ORIGINAL

0000172000

Timothy M. Hogan (004567)
ARIZONA CENTER FOR LAW
IN THE PUBLIC INTEREST
514 W. Roosevelt Street
Phoenix, Arizona 85003
(602) 258-8850

Michael A. Hiatt
EARTHJUSTICE
633 17th Street, Suite 1600
Denver, Colorado 80202
(303) 623-9466

Chinyere A. Osuala
EARTHJUSTICE
48 Wall Street, 19th Floor
New York, NY 10005
(202) 667-4500

BEFORE THE ARIZONA CORPORATION COMMISSION

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

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

Docket No. E-00000J-14-0023

VOTE SOLAR'S INITIAL CLOSING BRIEF

TABLE OF CONTENTS

INTRODUCTION 1

BACKGROUND 2

I. A Full and Robust Value of Solar Analysis Would Provide an Important Tool When Utilities Seek to Modify Net Metering or Solar Rate Design 2

II. The Commission's Actions in This Proceeding Will Impact Individuals, Families, and Small Businesses Across Arizona Who Invest in Solar 4

DISCUSSION 6

I. THE COMMISSION SHOULD REQUIRE A VALUE OF SOLAR ANALYSIS THAT ANALYZES THE FULL SET OF LONG-TERM BENEFITS AND COSTS 6

A. The Long-Term Benefit and Cost Methodology Comprehensively Values Rooftop Solar 6

B. Key Structural Issues and General Principles for the Value of Solar Analysis 11

1. The analysis should determine the value of rooftop solar exports 11

2. The analysis should be used to inform any modifications to net metering or rooftop solar rate design 12

3. A value of solar analysis should be required whenever a utility seeks to modify net metering or solar rate design 12

4. The analysis should determine the value rooftop solar exports provide to customers without solar 13

5. The analysis should use a realistic near-term forecast of rooftop solar penetration 14

6. The analysis should include all rooftop solar, both residential and commercial/industrial 15

7. The analysis should use an appropriate discount rate 16

8. Transparent and reliable data is key 16

C. Value of Solar Methodology 17

1. Utility Distributed Solar Costs 17

2. