, acknowledging same error).

**Table 7. Annual Cumulative Capacity Additions (MW) by Resource Type**

Year	Dominion Plan B			Synapse 111(d)-Compliant Clean Energy Scenario					
				Dominion Costs			ATB Costs		
	Firm Capacity Resource	Utility Solar	Battery Storage	Firm Capacity Resource	Utility Solar	Battery Storage	Firm Capacity Resource	Utility Solar	Battery Storage
2024									
2025									
2026									
2027		600						1,800	
2028	1,046	1,257	90				0	3,591	
2029	1,046	1,911	210				0	5,973	
2030	1,046	2,621	360		2,400		0	8,343	
2031	1,046	3,508	540	523	4,788		0	10,701	720
2032	1,046	4,391	720	1,046	4,864		0	13,048	1,920
2033	1,046	5,269	960	2,615	4,840		0	15,383	3,120
2034	1,046	6,142	1,200	3,138	4,816	120	0	17,706	4,320
2035	1,569	7,012	1,470	3,138	6,211	700	0	20,017	5,520
2036	2,092	7,876	1,770	3,138	8,580	700	0	22,317	6,720
2037	2,615	8,737	2,070	3,138	10,938	1,900	0	24,606	7,880
2038	3,138	9,593	2,370	3,138	13,283	3,100	0	26,883	8,640

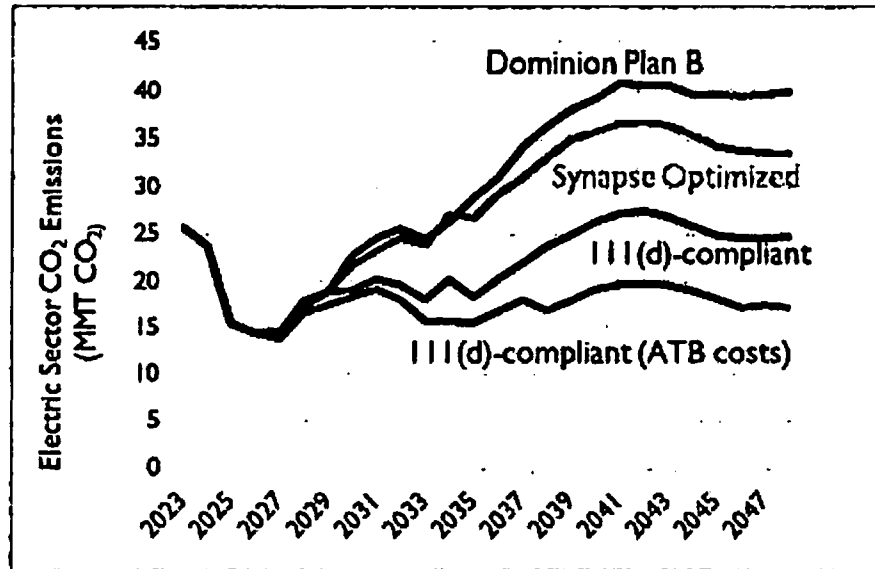
*Note: In all three scenarios, the model adds 2 tranches of 2,600 MW of offshore wind in each of 2027 and 2033. In the 111(d)-Compliant scenarios, the model adds a third tranche in 2035 (assuming Dominion renewable costs) and 2038 (NREL ATB renewable costs).*

According to Ms. Glick, the Synapse model waited until 2030 to start adding solar PV in the 111(d)-Compliant Clean Energy scenario because the model anticipates solar PV costs falling until 2030 and then flattening out, thereby supporting a delay in building out solar PV until 2030. Nevertheless, she acknowledged this may not be the best option for Dominion given realities in the solar market today.<sup>54</sup>

Ms. Glick next differentiated the generation levels by type as reflected in the Company's Alternative Plan B and the Synapse scenarios. Among other things, she noted that generation from coal and gas is higher under Alternative Plan B relative to the Synapse scenarios. She also highlighted the lower CO<sub>2</sub> emissions shown in the Synapse scenarios and provided the following chart comparing the greenhouse gas emissions of each modeled scenario:

<sup>54</sup> Ex. 24 and 24C/ES (Glick Direct), at 25-31. Ms. Glick also indicated that her modeling shifted a third offshore wind project back by a few years and, instead, supported building more solar PV and battery storage earlier in the Planning Period. *Id.* at 27. Furthermore, on pages 29-30 of her prefiled testimony, Ms. Glick provided figures showing the installed capacity for Alternative Plan B and the 111(d)-Compliant Clean Energy scenario.



**Figure 9. Dominion Greenhouse Gas Emissions by Modeled Scenario**

*Note: Figure does not reflect emissions from imports.*

Furthermore, Ms. Glick maintained the total cost to ratepayers associated with the 111(d)-Compliant Clean Energy scenario is \$1.8 billion lower than the cost of Alternative Plan B even when using Dominion's cost assumptions. She asserted that this differential widens even further (to \$7.7 billion) under NREL ATB cost sensitivities contemplating lower clean energy costs.<sup>55</sup>

In sum, Ms. Glick maintained the Synapse modeling demonstrates a clean energy portfolio that retires all of Dominion's coal by 2035 at a lower cost than the Company's plan to keep its fossil units online beyond 2045. She also opined that it is not in the best interests of Dominion's ratepayers to continue investing in fossil infrastructure, which could become stranded assets in 2045, and to ultimately pay large RPS penalties. Moreover, she recommended that the Company retire VCHEC by no later than 2027, Clover by 2032, and Mt. Storm by 2035 and invest the resources that would otherwise be used to run these units (including environmental compliance costs) into new, RPS-compliant clean energy resources. Additionally, she maintained that her analysis supports Dominion's planning for the procurement of clean energy replacement resources to meet growing data center load.<sup>56</sup>

In the next section of her prefiled testimony, Ms. Glick addressed the overall economic and regulatory factors impacting the 2023 IRP. Among other things, she acknowledged PJM's projection of a 5% increase to Dominion's peak load and 7% to Dominion's energy load over the next decade and questioned why the Company has just now started to plan for data center load

<sup>55</sup> *Id.* at 31-35. Ms. Glick also provided several figures comparing the generation results of Alternative Plan B to the Synapse scenarios and utilizing differing cost assumptions. *Id.* at 32-33 (Figures 6-8). Additionally, she provided tables comparing Alternative Plan B and 111(d)-Compliant Clean Energy scenario revenue requirements utilizing Dominion cost assumptions and NREL ATB cost data. *Id.* at 35 (Table 8) and 36 (Table 9).

<sup>56</sup> *Id.* at 36-38.

growth. She also explained that Dominion's data center load growth will increase its RPS requirements and again maintained the Company's modeling limitations on solar and battery storage deployment (as contrasted by Synapse's raising of build limits) will require payment of RPS penalties under Alternative Plan B. Furthermore, she asserted that Dominion's overstatement of renewable purchases by a unique type of buyers in its analysis resulted in an undercounting of its RPS penalty in Alternative Plan B by \$1 billion. Additionally, she maintained her modeling of a lower capital cost sensitivity for renewables, in conjunction with her increase of renewable build limits, is supported by trends she is seeing in falling renewable costs. In addition, Ms. Glick testified that a recent Federal Energy Regulatory Commission ("FERC") order approved reforms that are expected to alleviate PJM's interconnection backlog and speed up project approvals; concluded (based upon a study from the Nature Conservancy) that there is enough land in Virginia for the Company and/or data centers to build sufficient solar PV to meet their needs; provided an overview of the Section 111 Rules, the requirements of which, while not modeled by Dominion, she believes will have a large impact on the Company's existing coal and gas plants; and identified the EPA's MATS Rule and proposed Supplemental Steam Electric Effluent Limitations Guidelines and Standards rule ("Supplemental ELG Rule") as additional regulatory requirements impacting Dominion's existing resources. While recognizing that these factors highlight the uncertain and unstable nature of the current planning environment, Ms. Glick opined that more detailed analysis is needed in uncertain times.<sup>57</sup>

When providing surrebuttal at the hearing, Ms. Glick responded to the prefiled rebuttal testimony of Company witness Compton by agreeing with Staff witness Boehnlein's assessment that Dominion's NPV analysis shows certain generation units are uneconomic (and, in particular, highlighted her perceived risks associated with the continued operation of VCHEC which has a negative cash flow over the next ten years); agreeing with Mr. Compton that the next 5 and 15 years are more important to focus upon than the Study Period when planning, but suggesting Mr. Compton's near-term planning focus is inconsistent with his use of Study Period NPVs to support Dominion's continue reliance upon VCHEC; expressing confusion as to why much of the Company's modeling fundamentally does not comply with Virginia law (VCEA); supporting AEU witness Roumpani's testimony questioning the reliability of thermal resources during extreme weather; suggesting Dominion's renewable resources did not contribute more than minimally during Winter Storm Elliott because the Company does not have a high level of renewables on its system; defending her criticism of Dominion's retirement analysis; continuing to question why the Company has not considered solar and storage (with the possibility of bonus tax credits) for the Chesterfield site; defending her recommendation that Dominion update its modeling to reflect the Section 111 Rules given the significance of their impact; and expressing concern that the Company unevenly focused its analysis on quantifying and incorporating the costs of renewables without also focusing upon an evaluation of the benefits and value of battery storage and renewables.<sup>58</sup>

Ms. Glick then responded to the rebuttal testimony of Company witness Bradshaw. Specifically, she emphasized that the gathering of information relating to data centers (which Dominion has been doing for some time) is not the same thing as resource planning for data

<sup>57</sup> *Id.* at 38-48. Ms. Glick also suggested that data centers should be incentivized to invest in technologies to reduce their energy demand and should be required to procure at least some of their own renewables. *Id.* at 40.

<sup>58</sup> Tr. (Glick), at 356-365.

center load. She defended her prior contention that the Company's failure to plan earlier for data center load growth has now limited its options to meet near-term demand.<sup>59</sup>

In response to Company witness Flowers' rebuttal testimony, Ms. Glick first denied that Mr. Flowers provided a concrete justification for the build limits included in Dominion's modeling. Additionally, she maintained the Company should consider ways to build out its capabilities rather than considering new resource quantities to be fixed; suggested that Dominion is being inconsistent regarding its consideration of new technologies (for example, by not including long-duration storage in its analysis, while at the same time modeling SMRs as resource options); denied that she ever maintained solar alone can meet the Company's data center needs; acknowledged there are limitations and simplifications in the Nature Conservatory model (upon which she relied) but, nevertheless, continued to maintain there is significant land in Virginia upon which Dominion could deploy substantial solar PV; and asserted that the 2023 IRP proceeding provides an opportunity for the Commission to give guidance on what should be included in the Company's upcoming CPCN application for new CTs.<sup>60</sup>

During cross-examination by Clean Virginia, Ms. Glick suggested, when asked about the Section 111 Rules, that the Company should have known some level of federal carbon regulation would be coming when preparing the 2023 IRP and noted that carbon prices are frequently modeled in IRPs.<sup>61</sup> She also noted that long-duration battery storage is continuing to develop and that SMR technology is not in commercial use today.<sup>62</sup> Additionally, she recognized that Dominion's modeling considered the future ability of CTs to run on 100% green hydrogen and indicated that such technology is not economically in operation today.<sup>63</sup>

When questioned by Staff, Ms. Glick agreed the Section 111 Rules were proposed shortly before the 2023 IRP was filed and are not yet final.<sup>64</sup> She also acknowledged that previous comparable provisions went before the Supreme Court and never came to fruition.<sup>65</sup>

During cross-examination by the Company, Ms. Glick acknowledged an error in her comparison of fossil MW retirements contemplated by Dominion in its 2020 and in the 2023 IRP (shown on page 9 of her testimony).<sup>66</sup> She also agreed that when she optimized the modeling of Dominion's Alternative Plan B (using least-cost optimized modeling), her model, which incorporated Dominion's starting assumptions, did not economically optimize the retirement of the Clover and Mt. Storm units; however, she viewed this to be a mere starting point that did not consider the Section 111 Rules or other costs.<sup>67</sup> Ms. Glick was unsure what build limits she

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<sup>59</sup> *Id.* at 365-366.

<sup>60</sup> *Id.* at 366-371.

<sup>61</sup> *Id.* at 372-373.

<sup>62</sup> *Id.* at 374.

<sup>63</sup> *Id.* at 374-375.

<sup>64</sup> *Id.* at 376-377.

<sup>65</sup> *Id.* at 377-386. *See also id.* at 405-406 (in response to questioning from the Company regarding the preliminary status of the Section 111 Rules and the prior repeal of the Clean Power Plan).

<sup>66</sup> *Id.* at 379-382.

<sup>67</sup> *Id.* at 384-385.

included in her modeling but believed it may have been unconstrained.<sup>68</sup> She acknowledged that her model showed the Company bringing 2,400 MWs of renewables in one year and did not dispute that in 2022 only 677 MWs of renewable was brought online in the entirety of PJM.<sup>69</sup> However, Ms. Glick emphasized there have been queue issues in PJM.<sup>70</sup> She also explained that she did not claim Dominion should plan for 2,400 MWs in one year and clarified that her modeling merely showed building renewables to be economic “if you can get there.”<sup>71</sup> Furthermore, while not disputing the existence of Dominion’s rolling RFP for renewables (required by the VCEA), she suggested the IRP should also serve as a “strong communicator” of Dominion’s resource preferences to developers.<sup>72</sup>

On redirect, Ms. Glick clarified that her optimization model chose not to retire Clover and Mt. Storm because of the Company’s load forecast.<sup>73</sup>

**Dr. Shobe** began his testimony by providing an overall critique of the 2023 IRP. Specifically, he represented that he identified a number of errors, omissions, and questionable assumptions utilized in the 2023 IRP which, if corrected, could change the conclusions reached in Dominion’s analysis. While not denying that the Company was justified in planning for significant load growth associated with data centers, he suggested that Dominion utilized such load growth as cover for ceasing efforts to reduce emissions from fossil plants; misrepresenting Virginia’s withdrawal from RGGI; placing arbitrary limits on clean energy technology; and disregarding its obligation to consider the social cost of carbon in its decision making. Overall, Dr. Shobe concluded the 2023 IRP constitutes an unhelpful planning document reflecting a substantial step backward for the Company.<sup>74</sup>

The majority of Dr. Shobe’s prefiled testimony focused upon the Company’s treatment of RGGI in its planning. He noted that all of Dominion’s Alternative Plans assume Virginia’s exit from RGGI before January 1, 2024, based upon the Virginia State Air Pollution Control Board’s issuance of a Notice of Intended Regulatory Action. He testified that the Company failed to report the results of a sensitivity using a commodity forecast assuming Virginia stays in RGGI and including an associated RGGI-related cost adder on Virginia carbon-emitting generators. He also highlighted an appeal of the Virginia State Air Pollution Control Board’s decision (supporting the withdrawal) and maintained Virginia’s participation in RGGI will be uncertain for some time. Moreover, he denied that the Company’s RGGI sensitivity analysis is useful given its inclusion of inconsistent RGGI assumptions and the transition to a federal carbon price and because of the Company’s reliance upon a price forecast developed by ICF Resources, LLC

<sup>68</sup> *Id.* at 392-393. Ms. Glick also provided additional detail regarding her modeling in response to questioning by the Company. *See, e.g., id.* at 399-403 (relating to capacity import limits and the lower capital costs used in her sensitivities).

<sup>69</sup> *Id.* at 394-395.

<sup>70</sup> *Id.* at 395.

<sup>71</sup> *Id.* at 395-396.

<sup>72</sup> *Id.* 396-398. Ms. Glick was also unaware of Dominion’s specific yearly tranches of solar and storage subsequent to the VCEA’s passage and acknowledged not reviewing the Company’s various clean energy filings. *Id.* at 398-399.

<sup>73</sup> *Id.* at 407.

<sup>74</sup> Ex. 30 (Shobe Direct), at 2-3.

("ICF"), which, in his assessment, is inconsistent with current market conditions. According to Dr. Shobe:

The [2023] IRP's conception of transition to a federal carbon price is internally inconsistent. To the extent any sense can be made of the Company's assumptions, it is that CO<sub>2</sub> will be extremely cost-effective to control throughout the RGGI member states and that Virginia could purchase a glut of low-carbon electricity from RGGI at a favorable price relative to generating the electricity itself. One obvious way to accomplish this would be to allow greater importing of RECs from RGGI states. In which case – at least under the Company's RGGI price forecast – the cost of achieving its required clean energy levels would fall to levels close to those it forecasts for the other RGGI states.

Relative to energy efficiency, Dr. Shobe maintained Dominion did not appear to consider in its sensitivity analysis the effects of RGGI revenues on future electric demand and energy efficiency investment which, in his assessment, is likely to exceed \$1 billion if Virginia remains in RGGI.<sup>75</sup>

Dr. Shobe next considered Dominion's modeling of RECs. He characterized the Company's consideration of RECs in the 2023 IRP as "bad economics" given Dominion's reliance upon a fixed price series for RECs that is unresponsive to either the demand for RECs or the cost to produce them. He maintained this approach prompts the model toward irrational and imprudent action. Moreover, he maintained that the REC cost assumptions in the Company's modeling give the illusion that CO<sub>2</sub> emitting resources are more cost-effective than they actually are.<sup>76</sup>

Dr. Shobe then addressed the implications of the social cost of carbon to Dominion's 2023 IRP. He provided a definition of the social cost of carbon and identified the federal government's Interagency Working Group's most recent estimate of such cost as \$50 per ton of CO<sub>2</sub> emitted, rising at an annual rate of 2.5 to 3%. He also emphasized that Virginia law requires the social cost of carbon to be considered when evaluating an application to construct a new generating facility. He critiqued the 2023 IRP for failing to fully consider the social cost of carbon and maintained that the Interagency Working Group's estimate should be considered when evaluating the 2023 IRP, rather than the Company's federal CO<sub>2</sub> price (starting at \$3.18 in 2036, increasing to \$6.49 in 2037, and increasing to \$9.93 in 2038), because the Commission has not yet promulgated rules for determining the social cost of carbon and because, in his assessment, the Company's rates "have zero relationship with the social cost of carbon, as that term is generally understood in decision making." Dr. Shobe also recommended that the Commission require Dominion in future IRPs to "include a plan that generates the least-cost portfolio given the full social cost of carbon as a shadow price on each ton of CO<sub>2</sub> emissions."<sup>77</sup>

<sup>75</sup> *Id.* at 4-15. At the hearing, Dr. Shobe clarified that his analysis did not consider Pennsylvania to be a member of RGGI, while the Company did; noted that if Pennsylvania is in RGGI, Virginia's use of allowances would not exceed the number of allowances available; and adjusted his RGGI emission calculations on page 10 of his prefiled testimony considering Pennsylvania's inclusion. Tr. (Shobe), at 446-450.

<sup>76</sup> *Id.* at 16-20. Dr. Shobe also offered his assessment as to more reasonable ways for Dominion to model REC costs. *Id.* at 19-20.

<sup>77</sup> *Id.* at 21-25.

Lastly, Dr. Shobe suggested that an IRP's goal of providing useful information to the public, as previously recognized by the Commission, would be better realized if the Commission were to require Dominion to provide to the public, and not just case participants, the non-proprietary data underlying the graphs and charts in its IRPs.<sup>78</sup>

Dr. Shobe provided extensive surrebuttal testimony at the hearing. Specifically, when responding to the rebuttal testimony of Company witness Scheller, Dr. Shobe maintained Ms. Scheller's conclusions regarding falling RGGI demand are based upon out-of-date auction information; asserted that Ms. Scheller's Figure 1, wherein she attempted to explain ICF's forecast of a drop in RGGI allowances prices around 2026, contains numerous inaccuracies; identified an IETA market brief report (referenced in Ms. Scheller's testimony) which he maintained reflects institutional investors believe RGGI prices are likely to remain at recent levels; noted that while ICF assumed efficient markets for its capacity price forecast, it did not do so for its RGGI forecast; maintained Ms. Scheller failed to support her contention that the supply of RGGI allowances has loosened since 2022; disputed Ms. Scheller's conclusion that noncompliance investor interest in the RGGI market is falling; suggested Ms. Scheller's model fails to explain current market conditions by predicting a return to market fundamentals; suggested an ICF report dated October 8, 2018, shows ICF's longstanding inaccuracy in RGGI price forecasts; denied that he believes the RGGI market is too big to fail; clarified his belief that the RGGI market is large enough so that predictions of dramatic changes, differing from institutional investor actions, require exceptional justification; maintained Ms. Scheller's examples of rapid price drops in various emission markets support his opinions in this case; defended his testimony in this proceeding relative to his prior testimony in Pennsylvania; acknowledged that RGGI allowances and RECs are different (but also maintained that they serve the same function and are fundamentally linked); denied that Ms. Scheller actually compared her ICF forecast to national CO<sub>2</sub> allowance price forecasts; and asserted that Ms. Scheller does not seem to differentiate between a direct federal carbon tax and a federal market for carbon allowances.<sup>79</sup>

Relative to RECs, Dr. Shobe first acknowledged Ms. Scheller correctly criticized his prefiled testimony, as initially submitted and before he corrected it at the hearing, for suggesting that RECs should be part of the cost of dispatch for a fossil generator. He explained that a shadow price of carbon emissions should instead be added to the marginal cost of fossil generation for dispatch modeling and present values calculations. He also suggested that Ms. Scheller's discussion of solar REC values through 2026 is irrelevant to his testimony regarding the Company's planned payment of deficiency payments near the end of the Planning Period; emphasized that he focused on the possibility of policy shifts enabling more out-of-state REC purchases; maintained that the value of unbundled RECs and the implicit value of RECs bundled in a purchased power agreement ("PPA") must move together in the long run; and contended long-term unbundled REC prices high enough to justify a \$50-MW deficiency payment should give developers the incentive to either raise PPA prices (thereby inducing greater supply) or to unbundle RECs from PPAs, thereby bringing the price of unbundled RECs

<sup>78</sup> *Id.* at 25.

<sup>79</sup> Tr. (Shobe), at 453-480. See also Ex. 31 (RGGI auction report dated September 8, 2023); Ex. 32 (IETA market brief report); Ex. 33 (2017 ICF RGGI model); Ex. 34 (Shobe Pennsylvania testimony dated March 29, 2022).

back into equilibrium with the overall REC market. Furthermore, he suggested issues relating to labor and transformer shortages and queue difficulties cannot be expected to last 15 years.<sup>80</sup>

In response to Company witness Compton's rebuttal testimony, Dr. Shobe clarified that he takes no position on the accuracy of Dominion's demand forecast but continued to maintain the Company is using data center growth to justify the imposition of large financial and carbon emission burdens on customers. Additionally, he disagreed with Dominion's position that ICF's higher federal carbon forecast assumptions make a social cost of carbon/shadow cost of carbon adder duplicative; and maintained the shadow cost of carbon should be used in planning until an actual price reflecting the marginal value of emissions is actually charged.<sup>81</sup>

When questioned by Staff and the Hearing Examiner, Dr. Shobe maintained Virginia has profited from being a member of RGGI by having the ability to buy allowances from the rest of RGGI to achieve "compliance."<sup>82</sup> While initially appearing to refer to RGGI compliance, Dr. Shobe subsequently suggested RGGI membership would reduce the costs of compliance with various Virginia CO<sub>2</sub> reduction requirements.<sup>83</sup> When asked about the total of \$304 million from one quarterly RGGI auction in September 2023 that an auction report indicated was available for reinvestment, Dr. Shobe did not deny that Virginia customers paid approximately a quarter of this amount.<sup>84</sup>

During cross-examination by Dominion, Dr. Shobe acknowledged the September 2023 RGGI auction (referenced in Exhibit 31) occurred after the Company filed the 2023 IRP and confirmed that his RGGI price forecast applied to Dominion's plan sensitivity analyses.<sup>85</sup> Regarding the social cost of carbon, he cautioned against necessarily relying upon the cost ultimately agreed to by the Biden administration's Interagency Working Group, particularly with respect to localized estimates, and maintained "we [should] wait and see the outcome of the peer review of that process."<sup>86</sup> Additionally, he disagreed with Staff to the extent Staff recommended in the Company 2022 RPS Development Plan case (Case No. PUR-2022-00124) to exclude social cost of carbon/shadow cost of carbon from the Company's modeling analysis.<sup>87</sup>

On redirect examination, Dr. Shobe again maintained RGGI offers Virginia flexibility in achieving the reduction of carbon emissions sought by the General Assembly and clarified that the June 2023 RGGI auction produced numbers that are generally consistent with those from September 2023.<sup>88</sup> Additionally, he maintained Dominion's consideration of RGGI in a sensitivity lacks meaning in the planning process and confirmed his understanding that the

<sup>80</sup> Tr. (Shobe), at 480-486.

