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BEFORE THE ARIZONA CORPORATION COMMISSION

DOUG LITTLE – Chairman
BOB STUMP
BOB BURNS
TOM FORESE
ANDY TOBIN

Docket No. E-00000J-14-0023

IN THE MATTER OF THE COMMISSION'S INVESTIGATION OF VALUE AND COST OF DISTRIBUTED GENERATION.

VOTE SOLAR'S REPLY BRIEF

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INTRODUCTION

This proceeding should determine the proper methodology for valuing rooftop solar exports. There is only one methodology that will accurately and comprehensively value rooftop solar: the long-term benefit and cost methodology. Accordingly, the Commission should direct the utilities to value solar using this methodology in all subsequent rate cases and other proceedings where a utility proposes to eliminate net metering or alter solar rate design more generally.

The utilities and other parties would prefer to skip the value of solar analysis entirely and proceed directly to eliminating net metering. They have proposed numerous alternative methodologies for doing so, such as compensating rooftop solar exports based on utility-scale solar prices. But these alternatives all put the cart before the horse. In order to make a rational and fully-informed decision on any changes to net metering, the Commission must first know the full value of solar. Notably, even in Nevada and Maine, the states first conducted a full long-term value of solar analysis before attempting to eliminate net metering. It would be premature for the Arizona Commission to determine the compensation issues raised in this proceeding prior to a full value of solar analysis for each utility.

ARGUMENT

I. THE COMMISSION SHOULD ADOPT THE LONG-TERM BENEFIT AND COST METHODOLOGY FOR VALUING ROOFTOP SOLAR.

Vote Solar recommends the Commission adopt the long-term benefit and cost methodology for valuing rooftop solar.[1] This methodology comprehensively determines the net benefits that result when rooftop solar customers export excess energy to the grid. The long-term benefit and cost method fully values rooftop solar exports by (1) analyzing each type of benefit and cost that occurs when solar customers export energy

[1] Vote Solar Initial Closing Br. 6:10–11:3 ("Vote Solar Br.").

to the grid, and (2) examining these benefits and costs over the twenty- to thirty-year economic life of a solar photovoltaic ("PV") system. The approach thus incorporates all categories of benefits and costs, including those that occur today and in the future.

The long-term benefit and cost method is the only approach for valuing solar that comprehensively calculates the full set of benefits and costs. The alternative methodologies proposed by the utilities are not comprehensive because they fail to examine entire categories of benefits, they only consider benefits and costs over the short term, or they shortcut the process by setting value based on a different resource's price. Thus, when other jurisdictions have valued solar, they have typically employed the long-term cost and benefit method.[2] The results of the analysis should provide illuminating and important data on the overall value rooftop solar exports provide to the utility and non-solar customers. Without this critical information, the Commission would be unable to make reasonable and fully-informed decisions on utility proposals to eliminate net metering or otherwise alter solar rate design.

A. The Utilities' General Arguments Against the Long-term Benefit and Cost Methodology Are Unpersuasive and Are a Transparent Attempt to Avoid Quantifying the Full Value of Solar.

The utilities and their allies have launched several broad attacks against the long-term benefit and cost methodology that are without merit. Notably, these parties have not disputed that the long-term benefit and cost approach would incorporate certain benefits that their alternative methodologies would not. They also have not disputed that other jurisdictions have typically used the long-term benefit and cost approach to value solar. Instead, they make several arguments that boil down to one essential claim: rates in Arizona are based on historic costs, not future value, so the

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[2] *Id.* at 7:1–9; *accord* Staff Initial Closing Br. 8:7 ("Staff Br.") (noting other jurisdictions' value of solar analyses and the fact that "[w]ell recognized categories of costs/benefits have evolved for these studies.").

Commission should not require Arizona utilities to calculate the long-term value provided by solar.[3] These arguments are flawed for several reasons.

Most fundamentally, the arguments conflate two distinct issues: (1) the value provided by rooftop solar exports, and (2) the compensation solar customers receive for exports.[4] The value of solar analysis should fully and fairly calculate the net benefits of solar exports. Once that analysis is complete, the results will provide important information that should then inform any utility proposals to modify the compensation rate for exports. The value of solar analysis, which is the first step in that process, should not be unduly narrowed in scope or otherwise altered because of the utilities' concerns about how the Commission may ultimately use the results.

These arguments are also a rather transparent attempt to create a straw man. The utilities and their allies repeatedly argue against a full long-term value of solar analysis because they claim the Commission would use the results to set the compensation rate for rooftop solar exports.[5] But Vote Solar has never argued that the value of solar results should automatically set the compensation rate for exports. Instead, throughout this proceeding, Vote Solar has made clear that if the analysis shows the net benefits provided by exports are greater than the current retail rate compensation, it would indicate that net metering should remain in place. And conversely, if the analysis shows the net benefits are less than current retail rates, it may be appropriate to reduce the compensation solar customers receive for exports.[6]

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[3] *See, e.g.*, Ariz. Pub. Serv. Co. ("APS") Post-Hr'g Br. 28:15–19, 39:9–43:7, 45:1–46:4 ("APS Br."); Tucson Elec. Power Co. & UNS Elec., Inc. (collectively, "TEP") Initial Post-Hr'g Br. 7:15-20 ("TEP Br."); Grand Canyon State Elec. Coop. Ass'n Initial Closing Br. 1:12–13, 2:5–3:2.

[4] Vote Solar Br. 8:15–9:2, 34:16–35:13.

[5] *See* APS Br. 27:18–21, 39:21–22; TEP Br. 3:20–22, 7:15–16; Arizona Investment Council ("AIC") Post-Hr'g Reply Br. 13:9–11, 13:26–27, 14:20–22 ("AIC Br.").

[6] Briana Kobor Direct Test. 12:11–16 (Feb. 25, 2016) ("Kobor Direct") (Ex. Vote Solar-7); Briana Kobor Rebuttal Test. 5:12–14 (Apr. 7, 2016) ("Kobor Rebuttal") (Ex. Vote Solar-8); Vote Solar Br. 8:21–9:1.

APS characterizes the long-term benefit and cost methodology as presenting an incredibly complex, "insurmountable task," that requires forecasting multiple variables.[7] But numerous other states and utilities have managed to successfully accomplish this "insurmountable task," and there are helpful guidebooks that summarize the best practices for valuing solar.[8] Vote Solar believes that with proper Commission guidance, APS and the other Arizona utilities will be able to successfully commission a robust and thorough value of solar analysis. In fact, APS has sponsored two long-term value of solar analyses in the past.[9]

The utilities also criticize the long-term benefit and cost method because forecasts of future values will not always be accurate.[10] But this criticism is not specific to value of solar analyses, and it would equally apply to any type of long term forecasting. Forecasting future conditions is of course an integral component of a utility's (and most other businesses') operations. The value of these forecasts is not negated simply because they are not always 100% accurate. Moreover, the utilities' insistence on absolute precision in forecasting the future is premised on their mistaken assumption that the Commission would use the value of solar results to directly set compensation rates.[11] In any event, the utilities' concerns are unfounded because the value of solar analyses should be periodically updated, so that the value ascribed to solar is adjusted as future events and circumstances change. The Commission should not refuse to fully value solar just because doing so involves forecasting future conditions. Again, many other states and utilities have successfully applied the long-

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7 APS Br. 41:6.

8 *See, e.g.*, Kobor Direct 16:1–7 (Ex. Vote Solar-7) (discussing value of solar analyses in Maine, Vermont, Mississippi, Nevada, and Minnesota); *id.* Ex. BK-2 (IREC Guidebook).

9 *Id.* at 14:3–15:13. Vote Solar does not support the results or the specific methodology employed in APS's prior value of solar analyses, as they ignored certain types of benefits and undervalued solar.

10 APS Br. 42:21–24; TEP Br. 7:21–8:10; AIC Br. 14:18–15:11.

11 *See* APS Br. 43:3–7.

term benefit and cost method.[12] In addition, the Residential Utility Consumer Office ("RUCO") agrees the analysis should include long-term benefits and costs.[13]

AIC criticizes Vote Solar and The Alliance for Solar Choice ("TASC") for focusing "sole[ly]" on the methodology for valuing solar, which "cannot be created in a vacuum."[14] But Staff and RUCO agree with Vote Solar and TASC that this proceeding should focus on a methodology for valuing solar—and not the myriad cost of service and rate design issues raised by the utilities and AIC.[15] Moreover, AIC is incorrect that it would be improper to focus this proceeding on the value of solar methodology. A value of solar analysis should accurately and objectively value solar exports. The Commission should not narrow the methodology's scope due to peripheral issues related to compensation and rate design. Subsequent rate cases are the proper proceedings to raise such issues, and the value of solar results should provide important information to help resolve those issues at that time.

The utilities' and AIC's attempts to focus the Commission's attention elsewhere and to conflate distinct issues ultimately reflect the fact that it is in the utilities' interests to avoid quantifying the full value provided by rooftop solar exports. The utilities have long claimed that solar customers shift costs to other customers and receive subsidies, while essentially ignoring a critical component of the equation: the value provided by solar customers when they generate power and export it to the

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12 *See, e.g.*, Kobor Direct 16:1–7 (Ex. Vote Solar-7).

13 RUCO Closing Br. 3:2–3 ("RUCO Br."). The utilities also mistakenly suggest the risk of incorrectly predicting future conditions falls exclusively on non-solar customers. APS Br. 42:1–3; TEP Br. 8:6–10, 11:7–14; AIC Br. 14:4–6. But it is just as likely that the analysis could undervalue solar, which could occur, for example, if natural gas prices increase unexpectedly in the future. Staff has recognized this point, stating that if underlying conditions change, it would result "in either overpayments or underpayments in the export rate." Staff Br. 1:18–20 (emphasis added).

14 AIC Br. 2:11, 2:17.

15 Staff Br. 1:11–13; RUCO Br. 1:15–2:2.

grid.[16] As experience elsewhere shows, if Arizona utilities actually calculated the full value provided by solar, it would likely significantly undercut their subsidy claims.[17]

APS argues the Commission should eliminate net metering because there is an "absence of data justifying net metering."[18] But it is APS itself who is actively opposing efforts to generate this data. Value of solar analyses elsewhere have "justified" net metering by showing that the value provided by solar exports often exceeds the retail rate compensation solar customers receive for those exports. Moreover, TASC submitted evidence in this proceeding showing that is exactly the case in APS's territory.[19] APS is thus attempting to avoid calculating the data that may "justify" net metering, while simultaneously pointing to this lack of data as a reason to eliminate net metering.

Recent experiences in other states that have eliminated net metering (or sought to do so) highlights the utilities' obstinate efforts here to avoid calculating the full long-term value provided by solar. As previously discussed, the Maine legislature recently passed legislation—which the Governor vetoed—that would have eliminated net metering.[20] But before doing so, the Maine legislature sponsored a value of solar analysis that found the value of solar to be 33.7¢/kWh.[21] Notably, Nevada proceeded down a similar path. The utilities in Arizona have approvingly cited to Nevada's recent decision to eliminate net metering.[22] But Nevada had previously conducted a full value of solar analysis, which found the value of solar to be 18.5¢/kWh.[23]

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16 Vote Solar Br. 3:1–20.

17 Kobor Direct 16:1–7 (Ex. Vote Solar-7).

18 APS Br. 24:3.

19 Thomas Beach Direct Test. Ex. 2 (Feb. 25, 2016) (Ex. TASC-26) ("Beach Direct").

20 Vote Solar Br. 34:3–15.

21 *Id.*

22 APS Br. 28:22–29:17; *see also* UNSE Rate Case, Docket No. E-04204A-15-0142, Carmine Tilghman Rebuttal Test. 18:11–20:17 (Jan. 19, 2016).

