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May 12, 2025

VIA ELECTRONIC FILING

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

RE: Ex Parte: In the matter of future minimum bill proceedings for Appalachian Power Company pursuant to Code § 56-594.4

Case No. PUR-2025-00028

Dear Mr. Logan:

Please find enclosed for filing in the above-referenced docket the direct testimony and exhibits of Karl R. Rábago on behalf of Appalachian Voices. Included with this testimony are Mr. Rábago's one-page summary and three attachments.

As authorized by Rule 140 of the Commission's Rules of Practice and Procedure, Appalachian Voices is providing, and agrees to accept, service of documents in this case exclusively via email unless parties request otherwise.

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

Regards,

Josephus M. Allmond

Josephus M. Allmond

cc: Parties on Service List
Commission Staff
OHEParalegals@scc.virginia.gov

Attachments

Attachment KRR-1	Curriculum Vitae of Karl R. Rábago
Attachment KRR-2	Relevant Solar Experience
Attachment KRR-3	Discovery Responses

COMMONWEALTH OF VIRGINIA

STATE CORPORATION COMMISSION

PETITION OF 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*	)	Case No. PUR-2025-00028

SUMMARY OF

DIRECT TESTIMONY OF

KARL R. RÁBAGO

ON BEHALF OF

APPALACHIAN VOICES

May 12, 2025

SUMMARY OF DIRECT TESTIMONY OF KARL R. RÁBAGO

I am Karl R. Rábago, principal of Rábago Energy LLC, and based in Denver, Colorado. I appear on behalf of the Appalachian Voices.

In my direct testimony, I evaluate APCo's proposal in this proceeding. In my review, I find that APCo's proposed minimum bill fails when measured against all three of the specific requirements for the minimum bill and is essentially confiscatory. As a result, the proposal fails to meet the basic overarching requirement for reasonable and just rates in Code § 56-234 A.[1] In addition, APCo's petition is fatally flawed because it relies on its net metering petition in Case No. PUR 2024-00161. Though that proceeding is still pending, Commission Staff and every intervenor to file testimony in that proceeding have identified fundamental problems with APCo's proposal. APCo's excessive and confiscatory proposed minimum bill will do irreparable harm to the legislatively directed development of a shared solar market in its service territory, and should not be approved, even on an interim basis.

I recommend that the Commission reject APCo's proposed minimum bill in its entirety and instead approve a minimum bill in the amount of $8.96 per customer per month for residential shared solar subscribers. I provide additional complementary recommendations at the end of my testimony.

[1] Va. Code § 56-234 A.

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PETITION OF 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*	)	Case No. PUR-2025-00028

DIRECT TESTIMONY OF

KARL R. RÁBAGO

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May 12, 2025

I. INTRODUCTION AND WITNESS QUALIFICATIONS

Q. Please state your name, business name and address, and role in this matter.

A. My name is Karl R. Rábago. I am the principal of Rábago Energy LLC, a Colorado limited liability company, located at 1350 Gaylord Street, Denver, Colorado. I appear here in my capacity as an expert witness on behalf of Appalachian Voices.

Q. Please list your formal educational degrees.

A. I earned a Bachelor of Business Administration in Management from Texas A&M University in 1977, a Juris Doctorate with Honors from The University of Texas School of Law in 1984, a Master of Laws in Military Law from the U.S. Army Judge Advocate General's School in 1988, and a Master of Laws in Environmental Law from the Pace University Elisabeth Haub School of Law in 1990.

Q. Please summarize your experience and expertise in the field of utility regulation.

A. I have worked for some 35 years in the utility industry and related fields, following my honorable discharge from the U.S. Army, where I served as an Armored Cavalry officer and a Judge Advocate. I am actively involved in a wide range of utility regulatory and ratemaking issues across the United States. My previous employment experience includes serving as Commissioner with the Public Utility Commission of Texas, Deputy Assistant Secretary with the U.S. Department of Energy, Vice President with Austin Energy, Executive Director of the Pace Energy and Climate Center, Managing Director with the Rocky Mountain Institute, and Director with AES Corporation, among others. For the past twelve years, I have operated Rábago Energy LLC as a vehicle for my consulting and expert witness work. My resume is attached as **Exhibit KRR-1**.

Q. Have you ever testified before the State Corporation Commission of Virginia ("SCC" or "Commission") or other regulatory agencies in the past?

A. Yes. I appeared as an expert witness in SCC Cases PUE-2012-00064, PUE-2013-00088, PUE-2014-00026, PUE-2015-00035, PUE-2015-00036, PUE-2016-00049, PUE-2016-00050, PUR-2017-00045, PUR-2017-00051, PUR-2018-00065, PUR-2019-00050, PUR-2020-00035, PUR-2020-00169, PUR-2021-00058, PUR-2020-00125, PUR-2021-00146, and PUR-2024-00161. In the past twelve years, I have submitted testimony, comments, or presentations in utility proceedings in Alabama, Arkansas, Arizona, California, Colorado, Connecticut, District of Columbia, Florida, Georgia, Guam, Hawaii, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nevada, New Hampshire, New York, North Carolina, Ohio, Pennsylvania, Puerto Rico, Rhode Island, Texas, Vermont, Virginia, Washington, and Wisconsin. I have also testified before the U.S. Congress and have been a participant in comments and briefs filed at several federal agencies and courts.

Q. Do you have any special experience relating to rate making for distributed energy generation that is relevant to your testimony and this proceeding?

