COMMONWEALTH OF VIRGINIA

STATE CORPORATION COMMISSION

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PREFILED STAFF TESTIMONY

APPALACHIAN POWER COMPANY

FOR APPROVAL OF FUTURE MINIMUM BILL, TARIFFS, AND AGREEMENTS TO IMPLEMENT A SHARED SOLAR PROGRAM, PURSUANT TO SECTION 56-594.4 OF THE CODE OF VIRGINIA

PUR-2025-00028

MAY 12, 2025

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PART A

SUMMARY OF PREFILED TESTIMONY OF DANIEL P. RAFFERTY

The following findings and recommendations are found in my testimony. While uncertainty remains over the outcome of APCo's net metering proceeding in Case No. PUR-2024-00161 ("NEM Case") and noting that the Code provided a limited time frame for parties and Staff to evaluate the Company's minimum bill proposal, Staff recommends only a temporary adoption of the Company's proposed minimum bill. However, after a final order is issued in the NEM Case, Staff anticipates that the Commission would re-evaluate the minimum bill pursuant to Chapters 716 (HB 109) and 765 (SB 255) of 2024 Virginia Acts of Assembly, in a future docket. Staff recommends that the following concerns be addressed within that docket:

- The appropriateness of the Company's avoided costs methodology for calculating the "benefits credits" to be deducted from the gross minimum bill:
    - Staff has concerns with the Company's PVWatts modeling of a residential and commercial solar system respectively for calculating net excess electricity identified in the NEM Case. The Company revised its PVWatts modeling and avoided costs analysis in Rebuttal Testimony in that proceeding. While APCo's Rebuttal Testimony in that proceeding addressed many of Staff's concerns, that case is still pending a final order from the Commission, therefore the appropriateness of those revisions is currently unknown.
- The Company's basing of avoided transmission costs on net excess electricity, when all generation from shared solar facilities flows onto the distribution system and there is no on-site self-consumption. Staff believes this to be inappropriate as the methodology fails to reflect the full load reduction benefits attributable to shared solar.
- The Company's utilization of imported 2023 data from the NEM Case for avoided transmission and ancillary service costs whereas more recent data is available.
- Assessing the appropriate interpretation of calculating "the benefits of shared solar to the electric grid and to the Commonwealth" as outlined in Code § 56-594.4 D. This would help to determine the types of benefits to include and whether the Company's methodology of limiting the benefits to a customer's individual subscription is appropriate.
- Evaluating the feasibility of including other benefits to deduct from the gross minimum bill.

PREFILED TESTIMONY
OF
DANIEL P. RAFFERTY

PETITION OF APPALACHIAN POWER COMPANY, FOR APPROVAL OF A MINIMUM BILL, TARIFFS, AND AGREEMENTS TO IMPLEMENT A SHARED SOLAR PROGRAM, PURSUANT TO § 56-594.4 OF THE CODE OF VIRGINIA.

CASE NO. PUR-2025-00028

Q. PLEASE STATE YOUR NAME AND POSITION WITH THE COMMONWEALTH OF VIRGINIA STATE CORPORATION COMMISSION ("COMMISSION").

A. My name is Daniel P. Rafferty, and in the Commission's Division of Public Utility Regulation ("PUR"), I am a PUR Analyst.

Q. WHAT ARE YOUR PRESENT DUTIES AND RESPONSIBILITIES?

A. My primary responsibility as a PUR Analyst is to address renewable energy-related matters, including analysis and evaluation of issues that arise in the course of Commission proceedings and that are informed by the Code of Virginia ("Code"). My work primarily involves, but is not limited to, matters related to Code §§ 56-585.5, 56-587, 56-594.02, 56-594.3, 56-596.2, and 56-596.2:1. My duties also encompass performing analyses and evaluations of utility submissions related to the Commonwealth's mandatory Renewable Energy Portfolio Standard program, applications for certificates of public convenience and necessity, petitions to revise net energy metering tariffs, and issues pertaining to the Shared Solar Programs. Finally, I provide testimony on behalf of the Staff of the Commission ("Staff") and present alternative recommendations and proposals to the Commission as necessary.

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

A. During its 2024 Session, the Virginia General Assembly enacted Chapters 715 (HB 106), 716 (HB 108), 763 (SB 253), and 765 (SB 255) of the 2024 Virginia Acts of Assembly. These Acts amended the Code by revising Code § 56-594.3 related to the Shared Solar Programs and adding a new code section § 56-594.4, effective July 1, 2024. Code § 56-594.3 is applicable to Virginia Electric and Power Company d/b/a Dominion Energy Virginia ("Dominion") while Code § 56-594.4 is applicable to Appalachian Power Company ("APCo" or "Company"). Code § 56-594.4 requires the Commission to "establish by regulation a shared solar program that complies with the provisions of subsections B, C, D, and E by January 1, 2025," and requires "each utility to file any tariffs, agreements, or forms necessary for implementation of the program by July 1, 2025."[1]

On November 25, 2024, in Case No. PUR-2024-00122, the Commission issued an Order Adopting Regulations under Code §§ 56-594.3 and 56-594.4, which among other revisions, promulgated new rules for APCo's Shared Solar Program. On December 12, 2024, the Coalition for Community Solar Access filed a Petition for Reconsideration and Clarification. The Commission issued an Order Granting Reconsideration that: (1) continued jurisdiction over this matter to consider the Petition; and (2) suspended the Order Adopting Regulations pending the Commission's reconsideration.[2] The Commission issued an Order on Reconsideration in Case No. PUR-2024-00122, concurrently with the February 10th Order Initiating Proceedings, which

[1] Code § 56-594.4 B.

[2] *Commonwealth of Virginia, ex rel. State Corporation Commission, Ex Parte: In the matter of amending regulations governing shared solar programs,* Case No. PUR-2024-00122, Doc. Con. Cen. No. 241230063, Order Granting Reconsideration (Dec. 13, 2024).

unsuspended the Order Adopting Regulations, finalizing the new shared solar rules effective February 14, 2025.[3]

Pursuant to Code § 56-594.4, the Commission must establish a minimum bill for APCo, which shall include:

> the costs of all utility infrastructure and services used to provide electric service and administrative costs of the shared solar program. The Commission may modify the minimum bill over time. In establishing the minimum bill, the Commission shall (i) consider further costs the Commission deems relevant to ensure subscribing customers pay a fair share of the costs of providing electric service, (ii) minimize the costs shifted to customers not in a shared solar program, and (iii) calculate the benefits of shared solar to the electric grid and to the Commonwealth and deduct such benefits from other costs.

In its February 10th Order Initiating Proceedings, the Commission docketed this proceeding and directed the Company to file its proposed minimum bill for Shared Solar Programs by April 1, 2025.[4] The Commission further directed the Company to address:[5]

- The costs of all utility infrastructure and services used to provide electric service;
- The administrative costs necessary for operation of the shared solar program;
- Any other costs necessary to ensure subscribing customers ("Subscribers") pay a fair share of the costs of providing electric services;
- A quantification of the benefits of shared solar to the electric grid and to the Commonwealth; and
- An explanation of how the minimum bill proposed ensures that the costs shifted to customers not in a shared solar program are minimized.

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[3] *Commonwealth of Virginia, ex rel. State Corporation Commission, Ex Parte: In the matter of amending regulations governing shared solar programs,* Case No. PUR-2024-00122, Doc. Con. Cen. No. 250210181, (Feb. 10, 2025), Order on Reconsideration.

[4] Order Initiating Proceedings, at 4.

[5] *Id.* at 3.

In response to the Order Initiating Proceedings, the Company filed its Petition Proposing a Minimum Bill ("Petition") on April 1, 2025. The Commission issued an Order for Notice and Hearing ("Procedural Order") on April 11, 2025 that, among others, established a hearing date of June 9, 2025. In my testimony, I will discuss:

- APCo's Shared Solar Program requirements under Code § 56-594.4.
- Staff's concerns with the Code mandated timing of this proceeding and ongoing uncertainty about the Company's net metering program relative to Case No. PUR-2024-00161 ("NEM Case").
- Staff's ultimate recommendation in the instant proceeding for the Commission to temporarily adopt the Company's minimum bill proposal and revisit the complex issues raised by Staff in this proceeding in a future directed proceeding following the issuance of a final order in the Company's net metering case as directed by Chapters 716 and 765 of the 2024 Virginia Acts of Assembly.
- How the Company derives the minimum bill within its Petition, including:
  - Calculation of the "gross" minimum bill without deduction of calculated benefits credits.
  - Calculation of the "net" minimum bill to be paid by all subscribing customers inclusive of calculated benefits credits.
  - Staff's broad concerns and issues identified regarding the benefits credits.
- The apparent ambiguity in what the "benefits of shared solar to the electric grid and to the Commonwealth"[6] are, that should be included in the calculation, and the subsequent appropriateness of including or excluding those benefits attributed to shared solar.