23 Kobor Direct 16:1 (Ex. Vote Solar-7); *see also* Staff Br. 8:7–14 (discussing the "extensive" Nevada value of solar analysis). Unfortunately, Nevada largely ignored this full

In sharp contrast, the utilities here propose to skip the value of solar analysis entirely. Instead, they urge the Commission to eliminate net metering (or take a major step toward doing so) by proclaiming that compensation for exports should be based on utility-scale solar prices or short-term avoided costs. The Commission should reject this approach, as it would preclude the Commission and other stakeholders from possessing critical and necessary information on the value of solar. The utilities' approach would also assuredly prolong the current rooftop solar controversies in Arizona, as it would prevent the Commission from considering all of rooftop solar's benefits before making potentially significant changes to solar policy or rate design. The better approach for this proceeding is for the Commission to make clear that the utilities must fully value solar using the long-term benefit and cost methodology, and to issue guidance on the methodology and the calculations. The utilities would then conduct the value of solar analyses in subsequent rate cases or other proceedings where they propose the substantial rate design changes they seek to implement here.

B. Specific Issues Regarding the Long-term Benefit and Cost Methodology.

Vote Solar's closing brief summarized the key principles and methodological issues for the long-term benefit and cost methodology.[24] The other parties' closing briefs offered only limited criticisms of these specific methodological issues, which are addressed below.

1. The analysis should determine the value of solar exports.

The analysis should calculate the net benefits that occur when solar customers export excess energy to the grid.[25] There is generally broad agreement on this

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long-term value of solar analysis when it subsequently eliminated net metering and took an unreasonably narrow view of the value provided by rooftop solar.

24 Vote Solar Br. 11:4–24:13.

25 *Id.* at 11:9–22.

principle.[26] It appears only RUCO objects, arguing the analysis should analyze the value of both rooftop solar exports and solar energy consumed on-site.[27] RUCO contends that analyzing only exports will undervalue solar, as solar energy consumed on-site provides energy and capacity benefits, and there is "no sound economic or technical justification to value them separately."[28]

Vote Solar agrees with RUCO that solar energy consumed on-site provides significant benefits. However, focusing the analysis on exports is the better approach. Households and businesses have the right to purchase as much, or as little, energy from the utility as they wish, and they have the right to install whatever technologies they prefer to reduce their consumption. As Staff has explained, "The customer has the right to reduce load by con[]servation, insulation, high efficiency appliances, storage or the installation of a DG meter."[29] Thus, the utility should not "look behind the meter" based on its customers' technology choices. A utility should not treat a customer who consumes less by installing rooftop solar any differently than a customer who reduces consumption by installing insulation, high efficiency appliances, or other efficiency measures. The only difference occurs when a solar customer exports energy to the grid. Consequently, the analysis should focus only on the value of exports, and the results should inform the compensation solar customers receive for exports.[30]

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[26] *See, e.g.*, Staff Br. 13:18–19; APS Br. 2:13–20; TEP Br. 1:10–12.

[27] RUCO Br. 4:4–5:22.

[28] *Id.* at 4:14–5:6, 5:12–14.

[29] Staff Br. 13:19–21.

[30] If the Commission agrees with RUCO and wishes to also value solar energy consumed on-site, the analysis should employ the societal cost test. Vote Solar Br. 13–14 n.41. This test analyzes the benefits and costs that accrue to solar customers and non-solar customers, and it is the same test used to evaluate demand-side management programs that reduce consumption. Valuing both self-consumed and exported energy from the non-solar customers' perspective would not reliably value rooftop solar, because non-solar customers do not compensate solar customers for self-consumed energy. Thus, the value of a solar customer's self-consumed energy should be immaterial to non-solar customers. The societal perspective would calculate the value of exports and self-consumed energy to society as a whole.

2. The analysis should include environmental, economic development, and grid security benefits.

The value of solar analysis should calculate the full long-term environmental, economic development, and grid security benefits provided by rooftop solar exports.[31] Staff opposes including some of these benefits in the analysis.[32]

For environmental benefits, Staff appears to oppose including societal environmental benefits, but supports accounting for avoided environmental compliance costs and other environmental costs that are "identified in the IRP process" and "based on emerging regulation or result[] in reductions in emission levels over and above required levels."[33] However, all environmental benefits resulting from rooftop solar exports should be included in the analysis. When solar exports displace energy generated from fossil fuels, it results in less carbon pollution, less air pollution, and less water consumption.[34] Some of these environmental benefits directly reduce the utility's compliance and operation costs, and Staff would apparently agree with including these benefits in the analysis. But solar energy provides additional environmental benefits that do not directly reduce the utility's compliance and operation costs. For example, solar energy provides significant public health benefits and ecosystem benefits that are not reflected in a utility's avoided costs. These societal environmental benefits are significant and real, and the analysis should not ignore them just because they are not reflected in the utility's avoided costs. Vote Solar and TASC discuss how these environmental benefits should be calculated.[35]

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31 *Id.* at 22:8–24:13.

32 Staff Br. 18:4–19:13.

33 *Id.* at 18:7–11.

34 Kobor Direct 32:23–35:4 (Ex. Vote Solar-7); *see also id.* at Ex. BK-2, pp. 32–35.

35 *Id.* at 32:23–35:4; Curt Volkmann Direct Test. 22:1–26:7 (Feb. 25, 2016) (Ex. Vote Solar-3) ("Volkmann Direct"); Beach Direct Ex. 2, at 17–21 (Ex. TASC-26).

For economic benefits, Staff opposes including any such benefits in the analysis.[36] According to Staff, economic benefits are "very difficult to quantify and are not included in the ratemaking formula for existing generation and other facilities and are not unique or incremental to DG."[37] However, Vote Solar and TASC have explained and demonstrated how the analysis should quantify economic benefits, and there is no insurmountable difficulty with doing so.[38] In addition, contrary to Staff's claim, there are several compelling reasons to value and compensate rooftop solar exports differently than energy from traditional, centralized generation facilities.[39] As previously discussed, households and small businesses install rooftop solar primarily for on-site use, while large and sophisticated utilities and energy companies build and operate traditional, centralized generation facilities. Households and small businesses that install solar panels on their roofs also face numerous regulatory constraints that traditional, centralized facilities do not face.[40] Moreover, the "market" for solar exports is very different than the market for energy from these larger facilities. Rooftop solar provides real localized economic benefits, and the analysis should not ignore them.