A. Yes. A detailed description of my work relating to solar energy generation is at **Exhibit KRR-2**.

II. OVERVIEW OF TESTIMONY AND RECOMMENDATIONS

Q. Please provide an overview of your testimony in this proceeding.

A. In this testimony, I review the petition by Appalachian Power Company ("APCo" or "Company") for approval of a proposed *interim* minimum bill for shared solar

programs. This filing was required by the Virginia State Corporation Commission ("Commission" or "SCC") in an order issued on February 10, 2025, pursuant to Va. Code § 56-594.4. Within thirty days of the final order in the net metering proceeding, which is still underway, the Commission is obligated to initiate a second proceeding to recalculate the minimum bill pursuant to Va. Code § 56-594.[2]

Despite the fact that this is an interim proceeding, APCo's obligation is to produce evidence that proves its proposed minimum bill is reasonable and just,[3] and meets the requirements for a minimum bill as set forth in Va. Code § 56-594.4 and 20 Va. Admin. Code § 5-340-80. There are three objectives that must be met to comply with these requirements. The minimum bill must (a) ensure that shared solar subscribing customers pay a fair share of the costs of providing electric services, (b) minimize the costs shifted to customers not in a shared solar program, and (c) be reduced by the calculated benefits of shared solar to the electric grid.

In my review, I find that APCo proposed minimum bill fails when measured against all three of the specific requirements for the minimum bill and is essentially confiscatory. As a result, the proposal fails to meet the basic overarching requirement for reasonable and just rates in Va. Code § 56-234 A. In addition, APCo's petition is fatally flawed because it relies on its net metering petition in Case No. PUR 2024-00161. Though that proceeding is still pending, Commission Staff and every intervenor to file testimony in that proceeding have identified fundamental problems with APCo's proposal. APCo's excessive and confiscatory proposed minimum bill will do

[2] 2024 Va. Acts Ch. 716, Enactment Cl. 3.
[3] Va. Code § 56-234 A.

irreparable harm to the legislatively directed development of a shared solar market in its service territory, and should not be approved, even on an interim basis.

Q. Based on your examination of APCo's proposal, how do you recommend that the Commission rule on APCo's petition?

A. I recommend that the Commission reject APCo's proposed minimum bill in its entirety and instead approve a minimum bill in the amount of $8.96 per customer per month for residential shared solar subscribers. This amount reflects the sum of the residential basic customer charge plus one dollar for administrative costs. I provide additional complementary recommendations at the end of this testimony.

Q. Do you offer an alternative proposed minimum bill that aligns with the law and the evidence submitted in this case?

A. Yes. As an alternative to APCo's fatally flawed proposal, I recommend a minimum bill that is constructed as follows:

1. The residential customer class customer charge and the one dollar ($1.00) administrative costs charge are both reasonable and should be part of the minimum bill.
2. The minimum bill charges relating to volumetric charges, such as non-bypassable generation charges, base distribution charges, distribution rate adjustment clause ("RAC") charges, base transmission charges, and transmission RAC charges proposed by APCo, are unjustifiable because APCo did not evaluate whether shared solar creates benefits that should be deducted from these costs. As a precautionary measure against unjust overcharging in the minimum bill, and recognizing that some of these charges might be reasonable

in ensuring shared solar customers pay a fair share of grid costs, I propose that the charges be reduced by 50% until or unless APCo provides an evidence-based foundation for the percentage of the charges it claims shared solar customers should pay.

3. The avoided energy and capacity benefits of shared solar are real and simply cannot be excluded from a directive to "calculate benefits of shared solar to the electric grid." The Code requires that these benefits be deducted from the minimum bill, so the proposed minimum bill should be reduced accordingly.

III. APPLICABLE LAW AND REGULATORY POLICY

Q. What is the statutory policy context for this proceeding?

A. The General Assembly of Virginia enacted, and the Governor approved, on April 8, 2024, Chapter 716 of the 2024 Acts of Assembly. That Act amended the Code of Virginia by adding § 56-594.4, related to shared solar programs for APCo, a Phase I Utility. Chapter 716 is detailed and specific, and, like Chapter 715, also enacted in the 2024 session, provides for shared solar programs for Virginia's two largest investor-owned electric utilities. As set forth in that chapter, an overarching objective of the shared solar programs in Virginia is to "[r]easonably allow for the creation of shared solar facilities."[4]

Q. Please summarize the basic math of the shared solar program.

A. The math of a successful shared solar program is simple. Shared solar developers depend on revenues from customer-subscribers to pay for the shared solar facility, paid as subscription fees that enable developers to recover costs plus a level of profit

[4] Va. Code §§ 56-594.3 F 1, 56-594.4 F 1.

sufficient to attract investors. Subscribers depend on bill credits, after payment of a minimum bill and subscription fees, sufficient to make subscription financially attractive, as measured as bill savings. For low-income customers, these savings must be at least 10%.[5] For utilities, such programs are essentially fiscally neutral; they receive allowed revenues through a combination of minimum bill payments and cost recovery mechanisms. If subscription fees and the minimum bill together are greater than the bill credits, the program will not succeed.

