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November 16, 2021

**VIA ELECTRONIC FILING**

Mr. Joel H. Peck, Clerk  
c/o Document Control Center  
State Corporation Commission  
Tyler Building – First Floor  
1300 East Main Street  
Richmond, Virginia 23219

**RE: Petition of Virginia Electric and Power Company, For approval of the RPS Development Plan, approval & certification of proposed CE-2 Solar Projects pursuant to § 56-580 D and 56-46.1 of the Code of Virginia, revision of rate adjustment clause, designated Rider CE, under § 56-585.1 A 6 of the Code of Virginia, and a prudence determination to enter into power purchase agreements pursuant to § 56-585.1:4 of the Code of Virginia**

**Case No. PUR-2021-00146**

Dear Mr. Peck:

Attached for filing in the above-referenced matter is the Direct Testimony of Karl R. Rábago, which is being submitted on behalf of Appalachian Voices (“Environmental Respondent”). Included with this testimony are Mr. Rábago’s one-page summary and three attachments. This filing is being completed electronically, pursuant to the Commission’s Electronic Document Filing system.

Pursuant to Rule 140 of the Commission’s Rules of Practice and Procedure, Environmental Respondent is providing service of documents in this case exclusively via email unless parties request otherwise. Please let me know if you do not agree to electronic service and would like to receive hard copies of documents.

If you should have any questions regarding this filing, please do not hesitate to contact me at (434) 977-4090.

Regards,



Nathaniel Benforado

cc: Parties on Service List  
Commission Staff

COMMONWEALTH OF VIRGINIA  
STATE CORPORATION COMMISSION

PETITION OF VIRGINIA ELECTRIC )  
AND POWER COMPANY )

*For approval of the RPS Development Plan, )  
approval & certification of proposed CE-2 )  
Solar Projects pursuant to § 56-580 D and )  
56-46.1 of the Code of Virginia, revision of )  
rate adjustment clause, designated Rider )  
CE, under § 56-585.1 A 6 of the Code of )  
Virginia, and a prudence determination to )  
enter into power purchase agreements )  
pursuant to § 56-585.1:4 of the Code of )  
Virginia )*

Case No. PUR-2021-00146

**Summary of Direct Testimony of  
Karl R. Rábago, Rábago Energy LLC**

**On Behalf of  
Environmental Respondent**

**November 16, 2021**

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**Summary of Direct Testimony of Karl R. Rábago**

I am Karl R. Rábago, and I appear on behalf of Appalachian Voices (“Environmental Respondent”). I am principal of Rábago Energy LLC, a Colorado Limited Liability Company, with a business address of 2025 E. 24<sup>th</sup> Avenue, Denver, Colorado.

I examined the Company’s petition for approval of its 2021 RPS Development Plan (“RPS Plan”) under the Virginia Clean Economy Act (“VCEA”). My focus was on the process and approach to the development and presentation of the RPS Plan.

Once again, I believe Dominion has failed to conduct adequate long-term, least-cost implementation planning, and the Commission should reject the plan proposed here. Given the Company’s failure to submit least-cost VCEA compliant plans for the past two proceedings, I recommend that in future proceedings, the Commission require the Company to perform a set number of modeling runs and sensitivities as prescribed by other parties. Commission Staff would be permitted to develop and submit three alternative scenarios for the Company to run, while (1) industrial and commercial customer groups and (2) environmental and consumer groups, would each be permitted to submit two alternative plans of their own. In addition, whenever the Company conducts sensitivity analyses of its own plans, it should be directed to allow Staff and stakeholders to each submit additional sensitivities for the Company’s plans or their own plans.

I believe this approach will provide the Commission with the full record that it needs to establish a reasonable and prudent compliance pathway for customers, complete with appropriate baselines and alternative approaches to compare against the Company’s proposal. The current approach—where the Company develops its plan in a black box which the parties can only criticize after the fact and with limited ability to offer affirmative alternatives—does not provide the Commission with sufficient information to determine prudence. It needs to change.

COMMONWEALTH OF VIRGINIA  
STATE CORPORATION COMMISSION

PETITION OF VIRGINIA ELECTRIC )  
AND POWER COMPANY )

*For approval of the RPS Development Plan, )  
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Solar Projects pursuant to § 56-580 D and )  
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pursuant to § 56-585.1:4 of the Code of )  
Virginia )*

Case No. PUR-2021-00146

**Direct Testimony of  
Karl R. Rábago, Rábago Energy LLC**

**On Behalf of  
Environmental Respondent**

November 16, 2021

**INTRODUCTION & OVERVIEW**

1 **Q 1: Please state your name, business name and address, and role with the Environmental**  
2 **Respondent.**

3 **A:** My name is Karl R. Rábago. I am the principal of Rábago Energy LLC, a Colorado limited  
4 liability company, located at 2025 E. 24<sup>th</sup> Avenue, Denver, Colorado. I appear here in my  
5 capacity as an expert witness on behalf of Appalachian Voices (“Environmental  
6 Respondent”).

7 **Q 2: Please summarize your experience and expertise in the field of electric utility**  
8 **regulation and the renewable energy field.**

9 **A:** I have worked for more than 30 years in the electricity industry and related fields. I am and  
10 have been actively involved in a wide range of electric utility issues across the United  
11 States and around the world, in several different capacities. My previous employment  
12 experience includes Commissioner with the Public Utility Commission of Texas, Deputy  
13 Assistant Secretary with the U.S. Department of Energy, Vice President with Austin  
14 Energy, Director with AES Corporation, executive director of the Pace Energy and Climate  
15 Center, managing director with Rocky Mountain Institute, program manager with the  
16 Houston Advanced Research Center, and energy program manager for Environmental  
17 Defense Fund, among others. I hold a bachelor’s degree in business management, and I am  
18 trained as an attorney with a Juris Doctorate in Law and two post-doctorate Master of Laws  
19 degrees, one each in Military and Environmental Law. A detailed resume is attached as  
20 Attachment KRR-1.

21 **Q 3: Have you ever testified before the Virginia SCC or other regulatory agencies?**

22 **A:** Yes. In Virginia, I have submitted testimony in Virginia SCC Cases PUE-2012-00064,  
23 PUE-2013-00088, PUE-2014-00026, PUE-2015-00035, PUE-2015-00036, PUE-2016-

1 00049, PUE-2016-00050, PUR-2017-00051, PUR-2017-00045, PUR-2018-00065, PUR-  
2 2019-00050, PUR-2020-00035, PUR-2020-00135, PUR-2020-00134, PUR-2020-00169,  
3 and PUR 2021-00058. I have submitted testimony, comments, or presentations in  
4 proceedings in Alabama, Arkansas, Arizona, California, Colorado, Connecticut, District of  
5 Columbia, Florida, Georgia, Guam, Hawaii, Illinois, Indiana, Iowa, Kansas, Kentucky,  
6 Louisiana, Massachusetts, Michigan, Minnesota, Missouri, Nevada, New Hampshire, New  
7 York, North Carolina, Ohio, Pennsylvania, Puerto Rico, Rhode Island, South Dakota,  
8 Vermont, Virginia, Washington, and Wisconsin. I have also testified before the U.S.  
9 Congress and have been a participant in comments and briefs filed at several federal  
10 agencies and courts. A listing of my recent previous testimony is attached as Attachment  
11 KRR-2.

12 **Q 4: What materials did you review in preparing this testimony?**

13 **A:** I reviewed applicable sections of the Code of Virginia, the filings by Virginia Electric and  
14 Power Company (“Company”) in this proceeding, and the Company’s responses to  
15 requests for information from Environmental Respondent and from other parties in the  
16 case. In addition, I reviewed Commission Orders and relevant testimony in prior Company  
17 filings before the Virginia State Corporation Commission.

18 **Q 5: What is the purpose of this testimony?**

19 **A:** In this testimony, I examine the Company’s petition for approval of its 2021 RPS  
20 Development Plan (“RPS Plan”) under the Virginia Clean Economy Act (“VCEA”) and  
21 Va. Code § 56-585.5 D 4, in particular. My focus is on the process and approach to the  
22 development and presentation of the RPS Plan. While the bulk of this petition is focused  
23 on proposals for approval of specific solar generation and energy storage projects, I do not



1 address those projects in this testimony except in one regard. That is, the problems that I  
2 identify with the Company's approach to compliance with its statutory and regulatory  
3 planning obligations, and with the obligations of sound planning in general are serious. The  
4 Company's generation construction and procurement proposals at this early stage in VCEA  
5 implementation are likely reasonable despite the Company's planning flaws because of the  
6 current early stage in VCEA implementation at which this RPS Plan has been proposed.  
7 However, the gravity of these flaws has begun to suggest a point in the not-too-distant  
8 future when generation construction or procurement proposals will not be reasonably  
9 justified absent material changes in the way the Company undertakes its planning  
10 obligations.

11 **Q 6: What do you conclude about the Company's proposal and current planning process?**

12 **A:** As it stands, the Company develops its plans in secrecy, making self-serving assumptions  
13 and relying on strained interpretations of the law and Commission directives. This process  
14 results in a "preferred" plan that, at least through the first two RPS proceedings, favors the  
15 Company's interests over customers. Staff and other stakeholders rightfully question this  
16 "preferred" plan and are met with combative, legalistic, and obfuscatory tactics. At the end  
17 of the proceeding, very little is known as to true benchmarks and true least-cost planning.  
18 Even after this proceeding, for example, which followed an express order from the  
19 Commission requiring least-cost planning, the Commission will not have a true least-cost,  
20 VCEA-compliant plan due to the Company's black box approach.

21 This approach is not working and is putting customers' interests at risk. I've seen this same  
22 problem time and time again in Dominion's IRP space where the Company files a long-  
23 term plan riddled with problems, intervenors identify and critique those problems, the

1 Commission orders improvements, and then, in the next go-round the Company  
2 compromises the value of its modeling in a different way—none of which gives this  
3 Commission much useful information for its deliberations. Ratepayers deserve least-cost  
4 implementation planning, and I believe that at this point the only way to provide the  
5 Commission with useful least-cost planning is by opening the Company's modeling  
6 process to intervenors.

7 **Q 7: How do you recommend the Commission achieve this?**

8 **A:** I recommend that in future proceedings the Commission direct the Company to perform a  
9 set number of modeling runs and sensitivities using intervenor-selected modeling  
10 constraints and inputs. The alternative plans would (1) use the same model, (2) use the  
11 same (or mostly the same) load and commodity price forecasts, but (3) use reasonable  
12 modeling assumptions and constraints chosen by intervenors rather than only by the utility.  
13 Specifically, Commission Staff should be permitted to develop and submit three alternative  
14 scenarios for the Company to run, while (1) industrial and commercial customer groups  
15 and (2) environmental and consumer groups, should be permitted to develop and submit  
16 two alternative plans each. In addition, whenever the Company conducts sensitivity  
17 analyses of its alternative plans, it should be directed to allow Staff and the other groups to  
18 each submit additional sensitivities for the Company's plans or their own plans.

19 **Q 8: Why do you believe these changes will improve the Company's planning and the**  
20 **ultimate result in these cases?**

21 **A:** Thus far, the Company has shown that it is not capable of providing useful benchmarks for  
22 implementation of the renewable portfolio standard. By the time the proceeding  
23 commences, there is no real ability for other parties to fix these errors or present alternatives

1 for the Commission's consideration. Practically speaking, there is insufficient time for  
2 intervenors to prepare an alternative analysis using a separate modelling firm, the cost is  
3 too high for many intervenors to afford, and the Company's black box approach makes it  
4 virtually impossible to produce an apples-to-apples analysis. Enabling this engagement  
5 before the litigated hearing will require the Company to conduct workshops with Staff and  
6 stakeholders prior to modeling and plan development, ensuring that participation is  
7 meaningful and efficient. With this objective framework in place, the Company will  
8 understand that it must work with other parties on these alternatives and should result in a  
9 more collaborative process. Not only will this process promote collaboration in planning  
10 and reduce the contentiousness and litigation burden of plan review proceedings, the  
11 Commission will also be provided with several different alternatives and baselines against  
12 which to evaluate the reasonableness of the Company's proposals.

13 **Q 9: How would this process work in practice?**

14 **A:** After a litigated proceeding and final order in the RPS proceeding, the parties would  
15 interact through one or more workshops to exchange data and discuss specific modelling  
16 considerations. All parties, including the Company, would begin with a common set of  
17 modeling constraints (*e.g.*, minimum and maximum bill or procurement requirements,  
18 annual build or acquisition caps, etc.) and assumptions (*e.g.*, capacity factors, fuel price  
19 forecasts, busbar costs, useful operating lives, degradation rates, etc.) proposed by the  
20 Company to interested stakeholders in the workshop. The workshops would involve: (1)  
21 detailed explanation of the sources of constraints and assumptions, (2) opportunities for  
22 stakeholders to offer comments and suggest alternative constraints and assumptions, and  
23 (3) Company explanation of the basis on which it depends in selecting constraints and

1 assumptions. Once finalized, these modeling constraints and assumptions would remain  
2 constant across all plans analyzed in Company-originated plans reported to the  
3 Commission. The Company, Staff, and other parties, would be provided an opportunity to  
4 propose their own alternative runs based on adjusted modeling constraints, but which  
5 include the same common set of assumptions—three for Staff and two each for the other  
6 groups. The Company would cooperate with parties in optimizing the alternative plans to  
7 provide the most useful output information.

8 **Q 10: Would your proposed approach create a process that could still result in**  
9 **disagreements between stakeholders and the Company?**

10 **A:** In my experience, there will always be disagreements between and among the parties when  
11 the stakes are very high in planning processes. But my proposed approach creates an  
12 objective framework that will increase data transparency and stakeholder engagement at  
13 the *plan development* stage—allowing for the exploration of alternatives prior to the start  
14 of formal and often contentious regulatory review proceedings. Thus, the issues and  
15 disagreements should already be substantially narrowed and streamlined by the time the  
16 Commission’s review begins. If issues and disagreements remain when the Company  
17 makes its formal filing, the Commission can address them during the litigated hearing.

18 Ultimately, the Company bears the burden of producing and proposing reasonable plans  
19 and for executing them in a prudent and efficient manner. In my experience, the investment  
20 of time up front will vastly improve the litigated proceeding. The formal review will be  
21 less contentious and the remaining issues will already have been streamlined and  
22 simplified, the Commission will have a better record on which to rule. There is also one  
23 additional benefit to the Commission. For years we’ve been saying, “if they only did the

1 modeling our way, you'd have a better, more credible result." My proposal here actually  
2 makes stakeholders prove their case, which the Commission can then evaluate on its own  
3 merits rather than by evaluating Dominion's failures and omissions.

4 **Q 11: The changes you propose would reflect a dramatic shift in the Company's approach**  
5 **to developing its plans. Would these changes be worth the time and effort?**

6 **A:** Yes. First, the Commonwealth is on a long timeline for getting to its clean economy goals,  
7 and the planning issues are going to get even more complex. If unchanged, the current  
8 approach promises even larger costs and disagreements. Second, the upfront investment of  
9 time and effort that I propose will not create additional burdens on the Commission. In fact,  
10 this process will improve the quality of plan proposals that the Commission must review.  
11 Third, the Commission and the Company can take a more incremental approach in  
12 implementing these changes where long lead times justify such an approach. The most  
13 important step at this time is for the Commission and the Company to set the process of  
14 change in place—before more time and effort is invested in an approach that is not  
15 delivering value to anyone.

16 **Q 12: Have other jurisdictions taken such approaches?**

17 **A:** Yes. Active engagement of stakeholders in the development of utility resource plans is best  
18 practice in many jurisdictions.<sup>1</sup> I am aware that collaborative, workshop-based integrated  
19 resource planning processes are used by Entergy operating utilities and stakeholders in  
20 Arkansas, Louisiana, and New Orleans. The South Carolina Public Utility Commission

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<sup>1</sup> See R. Wilson & B. Biewald, *Best Practices in Electric Utility Integrated Resource Planning*, prepared for Regulatory Assistance Project by Synapse Energy Economics, Inc. (Jun. 2013), at 26-27, available at: <https://www.raponline.org/wp-content/uploads/2016/05/rapsynapse-wilsonbiewald-bestpracticesinirp-2013-jun-21.pdf>.

1 recently adopted a similar concept in the context of capacity planning.<sup>2</sup> That order is very  
 2 similar to what I recommend here, with the Company being required to perform the  
 3 modeling for other parties and absorb that cost. In addition, as an executive with Austin  
 4 Energy, we invited stakeholders to submit alternative plans in our resource planning  
 5 process. I saw firsthand how the approach improved stakeholder understanding of the  
 6 planning and modeling process, reduced contentiousness and suspicion, engaged  
 7 stakeholders in positive outcomes, and streamlined the decision-making process.

## 8 PLANNING REQUIREMENTS AND THE COMPANY'S APPROACH TO ITS

### 9 PLANNING OBLIGATIONS

10 **Q 13: What is the specific statutory requirement regarding the Company's submission of**  
 11 **an RPS Development Plan?**

12 **A:** Va. Code § 56-585.5 D 4 provides:

13 In connection with the requirements of this subsection, each Phase I and Phase II Utility  
 14 shall, commencing in 2020 and concluding in 2035, submit annually a plan and petition  
 15 for approval for the development of new solar and onshore wind generation capacity.  
 16 Such plan shall reflect, in the aggregate and over its duration, the requirements of  
 17 subsection D concerning the allocation percentages for construction or purchase of such  
 18 capacity. Such petition shall contain any request for approval to construct such facilities  
 19 pursuant to subsection D of § 56-580 and a request for approval or update of a rate  
 20 adjustment clause pursuant to subdivision A 6 of § 56-585.1 to recover the costs of  
 21 such facilities. Such plan shall also include the utility's plan to meet the energy storage  
 22 project targets of subsection E, including the goal of installing at least 10 percent of  
 23 such energy storage projects behind the meter. In determining whether to approve the  
 24 utility's plan and any associated petition requests, the Commission shall determine  
 25 whether they are reasonable and prudent and shall give due consideration to (i) the RPS  
 26 and carbon dioxide reduction requirements in this section, (ii) the promotion of new  
 27 renewable generation and energy storage resources within the Commonwealth, and  
 28 associated economic development, and (iii) fuel savings projected to be achieved by  
 29 the plan.

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<sup>2</sup> In that case, the South Carolina Commission ordered the utility to negotiate a "discounted, project-based licensing fee that permits interested intervenors the ability to perform their own modeling runs in the same software package as DESC, and to direct DESC to absorb the cost of these licensing fees." Order No. 2020-832, *In Re: South Carolina Energy Freedom Act (House Bill 3659) Proceeding Related to S.C. Code Ann. Section 58-37-40 and Integrated Resource Plans for Dominion Energy South Carolina, Incorporated*, Docket No. 2019-226-E (Dec. 23, 2020) at 92.

1  
2 **Q 14: What is the Company's approach to this obligation?**

3 **A:** The Company takes an unreasonable and unhelpful approach to its planning obligation. As  
4 stated by the Company:

5 As required by Va. Code § 56-585.5 D 4, the RPS Development Plan focuses on the  
6 development of solar, onshore wind, and energy storage. The Company has one plan  
7 for the development of solar, onshore wind, and energy storage that it will refine over  
8 time, the current version of which is shown in Figures 3, 4, 6, and 7 of the 2021 RPS  
9 Development Plan . . . Alternative Plans A, B, and C [from the Company's 2021 IRP  
10 Update filed in Commission Case No. PUR-2021-00201] are the alternative plans  
11 presented in the Company's 2021 IRP Update. The Company only incorporated the  
12 results of Alternative Plans A and B into this proceeding. As stated on page 8 of the  
13 RPS Development Plan, Alternative Plan A does not meet the development targets for  
14 solar, wind, and energy storage resources in Virginia established through the VCEA.  
15 By contrast, Alternative Plan B is consistent with this 2021 RPS Development Plan.<sup>3</sup>  
16

17 **Q 15: Why do you say this approach is unreasonable and unhelpful?**

18 **A:** The Company takes inconsistent and unreasonable positions that prevent parties from fully  
19 understanding the basis of the Company's proposal. For example, it takes the position that  
20 the 2021 IRP Update is the complete extent of the comprehensive planning that it must do  
21 here, in the RPS proceeding. Then in discovery here, the Company objects to discovery  
22 requests about these planning issues in its IRP update, arguing that anything other than the  
23 solar, wind, and energy storage proposals presented in this case are irrelevant to the  
24 evaluation of the Company's RPS Plan. The Company's position is not reasonable and  
25 should not be permitted. Recall that during the first RPS hearing, the Company argued that  
26 planning was *irrelevant* to its development proposal. Now, after the Commission rejected  
27 that argument, the Company is attempting to hide planning from discovery by unilaterally

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<sup>3</sup> See Company Responses to Staff Set 5-108, APV Set 3-2. Referenced discovery responses are provided in Attachment KRR-3.

1 confining key planning issues into a non-litigated proceeding. This approach, just like last  
2 year's, should be rejected.

3 As a second example, the Company repeatedly attempts to imply that the specific content  
4 of its RPS Plan is prescribed by the Commission in the Final Orders issued in Case Nos.  
5 PUR-2020-00035 ("2020 IRP") and PUR-2020-00134 ("2020 RPS").<sup>4</sup> At the same time,  
6 the Company uses this approach to exempt itself from the obligation it proposed for itself  
7 in the 2020 IRP, that is to develop "a reasonable baseline against which to evaluate  
8 alternatives."<sup>5</sup>

9 **Q 16: Didn't the Commission expressly adopt the Company's proposal in the 2020 IRP that**  
10 **a least-cost plan must address applicable carbon regulations and the mandatory RPS**  
11 **Program requirements of the VCEA?**<sup>6</sup>

12 **A:** Yes, but contrary to the selective and narrow interpretation that the Company seeks to apply  
13 to the Commission's Final Order, the Commission did not limit the least-cost plan *only* to  
14 addressing carbon regulations and mandatory RPS Program requirements. In fact, the  
15 Commission itself initiated the 2020 IRP docket by issuing an order in which it required  
16 the Company to "[m]odel the mandates and requirements of the VCEA and other relevant  
17 legislation based on the best available information, using reasonable and appropriately  
18 documented assumptions if necessary."<sup>7</sup> In the final order, the Commission then required  
19 that future IRPs and updates must include a least-cost plan that would meet applicable

<sup>4</sup> See Company Responses to Staff Set 5-108, APV Sets 2-2, 2-4, 2-5, 2-8, 2-9, 2-12, 3-3, 3-11, 3-13, 3-27, 3-29.

<sup>5</sup> Rebuttal Testimony of Glenn A Kelly, 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 (Oct. 13, 2020) ("Kelly Rebuttal") at 40:4-10.

<sup>6</sup> Final Order, In re: Virginia Electric and Power Company's Integrated Resource Plan filing pursuant to Va. Code sections 56-597 et seq., Case No. PUR-2020-00035 (Feb. 1, 2021) ("2020 IRP Final Order") at 14.

<sup>7</sup> Order, In re: Virginia Electric and Power Company's Integrated Resource Plan filing pursuant to Va. Code sections 56-597 et seq., Case N., PUR-2020-00035, (March 9, 2020) at 2.



1 carbon regulations and the mandatory RPS Program requirements of the VCEA.<sup>8</sup> In its  
 2 subsequent order in the 2020 RPS case, and prior to the filing of the petition in this  
 3 proceeding, the Commission ordered that RPS Development Plans broadly address RPS  
 4 and carbon dioxide reduction requirements in the VCEA.<sup>9</sup>

5 **Q 17: What did the Commission direct the Company to do following the 2020 RPS case?**

6 **A:** As in this proceeding, the Company proposed an unreasonably narrow approach in its first  
 7 RPS proceeding. The Commission rejected that approach, stating:

8 As a preliminary matter, we disagree with Dominion's assertion that its compliance  
 9 with the renewable energy certificate ("REC") retirement obligations of the RPS  
 10 Program pursuant to Code § 56-585.5 C is irrelevant to the instant proceeding. The  
 11 Company states, for example, "the scope of this proceeding ... is about meeting the  
 12 development targets set forth in Va. Code § 56-585.5 D, not cost-effective compliance  
 13 with the RPS Program set forth in Va. Code § 56- 585.5 C." The Company also states  
 14 that this proceeding is "limited by the four corners of Code [§ 56-] 585.5 to the  
 15 development plan and the associated requests." Code § 56-585.5 D 4 specifically  
 16 requires, however, the Commission to "give due consideration to (i) the RPS and  
 17 carbon dioxide reduction requirements in this section...." Dominion itself  
 18 acknowledges that "the RPS Program is the primary driver of the need for significant  
 19 new renewable energy generation." The Commission finds that in order to give due  
 20 consideration to the RPS and carbon dioxide reduction requirements in Code § 56-  
 21 585.5 when evaluating subsequent plans and associated petition requests, such future  
 22 annual filings shall analyze how Dominion's plan and petition requests address and  
 23 implement the RPS and carbon dioxide reduction requirements in Code § 56-585.5,  
 24 including but not necessarily limited to Code § 56-585.5 C.

25 The Commission further finds that in order to evaluate subsequent plans and  
 26 associated petition requests, such future annual filings shall include at a minimum:

- 27 • a least cost VCEA plan that meets (i) applicable carbon regulations and (ii)
- 28 the mandatory RPS Program requirements of the VCEA;
- 29 • evaluation of RECs from all sources (with both high and low-price
- 30 sensitivities), including utility-owned, third-party PPAs, and unbundled REC
- 31 purchases;
- 32 • modeling of the solar capacity factor as required by the Commission's
- 33 directives in the 2020 IRP proceeding;

<sup>8</sup> 2020 IRP Final Order at 14.

<sup>9</sup> Final Order, *Ex Parte: Establishing 2020 RPS Proceeding for Virginia Electric and Power Company*, Case No. PUR-2020-00134 (Apr. 30, 2021) ("2020 RPS Final Order") at 5-11 (extracted and discussed further later in this testimony).

- 1 • distributed generation sensitivities for unbundled REC purchases through
- 2 Requests for Proposals (“RFPs”), fixed price offers and over-the-counter
- 3 purchases;
- 4 • modeling of reliability impacts;
- 5 • updated fundamental forecasts and commodity pricing that reflect the VCEA
- 6 requirements; and
- 7 • a detailed chart showing how Dominion has complied to date with the
- 8 VCEA’s RPS requirements.

9 In addition to these minimum planning and modeling requirements for  
 10 Dominion's subsequent RPS filings and associated petition requests, we direct  
 11 Dominion to also file the following information in subsequent RPS filings.

12 RPS Compliance Certification. The Commission finds that this annual RPS  
 13 proceeding is a reasonable and appropriate proceeding to consider the Company’s  
 14 annual certification of compliance with the RPS Program. Such certification will  
 15 commence in the Company’s 2022 RPS filing for calendar year 2021. The Commission  
 16 directs Dominion to propose reporting metrics, and any needed protocols, associated  
 17 with RPS Program certification in its 2021 RPS filing.

18 \* \* \*

19  
 20  
 21 IRP and RPS filing consolidation. The Commission requested that the parties  
 22 address whether to consolidate the Company's filing of its IRP and IRP updates with  
 23 the annual RPS filing in a post-hearing filing. At this time, the Commission will not  
 24 direct any consolidation or synchronization of these filings; however, we may revisit  
 25 this decision at a later time as additional experience is gained with the annual RPS  
 26 filings. We do find, however, that, to a certain extent, the Company's modeling inputs  
 27 and assumptions should be consistent for purposes of the IRP and RPS proceedings.  
 28 We therefore direct the Company to explain the reason behind any deviations in the  
 29 assumptions and modeling used in the two proceedings.<sup>10</sup>

30 **Q 18: Why is it reasonable for the Commission to require a broad approach to development**  
 31 **of its RPS Development Plan that would reflect the range of mandates and**  
 32 **requirements on the Company?**

33 **A:** It is and was reasonable for the Commission in the 2020 RPS case to direct a broader, more  
 34 holistic approach by the Company in developing its RPS Development Plan because of the  
 35 simple fact that the various requirements associated to resource development and  
 36 procurement in the entire VCEA will directly affect both RPS requirements and carbon

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<sup>10</sup> *Id.* at 5-11 (citations omitted).

1 dioxide emissions in Virginia's clean energy economy. There is no reasonable or useful  
2 way to isolate the RPS requirements in Va. Code § 56-585.5 D 4 from the context in which  
3 it appears. Moreover, this broader approach will better ensure close alignment between the  
4 RPS Development Plan and the Integrated Resource Plan.

5 **Q 19: Given the VCEA, prior Commission orders, and other statutory and regulatory**  
6 **requirements, what kind of obligations did the Company choose to ignore in**  
7 **developing its Alternative Plan A?**

8 **A:** The Company conceded that it did not include in modeling or otherwise assess or apply:

- 9 • Mandatory retirement provisions of § 56-585.5 B 3 for existing units;
- 10 • Mandatory retirement provisions of § 56-585.5 B 3 as applied to new gas units selected  
11 in 2026 and 2027;
- 12 • Mandatory energy efficiency savings standards in § 56-596.2 for 2022 to 2025;
- 13 • Energy efficiency standards in § 56-596.2 for 2025 and beyond; and
- 14 • Social cost of carbon as a benefit or cost.<sup>11</sup>

15 **Q 20: Is the Company's position in this case consistent with its proposal for a modified least-**  
16 **cost plan submitted in the 2020 IRP proceeding?**

17 **A:** No. In the 2020 RPS proceeding, Company witness Kelly proposed that a least-cost plan  
18 would satisfy the requirements of the VCEA and *related* legislation relating to carbon  
19 regulation and the RPS program, and that the objective of the approach would be avoiding  
20 unnecessary litigation on the exact contours of the law as it relates to specific resources

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<sup>11</sup> Company Responses to APV Sets 2-2, 2-4, 2-5, 2-8, 2-9, 2-12, 3-29.

1 and what is or is not VCEA compliant, alleviate disagreement on timing of unit retirements,  
2 and provide a reasonable baseline for evaluation of alternatives.<sup>12</sup>

3 The Company's narrow and unreasonable approach to developing and evaluating  
4 alternatives is inconsistent with the Company's position in the 2020 RPS. The Company  
5 concedes that it did not model all requirements of the VCEA<sup>13</sup> and even states an objection  
6 to the phrase "to comply with Va. Code § 56-585.5" as overly broad, because, as it asserts,  
7 the statute has a number of different components with which the Company must  
8 "comply."<sup>14</sup>

9 **Q 21: How does the Company justify excluding these requirements and other resource**  
10 **considerations from Alternative Plan A, which it calls a least-cost plan?**

11 **A:** The Company asserts that its approach was dictated by the Commission's orders in the  
12 2020 IRP and 2020 RPS,<sup>15</sup> but as I just described, neither of those proceedings constrained  
13 the Company's least-cost planning process in the way the Company has proposed here.

14 **Q 22: Why isn't Alternative A from the Company's IRP a reasonable baseline for**  
15 **evaluation of alternatives?**

16 **A:** The Company asserts that Alternative A is "the least-cost plan."<sup>16</sup> But a plan that is  
17 intentionally non-compliant with provisions of the VCEA that impact RPS and carbon

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<sup>12</sup> Kelly Rebuttal at 40:4-10.

<sup>13</sup> Company Response to APV Set 3-13.

<sup>14</sup> Company Response to APV Set 3-2. The Company also apparently misread the discovery question. APV 3-2 specifically refers to § 56-585.5 B (the retirement mandates), but the Company responds as if the question referred to all of § 56-585.5.

<sup>15</sup> Company Response to APV Set 3-29.

<sup>16</sup> RPS Development Plan, Petition of Virginia Electric and Power Company for approval of the RPS Development Plan, approval and certification of the proposed CE-2 Solar Projects pursuant to §§ 56-580 D and 56-46.1 of the Code of Virginia, revision of rate adjustment clause, designated Rider CE, under § 56-585.1 A 6 of the Code of Virginia, and a prudence determination to enter into power purchase agreements pursuant to § 56-585.1:4 of the Code of Virginia, Case No. PUR-2021-00146 (Sept. 15, 2021) ("2021 RPS Development Plan") at 8.

1 dioxide requirements, including those relating to generation and other resource acquisition  
2 and development is *meaningless* in evaluating whether the proposed RPS Plan is a  
3 reasonable least-cost plan. The Company has effectively taken the litigation posture that  
4 its modeling can ignore any aspect of Virginia law that Dominion wants to ignore unless  
5 the Commission expressly orders otherwise for a specific statutory provision. This is  
6 nonsense. The Company should always be planning *for compliance* with the law. The  
7 Commission should not be required to micromanage the Company in this way, with the  
8 Company looking for technical loopholes to avoid meaningful compliance planning.

9 **Q 23: How do the two Company alternatives—Alternative Plan A and Alternative Plan B—**  
10 **compare?**

11 **A:** According to the Company, Plan A and Plan B from the 2021 IRP Update, which form the  
12 basis for Alternative Plan A and Alternative Plan B in the RPS Plan differ in the following  
13 ways:

- 14 • Plan A assumes no limit to REC purchases on an annual basis. Plan B assumes a 15%  
15 REC purchase limit annually.
- 16 • Plan A retires VCHEC on an economic basis, and the three biomass units in 2023,  
17 versus 2045 and 2028, respectively, in Plan B.
- 18 • Plan A does not retire Clover Units 1 and 2 or Mt. Storm Units 1 through 3 during the  
19 study period, while Plan B retires Clover Units 1 and 2 in 2025 and Mt. Storm Units 1  
20 through 3 in 2044.
- 21 • Plan A does not include a dispatch adder for the social cost of carbon, while Plan B  
22 does include this adder beginning in 2031.

- 1 • Plan A only includes approved and proposed DSM programs,<sup>17</sup> while Plan B includes
- 2 approved and proposed programs, as well as generic DSM programs to meet the
- 3 legislative targets for DSM.
- 4 • Plan B directs the model to select certain resources through 2035; Plan A does not.<sup>18</sup>
- 5 • Plan B enforces a 65%/35% split between cost-of-service solar generation resources
- 6 and PPAs consistent with the VCEA; Plan A does not.<sup>19</sup>

7 **Q 24: Do these differences mean that Alternative Plan A is a reasonable baseline to compare**  
 8 **against the Company's RPS Plan, that is, Alternative Plan B?**

9 **A:** No. As previously discussed, the Company's Alternative Plan A is not reasonable as a  
 10 least-cost plan against which to evaluate the Company's RPS Plan. Plan A does not comply  
 11 with Virginia law, it does not comply with relevant Commission orders, and is inconsistent  
 12 with the Company's commitments made in the 2020 RPS proceeding. It is therefore not a  
 13 useful benchmark for evaluating the Company's actual proposal—which is Plan B.

14 **Q 25: Did the Company provide information on how its plan and petition addresses and**  
 15 **implements the RPS and carbon dioxide reduction requirements in Code § 56-585.5,**  
 16 **including but not necessarily limited to Code § 56-585.5 C?**

17 **A:** No. As previously explained, the Company takes the position that such issues are irrelevant  
 18 to this proceeding.<sup>20</sup>

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<sup>17</sup> The Company justifies ignoring future DSM after current and proposed programs as dictated by the Commission's Final Orders in Case Nos. PUR-2020-00134 and PUR-2020-00035, "which provide specific instructions on what should and should not be included in Alternative Plan A," and by prior Commission orders in the Company's integrated resource planning proceedings. Company Response to APV Set 3-3.