Q. PLEASE BRIEFLY SUMMARIZE THE APCO SHARED SOLAR PROGRAM REQUIREMENTS UNDER CODE § 56-594.4.

A. Code § 56-594.4, enacted via HB 109 and SB 255, required the Commission to establish regulations for a Shared Solar Program for customers of a Phase I utility (*i.e.*, APCo) capped at 50 MW or 6% of peak load, whichever is less, by January 1, 2025.[7] The program

[6] Code § 56 594.4 D.

[7] Code § 56-594.4 E and F.

allows participating customers of a Phase I utility the opportunity to subscribe into an offsite shared solar facility and receive an offsetting monetary bill credit on their electric bill. A shared solar facility is defined as a facility that:[8]

> 1. Generates electricity by means of a solar photovoltaic device with a nameplate capacity rating that does not exceed 5,000 kilowatts [("kW")] of alternating current ("AC");
> 2. Is interconnected with the distribution system of an investor-owned electric utility within the Commonwealth;
> 3. Has at least three subscribers;
> 4. Has at least 40 percent of its capacity subscribed by customers with subscriptions of 25 kilowatts or less; and
> 5. Is located on a single parcel of land.

Code § 56-594.4 defines a "subscription," "subscriber," and "subscriber organization" as:[9]

> "Subscription" means a contract or other agreement between a subscriber and the owner of a shared solar facility. A subscription shall be sized such that the estimated bill credits do not exceed the subscriber's average annual bill for the customer account to which the subscription is attributed.
>
> "Subscriber organization" means any for-profit or nonprofit entity that owns or operates one or more shared solar facilities. A subscriber organization shall not be considered a utility solely as a result of its ownership or operation of a shared solar facility. A subscriber organization licensed with the Commission shall be eligible to own or operate shared solar facilities in more than one investor-owned utility service territory.
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> "Subscriber" means a retail customer of a utility that (i) owns one or more subscriptions of a shared solar facility that is interconnected with the utility and (ii) receives service in the service territory of the same utility in whose service territory the shared solar facility is interconnected.

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[8] Code § 56-594.4 A.

[9] *Id.*

In addition to receiving a bill credit, the Commission shall establish a minimum bill to be paid by all subscribers, which shall include the costs of all utility infrastructure to provide service to the customer and the administrative costs of the program.[10] In establishing the minimum bill, Code § 56-594.4 D requires the Commission to:[11]

i. Consider further costs the Commission deems relevant to ensure subscribing customers pay a fair share of the costs of providing electric services,

ii. Minimize the costs shifted to customers not in a shared solar program, and

iii. Calculate the benefits of shared solar to the electric grid and to the Commonwealth and deduct such benefits from other costs.

Pursuant to Code § 56-594.4 F, the Company is required to file all tariffs and other information necessary to implement the Shared Solar Program by July 1, 2025.[12]

Q. PLEASE BRIEFLY DESCRIBE THE REQUIREMENTS IN CODE § 56-594.4 F FOR ANY IMPLEMENTATION FILINGS APPROVED BY THE COMMISSION.

A. Code § 56-594.4 F requires that any utility implementation filings approved by the Commission shall:[13]

1. Reasonably allow for the creation of shared solar facilities;
2. Allow all customer classes to participate in the program;
3. Encourage public-private partnerships to further the Commonwealth's clean energy and equity goals, such as state agency and affordable housing provider participation as subscribers of a shared solar program;

[10] Code § 56-594.4 D.

[11] *Id.*

[12] Code § 56-594.4 F.

[13] *Id.*

4. Not remove a customer from its otherwise applicable customer class in order to participate in a shared solar facility;
5. Reasonably allow for the transferability and portability of subscriptions, including allowing a subscriber to retain a subscription to a shared solar facility if the subscriber moves within the same utility's service territory;
6. Establish standards, fees, and processes for the interconnection of shared solar facilities that allow the utility to recover reasonable interconnection costs for each shared solar facility;
7. Adopt standardized consumer disclosure forms;
8. Allow the utility the opportunity to recover reasonable costs of administering the program;
9. Ensure nondiscriminatory and efficient requirements and utility procedures for interconnecting projects;
10. Allow for the co-location of two or more shared solar facilities on a single parcel of land and provide guidelines for determining when two or more such facilities are co-located;
11. Include a program implementation schedule;
12. Prohibit credit checks as a means of establishing eligibility for residential customers to become subscribers;
13. Require a customer's affirmative consent by written or electronic signature before providing access to customer billing and usage data to a subscriber organization;
14. Establish customer engagement rules and minimum rules for education, contract reviews, and continued engagement;
15. Require net financial savings for low-income customers, as that term is defined in § 56-594.3, of at least 10 percent, relative to the subscription fee throughout the life of the subscription; and
16. Allow the utility to recover as the cost of purchased power pursuant to § 56-249.6 any difference between the bill credit provided to the subscriber and the cost of energy injected into the grid by the subscriber organization.

Q. PLEASE EXPLAIN ANY ISSUES AND UNCERTAINTIES CREATED BY THE TIMING OF THE INSTANT PROCEEDING AND THE ABSENCE OF A FINAL

ORDER IN APCO'S NET ENERGY METERING CASE, CASE NO. PUR-2024-00161.

A. Code § 56-594.4 F requires that the utility shall file any tariffs to implement the Shared Solar Program by July 1, 2025.[14] Based on the procedural schedule in the Company's NEM Case,[15] Staff believes it is unlikely that a final order[16] will be issued in the NEM Case before the July 1, 2025 date[17] by which the Company has to file its shared solar tariff in the instant case. As I'll discuss later in my testimony, significant uncertainty exists with regards to the Commission's determination of the Company's avoided costs methodology used in the NEM Case, which is also used by the Company in its minimum bill proposal in the instant case. Furthermore, the statutory deadline for the utility's filing of the applicable tariffs has provided the Commission, Staff, and intervenors only a limited window of time in which to conduct a robust discovery, evaluate the minimum bill proposal, and *fully* develop the record in the instant case.

Specifically, enactment clauses in Chapters 716 (HB 108) and 765 (SB 255) of the 2024 Virginia Acts of Assembly require that the Commission initiate a proceeding within 30 days of the outcome of the Company's net metering case, to re-calculate the minimum bill.[18] The Commission did not address these directives in its Procedural Order issued on

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[14] Code § 56-594.4 F states that the utility should file "any tariffs, agreements, or forms necessary for implementation of the program by July 1, 2025."

[15] *Petition of Appalachian Power Company, For approval to revise its net metering program pursuant to § 56-594 of the Code of Virginia*, Case No. PUR-2024-00161, Doc. Con. Cen. No. 241030096, Order for Notice and Hearing (Oct. 7, 2024) (Establishing a procedural schedule on the APCo petition filed August 30, 2024).

[16] Code § 56-594 E states in part: "The Commission shall enter its final order in such a proceeding no later than 12 months after it commences such proceeding . . . ."

[17] See Footnote 13.

April 11th; however, it is Staff's current understanding that the Commission will be required to initiate another minimum bill proceeding after a final order is issued in the Company's still pending NEM Case. As such, Staff recommends that the Commission adopt the proposed minimum bill, as an interim step, as part of the instant case. Then in the future directed proceeding, the Commission could direct the Company to address the complex issues identified by Staff and interveners, within the Company's minimum bill proposal.

Q. PLEASE BRIEFLY EXPLAIN HOW THE ABSENCE OF A FINAL ORDER IN CASE NO. PUR-2024-00161 IMPACTS THE INSTANT PROCEEDING.

A. To comply with Code § 56-594.4, which requires the Commission to "calculate the benefits of shared solar to the electric grid and to the Commonwealth," the Company is hereby proposing to calculate benefits credits to be deducted from the minimum bill.[19] The Company proposes to calculate these benefits credits by using the same avoided costs methodology that was used to calculate transmission and ancillary service cost benefits in the Company's NEM Case.[20] Staff therein identified various concerns with this approach, and the Company addressed many of those concerns in its Rebuttal Testimony and proposed new avoided cost-based proposals for the Commission's consideration.[21] Staff notes, however, that until the Commission issues a final order in the NEM Case, significant

[18] *See* 2024 Virginia Acts of Assembly, Ch. 716 at Enactment Clause 3 (https://legacylis.virginia.gov/cgi-bin/legp604.exe?241+ful+CHAP0716+pdf). *See also,* 2024 Virginia Acts of Assembly, Ch 765 at Enactment Clause 3 (https://legacylis.virginia.gov/cgi-bin/legp604.exe?241+ful+CHAP0765+pdf).

[19] *See* Petition at 5-6.

[20] *See NEM Case,* Case No. PUR-2024-00161, Direct Testimony of Nicole M. Coon, Doc. Con. Cen. No. 240870009, (Aug. 30, 2024), at 18-19.