For grid security benefits, Staff claims the record does not contain sufficient evidence to include grid reliability in the analysis.[41] But Vote Solar witness Curt Volkmann provided expert testimony on this very issue.[42] As a result, there is sufficient record evidence to include grid reliability benefits in the analysis.[43]

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36 Staff Br. 18:12–17.

37 *Id.* at 18:14–16.

38 Kobor Direct 35:5–20 (Ex. Vote Solar-7); Beach Direct Ex. 2, at 20–21 (Ex. TASC-26).

39 Vote Solar Br. 4:16–6:6, 9:15–11:3, 30:5–31:10.

40 *See id.* at 30:13–23 (discussing A.A.C. R14-2-2302(13)(a)–(c)).

41 Staff Br. 19:4–5.

42 Volkmann Direct 26:8–28:2 (Ex. Vote Solar-3); Tr. 1634:19–1635:18, 1655:23–1657:17, 1693:18–1694:15 (Volkmann Test.).

43 AIC also claims there is a "fundamental mismatch" with analyzing the long-term value of rooftop solar panels in place today, based on the benefits provided by the current and near-term levels of solar penetration. AIC Br. 14:13–15. However, Vote Solar has already explained why this approach is consistent and reasonable. Vote Solar Br. 14:1–15:5. The analysis should

II. THE ALTERNATIVE METHODOLOGIES ARE FLAWED AND WOULD NOT ACCURATELY VALUE ROOFTOP SOLAR EXPORTS.

The utilities, Staff, and RUCO have proposed several alternative methodologies for valuing solar. But critically, these proposals are not actually methods for valuing solar. Instead, they are methods for compensating solar exports at rates less than current retail rate net metering. These alternative methodologies are premature. Before ruling on proposals to eliminate net metering or alter solar rate design, the Commission should require the utilities to value solar exports using an accurate and objective methodology. The alternative methodologies would not do this. As a result, if the Commission selects these alternative methodologies as the approach for "valuing" solar, it would drastically alter solar compensation and the economics of rooftop solar without even bothering to calculate the value of solar. This would be out of step with other states.[44] It would also deprive the Commission and Arizonans of critically important information on the true value provided by rooftop solar.

A. APS's Short-term Avoided Cost Methodology Does Not Accurately Value Solar.

APS's proposed short-term avoided cost methodology does not accurately value solar because it would only incorporate a small subset of short-term benefits provided by solar.[45] APS claims the benefit of this approach is that it requires a simple calculation of historic avoided energy costs and energy losses, and it does not require any "judgment" relating to forecasting future benefits and costs.[46] But the objective should be to fully and accurately value solar, and it is unreasonable to take the

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calculate the value that rooftop solar systems in place today (and those that will soon be installed) provide over their economic lives. That requires basing the analysis on current and near-term solar penetration levels. When the analysis is updated to calculate the value that future rooftop solar systems provide over their economic lives, that analysis should be based on the solar penetration levels achieved at that time.

44 *See supra* p. 6:12–20.

45 Vote Solar Br. 25:11–26:12.

46 APS Br. 26:3–27:8.

majority of solar benefits off the table just because it may require some effort and "judgment" to quantify those benefits.[47]

B. TEP's "Utah Model" Does Not Accurately Value Solar and Is a Cost of Service Analysis, Rather than a Value of Solar Methodology.

TEP has proposed a "Utah Model" that would supposedly value solar by comparing two cost of service studies. The Commission should reject this alternative methodology because it is actually a cost of service analysis, rather than a value of solar methodology.[48] The utilities appear to concede this point, as TEP calls this approach the "Comparative Cost of Service Approach," and APS labels it a "COSS methodology."[49] Moreover, TEP itself confirms that "cost of service . . . is not the subject of this docket."[50] It would be inappropriate to use a cost of service analysis as the basis for valuing solar.

The "Utah Model" is also flawed because it ignores future benefits and entire categories of solar benefits, and it is based on complex cost of service hypotheticals.[51] In addition, there is no evidence that Utah has actually employed this methodology at this time. Ultimately, TEP only halfheartedly endorses this methodology, noting the approach is "complex" and its utility-scale solar proposal is "the most feasible approach and will be the least controversial to apply."[52] For these reasons, the Commission should not adopt the "Utah Model" for valuing solar.

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47 APS also suggests its short-term avoided cost approach would ultimately capture all of solar's benefits, albeit it would capture future benefits in the future, rather than on a levelized basis today. APS Br. 30:16–31:6. This is incorrect. This method would only incorporate two benefits provided by solar: avoided energy costs and energy losses. This method would thus never capture the many other benefits provided by solar, such as capacity savings, environmental benefits, economic development benefits, and grid security benefits.

48 Vote Solar Br. 26:13–28:6.

49 TEP Br. 5:8; APS Br. 38:21–22.

50 TEP Br. 5:7.

51 Vote Solar Br. 27:5–23.

52 TEP Br. 5:9, 15:11–13.

C. A Utility-scale Benchmarking Methodology Does Not Accurately Value Solar and Would Improperly Conflate Rooftop Solar with Utility-scale Solar.