<sup>18</sup> See Company Response to Staff Set 05-108.

<sup>19</sup> Company Response to Staff Set 6-161.

<sup>20</sup> Company Responses to APV Sets 2-2, 2-4, 2-5, 2-8, 2-9, 2-12, 3-29.

1 **Q 26: Why is the Company's failure to model the mandatory retirements in § 56-585.5 B**  
2 **important?**

3 **A:** It is critically important and a problem, present in both Alternative Plans A and B. The  
4 Company failed to constrain the model in both plans to reflect the fact that by law carbon  
5 dioxide emitting plants retire by 2045.<sup>21</sup> Due to this failure, Plan A creates an entirely  
6 unrealistic generation emissions gap in 2045, with fossil fuel assets emitting 18 million  
7 tons of carbon dioxide in 2046 at a time when the law requires them to be at *zero*.<sup>22</sup> Plan A  
8 also adds 970 MW of gas fired generation in 2026 and 2027 notwithstanding the fact that  
9 the facilities would not be fully depreciated by 2045 and would likely impose significant  
10 stranded costs on customers. The model chose these resources because the Company failed  
11 to provide the model with the complete economic basis.<sup>23</sup>

12 **Q 27: Did the Company evaluate renewable energy certificate ("REC") purchases from all**  
13 **sources?**

14 **A:** No. The Company's REC purchases evaluation in Alternative Plan A included the  
15 assumption that unlimited RECs would be available at a fixed price, even though the  
16 Company believes this is an unreasonable assumption.<sup>24</sup> For its Alternative Plan B, the  
17 Company assumed a fixed ratio of self-generated (75%), PPA-originated (22%), and  
18 unbundled (3%) REC purchases, but only out to the year 2035<sup>25</sup> and with assumptions

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<sup>21</sup> Va. Code § 56-585.5 B 4 does allow unit-specific exemptions to this mandatory retirement schedule, but Dominion did not include in its application—and in fact has refused to provide—any unit-specific analysis that an exemption would be necessary or appropriate.

<sup>22</sup> Those 18 million tons of carbon also increase ratepayers' RGGI compliance costs in 2045 unnecessarily.

<sup>23</sup> Company Response to APV Set 3-25.

<sup>24</sup> 2021 RPS Development Plan at 10.

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

1 about keeping many carbon emitting units operating out to the year 2045.<sup>26</sup> The Company  
2 did not evaluate any other alternative plans in this RPS Plan. The Company states that it  
3 took this approach because of specific direction from the Commission in the Final Orders  
4 issued in Case Nos. PUR-2020-00134 and PUR-2020-00035.<sup>27</sup>

5 **Q 28: Did the Company evaluate distributed generation sensitivities for unbundled REC**  
6 **purchases through Requests for Proposals (“RFPs”), fixed price offers and over-the-**  
7 **counter purchases?**

8 **A:** Not for all three options. The Company has issued and is evaluating responses to a request  
9 for proposals for unbundled REC purchases but has not yet initiated or made fixed price  
10 offers or over-the-counter purchases, citing market immaturity.<sup>28</sup>

11 **Q 29: Does the Company’s RPS Plan address modeling of reliability impacts?**

12 **A:** Not in any helpful way. The Company asserts that because its PLEXOS modeling  
13 assumptions include the option to select PJM market resources to meet any demand  
14 scheduled into the modeling runs, it assures reliability from a systems perspective.<sup>29</sup> Of  
15 course, this is what systems planning models do—they select from available resources to  
16 meet forecasted demand and calculate the total cost. But, as the Company notes, planning  
17 at more granular nodal and feeder levels is needed to ensure reliability.<sup>30</sup> Moreover,  
18 reliability modeling of plan alternatives is required to evaluate the reasonableness of

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<sup>26</sup> Company Response to APV Set 3-23.

<sup>27</sup> Company Response to APV Set 3-27.

<sup>28</sup> RPS Development Plan at 10.

<sup>29</sup> *Id.* at 9.

<sup>30</sup> *Id.*



1 reliability costs. The Company has not done that kind of comparative reliability modeling  
2 in this RPS Plan.

3 **Q 30: Did the Company propose metrics and protocols for use in evaluating its RPS Plan?**

4 **A:** Yes, but the metrics proposed by the Company are limited to accounting metrics for RECs<sup>31</sup>  
5 and will not provide useful tools for evaluating least cost, reliability, retirements, or other  
6 aspects of RPS compliance and carbon dioxide emissions reductions.

7 **Q 31: Is the Company's RPS Plan proposal or Alternative Plan B offered as a least-cost  
8 plan?**

9 **A:** No. The Company asserts that the unreasonable and unrealistic Alternative Plan A is the  
10 least-cost plan,<sup>32</sup> however, it only claims that Alternative Plan B, or the proposed RPS Plan,  
11 is "a reasonable and prudent plan to meet the development targets in Va. Code § 56-585.5  
12 D and E, consistent with the requirements of Va. Code § 56-585.5 D 4 and the  
13 Commission's prior orders."<sup>33</sup> In the absence of a reasonable baseline for comparison, there  
14 is no way to assess the reasonableness and prudence of the Company's RPS Plan. In fact,  
15 the Company created Alternative Plan A assuming an unlimited amount of RECs at a fixed  
16 price, while simultaneously stating that this assumption *it created* is not reasonable.<sup>34</sup> In  
17 other words, the Company *designed* Alternative Plan A to be unreasonable, rendering it  
18 useless to the Commission as a comparison.

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<sup>31</sup> *Id.* at Att. 9.

<sup>32</sup> *Id.* at 8.

<sup>33</sup> Company Response to APV Set 3-30.

<sup>34</sup> Despite vague inferences the Company makes, the Commission never required the Company to include this modeling assumption in any order I have reviewed.

1 **Q 32: Does the Company's RPS Plan provide any indication that it has been optimized for**  
2 **cost?**

3 **A:** No. There are numerous assumptions in the Company's RPS Plan (Alternative Plan B) that  
4 demonstrate it is expressly *not* optimized for cost, and not optimized in relation to any  
5 least-cost alternative plan. These issues include the following:

- 6 1. The Company's RPS Plan keeps the uneconomic VCHEC operating until 2045  
7 when Alternative Plan A would have retired the plant on an economic basis almost  
8 immediately.<sup>35</sup>
- 9 2. The Company's proposed RPS Plan retires 4,792 MW of fossil generation by 2045,  
10 but in its 2021 IRP Update Plan C, which eliminates fossil generation but was not  
11 included in the RPS Plan, it would retire 13,356 MW of these plants, so the  
12 proposed RPS Plan appears to keep over 8,500 MW of fossil generation operating  
13 past the year 2045,<sup>36</sup> increasing both RPS compliance and carbon-dioxide  
14 emissions-related (*i.e.*, RGGI) costs.<sup>37</sup>
- 15 3. In developing its proposed RPS Plan, the Company instructed its model to select  
16 14,310 MW of solar and 5,174 MW of wind by 2035 and to only select unbundled  
17 RECs in a given year if the forced solar and wind procurements did not generate  
18 enough RECs to comply with the RPS schedule in §56-585.5 C, which means that

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<sup>35</sup> Company Response to APV Set 3-23.

<sup>36</sup> Company Responses to Staff Set 9-197, APV Set 2-11; 2021 Update to the 2020 Integrated Resource Plan, *In re: Virginia Electric and Power Company's 2021 Update to its Integrated Resource Plan pursuant to § 56-597 et seq.*, Case No. PUR-2021-00201 (Sept. 1, 2021) ("2021 IRP Update") at 5, Summary Table: 2021 Update Results.

<sup>37</sup> Notwithstanding the direct relationship between fossil generation and carbon emissions, and the resulting relationship between fossil emissions and RPS compliance planning, the Company asserts that operational and retirement planning issues relating to fossil units are off-limits for discussion in the development and evaluation of the Company's RPS Plan. *See* Company Responses to APV Sets 3-6, 3-7, 3-8.

1           there is not a single year in the RPS Plan where RECs are shown to be obtained in  
2           a least-cost manner.<sup>38</sup>

3           4. The Company's Plan B does not retire all fossil generation by 2045 as required by  
4           law. The VCEA-compliant IRP Plan C that the Company developed and which  
5           would retire all fossil generation by 2045 was not included in this RPS Plan and  
6           could have reduced costs in years 2046 and beyond.<sup>39</sup>

7           5. The Company's plans do not include a social cost of carbon value in the net present  
8           value estimates at all.<sup>40</sup> The Company models the social cost of carbon as a shadow  
9           price that impacts resource selection in modeling beginning in 2031 and ramping  
10          up over fifteen years until 2046,<sup>41</sup> deflating the cost impact of carbon dioxide  
11          emitting generation like the new gas plants proposed by Company in its Alternative  
12          Plan A. As a result, the cost-effectiveness of the RPS Plan (Alternative Plan B)  
13          cannot be objectively analyzed for cost in relation to Alternative Plan A, the  
14          supposedly least-cost plan.

15          6. In all its planning, the Company never considered procuring more than the  
16          minimum required level of efficiency, distributed generation, behind-the-meter  
17          distributed generation, or PPA-based resources.<sup>42</sup> Once again, the Company seems  
18          to assume that the VCEA sets a 35% ceiling for PPA procurement, which is simply  
19          not the case.

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<sup>38</sup> Company Response to APV Set 3-5.

<sup>39</sup> Company Response to APV Set 3-12.

<sup>40</sup> Company Response to APV Set 2-12; 2021 IRP Update at 9.

<sup>41</sup> 2021 IRP Update at 9, Fig. 1.2.1.

<sup>42</sup> Company Response to APV Set 3-15.

1 7. Finally, the Company's proposed RPS Plan and 2021 IRP Update appear to include  
 2 no direct comparison of the costs and benefits of utility-built versus PPA-based  
 3 generation, allowing for no estimation of the relative benefits or added costs of  
 4 selecting more than the minimum required share of PPA-based resources.<sup>43</sup>

5 8. Energy efficiency does not appear to have been modeled dynamically, and instead  
 6 only as a load reducer at minimum required levels.<sup>44</sup>

### 7 CONCLUSIONS AND RECOMMENDATIONS

8 **Q 33: What do you conclude based on your review of the planning process, methods, and**  
 9 **assumptions employed by the Company in developing its proposed RPS Plan?**

10 **A:** The Company's approach to planning and proposing plans for RPS compliance is  
 11 fundamentally broken. Dominion treats the VCEA as a license to build, not as a  
 12 comprehensive policy goal of eliminating carbon pollution from the power sector while  
 13 maintaining reliability at the lowest reasonable cost. The proposal is not based on any  
 14 meaningful evaluation of alternatives, nor can it be compared to a reasonable baseline. The  
 15 Company's proposed RPS Plan cannot be trusted to deliver highest value in complying  
 16 with the VCEA at least cost. The Company's responses to information requests suggest  
 17 that it prizes defense of its plan over reasoned discourse or honest and transparent  
 18 evaluation of alternatives.

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<sup>43</sup> Company Response to APV Set 3-26.

<sup>44</sup> Company Response to APV Set 3-19.

1 **Q 34: Does the Company's proposed RPS Plan serve as an adequate justification for the**  
2 **Company's renewable energy construction and procurement proposals?**

3 **A:** I do not reach a conclusion on the reasonableness of the specific generation and energy  
4 storage resource proposals. I would note that we are still at the early stages of a multi-year  
5 transition to a clean energy economy for the Commonwealth and that markets are relatively  
6 immature for many clean energy resources. The way the Company does its planning and  
7 the way the Commission requires them to do it will guide the formation of those markets  
8 and determine whether the VCEA objectives are achieved in a true least-cost fashion.

9 **Q 35: What do you recommend that the Commission direct the Company to do?**

10 **A:** Now is the time for the Commission to establish a process that will provide the Commission  
11 with better planning information so that it can better protect customers. I recommend that  
12 in future proceedings, the Commission require the Company to perform a set number of  
13 modeling runs and sensitivities as prescribed by other parties. Commission Staff would be  
14 permitted to develop and submit three alternative scenarios for the Company to run, while  
15 (1) industrial and commercial customer groups and (2) environmental and consumer  
16 groups, would each be permitted to submit two alternative plans of their own. In addition,  
17 whenever the Company conducts sensitivity analyses of its own plans, it should be directed  
18 to allow Staff and stakeholders to each submit additional sensitivities for the Company's  
19 plans or their own plans.

20 **Q 36: How could this improve the pattern and practice of planning by the Company in**  
21 **future proceedings?**

22 **A:** In the current construct, the Company develops a limited and flawed proposal in a black  
23 box. The Company then files its proposal, without an appropriate baseline against which

1 to measure the proposal, which triggers the timeline for a final order and forces other parties  
2 to simply point out the proposal's flaws through contentious discovery in a limited window  
3 of time. The Commission then must rule without sufficient information. My proposal sets  
4 up a clear, objective framework for the Company, Staff, and other parties to develop better  
5 information for the Commission's review in advance of the hearing. The recommended  
6 structure, which dispenses with the Company's black box approach, will necessarily  
7 encourage engagement, collaboration, and data transparency, all of which will happen prior  
8 to the litigated proceeding. Ultimately, this work will improve the quality of utility  
9 planning and reveal opportunities for achieving the Commonwealth's clean energy goals  
10 at lower cost and with better payoffs. Under my proposal, the Commission will be  
11 presented with alternative approaches and baselines, and a much more complete record to  
12 determine a prudent course of action on behalf of customers.

13 **Q 37: Does this conclude your testimony?**

14 **A:** Yes.

# Attachment KRR-1

**Karl R. Rábago****Rábago Energy LLC**2025 East 24<sup>th</sup> Avenue, Denver, CO 80205c/SMS: +1.512.968.7543 | e: [karl@rabagoenergy.com](mailto:karl@rabagoenergy.com) | [rabagoenergy.com](http://rabagoenergy.com)

Nationally recognized leader and innovator in electricity and energy law, policy, and regulation. Experienced as a regulatory expert, utility executive, research and development manager, sustainability leader, senior government official, educator, and advocate. Law teaching experience at Pace University Elisabeth Haub School of Law, University of Houston Law Center, and U.S. Military Academy at West Point. Military veteran.

**Employment****RÁBAGO ENERGY LLC**

Principal: July 2012—Present. Consulting practice dedicated to providing business sustainability, expert witness, and regulatory advice and services to organizations in the clean and advanced energy sectors. Prepared and submitted testimony in more than 35 jurisdictions and 140 electricity and gas regulatory proceedings. Recognized national leader in development and implementation of innovative “Value of Solar” alternative to traditional net metering. Additional information at [rabagoenergy.com](http://rabagoenergy.com).

- Chairman of the Board, Center for Resource Solutions (1997-present). CRS is a not-for-profit organization based at the Presidio in California. CRS developed and manages the Green-e Renewable Electricity Brand, a nationally and internationally recognized branding program for green power and green pricing products and programs. Past chair of the Green-e Governance Board.
- Director, Solar United Neighbors (2018-present).

**PACE ENERGY AND CLIMATE CENTER, PACE UNIVERSITY ELISABETH HAUB SCHOOL OF LAW**

Senior Policy Advisor: September 2019—September 2020. Part-time advisor and staff member. Provide expert witness, project management, and business development support on electric and gas regulatory and policy issues and activities.

Executive Director: May 2014—August 2019. Leader of a team of professional and technical experts and law students in energy and climate law, policy, and regulation. Secured funding for and managed execution of regulatory intervention, research, market development support, and advisory services. Taught Energy Law. Provided learning and development opportunities for law students. Additional activities:

- Former Director, Alliance for Clean Energy – New York (2018-2019).
- Former Director, Interstate Renewable Energy Council (IREC) (2012-2018).
- Former Co-Director and Principal Investigator, Northeast Solar Energy Market Coalition (2015-2017). The NESEMC was a US Department of Energy’s SunShot Initiative Solar Market Pathways project. Funded under a cooperative agreement between the US DOE and Pace University, the NESEMC worked to harmonize solar market policy and advance supportive policy and regulatory practices in the northeast United States.



## Karl R. Rábago

### AUSTIN ENERGY – THE CITY OF AUSTIN, TEXAS

Vice President, Distributed Energy Services: April 2009—June 2012. Executive in one of the largest public power electric utility serving more than one million people in central Texas. Responsible for management and oversight of energy efficiency, demand response, and conservation programs; low-income weatherization; distributed solar and other renewable energy technologies; green buildings program; key accounts relationships; electric vehicle infrastructure; and market research and product development. Executive sponsor of Austin Energy's participation in an innovative federally-funded smart grid demonstration project led by the Pecan Street Project. Led teams that successfully secured over \$39 million in federal stimulus funds for energy efficiency, smart grid, and advanced electric transportation initiatives. Additional activities included:

- Director, Renewable Energy Markets Association. REMA is a trade association dedicated to maintaining and strengthening renewable energy markets in the United States.
- Membership on Pedernales Electric Cooperative Member Advisory Board. Invited by the Board of Directors to sit on first-ever board to provide formal input and guidance on energy efficiency and renewable energy issues for the nation's largest electric cooperative.

### THE AES CORPORATION

Director, Government & Regulatory Affairs: June 2006—December 2008. Director, Global Regulatory Affairs, provided regulatory support and group management to AES's international electric utility operations on five continents. Managing Director, Standards and Practices, for Greenhouse Gas Services, LLC, a GE and AES venture committed to generating and marketing voluntary market greenhouse gas credits. Government and regulatory affairs manager for AES Wind Generation. Managed a portfolio of regulatory and legislative initiatives to support wind energy market development in Texas, across the United States, and in many international markets.

### JICARILLA APACHE NATION UTILITY AUTHORITY

Director: 1998—2008. Located in New Mexico, the JANUA was an independent utility developing profitable and autonomous utility services that provide natural gas, water utility services, low-income housing, and energy planning for the Nation. Authored "First Steps" renewable energy and energy efficiency strategic plan with support from U.S. Department of Energy.

### HOUSTON ADVANCED RESEARCH CENTER

Group Director, Energy and Buildings Solutions: December 2003—May 2006. Leader of energy and building science staff at a mission-driven not-for-profit contract research organization based in The Woodlands, Texas. Responsible for developing, maintaining and expanding upon technology development, application, and commercialization support programmatic activities, including the Center for Fuel Cell Research and Applications; the Gulf Coast Combined Heat and Power Application Center; and the High-Performance Green Buildings Practice. Secured funding for major new initiative in carbon nanotechnology applications in the energy sector.

- President, Texas Renewable Energy Industries Association. As elected president of the statewide business association, led and managed successful efforts to secure and implement significant expansion of the state's renewable portfolio standard as well as other policy, regulatory, and market development activities.
- Director, Southwest Biofuels Initiative. Established the Initiative as an umbrella structure for a number of biofuels related projects.

## Karl R. Rábago

- Member, Committee to Study the Environmental Impacts of Windpower, National Academies of Science National Research Council. The Committee was chartered by Congress and the Council on Environmental Quality to assess the impacts of wind power on the environment.
- Advisory Board Member, Environmental & Energy Law & Policy Journal, University of Houston Law Center.

### **CARGILL DOW LLC (NOW NATUREWORKS, LLC)**

Sustainability Alliances Leader: April 2002—December 2003. Integrated sustainability principles into all aspects of a ground-breaking bio-based polymer manufacturing venture. Responsible for maintaining, enhancing and building relationships with stakeholders in the worldwide sustainability community, as well as managing corporate and external sustainability initiatives.

- Successfully completed Minnesota Management Institute at University of Minnesota Carlson School of Management, an alternative to an executive MBA program that surveyed fundamentals and new developments in finance, accounting, operations management, strategic planning, and human resource management.

### **ROCKY MOUNTAIN INSTITUTE**

Managing Director/Principal: October 1999—April 2002. Co-authored “Small Is Profitable,” a comprehensive analysis of the benefits of distributed energy resources. Provided consulting and advisory services to help business and government clients achieve sustainability through application and incorporation of Natural Capitalism principles.

- President of the Board, Texas Ratepayers Organization to Save Energy. Texas R.O.S.E. is a non-profit organization advocating low-income consumer issues and energy efficiency programs.
- Co-Founder and Chair of the Advisory Board, Renewable Energy Policy Project-Center for Renewable Energy and Sustainable Technology. REPP-CREST was a national non-profit research and internet services organization.

### **CH2M HILL**

Vice President, Energy, Environment and Systems Group: July 1998—August 1999. Responsible for providing consulting services to a wide range of energy-related businesses and organizations, and for creating new business opportunities in the energy industry for an established engineering and consulting firm. Completed comprehensive electric utility restructuring studies for the states of Colorado and Alaska.

### **PLANERGY**

Vice President, New Energy Markets: January 1998—July 1998. Responsible for developing and managing new business opportunities for the energy services market. Provided consulting and advisory services to utility and energy service companies.

### **ENVIRONMENTAL DEFENSE FUND**

Energy Program Manager: March 1996—January 1998. Managed renewable energy, energy efficiency, and electric utility restructuring programs. Led regulatory intervention activities in Texas and California. In Texas, played a key role in crafting Deliberative Polling processes. Participated in national environmental and energy advocacy networks, including the Energy Advocates Network, the National Wind Coordinating Committee, the NCSL Advisory Committee on Energy, and the PV-COMPACT Coordinating Council. Frequently appeared before the Texas Legislature, Austin City Council, and regulatory commissions on electric restructuring issues.

## Karl R. Rábago

### UNITED STATES DEPARTMENT OF ENERGY

Deputy Assistant Secretary, Utility Technologies: January 1995–March 1996. Manager of the Department's programs in renewable energy technologies and systems, electric energy systems, energy efficiency, and integrated resource planning. Supervised technology research, development and deployment activities in photovoltaics, wind energy, geothermal energy, solar thermal energy, biomass energy, high-temperature superconductivity, transmission and distribution, hydrogen, and electric and magnetic fields. Managed, coordinated, and developed international agreements. Supervised development and deployment support activities at national laboratories. Developed, advocated, and managed a Congressional budget appropriation of approximately \$300 million.

### STATE OF TEXAS

Commissioner, Public Utility Commission of Texas. May 1992–December 1994. Appointed by Governor Ann W. Richards. Regulated electric and telephone utilities in Texas. Co-chair and organizer of the Texas Sustainable Energy Development Council. Vice-Chair of the National Association of Regulatory Utility Commissioners (NARUC) Committee on Energy Conservation. Member and co-creator of the Photovoltaic Collaborative Market Project to Accelerate Commercial Technology (PV-COMPACT).

### LAW TEACHING

**Professor for a Designated Service:** Pace University Elisabeth Haub School of Law, 2014-2019. Non-tenured member of faculty. Taught Energy Law. Supervised a student intern practice.

**Associate Professor of Law:** University of Houston Law Center, 1990–1992. Full time, tenure track member of faculty. Courses taught: Criminal Law, Environmental Law, Criminal Procedure, Environmental Crimes Seminar, Wildlife Protection Law.

**Assistant Professor:** United States Military Academy, West Point, New York, 1988–1990. Member of the faculty in the Department of Law. Honorably discharged in August 1990, as Major in the Regular Army. Courses taught: Constitutional Law, Military Law, and Environmental Law Seminar.

### LITIGATION

Trial Defense Attorney and Prosecutor, U.S. Army Judge Advocate General's Corps, Fort Polk, Louisiana, January 1985–July 1987. Assigned to Trial Defense Service and Office of the Staff Judge Advocate.

### NON-LEGAL MILITARY SERVICE

Armored Cavalry Officer, 2d Squadron 9<sup>th</sup> Armored Cavalry, Fort Stewart, Georgia, May 1978–August 1981. Served as Logistics Staff Officer (S-4). Managed budget, supplies, fuel, ammunition, and other support for an Armored Cavalry Squadron. Served as Support Platoon Leader for the Squadron (logistical support), and as line Platoon Leader in an Armored Cavalry Troop. Graduate of Airborne and Ranger Schools. Special training in Air Mobilization Planning and Nuclear, Biological and Chemical Warfare.

## Karl R. Rábago

### Formal Education

**LL.M., Environmental Law, Pace University School of Law, 1990:** Curriculum designed to provide breadth and depth in study of theoretical and practical aspects of environmental law. Courses included: International and Comparative Environmental Law, Conservation Law, Land Use Law, Seminar in Electric Utility Regulation, Scientific and Technical Issues Affecting Environmental Law, Environmental Regulation of Real Estate, Hazardous Wastes Law. Individual research with Hudson Riverkeeper Fund, Garrison, New York.

**LL.M., Military Law, U.S. Army Judge Advocate General's School, 1988:** Curriculum designed to prepare Judge Advocates for senior level staff service. Courses included: Administrative Law, Defensive Federal Litigation, Government Information Practices, Advanced Federal Litigation, Federal Tort Claims Act Seminar, Legal Writing and Communications, Comparative International Law.

**J.D. with Honors, University of Texas School of Law, 1984:** Attended law school under the U.S. Army Funded Legal Education Program, a fully funded scholarship awarded to 25 or fewer officers each year. Served as Editor-in-Chief (1983-84); Articles Editor (1982-83); Member (1982) of the Review of Litigation. Moot Court, Mock Trial, Board of Advocates. Summer internship at Staff Judge Advocate's offices. Prosecuted first cases prior to entering law school.

**B.B.A., Business Management, Texas A&M University, 1977:** ROTC Scholarship (3-yr). Member: Corps of Cadets, Parson's Mounted Cavalry, Wings & Sabers Scholarship Society, Rudder's Rangers, Town Hall Society, Freshman Honor Society, Alpha Phi Omega service fraternity.

## Karl R. Rábago

### Selected Publications

- “Distributed Generation Law,” contributing author, American Bar Association Environment, Energy, and Resources Section (August 2020)
- “National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources,” contributing author, National Energy Screening Project (August 2020)
- “Achieving 100% Renewables: Supply-Shaping through Curtailment,” with Richard Perez, Marc Perez, and Morgan Putnam, PV Tech Power, Vol. 19 (May 2019).
- “A Radical Idea to Get a High-Renewable Electric Grid: Build Way More Solar and Wind than Needed,” with Richard Perez, The Conversation, online at <http://bit.ly/2YjnM15> (May 29, 2019).
- “Reversing Energy System Inequity: Urgency and Opportunity During the Clean Energy Transition,” with John Howat, John Colgan, Wendy Gerlitz, and Melanie Santiago-Mosier, National Consumer Law Center, online at [www.nclc.org](http://www.nclc.org) (Feb. 26, 2019).
- “Revisiting Bonbright’s Principles of Public Utility Rates in a DER World,” with Radina Valova, The Electricity Journal, Vol. 31, Issue 8, pp. 9-13 (Oct. 2018).
- “Achieving very high PV penetration – The need for an effective electricity remuneration framework and a central role for grid operators,” Richard Perez (corresponding author), Energy Policy, Vol. 96, pp. 27-35 (2016).
- “The Net Metering Riddle,” Electricity Policy.com, April 2016.
- “The Clean Power Plan,” Power Engineering Magazine (invited editorial), Vol. 119, Issue 12 (Dec. 2, 2015)
- “The ‘Sharing Utility:’ Enabling & Rewarding Utility Performance, Service & Value in a Distributed Energy Age,” co-author, 51<sup>st</sup> State Initiative, Solar Electric Power Association (Feb. 27, 2015)
- “Rethinking the Grid: Encouraging Distributed Generation,” Building Energy Magazine, Vol. 33, No. 1 Northeast Sustainable Energy Association (Spring 2015)
- “The Value of Solar Tariff: Net Metering 2.0,” The ICER Chronicle, Ed. 1, p. 46 [International Confederation of Energy Regulators] (December 2013)
- “A Regulator’s Guidebook: Calculating the Benefits and Costs of Distributed Solar Generation,” co-author, Interstate Renewable Energy Council (October 2013)
- “The ‘Value of Solar’ Rate: Designing an Improved Residential Solar Tariff,” Solar Industry, Vol. 6, No. 1 (Feb. 2013)
- “Jicarilla Apache Nation Utility Authority Strategic Plan for Energy Efficiency and Renewable Energy Development,” lead author & project manager, U.S. Department of Energy First Steps Toward Developing Renewable Energy and Energy Efficiency on Tribal Lands Program (2008)
- “A Review of Barriers to Biofuels Market Development in the United States,” 2 Environmental & Energy Law & Policy Journal 179 (2008)
- “A Strategy for Developing Stationary Biodiesel Generation,” Cumberland Law Review, Vol. 36, p.461 (2006)
- “Evaluating Fuel Cell Performance through Industry Collaboration,” co-author, Fuel Cell Magazine (2005)
- “Applications of Life Cycle Assessment to NatureWorks™ Polylactide (PLA) Production,” co-author, Polymer Degradation and Stability 80, 403-19 (2003)

## Karl R. Rábago

“An Energy Resource Investment Strategy for the City of San Francisco: Scenario Analysis of Alternative Electric Resource Options,” contributing author, Prepared for the San Francisco Public Utilities Commission, Rocky Mountain Institute (2002)

“Small Is Profitable: The Hidden Economic Benefits of Making Electrical Resources the Right Size,” co-author, Rocky Mountain Institute (2002)

“Socio-Economic and Legal Issues Related to an Evaluation of the Regulatory Structure of the Retail Electric Industry in the State of Colorado,” with Thomas E. Feiler, Colorado Public Utilities Commission and Colorado Electricity Advisory Panel (April 1, 1999)

“Study of Electric Utility Restructuring in Alaska,” with Thomas E. Feiler, Legislative Joint Committee on electric Restructuring and the Alaska Public Utilities Commission (April 1, 1999)

“New Markets and New Opportunities: Competition in the Electric Industry Opens the Way for Renewables and Empowers Customers,” EEBA Excellence (Journal of the Energy Efficient Building Association) (Summer 1998)

“Building a Better Future: Why Public Support for Renewable Energy Makes Sense,” Spectrum: The Journal of State Government (Spring 1998)

“The Green-e Program: An Opportunity for Customers,” with Ryan Wisser and Jan Hamrin, Electricity Journal, Vol. 11, No. 1 (January/February 1998)

“Being Virtual: Beyond Restructuring and How We Get There,” Proceedings of the First Symposium on the Virtual Utility, Kluwer Press (1997)

“Information Technology,” Public Utilities Fortnightly (March 15, 1996)

“Better Decisions with Better Information: The Promise of GIS,” with James P. Spiers, Public Utilities Fortnightly (November 1, 1993)

“The Regulatory Environment for Utility Energy Efficiency Programs,” Proceedings of the Meeting on the Efficient Use of Electric Energy, Inter-American Development Bank (May 1993)

“An Alternative Framework for Low-Income Electric Ratepayer Services,” with Danielle Jaussaud and Stephen Benenson, Proceedings of the Fourth National Conference on Integrated Resource Planning, National Association of Regulatory Utility Commissioners (September 1992)

“What Comes Out Must Go In: The Federal Non-Regulation of Cooling Water Intakes Under Section 316 of the Clean Water Act,” Harvard Environmental Law Review, Vol. 16, p. 429 (1992)

“Least Cost Electricity for Texas,” State Bar of Texas Environmental Law Journal, Vol. 22, p. 93 (1992)

“Environmental Costs of Electricity,” Pace University School of Law, Contributor—Impingement and Entrainment Impacts, Oceana Publications, Inc. (1990)

# Attachment KRR-2

**Testimony Submitted by Karl R. Rábago**  
**(as of 13 Nov 2021)**

<b>Date</b>	<b>Proceeding</b>	<b>Case/Docket #</b>	<b>On Behalf Of:</b>
Dec. 21, 2012	VA Electric & Power Special Solar Power Tariff	Virginia State Corporation Commission Case # PUE-2012-00064	Southern Environmental Law Center
May 10, 2013	Georgia Power Company 2013 IRP	Georgia Public Service Commission Docket # 36498	Georgia Solar Energy Industries Association
Jun. 23, 2013	Louisiana Public Service Commission Re-examination of Net Metering Rules	Louisiana Public Service Commission Docket # R-31417	Gulf States Solar Energy Industries Association
Aug. 29, 2013	DTE (Detroit Edison) 2013 Renewable Energy Plan Review (Michigan)	Michigan Public Utilities Commission Case # U-17302	Environmental Law and Policy Center
Sep. 5, 2013	CE (Consumers Energy) 2013 Renewable Energy Plan Review (Michigan)	Michigan Public Utilities Commission Case # U-17301	Environmental Law and Policy Center
Sep. 27, 2013	North Carolina Utilities Commission 2012 Avoided Cost Case	North Carolina Utilities Commission Docket # E-100, Sub. 136	North Carolina Sustainable Energy Association
Oct. 18, 2013	Georgia Power Company 2013 Rate Case	Georgia Public Service Commission Docket # 36989	Georgia Solar Energy Industries Association
Nov. 4, 2013	PEPCO Rate Case (District of Columbia)	District of Columbia Public Service Commission Formal Case # 1103	Grid 2.0 Working Group & Sierra Club of Washington, D.C.
Apr. 24, 2014	Dominion Virginia Electric Power 2013 IRP	Virginia State Corporation Commission Case # PUE-2013-00088	Environmental Respondents
Apr. 25, 2014	North Carolina Utilities Commission 2014 Avoided Cost Case - Direct	North Carolina Utilities Commission Docket # E-100, Sub. 140	Southern Alliance for Clean Energy
May 7, 2014	Arizona Corporation Commission Investigation on the Value and Cost of Distributed Generation	Arizona Corporation Commission Docket # E-00000J-14-0023	Rábago Energy LLC (invited presentation and workshop participation)
Jun. 2, 2014	North Carolina Utilities Commission 2014 Avoided Cost Case – Response (Corrected)	North Carolina Utilities Commission Docket # E-100, Sub. 140	Southern Alliance for Clean Energy
Jun. 20, 2014	North Carolina Utilities Commission 2014 Avoided Cost Case – Rebuttal	North Carolina Utilities Commission Docket # E-100, Sub. 140	Southern Alliance for Clean Energy