<sup>81</sup> *Id.* at 486-490. Dr. Shobe also identified resources that the Company could utilize in appropriately understanding the utilization of the social cost of carbon in planning. *Id.* at 491-492.

<sup>82</sup> *Id.* at 494-495.

<sup>83</sup> *Id.* at 495-496.

<sup>84</sup> *Id.* at 498-499. *See also* Ex. 31 (RGGI auction report dated September 8, 2023). Dr. Shobe testified that he would have to calculate the exact amount that Virginia customers paid in the associated RGGI auction. Tr. (Shobe), at 499.

<sup>85</sup> *Id.* at 500-501.

<sup>86</sup> *Id.* at 501-502.

<sup>87</sup> *Id.* at 503-504.

<sup>88</sup> *Id.* at 505-506.

Commission directed the Company to model Virginia in and out of RGGL.<sup>89</sup> Furthermore, he clarified that his reference to an EPRI report in his prefiled testimony related to how the social cost of carbon determined in the Biden administration's task force should be incorporated in the analysis.<sup>90</sup> Moreover, he interpreted language in this Commission's Order relating to Dominion's *2022 RPS Order*<sup>91</sup> as allowing the consideration of a carbon shadow price in alternate scenarios, something which the Company did not do in the 2023 IRP.<sup>92</sup>

### *Clean Virginia*

Clean Virginia presented the testimony of **Bryndis Woods, PhD**, Senior Researcher with the Applied Economics Clinic, a non-profit consulting group.<sup>93</sup>

**Dr. Woods** highlighted her perceived failures of the Company to meet basic VCEA requirements, present useful modeling results, account for federal regulatory requirements and the social cost of carbon, and to address the environmental justice repercussions of its 2023 IRP or to conduct meaningful stakeholder involvement in the 2023 IRP's development. She also highlighted the key provisions of the VCEA and concluded the 2023 IRP is not reasonable or in the public interest.<sup>94</sup>

Dr. Woods first discussed her conclusion that the Company failed to address environmental justice issues in its 2023 IRP despite being ordered to do so in the *2020 IRP Order*. While Dr. Woods acknowledged that Dominion included a section in the 2023 IRP describing its approach to environmental justice (Section 9.1), she emphasized that the Company failed to provide details regarding its environmental justice review process. Additionally, she maintained the Company's failure to address the environmental justice impacts of its resource planning decisions results in a lack of information for consideration by the public and the Commission when evaluating the community impacts of Dominion's planning. She then specified types of information she believes should be included in the Company's IRPs, and the actions she believes the Commission should direct Dominion to undertake in connection with its resource planning concerning environmental justice.<sup>95</sup>

Second, Dr. Woods asserted that Dominion failed to identify a feasible least-cost plan or preferred plan and contended the Alternative Plans proffered by the Company are too similar to provide a meaningful comparison of future resource pathway options. She interpreted the Commission's *2020 IRP Order* as requiring the Company to provide a least-cost plan compliant

<sup>89</sup> *Id.* at 506-507.

<sup>90</sup> *Id.* at 507-508.

<sup>91</sup> *Petition of Virginia Electric and Power Company, For approval of its 2022 RPS Development Plan under § 56-585.5 D 4 of the Code of Virginia and related requests*, Case No. PUR-2022-00124, Final Order (April 14, 2023) ("*2022 RPS Order*").

<sup>92</sup> Tr. (Shobe), at 508-511.

<sup>93</sup> Ex. 21 and 21C (Woods Direct).

<sup>94</sup> Ex. 21 and 21C (Woods Direct), at 5-7. On page 7 of her direct testimony, Dr. Woods first specified her reasons for concluding the 2023 IRP is not reasonable or in the public interest. Those reasons are identified and discussed in this Report's summary of her testimony.

<sup>95</sup> *Id.* at 9-10. On page 10 of her prefiled testimony, Dr. Woods detailed her recommendations regarding IRP/environmental justice considerations.



with carbon regulations and the VCEA's RPS Program requirements; denied that Dominion provided such a plan with the 2023 IRP; and noted that while Alternative Plan A complies with the RPS Program requirements (with a NPV cost of \$109.7 billion), it does not comply with the carbon reduction requirements of the VCEA which mandate Dominion's retirement of all carbon-emitting units by 2045. She also noted that Alternative Plan A increases CO<sub>2</sub> over time and has the highest CO<sub>2</sub> emissions of any of the Alternative Plans proposed by the Company. Moreover, she emphasized that the Company did not identify Alternative Plan A as a "true alternative path forward." In her assessment, Dominion could have used its least-cost plan to develop a true path forward by correcting and fine-tuning its assumptions and modeling choices. Furthermore, Dr. Woods emphasized that the Company did not identify a preferred plan. While acknowledging the Company was not required to do so, she asserted that it is common industry practice for utilities to identify preferred plans (usually constituting least-cost plans meeting public policy mandates and objectives). She maintained the failure to identify a least-cost plan and preferred plan will result in unnecessary costs to ratepayers and the Company's inability to meet the requirements of the VCEA. Additionally, she critiqued the 2023 IRP's Short-Term Action Plan for only including one specific generation capacity resource addition (970 MWs of new gas-fired CTs) and contended the similarity of the Alternative Plans with regard to resource additions (which she depicted in her Table 1) results in a "myopic view" of potential resource pathways. In sum, she concluded the Company failed to provide sufficient information for finding that the 2023 IRP is reasonable and in the public interest given Dominion's failure to identify a preferred plan, a feasible least-cost plan, meaningfully distinct Alternative Plans, or the costs of its Short-Term Action Plan.<sup>96</sup>

Third, Dr. Woods concluded that Dominion fails to account for uncertainties related to PJM's load forecast. In support of this assessment, she described how load forecasts are used in IRP modeling, noted that the Commission requires Dominion to utilize PJM load and energy forecasts in its IRP modeling, and provided a general overview of historical changes in PJM's load forecasts for the DOM Zone. Among other things, she acknowledged that the increase to PJM's forecast for 2033 (from 20,799 MWs predicted in 2019 to 32,276 MWs predicted in 2023) relates to the prediction that new data centers will open in Virginia. She also reasoned, based on the Company's discovery responses, that each of ten data centers accounts for 8% (800 MWs) of the total data center load (10,000 MWs) forecasted for 2038. Furthermore, while acknowledging that Dominion included a sensitivity representing an adjusted PJM load forecast in the 2023 IRP which increases and decreases the PJM load forecast for Alternative Plan B by 5%, Dr. Woods denied that such analysis adequately accounts for uncertainties related to the forecast because, in her assessment, the sensitivity is too narrow. According to Dr. Woods, overestimating peak load in the 2023 IRP could result in overbuilding or over-purchasing generation capacity causing overcharges. Conversely, she understood underestimating peak load could result in underbuilding or under-purchasing capacity with negative impacts on reliability. Moreover, she emphasized the importance of Dominion's modeling to other filings, including those related to RPS, RGGI, and DSM, and argued stakeholders and third parties should be given the opportunity to provide input on the load forecast.<sup>97</sup>

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<sup>96</sup> *Id.* at 11-17.

<sup>97</sup> *Id.* at 17-20.

Fourth, Dr. Woods concluded that Dominion's adjustment to PJM's annual energy demand forecast is based on unreasonable assumptions regarding energy efficiency. In support of this assessment, she first explained, based on a Company discovery response, that Dominion adjusted PJM's annual energy demand forecast by subtracting data centers from the forecast, reducing the remaining PJM DOM Zone forecast down to just represent the DOM Load Serving Entity ("LSE"), adding data center energy back in and adjusting for retail choice, and then subtracting non-data center retail choice and energy efficiency. She noted that while such adjustments assume the Company will meet the VCEA's energy efficiency requirements through the end of 2025, Dominion's most recent energy efficiency (DSM) case does not reflect the Company is on track to meet the VCEA energy efficiency requirements through the end of 2025. Moreover, she explained that Dominion contemplates a 5% energy savings target for 2026 and beyond, thereby also assuming that the Commission will leave energy efficiency targets at 2025 levels when it ultimately complies with the VCEA by setting new energy efficiency standards for 2026 through 2028. Additionally, she questioned Dominion's energy efficiency forecast which assumes a dramatic drop in annual incremental energy savings (from 995.5 gigawatt-hours ("GWh") in 2025 to 97.0 GWh in 2026). Among other things, she noted that the Company's forecasted incremental energy efficiency savings range for 2026 through 2048 equates to 0.1% or less of its 2019 total sales, as compared to the target ranges of other states which are from 1% to 3%. She also provided adjustments to the Company's annual energy demand forecast based upon the inclusion 1%, 2%, or 3% energy savings targets and maintained that Dominion's incorporation of more realistic energy efficiency assumptions into its IRP planning would allow Dominion to avoid unnecessary capacity purchases and potentially avoid the need for new gas-fired peaker plants.<sup>98</sup>

Fifth, Dr. Woods concluded the Company's Alternative Plans fail to build enough renewable energy and energy storage capacity to meet its VCEA obligations. She summarized Dominion's solar and onshore wind capacity development, offshore wind and energy storage capacity development, and RPS requirements under the VCEA and highlighted the Company's representation that Alternative Plan A complies with the VCEA's RPS mandates and Alternative Plan B complies with the solar, wind, and energy storage capacity development requirements of the VCEA. Based upon Dominion's discovery responses, Dr. Woods detailed how, in her assessment, Alternative Plan B does not build sufficient Company-owned capacity to meet the VCEA's renewable energy and energy storage development targets for solar and onshore by the dates specified in the VCEA. She also highlighted the limits placed by the Company in its modeling regarding the buildout of onshore wind and maintained such limits negatively impact the ability of the Alternative Plans to meet VCEA targets. She described the negative repercussions of Dominion's failure to provide Alternative Plans complying with the VCEA's renewable energy mandates and asserted that the Commission should not find the 2023 IRP to be reasonable and in the public interest because of such failure.<sup>99</sup>

Sixth, Dr. Woods concluded the Alternative Plans would increase the Company's greenhouse gas emissions through the mid-2040s, thereby conflicting with her assessment of the

<sup>98</sup> *Id.* at 20-28.

<sup>99</sup> *Id.* at 28-34. On page 31 of her prefiled testimony, Dr. Woods identified specific VCEA targets for renewable energy and energy storage to be achieved by 2027, 2030, 2032, and 2035 and detailed information provided by the Company in discovery which, in her view, indicates such targets are not met through Alternative Plan B.

VCEA's obligations (requiring the retirement of carbon-emitting units by December 31, 2045). Among other things, she noted that the 2023 IRP shows the Company's greenhouse gas emissions actually increasing despite representations on Dominion's website regarding its commitment to net zero emissions by 2050. She compared the CO<sub>2</sub> emissions of the various Alternative Plans, noted that Alternative Plans A through C reflect steadily increasing CO<sub>2</sub> emissions from 2031 and continuing, and recognized that Alternative Plans D and E reflect emission reductions over the forecast period (through the end of 2048). She disputed Dominion's assertion that Alternative Plans D and E comply with its requirement for the retirement of carbon-emitting units by 2045 because they both include 970 MWs of gas-fired capacity beyond 2045. Moreover, she disputed the Company's assumption that 970 MWs of capacity in Alternative Plans D and E can be interpreted as having zero emissions based upon Dominion's expectation that such capacity will be hydrogen capable by 2045. Among other things, she denied that the Company considered in its analysis other costs associated with running a gas-fired CT plant on hydrogen fuel; explained that not all hydrogen fuel is carbon emission free; emphasized that Dominion failed to specify the types of hydrogen it would produce or procure as part of Alternative Plans D or E; explained that while the Company has assessed the feasibility of converting a gas-fired CT to running on 100% hydrogen, Dominion's design has not yet progressed far enough to determine a necessary percentage of hydrogen blending; highlighted complexities associated with obtaining the necessary hydrogen blending for rendering a gas-fired power plant emission free; noted that no power plants in the United States currently run on 100% hydrogen fuel; denied that a converted CT operating on 100% hydrogen would necessarily produce zero emissions (and be consistent with the VCEA) given varying hydrogen types and nitrogen oxide ("NO<sub>x</sub>") emissions; and highlighted the potential for hydrogen leaks. She also maintained that Dominion failed to produce sufficient evidence that hydrogen conversion of the planned 970 MW gas-fired units can and will occur. Additionally, she criticized the Company's modeling of Alternative Plans D and E for contemplating 98% of planned retirements over the seven-year period immediately preceding the VCEA mandatory retirement deadline (thereby disadvantaging renewable energy and storage resources for replacement purposes); explained how Alternative Plans D and E are not meaningfully distinct from one another; and ultimately concluded, based on the Company's description of its Alternative Plans, that none of the Alternative Plans comply with all of the VCEA's requirements.<sup>100</sup>

Seventh, Dr. Woods concluded the 2023 IRP fails to adequately capture regulatory impacts on the Company's coal units or the cost risks of emitting CO<sub>2</sub>. According to Dr. Woods, Dominion takes a short-sighted and unrealistic approach when evaluating its coal fleet by ignoring certain risks associated with the keeping the plants online. She also highlighted the EPA's final Good Neighbor Plan/ozone Rules ("GNP Rules"), which address up- and down-wind polluters, and the proposed EPA Section 111 Rules. She indicated these rules would impact the Company's fuel units and explained that Dominion did not address the risks of these rules in the 2023 IRP. Moreover, she highlighted the Company's failure to model the social cost of carbon in the 2023 IRP, despite doing so in previous years.<sup>101</sup>

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<sup>100</sup> *Id.* at 34-46.

<sup>101</sup> *Id.* at 46-50.

Eighth, Dr. Woods maintained that Dominion failed to conduct stakeholder engagement as part of the 2023 IRP, despite her understanding that the Company was required to do so pursuant to § 56-599 D of the Code. She also indicated that the stakeholder engagement process is common practice elsewhere in the country. She characterized as insufficient Dominion's receipt of stakeholder input from other cases (IRP and RPS proceedings) because, in her view, these proceedings fail to provide stakeholders with an opportunity to make inquiries of the Company as it formulates its IRP or to provide feedback during the IRP's formulation. She then outlined her perception of the benefits of a stakeholder engagement process, maintained such a process helps to ensure the development of IRPs that are reasonable and in the public interest, summarized her assessment of stakeholder engagement best practices, and made recommendations for the Company's structuring of a stakeholder process to obtain timely input in the development of Dominion's next IRP.<sup>102</sup>

In the concluding section of her prefiled testimony, Dr. Woods summarized her recommendations to the Commission as follows:<sup>103</sup>

1. Regarding environmental justice, she recommended the Commission require that Dominion's IRPs: (i) consider the impact of unit retirement decisions on environmental justice communities or fenceline communities; (ii) present how the Company identifies potential environmental justice issues, including screening metrics; (iii) conduct engagement with communities affected by potential environmental justice issues, and report on those efforts; (iv) assess and present community-level health, environmental, and economic impacts from planned resource additions, retirements, or lack of retirements; (v) assess and present the changes in air quality or water quality anticipated from resource decisions within Dominion's service territory; (vi) assess and present how energy costs impact different communities within Dominion's service territory differently; (vii) include Alternative Plans that directly address environmental justice issues, such as by siting distributed energy resources in environmental justice communities or by prioritizing fossil fuel-fired generation retirements in environmental justice communities; and (viii) specify how energy efficiency, demand response, and distributed energy resource programs are being targeted towards underserved and vulnerable environmental justice community households, such as by offering income-or disability-qualified benefits, or by targeting program dollars at specific communities.
2. She recommended that the Commission not conclude the 2023 IRP is reasonable or in the public interest because it fails to identify a preferred plan, present a feasible least-cost plan, or provide meaningfully distinct Alternative Plans as required by the *2020 IRP Order*.
3. Given the degree to which the PJM's load forecast influences the Company's IRP results, she recommended that the Commission establish a load forecasting working group led by the Commission and include a broad range of representatives.

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<sup>102</sup> *Id.* at 50-56.

<sup>103</sup> *Id.* at 56-58.

4. She recommended that the Commission require Dominion to assume new, increasing energy efficiency requirements in every three-year period after 2023-2025.
5. Regarding Dominion's planned renewable energy and energy storage capacity in the Alternative Plans, she recommended that the Commission: (i) not find the 2023 IRP to be reasonable and in the public interest because the Company failed to meet basic requirements of the VCEA; and (ii) require Dominion to construct each Alternative Plan so that it meets VCEA-mandated solar, onshore wind, and energy storage capacity requirements by the dates specified in the VCEA.
6. Regarding Alternative Plans D and E, which the Company contends comply with the VCEA's 2045 retirement requirement, she recommended that the Commission: (i) not find the 2023 IRP to be reasonable and in the public interest even if the new planned 970 MW CT plant is assumed to be hydrogen capable by 2045; (ii) require the Company to construct each Alternative Plan to provide for the retirement of all biogenic and non-biogenic carbon-emitting resources by the end of 2045, with such retirements occurring at a steady pace from 2025 to 2045; and (iii) require the Company to construct each Alternative Plan to meet all of its obligations under the VCEA (including RPS, solar, onshore wind, energy storage capacity, and retirements in the amounts and by the dates prescribed by the VCEA).
7. Regarding potential regulatory impacts on the Company's coal units and costs of emitting CO<sub>2</sub>, she recommended that the Commission: (i) not find the 2023 IRP to be reasonable and in the public interest because Dominion chose to ignore EPA rules (the GNP Rules) and proposed rules (Section 111 Rules) and the federal cost of carbon; and (ii) direct Dominion to assess compliance costs associated with the GNP Rules and the Section 111 Rules and model a social cost of carbon that is in line with the EPA's most recent price.
8. Regarding stakeholder engagement, she recommended that the Commission: (i) order Dominion to commence stakeholder meetings as soon as possible for its next IRP; (ii) clearly communicate the information, materials, and data that the Company must make available to stakeholders (including, but not limited to, inputs and outputs, modeling assumptions, Company workpapers, Alternative Plans, sensitivity analyses, and load and energy forecasts); and (iii) provide clear guidance to Dominion on matters such as the minimum number of stakeholder meetings that must be held, types of meeting options and services that should be offered (in-person and remote, with translation and interpretation services being provided), and stakeholder participant types.

#### *Appalachian Voices*

Appalachian Voices presented the testimony of **Justin Schott**, Director of the Energy Equity Project and Lecturer of Energy Justice with the University of Michigan's School for Environment and Sustainability; **James F. Wilson**, an economist and independent consultant with Wilson Energy Economics; and **Gregory Abbott**, an independent energy consultant.

Mr. Schott provided an environmental justice review of the 2023 IRP. Among other things, he concluded Dominion did not meet the “fair treatment” and “meaningful involvement” requirements of the Virginia Environmental Justice Act (“VEJA”)<sup>104</sup> or adequately respond to prior Commission environmental justice directives in connection with its 2023 IRP. He also presented an energy framework that he believes can be employed to satisfy environmental justice objectives and analyzed energy insecurity and disproportionate impacts to environmental justice communities. Furthermore, he offered recommendations for rectifying his perceived environmental justice infirmities in the 2023 IRP.<sup>105</sup>

Mr. Schott first summarized his assessment of the environmental justice requirements applicable to the 2023 IRP. He noted that in Dominion’s *2020 IRP Order* the Commission directed the Company to address environmental justice concerns in its IRPs going forward. Despite this directive, Mr. Schott concluded the Company failed to meaningfully address environmental justice concerns in the 2023 IRP but, instead, appears to believe environmental justice should only apply to resource siting and not to planning. In Mr. Schott’s opinion, it is important to address, and to provide meaningful opportunities for the involvement of environmental justice communities involving, environmental justice concerns in the planning stage. He also offered certain “high-level” recommendations for Dominion’s compliance with the *2020 IRP Order* with regard to ensuring fair treatment and meaningful treatment, including: (i) compiling and maintaining a list of all environmental justice and fenceline communities as defined in the VEJA; (ii) establishing metrics to protect environmental justice communities from disproportionate burdens of the energy system; (iii) establishing metrics to ensure environmental justice communities receive an equitable share of benefits, including energy savings from DSM programs, job and business opportunities in clean energy projects, and wealth-building opportunities through programs encouraging distributed generation ownership and storage benefits; (iv) conducting listening sessions for residents in environmental justice communities; (v) ensuring input from community listening sessions is submitted so it becomes part of the record; and (vi) defining how the voices of those in environmental justice communities can shape the full cycle of the decision-making process.<sup>106</sup>

Mr. Schott next provided his assessment of harms impacting environmental justice communities in Dominion’s service territory. He began his discussion of this issue by addressing the concept of “energy justice” (which he characterized as a subset of “environmental justice”) and explaining that energy justice involves the sharing of benefits and burdens associated with the production and consumption of energy. He suggested energy justice concerns should be considered when evaluating Dominion’s approach toward environmental justice. He also highlighted energy insecurity, disproportionate exposures to urban heat islands, and disconnections as ways that Dominion’s customers experience energy injustice. Additionally, he provided Virginia-specific data relative to households experiencing energy insecurity (including information relative to income and race) and discussed dangers associated with energy insecurity. Furthermore, he discussed energy burden disparities (relative to the percentage of gross income that households spend on heating and electricity) in Virginia and in

<sup>104</sup> See §§ 2.2-234 *et seq.* of the Code.

<sup>105</sup> Ex. 11 (Schott Direct), at 6.

<sup>106</sup> *Id.* at 7-12.

Dominion's service territory. Among other things, he concluded, based upon his review of census tract data, that a number of census tracts in the Company's territory have more than 1,000 households with energy burdens greater than 10%, thereby warranting, in his assessment, priority consideration for DSM programs and access to distributed generation and storage. Moreover, he identified energy burden disparities by race (again, based upon census tract data) in Dominion's territory and maintained such disparities warranted consideration in the 2023 IRP. Regarding urban heat islands, he emphasized that Richmond faces severe heat wave risks, emphasized that the U.S. Department of Housing and Urban Development does not cover the cost of air conditioning upgrades, and highlighted the relationship between historically redlined communities and disproportionate exposure to extreme heat. As to disconnections, Mr. Schott noted there were more electric disconnections by investor-owned utilities in Virginia than in any other state except Illinois and indicated that Dominion was responsible for most of these disconnections in Virginia.<sup>107</sup>

Next, Mr. Schott evaluated the Company's approach to environmental justice. He noted that when discussing environmental justice in the 2023 IRP, Dominion acknowledged statutory environmental justice provisions. However, while Mr. Schott did not dispute the Company's characterization of the VEJA's requirements, he concluded, based upon his interpretation of the Company's overall representations, that Dominion did not specifically consider the tenets of energy justice in the 2023 IRP. Similarly, Mr. Schott concluded based upon the Company's discovery responses that Dominion lacks a concrete strategy for defining or evaluating environmental justice. He also opined that Dominion's environmental justice approach is too narrow because the Company interprets the VEJA as supporting a case-by-case evaluation of environmental justice concerns rather than an evaluation of environmental justice in the planning process. He further critiqued the 2023 IRP's approach toward environmental justice by highlighting Dominion's failure to: (i) conduct community engagement activities relative to the 2023 IRP; (ii) lay a foundation for how environmental justice will be considered in Dominion's integration analysis; (iii) include in the DSM section any indication that environmental justice is considered in the DSM planning process; and (iv) address fair treatment for residents in environmental justice communities. Additionally, based on the Company's discovery responses, Mr. Schott concluded Dominion lacks: (i) a definition of environmental justice and disproportionate impacts; (ii) a list of environmental justice communities in its service territory; (iii) metrics for tracking environmental justice impacts or conducting environmental justice evaluations; and (iv) guidance on how contractors should apply concepts of fair treatment and meaningful involvement.<sup>108</sup>

Mr. Schott then discussed the Energy Equity Framework, a tool that is used by some utility commissions, policymakers, and others to engage environmental justice communities in the establishment of quantitative targets, accountability metrics, and qualitative best practices. He testified that the Energy Equity Framework can be applied to integrated resources planning by offering templates for energy planning and decision making, identifying equity considerations

<sup>107</sup> *Id.* at 13-25. Later in his testimony, Mr. Schott maintained there is a connection between Dominion's poor energy efficiency performance and the number of disconnections in its service territory. *Id.* at 45-46.