[21] *See NEM Case,* Case No. PUR-2024-00161, Doc. Con. Cen. No. 250410212, (Apr. 8, 2025), Prefiled Staff Testimony of Daniel P. Rafferty. *See also NEM Case*, Case No. PUR-2024-00161, Appalachian Power Company Rebuttal Testimony, Doc. Con. Cen. No. 250440080, (Apr. 29, 2025).

uncertainty remains regarding the appropriateness of the Company's avoided costs methodology and the proposed updates provided in APCo's Rebuttal Testimony. Furthermore, as previously stated, it is Staff's understanding that another minimum bill proceeding will be needed shortly after the issuance of the final order in the NEM Case; as such, Staff believes that the future minimum bill proceeding would be the appropriate venue in which to re-evaluate the complex issues raised by Staff and other parties.

Q. WHAT IS STAFF'S ULTIMATE RECOMMENDATION?

A. Due to the identified timing issues and lingering uncertainty regarding the Company's NEM Case, Staff recommends that the Commission adopt an interim minimum bill on a temporary basis in the instant case, and to address the more complex issues with the Company's minimum bill proposal in a future directed proceeding.

Discussion of the Company's Proposal:

Q. PLEASE BRIEFLY SUMMARIZE THE COMPANY'S MINIMUM BILL PROPOSAL.

A. The Company based its minimum bill proposal to be paid by all subscribers on the Commission-approved methodology in Case No. PUR-2020-00125.[22] The Company's proposal first calculates a "gross" minimum bill, which includes fixed and volumetric charges, and then subtracts the Company's calculated benefits credits of shared solar to create the "net" minimum bill ultimately to be paid by all subscribers.[23]

[22] *See* Petition at 4, citing (*Commonwealth of Virginia, ex rel. State Corporation Commission, Ex Parte: In the matter of establishing regulations for a shared solar program pursuant to § 56-594.3 of the Code of Virginia*, Case No. PUR-2020-00125, 2022 S.C.C. Ann. Rept. 208 (July 7, 2022).

[23] Petition at 5.

Q. WHAT COSTS DID THE COMPANY INCLUDE IN CALCULATING THE GROSS MINIMUM BILL?

A. The Company uses a modified version of the Commission-approved methodology in Case No. PUR-2020-00125, which includes both fixed and volumetric charges, with the exception of Base Transmission Charges.[24] The Company's proposed fixed costs include a $1 monthly administrative charge and the applicable customer's (basic) charge.[25] The Company proposes to charge customers the five non-bypassable charges and other applicable distribution and transmission charges, as summarized in the table below for a residential customer:[26]

Table 1: APCo's Proposed Minimum Bill Charges For a Residential Customer

Charge Type	Charge Name	Amount	Unit
Customer Charge	Customer Charge	$7.96	Fixed
Administrative Charge	Administrative Charge	$1.00	Fixed
Non-Bypassable Charges	Rider PIPP	$0.00132	kWh[27]
	Rider BC RAC	$0.00059	kWh
	Rider A. 5 RPS RAC	$0.00103	kWh
	Rider PCAP RAC	$0.00013	kWh
	Rider A. 6 RPS RAC	$0.00011	kWh
Base Distribution Charges	Energy Distribution	$0.03828	kWh
Distribution RAC Charges	Rider EE RAC	$0.00237	kWh
Transmission RAC Charges	Rider T.RAC	$0.03646	kWh

[24] *Id* at 4.

[25] *Id.*

[26] Direct Testimony of Nicole M. Coon ("Coon Direct") at 4.

[27] "kWh" refers to kilowatt-hour.

Q. WHAT ARE STAFF'S OVERALL COMMENTS ON THE COSTS INCLUDED IN THE GROSS MINIMUM BILL CALCULATION?

A. Staff submits that the Company's included costs appear in line with the Commission-approved methodology in Case No. PUR-2020-000125. Therefore, Staff does not oppose the Company's calculation of the gross minimum bill.

Q. WHAT COSTS DID THE COMPANY INCLUDE IN THE BENEFITS CREDIT CALCULATION?

A. The Company calculated three different avoided costs credits to be deducted from the gross minimum bill: (i) avoided (shifted) transmission costs, (ii) avoided ancillary services, and (iii) avoided Renewable Energy Certificate ("REC") purchase costs.[28] The Company will receive RECs created by the shared solar facility from the Subscriber Organizations, which could be used by the Company to comply with its statutory RPS Program requirements. The Company will then compensate customers for the RECs created by the shared solar facility at the avoided REC purchase cost using the Renewable Energy Premium charge in Rider Wind, Water, and Solar ("Rider W.W.S.") for the applicable customer's schedule.[29] The Company calculated avoided transmission and ancillary service costs using the same

[28] Petition at 5.

[29] *Id.*

methodology the Company proposed in its NEM Case.[30] The Company's calculated benefits credits are summarized by rate class below:[31]

Table 2: APCo's Proposed Benefits Credits

Customer	Voltage Class	Transmission ($/kWh)	Ancillary Services ($/kWh)	RECs ($/kWh)	Total Benefits Credit ($kWh)
Residential	Secondary	$0.0072	$0.00150	$0.03189	$0.04059
Commercial, Industrial	Secondary	$0.0064	$0.00150	$0.03189	$0.03979
Commercial, Industrial	Primary	$0.0061	$0.00144	$0.03189	$0.03943
Commercial, Industrial	Sub-Transmission	$0.0060	$0.00142	$0.03189	$0.03931
Commercial, Industrial	Transmission	$0.0059	$0.00140	$0.03189	$0.03919

Benefits Credits Calculation:

Q. HOW DID THE COMPANY CALCULATE THE REC BENEFITS CREDIT?

A. The Company based its REC benefits credit on the Renewable Energy Premium charge in its Rider W.W.S.[32] based on the customer's applicable rate schedule. This charge is updated semi-annually and is reflective of a transparent market value of RECs.[33] The Company's current Renewable Energy Premium charge is $31.89/REC (per megawatt-hour or "MWh")

[30] *See NEM Case,* Case No. PUR-2024-00161, Direct Testimony of Nicole M. Coon, Doc. Con. Cen. No. 240870009, (Aug. 30, 2024), at 18-19.

[31] Coon Direct at 6; *see also* Direct Testimony of William K. Castle ("Castle Direct") at 8.

[32] *See Petition of Appalachian Power Company: For approval of its 2024 RPS Plan under § 56-585.5 of the Code of Virginia and related requests*, Case No. PUR-2024-00020, Direct Testimony of Aaron C. Thomas, Doc. Con. Cen. No. 240430117, (Apr. 25, 2024), at 11.

[33] *See NEM Case,* Case No. PUR-2024-00161, Direct Testimony of Ruben S. Blevins, Doc. Con. Cen. No. 250410211, (Apr. 8, 2025) ("Blevins NEM Case Direct"), at 78.

or $0.03189 (per kWh).[34] Staff agreed with the Company's use of the Renewable Energy Premium Charge in the NEM Case and also agrees in the instant proceeding that this price is reasonable.

Q. HOW DID THE COMPANY CALCULATE THE AVOIDED TRANSMISSION BENEFITS CREDIT?

A. The Company's calculation of the avoided transmission benefits credits is identical to its NEM Case methodology, in which the calculation of the benefits is based on how a customer's net excess electricity contributed to helping the Company avoid or "shift" fixed transmission costs.[35] To approximate the contribution of net excess electricity generation, the Company used the National Renewable Energy Laboratory's ("NREL") PVWatts Online Calculator ("PVWatts") to model the generation of a "typical" residential and commercial solar array of 9.89 $kW_{\text{direct current ("DC")}}$/8.25 kW_{AC}[36] and 52.53 kW_{DC}/43.77 kW_{AC}[37] and subtracted the average hourly generation from the average hourly load profile of an average residential or commercial customer.[38] To get the avoided transmission rate, the Company reported that it used its 2023 Network Integration Transmission Service

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[34] *Application of Appalachian Power Company for a 2024 biennial review of its base rates, terms and conditions pursuant to § 56-585.8 of the Code of Virginia,* Case No. PUR-2024-00024, Doc. Con. Cen. No. 241260050, APCo Biennial Compliance Filing at Sheet 40-1 (Dec. 30, 2024). The tariff is also available at https://www.appalachianpower.com/lib/docs/ratesandtariffs/Virginia/APCoStandardTariff28-January-1-2025SUTUpdate.pdf .

[35] Coon Direct at 7.

[36] *Id.*

[37] *Id* at 9; *see also* PVWatts Summary of Inputs for Commercial System in Company's Workpaper NMC-3 in Attachment DPR-3.

[38] Coon Direct at 7.

("NITS")[39] costs as the basis for the avoided transmission costs and performed the following calculation:[40]

> Avoided Transmission Cost Rate = Annual Transmission Credit ($) - annual Net Excess Generation (kWh), where Annual Transmission Credit = Loss Factor x Annual Transmission Reduction x Test Year Network Integration Transmission Service Rate ($/kW-year); Annual Transmission Reduction = the average of the annual average Net Excess Generation (kWh) occurring during APCo's 12 Coincident Peak ("12-CP") hours for the load year period of November 2020 through October 2023 x AEP Zone Transmission Loss Factor: and annual Net Excess Generation = monthly Net Excess Generation (kWh) x 12 months.

The Company reported the same average value of a 0.39 kW and a 1.17 kW reduction in peak load provided by a typical residential and commercial customer's net excess electricity respectively.[41] Using this approach, the Company calculated the same avoided transmission costs credits reported in the Company's NEM Case.[42]

Q. PLEASE SUMMARIZE STAFF'S CONCERNS REGARDING THE PVWATTS MODELING AND NET EXCESS ELECTRICITY CALCULATIONS IN CASE NO. PUR-2024-00161 THAT WAS USED IN DEVELOPING THE COMPANY'S

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[39] *See* 2023 PJM Annual Transmission Revenue Requirements (ATRR) and Network Integration Transmission Service (NITS) Rates: https://www.pjm.com/-/media/DotCom/markets-ops/settlements/network-integration-trans-service-2023.pdf.

[40] *See* Blevins NEM Case Direct at 20.

[41] Coon Direct at 7; *see also* Company's Workpaper NMC-3 "12 CPs-Transmission" tab in Attachment DPR-3.

[42] *See NEM Case,* Direct Testimony of Nicole M. Coon, Doc. Con. Cen. No. 240870009, (Aug. 30, 2024), at 18-19.

AVOIDED TRANSMISSION BENEFITS CREDITS IN THE INSTANT PROCEEDING.

A. In the NEM Case, Staff had identified various concerns with the Company's PVWatts solar modeling approach,[43] which was used to model the customer-generators net excess electricity by subtracting the generation from the Company reported average load profile. Staff offered recommendations in its testimony for improvements to the Company's PVWatts modeling methodology, which would also impact the calculation of the avoided transmission costs credit. In that proceeding, which is still pending before the Commission, the Company submitted Rebuttal Testimony that appears to have addressed many of Staff's concerns, by creating an alternative proposal adopting the following changes:[44]

- A re-calculated average system size of 8.82 kW_{DC}/7.35 kW_{AC} and 49.32 kW_{DC}/41.10 kW_{AC} for a residential and commercial solar system to model respectively. This correction addressed Staff's concerns regarding the Company's mixing of AC and DC capacity data when calculating the prior average system size.
- Using a "Fixed (roof mount)" racking type for a residential system instead of "Fixed (open rack)."
- Assuming a 27-degree tilt angle instead of the PVWatts default that uses a 20-degree tilt angle.
- Removing the average "hour ending" adjustments to the PVWatts modeled AC output.
- Appropriately adjusting the PVWatts output to accommodate daylight savings time and aligning it with other hourly data used by the Company.
- Calculating the net excess generation using monthly based hourly averages for both the solar generation and load profiles.

[43] *See NEM Case,* Testimony of Staff witness Daniel P. Rafferty, Doc. Con. Cen. No. 25410212 (Apr. 8, 2025) at 1.

[44] *See NEM Case,* Rebuttal Testimony of Company witness Nicole M. Coon, Doc. Con. Cen. No. 25440080 (Apr. 29, 2025) at 3 and 6-7.

While Staff is appreciative of the Company's efforts to incorporate Staff's recommendations, Staff acknowledges that the ultimate determination of the appropriateness of the Company's proposals rests with the Commission as it issues its final order on the NEM Case.

Q. PLEASE SUMMARIZE STAFF'S CONCERNS WITH LIMITING THE EVALUATION OF BENEFITS TO NET EXCESS ELECTRICITY.

A. Since the Company presents the same analysis of avoided transmission costs in this proceeding as it used in the NEM Case, the avoided transmission benefits credits are also based on a customer's approximated net excess electricity. As Staff noted in the NEM Case, however, limiting the analysis to just the modeled net excess electricity fails to consider the full load reduction benefits provided by that customer.[45] Furthermore, Staff believes that basing the benefits analysis on net excess electricity is also inappropriate as it fails to account for the distinct operational differences between front-of-the-meter based shared solar systems and behind-the-meter based net metered solar systems.

Q. PLEASE EXPLAIN BRIEFLY WHAT YOU MEAN BY "OPERATIONAL DIFFERENCES" BETWEEN A SHARED SOLAR FACILITY AND A NET METERING FACILITY.

A. Shared solar facilities are front-of-meter[46] systems in which all the electricity flows directly onto the distribution system. Shared solar does not generate any power for use to cover

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[45] *See* Blevins NEM Case Direct at 42.

[46] See basic explanation of "front-of-meter" or "behind-the-meter" provided by EnergyLink: https://goenergylink.com/blog/behind-the-meter-vs-in-front-of-the-meter-solar/.

onsite load,[47] as opposed to behind-the-meter systems. Instead, shared solar facilities function similarly to utility-scale systems in which all the power flows onto the Company's system, whereby it reduces the Company's total load obligation.[48] Therefore, there is no net excess electricity production and no bi-directional meter measuring the "net" electricity consumption, which the Company acknowledges in its discovery responses to Staff[49] and the Coalition for Community Solar Access ("CCSA").[50] Instead, a subscriber would be given bill credits for a portion of that electricity that corresponds to their subscription.

Q. WHY DOES STAFF FEEL IT IS IMPORTANT TO NOTE THE OPERATIONAL DIFFERENCES BETWEEN SHARED SOLAR AND A NET METERED FACILITY?

A. Staff believes it is important, because importing the Company's NEM Case analysis into this proceeding limits the calculation of the benefits to net excess electricity production, thereby discounting the total solar generation flowing onto the grid. This approach has the potential to underestimate the load reductions provided by shared solar at the Company's 12-CPs than what would be expected.[51] Staff therefore recommends that for future proceedings, the avoided transmission benefits be based on the full solar generation profile.

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[47] 20 VAC 5-340-40 D 1 of the Commission's Rules Governing Shared Solar Program, 20 VAC 5-340-10 *et seq*., states, in part: "The shared solar facility's meter shall not be located behind another utility customer account."

[48] Castle Direct at 4 (stating that shared solar facilities that are connected to the distribution system are considered to be "load reducers."

[49] Company's Response to Staff Integratory No. 2-4(c). See Attachment DPR-1.

[50] Company's Response to CCSA Interrogatories 1-3, 1-4, and 1-7. See Attachment DPR-1.

[51] The Company netting generation from a customer's load removes significant amounts of solar generation, which understates the total load reductions at the 12-CPs (despite no onsite usage for shared solar).

Q. DID THE COMPANY PERFORM ANY ANALYSIS ON A TYPICAL SHARED SOLAR CUSTOMER'S SUBSCRIPTION SIZE?

A. No. The Company did not provide any analysis of a "typical" subscription size of shared solar facilities for purposes of calculating the benefits credits nor for its minimum bill demonstration.[52] The Company assumes a 1,000 kWh subscription size for the billing analysis[53] and assumes a subscription size equal to 1,057 kWh[54] (9.89 kW_{DC}/8.25 kW_{AC})[55] and 5,614 kWh[56] (52.53 kW_{DC}/43.77 kW_{AC})[57] for a residential and commercial shared solar customer respectively, to calculate the avoided transmission benefits. Staff highlights the importance of ensuring that the assumed subscription size is reasonable such that it does not generate bill credits greater than the annual bill of the customer, which is a requirement of Code § 56-594.4 A.[58] Noting that Dominion has an existing Shared Solar Program that could potentially provide APCo with relevant information, Staff suggests that the Company work with Dominion, to the extent practical, to analyze an appropriate anticipated subscription size.

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[52] Company's response to Staff Interrogatory No. 2-5(a). See Attachment DPR-1.

[53] Castle Direct at 8.

[54] *See* Workpaper NMC-2 "Solar Production Summary" tab in Attachment DPR-2.

[55] Coon Direct at 7.

[56] *See* Workpaper NMC-3 "Solar Production Summary" tab in Attachment DPR-3.

[57] Coon Direct at 9; *see also* Workpaper NMC-3 "2023 Typical C&I" and "Solar Production" tabs in Attachment DPR-3.

[58] Code § 56-594.4 A defines a subscription as "a contract or other agreement between a subscriber and the owner of a shared solar facility. A subscription shall be sized such that the estimated bill credits do not exceed the subscriber's average annual bill for the customer account to which the subscription is attributed."

Q. DID THE COMPANY PERFORM ANY ANALYSIS ON THE TYPICAL SHARED SOLAR CUSTOMER'S ENERGY CONSUMPTION?

A. No. The Company assumes for its avoided transmission benefits credit an average monthly energy usage of 1,013 kWh and 7,446 kWh for a residential and commercial customer, respectively.[59] On an annual basis, a residential and commercial customer would be expected to consume 12,156 kWh and 89,352 kWh, respectively.[60] For a demonstration of its minimum bill, the Company assumes a 1,000 kWh monthly usage, or 12,000 kWh a year.[61] Staff notes the importance of average energy usage, as it is usually tied to the subscription provided by the subscriber organization,[62] thus providing further guidance on assumed subscription sizes and billing analysis for the minimum bill.