**Testimony Submitted by Karl R. Rábago**  
**(as of 13 Nov 2021)**

Jul. 23, 2014	Florida Energy Efficiency and Conservation Act, Goal Setting – FPL, Duke, TECO, Gulf	Florida Public Service Commission Docket # 130199-EI, 130200-EI, 130201-EI, 130202-EI	Southern Alliance for Clean Energy
Sep. 19, 2014	Ameren Missouri's Application for Authorization to Suspend Payment of Solar Rebates	Missouri Public Service Commission File No. ET-2014-0350, Tariff # YE-2014-0494	Missouri Solar Energy Industries Association
Aug. 6, 2014	Appalachian Power Company 2014 Biennial Rate Review	Virginia State Corporation Commission Case # PUE-2014-00026	Southern Environmental Law Center (Environmental Respondents)
Aug. 13, 2014	Wisconsin Public Service Corp. 2014 Rate Application	Wisconsin Public Service Commission Docket # 6690-UR-123	RENEW Wisconsin and Environmental Law & Policy Center
Aug. 28, 2014	WE Energies 2014 Rate Application	Wisconsin Public Service Commission Docket # 05-UR-107	RENEW Wisconsin and Environmental Law & Policy Center
Sep. 18, 2014	Madison Gas & Electric Company 2014 Rate Application	Wisconsin Public Service Commission Docket # 3720-UR-120	RENEW Wisconsin and Environmental Law & Policy Center
Sep. 29, 2014	SOLAR, LLC v. Missouri Public Service Commission	Missouri District Court Case # 14AC-CC00316	SOLAR, LLC
Jan. 28, 2016 (date of CPUC order)	Order Instituting Rulemaking to Develop a Successor to Existing Net Energy Metering Tariffs, etc.	California Public Utilities Commission Rulemaking 14-07-002	The Utility Reform Network (TURN)
Mar. 20, 2015	Orange and Rockland Utilities 2015 Rate Application	New York Public Service Commission Case # 14-E-0493	Pace Energy and Climate Center
May 22, 2015	DTE Electric Company Rate Application	Michigan Public Service Commission Case # U-17767	Michigan Environmental Council, NRDC, Sierra Club, and ELPC
Jul. 20, 2015	Hawaiian Electric Company and NextEra Application for Change of Control	Hawai'i Public Utilities Commission Docket # 2015-0022	Hawai'i Department of Business, Economic Development, and Tourism
Sep. 2, 2015	Wisc. PSCo Rate Application	Wisconsin Public Service Commission Case # 6690-UR-124	ELPC
Sep. 15, 2015	Dominion Virginia Electric Power 2015 IRP	Virginia State Corporation Commission Case # PUE-2015-00035	Environmental Respondents
Sep. 16, 2015	NYSEG & RGE Rate Cases	New York Public Service Commission Cases 15-E-0283, -0285	Pace Energy and Climate Center

**Testimony Submitted by Karl R. Rábago**  
**(as of 13 Nov 2021)**

Oct. 14, 2015	Florida Power & Light Application for CCPN for Lake Okeechobee Plant	Florida Public Service Commission Case 150196-EI	Environmental Confederation of Southwest Florida
Oct. 27, 2015	Appalachian Power Company 2015 IRP	Virginia State Corporation Commission Case # PUE-2015-00036	Environmental Respondents
Nov. 23, 2015	Narragansett Electric Power/National Grid Rate Design Application	Rhode Island Public Utilities Commission Docket No. 4568	Wind Energy Development, LLC
Dec. 8, 2015	State of West Virginia, et al., v. U.S. EPA, et al.	U.S. Court of Appeals for the District of Columbia Circuit Case No. 15-1363 and Consolidated Cases	Declaration in Support of Environmental and Public Health Intervenors in Support of Movant Respondent-Intervenors' Responses in Opposition to Motions for Stay
Dec. 28, 2015	Ohio Power/AEP Affiliate PPA Application	Public Utilities Commission of Ohio Case No. 14-1693-EL-RDR	Environmental Law and Policy Center
Jan. 19, 2016	Ohio Edison Company, Cleveland Electric Illuminating Company, and Toledo Edison Company Application for Electric Security Plan (FirstEnergy Affiliate PPA)	Public Utilities Commission of Ohio Case No. 14-1297-EL-SSO	Environmental Law and Policy Center
Jan. 22, 2016	Northern Indiana Public Service Company (NIPSCO) Rate Case	Indiana Utility Regulatory Commission Cause No. 44688	Citizens Action Coalition and Environmental Law and Policy Center
Mar. 18, 2016	Northern Indiana Public Service Company (NIPSCO) Rate Case – Settlement Testimony	Indiana Utility Regulatory Commission Cause No. 44688	Joint Intervenors – Citizens Action Coalition and Environmental Law and Policy Center
Mar. 18, 2016	Comments on Pilot Rate Proposals by MidAmerican and Alliant	Iowa Utility Board NOI-2014-0001	Environmental Law and Policy Center
May 27, 2016	Consolidated Edison of New York Rate Case	New York Public Service Commission Case No. 16-E-0060	Pace Energy and Climate Center
Jun. 21, 2016	Federal Trade Commission: Workshop on Competition and Consumer Protection Issues in Solar Energy - Invited workshop presentation	Federal Trade Commission - Solar Electricity Project No. P161200	Pace Energy and Climate Center
Aug. 17, 2016	Dominion Virginia Electric Power 2016 IRP	Virginia State Corporation Commission Case # PUE-2016-00049	Environmental Respondents

**Testimony Submitted by Karl R. Rábago**  
**(as of 13 Nov 2021)**

Aug. 17, 2016	Dominion Virginia Electric Power 2016 IRP	Virginia State Corporation Commission Case # PUE-2016-00049	Environmental Respondents
Sep. 13, 2016	Appalachian Power Company 2016 IRP	Virginia State Corporation Commission Case # PUE-2016-00050	Environmental Respondents
Oct. 27, 2016	Consumers Energy PURPA Compliance Filing	Michigan Public Service Commission Case No. U-18090	Environmental Law & Policy Center, "Joint Intervenors"
Oct. 28, 2016	Delmarva, PEPCO (PHI) Utility Transformation Filing – Review of Filing & Utilities of the Future Whitepaper	Maryland Public Service Commission Case PC 44	Public Interest Advocates
Dec. 1, 2016	DTE Electric Company PURPA Compliance Filing	Michigan Public Service Commission Case No. U-18091	Environmental Law & Policy Center, "Joint Intervenors"
Dec. 16, 2016	Development of New Alternative Net Metering Tariffs - Rebuttal of Unutil Testimony	New Hampshire Public Utilities Commission Docket No. DE 16-576	New Hampshire Sustainable Energy Association ("NHSEA")
Jan. 13, 2017	Gulf Power Company Rate Case	Florida Public Service Commission Docket No. 160186-EI	Earthjustice, Southern Alliance for Clean Energy, League of Women Voters-Florida
Jan. 13, 2017	Alpena Power Company PURPA Compliance Filing	Michigan Public Service Commission Case No. U-18089	Environmental Law & Policy Center, "Joint Intervenors"
Jan. 13, 2017	Indiana Michigan Power Company PURPA Compliance Filing	Michigan Public Service Commission Case No. U-18092	Environmental Law & Policy Center, "Joint Intervenors"
Jan. 13, 2017	Northern States Power Company PURPA Compliance Filing	Michigan Public Service Commission Case No. U-18093	Environmental Law & Policy Center, "Joint Intervenors"
Jan. 13, 2017	Upper Peninsula Power Company PURPA Compliance Filing	Michigan Public Service Commission Case No. U-18094	Environmental Law & Policy Center, "Joint Intervenors"
Mar. 10, 2017	Eversource Energy Grid Modernization Plan	Massachusetts Department of Public Utilities Case No. 15-122/15-123	Cape Light Compact
Apr. 27, 2017	Eversource Rate Case & Grid Modernization Investments	Massachusetts Department of Public Utilities Case No. 17-05	Cape Light Compact
May 2, 2017	AEP Ohio Power Electric Security Plan	Public Utilities Commission of Ohio Case No. 16-1852-EL-SSO	Environmental Law & Policy Center

**Testimony Submitted by Karl R. Rábago**  
**(as of 13 Nov 2021)**

Jun. 2, 2017	Vectren Energy TDSIC Plan	Indiana Utility Regulatory Commission Cause No. 44910	Citizens Action Coalition & Valley Watch
Jul. 26, 2017	Vectren Energy 2018-2020 Energy Efficiency Plan	Indiana Utility Regulatory Commission Cause No. 44927	Citizens Action Coalition
Jul. 28, 2017	Vectren Energy 2016-2017 Energy Efficiency Plan	Indiana Utility Regulatory Commission Cause No. 44645	Citizens Action Coalition
Aug. 1, 2017	Interstate Power & Light (Alliant) 2017 Rate Application	Iowa Utilities Board Docket No. RPU-2017-0001	Environmental Law & Policy Center, Iowa Environmental Council, Natural Resources Defense Council, and Solar Energy Industries Assoc.
Aug. 11, 2017	Dominion Virginia Electric Power 2017 IRP	Virginia State Corporation Commission Case # PUR-2017-00051	Environmental Respondents
Aug. 18, 2017	Appalachian Power Company 2017 IRP	Virginia State Corporation Commission Case # PUR-2017-00045	Environmental Respondents
Aug. 23, 2017	Pennsylvania Solar Future Project	Pennsylvania Dept. of Environmental Protection - Alternative Ratemaking Webinar	Pace Energy and Climate Center
Aug. 25, 2017	Niagara Mohawk Power Co. d/b/a National Grid Rate Case	New York Public Service Commission Case # 17-E-0238, 17-G-0239	Pace Energy and Climate Center
Sep. 15, 2017	Niagara Mohawk Power Co. d/b/a National Grid Rate Case	New York Public Service Commission Case # 17-E-0238, 17-G-0239	Pace Energy and Climate Center
Oct. 20, 2017	Missouri PSC Working Case to Explore Emerging Issues in Utility Regulation	Missouri Public Service Commission File No. EW-2017-0245	Renew Missouri
Nov. 21, 2017	Central Hudson Gas & Electric Co. Electric and Gas Rates Cases	New York Public Service Commission Case # 17-E-0459, -0460	Pace Energy and Climate Center
Jan. 16, 2018	Great Plains Energy, Inc. Merger with Westar Energy, Inc.	Missouri Public Service Commission Case # EM-2018-0012	Renew Missouri Advocates
Jan. 19, 2018	U.S. House of Representatives, Energy and Commerce Committee	Hearing on "The PURPA Modernization Act of 2017," H.R. 4476	Rábago Energy LLC

**Testimony Submitted by Karl R. Rábago**  
**(as of 13 Nov 2021)**

Jan. 29, 2018	Joint Petition of Electric Distribution Companies for Approval of a Model SMART Tariff	Massachusetts Department of Public Utilities Case No. 17-140	Boston Community Capital Solar Energy Advantage Inc.  (Jointly authored with Sheryl Musgrove)
Feb. 21, 2018	Joint Petition of Electric Distribution Companies for Approval of a Model SMART Tariff	Massachusetts Department of Public Utilities Case No. 17-140 - Surrebuttal	Boston Community Capital Solar Energy Advantage Inc.  (Jointly authored with Sheryl Musgrove)
Apr. 6, 2018	Narragansett Electric Co., d/b/a National Grid Rate Case Filing	Rhode Island Public Utilities Commission Docket No. 4770	New Energy Rhode Island ("NERI")
Apr. 25, 2018	Narragansett Electric Co., d/b/a National Grid Power Sector Transformation Plan	Rhode Island Public Utilities Commission Docket No. 4780	New Energy Rhode Island ("NERI")
Apr. 26, 2018	U.S. EPA Proposed Repeal of Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 82 Fed. Reg. 48,035 (Oct. 16, 2017) – "Clean Power Plan"	U.S. Environmental Protection Agency Docket No. EPA-HQ-OAR-2016-0592	Karl R. Rábago
May 25, 2018	Orange & Rockland Utilities, Inc. Rate Case Filing	New York Public Service Commission Case Nos. 18-E-0067, 18-G-0068	Pace Energy and Climate Center
Jun. 15, 2018	Orange & Rockland Utilities, Inc. Rate Case Filing	New York Public Service Commission Case Nos. 18-E-0067, 18-G-0068 – Rebuttal Testimony	Pace Energy and Climate Center
Aug. 10, 2018	Dominion Virginia Electric Power 2018 IRP	Virginia State Corporation Commission Case # PUR-2018-00065	Environmental Respondents
Sep. 20, 2018	Consumers Energy Company Rate Case	Michigan Public Service Commission Case No. U-20134	Environmental Law & Policy Center
Sep. 27, 2018	Potomac Electric Power Co. Notice to Construct Two 230 kV Underground Circuits	District of Columbia Public Service Commission Formal Case No. 1144	Solar United Neighbors of D.C.
Sep. 28, 2019	Arkansas Public Service Commission Investigation of Policies Related to Distributed Energy Resources	Arkansas Public Service Commission Docket No. 16-028-U	Arkansas Audubon Society & Arkansas Advanced Energy Association
Nov. 7, 2018	DTE Detroit Edison Rate Case	Michigan Public Service Commission Case No. U-20162	Natural Resources Defense Council, Michigan Environmental Council, Sierra Club

**Testimony Submitted by Karl R. Rábago**  
**(as of 13 Nov 2021)**

Mar. 26, 2019	Guam Power Authority Petition to Modify Net Metering	Guam Public Utilities Commission Docket GPA 19-04	Micronesia Renewable Energy, Inc.
Apr. 4, 2019	Community Power Network & League of Women Voters of Florida v. JEA	Circuit Court Duval County of Florida Case No. 2018-CA-002497 Div: CV-D	Earthjustice
Apr. 16, 2019	Dominion Virginia Electric Power 2018 IRP – Compliance Filing	Virginia State Corporation Commission Case # PUR-2018-00065	Environmental Respondents
Apr. 25, 2019	Georgia Power 2019 IRP	Georgia Public Service Commission Docket No. 42310	GSEA & GSEIA
May 10, 2019	NV Energy NV GreenEnergy 2.0 Rider	Nevada Public Utilities Commission Docket Nos. 18-11015, 18-11016	Vote Solar
May 24, 2019	Consolidated Edison of New York Electric and Gas Rate Cases – Misc. Issues	New York Public Service Commission Case Nos. 19-E-0065, 19-G-0066	Pace Energy and Climate Center
May 24, 2019	Consolidated Edison of New York Electric and Gas Rate Cases – Low- and Moderate-Income Panel	New York Public Service Commission Case Nos. 19-E-0065, 19-G-0066	Pace Energy and Climate Center
May 30, 2019	Connecticut DEEP Shared Clean Energy Facility Program Proposal	Connecticut Department of Energy and Environmental Protection Docket No. 19-07-01	Connecticut Fund for the Environment
Jun. 3, 2019	New Orleans City Council Rulemaking to Establish Renewable Portfolio Standards	New Orleans City Council Docket No. UD-19-01	National Audubon Society and Audubon Louisiana
Jun. 14, 2019	Consolidated Edison of New York Electric and Gas Rate Cases – Rebuttal Testimony	New York Public Service Commission Case Nos. 19-E-0065, 19-G-0066	Pace Energy and Climate Center
Jun. 24, 2019	Program to Encourage Clean Energy in Westchester County Pursuant to Public Service law Section 74-a; Staff Investigation into a Moratorium on New Natural Gas Services in the Consolidated Edison Company of New York, Inc. Service Territory	New York Public Service Commission Case Nos. 19-M-0265, 19-G-0080	Earthjustice and Pace Energy and Climate Center
Jul. 12, 2019	Application of Virginia Electric and Power Company for the Determination of the Fair Rate of Return on Common Equity	Virginia State Corporation Commission Case # PUR-2019-00050	Virginia Poverty Law Center

**Testimony Submitted by Karl R. Rábago**  
**(as of 13 Nov 2021)**

Jul. 15, 2019	New Orleans City Council Rulemaking to Establish Renewable Portfolio Standards – Reply Comments	New Orleans City Council Docket No. UD-19-01	National Audubon Society and Audubon Louisiana
Aug. 1, 2019	Interstate Power and Light Company – General Rate Case	Iowa Utilities Board Docket No. RPU-2019-0001	Environmental Law & Policy Center and Iowa Environmental Council
Aug. 19, 2019	Consolidated Edison of New York Electric and Gas Rate Cases – Surrebuttal	New York Public Service Commission Case Nos. 19-E-0065, 19-G-0066	Pace Energy and Climate Center
Aug. 21, 2019	Connecticut Department of Energy and Environmental Protection and Public Utility Regulatory Authority Joint Proceeding on the Value of Distributed Energy Resources - Comments	Connecticut Department of Energy and Environmental Protection/Public Utility Regulatory Authority Docket No. 19-06-29	Connecticut Fund for the Environment and Save Our Sound
Sep. 10, 2019	Interstate Power and Light Company – General Rate Case - Rebuttal	Iowa Utilities Board Docket No. RPU-2019-0001	Environmental Law & Policy Center and Iowa Environmental Council
Sep. 18, 2019	Connecticut Department of Energy and Environmental Protection and Public Utility Regulatory Authority Joint Proceeding on the Value of Distributed Energy Resources – Comments and Response to Draft Study Outline	Connecticut Department of Energy and Environmental Protection/Public Utility Regulatory Authority Docket No. 19-06-29	Connecticut Fund for the Environment, Save Our Sound, E4theFuture, NE Clean Energy Council, NE Energy Efficiency Partnership, and Acadia Center
Sep. 20, 2019	Connecticut Department of Energy and Environmental Protection and Public Utility Regulatory Authority Joint Proceeding on the Value of Distributed Energy Resources – Participation in Technical Workshop 1	Connecticut Department of Energy and Environmental Protection/Public Utility Regulatory Authority Docket No. 19-06-29  <a href="http://www.ctn.state.ct.us/ctnplayer.asp?odID=16715">http://www.ctn.state.ct.us/ctnplayer.asp?odID=16715</a>	Connecticut Fund for the Environment and Save Our Sound
Oct. 4, 2019	Connecticut Department of Energy and Environmental Protection and Public Utility Regulatory Authority Joint Proceeding on the Value of Distributed Energy Resources – Participation in Technical Workshop 2	Connecticut Department of Energy and Environmental Protection/Public Utility Regulatory Authority Docket No. 19-06-29  <a href="http://www.ctn.state.ct.us/ctnplayer.asp?odID=16766">http://www.ctn.state.ct.us/ctnplayer.asp?odID=16766</a>	Connecticut Fund for the Environment and Save Our Sound
Oct. 15, 2019	Electronic Consideration of the Implementation of the Net Metering Act (KY SB 100)	Kentucky Public Service Commission Case No. 2019-00256	Kentuckians for the Commonwealth & Mountain Association for Community Economic Development