The utilities have proposed various utility-scale benchmarking methodologies that would "value" rooftop solar at the wholesale price of utility-scale solar. These alternative methodologies do not accurately value the net benefits provided by rooftop solar—in fact, they do not even attempt to actually value the relevant categories of benefits and costs in any way. Instead, the "value" ascribed to rooftop solar would be based on nothing more than recent utility-scale solar prices. These proposals are thus actually methods to reduce the compensation for solar exports, rather than methods to accurately calculate the value of rooftop solar. These approaches are also improper because they conflate two distinct resources that are installed and operated by different types of entities who operate in different markets.[53]

The fundamental flaw in these approaches is that they treat distributed rooftop solar and utility-scale solar as interchangeable or fungible resources. This is highlighted by what APS poses as a rhetorical question: "If customers can obtain a higher value of solar at a quarter of the price with grid-scale solar, why pay more for the same sun?"[54] But this question does not lead to the self-evident answer APS intends. While distributed solar and utility-scale solar both produce clean, renewable energy, there are significant differences between the two resources. For example, distributed rooftop solar provides: (1) higher generation capacity value due to the geographic diversity of thousands of distributed solar systems spread across a service territory, (2) potentially greater avoided distribution costs and grid services, (3) greater local employment benefits, (4) customer capital investments that benefit the utility and non-solar customers, (5) scalability with developing storage technologies, (6)

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53 Vote Solar Br. 28:7–32:5.

54 APS Br. 25:15–16; *see also* TEP Br. 3:1–4 (making a similar claim).

beneficial competition with utility-provided energy, (7) increased customer knowledge and acceptance of distributed energy resources, and (8) increased energy independence for households and small businesses.[55] These are some of the reasons why it may indeed be appropriate to "pay more for the same sun" when Arizona families and small businesses install solar panels on the roofs of their homes and businesses.

The fact that distributed solar and utility-scale solar are not interchangeable or fungible with one another has been broadly recognized. In 2007, the Commission explicitly recognized this when it created the distributed generation "carve-out" in the renewable energy standard.[56] The record in that rulemaking provided ample evidence that distributed resources provide unique benefits that utility-scale resources do not. For example, the Staff Report discussing the distributed generation "carve-out" stated:

> By encouraging the installation of distributed resources at customer premises, the production of electricity will be moved closer to the point of use.
>
> By moving the production of electricity closer to the customer location, we can reduce the need to build new transmission to support the new generation. By reducing the hundreds of miles of transmission lines that have historically been needed to deliver electricity, there will be a resulting reduction in risk of losing that transmission to natural disaster or other unanticipated events. By having the generation closer to the customer, there will be reduced line losses. Therefore, more of the electricity generated will get to the end customer.[57]

In addition, in response to comments on the distributed generation "carve-out," the Commission stated:

> We agree with Staff that customers who pay capital costs to install distributed generation, benefit not only themselves, but the system by not

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55 *See, e.g.*, Kobor Rebuttal 34 n.78 (Ex. Vote Solar-8); Volkmann Direct 28:7–29:4, 30:15–32:6 (Ex. Vote Solar-3); Beach Direct 29:1–32:45 (Ex. TASC-26); Beach Rebuttal 9:9–18, 24:7–17 (Ex. TASC-27); TASC Post-Hr'g Br. 13:3–14:2, 19:9–20:21 ("TASC Br.").

56 A.A.C. R14-2-1805.

57 Docket No. RE-00000C-05-0030, *Staff Report, Proposed Amendments to the Environmental Portfolio Standard Rules* 12 (Feb. 2006), *available at* http://images.edocket.azcc.gov/docketpdf/0000040240.pdf.

> contributing to overloading of transmission line, overheating of distribution lines, wear and stress on substations and transformers, and the need for utilities to procure or generate the most expensive peaking power during peak load times, and utility customers who do not install distributed generation will therefore receive a benefit from distributed generation.[58]

Many other states, including Colorado, Illinois, Minnesota, and New Mexico, have created similar distributed generation "carve-outs" to their renewable energy standards.[59] These "carve-outs" recognize that distributed solar provides unique benefits compared to larger, centralized renewable resources.

Notably, the Administrative Law Judge ("ALJ") in the UNS Electric ("UNSE") rate case also recently cast doubts on the premise that rooftop solar exports should be compensated based on utility-scale solar prices. In that case, UNSE proposed to compensate new solar customers' exports at the price of the utility's most recent utility-scale solar power purchase agreement ("PPA"). The ALJ recommended that the Commission delay resolution of that proposal (and other solar rate design issues) until the Commission makes a decision in this proceeding.[60] But her Recommended Opinion and Order nonetheless states: "[W]e have concerns about whether the proposed [Renewable Credit Rate], which depends on a single-utility scale PPA rate, is a reasonable proxy for the market price of excess solar DG."[61] The ALJ's concerns with this utility-scale solar proposal provide further proof that the answer to APS's rhetorical question may not be as obvious as APS would hope. For these reasons, it is

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58 13 Ariz. Admin. Reg. 2389, 2395 (July 6, 2007).

59 *See* Colo. Rev. Stat. § 40-2-124(1)(c)(I)(E), (1)(c)(II)(A) (3% DG carve out by 2020, with half of that requirement from retail DG); 20 Ill. Comp. Stat. 3855/1-56(b) (1% DG carve out, with half of that requirement from systems smaller than 25 kW); Minn. Stat. § 216B.1691 subdiv. 2f(a) (1.5% solar carve out, with 10% of that requirement from DG systems smaller than 20 kW); N.M. Code R. § 17.9.572.7(G) (3% DG carve out).

60 UNSE Rate Case, Docket No. E-04204A-15-0142, Recommended Opinion and Order 115:20–117:16 (July 20, 2016).

61 *Id.* at 117:6–7.

unreasonable to compensate rooftop solar customers based on a different resource's wholesale price.

D. Staff's Proposed Methodologies Do Not Accurately Value Solar.

Staff proposes the Commission adopt two methodologies the utilities would apply in subsequent rate cases: (1) a traditional avoided cost calculation, and (2) a weighted average utility-scale solar methodology.[62]

For the traditional avoided cost calculation, Staff states that while its witness, Howard Solganick, prefers to only analyze short-term avoided costs, Staff itself "is not opposed to a long-term analysis."[63] Only analyzing short-term avoided costs does not accurately value solar because it ignores the significant benefits that occur in the future. As a result, analyzing long-term avoided costs is the preferred approach. However, Staff's long-term avoided cost approach would still fail to accurately value solar because it would not account for some categories of benefits. For example, Staff generally opposes including environmental, economic development, and grid security benefits in the value of solar analysis.[64] But as discussed above, Staff's concerns are unfounded and the analysis should include these benefits to accurately value solar.[65]

Staff's weighted average utility-scale solar approach is also flawed because it would compensate rooftop solar exports based on utility-scale solar prices.[66] Despite this fatal flaw, Staff's weighted average approach is a marked improvement over the utilities' proposed utility-scale methodologies. The utilities' approaches would use a single recent utility-scale solar PPA to set the compensation rate for rooftop solar exports. This could result in a highly variable export rate and the potential for a

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62 Staff Br. 14:11–17.