Q. How does the Code address the minimum bill element of the shared solar program?

A. The minimum bill is a crucial element of a shared solar program, and Chapter 716 addresses that element in several key ways. First, the minimum bill must be established by the Commission to address the costs of utility services and infrastructure used to provide electric service, as well as shared solar program administrative costs. Because shared solar subscribers do not host the solar facilities that are the basis of their subscription, they are fully charged the approved rates for all consumption at their meter. Shared solar facilities pay the costs associated with safely interconnecting their facilities to the utility grid. The remaining cost issue, the administrative costs of the program, is addressed in the proposed minimum bill. In establishing the minimum bill, the Commission has specific criteria it must address, and on which the proposing utility must submit supporting evidence. These criteria are: (1) subscribers must pay a fair share of the costs of their electric services, (2) the shifting of costs to non-subscriber customers must be minimized, and (3) the benefits of the shared solar program must be

[5] Va. Code § 56-594.4 F 15.

calculated and subtracted from the costs. The final criteria, requiring calculation and subtraction of benefits from costs, is new in Va. Code § 56-594.3, and is included in Va. Code § 56-594.4.

Q. How is the shared solar program related to the net metering program under Va. Code § 56-594?

A. The net metering program was amended in 2024 to include provisions requiring and prescribing the conduct of net metering proceedings.[6] The proceeding requires an analysis of (1) costs that net metering customers should pay for use of utility infrastructure—like a minimum bill, (2) appropriate compensation for benefits created by net metered generation—like a shared solar credit, (3) direct and indirect economic impacts—like the benefits assessed for deduction from the shared solar minimum bill, and (4) other information deemed relevant by the Commission.

Q. Are the minimum bill process and the net metering proceeding procedurally linked?

A. Yes. Enactment Clause 3 of Chapter 716 requires the Commission to recalculate the minimum bill within 30 days of the Commission's final order issued in the net metering proceeding. As a result, a failure by APCo to properly conduct the analysis required in the net metering proceeding, unless corrected in this proceeding, will lead to a fatally flawed minimum bill. In addition, the recalculation required in Chapter 716 means that the instant proceeding sets only an interim minimum bill for APCo's shared solar program.

Q. Does APCo attempt to link this case to any other proceeding?

[6] 2024 Va. Acts Ch. 783, codified at Va. Code § 56-594 E.

A. APCo incorrectly relies on the Commission-approved methodology for Virginia Electric and Power Company's shared solar program minimum bill set in PUR-2020-00125 but does not attempt to update the results of that decision in light of the amendment of Code § 56-594.3 or the enactment of Code § 56-594.4. This is a fundamental error because the law governing the earlier proceeding did not require the calculation and subtraction of benefits from the proposed minimum bill amount.

Q. Why is the minimum bill so important from a practical sense?

A. As previously summarized, a properly calculated minimum bill is essential to reasonably allow for the creation of shared solar facilities.[7] Further, a properly calculated minimum bill will serve the other statutory objectives, including allowing all customer classes to participate,[8] enabling public-private partnerships such as those involving affordable housing providers,[9] allowing the utility to recover reasonable administrative costs,[10] and ensuring net financial savings for low-income customers.[11]

Q. How does APCo's proposed minimum bill stack up against the statutory and regulatory policy requirements?

A. The evidence in this case and in APCo's net metering proceeding establishes that the proposed minimum bill is too high. If approved, it would unnecessarily and unreasonably destroy any opportunity for an economic and beneficial shared solar market to emerge.

[7] *See* Va. Code § 56-594.4 F 1.
[8] *Id.* § 56-594.4 F 2.
[9] *Id.* § 56-594.4 F 3.
[10] *Id.* § 56-594.4 F 8.
[11] *Id.* § 56-594.4 F 15.

Q. Does APCo have any obligation to set a minimum bill just to ensure shared solar works financially?

A. No. APCo's obligation is to propose a minimum bill that follows the statutory and regulatory requirements. APCo's methodology for calculating its proposed minimum bill does not meet those requirements, and for that reason it fails.

Q. Would a properly calculated minimum bill in APCo's service territory support the emergence of a shared solar opportunity for APCo's customers?

A. In my opinion, yes. If APCo were to calculate and subtract all benefits created by shared solar, I believe shared solar providers could offer shared solar subscriptions at a rate that penciled out for customer-subscribers. Thus, APCo's proposed minimum bill poses a stark tradeoff for the Commission: kill the shared solar program with an unreasonably inflated and confiscatory minimum bill, or approve a reasonable minimum bill and learn from an emerging market.

IV. ANALYSIS OF APCO'S PROPOSED MINIMUM BILL

Q. Please describe how APCo constructed its proposal in this proceeding and any issues you have with its approach.

A. My review of APCo's proposal addresses the following elements of that proposal:

- Addition of the applicable rate class customer charge in the minimum bill.
- Addition of a one dollar per customer per month charge for administrative costs.
- Addition of volumetric non-bypassable charges.
- Addition of volumetric distribution and transmission charges.
- Subtraction of benefits for avoided transmission costs and avoided ancillary services based on net metering proceeding proposal.
- Subtraction of benefits for REC value based on Optional Rider W.W.S. premium charge.

- Exclusion of energy and capacity benefits value.

Q. What are your general concerns about APCo's approach to proposing a minimum bill for shared solar customers?

A. I have four broad concerns. First, APCo relies on the methodology underlying the minimum bill approved by the Commission in PUR-2020-00125 in several places.[12] This is not a reasonable approach because the Code provision that governed the minimum bill calculation in that case has since been amended. Importantly, the new Code provision requiring calculation of the benefits of shared solar and the subtraction of those amounts from minimum bill charges applies to the entire minimum bill and does not permit exceptions. While the testimony filed by APCo lists the charges proposed for inclusion in the minimum bill, APCo did not examine the cost components of those charges in order to ensure compliance with the Code requirements beyond "reviewing its tariff book."[13]

Second, the linkage in the Code between the net metering proceeding and the minimum bill proceeding creates a "garbage in – garbage out" situation for APCo's proposal in this case. The serious undervaluing of customer-sited generation in APCo's net metering case contaminates this proceeding and virtually guarantees that APCo's minimum bill proposal will unjustifiably undervalue the benefits of shared solar.