**Testimony Submitted by Karl R. Rábago**  
**(as of 13 Nov 2021)**

Oct. 15, 2019	New Orleans City Council Rulemaking to Establish Renewable Portfolio Standards – Comments on City Council Utility Advisors' Report	New Orleans City Council Docket No. UD-19-01	National Audubon Society and Audubon Louisiana, Vote Solar, 350 New Orleans, Alliance for Clean Energy, PosiGen, and Sierra Club
Oct. 17, 2019	Indiana Michigan Power Co. General Rate Case	Michigan Public Service Company Case No. U-20359	Environmental Law & Policy Center, The Ecology Center, the Solar Energy Industries Association, and Vote Solar
Dec. 4, 2019	Alabama Power Company Petition for Certificate of Convenience and Necessity	Alabama Public Service Commission Docket No. 32953	Energy Alabama and Gasp, Inc.
Dec. 5, 2019	In the Matter of Net Metering and the Implementation of Act 827 of 2015	Arkansas Public Service Commission Docket No. 16-027-R	National Audubon Society and Arkansas Advanced Energy Association
Dec. 6, 2019	Proposed Revisions to Vermont Public Utility Commission Rule 5.100	Vermont Public Utility Commission Case No. 19-0855-RULE	Renewable Energy Vermont ("REV")
Jan. 15, 2020	General Rate Case	Washington Utilities and Transportation Commission Docket Nos. UE-190529 & UG-190530	Puget Sound Energy
Feb. 11, 2020	Application of Entergy Arkansas, LLC for a Proposed Tariff Amendment: Solar Energy Purchase Option – Direct Testimony	Arkansas Public Service Commission Docket No. 19-042-TF	Arkansas Advanced Energy Association
Mar. 17, 2020	Application of Entergy Arkansas, LLC for a Proposed Tariff Amendment: Solar Energy Purchase Option – Surrebuttal Testimony	Arkansas Public Service Commission Docket No. 19-042-TF	Arkansas Advanced Energy Association
Jun. 16, 2020	PECO Energy Default Supply Plan V – Direct Testimony	Pennsylvania Public Utility Commission Docket No. P-2020-3019290	Environmental Respondents / Earthjustice
Jun. 24, 2020	Consumers Energy Company General Rate Case – Direct Testimony	Michigan Public Service Commission Case No. U-20697	Joint Clean Energy Organizations / Environmental Law & Policy Center
Jul. 14, 2020	Consumers Energy Company General Rate Case – Rebuttal Testimony	Michigan Public Service Commission Case No. U-20697	Joint Clean Energy Organizations / Environmental Law & Policy Center
Jul. 23, 2020	PECO Energy Default Supply Plan V – Surrebuttal Testimony	Pennsylvania Public Utility Commission Docket No. P-2020-3019290	Environmental Stakeholders / Earthjustice



**Testimony Submitted by Karl R. Rábago**  
**(as of 13 Nov 2021)**

Sep. 15, 2020	Dominion Virginia Electric Power 2020 IRP – Direct Testimony	Virginia State Corporation Commission Case # PUR-2020-00035	Environmental Respondents
Sep. 18, 2020	Avoided Cost Proceeding for Georgia Power – Direct Testimony	Georgia Public Service Commission Docket No. 4822	Georgia Solar Energy Industries Association, Inc.
Sep. 29, 2020	Madison Gas and Electric – General Rate Case – Affidavit in Opposition to Electric Rates Settlement	Wisconsin Public Service Commission Docket No. 3270-UR-123	Sierra Club
Sep. 30, 2020	Madison Gas and Electric – General Rate Case – Gas Rates	Wisconsin Public Service Commission Docket No. 3270-UR-123	Sierra Club
Oct. 2, 2020	Duke Energy Florida Petition for Approval of Clean Energy Connect Program	Florida Public Service Commission Docket No. 20200176-EI	League of United Latin American Citizens of Florida
Sep. 30, 2020	Madison Gas and Electric – General Rate Case – Gas Rates	Wisconsin Public Service Commission Docket No. 3270-UR-123	Sierra Club
Oct. 2, 2020	Duke Energy Florida Petition for Approval of Clean Energy Connect Program	Florida Public Service Commission Docket No. 20200176-EI	League of United Latin American Citizens of Florida
Oct. 2, 2020	Ameren Illinois – Investigation re: Calculation of Distributed Generation Rebates	Illinois Commerce Commission Docket No. 20-0389	Joint Solar Parties
Dec. 9, 2020	Arkansas – In the Matter of a Rulemaking to Adopt an Evaluation, Measurement, and Verification Protocol and Propose M&V Amendments to the Commission’s Rules for Conservation and Energy Efficiency Programs; In the Matter of the Continuation, Expansion, and Enhancement of Public Utility Energy Efficiency Programs in Arkansas	Arkansas Public Service Commission Docket Nos. 10-100-R, 13-002-U	Arkansas Advanced Energy Association
Dec. 22, 2020	Appalachian Power Company 2020 Virginia Clean Economy Act Compliance Plan	Virginia State Corporation Commission Case No. PUR-2020-00135	Environmental Respondent
Jan. 4, 2021	Dominion Virginia Electric Power Company Clean Economy Compliance Plan	Virginia State Corporation Commission Case No. PUR-2020-00134	Environmental Respondent
Feb. 5, 2021	Ameren Illinois – Investigation re: Calculation of Distributed Generation Rebates - Rebuttal	Illinois Commerce Commission Docket No. 20-0389	Joint Solar Parties

**Testimony Submitted by Karl R. Rábago**  
**(as of 13 Nov 2021)**

Feb. 15, 2021	Kentucky Power Company General Rate Case	Kentucky Public Service Commission Case No. 2020-00174	Joint Intervenors – Mountain Association, Kentuckians for the Commonwealth, Kentucky Solar Energy Society
Mar. 2, 2021	Dominion Virginia Electric Power Company Rider RGGI Proposal	Virginia State Corporation Commission Case No. PUR-2020-00169	Environmental Respondent
Mar. 5, 2021	Kentucky Utilities Company and Louisville Gas and Electric Company General Rate Cases	Kentucky Public Service Commission Case Nos. 2020-00349, 2020-00350	Joint Intervenors – Mountain Association, Kentuckians for the Commonwealth, Kentucky Solar Energy Society
Apr. 5, 2021	Docket to Review the Efficacy and Fairness of the Net Metering and Interconnection Rules – Comments	Mississippi Public Service Commission Docket No. 2021-AD-19	Entegrity Energy Partners, LLC & Audubon Delta / National Audubon Society
Apr. 13, 2021	Petition of Guam Power Authority for Creation of a New Energy Storage Rate – Comments of Micronesia Renewable Energy, Inc.	Guam Public Utilities Commission Docket No. 20-09	Micronesia Renewable Energy, Inc.
May 25, 2021	Petition of Episcopal Diocese of Rhode Island for Declaratory Judgment on Transmission System Costs and Related “Affected System Operator” Studies	Rhode Island Public Utility Commission Docket No. 4981	Episcopal Diocese of Rhode Island
Jun. 21, 2021	Petition for Rate Increase by Florida Power & Light Company – Direct Testimony	Florida Public Service Commission Docket No. 20210015-EI	Florida Rising, Inc., League of United Latin American Citizens of Florida, and Environmental Confederation of Southwest Florida, Inc.
Jun. 22, 2021	Application of Consumers Energy Company for Authority to Increase Its Rates for the Generation and Distribution of Electricity and Other Relief	Michigan Public Service Commission Case No. U-20963	The Environmental Law and Policy Center (EPLC)
Jun. 28, 2021	Pennsylvania Public Utility Commission v. PECO Energy Company (GRC)	Pennsylvania Utility Commission Docket No. R-2021-3024601	Clean Energy Advocates
Jul. 12, 2021	Application of Consumers Energy Company for Authority to Increase Its Rates for the Generation and Distribution of Electricity and Other Relief – Rebuttal	Michigan Public Service Commission Case No. U-20963	The Environmental Law and Policy Center (EPLC)
Jul. 28, 2021	Application of Shenandoah Valley Electric Cooperative for a General Increase in Rates	Virginia State Corporation Commission Case No. PUR-2021-00054	Solar United Neighbors of Virginia (SUN-VA)

**Testimony Submitted by Karl R. Rábago**  
**(as of 13 Nov 2021)**

Aug. 5, 2021	Kentucky Utilities Company and Louisville Gas and Electric Company General Rate Cases – Supp. Proceeding on Net Energy Metering	Kentucky Public Service Commission Case Nos. 2020-00349, 2020-00350	Joint Intervenors – Mountain Association, Kentuckians for the Commonwealth, Kentucky Solar Energy Society
Sep. 2, 2021	Madison Gas & Electric Co. – General Rate Case	Wisconsin Public Service Commission Docket No. 3270-UR-124	Sierra Club
Sep. 3, 2021	Dominion Virginia Electric Power Company – Triennial Rate Review – Direct Testimony on ROE	Virginia State Corporation Commission Case No. PUR-2020-00169	
Sep. 13, 2021	Petition for Rate Increase by Florida Power & Light Company – Settlement Testimony	Florida Public Service Commission Docket No. 20210015-EI	Florida Rising, Inc., League of United Latin American Citizens of Florida, and Environmental Confederation of Southwest Florida, Inc.
Sep. 20, 2021	Madison Gas & Electric Co. – General Rate Case – Surrebuttal Testimony	Wisconsin Public Service Commission Docket No. 3270-UR-124	Sierra Club
Sep. 27, 2021	Dakota Energy Cooperative, Inc. v. East River Electric Power Cooperative, Inc. and Basin Electric Power Cooperative – Expert Report	US. District Court, District of South Dakota (Southern Division) Case 4:20-CV-04192-LLP	Dakota Energy Cooperative, Inc.
Oct. 5, 2021	In the Matter of establishing regulations for a shared solar program pursuant to § 56-594.3 of the Code of Virginia	Virginia State Corporation Commission Case No. PUR-2020-00125	Coalition for Community Solar Access
Nov. 1, 2021	Dakota Energy Cooperative, Inc. v. East River Electric Power Cooperative, Inc. and Basin Electric Power Cooperative – Surrebuttal Expert Report	US. District Court, District of South Dakota (Southern Division) Case 4:20-CV-04192-LLP	Dakota Energy Cooperative, Inc.

# Attachment KRR-3

**Virginia Electric and Power Company**  
**Case No. PUR-2021-00146**  
**Appalachian Voices**  
**Second Set**

The following response to Question No. 2 of the Second Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on October 21, 2021 has been prepared under my supervision.

Madison Matherley  
Energy Market Analyst  
Dominion Energy Services, Inc.

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**Question No. 2**

For Plan A, did the Company include as modeling parameters the mandatory retirement provisions of § 56-585.5 B 3? If not, please explain why not.

**Response:**

No. See page 6 of the Commission's Final Order in Case No. PUR-2020-00134 and pages 13 to 14 of the Commission's Final Order in Case No. PUR-2020-00035, which provide specific instructions on what should and should not be included in Alternative Plan A.

**Virginia Electric and Power Company**  
**Case No. PUR-2021-00146**  
**Appalachian Voices**  
**Second Set**

The following response to Question No. 4 of the Second Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on October 21, 2021 has been prepared under my supervision.

Madison Matherley  
Energy Market Analyst  
Dominion Energy Services, Inc.

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**Question No. 4**

Did Plan A's modeling assumptions apply the mandatory retirement provisions of § 56-585.5 B 3 to the new natural gas combustion turbines selected in 2026 and 2027? If not, please explain why not.

**Response:**

No. See page 6 of the Commission's Final Order in Case No. PUR-2020-00134 and pages 13 to 14 of the Commission's Final Order in Case No. PUR-2020-00035, which provide specific instructions on what should and should not be included in Alternative Plan A.

**Virginia Electric and Power Company**  
**Case No. PUR-2021-00146**  
**Appalachian Voices**  
**Second Set**

The following response to Question No. 5 of the Second Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on October 21, 2021 has been prepared under my supervision.

Madison Matherley  
Energy Market Analyst  
Dominion Energy Services, Inc.

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**Question No. 5**

Please explain why Plan A does not comply with the mandatory retirement provisions of § 56-585.5 B 3, and please provide any study or analysis supporting the decision to not comply with § 56-585.5 B 3.

**Response:**

See page 6 of the Commission's Final Order in Case No. PUR-2020-00134 and pages 13 to 14 of the Commission's Final Order in Case No. PUR-2020-00035, which provide specific instructions on what should and should not be included in Alternative Plan A.

**Virginia Electric and Power Company**  
**Case No. PUR-2021-00146**  
**Appalachian Voices**  
**Second Set**

The following response to Question No. 8 of the Second Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on October 21, 2021 has been prepared under my supervision.

Madison Matherley  
Energy Market Analyst  
Dominion Energy Services, Inc.

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**Question No. 8**

Does Plan A comply with the mandatory energy efficiency savings standards in § 56-596.2 for 2022 to 2025? If not, please explain why not.

**Response:**

No. See page 6 of the Commission's Final Order in Case No. PUR-2020-00134 and pages 13 to 14 of the Commission's Final Order in Case No. PUR-2020-00035, which provide specific instructions on what should and should not be included in the least-cost plan.



**Virginia Electric and Power Company**  
**Case No. PUR-2021-00146**  
**Appalachian Voices**  
**Second Set**

The following response to Question No. 9 of the Second Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on October 21, 2021 has been prepared under my supervision.

Madison Matherley  
Energy Market Analyst  
Dominion Energy Services, Inc.

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**Question No. 9**

For Plan A, please identify the energy efficiency standards the model assumed for 2025 and beyond. If the model assumed that targets under § 56-596.2 B 1 d were zero, please confirm and explain why.

**Response:**

Plan A only includes approved and proposed DSM programs. See page 6 of the Commission's Final Order in Case No. PUR-2020-00134 and pages 13 to 14 of the Commission's Final Order in Case No. PUR-2020-00035, which provide specific instructions on what should and should not be included in the least-cost plan.

**Virginia Electric and Power Company**  
**Case No. PUR-2021-00146**  
**Appalachian Voices**  
**Second Set**

The following response to Question No. 11 of the Second Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on October 21, 2021 has been prepared under my supervision.

Chang Lee  
Energy Market Analyst  
Dominion Energy Services, Inc.

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**Question No. 11**

Please provide the CO2 emissions by power plant unit during the entire study period for Plans A and B. Where available, please provide copies electronically in the native file format.

**Response:**

See Attachment APV Set 02-11 (CML).

**Virginia Electric and Power Company**  
**Case No. PUR-2021-00146**  
**Appalachian Voices**  
**Second Set**

The following response to Question No. 12 of the Second Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on October 21, 2021 has been prepared under my supervision.

Madison Matherley  
Energy Market Analyst  
Dominion Energy Services, Inc.

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**Question No. 12**

Please confirm whether Plan A includes the social cost of carbon as a benefit or cost of new resources. If not, please explain why not.

**Response:**

No. See page 6 of the Commission's Final Order in Case No. PUR-2020-00134 and pages 13 to 14 of the Commission's Final Order in Case No. PUR-2020-00035, which provide specific instructions on what should and should not be included in the least-cost plan.

**Virginia Electric and Power Company**  
**Case No. PUR-2021-00146**  
**Appalachian Voices**  
**Third Set**

The following response to Question No. 1 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Madison Matherley  
Energy Market Analyst  
Dominion Energy Services, Inc.

As it pertains to legal matters, the following response to Question No. 1 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Sarah R. Bennett  
McGuireWoods LLP

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**Question No. 1**

Reference Dominion's Response to AV Set 2-2. Reference also Page 6 of the Commission's Final Order in Case No. PUR-2020-00134, which states that such future annual filings shall include at a minimum:

- a least cost VCEA plan that meets (i) applicable carbon regulations and (ii) the mandatory RPS Program requirements of the VCEA;
- evaluation of RECs from all sources (with both high and low-price sensitivities), including utility-owned, third-party PPAs, and unbundled REC purchases;
- modeling of the solar capacity factor as required by the Commission's directives in the 2020 IRP proceeding;
- distributed generation sensitivities for unbundled REC purchases through Requests for Proposals ("RFPs"), fixed price offers and over-the-counter purchases;
- modeling of reliability impacts;
- updated fundamental forecasts and commodity pricing that reflect the VCEA requirements; and
- a detailed chart showing how Dominion has complied to date with the VCEA's RPS requirements.

Reference also Page 14 of the Commission's Final Order in Case No. PUR-2020-00035, which states

Dominion proposes that future IRPs and updates include a least cost VCEA plan that would meet (i) applicable carbon regulations and

(ii) the mandatory RPS Program requirements of the VCEA. For this plan, the Company proposes not to force the model to select any specific resource nor exclude any reasonable resource and allow the model to optimize the accompanying resource plan. Based on the record in this proceeding, we find this proposal to be reasonable at this time.

a) For Plan A, please confirm that the Company does not consider the mandatory generation retirement provisions of § 56-585.5 B to constitute “applicable carbon regulations” in this context. If so, explain why not.

b) Please identify all “carbon regulations” the Company does consider to be “applicable” and explain what assumptions the Company made in Plan A about what those “applicable carbon regulations” would require for the entire planning period.

c) If they are different, please identify all “carbon regulations” the Company considers to be “applicable” and explain what assumptions the Company made in Plan B about what those “applicable carbon regulations” would require for the entire planning period.