<sup>108</sup> *Id.* at 26-31.

for specific audiences, and providing open-source tools and data sets that can be used for analysis and community engagement.<sup>109</sup>

Mr. Schott next analyzed the 2023 IRP utilizing four energy justice principles: recognition justice, procedural justice, distributive justice, and restorative justice. Regarding recognition justice, he expressed concern that Dominion has failed to identify communities deserving environmental justice consideration because of injustices such as pollution and energy inefficient housing. Regarding procedural justice, he criticized the Company for failing to conduct community engagement activities associated with the 2023 IRP's development. Concerning distributive justice, Mr. Schott criticized Dominion for failing to make its DSM programs more ambitious and targeted to benefit environmental justice communities. Relative to restorative justice, Mr. Schott expressed concern regarding the Company's failure to offer a remedy to energy injustices (such as disproportionate exposure to extreme heat, lack of access to clean energy jobs, high levels of disconnections and energy insecurity in low-income communities and communities of color) in the 2023 IRP. In particular, he criticized Dominion for failing to adequately consider how climate change impacts could affect its customers and energy needs in its integrated resource planning.<sup>110</sup>

In the concluding section of his prefiled testimony, Mr. Schott urged the Commission to reject the 2023 IRP, require Dominion to take corrective steps relative to the 2023 IRP, and establish accountability mechanisms requiring the Company's integration of environmental justice procedures into its planning before an IRP can be approved. In the alternative, if the Commission decides to approve the 2023 IRP, he recommended that the Commission not consider any of the 2023 IRP's analyses or targets when evaluating specific RPS proposals or any request for a CPCN. Additionally, he provided a detailed list of recommendations, geared toward achieving fair treatment and meaningful involvement, for requirements associated with the Company's future IRP filings.<sup>111</sup>

At the hearing, Mr. Schott provided extensive surrebuttal responding to the testimony of Staff witness Glattfelder and the rebuttal testimony of Company witness MacCormick concerning environmental justice. Among other things, Mr. Schott disputed Staff witness Glattfelder's conclusion that Dominion appropriately considered environmental justice in the 2023 IRP; suggested Staff's lack of experience may have impacted such conclusion; maintained Staff incorrectly concluded an environmental justice evaluation requires consideration of site-specific impacts; concluded Staff appeared not to consult the resources he cited in his prefiled testimony; and argued language in the *2020 IRP Order* reflects that the Commission intended the

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<sup>109</sup> *Id.* at 32-33.

<sup>110</sup> *Id.* at 33-52. Mr. Schott also criticized Dominion's overall approach to DSM and energy efficiency in the 2023 IRP, among other things, maintaining that the Company's DSM's assumptions about the cost-effective potential of DSM programs fail to align with other expert evaluations (such as those provided by NREL). *Id.* at 39-41. Additionally, he maintained Dominion's Income and Age Qualifying DSM program yields disproportionately low benefits to vulnerable, low-income customers. *Id.* at 42. Moreover, he expressed concern regarding the Company's plans to address increasing data center load with new supply generation and criticized the Company for failing to pursue significant data center DSM programs. *Id.* at 46-47.

<sup>111</sup> *Id.* at 52-54.



Company to consider more than site-specific impacts when addressing environmental justice in IRPs.<sup>112</sup>

Relative to Company witness MacCormick's rebuttal testimony, Mr. Schott maintained Ms. MacCormick essentially acknowledged more than a site-specific analysis of environmental justice is required when she identified Dominion's overall environmental justice approach.<sup>113</sup> Additionally, he disagreed with Ms. MacCormick's characterization of his prefiled testimony (in particular, with respect to fenceline community impacts and his recommendations for the consideration of health and well-being factors); asserted that Ms. MacCormick failed to contest his conclusions regarding material and disproportionate impacts; contended Dominion appears not to have adjusted its initial environmental justice policy, implemented in 2018, to respond to the VCEA and the *2020 IRP Order*; criticized the Company's IRP development procedure for failing to include outreach and listening; asserted that Dominion's environmental policy/approach fails to include sufficient detail; and contended Dominion's site-specific approach is contrary to guidance from the EPA or industry best practices.<sup>114</sup> Among other things, he stated: "I think every environmental justice advocate that I know [of] from experience would say engagement has to begin in the planning phase."<sup>115</sup>

When cross-examined by Staff, Mr. Schott acknowledged that the *2020 IRP Order* directed the Company to consider environmental justice in CPCN cases but maintained the order also indicated environmental justice should be addressed in IRPs; admitted he was unaware of whether environmental justice has been considered in CPCN cases subsequent to the *2020 IRP Order*; and acknowledged the Commission has not prevented environmental justice communities from participating in the 2023 IRP case.<sup>116</sup>

Mr. Schott also responded to a series of questions from the Company at the hearing. Among other things, he suggested documentation cited in a Dominion discovery response as guidance consulted by the Company does not mandate only site-specific evaluations of environmental justice; acknowledged that there was an opportunity for members of the public to file written comments in connection with the 2023 IRP but maintained this opportunity was not provided by the Company; and suggested that public witness testimony regarding the 2023 IRP is not "evidentiary."<sup>117</sup>

On redirect, Mr. Schott confirmed his understanding that the Commission ultimately has the discretion to determine if the Company adequately addressed environmental justice in the 2023 IRP.<sup>118</sup>

**Mr. Wilson** evaluated the forecasts of peak loads and total resource requirements included in the 2023 IRP and provided associated recommendations. By way of summary, he:

<sup>112</sup> Tr. (Schott), at 176-179.

<sup>113</sup> *Id.* at 180.

<sup>114</sup> *Id.* at 181-194.

<sup>115</sup> *Id.* at 194.

<sup>116</sup> *Id.* at 196-200. Additionally, Mr. Schott did not dispute that Staff's testimony was filed about two weeks after he filed his testimony. *Id.* at 199-200.

<sup>117</sup> *Id.* at 200-211. See also Ex. 12 (Dominion response to AV 19-1).

<sup>118</sup> Tr. (Schott), at 212.

1. Concluded the DOM Zone peak load forecast for all customers other than data centers used in the 2023 IRP, which is based upon PJM's 2023 DOM Zone summer peak load forecast, falls within a range of reasonableness.<sup>119</sup>
2. Recognized that while Dominion utilized a historical average to estimate the DOM LSE portion of the DOM Zone forecast for customers other than data centers, it ignores the downward trend in the associated DOM LSE forecast.<sup>120</sup>
3. Concluded that while the Company's recent near-term data center forecasts have been fairly accurate, the lack of communication and coordination between PJM and utilities relative to sharing forecasts may have led to substantial double-counting of near-term data center loads.<sup>121</sup>
4. Emphasized the difficulty associated with forecasting longer-term data center demand and recognized that while Dominion previously hired Quanta Technologies to prepare studies and forecasts of data centers, neither the Company nor PJM has actually hired an outside consultant to perform such a study or to conduct the type of forward-looking research that it would require.<sup>122</sup>
5. Concluded the longer-term data center forecast used in the 2023 IRP is not supported by firm evidence, market studies, or a reasonable forecasting approach; is highly speculative; and likely double-counts some anticipated data center loads; and maintained appropriate scenarios for sound planning will not be available until data center load growth is studied by qualified professional forecasters.<sup>123</sup>
6. Criticized Dominion's method for determining its total capacity requirements and the capacity gap for utilizing an installed capacity ("ICAP") reserve margin rather than following PJM's approach using a Forecast Pool Requirement ("FPR") but ultimately concluded this error is likely small as compared to the large uncertainty associated with the data center forecast.<sup>124</sup>
7. Prepared an alternative long-term data center forecast by updating the Bass Diffusion Model data center forecasting approach (supported by the Company in connection with its 2018 and 2020 IRPs) and utilizing historical data, thereby providing what he believes to be a more "grounded" forecast than the 2023 IRP's forecast that was prepared using polynomial equations.<sup>125</sup>

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<sup>119</sup> Ex. 13 (Wilson Direct), at 4, 18.

<sup>120</sup> *Id.* at 4, 20-21.

<sup>121</sup> *Id.* at 5, 27.

<sup>122</sup> *Id.* at 5-6, 45-47.

<sup>123</sup> *Id.* at 6-7, 35-36.

<sup>124</sup> *Id.* at 7, 21-23.

<sup>125</sup> *Id.* at 8, 37-40.

8. Presented an alternative load forecast, capacity requirements, and capacity gap calculations reflected in the following table:<sup>126</sup>

<b>Table 1: Capacity Gap Calculations from the 2023 Plan and with Alternative Data Center Forecast (Summer, Plan B)</b>								
Row		2024	2026	2028	2030	2032	2034	2036
1	Capacity Gap including All New Builds – 2023 Plan	(1,019)	(1,496)	(83)	(788)	(1,707)	(1,847)	(1,956)
2	Capacity Gap including only Approved New Builds – 2023 Plan	(1,019)	(1,496)	(1,682)	(3,033)	(4,563)	(6,481)	(8,622)
3	DOM LSE data center forecast used in 2023 Plan	3,857	4,913	5,744	6,794	8,173	9,869	11,875
4	Alternative forecast based on Bass Diffusion Model	3,857	4,873	5,656	6,173	6,478	6,648	6,738
5	Change in load forecast	0.49	(40)	(88)	(621)	(1,694)	(3,221)	(5,137)
6	Change in capacity req't (change in forecast + 14.7% reserve)	0.56	(46)	(101)	(712)	(1,943)	(3,695)	(5,892)
7	Capacity Gap including All New Builds, alternative forecast	(1,019)	(1,542)	18	(76)	236	1,848	3,936
8	Capacity Gap, only Approved New Builds, alternative forecast	(1,019)	(1,542)	(1,581)	(2,321)	(2,620)	(2,786)	(2,730)
Sources: Response to Data Requests Staff 1-52; APV 5-4; APV 12-3ab.								

9. Concluded the Company's high and low data center forecasts present a very narrow and arbitrary range around the base forecast (the uncertainty of which is understated) and maintained the +/- 5% sensitivity performed by Dominion gives a false sense of confidence regarding the Company's planning conclusions because, in his assessment, this sensitivity understates the range of uncertainty of the load forecast.<sup>127</sup>
10. Maintained that data centers do not rely upon the Company for the reliability of their electric supply, thereby making any Company plans for reserve capacity to provide resource adequacy for data centers somewhat duplicative, and emphasized the ability of large data center companies to shift between regions the schedule for the construction of data centers.<sup>128</sup>
11. Recommended that the Commission request PJM, and require the Company to request PJM, to commission a qualified outside firm to prepare a detailed study and set of scenarios of future data center loads in the PJM footprint, including detail by zone and addressing electrification and any other major uncertainties about future loads; or, in the alternative (if PJM declines to perform this task), that the Commission direct Dominion to commission the study; and recommended that the Commission put the Company on notice that customers will be held harmless from costs and risks associated with investments made based upon speculative forecasts of data center growth beyond Dominion's 2022-2027 projections.<sup>129</sup>

<sup>126</sup> *Id.* at 8-9.

<sup>127</sup> *Id.* at 9, 49.

<sup>128</sup> *Id.* at 9-10, 42-45.

<sup>129</sup> *Id.* at 10-11, 49.

12. Recommended relative to load forecasting for IRPs that the Commission require the Company to: (i) present weather-normalized historical peak loads for the DOM Zone and/or DOM LSE (either prepared by the Company or PJM), and discuss recent trends in weather-normalized peak loads; and (ii) relative to Dominion's preparation of its own longer-term data center forecasts, that such forecasts (a) be supported by forward-looking analysis not solely relying upon formulaic projections of historical trends, (b) use the Bass Diffusion Model S-shaped curve for most data center customer group projections (to limit the amount of unsupported long-run demand growth included in the forecast), (c) consider treating the first years of the forecast period as historical data in the regressions, and (d) include the preparation of higher and lower long-term load forecast scenarios (capturing a reasonable range of future loads informed by in-depth market analysis) to reflect uncertainties about the pace of economic growth and other load forecast drivers.<sup>130</sup>
13. Recommended relative to the calculation of capacity requirements used in IRPs that the Commission require the Company to determine capacity obligations applying PJM's approach – that is, either using the PJM FPR, leading to capacity obligations in unforced capacity ("UCAP") terms or presented in ICAP terms based on the DOM LSE fleet-wide average value.<sup>131</sup>

Specifically relative to DOM Zone peak load trends and forecasts, Mr. Wilson provided an overview of recent trends in weather-normalized summer peak loads. He also opined, based upon the very low reserves experienced by PJM in 2014 and again in 2022 during winter extreme cold events, that Dominion should be focusing more on winter than summer peaks going forward. He presented and discussed the DOM Zone peak load forecasts that have been used in Dominion's prior recent IRPs and explained that the Commission required the Company to rely on the PJM forecast for IRPs, most likely because of prior Dominion peak load forecasting repeatedly overstating future capacity needs by thousands of MWs. He also noted that the current forecasts of PJM and the Company are comparable through 2030. Additionally, he provided a figure depicting the peak load forecast in the 2023 IRP for all customers other than firm data centers (Figure JFW-C) and, as explained above, opined that this forecast falls within a range of reasonableness.<sup>132</sup>

Specifically relative to the DOM LSE forecast upon which the 2023 IRP is based, Mr. Wilson outlined the approach used by Dominion in developing this forecast and opined that structure of the Company's approach makes sense (with respect to non-data center customers), except with respect to Dominion's reliance upon the Summer LSE Ratio (that is, the average over 2014 to 2022 of the July DOM LSE total monthly energy to the July DOM Zone total monthly energy). He described how, in his assessment, the Company's approach to estimating the DOM LSE portion of the non-data-center forecast is flawed but, nevertheless, opined that any error associated with such flawed approach likely results in only a small error as compared to the broad range of uncertainty applicable to the data center forecast.<sup>133</sup>

<sup>130</sup> *Id.* at 12.

<sup>131</sup> *Id.* at 12-13, 23-24.

<sup>132</sup> *Id.* at 14-18.

<sup>133</sup> *Id.* at 19-21.

Concerning minimum PJM reliability requirements and the capacity gap, Mr. Wilson first maintained Dominion's description of the future generating capacity it considered for the 2023 IRP is inaccurate because it does not represent the amount of capacity required by PJM or represent how the Company actually calculated its capacity amounts. According to Mr. Wilson, Dominion's methodology for calculating the Minimum PJM Reliability Requirement values used in the 2023 IRP, which multiplies its DOM LSE coincident peak forecast by a 14.7% installed margin and leads to amounts represented in ICAP terms, is flawed because capacity obligations in PJM are assigned in UCAP terms. He was unable to estimate the impact of this error. However, he did recalculate the Company's reserve requirements and capacity gap based on an alternative data center forecast.<sup>134</sup>

Mr. Wilson next provided a detailed critique of Dominion's data center load forecast. He first recognized that the data center load component of the PJM 2023 DOM Zone forecast utilized in the 2023 IRP was developed by PJM by adding together the projections submitted by the Company and the Northern Virginia Electric Cooperative ("NOVEC"). While the PJM 2023 DOM Zone forecast reflects a huge increase in the longer-term data center peak load projection, Mr. Wilson maintained that this does not reflect changed PJM thinking about longer-term data center loads.<sup>135</sup>

Mr. Wilson then provided an overview of the Company's near-term (2023-2027) data center forecast (that is provided to PJM), acknowledged that such forecast is based upon substantial information, and concluded the near-term forecast is likely to be reasonable, except for the potential of double-counting (associated with a lack of coordination with NOVEC and PJM) and for the Company's inclusion a data centers outside of Dominion's service territory. Mr. Wilson subsequently explained, however, that because the Company adjusted the PJM data center forecast utilized in the 2023 IRP to correct for data center loads that are not in its territory, the service territory infirmity may not be an issue for this case.<sup>136</sup>

Next, Mr. Wilson turned to the longer-term portion of the data center load forecast. He provided an overview of how PJM has formulated such forecasts in the past and noted that for 2023, PJM requested longer-term forecasts (through 2038) from Dominion and from NOVEC. He also provided an overview of Dominion's methodology for preparing the longer-term data center forecasts in past IRPs, which has varied somewhat over time, but noted that the Company's fundamental approach of extrapolating based only on historical data has remained the same. According to Mr. Wilson, the approach of extrapolating based on historical data is an ineffective means of projecting longer-term data center loads because it fails to consider evolving industry trends or planned future data centers. Additionally, he again emphasized that Dominion's longer-term data center forecast is not based on firm evidence of new data centers or expansions in 2028 or later years.<sup>137</sup>

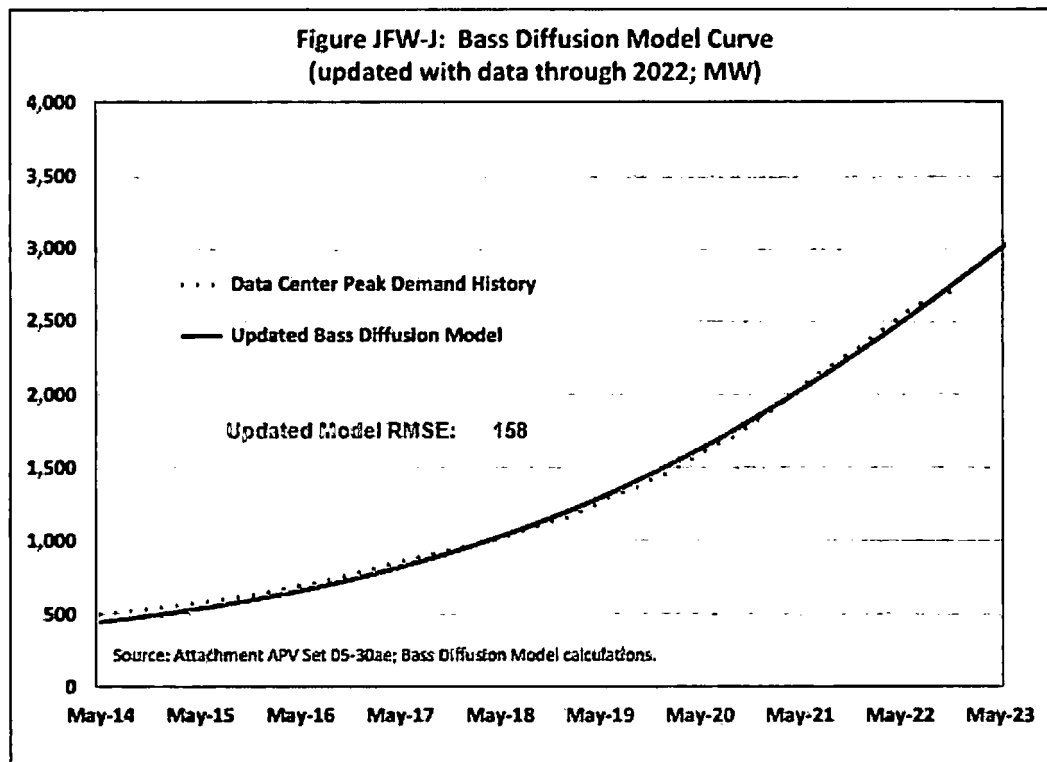
<sup>134</sup> *Id.* at 21-24. See also Table 1 on page 9 of Mr. Wilson's prefiled testimony.

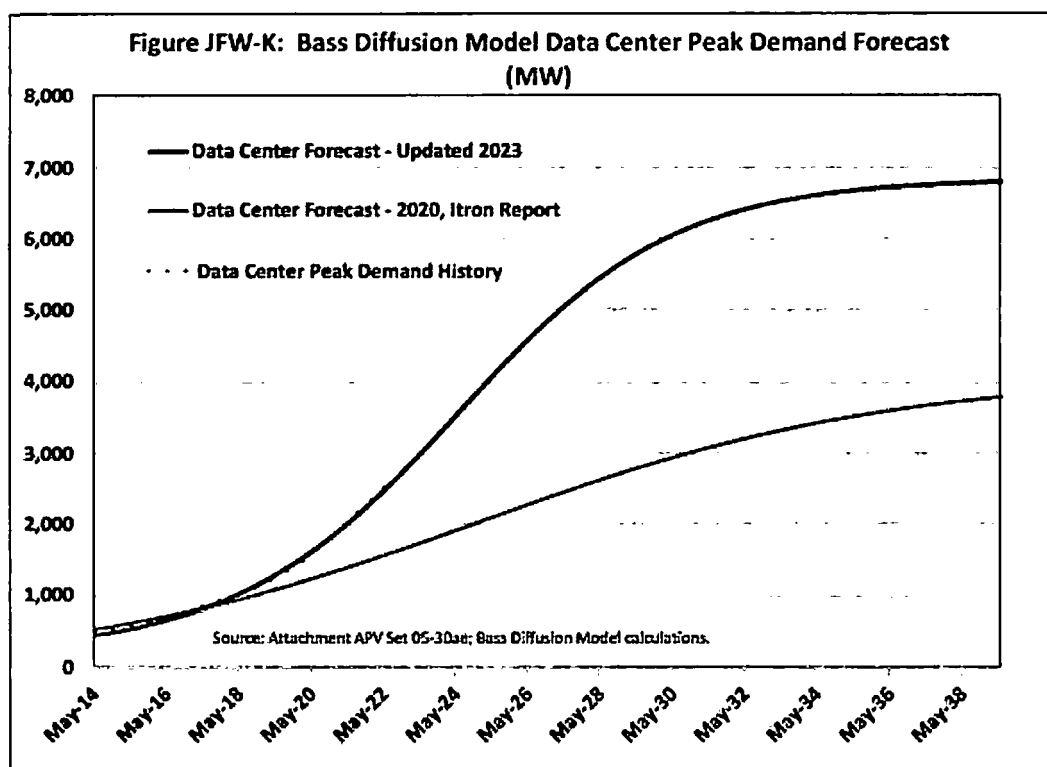
<sup>135</sup> *Id.* at 24-25.

<sup>136</sup> *Id.* at 25-32.

<sup>137</sup> *Id.* at 32-37. Mr. Wilson also provided a figure depicting the longer-term data center load forecasts for the DOM LSE, NOVEC, Mecklenburg Electric Cooperative ("MEC") and Rappahannock Electric Cooperative ("RappEC"). *Id.* at 36 (Figure JFW-G).