Third, APCo approached the evaluation of benefits created by shared solar with the assumption that shared solar facilities are "similar" to facilities the Company

[12] Direct Testimony of William K. Castle, *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 (Apr. 1, 2025) ("Castle Direct") at 2-4.

[13] APCo Responses to APV Data Requests 1-3 & 1-4. Copies of this discovery response and all other public discovery responses cited in my testimony are included in **Exhibit KRR-3**.

contracts for or with to comply with the Virginia Clean Economy Act ("VCEA").[14] This assumption is untenable in light of benefits that accrue directly to subscriber-customers, especially low-income customers, because it ignores or undervalues economic benefits to the region and customers where APCo operates.

Finally, APCo argues for its confiscatory minimum bill proposal on the grounds that it must ensure that customer-subscribers contribute a fair share towards APCo's cost of retail service that they use every day.[15] APCo uses the customer-subscriber net bill amount as the standard for setting the minimum bill,[16] but the Company's approach is inconsistent with a faithful accounting of costs and benefits as required by the Code. This argument completely ignores the fact that shared solar subscribers pay the full cost-of-service based rates for every single kilowatt-hour they use. Separately, these customer-subscribers earn a bill credit for the value of their investment in clean energy generating facilities built and operated in APCo's service territory. APCo's proposal is confiscatory because it is using its minimum bill proposal to try to claw back the shared solar bill credit that subscribers rightfully earn.

Q. What is your opinion of APCo's proposal to include the basic customer charge amount in the minimum bill?[17]

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[14] Direct Testimony of Nicole M. Coon, *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 (Apr. 1, 2025) ("Coon Direct") at 5; Castle Direct at 4:4-7; APCo Response to APV Data Request 1-7.
[15] Coon Direct at 9; APCo Response to APV Data Request 1-5(b).
[16] *See* Coon Direct at 9.
[17] Coon Direct at 4.

A. I find the addition of the basic customer charge amount reasonable. The charge reflects basic customer costs that do not vary with usage and which are not impacted by the construction and operation of shared solar facilities.

Q. What is your opinion of APCo's proposal to include a fixed charge of one dollar per customer per month to recover incremental administrative costs incurred to manage the shared solar program?[18]

A. I find the addition of a fixed charge for administrative costs recovery of one dollar per customer per month to be reasonable. In this regard, I also agree that the Commission's decision in PUR-2020-00125 supports this approach, even though administrative costs are not yet fully understood.

Q. What is your opinion of APCo's addition of non-bypassable charges?[19]

A. I find the addition of non-bypassable charges to support the percentage of income payment program ("PIPP") and the broadband capacity rate ("BC") to be reasonable. These are costs not directly related to the impacts of a shared solar program.

However, the remaining renewable portfolio standard ("RPS"), production cost allocation charge ("PCAP"), and renewables capacity charges may all be impacted by benefits created by the construction and operation of shared solar facilities. For example, shared solar generation can reduce RPS compliance costs. Because APCo did not analyze these potential benefits, I propose that the proposed charges be reduced by 50% prior to being added to the interim minimum bill calculation.

[18] *Id.* at 4.
[19] *Id.* at 4-5.

Q. What is your opinion of APCo's addition of distribution and transmission charges in the proposed minimum bill?[20]

A. APCo did not analyze whether the costs included in the base distribution charges and the transmission RAC would be impacted by benefits created by the construction and operation of shared solar facilities. These benefits are necessary to consider because generation sited at the distribution level of the grid and operating for twenty-five or more years can offset or reduce overall system transmission costs. In addition, APCo can work with shared solar developers to identify high-value sites in the grid for siting generation. Because APCo did not analyze these potential benefits, I recommend that the proposed charges be reduced by 50% prior to being added to the interim minimum bill calculation.

However, the distribution costs included in the Energy Efficiency RAC are unlikely to be directly impacted by the shared solar program, and so I find it reasonable to add the EE RAC amount to the minimum bill.

Q. What is your opinion of APCo's subtraction of transmission and ancillary services benefits from the proposed minimum bill?[21]

A. APCo's proposal to subtract transmission and ancillary services benefits from the minimum bill is directionally correct. However, APCo merely cuts and pastes its calculations for those benefits from its flawed net metering proposal. The evidence in that case is that APCo undercounts benefits of non-utility distributed solar. I include

[20] *Id.* at 5.
[21] *Id.* at 5-8.

these credits in my alternative proposal only as a floor and recommend further analysis by APCo prior to its next minimum bill proceeding.

Q. What is your opinion of APCo's proposal to subtract a REC value from the minimum bill calculation?[22]

A. Again, APCo is directionally correct, but analytically limited. APCo's view is that there is parity between the premium charge in Optional Rider W.W.S.—a green pricing program charge—because a REC is said to embody all the non-energy attributes of renewable energy.[23] APCo asserts that the REC value embodies the distribution-level benefits of carbon-free energy, workforce development, energy security, energy resilience, reliability improvements, and other benefits created by shared solar facilities.[24] APCo bootstraps this assertion from language in its Optional Rider W.W.S. tariff, but offers no evidence that these attributes are internalized in the observable REC market prices it relies on.[25] APCo offers no market data to support these categorical assertions. I include this credit in my alternative proposal only as a floor and recommend further analysis by APCo.