Q. DOES STAFF HAVE ANY COMMENTS ON THE DATA SOURCES USED FOR THE COMPANY'S CALCULATION OF AVOIDED TRANSMISSION AND ANCILLARY SERVICE BENEFITS CREDITS?

A. Yes. Since the Company imported the same analysis from the NEM Case, the Company's NITS Rates and Ancillary Service costs used in the instant case are from the year 2023.

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[59] *See* Workpapers NMC-2 and NMC-3 in the "2023 Typical RES" and "2023 Typical C&I" tabs respectively in Attachments DPR-2 and DPR-3.

[60] Assumes average monthly consumption continues over the course of the year. Subscriber Organizations will typically use a customer's average monthly or yearly energy consumption to match them with the appropriate subscription size. Also see Ampion's explanation of how customers are matched and how they estimate subscription needs. Ampion is the subscribing platform partner for Community Housing Partners' ("CHP") Solar Savings shared solar program for the Dominion Energy program. https://ampion.net/how-it-works/faq.

[61] See Castle Direct at 8 for demonstration of proposed minimum bill calculation for 1,000 kWh customer with the same subscription size.

[62] See footnote 55.

Staff notes that more recent data NITS rates and ancillary service[63] cost data is available, and Staff believes that while the NITS rates align with the test year from the NEM Case, it would be appropriate for the Company to use the most up to date cost information within its current proposal. In response to a Staff discovery request, the Company stated that it would update the benefits credits based on a final order in the NEM Case.[64] However, Staff would like to point out that updated NITS rates have been available since January of this year.[65] Staff is not opposed to using 2023 data in the instant proceeding, but submits that it would be more appropriate for the Company to use the most up to date sources where feasible.

Discussion of Excluded Benefits

Q. DOES STAFF HAVE ANY COMMENTS ON THE EXCLUSION OF AVOIDED ENERGY, CAPACITY, AND OTHER BENEFITS?

A. Yes. The Company did not calculate any benefits credits for avoided energy and capacity costs. Furthermore, as Staff witness Unger discusses in his direct testimony and as Staff also highlighted in the NEM Case, the Company excluded other economic, social, and environmental benefits, such as the Societal Cost of Carbon. Staff recommends that these considerations should be addressed in a future shared solar docket once the NEM Case concludes.

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[63] Company's response to Staff Interrogatory No. 2-9 (a). See Attachment DPR-1.

[64] Company's responses to Staff Interrogatory Nos. 2-4 (e), 2-8, and 2-9. See Attachment DPR-1.

[65] *See* 2025 PJM NITS Rates: https://www.pjm.com/-/media/DotCom/markets-ops/settlements/network-integration-trans-service-jan-2025.pdf.

Code Ambiguity As It Relates to Method of Calculating Benefits

Q. DOES STAFF HAVE ANY COMMENTS ON THE LANGUAGE FOUND IN CODE § 56-594.4 D REGARDING CALCULATING "THE BENEFITS OF SHARED SOLAR TO THE ELECTRIC GRID AND TO THE COMMONWEALTH?"

A. Yes. Other than the uncertainty regarding the appropriateness of the Company's avoided costs methodology pending the final directive in the NEM Case, Staff believes it is necessary to highlight the fundamental differences in Code language between the Shared Solar Program and the net metering program. While Code § 56-594 calls for the evaluation of benefits related to the current net metering program,[66] Code § 56-594.4 instead calls for a calculation of benefits based on "the benefits of shared solar to the electric grid and to the Commonwealth."[67] To Staff, this distinction is important to highlight, as it may imply: (a) an expression to review the benefits of shared solar differently than the net metering program, and (b) calculating the benefits provided by the shared solar facility itself rather than the individual customer.

Currently, the Company assumes that all the possible avoided transmission benefits attributable to shared solar are limited to just the customer's subscribed capacity or energy, which is only a small fraction of the contributions of the shared solar facility itself. Explained differently, the Company, by importing its NEM Case analysis into this proceeding, limits the calculation of the benefits to the subscriber rather than calculating the benefits attributable to the electricity production of the shared solar facility itself.

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[66] Code § 56-594 I and § 56-594 J.

[67] Code § 56-594.4.

However, Staff acknowledges the ambiguity in the language stating, "the benefits of shared solar to the electric grid and to the Commonwealth," and looks to the Commission for guidance on how to approach calculating the benefits of shared solar in future proceedings.

Conclusions and Recommendations

Q. PLEASE SUMMARIZE YOUR CONCLUSIONS AND RECOMMENDATIONS.

A. While uncertainty remains over the outcome of APCo's net metering proceeding in the NEM Case and noting that the Code provided a limited time frame for parties and Staff to evaluate the Company's minimum bill proposal, Staff recommends only a temporary adoption of the Company's proposed minimum bill within this proceeding. However, after a final order is issued in the NEM Case, Staff anticipates that the Commission would re-evaluate the minimum bill pursuant to Chapters 716 (HB 109) and 765 (SB 255) of 2024 Virginia Acts of Assembly in a future proceeding. Staff recommends that the following concerns be addressed within that future docket:

- The appropriateness of the Company's avoided costs methodology for calculating the "benefits credits" to be deducted from the gross minimum bill:
    - Staff has concerns with the Company's PVWatts modeling of a residential and commercial solar system respectively for calculating net excess electricity identified in the NEM Case. The Company revised its PVWatts modeling and avoided costs analysis in Rebuttal Testimony in the NEM Case. While APCo's Rebuttal Testimony in the NEM Case addressed many of Staff's concerns, that case is still pending a final directive from the Commission, therefore the appropriateness of those revisions is currently unknown.
- The Company's basing of avoided transmission costs on net excess electricity, when all generation from shared solar facilities flows onto the distribution system and there is no on-site self-consumption. Staff believes this to be inappropriate as the methodology fails to reflect the full load reduction benefits attributable to shared solar.
- The Company's utilization of imported 2023 data from the NEM Case for avoided transmission and ancillary service costs whereas more recent data is available.

- Assessing the appropriate interpretation of calculating "the benefits of shared solar to the electric grid and to the Commonwealth" as outlined in Code § 56-594.4 D. This would help to determine the types of benefits to include and whether the Company's method of limiting the benefits to a customer's individual subscription is appropriate.
- Evaluating the feasibility of including other economic, social, and environmental benefits to deduct from the gross minimum bill.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

Attachment DPR-1: Interrogatory

Responses

COMMONWEALTH OF VIRGINIA
STATE CORPORATION COMMISSION
APPLICATION OF
APPALACHIAN POWER COMPANY
SCC CASE NO. PUR-2025-00028
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Staff Set 2
To Appalachian Power Company

Interrogatory Staff 2-4:

Please refer to Company Witness Coon's testimony at page 7, which describes the Company's calculation of avoided transmission costs and PVWatts modeling. The Company reports using the same PVWatts modeling methodology as used in Case No. PUR-2024-00161, including modeling a 9.89 kilowatt direct current (kW_{DC}) or a 8.25 kilowatt alternating current (kW_{AC}) residential solar system to calculate the net-excess electricity. Please also refer to Code § 56-594.4 D, which states that when establishing the minimum bill, the Commission shall, among other things "calculate the benefits of shared solar to the electric grid and to the Commonwealth and deduct such benefits from other costs."

a. On page 9 of Company Witness Coon's direct testimony, the Company explains that it performed a similar avoided ("shifted") transmission costs analysis for commercial and industrial customers by stating "[t]he Company performed the same exact analysis as described for a residential net metering customer above but used different typical profiles for customers and solar arrays." Please confirm or deny if the Company's statement outlined above refers to the Company performing the same PVWatts modeling of a 52.53 kWDC/43.77 kWAC solar array as in the Company's net metering case (PUR-2024-00161).

b. Please provide a detailed narrative explanation why the Company feels it is appropriate to use the same methodology as used in Case No. PUR-2024- 00161, given the differences between a net metering facility and a shared solar facility.

c. Confirm or deny that when a shared solar facility generates electricity, that electricity is not used to serve onsite load and therefore, all the electricity flows directly onto the Company's distribution system.

d. Please refer to the Company's responses to CCSA Interrogatories 1-3 (c&d), 1-4 (d), and 1-7 (d). The Company explains in each of these responses that shared solar has no "self-consumption" and that shared solar facilities "export their full generation." Based on these responses, please provide a detailed narrative description for why the Company feels it is appropriate to only evaluate "net-excess" electricity with respect to calculating avoided ("shifted") transmission costs, despite the lack of "self-consumption" by shared solar facilities.

e. Referring to Staff Interrogatory No. 9-88 in Case No. PUR-2024-00161, the Company explains that it had mixed direct current (DC) and alternating current (AC) capacity data for its net metering customers when calculating the average system size. Please provide a detailed narrative description of why the Company decided to use the same average system size for its PVWatts modeling in this instant proceeding knowing its calculation used a mixture of AC and DC nameplate capacity ratings.

f. Is it the Company's viewpoint that the "benefits of shared solar to the electric grid and to the Commonwealth" should be calculated using the same benefits as the net metering program as outlined in Code § 56-594 J.? If not, please explain what benefits the Company believes are specific to shared solar.

g. Is it the Company's viewpoint that a net metered customer is functionally the same as a shared solar customer?