**Response:**

(a) The Company objects to this request to the extent it seeks a legal conclusion. Notwithstanding and subject to this objection, the Company provides the following response:

Confirmed. Refer to page 14 of the Commission’s Final Order in Case No. PUR-2020-00035, which adopts the Company’s proposal for a least-cost plan for future proceedings. See also the rebuttal testimony of Company Witness Kelly to which the Commission cites, which explains the rationale for the proposal and includes Va. Code § 56-585.5 B in the list of provisions of the VCEA that require interpretation, so would result in further litigation on the “least-cost plan” if required. See also the Company’s integrated resource planning proceedings over the past five to ten years, in which “carbon regulations” have referred to laws or regulations that put a tax on carbon emissions.

(b) and (c) The Company used the RGGI + Federal CO<sub>2</sub> commodity forecast in both Alternative Plans A and B, which assumes the Commonwealth in RGGI and a potential federal tax on CO<sub>2</sub> emissions starting in 2026.

**Virginia Electric and Power Company**  
**Case No. PUR-2021-00146**  
**Appalachian Voices**  
**Third Set**

The following response to Question No. 2 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Madison Matherley  
Energy Market Analyst  
Dominion Energy Services, Inc.

As it pertains to legal matters, the following response to Question No. 2 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Sarah R. Bennett  
McGuireWoods LLP

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**Question No. 2**

Reference the Company's Response to AV Set 2-6.

a) Please confirm that RPS Plan B is the Company's current proposed pathway to comply with § 56-585.5.

b) Please confirm that, according to RPS Plan B, the Company is currently planning on petitioning the Commission for relief from the mandatory retirement requirements of § 56-585.5 B for each of the following natural gas-fired generation facilities:

- Darbytown Units 1-4
- Elizabeth River Units 1-3
- Gravel Neck Units 3-6
- Ladysmith Units 1-5
- Remington Units 1-4
- Bear Garden
- Brunswick County
- Chesterfield Units 7-8
- Gordonsville Units 1-2
- Greensville
- Possum Point Unit 6
- Warren County

c) For each of the units listed above, on a unit-by-unit basis, please provide the studies or analyses showing that retiring the unit by December 31, 2045 would "threaten the reliability or

security of electric service to customers,” and explain how such studies or analyses “consider in-state and regional transmission entity resources.” If the Company has not performed any such analysis, please so state.

**Response:**

The Company objects to this request because the phrase “RPS Plan B” is vague and undefined. The Company has one plan for the development of solar, onshore wind, and energy storage under Va. Code § 56-585.5 D and E that it will refine over time, the current version of which is shown in Figures 3, 4, 6, and 7 of the 2021 RPS Development Plan. Alternative Plans A, B, and C are the alternative plans presented in the Company’s 2021 IRP Update. The Company only incorporated the results of Alternative Plans A and B into this proceeding. As stated on page 8 of the RPS Development Plan, Alternative Plan A does not meet the development targets for solar, wind, and energy storage resources in Virginia established through the VCEA. By contrast, Alternative Plan B is consistent with this 2021 RPS Development Plan. The Company also objects to the phrase “to comply with Va. Code § 56-585.5” as overly broad, as that statute has a number of different components with which the Company must “comply.” Finally, the Company objects to this request as not relevant or reasonably likely to lead to the discovery of admissible evidence in this proceeding to the extent it seeks information on the 2021 IRP Update filed in Case No. PUR-2021-00201 beyond the components of that filing incorporated into the 2021 RPS Development Plan. Notwithstanding and subject to these objections, and with that context, the Company provides the following response:

(a) The development plans for solar, onshore wind, and storage shown in Figures 3, 4, 6, and 7 of the 2021 RPS Development Plan is the Company’s current proposed pathway to comply with Va. Code § 56-585.5 D and E. Alternative Plan B of the 2021 IRP Update is consistent with the 2021 RPS Development Plan.

(b) and (c) See the Company’s response to Staff Set 09-197.

**Virginia Electric and Power Company**  
**Case No. PUR-2021-00146**  
**Appalachian Voices**  
**Third Set**

The following response to Question No. 3 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Sarah R. Bennett  
McGuireWoods LLP

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**Question No. 3**

Reference the Company's Responses to AV Set 2-8 and 2-9. Also reference the Commission's Final Order in Case No. PUR-2020-00035 (Feb. 1, 2021) at page 12, which states "[t]he Commission has not yet set the post-2025 energy efficiency targets. We agree, however, that assuming those targets would be zero after 2025 was unreasonable and direct the Company to continue to model energy efficiency targets after 2025."

a) Please explain how RPS Plan A, which according to the Company's Response to AV Set 2-1 is the same as IRP Update Plan A, complies with the Commission's directive "to continue to model energy efficiency targets after 2025."

**Response:**

The Company objects to this request because the phrase "RPS Plan A" is vague and undefined. The Company has one plan for the development of solar, onshore wind, and energy storage under Va. Code § 56-585.5 D and E that it will refine over time, the current version of which is shown in Figures 3, 4, 6, and 7 of the 2021 RPS Development Plan. Alternative Plans A, B, and C are the alternative plans presented in the Company's 2021 IRP Update. The Company only incorporated the results of Alternative Plans A and B into this proceeding. As stated on page 8 of the RPS Development Plan, Alternative Plan A does not meet the development targets for solar, wind, and energy storage resources in Virginia established through the VCEA. By contrast, Alternative Plan B is consistent with this 2021 RPS Development Plan. The Company also objects to this request as not relevant or reasonably likely to lead to the discovery of admissible evidence in this proceeding to the extent it seeks information on the 2021 IRP Update filed in Case No. PUR-2021-00201 beyond the components of that filing incorporated into the 2021 RPS Development Plan. Finally, the Company objects to the premise of this request, which suggests that the directive from the Commission was to model energy efficiency targets after 2025 as part of Alternative Plan A. Notwithstanding and subject to these objections, and with that context, the Company provides the following response:

See page 6 of the Commission's Final Order in Case No. PUR-2020-00134 and pages 13 to 14 of the Commission's Final Order in Case No. PUR-2020-00035, which provide specific instructions



on what should and should not be included in Alternative Plan A. See also prior Commission orders in the Company's integrated resource planning proceedings, which direct that the "least-cost plan" should only include approved and proposed demand-side management programs.

**Virginia Electric and Power Company**  
**Case No. PUR-2021-00146**  
**Appalachian Voices**  
**Third Set**

The following response to Question No. 5 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Madison Matherley  
Energy Market Analyst  
Dominion Energy Services, Inc.

As it pertains to legal matters, the following response to Question No. 5 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Sarah R. Bennett  
McGuireWoods LLP

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**Question No. 5**

Reference the Company's Response to AV Set 2-14. Please confirm that for RPS Plan B the model was instructed to select 14,310 MW of solar and 5,174 MW of wind by 2035 and that the model could only select unbundled RECs in a given year if the forced solar and wind procurements did not generate enough RECs to comply with the RPS schedule in §56-585.5 C.

**Response:**

The Company objects to this request because the phrase "RPS Plan B" is vague and undefined. The Company has one plan for the development of solar, onshore wind, and energy storage under Va. Code § 56-585.5 D and E that it will refine over time, the current version of which is shown in Figures 3, 4, 6, and 7 of the 2021 RPS Development Plan. Alternative Plans A, B, and C are the alternative plans presented in the Company's 2021 IRP Update. The Company only incorporated the results of Alternative Plans A and B into this proceeding. As stated on page 8 of the RPS Development Plan, Alternative Plan A does not meet the development targets for solar, wind, and energy storage resources in Virginia established through the VCEA. By contrast, Alternative Plan B is consistent with this 2021 RPS Development Plan. Notwithstanding and subject to this objection, and with that context, the Company provides the following response:

Confirmed that the model was instructed to select 14,310 MW of solar and 5,174 MW of offshore wind by 2035. And confirmed that the PLEXOS model ensured that the Company had sufficient RECs to meet its RPS Program annual requirements.

**Virginia Electric and Power Company**  
**Case No. PUR-2021-00146**  
**Appalachian Voices**  
**Third Set**

The following response to Question No. 6 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Sarah R. Bennett  
McGuireWoods LLP

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**Question No. 6**

Reference the Company's Response to AV Set 2-15, which asks:

Please indicate if there are any engineering/operational requirements which require any of the Company's carbon-emitting units to run as a "must-run" unit when providing power during hours when it is not economic to PJM. a) If any such carbon-emitting unit has any such must run constraints, please describe the conditions.

Reference also the Commission's August 4, 2021 Order in Case No. PUR-2021-00169 on page 10, which states "Dominion's RGGI compliance is not isolated from its RPS plans, which are also required by statute."

Any "engineering/operational requirements, which require any of the Company's carbon-emitting units to run as a 'must-run' unit when providing power during hours when it is not economic to PJM" clearly implicate Dominion's RGGI compliance, which in turn clearly impacts its RPS plans and is clearly relevant to this proceeding. Please provide a complete, updated response to AV Set 2-15.

**Response:**

The Company stands on its objections as stated in the Company's objection and response to APV Set 02-15. Specifically, the Company objects to this request as not relevant or reasonably likely to lead to the discovery of admissible evidence in this proceeding because it requests information on the operations of carbon-emitting resources, which is beyond the scope of this proceeding under Va. Code § 56- 585.5 D 4 focused on the development of solar, onshore wind, and energy storage.

**Virginia Electric and Power Company**  
**Case No. PUR-2021-00146**  
**Appalachian Voices**  
**Third Set**

The following response to Question No. 7 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Sarah R. Bennett  
McGuireWoods LLP

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**Question No. 7**

Reference the Company's Response to AV Set 2-21, which declines to answer a number of questions concerning the Company's plans for VCHEC, including the Company's rationale to model VCHEC's retirement in 2045 in RPS Plan B. Reference also the Commission's August 4, 2021 Order in Case No. PUR-2021-00169 on page 10, which states "Dominion's RGGI compliance is not isolated from its RPS plans, which are also required by statute."

Modeling assumptions regarding VCHEC's future operations clearly implicate VCHEC's future emissions, which clearly implicate Dominion's RGGI compliance, which in turn clearly impacts the Company's proposed RPS plans and is clearly relevant to this proceeding. Please provide a complete, updated response to AV Set 2-21 (a)-(f) and (h)(i) and (h)(ii).

**Response:**

The Company stands on its objections as stated in the Company's objection and response to APV Set 02-21. Specifically, the Company objects to this request as not relevant or reasonably likely to lead to the discovery of admissible evidence in this proceeding because it requests information on VCHEC, which is beyond the scope of this proceeding under Va. Code § 56-585.5 D 4 focused on the development of solar, onshore wind, and energy storage. The Company also objects to this request to the extent it would require original work.

**Virginia Electric and Power Company**  
**Case No. PUR-2021-00146**  
**Appalachian Voices**  
**Third Set**

The following response to Question No. 8 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Madison Matherley  
Energy Market Analyst  
Dominion Energy Services, Inc.

As it pertains to legal matters, the following response to Question No. 8 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Sarah R. Bennett  
McGuireWoods LLP

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**Question No. 8**

Reference the Company's Response to AV Set 2-22. Please provide the workpapers for VCHEC's cashflows in the NPV for Plan B shown in Figure 8 of the 2021 RPS Development Plan.

**Response:**

The Company stands on its objections as stated in the Company's objection and response to APV Set 02-22. Specifically, the Company objects to this request as not relevant or reasonably likely to lead to the discovery of admissible evidence in this proceeding because it requests information on VCHEC, which is beyond the scope of this proceeding under Va. Code § 56-585.5 D 4 focused on the development of solar, onshore wind, and energy storage.

**Virginia Electric and Power Company**  
**Case No. PUR-2021-00146**  
**Appalachian Voices**  
**Third Set**

The following response to Question No. 11 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Madison Matherley  
Energy Market Analyst  
Dominion Energy Services, Inc.

As it pertains to legal matters, the following response to Question No. 11 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Sarah R. Bennett  
McGuireWoods LLP

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**Question No. 11**

Reference the Company's Response to Staff Set 9-197. Please clarify whether the 2021 IRP Update's Alternative Plan C will retire all fossil generation including the listed facilities in the response. Please clarify whether Alternative Plan A will retire the fossil generation listed in the response and when those retirements will occur. Please explain why Alternative Plan A adds 970 MW of gas-fired generation if the listed facilities are not retired.

**Response:**

The Company objects to this request as not relevant or reasonably likely to lead to the discovery of admissible evidence in this proceeding to the extent it seeks information on the 2021 IRP Update filed in Case No. PUR-2021-00201 beyond the components of that filing incorporated into the 2021 RPS Development Plan. Notwithstanding and subject to these objections, the Company provides the following response:

See the Company's responses to APV Set 02-06, APV Set 02-07, Staff Set 01-06, and Staff Set 03-84. As to why Alternative Plan A adds 970 MW of gas-fired generation, see page 6 of the Commission's Final Order in Case No. PUR-2020-00134 and pages 13 to 14 of the Commission's Final Order in Case No. PUR-2020-00035, which provide specific instructions on what should and should not be included in Alternative Plan A.

**Virginia Electric and Power Company**  
**Case No. PUR-2021-00146**  
**Appalachian Voices**  
**Third Set**

The following response to Question No. 13 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Sarah R. Bennett  
McGuireWoods LLP

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**Question No. 13**

Reference the Company's Responses to AV Set 2-2 and 2-8, which confirm that RPS Plan A does not model compliance with all aspects of the Virginia Clean Economy Act, including but not limited to compliance with § 56-585.5 B and § 56-596.2 B 2. Please explain what value the Company believes Plan A provides to the Commission.

**Response:**

As stated in the Company's responses to APV Set 02-02 and 02-08, see page 6 of the Commission's Final Order in Case No. PUR-2020-00134 and pages 13 to 14 of the Commission's Final Order in Case No. PUR-2020-00035, which provide specific instructions on what should and should not be included in the least-cost plan. See also the rebuttal testimony of Company Witness Kelly to which the Commission cites, which explains the rationale for the proposal, including the Company's agreement "that it is helpful to have a benchmark or a baseline against which to evaluate other alternatives."

**Virginia Electric and Power Company**  
**Case No. PUR-2021-00146**  
**Appalachian Voices**  
**Third Set**

The following response to Question No. 15 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Madison Matherley  
Energy Market Analyst  
Dominion Energy Services, Inc.

As it pertains to legal matters, the following response to Question No. 15 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Sarah R. Bennett  
McGuireWoods LLP

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**Question No. 15**

Please indicate whether the Company evaluated any scenarios or situations in which (1) efficiency, (2) distributed generation, and (3) behind the meter solar generation amounts are less than or exceed the minimum levels for those resources established in the VCEA or other applicable laws. Please explain in detail why or why not for each kind of resource.

**Response:**

The Company objects to this request as not relevant or reasonably likely to lead to the discovery of admissible evidence in this proceeding to the extent it seeks information on the 2021 IRP Update filed in Case No. PUR-2021-00201 beyond the components of that filing incorporated into the 2021 RPS Development Plan. Notwithstanding and subject to this objection, the Company provides the following response:

Alternative Plans A and B incorporate different assumptions related to DSM, as explained in the Company's response to Staff Set 06-161. The Company did not model any additional scenarios for energy efficiency, distributed generation, or behind-the-meter generation levels.



**Virginia Electric and Power Company**  
**Case No. PUR-2021-00146**  
**Appalachian Voices**  
**Third Set**

As it pertains to estimated energy efficiency costs, the following response to Question No. 19 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Edmund J. Hall  
Energy Market & DSP Strategic Advisor  
Dominion Energy Services, Inc.

As it pertains to modeling, the following response to Question No. 19 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision

Kevin L. Cross  
Energy Market Consultant  
Dominion Energy Services, Inc.

As it pertains to legal matters, the following response to Question No. 19 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Sarah R. Bennett  
McGuireWoods LLP

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**Question No. 19**

Please explain how the estimated energy efficiency costs for 2020 compare to the average costs for 2012-2020. Please indicate whether modeling for the 2021 IRP Update and 2021 RPS Development Plan made energy efficiency available for selection by the models at the prices estimated. Please explain whether any sensitivity analysis was performed for lower or higher cost assumptions for energy efficiency.

**Response:**

The Company objects to this request as not relevant or reasonably likely to lead to the discovery of admissible evidence in this proceeding to the extent it seeks information on the 2021 IRP Update filed in Case No. PUR-2021-00201 beyond the components of that filing incorporated into the 2021 RPS Development Plan. Further, the Company objects to this request because the

phrase “energy efficiency costs” is vague and undefined. Notwithstanding and subject to these objections, the Company provides the following response:

As stated on pages 8 and 9 of the RPS Development Plan, Alternative Plans A and B shown on page 9 are the results of Alternative Plans A and B from the 2021 IRP Update. Energy efficiency was incorporated into the PLEXOS modeling as a load reducer. See pages 22 and 23 of the 2021 IRP Update for more information on the sensitivities performed for that proceeding.

**Virginia Electric and Power Company**  
**Case No. PUR-2021-00146**  
**Appalachian Voices**  
**Third Set**

The following response to Question No. 23 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Madison Matherley  
 Energy Market Analyst  
 Dominion Energy Services, Inc.

As it pertains to legal matters, the following response to Question No. 23 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Sarah R. Bennett  
 McGuireWoods LLP

**Question No. 23**

Reference Attachment Staff Set 1-13 (1) (DA)

a) Please confirm that this is a complete and accurate list of all unit retirements over the entire study period:

<b>Unit</b>	<b>Retirement Year</b>
Chesterfield 5	2023
Chesterfield 6	2023
Yorktown 3	2023
Clover 1	2025
Clover 2	2025
Rosemary	2027
Hopewell	2028
Alta Vista	2028
Southampton	2028
Mount Storm 1	2044
Mount Storm 2	2044
Mount Storm 3	2044
Virginia City	2045

b) Please confirm that for RPS Plan B, VCHEC has a negative NPV of \$363 million between 2021 and 2030 but does not retire until 2045.