Q. What is your opinion of APCo's proposal to ignore and not subtract the energy and capacity benefits created by the operation of shared solar facilities?[26]

A. APCo ignores the direction of the Code and chooses not to subtract the benefits it receives in avoided energy and capacity costs from shared solar operations. APCo attempts to justify this violation of the Code requirement by asserting that including its

[22] *Id.* at 5-6.
[23] Castle Direct at 6; APCo Response to APV Data Request 1-18.
[24] APCo Response to APV Data Request 1-6.
[25] APCo Responses to APV Data Request 1-8 & 1-19.
[26] Coon Direct at 8-9.

estimates of these benefits would result in minimum bill that is lower than its proposal—approximately the level of the fixed customer charge plus an administrative costs recovery charge.[27] But the Code does not say or infer that a reasonable minimum bill is determined by APCo's subjective preference for the customer-subscriber's net bill payment amount. APCo further argues that omitting energy and capacity benefits is appropriate "because these benefits are adequately conveyed to a shared solar subscriber via the bill credit."[28] This argument is at best sleight of hand. The Code requires subtraction of benefits to ensure a reasonable minimum bill for costs incurred to serve shared solar customers—*the bill credit level is not a part of the minimum bill calculation*.

I further note that the energy and capacity benefits that APCo recognized also come directly from its flawed net metering proposal and reflect the same underestimation problems that characterize much of the rest of its proposal in that proceeding. Nevertheless, I include those credits in my alternative proposal as a floor and recommend further analysis by APCo to identify a just and reasonable amount to fully reflect energy and capacity benefits in the minimum bill calculation.

V. ALTERNATIVE PROPOSAL FOR INTERIM MINIMUM BILL

Q. Please review and explain your proposal for the interim minimum bill.

A. I propose that the Commission establish a minimum bill for APCo's shared solar program that is set at the current fixed customer charge plus one dollar for

[27] *Id.* at 9.

[28] *Id.* at 8:16-18. APCo witness Castle likewise asserts that "[i]ncluding these avoided cost benefits as a reduction to the minimum bill would double-count those benefits and undermine the purpose of the minimum bill." Castle Direct at 4:22-23.

administrative costs. I arrive at that proposal in six calculation steps, as shown in Table KRR-1 below, plus one additional adjustment.

Table KRR-1: Steps to Calculate a Proposed Minimum Bil

Step	Description	Impact on Minimum Bill Amount ($/Customer/Month)	Cumulative
1	Add the current class fixed customer charge	+ $7.96	$7.96
2	Add a placeholder administrative costs recovery charge of one dollar per customer per month	+ $1.00	$8.96
3	Addition of volumetric non-bypassable charges PIPP and BC RAC	+ $1.91	$10.87
4	Reduce APCo's proposed additions for other non-bypassable and volumetric charges by 50% (except EE RAC). This is a placeholder for the subtraction of benefits against each of these charges that APCo did not analyze.	+ $40.38	$51.25
5	Subtract the value of benefits identified and deducted by APCo in its minimum bill proposal	- $40.59	$10.66
6	Subtract the value of saved energy and capacity that APCo failed to subtract.	- $38.70	**- $28.05**

These adjustments attempt to mitigate the deficiencies in APCo's proposal in light of the compressed time schedule for this proceeding and the pendency of APCo's net metering proceeding. In total, these adjustments yield a minimum bill that, for a customer using 1,000 kWh per month on average, would result in a monthly *credit* to shared solar customers of $28.05 per month.

Q. Is it reasonable that a minimum bill could actually be a credit?

A. Yes. The Code requires a summing of costs and benefits and does not include a floor level or amount. Experience with comprehensive value of solar analysis supports a

conclusion that if fully studied and properly analyzed by APCo, the benefits of shared solar could outweigh the costs.[29] However, the lack of data in APCo's filing in this case and the net metering proceeding do not allow for precision in determining the net value of the benefits of shared solar. The best option that aligns with meeting the statutory requirement for a reasonable opportunity to create shared solar facilities, and that faithfully reflects the summing of costs and benefits required in the Code, is to adopt my proposed calculation methodology in this interim proceeding. In addition, the Commission should require APCo to supplement its analysis with work it should have done to inform its minimum bill and net metering proposals prior to the next minimum bill proceeding. Proceeding with APCo's proposed minimum bill and methodology would reward the utility for non-compliance and frustrate the emergence of a viable shared solar market in its service territory.

Q. What do you propose?

A. Even though the net benefits of shared solar could exceed the costs, I propose that the Commission approve a minimum bill of $8.96 per customer per month, comprised of the basic customer charge and the one-dollar administrative costs recovery charge. This is a reasonable interim minimum bill because the customer charge reflects basic customer costs and neither it, nor the administrative charge, are impacted by the volume

[29] S. Forrester & E. O'Shaughnessy, *A Review of Value of Solar Studies In Theory and In Practice,* LBNL (Jan. 2025) ("LBNL VoS Review") at 20, Fig. 3, available at: https://eta-publications.lbl.gov/sites/default/files/2025-01/20250123_final_vos.pdf. The LBNL VoS Review summarizes findings from both meta-analyses and individual studies—more than 20 in studies in total—published between 2018 and 2023, and covering studies dating back to 2012.

of use. Any other charges that I have identified as reasonable are more than offset by benefits.