Response Staff 2-4:

a. Confirmed.

b&d. Please see the Company's response to APV 1-9. If the Commission decides that the calculations should be independent of each other, the Company is willing to perform an analysis based solely on a hypothetical shared solar facility, because the Company currently has no shared solar facilities in operation in its Virginia service territory. In addition, the credits are being applied to the entirety of the generation from the shared solar facility.

c. Confirmed.

e. The Company is aware of these changes and will be updating the analysis in its rebuttal testimony in Case No. PUR-2024-00161 (the "Net Metering Case"). The Company stated in its direct testimony in this case that the final benefit credits for shifted transmission and ancillary services would be updated to reflect what was ordered in the Net Metering Case.

f. No. The Company is proposing to compensate shared solar customers for the REC, while net metering customer-generators own their RECs. That said, the Company believes that shared solar and net metering systems are similar because they are connected at the distribution level and act as load reducers. Thus, the energy-related benefits would be calculated in a similar fashion to net metering systems and utility-scale, distribution-connected, load reducing solar facilities. The basis for benefit calculations of all three types of distribution-connected systems have been consistent across the Company's respective filings. As described in witness Coon's direct testimony, for purposes of the shared solar minimum bill, the Company does not believe it is appropriate to apply the benefits of capacity and energy as calculated in the net metering case.

g. They are similar. They both are offsetting a portion of their load from distribution-connected solar facilities. They also cannot size their system, or allocation of generation from the shared solar facility, that is greater than the usage.

The foregoing response is made by Nicole M. Coon, Regulatory Consultant Prin, on behalf of Appalachian Power Company.

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Staff Set 2
To Appalachian Power Company

Interrogatory Staff 2-5:

Please refer to Code § 56-594.4 A for the definition of "subscription", which states that a subscription to a shared solar facility should not be sized "such that the estimated bill credits do not exceed the subscriber's average annual bill for the customer account to which the subscription is attributed."

a. Did the Company perform any evaluation to determine the "typical" shared solar customer's subscription size? If not, please explain why in a detailed narrative description.

b. Please provide the average annual energy usage by customer account type (e.g. Residential, commercial, industrial).

Response Staff 2-5:

a. No. The Company does not have any shared solar customers and is unable to perform an analysis of the hypothetical "typical" subscription size in its Virginia service territory.

b. Please see the Company's response to CCSA 1-11, Workpaper NMC-2 and CCSA 1-11 Attachment 1.

The foregoing response is made by William K. Castle, Dir Regulatory Svcs and Nicole M. Coon, Regulatory Consultant Prin, on behalf of Appalachian Power Company.

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Staff Set 2
To Appalachian Power Company

Interrogatory Staff 2-8:

Please refer to Company Witness Coon's direct testimony at page 7, which describes the Company's approach to calculating the transmission credit. Please also see PJM's Annual Transmission Revenue Requirement ("ATRR") and the Network Integration Transmission Service ("NITS") Rates as of January 2025, which can be found at https://www.pjm.com/-/media/DotCom/markets-ops/settlements/network-integration-trans-service-jan-2025.pdf. Please provide a detailed narrative description as to why the Company did not include updated 2025 or 2024 NITS rates in its transmission credit calculation.

Response Staff 2-8:

The Company is using the rates calculated in the Net Metering Case. In that case, the test year was calendar year-end 2023. The Company is proposing in that case to update the rates with its Biennial Reviews, thus encompassing any future market changes and updated values.

The foregoing response is made by Nicole M. Coon, Regulatory Consultant Prin, on behalf of Appalachian Power Company.

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Staff Set 2
To Appalachian Power Company

Interrogatory Staff 2-9:

Please refer to Company Witness Coon's direct testimony at page 8, which discusses the Company's calculation of the ancillary services credit.

a. Does the Company have any updated data for PJM ancillary service costs incurred during 2024?

b. If "yes" to subpart (a) above, please provide a detailed narrative description of why the Company chose not to update its calculation of ancillary service credit to reflect more recent cost data.

Response Staff 2-9:

a. Yes.

b. Please see the response to Staff 2-8.

The foregoing response is made by Nicole M. Coon, Regulatory Consultant Prin, on behalf of Appalachian Power Company.

COMMONWEALTH OF VIRGINIA
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CCSA Set 1
To Appalachian Power Company

Interrogatory CCSA 1-3:

Please identify and provide all data sources, methodologies, assumptions, and calculations relied upon to estimate the avoided ancillary services benefits associated with the Shared Solar Program, as presented in APCo's avoided cost study. Your response should include:

a. Identification of the specific ancillary service components included in the avoided cost estimate and how each component was calculated or sourced;

b. An explanation of the rationale for any variation in ancillary service avoided costs across customer classes, as shown in Table 2 of the avoided cost study on page 6 of the Direct Testimony of Nicole M. Coon;

c. Clarification on whether the avoided ancillary services benefits were calculated based solely on exported generation or the full output of the solar system (i.e., including both exported and self-consumed generation); and

d. A statement confirming whether APCo treated only exported generation as a load reduction in its analysis or accounted for self-consumed generation in its assessment of load reduction.

Response CCSA 1-3:

a. As described in Company witness Coon's direct testimony, page 8 lines 10-12 "The Company used its actual 2023 PJM Ancillary Services charges as the basis for the ancillary service cost component rate."

b. The variation is based on the different line losses at different voltages. Please see Workpapers NMC-2 and NMC-3 on the "Combined-Ancillary" tab.

c & d. The avoided ancillary service benefit calculation is based on the total amount charged by PJM to the Company in 2023 divided by the Company's total load for 2023. Please see the calculation on the "Combined – Ancillary" tab in Workpapers NMC-2 and NMC-3. Additionally, shared solar facilities do not have any self-consumed generation.

The foregoing response is made by Nicole M. Coon, Regulatory Consultant Prin, on behalf of Appalachian Power Company.

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CCSA Set 1
To Appalachian Power Company

Interrogatory CCSA 1-4:

Please identify and provide all data sources, methodologies, assumptions, and calculations relied upon to estimate the avoided energy benefit associated with the Shared Solar Program. In particular, please:

a. Identify and provide the underlying data used to derive the avoided energy benefit value of $0.0372 per kilowatt-hour, as referenced on page 8, line 21 of the Direct Testimony of Nicole M. Coon on behalf of APCo;

b. Describe the time periods, locational basis, and seasonal or time-of-use differentiation (if any) applied in deriving this value;

c. Explain whether the avoided energy value is based on wholesale market pricing, forward market data, utility procurement costs, or other benchmarks; and

d. Specify whether this avoided energy value applies to exported generation only, or the total generation output of shared solar systems (including self- consumed energy).

Response CCSA 1-4:

The Company is not proposing an "avoided energy benefit associated with the Shared Solar Program" in this case. The discussion in Company witness Coon's testimony, in conjunction with witness Castle's testimony, illustrates how including the avoided energy and capacity benefits on the minimum bill that were included in the Net Metering Case (PUR-2024-00161) would result in the Company not recovering sufficient costs to ensure subscribing customers pay a fair share of the costs of providing electric service.

a-c. Please see CCSA 1-4 Attachment 1, "Energy" tab. The avoided energy cost credit is based on the average loss-adjusted PJM day-ahead market price for the AEP APCo Residual Aggregate during the on-peak hours from the hour-ending 0700 though the hour-ending 2300 for the period from January 1, 2023, through December 31, 2023. This reflects the wholesale price of energy delivered to the Company by the customer-generator.

d. The avoided energy value is not applicable to the minimum bill in this proceeding. Additionally, shared solar facilities do not have any self-consumed generation.

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CCSA Set 1
To Appalachian Power Company

Interrogatory CCSA 1-7:

On page 7, lines 13–16 of her Direct Testimony, Nicole M. Coon states that the Company calculated an average 0.39 kW reduction in its peak load based on the average of the hourly excess generation coincident with the Company's Network Service Peak Load (NSPL) in 2021, 2022, and 2023. In light of this statement, please:

a. Identify the specific hours corresponding to the NSPL for each of the 12 coincident peak months across 2021, 2022, and 2023;

b. Explain why APCo applied the avoided transmission benefit for a residential customer as a proxy for the avoided transmission value associated with shared solar systems;

c. Explain why APCo applied the avoided transmission benefit for a residential customer as a proxy for the avoided transmission value associated with shared solar systems; and

d. Explain why any reduction in APCo's NSPL— through self-consumption does not reduce its transmission cost obligations under PJM's Network Integration Transmission Service (NITS) and therefore was excluded from the avoided transmission benefit calculation.

Response CCSA 1-7:

a. Dates and hours for NSPLs are publicly available on PJM's website. Responses are hour ending in Eastern Prevailing Time:

    2021: 7/9/20 Hour 17
    2022: 8/24/21 Hour 17
    2023: 6/22/2022 Hour 16

b & c. The Company is proposing varying rates for customers and voltage levels. Please see Table 2 in Company witness Coon's direct testimony. Furthermore, shared solar facilities are similar to net metering systems because they are connected to the distribution system and act as load reducers.

d. Self-consumption is not a part of this case. Shared Solar facilities export their full generation.

Attachment DPR-2: Relevant Information From Workpaper NMC-2

Row Labels	Average of Hour Ending kWh	Sum of Hour Ending kWh
1	-	-
2	-	-
3	-	-
4	-	-
5	-	-
6	0.00	1.73
7	0.12	42.47
8	0.64	232.25
9	1.72	627.63
10	2.97	1,083.35
11	3.94	1,437.10
12	4.52	1,649.60
13	4.72	1,721.73
14	4.61	1,683.47
15	4.23	1,544.06
16	3.52	1,285.84
17	2.49	907.40
18	1.30	473.45
19	0.41	150.36
20	0.06	21.23
21	0.00	0.19
22	-	-
23	-	-
24	-	-
Grand Total	**1.47**	**12,861.88**

monthly	annual
1,057.14	

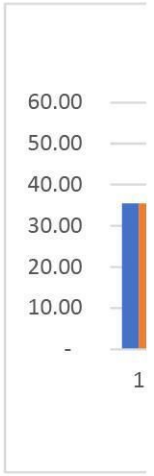
Typical Res Customer	Typical NMS Customer
1,013	8.25

HE	begin	end	kWh/Month	kWac-ICAP
1	midnight	1 AM	35.48	-
2	1	2 AM	33.66	-
3	2	3 AM	32.82	-
4	3	4 AM	32.87	-
5	4	5 AM	34.10	-
6	5	6 AM	36.52	0.14
7	6	7 AM	40.41	3.49
8	7	8 AM	44.68	19.09
9	8	9 AM	44.72	51.59
10	9	10 AM	43.77	89.04
11	10	11 AM	42.23	118.12
12	11	12 AM	41.98	135.58
13	12	1 AM	42.27	141.51
14	1	2 PM	41.89	138.37
15	2	3 PM	42.74	126.91
16	3	4 PM	44.43	105.69
17	4	5 PM	47.30	74.58
18	5	6 PM	51.13	38.91
19	6	7 PM	51.98	12.36
20	7	8 PM	50.44	1.74
21	8	9 PM	49.10	0.02
22	9	10 PM	46.88	-
23	10	11 PM	43.22	-
24	11	midnight PM	38.82	-
Monthly			1,013	1,057
Annual			12,162	12,686

Continues on page 3

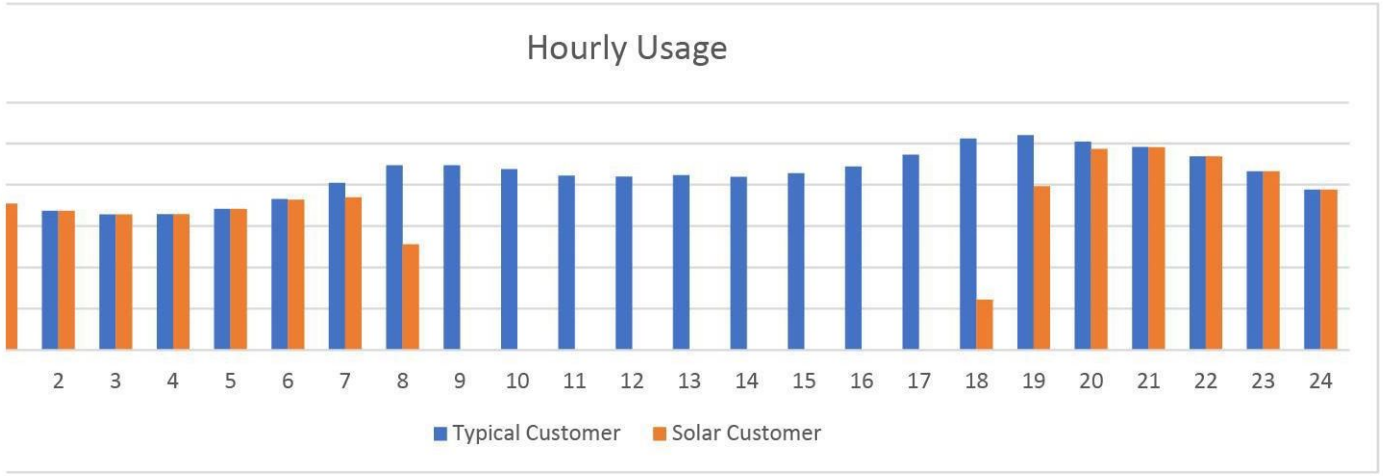
Avoided Cost Component	Rates
Transmission	$0.00720
Ancillary Service	$0.00150
Total	$0.00870

Continues on page 4



NMS II Avoided Cost Component Rates ($/kWh)				
Customer	Voltage Level	Transmission	Ancillary Service	Total Energy Credit
Residential	Secondary	$ 0.0072	$ 0.00150	$ 0.0087

Typical Solar Netted Energy	Typical Solar Received from Utility	Typical Solar Net Excess Gen Delivered to Grid	Transmission (12CP) Net Excess Transmission Credit ($/kWh)	Ancillary Net Excess Ancillary Credit ($/kWh)
-	35.48	-	$0.00720	$0.00150
-	33.66	-	$0.00720	$0.00150
-	32.82	-	$0.00720	$0.00150
-	32.87	-	*$0.00720*	*$0.00150*
-	34.10	-	$0.00720	$0.00150
0.14	36.37	-	$0.00720	$0.00150
3.49	36.92	-	$0.00720	$0.00150
19.09	25.59	-	$0.00720	$0.00150
44.72	-	6.86	$0.00720	$0.00150
43.77	-	45.27	$0.00720	$0.00150
42.23	-	75.88	$0.00720	$0.00150
41.98	-	93.60	$0.00720	$0.00150
42.27	-	99.24	$0.00720	$0.00150
41.89	-	96.47	$0.00720	$0.00150
42.74	-	84.17	$0.00720	$0.00150
44.43	-	61.26	$0.00720	$0.00150
47.30	-	27.28	$0.00720	$0.00150
38.91	12.21	-	$0.00720	$0.00150
12.36	39.62	-	$0.00720	$0.00150
1.74	48.70	-	$0.00720	$0.00150
0.02	49.09	-	$0.00720	$0.00150
-	46.88	-	$0.00720	$0.00150
-	43.22	-	$0.00720	$0.00150
-	38.82	-	$0.00720	$0.00150
467	546	590		
5,605	6,556	7,080		


Hourly Usage
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Typical Customer
Solar Customer

Attachment DPR-3: Relevant Information From Workpaper NMC-3

Summary of PVWatts Inputs for a Commercial and Industrial System:

PVWatts Hourly PV Performance Data		
Requested Location	roanoke virginia	
Location	Lat, Lng: 37.29, -79.94	
Latitude (DD)	37.29	
Longitude (DD)	-79.94	
Elevation (m)	315.3999939	
DC System Size (kW)	52.53	
Module Type	Standard	
Array Type	Fixed (open rack)	
Array Tilt (deg)	20	
Array Azimuth (deg)	180	
System Losses (%)	14.08	
DC to AC Size Ratio	1.2	
Inverter Efficiency (%)	96	
Ground Coverage Ratio	NA	
Albedo	From weather file	
Bifacial	No (0)	
Monthly Irradiance Loss (%)		
	Jan	0
	Feb	0
	Mar	0
	Apr	0
	May	0
	June	0
	July	0
	Aug	0
	Sept	0
	Oct	0
	Nov	0
	Dec	0

Annual Transmission Revenue Requirements (ATRR) and Network Integration Trar			
Transmission Zone	**Transmission Owner**	**Annual Revenue Requirement**	**Tota Rever**
AECO	Atlantic City Electric Company	$ 239,334,801.00	**$**
AEP	AEP East Operating Companies	$ 1,225,257,720.00	
	AEP East Transmission Companies	$ 1,465,678,700.00	
	AMP Transmission, LLC	$ 351,352.00	
			$

Continues on page 4

Date	Load Year	CP Year
30-Nov	2019	2022
1-Dec	2020	2022
29-Jan	2021	2022
4-Feb	2021	2022
8-Mar	2021	2022
2-Apr	2021	2022
25-May	2021	2022
29-Jun	2021	2022
28-Jul	2021	2022
24-Aug	2021	2022
14-Sep	2021	2022
14-Oct	2021	2022
23-Nov	2021	2023

Continues on pages 4-5

9-Dec	2021	2023
27-Jan	2022	2023
15-Feb	2022	2023
12-Mar	2022	2023
20-Apr	2022	2023
31-May	2022	2023
22-Jun	2022	2023
20-Jul	2022	2023
3-Aug	2022	2023
21-Sep	2022	2023
20-Oct	2022	2023
21-Nov	2022	2024
23-Dec	2022	2024
10-Jan	2023	2024
4-Feb	2023	2024
20-Mar	2023	2024
25-Apr	2023	2024
31-May	2023	2024
30-Jun	2023	2024
27-Jul	2023	2024
24-Aug	2023	2024
5-Sep	2023	2024
3-Oct	2023	2024