Mr. Wilson then addressed his alternative data center forecast formulated using the Bass Diffusion Model (a model utilized by the Company in connection with its 2018 and 2020 IRPs). Although he previously criticized the Bass Diffusion Model, Mr. Wilson concluded the model's "S shaped curve" concept is reasonable to apply in this case. He also noted that the data center forecasts of NOVEC, MEC and RappEC (shown in his Figure JFW-G) have the same shape. While Mr. Wilson believes data center forecasts should be based on detailed studies providing multiple scenarios, he concluded updating the Bass Diffusion Model approach leads to a more sound alternative to the Company's new data center forecasting methodology. He provided the following figures depicting the results of his updated model application:





He also described the minimal changes/updates that he applied to the Bass Diffusion Model (as used in the Company's 2020 IRP).<sup>138</sup>

Regarding the location of data centers, Mr. Wilson explained that data centers began to concentrate in Northern Virginia approximately ten years ago because of the large presence of government and defense agencies in the area and the associated strong internet connectivity. However, he maintained that there is significant uncertainty as to whether data center electric demand will continue to grow in Northern Virginia and suggested there are reasons to expect developers to shift to other regions. Among other things, he highlighted local opposition to data center growth and developer interest in relying upon carbon-free energy, making other regions more attractive. Moreover, he emphasized that large amount of the Company's 2030 forecasted demand is based upon a small number of customers, thereby increasing the uncertainty of the forecast. Additionally, he maintained the global demand for services provided by data centers is uncertain and explained how data center companies could moderate their need for capacity (by squeezing redundancy out of their available storage). In Mr. Wilson's view, these factors suggest growth in Virginia's data center demand may ultimately slow and follow the S-shaped curve of the Bass Diffusion Model.<sup>139</sup>

In the concluding section of his prefiled testimony, Mr. Wilson explained and supported his assessment that data center projections should be prepared by professional forecasters.

<sup>138</sup> *Id.* at 37-40.

<sup>139</sup> *Id.* at 41-45.

Among other things, he highlighted the research and analysis that was performed on behalf of the Company in 2013 and 2015 by Quanta Technologies and denied that Dominion's data center forecast in this case is based on anything comparable. He also questioned the Company's decision not to give credence to trade press discussions and forecasts as useful tools in predicting data center growth and the overall qualifications of the Dominion staff involved in preparing the longer-term data center forecast in the 2023 IRP. In Mr. Wilson's assessment, a professional forecaster would present multiple scenarios, increasing the likelihood that the future will fall within the bounds of the scenarios. Additionally, he questioned the value of the high and low range data center projections, formulated by aggregating various extrapolations in different ways, and the narrow-ranged sensitivity (+/- 5% applied in each year through 2037) explored by the Company in the 2023 IRP. Finally, Mr. Wilson offered suggestions for the improvement to Dominion's longer-term data center forecasts if the Company continues to prepare such forecasts using historical data.<sup>140</sup>

When providing surrebuttal at the hearing, Mr. Wilson suggested Company witness Bradshaw's reference to consistently low load forecasts previously obtained by Dominion from outside consultants highlights uncertainty about future data center load. Additionally, he distinguished the avoidance of double counting discussed by PJM in its 2023 Load Forecast Supplement from the potential double counting of data center load (associated with Dominion and NOVEC) addressed in his prefiled testimony; emphasized the small number of customers driving Dominion's data center load growth; highlighted the backup generation of data centers which, in his assessment, makes their load similar to that of interruptible customers and suggested that the Company could ask data centers to drop load on high load days (and use backup generation); and defended as useful and reliable (and in response to Dominion witness Rajan's criticism) the use of estimated historical weather-normalized peak loads (based upon numerous data points) in formulating load forecasts.<sup>141</sup>

Regarding his Bass Diffusion Model analysis, Mr. Wilson agreed with Company witness Rajan that Bass Diffusion Model results vary with small variations to assumptions and emphasized that, for this reason, he utilized the Company's 2020 workpapers without varying all of the parameters when performing his analysis in this case. In addition, he maintained that he corrected an earlier error (identified by Company witness Rajan) in his Bass Diffusion Model analysis; and asserted that the results of Bass Diffusion Model fit well with the historical data, while still maintaining that forward-looking analysis is needed to inform resulting scenarios.<sup>142</sup>

During cross-examination by Dominion, Mr. Wilson again maintained that the process followed by PJM to avoid double counting (discussed in PJM's 2023 Load Forecast Supplement) related to the double counting of embedded amounts inside econometric forecasts and would not avoid the potential double counting of data center load that he identified related to Dominion and other entities.<sup>143</sup> Mr. Wilson continued to maintain that PJM and the Company lack the

<sup>140</sup> *Id.* at 45-49.

<sup>141</sup> Tr. (Wilson), at 214-228. See also Ex. 14 (excerpt from PJM 2023 Load Forecast Supplement). Mr. Wilson also noted that Company witness Bradshaw's Figures 1 and 2 (relating to customer contract load amounts) reflect graphs that are very similar to the results of his Bass Diffusion Model analysis. *Id.* at 216-217.

<sup>142</sup> *Id.* at 228-232.

<sup>143</sup> *Id.* at 235-237. Mr. Wilson also believed he raised his double counting concerns before the PJM forecasting subcommittee. *Id.* at 237-239.



experience and qualifications to perform a longer-term (15-year) data center load forecast; acknowledged that a longer-term data center load forecast with multiple scenarios (and attached narratives) would be useful; characterized a “short-term” forecast as being for four to five years; confirmed his assessment that Dominion’s near-term data load forecast is likely reasonable and that the Company’s recent near-term data center load forecasts have been fairly accurate; and suggested PJM asked Dominion for a 15-year data center load forecast because “nobody wants to do that” type of forecast which, in his assessment, is “hard” and should involve “forward-looking research.”<sup>144</sup> Furthermore, while Mr. Wilson acknowledged PJM may have heard from the data center industry, he denied that PJM did the type of forward-looking research appropriate for a 15-year data center load forecast.<sup>145</sup> Concerning financial commitments from the Company’s data center customers, Mr. Wilson continued to believe it was possible for customers to abandon some level of commitment depending upon business concerns.<sup>146</sup> Additionally, while indicating that he is not a “fan” of the Bass Diffusion Model, he asserted that its overall shape is more reasonable than a linear or polynomial model for data center forecasting.<sup>147</sup> Mr. Wilson also acknowledged that the Company’s consultant data center forecasts from 2013, 2015, and 2020 were pretty far off but asserted that “everyone got it wrong;” denied not believing in the importance of considering historical information when forecasting; and indicated that his Bass Diffusion Model analysis was based on historical data (while at the same time emphasizing that data center load is a “huge wild card”).<sup>148</sup>

On redirect, Mr. Wilson confirmed that the Bass Diffusion Model analysis he submitted as an alternative model in this case merely updated (with current data) a spreadsheet previously produced by Itron, a consultant for the Company; acknowledged his prior testimony indicating that the Bass Diffusion Model was worse than other forecasting approaches; maintained he has always believed there is a need for forward-looking research in forecasting; confirmed his understanding that Dominion is using a linear polynomial approach in this case; and opined that the Bass Diffusion Model, which supports increased data center load in the near term and then flattens, is more appropriate for forecasting data center load/planning than the Company’s polynomial approach, which reflects increasing data center load at an increasing rate and with the largest increase in the final year of the forecast (2037-2038).<sup>149</sup> Regarding Dominion’s evidence of financial commitments from data center customers, Mr. Wilson confirmed his understanding that 80% of the Company’s data center load comes from five customers; maintained that one customer’s change of plans could impact Dominion’s overall load

<sup>144</sup> *Id.* at 239-251. Mr. Wilson also identified a discovery response wherein Appalachian Voices identified types of information a professional forecaster would consider. *See* Ex. 15 (Appalachian Voices’ response to Dominion 3-61). Furthermore, Mr. Wilson maintained that things have changed since 2018, when he testified that 15-year forecasts were not useful, because of PJM’s significant increase to its 15-year load forecast. *Id.* at 247-251. *See also* Ex. 16 (excerpt of Mr. Wilson’s testimony in PUR-2018-00065).

<sup>145</sup> *Tr.* (Wilson), at 252.

<sup>146</sup> *Id.* at 253-257.

<sup>147</sup> *Id.* at 258-260. Mr. Wilson also explained that when he criticized the Company’s use of the Bass Diffusion Model in the 2018 IRP, he thought its usage was a step backwards as compared to Dominion asking its consultant (Quanta Technologies) to update their work. *Id.* at 263.

<sup>148</sup> *Id.* at 264-267. Mr. Wilson responded to a series of questions relating to, and explaining, his Bass Diffusion Model analysis. *Id.* at 267-274. *See also* Ex. 17 (Appalachian Voices response to Dominion 4-66) and Ex. 18 (Bass Diffusion Model as presented in Mr. Wilson’s testimony).

<sup>149</sup> *Id.* at 275-278.

significantly; and suggested that the financial commitments at issue would not represent a significant financial commitment to the type of customers involved.<sup>150</sup>

**Mr. Abbott** discussed and critiqued the Company's planning process, modeling, and supply-side resources in the 2023 IRP. As a preliminary matter, while agreeing with Dominion that the 2023 IRP constitutes a "snapshot in time," he maintained that when reviewed together with prior IRPs, Dominion appears to have a strong incentive to develop large capital-intensive projects that can deliver a return to stockholders. With this concept in mind, Mr. Abbott viewed the 2023 IRP as the Company's vehicle for supporting multi-billion-dollar investments that will be paid for by its customers for decades to come. Because he also concluded that Dominion made numerous unreasonable assumptions in the 2023 IRP and failed to provide information required by statute, regulation, and prior Commission orders, Mr. Abbott opined that the 2023 IRP's modeling is unreasonable and should not be relied upon by the Commission.<sup>151</sup>

Mr. Abbott began his prefiled testimony by describing the requirements applicable to the 2023 IRP established by statute, regulation, and prior Commission orders. He then identified the Alternative Plans proposed in the 2023 IRP (Alternative Plans A through E), concluded that none of the Alternative Plans comply with express Commission directives, and maintained that the Alternative Plans should be rejected entirely or dismissed as unreliable for informing future CPCN cases. Among other things, based upon provisions of the VCEA, he concluded the default position for all of the Company's Alternative Plans should be for the retirement of all fossil fuel units by 2045 and asserted that the model should be solving to maintain reliability in a least-cost way while also meeting the statutory retirement deadlines. As stated by Mr. Abbott,

Existing carbon-emitting fossil fuel generating units should not be included to operate beyond 2045 in the IRP plans unless Dominion is able to demonstrate on a case-by-case, unit-by-unit, basis that the retirement of each unit would threaten the reliability or security of the system.

He denied that Dominion provided a reliability analysis of retiring each fossil fuel unit on a case-by-case basis but, instead, asserted the Company assumed in its Alternative Plans A, B, and C that reliability will be threatened by the retirement of its entire generation fleet. According to Mr. Abbott, given this perceived threat, each of these plans also assumes the continued operation of the Company's entire existing fossil fuel generation fleet beyond 2045. He maintained this approach is inconsistent with § 56-585.5 B 3 of the Code (which allows the Company to petition the Commission for relief from retirement requirements based on reliability concerns).<sup>152</sup>

Additionally, Mr. Abbott opposed the Company's default assumption utilized in the 2023 IRP that Virginia will be out of RGGI by January 1, 2024; noted that RGGI remained applicable law when the 2023 IRP was filed; maintained the decision to model Virginia's exit from RGGI conflicts with the Commission's directive in the *2020 IRP Order* providing that the Company's least-cost plan should consider existing laws and regulations; and critiqued the RGGI sensitivity performed by Dominion. He opined that Dominion should have recognized Virginia remaining

<sup>150</sup> *Id.* at 279-280.

<sup>151</sup> Ex. 20 (Abbott Direct), at 2-3.

<sup>152</sup> *Id.* at 5-10.

in RGGI as a default assumption and modeled Virginia's exit from RGGI as a sensitivity in the 2023 IRP.<sup>153</sup>

Furthermore, Mr. Abbott discussed the 2023 IRP relative to the energy resource standard requirements in § 56-596.2 of the Code and maintained that the Company failed to comply with a prior Commission directive relative to its 2022 RPS plan filing requiring Dominion to address energy efficiency requirements in its modeling assumptions beginning in 2026. Specifically, Mr. Abbott maintained the Company's decision to utilize "the exact same modeling assumption for the energy savings targets beginning in 2026 in the 2023 IRP as Dominion used in the 2022 RPS filing is not responsive to the Commission's directive ...." In addition, he highlighted the VCEA's revision to § 56-585.1 A 5 c of the Code that prevents the Commission from approving new utility-owned carbon-emitting generation facilities unless the utility has met energy savings goals in § 56-596.2 of the Code and noted that all of the Company's plans contemplate the construction of new gas-fired generation units. Given these requirements, and given Dominion's energy saving assumptions, Mr. Abbott concluded Dominion's Alternative Plan A should be rejected as a matter of law (because it will not achieve energy savings goals), and he questioned the legal viability of the remaining plans (all of which contemplate the construction of new Dominion-owned gas units).<sup>154</sup>

Mr. Abbott next addressed the Commission directive that the Company identify a least cost VCEA-compliant plan. While acknowledging that Dominion presented a least-cost plan, Alternative Plan A, Mr. Abbot maintained Alternative Plan A fails to comply with the VCEA because its fails to retire all carbon emitting fossil fuel generating units by December 31, 2045; fails to achieve statutory energy savings goals; contemplates the construction of new gas-fired resources despite not meeting energy savings goals; and assumes Virginia exits RGGI on December 31, 2023.<sup>155</sup>

In addition to maintaining that the Company failed to properly address the VCEA in the 2023 IRP, Mr. Abbott identified the following modeling assumptions as problematic:

1. He critiqued Dominion's transmission constraint of 5,200 MWs for importing/exporting power from/to PJM markets.<sup>156</sup>
2. He questioned Dominion's failure to include energy produced from Dominion-owned ring-fenced facilities in the model.<sup>157</sup>
3. He questioned Dominion's failure to include the energy produced from renewable facilities under PPAs with bundled accelerated renewable energy buyers ("ARBs") in the model.<sup>158</sup>

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<sup>153</sup> *Id.* at 10-11.

<sup>154</sup> *Id.* at 11-13.

<sup>155</sup> *Id.* at 13.

<sup>156</sup> *Id.* at 15-18.

<sup>157</sup> *Id.* at 18-19.

<sup>158</sup> *Id.* at 19-20.

4. He maintained Dominion's capacity assumption for future data center load that will be bundled ARBs is unrealistic.<sup>159</sup>
5. He concluded Dominion's peak load forecast appears to be biased to the high side and is subject to a high level of uncertainty.<sup>160</sup>
6. He concluded Dominion's capacity price forecast appears to be biased on the high side and is subject to a high level of uncertainty.<sup>161</sup>
7. He concluded Dominion's coal unit dispatch model assumption may not fully capture the costs of actual coal unit dispatch.<sup>162</sup>

Relative to these concerns, Mr. Abbott recommended that:

1. The Commission direct the Company to conduct a new transmission constraint study to set a more realistic import/export constraint in future IRP filings, require the Company to file this study with its next IRP, and require the study to be updated on a regular basis.<sup>163</sup>
2. The Commission direct the Company, in its next IRP and in the 2023 IRP, to utilize a projected ARB-certified nameplate capacity that corresponds to its forecast of the energy produced by ARB-certified facilities used to offset Dominion's load for RPS compliance purposes.<sup>164</sup>
3. The Company employ a strategy for addressing risks to captive ratepayers (associated with over-building) utilizing a diverse mix of Dominion-owned new construction and PPAs with new or existing merchant plants to serve peak loads.<sup>165</sup>
4. The Commission direct Dominion to perform sensitivity model runs using the most recent S&P Global PJM capacity price forecast in the Company's next IRP filing and in connection with any future filings seeking CPCNs for generation or energy storage resources.<sup>166</sup>
5. To obtain more accurate model results for coal unit dispatch, the Company could consider an alternative coal unit dispatch in the model by designating certain hours as

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<sup>159</sup> *Id.* at 20-25.

<sup>160</sup> *Id.* at 25-30.

<sup>161</sup> *Id.* at 31-38.

<sup>162</sup> *Id.* at 38-40.

<sup>163</sup> *Id.* at 18.

<sup>164</sup> *Id.* at 25. Mr. Abbott also opined that the actual nameplate capacity from ARB-certified facilities under bundled contracts with data center companies for the most recent year should be forecasted to grow at the same rate as the Company's forecast of data center growth. *Id.*

<sup>165</sup> *Id.* at 30. Mr. Abbott contrasted this approach with the 2023 IRP's assumption that nearly all newly constructed resources will be Company-owned. *Id.*

<sup>166</sup> *Id.* at 37-38. Mr. Abbott opined that a sensitivity using the S&P Global PJM capacity price would serve as a "reality check" of the Company's capacity price forecast. *Id.*

must-run (based upon observed actual testing dispatch hours from prior years) to determine whether those hours are economic or uneconomic; and for VCHEC, the Company could review its must-run dispatch scheduling from prior years for biomass compliance and designate those same hours as must-run in the model.<sup>167</sup>

Mr. Abbott next addressed the consideration of data center growth in the planning process and its implications concerning Dominion's plans for new generation. While acknowledging that PJM is forecasting dramatic load growth increases in the DOM Zone compared to the 2020 IRP, he emphasized that such growth is almost entirely due to the Company's data center forecast with most of such growth being concentrated in Northern Virginia. In Mr. Abbott's assessment, Dominion has yet to deal with this concentrated growth in its planning. As explained by Mr. Abbott,

It is clear that the primary driver in the model results for new future generation capacity to serve peak load, energy sales, and RECs is from one type of customer (data centers) concentrated in one geographic area ([N]orthern Virginia). Further, future system reliability issues will also likely be concentrated in the [N]orthern Virginia area of the DOM Zone. Given that data center load growth in [N]orthern Virginia is the source of future peak load, energy sales, RECs, and reliability needs, Dominion's planning process should shift to focus on solutions for the actual problem – data center growth in that specific geographic part of the DOM Zone.

He indicated that the Company's modeling assumed that load growth for the DOM Zone is essentially spread out evenly throughout Dominion's service territory, thereby making the *PLEXOS* model try to solve for load growth of approximately 1.6% per year through 2027 for the Company's whole system. He also indicated the modeling failed to recognize that, for the rest of the system and excluding data centers, load growth is actually decreasing by approximately 1.4% a year through 2027. According to Mr. Abbott, ignoring this reality can lead to solutions like a new gas-fired unit in Chesterfield or a SMR in southwest Virginia, neither of which may actually be the best solution (in part, because of transmission issues). He characterized data center load growth in Northern Virginia, if it actually materializes, as "highly problematic" because it is caused by only one type of customer in one geographic location and emphasized that Dominion has not configured its model to address this issue. Under the circumstances, he recommended that the Company be directed to explore modeling solutions for the location-specific issue and, until it does so, does not believe the Company's planning provides the Commission with reliable information for evaluating the 2023 IRP or for evaluating future CPCNs.<sup>168</sup>

Mr. Abbott then discussed the consideration of non-wires alternatives ("NWAs") in the planning process. In particular, he maintained that NWAs, including a demand response program for data centers and the incorporation of large amounts of DERs (such as rooftop solar and battery storage facilitated by the "smart grid" being pursued by the Company through its statutorily-supported distribution grid moderation improvements) could serve as a useful option

<sup>167</sup> *Id.* at 40.

<sup>168</sup> *Id.* at 40-41. *See also* Tr. (Abbott), at 299 (correcting page 41 of his prefilled testimony).

to address forecasted data center load concentrated in Northern Virginia. Based upon Dominion's discovery responses, Mr. Abbott was unable to ascertain whether the Company has fully explored demand response opportunities with data center companies. Under the circumstances, he recommended that the Commission direct the Company to investigate the viability of a data center centric demand response program and report its finding in its next IRP. Furthermore, he recommended that the Commission direct Dominion to examine the viability of a customer rebate and/or utility financing program to incentivize the deployment of behind the meter distributed solar systems.<sup>169</sup>

Mr. Abbott also addressed expected future CPCN filings by the Company. While noting that Dominion did not specifically identify a preferred plan in the 2023 IRP, Mr. Abbott concluded the Company prefers either Alternative Plan B or Alternative Plan D because both of these plans show 970 MWs of gas-fired CT coming online in 2028. He also identified a Dominion discovery response wherein the Company indicated it expects to apply for an air permit and local permits in 2023 and to apply in 2024 for a CPCN for a Chesterfield gas-fired plant. According to Mr. Abbott, the *PLEXOS* model did not select a set of gas CT units in 2028 on a least-cost optimization basis but, instead, Dominion instructed the model to select the units for both Alternative Plan B and Alternative Plan D. Additionally, he indicated that Alternative Plan B modeled the Company's fossil fuel generating fleet as continuing to operate beyond 2045, but Alternative Plan D modeled the retirement of all such units, including the new Chesterfield CTs, by 2045. In Mr. Abbott's assessment, the economics of the 2045 retirement or continued operation of new Chesterfield CTs should be scrutinized in any associated CPCN case. Furthermore, he denied that the Company provided an explanation for forcing the model to select new gas CT units in 2028.<sup>170</sup>

Mr. Abbott also discussed statutory restrictions pertaining to the construction of new carbon emitting generation (§ 56-585.1 A 5 of the Code) and emphasized the Commission has not yet determined that Dominion has met, or is likely to meet, the energy savings goals required by the VCEA as a condition for allowing the Commission to approve a set of new gas CT units. Because Mr. Abbott doubted Dominion would meet statutory energy savings goals before seeking a CPCN for the new Chesterfield CT units, he concluded the Company would rely upon the statutory reliability exception to justify the need for new gas CT capacity in 2028. He expressed concern that Dominion will attempt to rely on its IRP model inputs and results to support future CPCN and RPS filings. Given the Company's stated intention to pursue the Chesterfield CT project, Mr. Abbott recommended that the Commission give Dominion specific instructions as to what should be included in its anticipated 2024 CPCN application. Specifically, he recommended the following:

1. The Commission should instruct Dominion to include a comprehensive reliability analysis, coordinated with and verified by PJM, demonstrating the reliability need for

<sup>169</sup> *Id.* at 42-49. Mr. Abbott also suggested the Commission could direct Dominion to initiate a stakeholder process with major data center players to explore a workable data center demand response program. *Id.* at 46. Additionally, he discussed possible ways for Dominion to incent data centers to locate in less congested areas of the DOM Zone. *Id.* at 47.

<sup>170</sup> *Id.* at 50-51.

the Chesterfield project including the timing of the need and location of any projected system reliability violations identified in the DOM Zone.