Q. Are there other reasons to move ahead with a positive minimum bill based on the customer charge and administrative costs recovery charge?

A. As a shared solar customer, and based on my work in the field, I know that shared solar subscribers seek not just monetary benefits for themselves, but a wide range of benefits for all customers and their communities. Making a reasonable minimum contribution to utility costs, even in the face of net benefits, helps realize that objective and provides additional support to shared solar program success.

Q. Why do you recommend that the Commission move ahead with a 50% reduction in the proposed minimum bill charge for some non-bypassable and volumetric riders?

My proposed 50% reduction in the minimum bill charge for some non-bypassable and volumetric riders is grounded on ensuring that APCo does not overcharge for those costs, but it is not, of course, grounded in a precise calculation or analysis. That precision was not possible because APCo did not perform the required benefits analysis, and because the compressed schedule in this proceeding did not allow time for intervenors to conduct their own analysis.

VI. RECOMMENDATIONS

Q. What should the Commission do with APCo's interim minimum bill proposal?

A. The Commission should deny the proposal from APCo for a shared solar minimum bill.

Q. What minimum bill should the Commission approve for APCo's shared solar programs?

A. I recommend that the Commission approve a minimum bill in the amount of $8.96 per customer per month for residential shared solar subscribers.

Q. Do you have any further recommendations?

A. Yes. The Commission should further direct APCo to conduct the analysis it should have completed before filing this petition, and to submit that analysis for review well before the formal filing of a proposed permanent minimum bill methodology. In that analysis, APCo should evaluate whether any of the non-bypassable and other volumetric charge amounts should be reduced to reflect benefits created by the shared solar program. The Commission should also require APCo to recalculate the minimum bill in light of the Commission's final order in the net metering proceeding.

Q. Does this conclude your direct testimony?

A. Yes.

ATTACHMENT KRR-1

Karl R. Rábago

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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 174 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.

- Chairman of the Board, Center for Resource Solutions (1997-present). Past chair of the Green-e Governance Board.
- Director, Colorado Electric Transmission Authority (2022-present).
- Director, Inside Climate News (2024-present)
- Advisor, Commission Shift (2021-present).
- Director, Solar United Neighbors (2018-2024).
- Director, Texas Solar Energy Society (2022-2024).

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. Provided transitional 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:

- Director, Alliance for Clean Energy – New York (2018-2019).
- Director, Interstate Renewable Energy Council (IREC) (2012-2018).
- 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 utilities, 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.
- Member, 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 Energy 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 provided 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 on 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 multiple biofuels related projects.

- Member, Committee to Study the Environmental Impacts of Wind Power, 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 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 9th 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, on federal regulation of cooling water intake structures for electric power plants.

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

Utilities are Shedding Crocodile Tears over Community Solar "Cost-Shift," Utility Dive Opinion (April 14, 2025).

The Future of Decentralized Electricity Distribution Networks: Ch. 14 – Performance-Based Regulation to Drive Transformation and Encourage DER Market Growth, contributing co-author with Jesse Hitchcock, Elsevier (2023).

Climate Change Law: An Introduction, contributing author (Introduction to Energy Law), Elgar (2021).

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 (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, with 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, 51st 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 with Jason Keyes, 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)

Karl R. Rábago

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)

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 Wiser 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, Klewer 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

Karl R. Rábago Solar Experience

General: Karl R. Rábago has 34+ years of experience working with the regulatory, technology, and business issues associated with solar energy, energy efficiency, wind energy, and utility regulation. That experience includes service as a public utility commissioner in Texas; a Deputy Assistant Secretary for the U.S. Department of Energy in charge of solar research and development programs; an advocate with Rocky Mountain Institute, Environmental Defense Fund, the Houston Advanced Research Center, the Pace Energy and Climate Center; a utility executive and regulatory affairs manager with Austin Energy and AES; and consulting and expert witness work in more than 175 cases and proceedings. He is an attorney and has earned degrees in business management, law, military law, and environmental law.

Key Solar Energy Experience: Mr. Rábago was a key member of the Local Solar for All Coalition (localsolarforall.org) team. LS4A has commissioned groundbreaking studies of the entire grid for the continental U.S., as well as for several individual states, using the powerful new WIS:dom®-P planning model developed by Vibrant Clean Energy (now owned by Pattern Energy). The model performs capacity expansion and production cost modeling at fine resolution—3 sq. km. / 5 minutes / 1 kiloWatt—and shows that aggressive deployment of distributed solar and distributed storage is the least cost path for decarbonization and can yield hundreds of billions of dollars in electricity cost savings over the coming decades.

Mr. Rábago works with the Coalition for Community Solar Access as an expert advisor in Community / Shared Solar Program design and implementation, notably in Virginia, New York, New Mexico, Georgia, and Ohio.

He serves on the board of the Center for Resource Solutions, which operates the Green-e™ certification program for voluntary green power products and programs, and has served on numerous other not-for-profit boards, including Solar United Neighbors, the Texas Solar Energy Society, the Interstate Renewable Energy Council, the Texas Renewable Energy Industry Association, and Texas Ratepayers Organization to Save Energy.

Mr. Rábago has testified and/or submitted formal comments on solar valuation in Arkansas, California, Connecticut, Georgia, Guam, Iowa, Kentucky, Louisiana, Maine, Massachusetts, Michigan, Minnesota, Missouri, New York, North Carolina, Rhode Island, Vermont, and Virginia.