**Response:**

The Company objects to this request because the phrase “RPS Plan A” is vague and undefined. The Company has one plan for the development of solar, onshore wind, and energy storage under Va. Code § 56-585.5 D and E that it will refine over time, the current version of which is shown in Figures 3, 4, 6, and 7 of the 2021 RPS Development Plan. Alternative Plans A, B, and C are the alternative plans presented in the Company’s 2021 IRP Update. The Company only incorporated the results of Alternative Plans A and B into this proceeding. As stated on page 8 of the RPS Development Plan, Alternative Plan A does not meet the development targets for solar, wind, and energy storage resources in Virginia established through the VCEA. By contrast, Alternative Plan B is consistent with this 2021 RPS Development Plan. Notwithstanding and subject to this objection, and with that context, the Company provides the following response:

- a) The Company assumes that subpart (a) seeks information on the retirements for Alternative Plan B. If so, confirmed.
- b) See the Company’s response to subpart (a).

**Virginia Electric and Power Company**  
**Case No. PUR-2021-00146**  
**Appalachian Voices**  
**Third Set**

The following response to Question No. 25 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Madison Matherley  
Energy Market Analyst  
Dominion Energy Services, Inc.

As it pertains to legal matters, the following response to Question No. 25 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Sarah R. Bennett  
McGuireWoods LLP

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**Question No. 25**

Please reference the 485 MW natural gas-fired CTs in RPS Plan A added in 2026 and 2027.

- a) What useful life and depreciation terms are assumed?
- b) Please confirm that the Company did not constrain the model to retire those units by 2045.
- c) Please confirm that in RPS Plan A those units do not retire by 2045.
- d) Does the Company anticipate any undepreciated value for those generation units in 2046? If so, please explain how the Company anticipates that any undepreciated balances will be recovered if the units are retired in 2046 or before that date.

**Response:**

The Company objects to this request because the phrase "RPS Plan A" is vague and undefined. The Company has one plan for the development of solar, onshore wind, and energy storage under Va. Code § 56-585.5 D and E that it will refine over time, the current version of which is shown in Figures 3, 4, 6, and 7 of the 2021 RPS Development Plan. Alternative Plans A, B, and C are the alternative plans presented in the Company's 2021 IRP Update. The Company only incorporated the results of Alternative Plans A and B into this proceeding. As stated on page 8 of the RPS Development Plan, Alternative Plan A does not meet the development targets for solar, wind, and energy storage resources in Virginia established through the VCEA. By contrast, Alternative Plan B is consistent with this 2021 RPS Development Plan. The Company also objects to this request as not relevant or reasonably likely to lead to the discovery of admissible evidence in this proceeding to the extent it seeks information on the 2021 IRP Update

filed in Case No. PUR-2021-00201 beyond the components of that filing incorporated into the 2021 RPS Development Plan. The Company also objects to this request to the extent it seeks information on cost recovery in the context of a long-term planning exercise, and to the extent it seeks information related to units that the Company does not currently plan to construct. Notwithstanding and subject to these objections, and with that context, the Company provides the following response:

- a) See the Company's response to Staff Set 01-02.
- b) Confirmed.
- c) Confirmed.
- d) Yes, to the extent these units were developed, the Company would anticipate some undepreciated value due to the unit's useful life being longer than the study period.

**Virginia Electric and Power Company**  
**Case No. PUR-2021-00146**  
**Appalachian Voices**  
**Third Set**

The following response to Question No. 26 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Madison Matherley  
Energy Market Analyst  
Dominion Energy Services, Inc.

As it pertains to legal matters, the following response to Question No. 26 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Sarah R. Bennett  
McGuireWoods LLP

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**Question No. 26**

Please provide a side-by-side comparison of all cost components and terms for Company-built versus PPA resources, both utility-scale and distributed-scale, based on current development plans and RFP results. Please break down costs by components including energy, capacity, term, financing costs, transmission interconnection, generation re-dispatch, ancillary services, emissions costs, and all other costs that will be faced by the Company and its customers.

**Response:**

The Company objects to this request to the extent it requires original work. The Company also objects to this request because it has provided all available information to compile such a side-by-side comparison, and because the burden of deriving or ascertaining the response is substantially the same for the Company as it is for Appalachian Voices. See 5 VAC 5-20-260. Finally, the Company objects to this request as vague because it is unclear whether the request seeks information on the resources shown in the Company's long-term plan generally, or on the CE-2 Projects and CE-2 PPAs specifically. Notwithstanding and subject to these objections, the Company provides the following response assuming that the request seeks information on the resources in the Company's long-term plan:

Please see the Company's response to Staff Set 01-02 for the applicable cost components for Company-built resources. The Company does not have this level of detail on cost components for PPA resources.

**Virginia Electric and Power Company**  
**Case No. PUR-2021-00146**  
**Appalachian Voices**  
**Third Set**

The following response to Question No. 27 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Madison Matherley  
Energy Market Analyst  
Dominion Energy Services, Inc.

As it pertains to legal matters, the following response to Question No. 27 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Sarah R. Bennett  
McGuireWoods LLP

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**Question No. 27**

Reference p. 10 of RPS Development Plan. Please explain why the Company developed Alternative Plan A with the assumption of “a market where an unlimited number of RECs are available at a fixed price” when the Company does not believe this is a reasonable assumption. Please explain what a more reasonable assumption would be and how this impacts RPS Plan A and its comparison to RPS Plan B.

**Response:**

The Company objects to this request because the phrases “RPS Plan A” and “RPS Plan B” are vague and undefined. The Company has one plan for the development of solar, onshore wind, and energy storage under Va. Code § 56-585.5 D and E that it will refine over time, the current version of which is shown in Figures 3, 4, 6, and 7 of the 2021 RPS Development Plan. Alternative Plans A, B, and C are the alternative plans presented in the Company’s 2021 IRP Update. The Company only incorporated the results of Alternative Plans A and B into this proceeding. As stated on page 8 of the RPS Development Plan, Alternative Plan A does not meet the development targets for solar, wind, and energy storage resources in Virginia established through the VCEA. By contrast, Alternative Plan B is consistent with this 2021 RPS Development Plan. Notwithstanding and subject to these objections, and with that context, the Company provides the following response:

See page 6 of the Commission’s Final Order in Case No. PUR-2020-00134 and pages 13 to 14 of the Commission’s Final Order in Case No. PUR-2020-00035, which provide specific instructions



on what should and should not be included in the least-cost plan. See also the Company's responses to Staff Set 01-30(a) and Staff Set 06-161.

**Virginia Electric and Power Company**  
**Case No. PUR-2021-00146**  
**Appalachian Voices**  
**Third Set**

The following response to Question No. 27 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Madison Matherley  
Energy Market Analyst  
Dominion Energy Services, Inc.

As it pertains to legal matters, the following response to Question No. 29 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Sarah R. Bennett  
McGuireWoods LLP

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**Question No. 29**

Reference the Company's Response to AV Set 2-2, -4, -5, -8, -9, -12. In each of the Company's Responses to AV questions listed, the Company indicated that it did not include in modeling or otherwise assess or apply:

- AV Set 2-2: Mandatory retirement provisions of § 56-585.5 B 3
- AV Set 2-4: Mandatory retirement provisions of § 56-585.5 B 3 as applied to new gas units selected in 2026 and 2027
- AV Set 2-5: Mandatory retirement provisions of § 56-585.5 B 3
- AV Set 2-8: Mandatory energy efficiency savings standards in § 56-596.2 for 2022 to 2025
- AV Set 2-9: Energy efficiency standards for 2025 and beyond
- AV Set 2-12: Social cost of carbon as a benefit or cost

a) Please explain whether the Company believes that these exclusions resulted in a reasonable assessment and development of a least cost plan for the Company in compliance with Virginia law. If not, please indicate whether the Company had any objective basis for believing that the Commission wanted those requirements and standards excluded in the development of a least cost RPS Development Plan. Please indicate whether the Company had any communications with the Commission or Staff regarding the exclusion of the listed requirements in the development of the RPS Plan. Please explain why or why not.

**Response:**

The Company objects to the premise of this request, which implies that the bullets listed in the request are “listed requirements in the development of the RPS Plan.” The Company also objects to this request to the extent it seeks a legal conclusion. Notwithstanding and subject to these objections, the Company provides the following response:

Yes, the Company has an objective basis for modeling Alternative Plan A as it did. See page 6 of the Commission’s Final Order in Case No. PUR-2020-00134 and pages 13 to 14 of the Commission’s Final Order in Case No. PUR-2020-00035, which provide specific instructions on what should and should not be included in the least-cost plan. On page 14 of the Commission’s Final Order in Case No. PUR-2020-00035, the Commission adopts the Company’s proposal for a least-cost plan for future proceedings. See also the rebuttal testimony of Company Witness Kelly to which the Commission cites, which explains the rationale for the proposal and includes Va. Code § 56-585.5 B in the list of provisions of the VCEA that require interpretation, so would result in further litigation on the “least-cost plan” if required. See also the Company’s integrated resource planning proceedings over the past five to ten years, in which the Commission has provided directives on how the Company should model the “least-cost plan.”

The Company did not have any communications with Commission Staff regarding the development of Alternative Plan A, as the Company believes the Commission’s orders were clear.

**Virginia Electric and Power Company**  
**Case No. PUR-2021-00146**  
**Appalachian Voices**  
**Third Set**

The following response to Question No. 30 of the Third Set of Interrogatories and Requests for Production of Documents propounded by Appalachian Voices and received on November 3, 2021 has been prepared under my supervision.

Sarah R. Bennett  
McGuireWoods LLP

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**Question No. 30**

Does the Company assert that RPS Plan B is the least cost RPS Development Plan that the Company could have proposed? Please list all key facts and factors that support the Company's assertion that Alternative Plan B is the least cost RPS Development Plan for the Company at this time.

**Response:**

The Company objects to this request because the phrase "RPS Plan B" is vague and undefined. The Company has one plan for the development of solar, onshore wind, and energy storage under Va. Code § 56-585.5 D and E that it will refine over time, the current version of which is shown in Figures 3, 4, 6, and 7 of the 2021 RPS Development Plan. Alternative Plans A, B, and C are the alternative plans presented in the Company's 2021 IRP Update. The Company only incorporated the results of Alternative Plans A and B into this proceeding. As stated on page 8 of the RPS Development Plan, Alternative Plan A does not meet the development targets for solar, wind, and energy storage resources in Virginia established through the VCEA. By contrast, Alternative Plan B is consistent with this 2021 RPS Development Plan. The Company also objects to this request to the extent it seeks a legal conclusion. Notwithstanding and subject to these objections, and with that context, the Company provides the following response:

The 2021 RPS Development Plan presents a reasonable and prudent plan to meet the development targets in Va. Code § 56-585.5 D and E, consistent with the requirements of Va. Code § 56-585.5 D 4 and the Commission's prior orders. See Section VI of the 2021 RPS Development Plan for details on the reasonableness and prudence of the 2021 RPS Development Plan.

Virginia Electric and Power Company  
Case No. PUR-2021-00146  
Virginia State Corporation Commission Staff  
Fifth Set

The following response to Question No. 108 of the Fifth Set of Interrogatories and Requests for Production of Documents propounded by the Virginia State Corporation Commission Staff and received on October 15, 2021 has been prepared under my supervision.

Kevin L. Cross  
Energy Market Consultant  
Dominion Energy Services, Inc.

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**Question No. 108**

Please refer to the Company's response to Staff Interrogatory No. 1-5. Identify all generation and/or storage resources, both Company-owned and PPAs, not yet approved by the Commission that the Company instructed the PLEXOS model to select in each of the RPS Development Plans (e.g., Plans A, B, and C) rather than allowing the model to select these resources for construction or acquisition on an economic basis.

**Response:**

As required by Va. Code § 56-585.5 D 4, the RPS Development Plan focuses on the development of solar, onshore wind, and energy storage. The Company has one plan for the development of solar, onshore wind, and energy storage that it will refine over time, the current version of which is shown in Figures 3, 4, 6, and 7 of the 2021 RPS Development Plan. Accordingly, the Company disagrees that "Plans A, B, and C" are examples of the RPS Development Plan. Instead, Alternative Plans A, B, and C are the alternative plans presented in the Company's 2021 IRP Update. The Company only incorporated the results of Alternative Plans A and B into this proceeding. As stated on page 8 of the RPS Development Plan, Alternative Plan A does not meet the development targets for solar, wind, and energy storage resources in Virginia established through the VCEA. By contrast, Alternative Plan B is consistent with this 2021 RPS Development Plan. With that understanding, the Company provides the following response to this request:

All resources in Plan A were selected based on a least-cost optimization.

The resources in Plan B were directed to be selected by the model through 2035; resources beyond 2035 were selected by the PLEXOS model on a least-cost optimization basis.

**Virginia Electric and Power Company**  
**Case No. PUR-2021-00146**  
**Virginia State Corporation Commission Staff**  
**Sixth Set**

The following response to Question No. 161 of the Sixth Set of Interrogatories and Requests for Production of Documents propounded by the Virginia State Corporation Commission Staff and received on October 19, 2021 has been prepared under my supervision.

Kevin L. Cross  
Energy Market Consultant  
Dominion Energy Services, Inc.

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**Question No. 161**

Please identify all differences in model inputs and assumptions for Plan B compared to Plan A. For example, Plan A assumed unlimited amounts of RECs could be procured from the market at the Company's projected REC prices. Does Plan B make a similar assumption or does it cap the amount of market RECs that are available for the model to select at the Company's projected REC prices?

**Response:**

Plan A and Plan B from the 2021 IRP Update differ in the following ways:

- Plan A assumes no limit to REC purchases on an annual basis. Plan B assumes a 15% REC purchase limit annually.
- Plan A retires VCHEC, and the three biomass units in 2023, versus 2045 and 2028, respectively, in Plan B.
- Plan A does not retire Clover Units 1 and 2 or Mt. Storm Units 1 through 3 during the study period, while Plan B retires Clover Units 1 and 2 in 2025 and Mt. Storm Units 1 through 3 in 2044.
- Plan A does not include a dispatch adder for the social cost of carbon, while Plan B does include this adder beginning in 2031.
- Plan A only includes approved and proposed DSM programs, while Plan B includes approved and proposed programs, as well as generic DSM programs to meet the legislative targets for DSM.
- Plan B directs the model to select certain resources through 2035; Plan A does not. See the Company's response to Staff Set 05-108.
- Plan B enforces a 65%/35% split between cost-of-service solar generation resources and PPAs consistent with the VCEA; Plan A does not.

**Virginia Electric and Power Company**  
**Case No. PUR-2021-00146**  
**Virginia State Corporation Commission Staff**  
**Ninth Set**

The following response to Question No. 197 of the Ninth Set of Interrogatories and Requests for Production of Documents propounded by the Virginia State Corporation Commission Staff and received on October 25, 2021, as revised on October 26, 2021, has been prepared under my supervision.

Madison Matherley  
Energy Market Analyst  
Dominion Energy Services, Inc.

As it pertains to legal matters, the following response to Question No. 197 of the Ninth Set of Interrogatories and Requests for Production of Documents propounded by the Virginia State Corporation Commission Staff and received on October 25, 2021, as revised on October 26, 2021, has been prepared under my supervision.

Sarah R. Bennett  
McGuireWoods LLP

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**Question No. 197**

Please refer to the Company's response to Staff Interrogatory No. 3-84, Attachment Staff Set 03-84 (MM), specifically Alternative Plan B, and the Company's 2021 IRP Update filed in Case No. PUR-2021-00201 at 14. Identify all natural-gas-fired units Alternative Plan B envisions continued operation of and the anticipated date or dates the Company intends to petition the Commission for relief from the requirements of Code § 56-585.5 B to continue such operations.

**Response:**

The Company objects to this request as not relevant or reasonably likely to lead to the discovery of admissible evidence in this proceeding to the extent it seeks information on the 2021 IRP Update filed in Case No. PUR-2021-00201 beyond the components of that filing incorporated into the 2021 RPS Development Plan. Notwithstanding and subject to this objection, the Company provides the following response:

See below for a list of the natural gas-fired generation that Plan B preserves beyond 2045 to address future system reliability, stability, and energy independence issues. As noted on page 18 of the 2021 IRP Update, in the 2020 IRP, the Company provided an initial overview of the reliability analyses that it would need to perform to investigate the probable system reliability issues resulting from the addition of significant renewable energy resources and the retirement of synchronous generator facilities. Pages 18 and 19 of the 2021 IRP Update provide a status update on this analysis, which will take significant work over the coming years. Until these

studies are completed, and until the Company knows the changing market and regulatory conditions that will occur over the next twenty years, the Company does not know if or when it will need to petition the Commission for relief from the requirements of Va. Code § 56-585.5 B.

Additionally, as noted on page 18 of the 2021 IRP Update, Alternative Plans B and C (which retires all Company-owned carbon-emitting generation by the end of 2045) are very similar through 2035—the planning period under Va. Code § 56-585.5 D 4. This alignment between Plans B and C suggests a common pathway for the Company to pursue now while allowing new technologies to emerge and mature and allowing analysis and study to continue.

The Company will continue to evaluate potential unit retirements considering changing market conditions and regulatory requirements.

Gordonsville 1  
Gordonsville 2  
Chesterfield 7  
Chesterfield 8  
Possum Point 6  
Bear Garden  
Elizabeth River 1-3  
Gravel Neck 3-6  
Darbytown 1-4  
Ladysmith 1-5  
Remington 1-4  
Brunswick  
Greensville  
Warren County



**CERTIFICATE OF SERVICE**

I hereby certify that the following have been served with a true and accurate copy of the foregoing via electronic service:

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**DATED: November 16, 2021**