2. The Commission should instruct Dominion to conduct an RFP open to both new and existing peaking generation and storage resources and present the results with the 2024 CPCN application.
3. The Commission should instruct Dominion to perform the economic analysis of the proposed CTs under two scenarios: (i) assuming (as the base assumption) that the CTs retire in 2045 consistent with Alternative Plan D; and (ii) assuming that the CTs operate over their expected useful life as a sensitivity consistent with Alternative Plan B.
4. The Commission should direct Dominion to evaluate the viability of a data center specific demand response program as an NWA peaking resource and to report its findings relative to such NWA with the 2024 CPCN application.<sup>171</sup>

At the hearing, and in response to Company witness Compton's criticism of his conclusions, Mr. Abbott reiterated his belief that the default assumption for retirements in the Company's modeling should be that carbon-emitting units are retired by 2045 unless Dominion can demonstrate on a case-by-case basis that a unit is needed for system reliability. Additionally, he maintained that the Company failed to provide substantive analysis in the 2023 IRP that would justify keeping any carbon-emitting unit online after the statutory retirement date; denied that he recommended the Company enter into PPAs instead of building a new gas unit; clarified his recommendation for Dominion to conduct an RFP open to existing and new third-party peaking generation and energy storage resources prior to obtaining a CPCN for a new gas unit; denied that Dominion's representation regarding its intention to provide evidence of third-party market alternatives in an upcoming CPCN proceeding is comparable to a commitment to issuing a formal RFP; denied, based upon Dominion's modeling analysis which did not allow the selection of gas CT units on a least-cost basis until 2033 or 2034, that the planned Chesterfield gas CT units with a commercial operations date of 2028 are cost-effective; emphasized that project development risks for new projects, such as those discussed by Mr. Compton, are not limited to PPAs; emphasized that there are no project development risks associated with existing generation or storage resources; denied that he believes generation must be located near load growth but suggested the Company's modeling failed to consider the potential mitigation of transmission upgrade costs through a locational analysis of generation resources; noted that Mr. Compton failed to explicitly take a position on his recommendation that the Company should be required, in connection with its next IRP, to conduct a new study to update its 5,200 MW modeling constraint for importing energy from the PJM market; emphasized that there are large merchant plants located in the DOM Zone not appearing to be under contract with non-DOM LSE load in the DOM Zone; and denied that the Company's low-capacity price forecast sensitivity, which is significantly higher than S&P Global forecast and the low-capacity

<sup>171</sup> *Id.* at 52-55. Mr. Abbott also emphasized that the retirement of Chesterfield coal units 5 and 6 did not create a threat to reliability. Among other things, he explained that while Chesterfield units 5 and 6 were operational during Winter Storm Elliott in December 2024, Dominion would have been capable of importing sufficient MWs to ensure reliability even if these units had been retired. *Id.* at 53-54.

price forecast of Staff witness Johnson and is only 6.5% lower than the base case forecast, is reasonable.<sup>172</sup>

In response to Company witness Bradshaw's criticisms of his testimony, Mr. Abbott disputed Mr. Bradshaw's conclusion that his concerns regarding a lack of locational modeling are unwarranted given that data center growth was forecasted at the county level. Additionally, he questioned the sufficiency of the Company interactions with data centers regarding possible demand response given the extent of the data center growth problem (and likely associated ratepayer impacts and reliability concerns); and stood by his recommendation that the Commission direct the Company to initiate a stakeholder process with major data center players and Staff to design a workable demand response program.<sup>173</sup>

In response to Company witness Flowers' criticisms of his testimony, Mr. Abbott expressed concern that Dominion does not appear to recognize the relationship between IRP proceedings and CPCN applications. In addition, he suggested flaws in the Company's long-term planning process will implicate the validity of any CPCN application; and stood by his recommendation for the Commission to establish – in this IRP case or in a separate order – requirements for the upcoming CPCN application.<sup>174</sup>

In response to Company witness Rajan's criticisms of his testimony relating to prior load forecasts, Mr. Abbott clarified that he did not perform his own load forecast but, instead, simply provided an overview of prior Dominion forecasts.<sup>175</sup>

When questioned by Clean Virginia, Mr. Abbott was asked about the conditions for obtaining exemptions to various VCEA requirements. Among other things, he recognized that §§ 56-585.1 A 5 and A 6 of the Code provide additional hurdles associated with obtaining a CPCN requiring that the Company show there is a threat to reliability and that supply-side resources are more cost-effective than demand-side resources.<sup>176</sup> He also indicated the Company is required to consider all in-state and regional transmission entity resources.<sup>177</sup> Furthermore, he confirmed his belief that Dominion has already begun some development work associated with new planned CTs based on its application for an air permit.<sup>178</sup> However, Mr. Abbott did not necessarily agree that the Company was required to issue an RFP for possible alternatives before performing preliminary work associated with the project.<sup>179</sup>

<sup>172</sup> Tr. (Abbott), at 301-320. Mr. Abbott also highlighted language in the *2020 IRP Order* wherein the Commission stated the Company should consider market purchases during the winter from the PJM wholesale market, including market purchases from merchant generators in the DOM Zone that are not subject to a transmission import capacity constraint. *Id.* at 312-313.

<sup>173</sup> *Id.* at 320-323.

<sup>174</sup> *Id.* at 323-326. *See also id.* at 335-336.

<sup>175</sup> *Id.* at 326-327.

<sup>176</sup> *Id.* at 330-331.

<sup>177</sup> *Id.* at 331.

<sup>178</sup> *Id.* at 332.

<sup>179</sup> *Id.* at 333-334.



DCC

DCC presented the testimony of **Josh Levi**, it's current president.

**Mr. Levi** explained that DCC represents the interests of the data center community and is headquartered in Virginia. He maintained that the DCC has a compelling interest in ensuring that the Company's bulk system can provide a reliable and affordable supply of electricity to support the retention of investments from DCC's members in Virginia. In his assessment, the Commission has an important role in ensuring that Dominion has sufficient resources to address known and reasonably projected data center load growth. He highlighted Virginia's success in encouraging a growing data center market; noted that Virginia is also targeting other key drivers of the twenty-first century economy including advanced manufacturing, battery storage, aerospace, and controlled agriculture; and maintained Virginia's success in attracting such industries depends on reliable and affordable electricity. He also emphasized the impact of data centers on people's daily lives given the increasingly digitalized world; recognized the significant economic benefits that the data center industry has brought to Virginia (in 2021, \$6.8 billion in investment, representing close to two-thirds of all capital investment in the Commonwealth); and offered specific examples of how data centers produce economic benefits and direct and indirect tax revenues in Virginia. More specifically, he discussed how data centers have been beneficial to Virginia (and, in particular, Loudoun County). Furthermore, he described how cloud computing and the data center industry have contributed to increased energy efficiency. Among other things, he testified that the data center industry has directly and indirectly financed clean energy development, supported clean energy through public policy advocacy, set clean energy goals, and encouraged other industries to make commitments to sustainability. Given these factors, Mr. Levi urged the Commission to consider the following:

Dominion's proposed IRP – and any related investments – cannot be viewed in a vacuum as solely serving and benefiting data centers, even taking into account Dominion's observation in its 2023 IRP that the 'proliferation of high-demand data centers' will contribute to the increased growth rate of electricity demand.

In sum, Mr. Levi maintained Dominion's planned investments are required to support and grow economic drivers of the twenty-first century.<sup>180</sup>

When cross-examined by Sierra Club, Mr. Levi confirmed his belief in the importance of the services provided by data centers; represented that the DCC does not refute Dominion's assessment that data centers are a key driver of its overall energy and peak demand; confirmed his understanding that certain data center companies have set goals to operate on carbon-free energy; and represented that the DCC organization has not discussed implementing a carbon-free energy goal.<sup>181</sup> He testified that the DCC has not taken a position on the 2023 IRP and explained that the DCC joined this case to ensure "everyone understood what data centers are, the value ... data centers bring to our everyday lives, the climate and energy impacts of the industry, and also

<sup>180</sup> Ex. 19 (Levi Direct), at 1-11.

<sup>181</sup> Tr. (Levi), at 285-288. Mr. Levi subsequently confirmed that he did not confirm Dominion's load forecast through analysis. *Id.* at 296.



Dominion's resource mix and asserted that the Company failed to justify why the Alternative Plans were not designed to be VCEA-compliant.<sup>187</sup>

Regarding RGGI and the costs of climate change, Dr. Roumpani first explained that all of Dominion's Alternative Plans assume Virginia's exit from RGGI before January 1, 2024, and, therefore, assume no carbon cost and limit RGGI participation in the analysis. In her assessment, the Company should be required to conduct its planning as though Virginia remains in RGGI because the withdrawal remains subject to litigation. Furthermore, because the social cost of carbon must be considered when evaluating an application for a CPCN, she maintained Dominion should have included the social cost of carbon in its IRP analysis, at least at the sensitivity level, for purposes of consistency.<sup>188</sup>

Dr. Roumpani then contended that Dominion's analysis understates the role of renewable resources and energy storage, thereby leading to suboptimal portfolios.<sup>189</sup> Specifically, she concluded the following:

1. The Company's limits on renewable and energy storage resource additions are not fully justified and unreasonably restrict the selection of these resources in the Alternative Plans, thereby potentially preventing the model to select more renewable energy (with a lower revenue requirement).<sup>190</sup>

Among other things, Dr. Roumpani identified the annual limits that Dominion included in its modeling runs regarding energy storage and solar resources and maintained the Company failed to provide a reasonable explanation for such annual limits.<sup>191</sup> Similarly, she identified the annual limits that Dominion included in its modeling runs regarding onshore and offshore wind.<sup>192</sup> While Dr. Roumpani believes Dominion provided a reasonable explanation in the short-term for build limits associated with onshore wind (relating to the availability of land), she opined that it would be reasonable in the long term "to assume that additional onshore and, particularly, offshore resources could be enabled with further commercial development and technological advancements, both with regard to generation and transmission."<sup>193</sup> Dr. Roumpani also concluded Dominion's longer-term choice to limit storage resources to those that are feasible today and choice not to model other advanced technologies (with the exception of SMRs), results in an IRP that "presents a false dichotomy of either keeping online uneconomic thermal generation and failing to comply with the VCEA or relying on an expensive capacity market."<sup>194</sup> To

<sup>187</sup> *Id.* at 10-16.

<sup>188</sup> *Id.* at 16-19. Dr. Roumpani did, however, acknowledge that the Company's base case price forecast includes a federal carbon price remaining at zero up to 2035 and starting at \$3.18/ton in 2036. *Id.* at 16. She also compared the carbon prices included in Dominion's 2023 IRP and its 2021 IRP update. *Id.* at 17-18.

<sup>189</sup> *Id.* at 19-36.

<sup>190</sup> *Id.* at 20-27.

<sup>191</sup> *Id.* at 20-23.

<sup>192</sup> *Id.* at 23-24.

<sup>193</sup> *Id.* at 25.

<sup>194</sup> *Id.* at 25-26.

address these infirmities, Dr. Roumpani offered recommendations for modeling changes which are highlighted later in this summary of her testimony.

2. The cost of energy storage in the Company's analysis is overstated.<sup>195</sup>

Among other things, Dr. Roumpani noted the Company's projected costs for solar, offshore wind, and energy storage are based on limited cost data from Company-developed projects through 2022, rather than being based on publicly available data.<sup>196</sup> In her assessment, however, Dominion's cost projections should be based on public technology baselines such as the NREL ATB.<sup>197</sup>

3. The Company's analysis failed to appropriately consider the flexibility and other benefits of energy storage.<sup>198</sup>

Among other things, Dr. Roumpani provided an overview of the benefits of energy storage, highlighted the importance of considering a flexibility benefit associated with energy storage (allowing for quick responses to changing needs without fuel usage and ramp ups) in an IRP analysis, and noted that the Company failed to model the potential for mitigating re-dispatch costs (with storage) in connection with Plan B.<sup>199</sup> Furthermore, she opined that if Dominion includes additional re-dispatch or ancillary costs in its evaluation of renewable resource builds, it should also account for the value that energy storage can bring by mitigating those costs.<sup>200</sup>

4. The Company's analysis failed to incorporate bonus tax credits that could further reduce the cost of renewable energy and storage.<sup>201</sup>

Among other things, while acknowledging that Dominion incorporated resource cost changes enabled by the IRA into its analysis "to a limited degree" by modeling production and investment tax credits ("PTCs" and "ITCs"), Dr. Roumpani maintained the Company failed to incorporate certain bonus credits authorized by the IRA and failed to take into account the possible benefits of certain low interest loans.<sup>202</sup> She also recommended that the Company be required in any request for a CPCN to explain whether energy storage could be constructed at the Chesterfield site, as an alternative to CT units, and to explain whether such energy storage would qualify for bonus credits.<sup>203</sup>

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<sup>195</sup> *Id.* at 27-29.

<sup>196</sup> *Id.* at 27.

<sup>197</sup> *Id.* at 28-29.

<sup>198</sup> *Id.* at 29-34.

<sup>199</sup> *Id.* at 29-30.

<sup>200</sup> *Id.* at 34. Specifically, she recommended that Dominion estimate a benefit for energy storage reflecting the reduction of renewable integrations costs that each kW of storage can provide and contended this cost should be included in the PLEXOS optimization. *Id.* Additionally, she recommended that the Company reduce transmission upgrade costs "as appropriate" in its retirement analysis when considering storage replacements. *Id.*

<sup>201</sup> *Id.* at 34-36.

<sup>202</sup> *Id.* at 34-35.

<sup>203</sup> *Id.* at 36.

Dr. Roumpani next contended that Dominion's analysis overstates the reliability of thermal resources and underestimates the associated risks, thereby leading to suboptimal portfolios.<sup>204</sup> Specifically, she concluded the following:

1. The Company's analysis overstates the capacity contribution of thermal resources.<sup>205</sup>

Among other things, Dr. Roumpani characterized as unreasonable Dominion's assumption that a thermal asset's installed capacity is a viable proxy for its firm capacity contribution because fossil-fueled assets are not perfectly dispatchable at their full capacity at any time.<sup>206</sup> Moreover, she highlighted PJM reliability risk analysis (focusing upon Winter Storm Elliott) demonstrating that thermal assets, particularly CTs, are less dependable than what the company assumes in the 2023 IRP.<sup>207</sup> She also recommended that the Company be required to provide documentation in its IRPs associated with any thermal resource it intends to operate beyond 2045 supporting the cost-effectiveness and reliability of such resource.<sup>208</sup>

2. The Company's analysis understates the cost of thermal resources.<sup>209</sup>

Among other things, Dr. Roumpani suggested that Dominion's stated intention, in its Short-Term Action Plan, to add a liquified natural gas ("LNG") facility to support its Greensville Power Station and reduce its reliance on a single-pipeline reflects there are additional costs needed for existing and new thermal capacity to be reliable.<sup>210</sup> She also highlighted costs associated with winterization and policy requirements applicable to thermal units (including hydrogen fueling costs associated with running new CTs) and fuel price risks which, in her assessment, were not properly accounted for in Dominion's modeling.<sup>211</sup>

3. The Company's portfolios do not properly account for the risk of future emissions regulations.<sup>212</sup>

Among other things, Dr. Roumpani noted Dominion has not modeled the impacts of the GNP Rules, an EPA requirement aiming to significantly cut smog-forming nitrogen oxide pollution from power plants in 23 states, including Virginia.<sup>213</sup> Additionally, she explained her conclusion that the impact of the GNP Rules and

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<sup>204</sup> *Id.* at 36-49.

<sup>205</sup> *Id.* at 37-41.

<sup>206</sup> *Id.* at 38.

<sup>207</sup> *Id.* at 39-40.

<sup>208</sup> *Id.* at 41.

<sup>209</sup> *Id.* at 41-43.

<sup>210</sup> *Id.* at 42.

<sup>211</sup> *Id.* at 42-43.

<sup>212</sup> *Id.* at 43-46.

<sup>213</sup> *Id.* at 43. Dr. Roumpani also noted that Dominion does not intend to model performance standards being considered by the EPA. *Id.* at 45-46.

other proposed EPA standards on Dominion's resource fleet will probably increase the costs of continuing to operate thermal units.<sup>214</sup>

4. Dominion's retirement analysis is based on flawed assumptions.<sup>215</sup>

Among other things, Dr. Roumpani summarized the results of the Company's retirement analysis,<sup>216</sup> explained why she does not believe the Commission should rely on such analysis;<sup>217</sup> and recommended Dominion's use of a more realistic set of alternatives in modeling its retirement analysis.<sup>218</sup>

Next, Dr. Roumpani maintained that the Alternative Plans do not reflect Dominion's full range of options. Among other things, she maintained the 2023 IRP fails to consider a broad range of futures in a way that is informative because it does not include a VCEA-compliant plan; does not explore in the short-term how the optimal portfolio would differ if the Company eased certain feasibility limits; and does not consider the breadth of long-term future market, policy, and technological scenarios. Additionally, she maintained Dominion's cost estimates are informed by flawed assumptions. When highlighting the Company's failure to present a fully VCEA-complaint portfolio, Dr. Roumpani also noted that Dominion's Alternative Plans B and D include 970 MWs of natural gas peaking capacity that was forced in by the Company. She further maintained that Dominion has not presented analysis showing that Alternative Plans B and D would have reliability issues absent the inclusion of the forced gas units.<sup>219</sup>

In the concluding section of her prefiled testimony, Dr. Roumpani identified her key concerns regarding the 2023 IRP as follows: (i) the Alternative Plans are not VCEA-compliant; (ii) the design of the Alternative Plans fails to present a broad range of portfolios that could serve as a meaningful "guide for providing customers a path to reliable, affordable, and increasingly clean power that meets public policy objectives;" (iii) the Company's load forecast contains problematic assumptions that overstate its capacity needs; (iv) the Company's analysis underestimates the role of demand-side resources, thereby leading to suboptimal resource portfolios; (v) the Company's analysis underestimates the role of renewable resources and energy storage, thereby leading to suboptimal portfolios; and (vi) the Company's analysis overstates the role of thermal resources and underestimates the associated risks, thereby leading to suboptimal portfolios.<sup>220</sup>

Furthermore, Dr. Roumpani summarized AEU's overall recommendations as follows:<sup>221</sup>

<sup>214</sup> *Id.* at 44. Dr. Roumpani also suggested that the Company had time after the GNP Rules went into effect to consider its impacts as a sensitivity in the 2023 IRP. *Id.* at 45. Additionally, she recommended that Dominion revise the 2023 IRP to comply with the GNP Rules. *Id.* at 45-46.

<sup>215</sup> *Id.* at 46-49.

<sup>216</sup> *Id.* at 46-47.

<sup>217</sup> *Id.* at 47-48.

<sup>218</sup> *Id.* at 48-49.

<sup>219</sup> *Id.* at 49-53. Dr. Roumpani also recommended the Company's development of Alternative Plans reflecting a more complete set of options. *Id.* at 53.

<sup>220</sup> *Id.* at 53-55.

<sup>221</sup> *Id.* at 55-56. As explained by Dr. Roumpani, AEU's concerns regarding Dominion's load forecast and use of demand-side resources were supported by AEU witness Burgess. *Id.* at 54.

Regarding supply-side resource options, Dominion should develop a plan that:

- Meets VCEA requirements regarding the amount of solar, wind, and storage developed over the study period with *PLEXOS* being required to meet the targets but also being allowed to select the optimal timing for resources and with *PLEXOS* allowing for the selection of renewable resources above VCEA development targets on a least-cost optimization basis.
- Does not include forced-in fossil fuel resources.
- Allows *PLEXOS* to select additional energy storage options in the short-term including hybrid resources and storage of six and eight hours of duration.
- Allows *PLEXOS* to select from a more realistic set of resource options in the long term which, at a minimum, should include long-duration storage or other clean peaking technology and increased limits for solar and wind.
- Allows coal units to endogenously retire with the latest retirement date of 2045.
- Updates the storage cost assumptions to better align with public and widely used estimates.
- Complies with the GNP Rules.
- Assumes Virginia remains in RGGI and assumes a social cost of carbon in the resource selection and retirement step.

On the demand side, Dominion should develop a plan including:

- A more limited forecast for data center load that accounts for the limitations and expanded energy efficiency and demand response programs for data centers.
- A more limited forecast for EV load fully accounting for EV TOU adoption and managed charging programs.
- Usage per customer trends for commercial and industrial customers consistent with recent trends.
- A scenario with an energy efficiency adjustment consistent with AEU's alternative projections and including the alternative projections in the load forecast assumption utilized in *PLEXOS*.

Mr. Burgess examined and critiqued the 2023 IRP with a focus on Dominion's load forecast and DSM projections. He also provided certain associated recommendations for the Commission's consideration.<sup>222</sup>

As a preliminary matter, Mr. Burgess opined that the substantial level of growth in the load forecast projected by Dominion is unlikely to materialize. He then identified four factors in the 2023 IRP which, in his assessment, are contributing to an exaggerated load forecast: (i) an overly aggressive data center and EV load forecast; (ii) an inaccurate forecast of usage per customer for the industrial and commercial sectors; (iii) an underestimate of energy and peak savings contributions from energy efficiency programs; and (iv) an underestimate of the peak savings contributions from demand response programs.<sup>223</sup>

Mr. Burgess explained that Dominion projects its total peak load will increase by 10,000 MWs between now and 2038, with data center load making up approximately half of its total kWh sales by 2038. He also described the Company's methodology for projecting data center peak load demand and acknowledged there has been unprecedented growth in Virginia's data center demand in recent years which may continue for some time. Nevertheless, he believed caution should be applied when assuming the trend will continue for the next 15 years because: (i) likely rising transmission costs may encourage data centers to explore other locations; (ii) land use conflicts in Northern Virginia may make it more difficult for data centers to secure locations; (iii) data center clean energy preferences may deter data centers from entering Dominion's service territory; and (iv) data centers are exploring demand reduction opportunities. He denied that the Company's load forecast accounts for any of these factors. Furthermore, Mr. Burgess indicated that the Company applies only minimal adjustments to its data center and EV load forecasts to account for future DSM programs within these sectors. He also identified potential programs and opportunities for mitigating the impacts of EV and data center load.<sup>224</sup>

Mr. Burgess next maintained the usage projections in the Company's load forecast conflict with historical trends for the commercial and industrial sectors. He contrasted Dominion's projected usage trends for residential customers, which were, in his assessment, modeled more carefully by Dominion, from the Company's usage per customer projections for commercial and industrial customers, which he found to be significantly at odds with historical trends and unreasonable. More specifically, he expressed concern that Dominion's failure to use a similar usage per commercial/industrial customer approach to that utilized for residential customers when projecting commercial and industrial usage is inflating the load forecast for commercial and industrial customers.<sup>225</sup>

Furthermore, Mr. Burgess contended the Company's analysis underestimates the role of energy efficiency programs, thereby leading to suboptimal portfolios. He defined energy efficiency; opined that the 2023 IRP fails to include reasonable (or well thought out/realistic) assumptions for the amount of energy and peak savings that could be achieved from future

<sup>222</sup> Ex. 22 and 22C (Burgess Direct), at 9-11. Mr. Burgess' overall findings and recommendations, which are identified at both the beginning and the end of his prefled testimony, are addressed throughout this Report.

<sup>223</sup> *Id.* at 12.

<sup>224</sup> Ex. 22 (Burgess Public Direct), at 13-18 and 22C (Burgess Confidential Direct), at 13-19.

<sup>225</sup> Ex. 22 and 22C (Burgess Direct), at 19-21.



energy efficiency programs (referred to by the Company as “Category 2” energy efficiency programs, as contrasted with “Category 1” programs which already exist); provided his own alternative projection of total energy and peak savings from energy efficiency programs which, among other things, increased the level of peak savings (~975 MWs) to approximately enough equivalent capacity to avoid the new natural gas additions contemplated in the 2023 IRP; and identified recent developments (including the IRA) increasing the potential of DSM measures which, in his view, make his projection more achievable. Additionally, he opined that there are opportunities to pursue an expanded level of energy efficiency savings cost-effectively. Among other things, he emphasized that many energy efficiency programs are significantly less costly than supply-side resources when compared on a \$/MWh basis. He also denied that Dominion’s *PLEXOS* modeling approach sufficiently investigates the possibility for an expanded energy efficiency portfolio to be selected if it is more cost-effective. Similarly, he denied that the Company’s previous potential market study from 2020 referenced in the 2023 IRP adequately captured the opportunity for achieving an expanded energy efficiency portfolio.<sup>226</sup>

Similarly, Mr. Burgess concluded that Dominion’s analysis underestimates the role of demand response programs, thereby leading to suboptimal resource portfolios. He defined demand response; identified varying types of demand response programs; and described the types of benefits demand response programs provide to utilities, ratepayers, and the grid. He then opined that the Company failed to include reasonable assumptions for the amount of peak demand savings achievable through existing and future demand response programs. He asserted, among other things, that Dominion’s peak load forecast does not appear to consider expanding the Company’s demand response offerings. He maintained greater peak reductions from demand response could be achieved and included in the Company’s IRP (through new demand response programs, greater ramp up of smart thermostat and water savings demand response programs, and improvements to under-performing demand response programs); clarified his concerns regarding Dominion’s existing approach to demand response; identified additional opportunities for the Company to mitigate expected load growth in the residential section (by encouraging robust adoption of EV TOU rates, expanding the existing EV demand response program, pursuing expanded beyond the initial pilot phase charging by way of vehicle telematics, and pursuing bidirectional charging opportunities); and identified additional opportunities to mitigate commercial and industrial load growth through demand response. Overall, he offered four general recommendations regarding demand response: (i) Dominion should pursue the demand response programs he supports in his testimony as well as time-differentiated energy efficiency measures (which he believes to be of the highest priority); (ii) the Company should expand its existing peak reduction demand response programs to incorporate more controllable and interruptible load; (iii) Dominion should develop new and expanded demand response programs specific to data centers; and (iv) the Company should develop new and expanded EV demand response programs in the near term (including the development of TOU rates).<sup>227</sup>

In the concluding section of his prefiled testimony, Mr. Burgess summarized his overall conclusions and recommendations. Concerning Dominion’s load forecast and projected demand resources, he concluded four factors contribute to the Company’s exaggerated load forecast:

<sup>226</sup> *Id.* at 21-29.