As a consultant advisor to the National Audubon Society, Mr. Rábago has worked and continues to work on several past and on-going dockets, including before the Arkansas Public Service Commission, the New Orleans City Council, the Mississippi Public Service Commission, and the Federal Energy Regulatory Commission on matters relating to net energy metering, regulatory and legislative solar policy, transmission planning and siting, and markets for distributed energy resources.

As a contributing author, trainer, and expert advisor to E4TheFuture, Mr. Rábago helped co-author the National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources, contributing chapters on distribution generation and demand response. He has participated as an expert facilitator in supporting development of uniform benefit-cost analysis frameworks in several jurisdictions, and in conducting training programs on benefit-cost analysis.

As Executive Director of the Pace Energy and Climate Project, Mr. Rábago was an active participant in the New York "Reforming the Energy Vision" proceeding, including proceedings relating to the Value of Distributed Energy Resources.

Since 2012, Mr. Rábago has frequently provided advice to solar developers working throughout the United States.

At Austin Energy, Mr. Rábago led the utility's $5 million annual capital program for solar project development on public buildings, and managed commercial and residential rebate and net metering programs as well. While there, he developed a new performance-based incentive program for commercial customers and created the "Value of Solar Tariff" now used in Austin for residential customers and subsequently adopted in Minnesota law.

As a director for the federally chartered Jicarilla Apache Nation Utility Authority, Mr. Rábago oversaw the installation and operation of a solar PV demonstration project on tribal land and led the creation of a "First Steps" plan for sustainable energy for the Nation.

While leading the Energy Solutions Group at the Houston Advanced Research Center, Mr. Rábago also served as President of the Board of Directors for the Texas Renewable Energy Industries Association.

At Rocky Mountain Institute, as a managing director, Mr. Rábago co-authored "Small Is Profitable," an award-winning reference that characterizes the operational, engineering, financial, and economic benefits of right-sized energy resources, including solar PV.

While with CH2M HILL, an engineering firm, Mr. Rábago co-authored electricity industry restructuring studies for both Colorado and Alaska that addressed, among many other things, potential for solar energy development in those states.

While at the Environmental Defense Fund, Mr. Rábago worked with all the major utilities in Texas on deliberative polling exercises in the context of integrated resource planning to gauge and report strong public support in Texas for solar energy, and to reflect that support in the RPS enacted in utility restructuring.

As Deputy Assistant Secretary at the U.S. Department of Energy, he was responsible for the solar photovoltaic research, development, and demonstration, and supervised research programs conducted at the National Renewable Energy Laboratory, Sandia National Laboratory, universities, and other organizations. He testified before and worked with Congress to grow solar research programs funded through the Department of Energy.

As NARUC Energy Conservation Committee Vice Chair, he co-led, with stakeholders from around the country, in the creation and operation of the Photovoltaic Collaborative Market Project to Accelerate Commercial Technology ("PV-COMPACT"), a supporting organization to the Utility PhotoVoltaic Group ("UPVG"), funded by an innovative and successful new approach to public/private partnership in technology demonstration and deployment.

As a public utility commissioner in Texas in the early 1990s, he worked with utilities in Texas to craft line extension rules and supported utility solar and private pilot and demonstration projects in Texas.

While teaching environmental law at the U.S. Military Academy at West Point, Mr. Rábago earned a Master of Laws degree from the Pace Law School (now Elisabeth Haub School of Law) and conducted extensive research on environmental externalities. His research was included in the seminal treatise on externalities—"The Environmental Costs of Electricity"—published by the Pace Energy and Climate Center.

ATTACHMENT KRR-3

COMMONWEALTH OF VIRGINIA
STATE CORPORATION COMMISSION
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APPALACHIAN POWER COMPANY
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APV Set 1
To Appalachian Power Company

Interrogatory APV Set 1-3:

Please reference Table 1 to Company Witness Coon's testimony. Please provide a detailed list of all the cost components for each of the charges listed in Table 1, including the functionalized basis of the cost component, the allocation method, the specific costs, and the amount per customer or kWh for each cost component.

Response APV Set 1-3:

All of the line items, besides Shifted Transmission Credit, Ancillary Service Credit, and the Administrative Charge, are included in the Company's publicly available tariff book and have been reviewed and approved by the Commission in various proceedings. On page 7 of his direct testimony, witness Castle describes the Administrative Charge. On pages 7 and 8 of her direct testimony, witness Coon describes the calculation of the Shifted Transmission Credit and Ancillary Service Credit. The Company also provided witness Coon's workpapers (Workpaper NMC-2 and NMC-3) for the calculation of these credits at the time of filing this Petition.

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

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Interrogatory APV Set 1-4:

Did the Company perform any review of non-bypassable or other charges to determine whether the components of those charges were appropriate for inclusion in its proposed minimum bill? If not, please explain why. If so, please provide all documents, emails, and other materials related to such review.

Response APV Set 1-4:

The Company performed a review of the Case No. PUR-2020-00125 where Virginia Electric Power Company established a shared solar program. The Company reviewed its tariff book in light of PUR-2020-00125, the November 25, 2024 Order Adopting Regulations in Case No. PUR-2024-00122, and the February 10, 2025 Order Initiating Proceeding in this case. The Company also inquired with Staff to clarify questions. The email with Staff is included in APV 1-4 Attachment 1.