Customer	Voltage Level	Loss Factor
Commercial, Industrial	Secondary	1.06912
Commercial, Industrial	Primary	1.02503
Commercial, Industrial	Sub-Transmission	1.01433

Continues on pages 5-6

Commercial, Industrial	Transmission	1.00000

ısmission Service (NITS) Rates	
al Zonal Annual nue Requirement	Network Integration Transmission Service Rate ($/MW-Year)
239,334,801.00	$ 91,559.00
2,691,287,772.00	$ 123,924.80

123,924.80 $/MW-Year
123.92 $/kW-Year

Hour Ending	CP	Gross Generation kWh Solar Array (43.77 kWac/52.53 kWdc)	Net Generation kWh Solar Array (43.77 kWac/52.53 kWdc)
19	12CP	0	0
19	12CP	0	0
18	12CP	7.079826	0
8	12CP	0	0
8	12CP	2.263422	0
8	12CP	5.155564	0
16	12CP	18.003456	6.853902132
15	12CP	26.7454275	10.22714693
17	12CP	21.4554815	2.013820464
17	12CP	19.0353855	2.013820464
17	12CP	16.815445	2.013820464
17	12CP	1.058062	2.013820464
8	12CP	0.0824265	0

8	12CP		0	0
8	12CP		0	0
8	12CP		0.7727395	0
20	12CP		0	0
8	12CP		7.518064	0
17	12CP		22.53186	2.013820464
16	12CP		28.0713815	6.853902132
18	12CP		4.9184935	0
16	12CP		23.6011115	6.853902132
18	12CP		10.0426745	0
8	12CP		4.0903125	0
8	12CP		0.814389	0
18	12CP		0.195857	0
8	12CP		0	0
8	12CP		0	0
8	12CP		4.2140275	0
8	12CP		6.9338735	0
18	12CP		14.340976	0
18	12CP		7.2382685	0
18	12CP		12.8340755	0
18	12CP		10.489701	0
19	12CP		3.4644655	0
18	12CP		6.762217	0
		3-year Average kW	7.96	1.13
		AEP Zone T Loss Factor		1.034126
				1.173674285

Annual Transmission Reduction	Annual Transmission Credit	Annual Net Solar Generation	Monthly Transmission Credit ($/kWh)
1.1737	155.5007	24,479	0.0064
1.1737	149.0879	24,479	0.0061
1.1737	147.5316	24,479	0.0060

1.1737	145.4474	24,479	0.0059

Row Labels	Average of Hour Ending kWh	Sum of Hour Ending kWh
1	-	-
2	-	-
3	-	-
4	-	-
5	-	-
6	0.03	9.21
7	0.62	225.51
8	3.38	1,233.37
9	9.13	3,333.14
10	15.76	5,753.52
11	20.91	7,632.32
12	24.00	8,760.97
13	25.05	9,144.09
14	24.50	8,940.86
15	22.47	8,200.41
16	18.71	6,828.97
17	13.20	4,818.66
18	6.89	2,513.97
19	2.19	798.44
20	0.31	112.70
21	0.00	1.01
22	-	-
23	-	-
24	-	-
Grand Total	**7.80**	**68,307.13**
monthly		annual
	5,614.28	

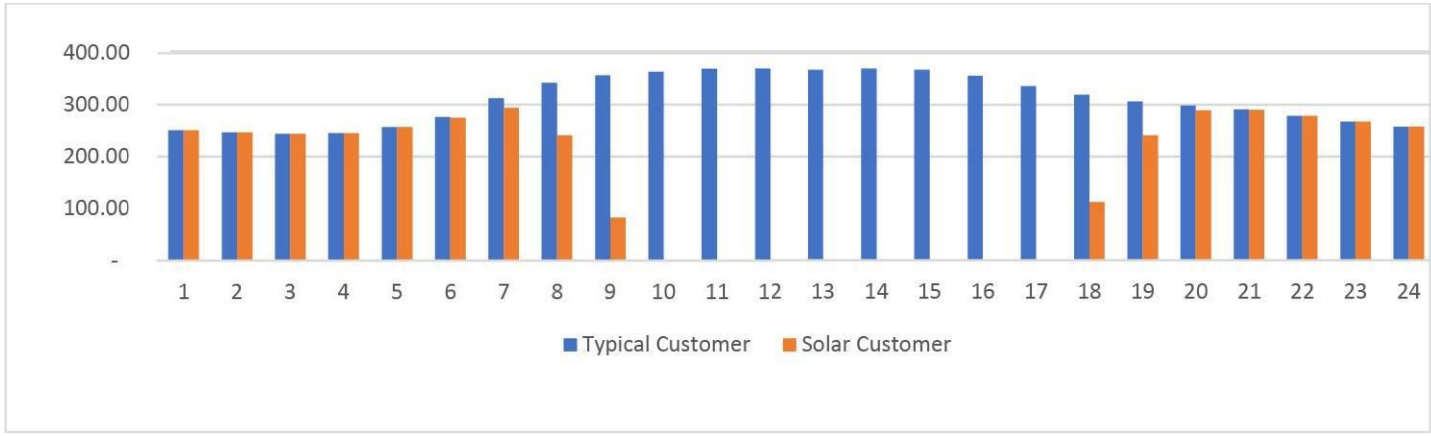
Typical C&I Customer	Typical NMS Customer
7,446	43.77

HE	begin	end	kWh/Month	kWac-ICAP
1	midnight	1 AM	250.65	-
2	1	2 AM	246.70	-
3	2	3 AM	243.96	-
4	3	4 AM	245.27	-
5	4	5 AM	256.73	-
6	5	6 AM	275.79	0.76
7	6	7 AM	312.49	18.54
8	7	8 AM	342.23	101.37
9	8	9 AM	356.40	273.96
10	9	10 AM	362.88	472.89
11	10	11 AM	369.25	627.31
12	11	12 AM	369.72	720.08
13	12	1 AM	367.72	751.57
14	1	2 PM	370.05	734.87
15	2	3 PM	367.19	674.01
16	3	4 PM	355.67	561.28
17	4	5 PM	335.64	396.05
18	5	6 PM	319.06	206.63
19	6	7 PM	306.53	65.63
20	7	8 PM	298.50	9.26
21	8	9 PM	290.58	0.08
22	9	10 PM	278.44	-
23	10	11 PM	267.36	-
24	11	midnight PM	257.67	-
Monthly			7,446	5,614
Annual			89,358	67,371

Avoided Cost Component	Rates
Transmission	$0.00640
Ancillary Service	$0.00150
Total	$0.00790

NMS II Avoided Cost Component Rates ($/kWh)				
Customer	Voltage Level	Transmission	Ancillary Service	Total Energy Credit
Commercial, Industrial	Secondary	$ 0.0064	$ 0.00150	$ 0.0079
Commercial, Industrial	Primary	$ 0.0061	$ 0.00144	$ 0.0075
Commercial, Industrial	Sub-Transmission	$ 0.0060	$ 0.00142	$ 0.0074
Commercial, Industrial	Transmission	$ 0.0059	$ 0.00140	$ 0.0073

Typical Solar Netted Energy	Typical Solar Received from Utility	Typical Solar Net Excess Gen Delivered to Grid	Transmission (12CP) Net Excess Transmission Credit ($/kWh)	Ancillary Net Excess Ancillary Credit ($/kWh)
-	250.65	-	$0.00640	$0.00150
-	246.70	-	$0.00640	$0.00150
-	243.96	-	$0.00640	$0.00150
-	245.27	-	$0.00640	$0.00150
-	256.73	-	$0.00640	$0.00150
0.76	275.04	-	$0.00640	$0.00150
18.54	293.96	-	$0.00640	$0.00150
101.37	240.86	-	$0.00640	$0.00150
273.96	82.44	-	$0.00640	$0.00150
362.88	-	110.02	$0.00640	$0.00150
369.25	-	258.06	$0.00640	$0.00150
369.72	-	350.36	$0.00640	$0.00150
367.72	-	383.85	$0.00640	$0.00150
370.05	-	364.81	$0.00640	$0.00150
367.19	-	306.81	$0.00640	$0.00150
355.67	-	205.62	$0.00640	$0.00150
335.64	-	60.41	$0.00640	$0.00150
206.63	112.44	-	$0.00640	$0.00150
65.63	240.90	-	$0.00640	$0.00150
9.26	289.24	-	$0.00640	$0.00150
0.08	290.49	-	$0.00640	$0.00150
-	278.44	-	$0.00640	$0.00150
-	267.36	-	$0.00640	$0.00150
-	257.67	-	$0.00640	$0.00150
3,574	3,872	2,040		
42,892	46,466	24,479		


Hourly Usage
400.00
300.00
200.00
100.00
-
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Typical Customer
Solar Customer