<sup>227</sup> Ex. 22 (Burgess Public Direct), at 29-38 and 22C (Burgess Confidential Direct), at 30-38.

(i) the forecast is overly aggressive and does not consider issues that may mitigate data center growth in Northern Virginia;

(ii) Dominion's per customer usage projections for commercial and industrial customers are inconsistent with historical trends;

(iii) the Company's resource modeling underestimates the role of energy efficiency programs by failing to consider additions beyond VCEA minimums; and

(iv) Dominion's modeling underestimates the value of demand response programs.

Mr. Burgess recommended that the Commission reject the 2023 IRP in its current form, and require the Company to file a revised IRP modifying the load forecast with changes to supply-side resource assumptions (supported by AEU witness Roumpani) and with the following demand-side modifications: (i) a more limited data center load forecast; (ii) a more limited EV load forecast; and (iii) appropriate usage per customer trends for the commercial and industrial sector. Moreover, he recommended that the Commission require Dominion to revise its IRP analysis (used in *PLEXOS*) including at least one Alternative Plan with an energy efficiency adjustment consistent with his alternative projection. Additionally, he recommended certain actions relative to the Company's future IRPs (concerning matters such as the modeling of energy efficiency and demand response resources). Finally, he supported the same overall recommendations as Dr. Roumpani on behalf of AEU.<sup>228</sup>

### *Staff*

Staff submitted the testimony of **Bernadette Johnson**, General Manager, Power & Renewables, for Enverus, Inc. ("Enverus"); **Matthew S. Glattfelder**, a Public Utility Regulation Analyst with the Commission's Division of Public Utility Regulation ("PUR"); **Oliver C. Collier**, another PUR Analyst; **Andrew T. Boehnlein**, a Manager with PUR; and **Anna L. Clayton**, Principal Utility Specialist with the Commission's Division of Utility Accounting and Finance ("UAF").

**Ms. Johnson** explained that she was engaged by Staff to: (i) provide Staff's proprietary benchmark and basis 25-year forecasts for natural gas (Henry Hub); (ii) review the Company's 25-year commodity and power price forecasts contained in the 2023 IRP and compare and contrast such prices with those of Enverus; (iii) review Dominion's 25-year commodity and power price forecasts from its 2009-2022 IRPs and 2020-2022 RPS Plans and discuss the Company's track record concerning accurate commodity and power price forecasts; (iv) provide energy sales and peak load 25-year forecasts for the PJM-DOM Zone and the Dominion LSE, provide peak load forecasts for various PJM peaks (the summer coincident peak, the summer non-coincident peak, and the winter non-coincident peak), and compare and contrast the Enverus energy sales and peak load forecasts with the Company's forecasts in the 2023 IRP and with PJM's 2023 forecasts; (v) review Dominion's 25-year energy sales and peak load forecasts from its 2009-2022 IRPs and 2020-2022 RPS Plans and discuss the Company's track record concerning the accuracy of its energy sales and peak load forecasts; (vi) review Dominion's

<sup>228</sup> Ex. 22 (Burgess Public Direct), at 38-42 and 22C (Burgess Confidential Direct), at 39-42.

available RGGI and CO<sub>2</sub> forecasts and discuss the reasonableness of including a RGGI and national CO<sub>2</sub> price in the planning model; (vii) provide a 15-year renewable energy certificate ("REC") forecast for the PJM region; (viii) review the Company's load, commodity price, market price, and energy sales forecasts and forecasting methodologies and discuss the reasonableness of Dominion's forecasting methodologies, assumptions, and inputs; and (ix) provide a 15-year capacity price forecast for the DOM Zone in PJM.<sup>229</sup>

Ms. Johnson explained that while Dominion, PJM and Enverus utilize different forecasting methodologies depending upon subject items, the three entities all use scientific approaches that can be reasonably expected to map a legitimate outcome. She emphasized difficulties associated with the global environment resulting in extremely volatile (and within the past ten years largely unprecedented) commodity prices and consumption patterns. Given such factors, she did not believe differences in the forecasts to be surprising or unexpected. She also recognized/concluded the following: (i) Dominion's price forecasts rely upon an analysis provided by ICF as of February 28, 2023; (ii) the Company's discussion of its methodology in the 2023 IRP is "robust and transparent;" (iii) Dominion utilizes a single source, ICF, to provide multiple scenarios for its commodity price forecasts as a means of ensuring consistency in its methodologies and assumptions; (iv) for most commodity prices, the Company utilizes forward market prices as of February 28, 2023 for the first 18 months, blended forward prices (with ICF estimates) for the next 18 months, and exclusive ICF estimates beyond the first 36 months; (v) ICF provides capacity and federal CO<sub>2</sub> price forecasts to Dominion for all forecasted years in the 2023 IRP; (vi) Enverus also utilizes a blend of market prices and analyst generated outlooks, the mixture of which varies depending upon the reliability of the observable market, and, although likely differing from the prices utilized by the Company, "both approaches represent best-efforts at identifying a reasonable outlook;" (vii) Enverus agrees with the Company's representation in the 2023 IRP that the commodity prices analyzed therein present reasonable likely outcomes, based upon current market fundamental understandings, but do not present all possible outcomes; and (viii) Enverus agrees with Dominion's approach of blending observable forward market prices. Additionally, Ms. Johnson concluded the Company's forecast date of February 28, 2023, is reasonably timely; supported Enverus' more significant reliance upon machine learning in load forecasting to better capture trends that may not be apparent in subjective data; explained that Enverus' forecasts were generated on or about June 22, 2023; noted that Enverus has attempted to highlight forecast differences based on outlook and view rather than simply relating to timing; and opined that while the fuel and power prices of Enverus and the Company differ, they do not do so in an unacceptable manner.<sup>230</sup>

Ms. Johnson identified the three areas wherein Enverus' forecasting differs from Dominion's as: (i) the energy sales and peak load forecasts; (ii) the capacity price forecast; and (iii) the REC forecast.<sup>231</sup> Furthermore, she sponsored and supported the Summary Report and Findings attached to her testimony which, among other things, addressed and compared natural gas, coal, and fuel oil forecasts of Enverus and the Company;<sup>232</sup> addressed and compared the

<sup>229</sup> Ex. 27 (Johnson Direct), at 2-3.

<sup>230</sup> *Id.* at 3-4.

<sup>231</sup> *Id.* at 4.

<sup>232</sup> *Id.*, Summary Report and Findings at 8-15.

energy sales and peak load forecasts of Enverus, the Company, and PJM;<sup>233</sup> addressed and compared the power price forecasts of Enverus and the Company;<sup>234</sup> addressed the RGGI and national CO<sub>2</sub> price forecast information included in the 2023 IRP;<sup>235</sup> addressed and compared the REC forecasts of Enverus and the Company;<sup>236</sup> and addressed and compared the capacity market forecasts of Enverus and the Company.<sup>237</sup> Of particular note, the Enverus energy sales forecast is lower than the forecasts of Dominion and PJM primarily due to the outlook for growth in data centers and Enverus' use of a "more wholistic approach focusing on all drivers of load not just data centers."<sup>238</sup> Additionally, Ms. Johnson provided an Appendix explaining the methodologies utilized in her analysis.<sup>239</sup>

At the hearing, and in response to Company witness Rajan's rebuttal testimony, Ms. Johnson defended Enverus' use of a historical weather-normalized load analysis capturing residential, commercial, and industrial demand and load growth and incorporating all observed changes in load (including from data centers, electric vehicle charging, demand response, and rooftop solar impacts); and emphasized that Enverus' load forecasts have proven to be more accurate than Dominion's for many years.<sup>240</sup>

In response to Company witness Bradshaw's rebuttal testimony, Ms. Johnson defended her use of Electric Reliability Council of Texas ("ERCOT") data given the high level of load growth in that region. Additionally, she emphasized that the consideration of a combination of factors is important to determining overall load growth (that is, considering not just data center load growth in Virginia or economic growth in Texas).<sup>241</sup>

In response to Company witness Scheller's rebuttal testimony, Ms. Johnson denied that the Enverus capacity forecast fails to capture the value of resource adequacy. She also explained that such forecast was formulated using actual heat rate data (as contrasted with the ICF forecast which, according to Ms. Johnson, focused upon what could happen in a perfectly efficient market not existing in PJM).<sup>242</sup>

When questioned by Appalachian Voices, Ms. Johnson confirmed her projection that growth from the residential class is expected to decline by 22% and from the industrial class by 3%; confirmed her prior testimony critiquing demand forecasts relying too heavily on one sector; and indicated that she had no reason to question a Company discovery response indicating that most of its data center demand comes from Northern Virginia.<sup>243</sup> She clarified that while she takes issue with the size of growth being forecasted by Dominion, she does not dispute that data

<sup>233</sup> *Id.*, Summary Report and Findings at 16-23.

<sup>234</sup> *Id.*, Summary Report and Findings at 24-25.

<sup>235</sup> *Id.*, Summary Report and Findings at 26-27.

<sup>236</sup> *Id.*, Summary Report and Findings at 28.

<sup>237</sup> *Id.*, Summary Report and Findings at 29-30.

<sup>238</sup> *Id.*, Summary Report and Findings at 16.

<sup>239</sup> *Id.*, Summary Report and Findings, Appendix.

<sup>240</sup> Tr. (Johnson), at 411-412. Ms. Johnson also took issue with Company witness Rajan's suggestion, when attempting to discredit the reliability of the Enverus forecast, that there were no unusual factors at play on July 28, 2023, and noted there was a heat wave in that period. *Id.* at 412-413.

<sup>241</sup> *Id.* at 413-414.

<sup>242</sup> *Id.* at 414.

<sup>243</sup> *Id.* at 417-419.

center load is growing and will continue to grow.<sup>244</sup> She emphasized the difficulty in trying to forecast long-term when only a few factors or a limited number of customers are driving data center demand.<sup>245</sup>

When questioned by Sierra Club, Ms. Johnson confirmed that she was not asked to consider the social cost of carbon in her analysis (to the extent that it is differentiated from an actual carbon tax).<sup>246</sup>

During cross-examination by Dominion, Ms. Johnson again confirmed Enverus' reliance upon actual historical data in the formulation of its energy sales and peak load forecasts and acknowledged that Enverus did not consider the type of forward-looking information highlighted by Appalachian Voices witness Wilson.<sup>247</sup> Nevertheless, she opined that a third-party expert in data-center-specific market dynamics would be valuable in the development of a data center load forecast.<sup>248</sup> Additionally, while Ms. Johnson confirmed that Enverus did not evaluate any of the actual financial commitment contracts referenced in Company witness Bradshaw's rebuttal testimony, she maintained one of Mr. Bradshaw's charts (summarizing contractual information supports) supports her conclusion that there is more clarity in the next couple of years regarding data center growth and indicated she would need more information before being able to assess if identified financial commitments show the Company's forecast from 2026 to 2032 to be conservative.<sup>249</sup> Ms. Johnson also clarified that her arrangement with Staff did not include carving out a specific data center forecast.<sup>250</sup>

On redirect, Ms. Johnson clarified that Enverus did not provide a RGGI forecast but looked at historical data when considering RGGI and a national CO<sub>2</sub> price.<sup>251</sup> She also maintained Company witness Bradshaw's rebuttal chart (Figure 1) summarizing various financial commitment contracts does not provide perfect clarity (despite reflecting that the metered load is lower than the aggregate of contract capacity) and confirmed the contractual information provided by Mr. Bradshaw on rebuttal did not change her opinion that the near-term is more predictable as compared to predicting the far term regarding data centers.<sup>252</sup>

**Mr. Glattfelder** focused on the Company's modeling input assumptions other than those related to load forecasts, energy sales, and commodity price forecasts (that are addressed by Staff witness Johnson).<sup>253</sup>

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<sup>244</sup> *Id.* at 420.

<sup>245</sup> *Id.* at 420-421. Ms. Johnson subsequently explained that forecasting becomes more difficult when you go out beyond two to two and a half years and when you are considering plans for a data center to build ten or more years from now. *Id.* at 421-422.

<sup>246</sup> *Id.* at 424.

<sup>247</sup> *Id.* at 426-432. See also Ex. 29 (Staff responses to Dominion 3-20 and 3-22).

<sup>248</sup> *Id.* at 431-432.

<sup>249</sup> *Id.* at 432-438.

<sup>250</sup> *Id.* at 438-440.

<sup>251</sup> *Id.* at 441.

<sup>252</sup> *Id.* at 443-444.

<sup>253</sup> Ex. 35 (Glattfelder Direct), at 1-2.

Mr. Glattfelder first provided a description of Dominion's modeling methodology which uses *PLEXOS* software for the creation of long term optimization models to develop resource plans including levels and types of resources required to meet the Company's future capacity and energy needs. He explained that Dominion modified its modeling after the 2020 IRP to incorporate VCEA refinements – including, but not limited to, eleven refinements depicted in Section 4.12 of the 2023 IRP. He identified the input assumptions that are common to all of the Alternative Plans (the 2023 PJM load forecast; Dominion's exit from RGGI before January 1, 2024; the retirement of Yorktown 3, Chesterfield 5, and Chesterfield 6 in May of 2023; the base commodity forecast; and certain 2023 legislation). Because there may be legal challenges blocking Virginia's exit from RGGI, Mr. Glattfelder suggested the Commission may find it appropriate to require the Company to include modeling reflecting both Virginia's exit from RGGI and Virginia's continued participation in RGGI in its future IRP and RPS modeling. He also discussed Dominion's modeling of the IRA and the Company's representation that it may need additional guidance from the Internal Revenue Service ("IRS") to fully analyze federal tax credit impacts. Additionally, he testified that Staff has concerns regarding the following aspects of the Company's Alternative Plan modeling: (i) the average annual onshore wind capacity factors utilized; (ii) the ELCC capacity values of solar generation utilized; (iii) the estimated construction costs and timing of SMRs incorporated; (iv) the energy, load, and commodity forecasts utilized; and (v) the 5% energy efficiency savings attributed to Dominion's current and planned DSM activities.<sup>254</sup>

Mr. Glattfelder then provided an overview of Dominion's resource selection process and identified four-hour, lithium-ion battery storage; SMRs; capacity purchases; and natural gas units as the supply resources that were made available in the Company's *PLEXOS* modeling. Concerning renewable resources, he indicated solar (distributed and non-distributed) and wind (onshore and offshore) were made available for model selection.<sup>255</sup>

Regarding solar resources, Mr. Glattfelder explained that the Company allowed *PLEXOS* to select solar resources in 60 MW blocks; limited the model to selecting a yearly utility-scale solar maximum of 900 MWs for Alternative Plans A through C; limited the model to selecting a yearly utility-scale solar maximum of 900 MWs through 2038 and increasing to 1,200 MWs starting in 2029 for Alternative Plans D and E; allowed the model to select Company-owned or PPAs for solar in Alternative Plan A; and modeled PPAs as 35% of solar generation capacity placed into service over the Study Period for Alternative Plans B through E. He then summarized the solar capacity factors assumed by Dominion and provided comparative data. Based upon published averages from the 2022 Berkeley Labs Study and sampled actual performance (from Company-owned facilities and a contracted generation facility in Virginia), he did not oppose the Company's assumed capacity factors for solar tracking resources. However, he concluded Dominion appears to have utilized an inflated bonus/penalty risk-adjusted ELCC as an input in its modeling for fixed and tracking solar resources for 10 of the 12 forecasted years from 2023 to 2032. He questioned the ELCC value assumptions used by the Company (comparing them to a salesperson's creation of an annual budget based upon expected commissions that are not guaranteed) and recommended that the public class values for

<sup>254</sup> *Id.* at 2-6.

<sup>255</sup> *Id.* at 6-7.

ELCC published by PJM be used rather than a value that is modified with bonus and penalty adjustments (as was done by the Company in the 2023 IRP).<sup>256</sup>

Regarding wind resources, Mr. Glattfelder first recognized Dominion's receipt of approval for the Coastal Virginia Offshore Wind Project representing 2,600 MWs of capacity and noted that a 42% capacity factor for this project was used in the Company's modeling associated with all of the Alternative Plans. He also identified wind resources available for selection in Dominion's *PLEXOS* modeling (a 120 MW project with a 36.5% capacity factor, an 80 MW project with a 42.4% capacity factor, and a 60 MW generic wind resource with a 39.5% capacity factor). In his assessment, the capacity factors used by Dominion for modeling onshore wind appear optimistic as compared to published averages and sampled facilities in Virginia. He ultimately recommended that the Commission require Dominion in future IRP, RPS, or other relevant proceedings (including for CPCNs) to incorporate within its analysis the most recent studies and proven capacity factors of existing facilities in Virginia (or as close as possible). Furthermore, Mr. Glattfelder testified that Staff does not oppose the Company's assumed values for wind which are based upon the December 2022 PJM ELCC study (showing offshore wind has an assumed ELCC of 43%, decreasing over time as offshore wind saturation grows).<sup>257</sup>

Regarding energy storage resources, Mr. Glattfelder explained that the Company assumes all storage additions in the 2023 IRP are four-hour, lithium-ion batteries or pumped storage. Additionally, he explained the yearly MW storage limitations in the Alternative Plans, discussed the ELCC values assumed by Dominion for storage resources, and represented that Staff does not oppose the Company's assumed ELCC.<sup>258</sup>

Regarding thermal resources, Mr. Glattfelder noted that the Company included natural gas-fired units and SMRs in its modeling. He provided an overview of the natural gas input assumptions utilized by Dominion and indicated that Staff does not oppose the Company's assumption that its anticipated new CTs will be hydrogen-capable by 2045 "given that all the natural gas units in the model, assuming additional modifications, can co-fire with hydrogen utilizing existing technology."<sup>259</sup>

Regarding nuclear resources, Mr. Glattfelder first recognized that all nuclear additions in the Alternative Plans are assumed to be SMRs. He summarized the Company's representations about SMRs in the 2023 IRP and then outlined Staff's concerns regarding associated uncertainties. Specifically, because SMRs are still in early stages of development, Mr. Glattfelder cautioned that there are many uncertainties around Dominion's planned SMR development, including cost uncertainties and concerns regarding timing.<sup>260</sup>

Regarding Dominion's existing generating fleet, Mr. Glattfelder confirmed that the Company included in the 2023 IRP adjustments to the capacity values of its Brunswick facility (increased/"up rated" by 18 MWs in 2023) and the Warren facility (increased/"up rated" by 7

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<sup>256</sup> *Id.* at 7-12.

<sup>257</sup> *Id.* at 12-15.

<sup>258</sup> *Id.* at 15-17.

<sup>259</sup> *Id.* at 17-18.

<sup>260</sup> *Id.* at 18-19.

MWs in 2022). Additionally, Dominion reduced the capacity of its Mt. Storm facility by 1.1 MWs in 2022.<sup>261</sup>

Regarding purchased capacity, Mr. Glattfelder first summarized the capacity purchases included by the Company in each of its Alternative Plans. Among other things, he noted that Alternative Plans D and E begin with a capacity purchase limit of 5,200 MWs from 2024-2038 which increases to 13,000 MWs for 2039-2048. In his assessment, the capacity purchases contemplated at the end of the Alternative Plans D and E Planning Period appear larger than physically possible without substantial increases to Dominion's import capabilities. Specifically, he calculated that to achieve the capacity purchases contemplated in Alternative Plans D and E, the Company will have to increase its interstate capacity import capability by 8,100 MWs by 2045, representing an increase of 300%.<sup>262</sup>

Regarding RECs, Mr. Glattfelder first outlined Dominion's approach for modeling RECs in *PLEXOS*. He then represented that Staff does not generally have concerns regarding the Company's REC assumptions. However, he also emphasized that because RECs are produced based on the energy output of renewable facilities, less energy production would also mean fewer RECs for compliance with § 56-585.5 C of the Code. He reiterated Staff's concerns regarding the average capacity factors used by the Company in estimating the energy outputs of onshore wind resources and highlighted the possibility of lower than estimated REC production by these resources.<sup>263</sup>

Regarding construction costs, Mr. Glattfelder noted that Dominion based the construction cost assumptions utilized in its modeling on Company projects through 2022 (modified thereafter based upon various assumptions including NREL annual escalation percentages). He testified that Staff does not oppose the Company's construction cost methodology because it is based on actual data from Virginia resources.<sup>264</sup>

Lastly, Mr. Glattfelder addressed environmental justice. He noted that Dominion included a brief discussion of VEJA requirements in the 2023 IRP and a general narrative regarding the Company's commitments. He testified that Staff generally agrees with the Company's approach regarding environmental justice, including the conclusion that the evaluation of a resource's environmental justice impacts requires site-specific information (the details of which are not included in the 2023 IRP).<sup>265</sup>

At the hearing, Mr. Glattfelder defended Staff's support for the use of PJM ELCC guidance for capacity value assumptions (without modification to include bonuses and penalties) until specific performance information on the units is obtained.<sup>266</sup>

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<sup>261</sup> *Id.* at 20.

<sup>262</sup> *Id.* at 20-21.

<sup>263</sup> *Id.* at 21-22.

<sup>264</sup> *Id.* at 22-23.

<sup>265</sup> *Id.* at 23-25.

<sup>266</sup> Tr. (Glattfelder), at 513-514.



During cross-examination by Appalachian Voices, Mr. Glattfelder responded to a series of questions relating to environmental justice. Among other things, he confirmed he was unaware of Dominion identifying in the 2023 IRP environmental justice communities within its service territory or negative consequences impacting such communities; acknowledged being unfamiliar with the VEJA policy statement in the Code but, instead, indicated he was more familiar with the definitions in § 2.2-234 of the Code; acknowledged being unaware of the Company distinguishing between “environmental justice communities” and “fenceline communities” in the 2023 IRP; confirmed Staff’s general belief that Dominion’s assessment of environment justice in the 2023 IRP was appropriate given Staff’s understanding of the VEJA; agreed Staff has had limited experience with the VEJA; and represented that he is new to the Commission and lacks specific knowledge regarding any Staff training protocols concerning newly enacted legislation.<sup>267</sup>

On redirect, Mr. Glattfelder confirmed the 2023 IRP includes language reflecting the Company’s commitment to allowing “all communities” to have a “meaningful voice in planning and development processes.”<sup>268</sup>

**Mr. Collier** discussed Dominion’s modeling results with a focus on Alternative Plans A, B and E, which the Company views as fulfilling its capacity and energy needs pursuant to § 56-598 of the Code, as well as meeting its REC requirements under § 56-585.5 C of the Code. He also addressed Dominion’s approach to risks in the Alternative Plans, and discussed the nine sensitivities provided in connection with Alternative Plan B.<sup>269</sup>

Mr. Collier described the Company’s modeling process. Among other things, he noted that while Dominion developed capacity and energy need forecasts for the Study Period (25 years), § 56-597 of the Code only contemplates a review of utility needs over only 15 years (herein, the Planning Period). He also noted that Dominion utilizes developed assumptions (which were analyzed by Staff witness Glattfelder) as inputs in its *PLEXOS* modeling to develop Alternative Plans to serve its future energy and capacity needs under possible future scenarios. Additionally, he explained that *PLEXOS* provides NPV costs associated with each Alternative Plan. Furthermore, he testified that Dominion included the following retirement analyses in connection with the 2023 IRP (as directed by the Commission in the 2020 IRP case): (i) allowing *PLEXOS* to endogenously optimize the timing of CO<sub>2</sub> emitting generating units; (ii) modeling a “glide path” providing for continued reliable service while transitioning to a cleaner energy fleet; and (iii) conducting a cash-flow analysis focused on coal-fired, biomass-fired, and large combined cycle natural gas-fired facilities under certain market conditions. His testimony addressed the modeling described in (i) and (ii), above, while Staff witness Boehnlein addressed the cash flow analysis described in (iii).<sup>270</sup>

Mr. Collier provided an overview of, and figures depicting, the Company’s “going in” summer capacity (based on currently approved resources) and annual energy positions.