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

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Interrogatory APV Set 1-7:

Please reference page 5 of Company Witness Coon's testimony, where she states that shared solar facilities are "similar" to utility-scale solar generation facilities. Please explain in detail why Witness Coon believes these facilities are similar, including any differences that the Company identifies between those kinds of facilities and why those differences were not accounted for in the minimum bill proposal.

Response APV Set 1-7:

The comparison of shared solar facilities and utility scale, distribution-connected solar facilities is described in further detail on page 4 of witness Castle's direct testimony. They are connected to the distribution system and act as load reducers.

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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Interrogatory APV Set 1-20:

Please reference page 6 of Company Witness Castle's testimony, which discusses the values associated with RECs. Please confirm that the Company's position is that the RECs from shared solar facilities sited in the Company's service territory have no distinct value compared with any other REC available for use in compliance with the VCEA. Please explain why this is the Company's position. If it is not the Company's position, please explain why.

Response APV Set 1-20:

There is no distinction in the Code of Virginia between a REC produced by a shared solar facility and a REC produced by another renewable energy generator that meets the requirements specified in § 56-585.5 C.

The foregoing response is made by William K. Castle, Dir Regulatory Svcs, on behalf of Appalachian Power Company.

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Interrogatory APV Set 1-5:

Please provide responses to the following, relating to costs shifted or cost shifts: a): Please describe in detail how the Company defines the terms "cost shift" and "costs shifted." b): Please explain the circumstances under which a "cost shift" is believed to occur or be possible. c): Please explain the mechanisms by which a "cost shift" will impact customer rates. d): Please explain the circumstances and criteria under which the Company believes a "cost shift" or potential "cost shift" is either favorable or unfavorable.

Response APV Set 1-5:

a. The words speak for themselves. Costs shifts are synonymous with cross-subsidization.

b. Without the minimum bill, shared solar subscriber bills could be at or near zero which would result in them not paying their fair share of the costs necessary for the Company to provide electric service when solar is not generating.

c. Costs allocated to non-participating customers would be higher, thus leading to higher rates.

d. The Company is a proponent of minimizing cost shifts and subsidization between and within classes to the greatest extent possible.

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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Interrogatory APV Set 1-18:

Please reference page 6 of Company Witness Castle's testimony, which discusses the attributes of renewable (solar) generation. Please provide a complete list of the attributes of renewable (solar) generation, an itemized detailing of the value of those attributes, and any and all materials reviewed or relied upon by the Company in characterizing the list of attributes and their respective values.

Response APV Set 1-18:

Please see the U.S. EPA definition of a REC:

> A renewable energy certificate, or REC is a market-based instrument that represents the property rights to the environmental, social, and other non-power attributes of renewable electricity generation.[1]

[1] https://www.epa.gov/green-power-markets/renewable-energy-certificates-recs

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The foregoing response is made by William K. Castle, Dir Regulatory Svcs, on behalf of Appalachian Power Company.

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To Appalachian Power Company

Interrogatory APV Set 1-6:

Please explain how the Company accounted for the distribution-level benefits of carbon-free energy, workforce development, energy security, energy resilience, reliability improvements, and other benefits created by shared solar facilities.

Response APV Set 1-6:

The Company is proposing to compensate shared solar subscribers for the RECs produced by the shared solar facility. The REC embodies all of the non-power attributes associated with renewable (solar) energy.

The foregoing response is made by William K. Castle, Dir Regulatory Svcs, on behalf of Appalachian Power Company.

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To Appalachian Power Company

Interrogatory APV Set 1-8:

Please reference page 6 of Company Witness Coon's testimony, which proposes the use of this rider as the basis for the REC credit on the minimum bill. Please explain in detail the basis for this proposal. Please also explain in detail the derivation of the renewable energy premium charge in Optional Rider W.W.S. and how the charge is applied.

Response APV Set 1-8:

The Company is assuming that "this rider" references Optional Rider W.W.S. The Company chose this rider as a basis for the REC credit because the Renewable Energy Premium within Optional Rider W.W.S is adjusted every six months to reflect the observable market value of RECs. The derivation of the premium is explained in the Company's publicly available tariff book which states:

"The Premium shall reflect the Company's renewable generating portfolio and the value of the RECs generated by those resources, whether Tier I or Tier II. The value of the RECs generated by the Company's resources will be determined by averaging the cost of the applicable RECs from the prior six months and the cost for RECs to be delivered in the subsequent six months, as reported by S&P Global IQ (or successor) on or about January 1 or July 1 of each year."

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

COMMONWEALTH OF VIRGINIA
STATE CORPORATION COMMISSION
APPLICATION OF
APPALACHIAN POWER COMPANY
SCC CASE NO. PUR-2025-00028
Interrogatories and Requests for the Production of Documents by the APPALACHIAN VOICES
APV Set 1
To Appalachian Power Company

Interrogatory APV Set 1-19:

Please reference page 6 of Company Witness Castle's testimony, which discusses the benefits embodied by renewable energy certificates ("RECs"). Please confirm that the Company's position is that the RECs from shared solar facilities sited in the Company's service territory have no distinct value that has been estimated and that can be quantified in advance of the construction and operation of such facilities.

Response APV Set 1-19:

RECs have a market value that is readily quantifiable. The Company's Optional Rider W.W.S. is adjusted every six months to reflect the observable market value of RECs.

The foregoing response is made by William K. Castle, Dir Regulatory Svcs, on behalf of Appalachian Power Company.

CERTIFICATE OF SERVICE

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

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DATED: May 12, 2025