63 *Id.* at 4:16–20; *see also id.* at 16:1–2 ("[T]hese benefits and costs can be done on either a short-term basis or a long-term basis depending upon the type of analysis the Commission wants undertaken.").

64 *Id.* at 18:4–19:5.

65 *See supra* pp. 9:1–10:19.

utility to strategically select low-priced PPAs to minimize rooftop solar compensation. Staff's approach would reduce this variability and the "gaming" opportunity.

But Staff's analysis highlights how arbitrary the utility-scale benchmarking approach is for "valuing" rooftop solar. For example, TEP and UNSE have proposed to use the utility-scale approach to compensate new solar customers' exports at 5.84¢/kWh.[67] But Staff's analysis shows that if TEP and UNSE used a weighted average approach instead, the value ascribed to exports would range from 10.6¢/kWh to 13.3¢/kWh.[68] This wide disparity in the "value" attributed to rooftop solar highlights the utility-scale solar methodology's arbitrary nature. The actual value provided by rooftop solar is a relatively stable and objective value, and it does not fluctuate wildly based on the price of a utility's most recent utility-scale solar PPA, or some subset of historical PPAs.

E. RUCO's Step-Down Methodology Does Not Accurately Value Solar.

RUCO proposes a step-down methodology for valuing solar that would incrementally decrease the compensation solar customers receive for exports on a pre-determined schedule. This is not an acceptable approach for valuing rooftop solar. RUCO's approach is clearly a method for reducing the compensation for exports, rather than an attempt to accurately value solar exports.[69]

Tellingly, RUCO appears largely uninterested in the initial "value" ascribed to rooftop solar—instead, its primary concern is how that value would incrementally decrease over time to reflect its policy preferences. For example, when RUCO witness Lon Huber first proposed the step-down methodology in supplemental testimony on

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66 *See supra* pp. 13:1–16:2; Vote Solar Br. 32:6–33:6.

67 UNSE Recommended Opinion and Order 98:1–3; TEP Rate Case, Docket No. E-01933A-15-0322, Carmine Tilghman Direct Test. 9:15–25 (Nov. 5, 2015).

68 Staff Br. 21:19–25.

69 Vote Solar Br. 33:7–35:13.

June 9, 2016, he discussed how the starting point could be utility-scale solar prices.[70] Later, RUCO filed comments stating that an avoided cost calculation could also be the starting point.[71] In its closing brief, RUCO proposed an RPS Bill Credit option, which would use current retail rates as the starting point for the step-down methodology.[72] The full long-term value of solar should not be arbitrarily set in this manner. Moreover, the value ascribed to rooftop solar should not decrease over time based on a party's policy preferences, rather than a reduction in actual value.

While Vote Solar appreciates RUCO's attempts to balance the competing interests and policy perspectives regarding rooftop solar compensation, its proposal suffers from the same fatal flaw as the other alternative methodologies: it would prematurely jump to compensation issues without any attempt to actually value the net benefits of solar. Again, to reach a rational and fully-informed decision on any compensation proposal that would do away with net metering, it is imperative that the utilities first calculate the full long-term value of solar.

Even if the Commission were to address compensation issues in this proceeding, RUCO's RPS Bill Credit option is seriously flawed because it is a buy-all, sell-all arrangement. Under a buy-all, sell-all approach, the utility would purchase the entire output of a solar customer's PV system, and the customer would purchase all of the electricity they consume from the utility. This approach would be a dramatic departure from current rate design, where solar customers self-consume their PV system's energy and export any excess energy to the grid. A buy-all, sell-all approach is a flawed mechanism for compensating solar customers because it violates customers' right to self-consume the energy they generate on their own property through their

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70 *See* Briana Kobor Suppl. Resp. Test. 1:23–2:5 (June 13, 2016).
71 RUCO Comments (June 22, 2016).
72 RUCO Br. 8:12.

own investments. Staff has repeatedly recognized this important right, and the Commission should not infringe on this right by endorsing a buy-all, sell-all proposal.[73]

III. THE UTILITIES' COST OF SERVICE STUDIES ARE IRRELEVANT TO THE VALUE OF SOLAR ANALYSIS AND ARE CRITICALLY FLAWED.

APS spends a significant portion of its post-hearing brief defending its cost of service study.[74] According to APS, this value of solar proceeding is about "determining a COSS methodology."[75] But try as it might to deflect attention from the core issue of valuing rooftop solar, APS's cost of service study is irrelevant to the main issues in this proceeding.[76] This is because the relevant costs in the value of solar analysis are (1) the compensation the utility pays to solar customers for exports, and (2) integration costs. In contrast, a cost of service study calculates the costs a utility incurs to provide customers with electricity. The types of costs included in a cost of service study thus play no role in a value of solar analysis. APS has recognized that a value of solar analysis and a cost of service study are "fundamentally different" types of analyses.[77] Moreover, even TEP acknowledges that "cost of service . . . is not the subject of this docket."[78]

In addition to being irrelevant to this proceeding, the cost of service studies are also methodologically flawed.[79] One of the flaws in APS's study is that it does not

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[73] *See supra* p. 8:10–12; Vote Solar Br. 11:15–18. If the Commission does at some point decide to eliminate net metering—which it should not do at this time and without an accurate long-term value of solar analysis—RUCO's step-down methodology does have merits. For example, RUCO's proposal would provide pricing certainty to solar customers by providing a twenty-year fixed bill credit. This provides important certainty for solar customers compared to other compensation proposals, where a solar customer's compensation could unpredictably change every year. In addition, if the Commission were to eliminate net metering after conducting a full long-term value of solar analysis, incrementally decreasing compensation over time would be preferable and would promote gradualism.