<sup>267</sup> *Id.* at 515-529. Counsel for Staff stipulated at the hearing that “environmental justice communities” and “fenceline communities” are two different defined terms in the VEJA. Tr. (Chambliss), at 521.

<sup>268</sup> Tr. (Glattfelder), at 530.

<sup>269</sup> Ex. 36 (Collier Direct), at 1-2.

<sup>270</sup> *Id.* at 2-4.

Additionally, he recognized that Dominion included the Alternative Plans (A through E) with the 2023 IRP representing different scenarios to meet its forecasted capacity and energy needs and included risk/sensitivity analyses for the Alternative Plans representing NPV futures relative to Virginia's participation in RGGI. Mr. Collier also identified the common assumptions used in the Company's modeling runs, acknowledged that the Company modeled various future plans under which it can provide for its energy, capacity, and REC needs based on varying assumptions, and presented multiple paths forward.<sup>271</sup>

Mr. Collier next discussed Alternative Plan A, identified by Dominion as its least-cost plan meeting carbon regulations and mandatory RPS requirements but not meeting statutory development targets for solar, wind, and energy storage (in §§ 56-585.5 D 2 and E 2 of the Code) or complying with the retirement requirements in § 56-585.5 B of the Code. Among other things, Mr. Collier noted that while Alternative Plan A envisions an additional 5,905 MWs of natural gas to be constructed and annual purchases of between 900 and 2,700 MWs of capacity during the Planning Period, Alternative Plan A would not, in Staff's assessment, require Dominion to increase its transmission capacity import limits through the Planning or Study Periods. He also detailed the significant additional PPAs that the Company would be required to enter into under Alternative Plan A and provided the following table summarizing the cumulative nameplate and firm capacity additions of various resource types and associated NPV costs envisioned under Alternative Plan A:

**Table 1: Cumulative Nameplate Capacity Additions (MW)  
for Alternative Plan A through 2038<sup>36</sup>**

<b>Resource Type (NmPlt)</b>	<b>Cumulative Capacity Additions (MW)</b>
Solar PPA	10,800
Solar COS	-
Solar DER	-
Wind	3,040
Storage	1,050
Natural Gas-Fired	5,905
Nuclear	-
Capacity Purchases	27,100
NPV (\$B) costs through 2038 <sup>37</sup>	\$66.50

Mr. Collier explained further that even with the significant resource and PPA additions contemplated for Alternative Plan A there is a small marginal gap between Dominion's capacity resources and its capacity need throughout the Planning and Study Periods. Similarly, he indicated the Company would be a net purchaser of energy throughout the period of 2024-2048 under Alternative Plan A. Relative to statutory REC requirements, Mr. Collier noted that Alternative Plan A appears to provide for enough RECs through 2035, but reflects a significant REC deficiency beginning in 2035. He then highlighted Dominion's representation that customers will be charged a deficiency price multiplied by the current year's deficiency volume

<sup>271</sup> *Id.* at 5-8.

if REC requirements are not met. Furthermore, he recognized that the Company does not view Alternative Plan A to be a viable path forward given its over-reliance on PPAs and inability to meet statutory development targets.<sup>272</sup>

Mr. Collier then addressed Alternative Plan B, described by Dominion as including the development of solar, wind, and energy storage as contemplated by § 56-585.5 D and E of the Code. He also indicated that Alternative Plan B (like Alternative Plan A) does not retire existing generation and adds 2,910 MWs of natural gas-fired units, 10,875 MWs of solar, 2,370 MWs of energy storage, 3,040 MWs of wind, and 804 MWs of SMR over the Planning Period. Additionally, he recognized that Alternative Plan B would require an increase to the Company's transmission capacity import limitation to 5,400 MWs by 2039 and the purchase of between 200 and 2,600 MWs of annual capacity during the Planning Period. Furthermore, he detailed additions required under Alternative Plan B during the Study Period and provided the following tables summarizing the cumulative nameplate and firm capacity additions of various resource types and associated NPV costs envisioned under Alternative Plan B:

**Table 3: Cumulative Nameplate Capacity Additions (MW)  
for Alternative Plan B through 2038<sup>57</sup>**

Resource Type (NmPlt)	Cumulative Capacity Additions (MW)
Solar PPA	3,444
Solar COS	6,396
Solar DER	1,035
Wind	3,040
Storage	2,370
Natural Gas-Fired	2,910
Nuclear	804
Capacity Purchases	21,900
NPV (\$B) costs through 2038 <sup>58</sup>	\$77.5

**Table 4: Cumulative Firm Capacity Additions (MW)  
for Alternative Plan B through 2038<sup>59</sup>**

Resource Type (Firm)	Cumulative Capacity Additions (MW)
Solar	2,153
Wind	776
Storage	2,109
Natural Gas-Fired	2,910
Nuclear	732
NPV (\$B) costs through 2038 <sup>60</sup>	\$77.5

Moreover, he explained that Alternative Plan B would result in significant capacity shortfalls from Company-owned and contract resources. Similarly, he indicated the Company would be a

<sup>272</sup> *Id.* at 8-16. Mr. Collier used the acronym "COS" in his testimony (and tables) when referring to "cost of service." *Id.* at 10 n.35.

net purchaser of energy throughout the period of 2024-2048 under Alternative Plan B. Relative to statutory REC requirements, Mr. Collier noted that the Company anticipates meeting the REC shortfall envisioned to begin under Alternative Plan B in 2039, by paying statutory deficiency payments.<sup>273</sup>

Mr. Collier next discussed Dominion's modeling of retirements. He indicated that while Alternative Plans A, B, and C allowed the model to select unit retirements on a least-cost basis, it did not select any retirements during either the Planning Period or the Study Period. Additionally, he highlighted Staff witness Johnson's opinion that Dominion's capacity price forecasts are overstated, and explained that when capacity prices are overstated, the model will recognize an overstated value of the associated generation facility (at least to its capacity value), thereby resulting in the model's selection of a unit's continued operation rather than its retirement. If the Commission shares Staff's concerns regarding Dominion's capacity price forecasts, Mr. Collier suggested the Commission may find it appropriate to require Dominion to conduct modeling runs wherein *PLEXOS* selects, on an economic basis, generation unit retirements.<sup>274</sup>

Mr. Collier then addressed Alternative Plan E which retires all Company-owned carbon-emitting generation by the end of 2045 (but after the Planning Period), includes new generation resources selected on a least-cost optimized basis without regard to statutory development targets for renewable resources (and most of which would be constructed during the Study Period), and would require an increase in Dominion's capacity transport limit from approximately 2,700 MWs to 10,800 MWs in 2037. He also provided the following tables summarizing the cumulative nameplate and firm capacity additions of various resource types and associated NPV costs envisioned under Alternative Plan E:

**Table 5: Cumulative Nameplate Capacity Additions (MW)  
for Alternative Plan E through 2038<sup>74</sup>**

<b>Resource Type (NmPlt)</b>	<b>Cumulative Capacity Additions (MW)</b>
Solar PPA	3,780
Solar COS	7,020
Solar DER	294
Wind	3,040
Storage	2,910
Natural Gas-Fired	970
Nuclear	1,072
Capacity Purchases	29,100
NPV (\$B) costs through 2038 <sup>75</sup>	\$81.0

<sup>273</sup> *Id.* at 16-22.

<sup>274</sup> *Id.* at 22-23.

**Table 6: Cumulative Firm Capacity Additions (MW)  
for Alternative Plan E through 2038<sup>76</sup>**

<b>Resource Type (Firm)</b>	<b>Cumulative Capacity Additions (MW)</b>
Solar	2,197
Wind	776
Storage	2,590
Natural Gas-Fired	970
Nuclear	976
NPV (\$B) costs through 2038 <sup>77</sup>	\$81.0

Mr. Collier explained further that Alternative Plan E would leave the Company with a capacity deficit relative to projected need throughout the Study Period – in the approximate amount of 3,595 MWs in 2038, growing to approximately 10,569 MWs in 2045 because of CO<sub>2</sub> unit retirements, and falling to approximately 10,531 MWs by 2048. Additionally, he indicated the Company would be a net purchaser of energy throughout the period of 2024-2048 under Alternative Plan E. Relative to statutory REC requirements, Mr. Collier noted that Alternative Plan E would require Dominion to purchase approximately 19,508,000 RECs in 2038 and 39,287,000 RECs in 2048. He then recognized that Dominion does not view Alternative Plan E to be a viable path forward given concerns regarding energy independence and system reliability.<sup>275</sup>

While Mr. Collier acknowledged the Company did not specifically identify a “preferred” or “primary” plan the 2023 IRP, he concluded Dominion views Alternative Plan B as its preferred plan because it included nine additional sensitivity/risk analyses for Alternative Plan B that it did not provide in connection with Alternative Plans C, D, or E. He also discussed NPV cost information provided by Dominion. Among other things, Mr. Collier indicated the Planning Period NPV cost information included in his testimony may be slightly overstated because the Company failed to correct an ELCC value error discovered by Dominion after its initial filing. He then provided the following tables comparing the NPV costs of Alternative Plans A, B, and E:

<sup>275</sup> *Id.* at 23-30.

**Table 7: Net Present Value Costs of Alternative Plans A, B, and E for 2023-2038<sup>21</sup>**

Alternative Plans	Total System Costs (\$B)	Grid Transformation Costs (Net of Benefits)(\$B)	Strategic Underground Program (\$B)	Transmission Costs (\$B)	Transmission Import (\$B)	Total Costs (\$)
Alternative Plan A	\$ 49.4	\$ (1.6)	\$ 0.7	\$ 18.0	\$ -	\$ 66.5
Alternative Plan B	\$ 54.1	\$ (1.6)	\$ 0.7	\$ 18.0	\$ 6.2	\$ 77.4
Alternative Plan E	\$ 53.0	\$ (1.6)	\$ 0.7	\$ 18.0	\$ 10.9	\$ 81.0

**Table 8: Net Present Value Costs of Alternative Plans A, B, and E for 2023-2048<sup>22</sup>**

Alternative Plans	Total System Costs (\$B)	Grid Transformation Costs (Net of Benefits)(\$B)	Strategic Underground Program (\$B)	Transmission Costs (\$B)	Transmission Import (\$B)	Staff Interrogatory 03-97 (d) Adjustment	Total Costs (\$)
Alternative Plan A	\$ 88.5	\$ (1.6)	\$ 0.7	\$ 22.2	\$ -	\$ (0.2)	\$ 109.6
Alternative Plan B	\$ 100.2	\$ (1.6)	\$ 0.7	\$ 22.2	\$ 6.2	\$ 0.1	\$ 127.8
Alternative Plan E	\$ 105.8	\$ (1.6)	\$ 0.7	\$ 22.2	\$ 10.9	\$ 1.1	\$ 139.1

He noted that the NPV cost differences reflected above are primarily related to the varying quantities and types of resources selected in each model – together with the energy, capacity, and REC purchases needed to serve customers, meet PJM reliability standards given the PJM Dominion load forecast, and fulfill statutory requirements.<sup>276</sup>

Next, Mr. Collier discussed the impacts of Staff-identified issues in the Company's modeling, which he identified as: (i) Staff witness Johnson's concerns regarding Dominion's load, energy sales, and commodity price forecasts; (ii) Staff witness Glattfelder's concerns regarding the average annual capacity factors assumed by the Company for onshore wind resources, the capacity values of solar generating units assumed by Dominion, and the Company's SMR expectations; and (iii) Staff witness Boehnlein's concerns regarding the Company's 5% energy efficiency target saving assumptions given Dominion's current and projected DSM Portfolio savings.<sup>277</sup> Specifically, he addressed the impacts of such concerns as follows:

1. Mr. Collier noted that the Enverus energy and load forecasts supported by Staff witness Johnson are significantly lower than the Company's and show data center needs may not be realized to the degree stated by Dominion. He also provided the following figures comparing the forecasts of Enverus and the Company relative to Alternative Plan B:

<sup>276</sup> *Id.* at 30-33.

<sup>277</sup> *Id.* at 33.

Figure 1: Appendix 2A Alternative Plan B, Enverus Forecast Overlay, Capacity (MW)

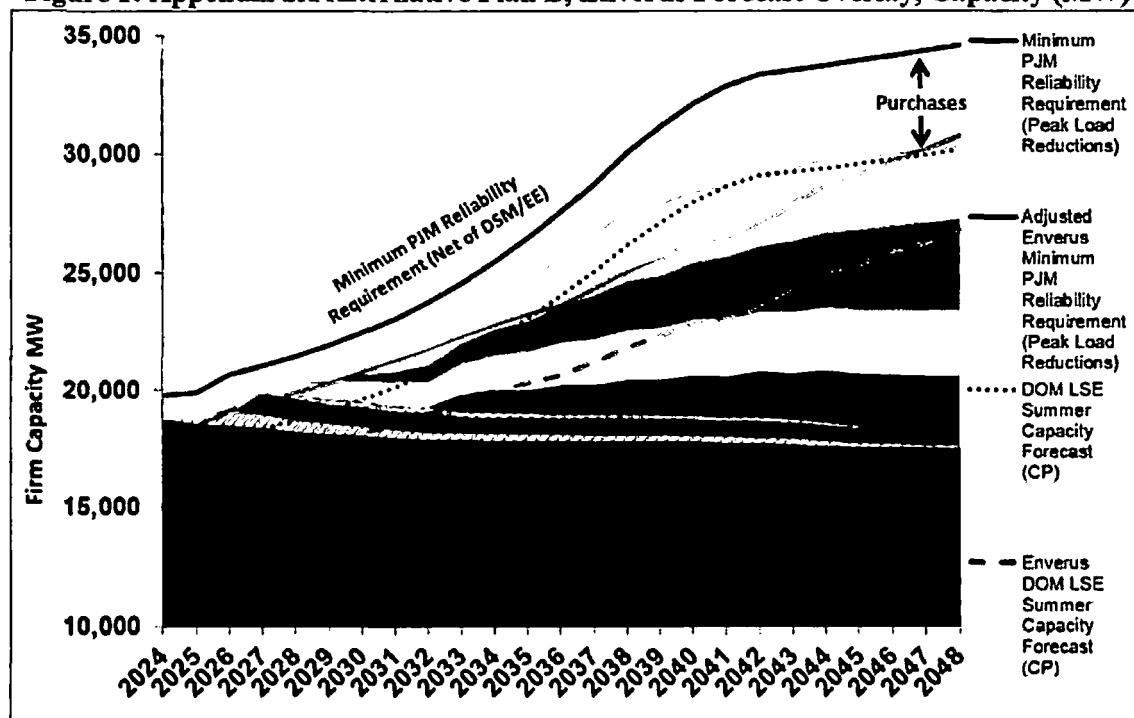
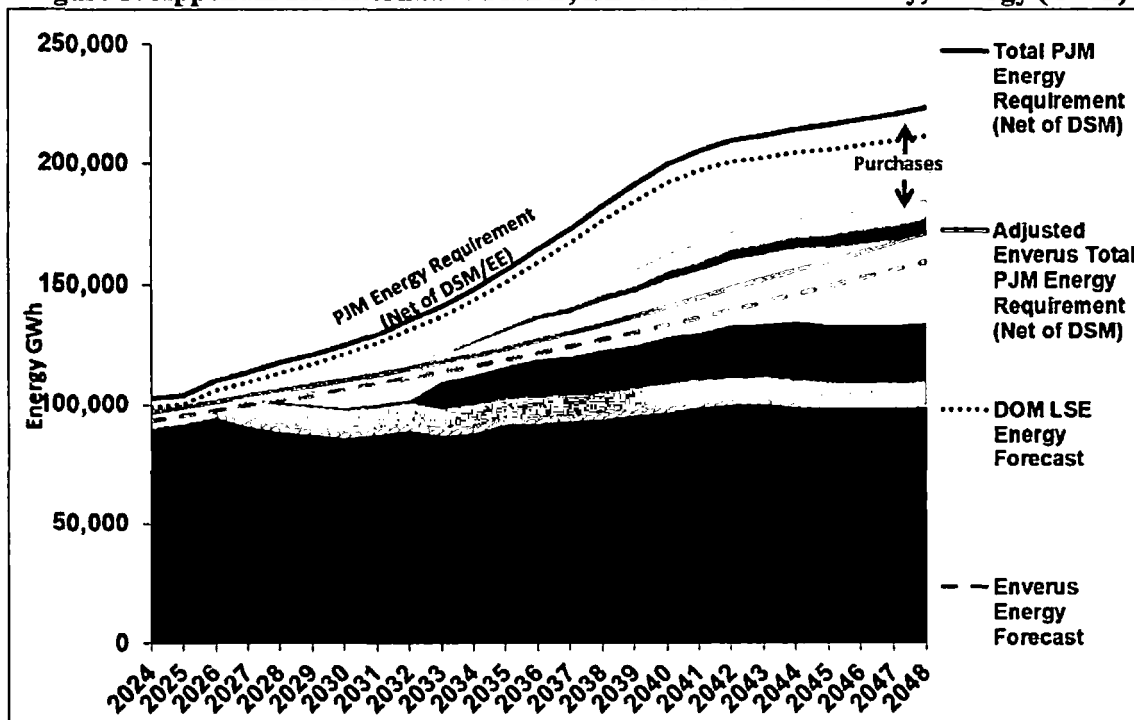


Figure 2: Appendix 2A Alternative Plan B, Enverus Forecast Overlay, Energy (GWh)



According to Mr. Collier, Figure 1 shows if Dominion's actual load growth more closely aligns with the Enverus forecast in the future, the resource additions of Alternative B would provide more than enough capacity to serve the Company's Planning Period load without a capacity deficit until 2047. Additionally, he maintained Figure 2 shows if the future aligns more closely to the Enverus forecast than Dominion's, the resource additions of Alternative Plan B would meet its customers' energy needs during the Planning and Study Periods, except for in 2024. Similarly, he recognized that any energy deficit would be less than what is captured in the Company's modeling to the extent actual energy sales fall between the forecasts of Dominion and Enverus.<sup>278</sup>

2. Regarding Staff witness Glattfelder's concerns, Mr. Collier maintained the Company's use in modeling of average annual capacity factors based upon engineering estimates, rather than observed utility, Virginia or region-specific average annual capacity or for onshore wind resources, may have resulted in an understatement of the NPV costs for the Alternative Plans (and could also impact costs associated with Dominion's REC requirements). Similarly, Mr. Collier concluded Dominion's utilization of bonus/penalty risk adjusted ELCC values as inputs when modeling fixed solar resources and tracking solar resources, rather than using PJM published ELCC values, may have resulted in an overstatement of forecasted available capacity from solar resources and an understatement of the NPV costs of the Alternative Plans in the 2023 IRP (and could also impact the Company's capacity import limits). Furthermore, he concluded the high degree of uncertainty regarding the costs of SMR development may result in an under- or over-statement of the NPV costs of Alternative Plans B, C, D, and E and recommended that Dominion continue to monitor developing information concerning SMR costs and update its associated assumptions in future IRPs and RPS plan filings.<sup>279</sup>
3. Regarding Staff witness Boehnlein's concerns, Mr. Collier concluded the NPV costs of the Alternative Plans could be understated (because of under-forecasted energy, demand, and REC needs) to the extent that Dominion is unable to reduce its energy sales through the implementation of cost-effective energy efficiency programs/ DSM programs to meet the 5% annual energy and demand reduction target.<sup>280</sup>

Lastly, Mr. Collier addressed and evaluated the Company's risk/sensitivity analysis provided in the 2023 IRP. He first noted that for all Alternative Plans Dominion evaluated the NPV cost impacts of Virginia complying with, or exiting as of January 1, 2024, RGGI, and provided the following table comparing the associated NPV costs:

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<sup>278</sup> *Id.* at 33-36.

<sup>279</sup> *Id.* at 37-41.

<sup>280</sup> *Id.* at 41-42.



**Table 9: NPV Costs of Virginia's Participation in RGGI**

Plan	NPV Total (\$B)		
	Virginia Exits RGGI	Virginia In RGGI	Difference (\$B)
Plan A	\$ 109.7	\$ 111.5	\$ 1.80
Plan B	\$ 127.7	\$ 129.3	\$ 1.60
Plan C	\$ 127.2	\$ 129.1	\$ 1.90
Plan D	\$ 140.9	\$ 142.5	\$ 1.60
Plan E	\$ 138.0	\$ 139.7	\$ 1.70

He then reiterated Staff witness Glattfelder's concern regarding uncertainties as to Virginia RGGI status.<sup>281</sup>

Mr. Collier next identified the nine NPV cost sensitivity tests provided by the Company in connection with Alternative Plan B (relating to a PJM High Load Forecast, PJM Low Load Forecast, Company Load Forecast, Approved Energy Efficiency, High Fuel Prices, Low Fuel Prices, High Capital Construction Costs, Low Capital Construction Costs, and Solar Design Capacity Factor) and provided the following table summarizing these sensitivities:

**Table 10: Plan B Sensitivities on NPV Costs<sup>119</sup>**

Plan B Sensitivities on NPV Costs		Plan A Vs. Base Plan B	
Base Plan B	\$ 127.70	\$	-
PJM High Load Forecast	\$ 137.90	\$	10.20
PJM Low Load Forecast	\$ 110.20	\$	(17.50)
Company Load Forecast	\$ 129.70	\$	2.00
Approved Energy Efficiency	\$ 127.80	\$	0.10
High Fuel Prices	\$ 143.40	\$	15.70
Low Fuel Prices	\$ 124.90	\$	(2.80)
High Capital Construction Costs	\$ 134.70	\$	7.00
Low Capital Construction Costs	\$ 124.00	\$	(3.70)
Solar Design Capacity Factor	\$ 126.90	\$	(0.80)

Among other things, he emphasized that Dominion's sensitivity analysis (of PJM High Load Forecast, PJM Low Forecast, and High Fuel Prices) produced a range of NPVs higher or lower than those presented in the Company's base case scenarios by more than \$10 billion. He ultimately represented that Staff has no position on the sufficiency of Dominion's risk analysis.<sup>282</sup>

When questioned by Appalachian Voices, Mr. Collier confirmed Dominion's Alternative Plan A did not model VCEA energy efficiency targets.<sup>283</sup> He acknowledged that he was unfamiliar with any SMRs currently in operation in the United States and confirmed the Company has not yet put an SMR successfully into service.<sup>284</sup> He was somewhat unclear as to why Staff did not elect to recommend that the Company be required to conduct a modeling run

<sup>281</sup> *Id.* at 42-44.

<sup>282</sup> *Id.* at 44-45.

<sup>283</sup> Tr. (Collier), at 534.

<sup>284</sup> *Id.* at 535-536.

in future IRPs where SMRs are not available to the model.<sup>285</sup> Furthermore, Mr. Collier confirmed his Table 10 (on page 45 of his prefiled testimony) shows, for the Company's various Alternative Plans, that Alternative Plan B has the largest NPV cost swing (\$17.5 billion dollars lower) when comparing the PJM low-load forecast sensitivity result to the base case and agreed the load forecast and high fuel prices are the largest drivers of the price differentials for Alternative Plan B.<sup>286</sup>

**Mr. Boehnlein** evaluated the Company's DSM adjustment to its 2023 load forecast; and reviewed Dominion's NPV analysis for coal-fired, biomass-fired, and natural gas combined cycle resources.<sup>287</sup>

Mr. Boehnlein explained that Dominion developed its load forecast and then made a post-model adjustment to account for DSM-achieved energy savings. He noted that such adjustment includes "Category 1" savings related to Commission-approved, ongoing DSM programs; and "Category 2" savings related to unidentified/generic savings from programs and measures designed to meet: (i) VCEA targets from 2022 through 2025; (ii) a 5% energy savings target for 2026 and beyond; (iii) the GTSA's \$870 million energy efficiency spending requirement (through 2028); and (iv) the 15% low-income/elderly/disabled DSM cost allocation requirement. He also recognized that while the Company made both Category 1 and Category 2 savings adjustments in connection with Alternative Plans B through E, only Category 1 savings were considered in connection with Alternative Plan A.<sup>288</sup>

Mr. Boehnlein provided an overview of the energy efficiency goals in the VCEA and Dominion's process for meeting statutory requirements (by designing voluntary programs, seeking associated Commission approvals, and tracking savings through evaluation, measurement, and verification ("EM&V")). He also provided the following table summarizing the Company's progress in meeting the goals in § 56-596.2 B 2 of the Code:

<sup>285</sup> *Id.* at 537-538. Mr. Collier also noted that Staff has gained information regarding energy efficiency from DSM cases leading it to take a position regarding energy efficiency that Staff is not yet capable of taking regarding SMRs. *Id.* at 538.

<sup>286</sup> *Id.* at 539-541. Mr. Collier also confirmed Staff generally takes no position on Dominion's sensitivities. *Id.* at 541.

<sup>287</sup> Ex. 37 (Boehnlein Direct), at 1.

<sup>288</sup> *Id.* at 2-3.

Table 1				
Year	VCEA Target (MWh)	VCEA Target %	Cumulative Reported Savings (MWh)	Savings as % of 2019 Retail Sales
<b>Net Savings</b>				
2022	852,892	1.25%	839,243	1.23%
2023	1,705,783	2.50%	1,215,245	1.78%
2024	2,558,675	3.75%	1,591,089	2.33%
2025	3,411,567	5.00%	1,888,441	2.77%
<b>Gross Savings</b>				
2022	852,892	1.25%	1,283,589	1.88%
2023	1,705,783	2.50%	1,713,926	2.51%
2024	2,558,675	3.75%	2,134,640	3.13%
2025	3,411,567	5.00%	2,461,772	3.61%

He then explained that Dominion does not project it will meet VCEA goals on either a net or gross basis. Furthermore, he emphasized that the 2023 IRP assumes the Company's ability to "fill the gap" in savings to meet VCEA goals through Category 2 savings.<sup>289</sup>

According to Mr. Boehnlein, Staff does not believe it is reasonable to assume that Category 2 savings will fill the gap between Dominion's approved and any future DSM programs (and thereby meet VCEA goals). He reached this conclusion for the following reasons: (i) the magnitude of savings the Company can reasonably achieve through its current DSM paradigm is questionable; (ii) Dominion faces significant headwinds in identifying and implementing future DSM programs given the declining potential of future DSM savings, and the potential for the IRA to hinder the Company's ability to generate future energy efficiency savings (because of the ability of vendors to take advantage of IRA opportunities); and (iii) because of timing issues associated with obtaining necessary Commission approvals of DSM programs.<sup>290</sup>

Mr. Boehnlein then highlighted risks to ratepayers associated with the Company's DSM modeling assumptions. Among other things, he asserted as follows:

If the Company makes inaccurate assumptions regarding the Company's ability to save energy via DSM in its modeling, *e.g.*, through the Company modeling an achievement of the energy savings goals established in Code § 56-596.2 B 2, then the costs associated with *not* actually saving that quantity of energy are effectively hidden from view, at least initially. It is only when those projected savings do not come to fruition at some point in the future, and the Company purchases the required substitutes, that ratepayers pay for those costs. In contrast, by modeling what is known to be achievable in the short term, the Company could potentially act to mitigate the risks of surprise costs appearing in the future.

<sup>289</sup> *Id.* at 3-6.

<sup>290</sup> *Id.* at 6-10.

In response to these concerns, Mr. Boehnlein recommended that the Commission require Dominion to provide additional modeling incorporating only Category 1 savings for Alternative Plans B through E in future IRP proceedings.<sup>291</sup>

Mr. Boehnlein next addressed the retirement analysis included in the 2023 IRP associated with the Company's carbon-generating units. Among other things, he noted that Dominion provided economic analyses showing its calculation of the NPVs for coal-fired, biomass-fired, and gas combined cycle generation facilities on a 10- and 25-year timeline, and provided the following charts summarizing the results of these analyses:

<b>Twenty-Five-Year Cash Flow Analysis Results (NPV \$ Million)<sup>29</sup></b>				
<b>Units</b>	<b>2023 Plan A</b>	<b>2023 Plan B</b>	<b>Low- Capacity Price</b>	<b>High-Capacity Price</b>
Clover 1 - 2	\$423	\$797	\$563	\$828
Mt Storm 1 - 3	\$1,817	\$3,763	\$2,915	\$3,876
VCHEC	\$193	\$792	\$465	\$835
Altavista	\$104	\$165	\$138	\$169
Hopewell	\$120	\$181	\$157	\$184
Southampton	\$125	\$186	\$158	\$190
Rosemary	\$27	\$35	(\$39)	\$45
Bear Garden	\$1,650	\$2,440	\$2,098	\$2,486
Brunswick	\$3,670	\$5,456	\$4,689	\$5,559
Chesterfield 7 - 8	\$989	\$1,603	\$1,389	\$1,631
Gordonsville 1 - 2	\$469	\$775	\$654	\$791
Greenville	\$4,692	\$6,869	\$6,007	\$6,984
Possum Point 6	\$1,344	\$2,103	\$1,788	\$2,145
Warren	\$4,114	\$5,827	\$5,068	\$5,929

<sup>291</sup> *Id.* at 10-12. Mr. Boehnlein also acknowledged that Dominion modeled energy efficiency savings, including Category 2 savings, to comply with the Commission's directive in the 2020 IRP Order. *Id.* at 11.

Ten-Year Cash Flow Analysis Results (NPV \$ Million) <sup>26</sup>					
Units	2023 Plan A	2023 Plan B	Low- Capacity Price	High- Capacity Price	Est. T&D Impact
Clover 1 - 2	\$52	\$48	(\$23)	\$110	\$0
Mt. Storm 1 - 3	\$148	\$126	(\$130)	\$352	\$6
VCHEC <sup>27</sup>	(\$199)	(\$206)	(\$305)	(\$119)	\$16.8
Altavista	\$21	\$20	\$12	\$27	\$0
Hopewell	\$34	\$32	\$25	\$39	\$0
Southampton	\$36	\$35	\$27	\$42	\$0
Rosemary	(\$4)	(\$4)	(\$26)	\$16	\$0
Bear Garden	\$570	\$557	\$454	\$649	\$6
Brunswick	\$1,217	\$1,186	\$954	\$1,391	\$6.5
Chesterfield 7 - 8	\$316	\$305	\$241	\$362	\$3
Gordonsville 1 - 2	\$122	\$118	\$81	\$150	\$0
Greenville	\$1,600	\$1,562	\$1,301	\$1,792	\$6.5
Possum Point 6	\$410	\$397	\$302	\$482	\$11.7
Warren	\$1,600	\$1,568	\$1,339	\$1,771	\$0

Additionally, he highlighted that the ten-year cash flow analysis shows VCHEC to be uneconomic over the next ten years under all scenarios, shows Rosemary to be uneconomic under every scenario except the high-capacity price scenario, and shows Clover and Mt. Storm to be uneconomic under a low-capacity price scenario. Concerning the 25-year analysis, he highlighted that all units are shown to be economic except for Rosemary under the low-capacity price forecast. Furthermore, he recognized that the unit-specific data used in the Company's retirement analysis was incorporated into Dominion's *PLEXOS* modeling, and *PLEXOS* was allowed to endogenously optimize the timing of unit retirements under Alternative Plans A through C, with all units being selected to continue operating throughout the Planning Period. In addition, he recognized that under Alternative Plans D and E (wherein Dominion retires all carbon-emitting units by 2045), the Company sought to identify a "glide path" balancing unit retirements with reliability needs.<sup>292</sup>

Mr. Boehnlein explained that Dominion did not present a 15-year cash flow analysis with the 2023 IRP and emphasized that the results of the Company's retirement analysis were dependent upon the underlying assumptions utilized therein. He then presented the results of Staff's alternative cash flow analysis performed for a 15-year period and utilizing Staff witness Johnson's capacity price forecast, summarized in the following chart:

<sup>292</sup> *Id.* at 12-15.

15-Year Cash Flow Analysis Results (NPV \$ Million)					
Units	2023 Plan A	2023 Plan B	Low-Capacity Price	High-Capacity Price	2023 Plan B Staff Capacity Price
Clover 1 - 2	\$105	\$136	\$8	\$197	(\$5)
Mt Storm 1 - 3	\$368	\$506	\$40	\$727	(\$4)
VCHEC	(\$210)	(\$168)	(\$348)	(\$82)	(\$364)
Altavista	\$33	\$37	\$22	\$44	\$21
Hopewell	\$47	\$51	\$39	\$58	\$37
Southampton	\$51	\$56	\$40	\$63	\$39
Rosemary	\$5	\$7	(\$35)	\$26	(\$38)
Bear Garden	\$763	\$817	\$629	\$907	\$611
Brunswick	\$1,646	\$1,796	\$1347	\$1,969	\$1,307
Chesterfield 7 - 8	\$397	\$440	\$323	\$496	\$312
Gordonsville 1 - 2	\$169	\$189	\$122	\$221	\$115
Greensville	\$2,164	\$2,315	\$1,840	\$2,540	\$1,796
Possum Point 6	\$552	\$604	\$431	\$687	\$415
Warren	\$2,083	\$2,201	\$1,782	\$2,399	\$1,744

He explained that under Staff's alternative analysis, all units perform worse than under Dominion's Alternative Plan B low-capacity price sensitivity. Finally, he recommended that to the extent the Commission finds a unit to be uneconomic, the Commission should consider the cost of that unit to be unreasonable in future cost recovery proceedings.<sup>293</sup>

During cross-examination by Appalachian Voices, Mr. Boehnlein defended his recommendation for a sensitivity relative to Alternative Plans B and E wherein Category 2 savings (associated with energy efficiency programs not yet approved by the Commission) are set at zero given "robust" evidence that Dominion is in "bad shape when it comes to meeting" the VCEA 5% target referenced in the 2020 IRP Order and given the goal of "getting a more fine-tuned idea of what the actual load is going to be with what we know today based on a snapshot in time."<sup>294</sup>

When questioned by the Company, Mr. Boehnlein confirmed his belief that Dominion's 2023 IRP modeling complied with prior Commission directives.<sup>295</sup>

On redirect, Mr. Boehnlein agreed the Company could run additional sensitivities if the Commission directs his recommended sensitivity relative to energy efficiency.<sup>296</sup>

<sup>293</sup> *Id.* at 15-17.

<sup>294</sup> Tr. (Boehnlein), at 545-550.

<sup>295</sup> *Id.* at 551.

<sup>296</sup> *Id.* at 552.

Ms. Clayton evaluated customer bill impacts in connection with the Alternative Plans. She presented the following table summarizing Dominion's bill analysis (for the residential, GS-1, and GS-4 rate classes):

**Table 1**  
**Summary of Company's Bill Analyses**

	Directed Methodology			Company Methodology		
	Residential <sup>1</sup>	GS-1 <sup>2</sup>	GS-4 <sup>3</sup>	Residential	GS-1	GS-4
	Plan B	Plan B	Plan B	Plan B	Plan B	Plan B
Dec. 31, 2019	\$122.66	\$573.95	\$350,860.69	\$122.66	\$573.95	\$350,860.69
May 1, 2020	\$ 116.18	\$ 532.40	\$ 312,878.69	\$116.18	\$532.40	\$312,878.69
August 1, 2023	\$ 125.44	\$ 614.04	\$ 415,848.25	\$125.44	\$614.04	\$415,848.25
Year End 2030	\$ 193.12	\$ 923.00	\$ 549,595.83	\$167.34	\$763.19	\$489,899.83
Year End 2035	\$ 235.40	\$ 1,135.48	\$ 686,363.63	\$174.15	\$779.42	\$505,429.63
Total Bill Increase (May 2020 – 2035)	\$ 119.22	\$ 603.08	\$ 373,484.94	\$57.97	\$247.02	\$192,550.94

<sup>Note 1</sup> Residential bill analysis assumes monthly typical usage of 1,000 kilowatt-hours ("kWh").

<sup>Note 2</sup> GS-1 (Small General Service) bill analysis assumes monthly usage of 6,000 kWh.

<sup>Note 3</sup> GS-4 (Large General Service Primary Voltage) bill analysis assumes monthly usage of 6,000,000 kWh and monthly demand of 10,000 kilowatts ("kW").

Additionally, she provided an overview of the Commission's directive in the *2020 IRP Order* requiring the Company to model the costs and reliability impacts of the VCEA and other legislation in the 2023 IRP and to include updated bill analyses by plan pursuant to the Commission's Directed Methodology. Although the Company provided such analysis with the 2023 IRP, Ms. Clayton acknowledged Dominion's assessment that use of the Directed Methodology overstates bill projections by failing to reflect anticipated growth in sales over the period in connection with which each build plan is based. Under the circumstances, the Company also presented a bill analysis using a forecasted system, class sales growth, and associated class allocation factors, referred to herein as the "Company Methodology."<sup>297</sup>

Ms. Clayton next described the residential bill analysis performed by the Company. She also summarized the results of such analysis in the following figure:

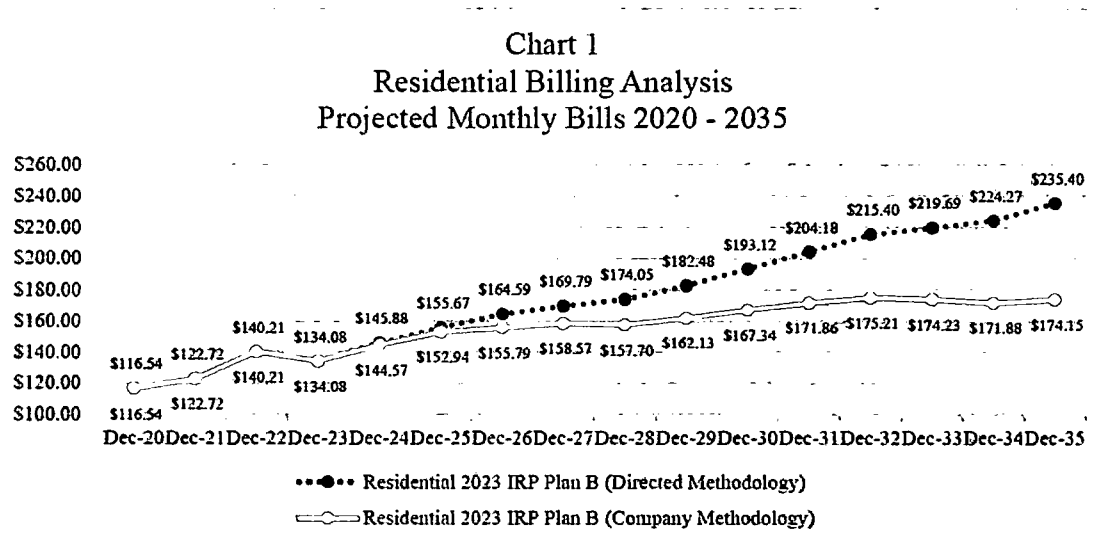
<sup>297</sup> Ex. 38 (Clayton Direct), at 1-4.

Figure 2.5.1: Residential Bill Projection (1,000 kWh per Month)

	Plan B – Company Methodology (includes load growth)			Plan B – Directed Methodology (excludes load growth)		
	Projected Bill	CAGR Dec. 2019	CAGR May 2020	Projected Bill	CAGR Dec. 2019	CAGR May 2020
Dec. 31, 2019	\$122.66			\$122.66		
May 1, 2020	\$116.18			\$116.18		
Year End 2030	\$167.34	2.9%	3.5%	\$193.12	4.2%	4.9%
Year End 2035	\$174.15	2.2%	2.6%	\$235.40	4.2%	4.6%
Total Bill Increase (May 2020-2035)	\$57.97			\$119.22		

Note: Derived using the system resources selected in Alternative Plan B incorporating the Company Methodology for the purposes of the future billing analysis, including forecasted sales growth and forecasted class allocation factors.

Additionally, she provided the following chart depicting projected monthly residential bills under Alternative Plan B for 2020 through 2035:



She then noted that the Company's bill analysis shows the monthly bill of a Virginia residential customer using 1,000 kWh per month is projected to be \$235.40 for Alternative Plan B by 2035, representing an increase of \$119.22 per month as compared to May 1, 2020. Furthermore, she described how Dominion calculated residential bills and provided the following table illustrating the Company's bill calculation methodology:



**Table 2**  
**Simplified Calculation of**  
**Residential Monthly Bill Impact**

Revenue Requirement	\$100,000,000
x Virginia Jurisdictional Allocation %	80.00%
Virginia Jurisdictional Revenue Requirement	\$80,000,000
x Residential Allocation %	52.00%
Residential Revenue Requirement	\$41,600,000
/ Annual Residential kWh	30,000,000,000
Residential rate per kWh	\$0.00139
x 1,000 Kilowatt-hours per month	1,000
<b>Residential Monthly Bill Impact</b>	<b>\$1.39</b>

Furthermore, she clarified that Staff does not view Dominion's residential bill analysis of Alternative Plans B, C, D, or E as representing the definitive cost to a typical residential customer of VCEA compliance. Similarly, she indicated that the Company's residential bill analysis of Alternative Plan A does not represent the definitive cost to a typical residential customer of a least-cost plan.<sup>298</sup>

Ms. Clayton then described the small and large general customer bill analysis provided in the 2023 IRP. She also provided the following table summarizing Dominion's Alternative Plan B billing analysis results for GS-1 and GS-4 customers:

<sup>298</sup> *Id.* at 4-8.

**Table 3**  
**Summary of the Company's GS-1 and GS-4 Bill Analyses**

	GS-1 <sup>1</sup>	GS-4 <sup>2</sup>
	Plan B	Plan B
Dec. 31, 2019	\$573.95	\$350,860.69
May 1, 2020	\$ 532.40	\$ 312,878.69
August 1, 2023	\$ 614.04	\$ 415,848.25
Year End 2030	\$ 923.00	\$ 549,595.83
Year End 2035	\$ 1,135.48	\$ 686,363.63
Total Bill Increase (May 2020 – 2035)	\$ 603.08	\$ 373,484.94

Note 1 GS-1 bill analysis assumes monthly usage of 6,000 kWh

Note 2 GS-4 bill analysis assumes monthly usage of 6,000,000 kWh and monthly demand of 10,000 kW

Additionally, she provided the following charts depicting projected monthly bills for GS-1 and GS-4 customers under Alternative Plan B from 2020 through 2035:

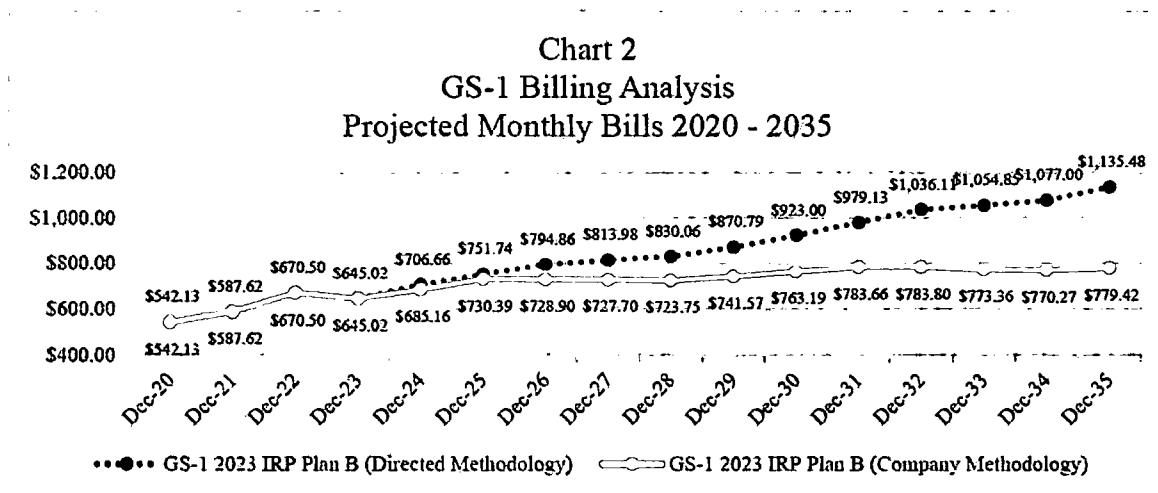
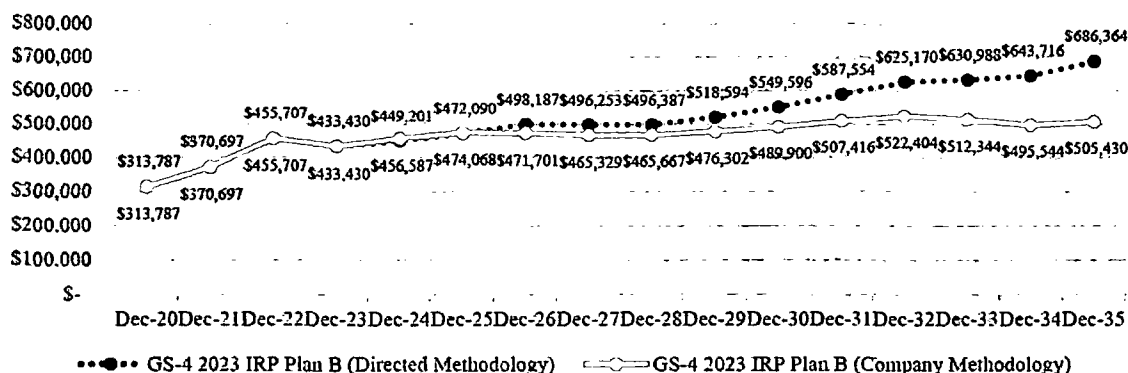


Chart 3  
GS-4 Billing Analysis  
Projected Monthly Bills 2020 - 2035



Furthermore, Ms. Clayton clarified that Dominion provided the small and large customer bill analysis in accordance with the Commission's directive in the *2020 IRP Order*.<sup>299</sup>

Ms. Clayton ultimately represented that Staff does not take issue with the Company's bill analyses calculations.<sup>300</sup>

When questioned by Appalachian Voices, Ms. Clayton indicated that the Company Methodology for determining customer bill impacts of the Alternative Plans differs from the Directed Methodology by including projections for billing determinants and growth and confirmed Staff takes no position as to the accuracy of the projections utilized by the Company in its analysis.<sup>301</sup> Additionally, she confirmed various calculations of 2035 monthly residential bill impacts under various Alternative Plans appeared to show less significant increases under the Company Methodology than the Directed Methodology.<sup>302</sup>

When questioned by Consumer Counsel, Ms. Clayton confirmed Staff previously recommended the Directed Methodology and recognized language in *2020 IRP Order* reflecting Staff's assessment that the Company Methodology is likely to understate bill impacts.<sup>303</sup> She also confirmed her belief that bill impacts prepared using the Directed Methodology represent part of the range of possible outcomes in the next 15 or 20 years.<sup>304</sup> For Alternative Plan B, she confirmed her monthly residential bill analysis shows an increase from May 2020 to 2035 of \$57.97 under the Company Methodology as compared to an increase of \$119.22 under the Directed Methodology (representing a difference of \$61.25).<sup>305</sup>

<sup>299</sup> *Id.* at 8-10.

<sup>300</sup> *Id.* at 10. Ms. Clayton also provided additional bill analyses for illustrative purposes in her Appendix A.

<sup>301</sup> Tr. (Clayton), at 555-556.

<sup>302</sup> *Id.* at 557-560.

<sup>303</sup> *Id.* at 561-563.

<sup>304</sup> *Id.* at 564.

<sup>305</sup> *Id.* at 565.