[74] APS Br. 2:21–14:19.

[75] *Id.* at 5:4–5.

[76] Vote Solar Br. 36:1–16.

[77] Leland Snook Direct Test. 29:14 (Feb. 25, 2016) ("Snook Direct") (Ex. APS-1).

[78] TEP Br. 5:7 (emphasis added).

[79] Vote Solar Br. 36:17–40:14.

allocate costs to solar customers based on the electricity APS actually provides to them. Instead, APS allocates costs to solar customers based on their total load, which includes electricity generated by the rooftop solar system and consumed on-site.[80] APS claims allocating costs to solar customers in this manner is necessary to account for the utility's costs of providing start-up power, voltage quality, and generation backup in case the rooftop solar system fails.[81] But these services are not unique to solar customers and allocating costs to solar customers based on delivered load would fully account for these services. For example, generation backup is another term for delivered energy and capacity. The cost of service study for all customers, which is based on delivered load, fully accounts for this. Start-up power refers to short periods of high demand when appliances such as air conditioners start up, and it is a service utilities provide equally to all customers. Voltage quality is also a standard service provided by the utility to all customers. And with the addition and activation of smart inverters, this may soon be a service that solar customers provide to the utility.

Moreover, APS has not provided any evidence of incremental costs associated with these services due to rooftop solar. And even if these costs did exist, allocating costs based on total load is not the appropriate way to measure the costs. Rather, APS should identify incremental expenses, if any, and attribute those incremental costs to solar customers. It is improper for APS to allocate costs to solar customers in a way that overstates the services APS provides them. APS should allocate costs to solar customers the same as how it allocates costs to other customers, which is based on delivered load.[82]

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80 *Id.* at 37:7–38:5.

81 APS Br. 9:8–13.

82 APS incorrectly claims Vote Solar witness Briana Kobor "repudiated" her pre-filed testimony on this issue during the hearing. *Id.* at 8:21–22. Ms. Kobor testified that a utility's solar customers rely on the grid when they are not using energy supplied by the utility. Tr. 1748:11–15. But that general statement in no way acknowledges or implies the utility provides solar customers with specific "back-up" or "start-up" services during those times.

A second flaw in APS's study is that it does not accurately value the benefits provided by rooftop solar.[83] APS claims its approach recognizes the long-term benefits of solar, but only in the future years when those benefits occur.[84] This is incorrect. APS's study only incorporates two types of solar benefits: short-term avoided energy and APS's measure of generation capacity savings. APS admits its study "did not include savings for transmission or distribution costs, nor did it include environmental or economic development benefits."[85] As a result, APS's study never considered many of the benefits provided by rooftop solar. In addition, even for the limited benefits that APS's study did consider, it is inappropriate to ascribe no value for capacity benefits until APS acquires additional capacity. The better approach is to value benefits on a continuous basis. Although utility planning models typically forecast capacity additions in large, "lumpy" increments, rooftop solar's modularity and scalability can offset or delay these additions.[86] The analysis should account for this value today.

Finally, there are significant transparency and accessibility issues with the utilities' cost of service studies.[87] Both APS and TEP used third-party proprietary systems that prevented Vote Solar and other Intervenors from fully reviewing the studies in a timely manner. APS responds that it provided sufficient information for other parties to "replicate[] the analysis using their own COSS tool," and that Vote Solar's only "quibble" is that doing so would be tedious.[88] APS understates the difficulty in replicating the study. As Vote Solar witness Kobor explained, APS

83 Vote Solar Br. 38:6–16.
84 APS Br. 14:13–15.
85 Snook Direct 17:13–15 (Ex. APS-1).
86 Kobor Direct. 25:4–14 (Ex. Vote Solar-7).
87 Vote Solar Br. 40:15–41:16.
88 APS Br. 37:22, 38:1.

provided a spreadsheet containing 157 tabs, and some of those tabs contained over 4,000 rows with various numbers and a single column.[89] Ms. Kobor stated:

> Some of these numbers are linked elsewhere in the model and some are values that are presumably taken from one of the input sheets provided by APS; though the formatting in this document bears no resemblance to the formatting in the other sheets.
>
> For a cost of service expert to successfully link up the inputs with the model provided by APS, he or she would need to individually examine each cell on this sheet, and a good portion of the other 157 sheets in the model that look very similar to this one. This is sufficient enough of a barrier to effective intervention that I would consider APS's model a black box.[90]

Staff has also expressed concern with this significant transparency issue. Staff recommends that APS provide a workable model with linked inputs and outputs, so that parties can vary the inputs and assumptions.[91] Vote Solar agrees with this recommendation for all future proceedings. But for this proceeding, these transparency and accessibility issues provide further reason to reject the utilities' cost of service study methodologies and results.

IV. THE COMMISSION SHOULD NOT SINGLE OUT SOLAR CUSTOMERS FOR A SEPARATE CUSTOMER CLASS.

APS and AIC urge the Commission to single out solar customers as a separate customer class in this proceeding.[92] However, these rate design recommendations are far outside the scope of this value of solar proceeding. For example, TEP has recognized that "rate design . . . is not the subject of this docket."[93] Staff similarly believes this proceeding is "about . . . methodologies," which "should be used in electric utility rate cases to help inform the Commission's decision making on related policy

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89 Tr. 1711:15–23 (Kobor Test.); Ex. Vote Solar-9 (demonstrating the inaccessibility of APS's working model).

90 Tr. 1711:23–1712:9 (Kobor Test.).

91 Staff Br. 33:3–6.

92 APS Br. 14:20–22:19; AIC Br. 5:17–7:17.

93 TEP Br. 5:7.

and ratemaking issues."[94] Singling out solar customers as a separate class is a paradigmatic rate design decision, and it would be inappropriate for the Commission to do so in this generally-applicable value of solar docket. The Commission should not single out solar customers as a separate rate class in a vacuum, without considering how they compare to a utility's other residential and small commercial customers. There is insufficient evidence in the record here to conduct this fact-specific inquiry.

APS and AIC both list several ways the average solar customer differs from the average non-solar customer. But merely listing how one type of customer in a rate class differs from other types of customers does not by itself justify disparate treatment. Within the residential class, there are a wide variety of customer types and one could similarly highlight the differences between rural versus urban customers, customers in apartments versus single-family homes, or customers with central air conditioning versus those without air conditioning. Yet highlighting the differences between these customers would not automatically justify placing them in different customer classes. In the UNSE rate case, Staff aptly warned of this approach's danger when it cautioned that "[o]nce DG customers are singled out for special treatment, it sets a precedent for singling out other customer categories."[95]

What matters is whether the differences between the average solar customer and the average non-solar customer result in any meaningful impacts that would justify singling out solar customers for differential rate treatment. If there is no meaningful difference, singling out solar customers would violate the prohibition against discriminatory rate treatment in the Arizona Constitution and the Commission's rules.[96]

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94 Staff Br. 1:11–13.

95 UNSE Rate Case, Docket No. E-04204A-15-0142, Thomas Broderick Direct Test. 7:6–7 (Dec. 9, 2015).

96 Ariz. Const. art. XV, § 12; A.A.C. R14-2-1801(M) & R14-2-2305; *see also Town of Wickenburg v. Sabin*, 200 P.2d 342, 343 (Ariz. 1948).

The recent UNSE rate case provides a good example of why a fact-specific analysis is necessary. In that case, UNSE claimed solar customers cause numerous problems. But for every issue UNSE highlighted, solar customers are a negligible cause of the alleged problem. In fact, rooftop solar customers are responsible for just 2%-6% of every issue UNSE raised, which means that non-solar customers are responsible for 94%-98% of each supposed problem.[97] There is thus no rooftop solar "problem" that the utility needs to fix. Based on these facts, it would be unjust and discriminatory to single out this small minority of solar customers to address an alleged problem, while allowing the customers who actually cause the vast majority of the problem to maintain the status quo. The UNSE case demonstrates why it is necessary to holistically examine all customers within a class before singling out solar customers for differential rate treatment. Such a holistic and comprehensive analysis is not possible in this proceeding.

APS suggests it would be appropriate to single out solar customers for differential rate treatment because they are more costly to serve and they "might actually impose new costs."[98] However, the evidence does not support APS's generalized speculation about how rooftop solar increases costs. APS relies heavily on TEP witness Carmine Tilghman's testimony to support this proposition. But as Mr. Tilghman acknowledged on cross examination, TEP and UNSE are unable to quantify any additional operational expenses caused by rooftop solar.[99]

APS also suggests it is appropriate to single out solar customers as a separate class because "no party appears to contest that rooftop solar customers are partial requirements customers."[100] Vote Solar strongly disputes that the Commission should

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97 UNSE Rate Case, Docket No. E-04204A-15-0142, Vote Solar Initial Post-Hr'g Br. 5:4–10:12 (Apr. 25, 2016).

98 APS Br. 19:3–20:5.

99 Tr. 689:10–690:20 (Tilghman Test.).

100 APS Br. 15:13–14.

classify rooftop solar customers as partial requirements customers, as the term is commonly understood.[101] As Vote Solar witness Volkmann testified, the term "partial requirements customer" typically refers to large commercial and industrial customers with complex energy needs and sophisticated loads.[102] Partial requirements customers often include refineries, universities, large hotels, hospitals, and combined heat and power installations at steel and chemical plants. A household or small business that installs rooftop solar is categorically different than these large and sophisticated entities. Moreover, unlike traditional partial requirements customers, a customer who installs solar does not require the utility to incur additional costs or change their infrastructure. Instead, solar customers continue to rely on the same transmission and distribution infrastructure as before they installed solar. Thus, the Commission should not categorize rooftop solar customers as partial requirements customers or otherwise single out solar customers as a separate customer class.

V. THE COMMISSION CANNOT ELIMINATE NET METERING IN THIS PROCEEDING.

Each of the alternative methodologies proposed by the utilities and other parties would reduce the compensation solar customers receive for exports. Accordingly, each of these proposals would eliminate net metering, which compensates solar customers for exports at the retail rate. However, retail rate net metering is codified in the Commission's rules.[103] The Commission adopted these regulations codifying net metering through formal rulemakings.[104] Consequently, the Commission cannot vacate or amend these regulations unless it begins a new rulemaking process,

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101 Vote Solar Br. 5:9–6:6.
102 Tr. 1623:24–1625:16 (Volkmann Test.).
103 A.A.C. R14-2-1801(M), R14-2-2302(11).
104 *See* 15 Ariz. Admin. Reg. 638 (Apr. 17, 2009); 13 Ariz. Admin. Reg. at 2389.

with the requisite public notice and opportunity for public participation.[105] Vote Solar and TASC have previously raised this point.[106] TEP also apparently recognizes this issue, as it requests the Commission "commence a rulemaking to review and amend the current Net Metering Rules to track the outcome of this docket."[107] This legal bar presents yet one more reason why the Commission should limit its decision in this proceeding to the proper methodology for valuing rooftop solar exports.

CONCLUSION

Vote Solar recommends the Commission direct the utilities to conduct a value of solar analysis using the long-term benefit and cost methodology to determine the full set of benefits and costs provided by rooftop solar exports. Vote Solar also recommends the Commission reject the cost of service study evidence provided by the utilities in this proceeding, as they are irrelevant to the value of solar analysis and suffer from significant methodological flaws and transparency issues.

DATED this 5th day of August, 2016.

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105 *See, e.g.*, Ariz. Rev. Stat. § 41-1001(19) (a "rule" subject to the Arizona APA includes "the amendment or repeal of a prior rule").

106 Vote Solar Br. 4 n.8; TASC Br. 24:9–16, 25:17–26:16.

107 TEP Br. 15:17–18.

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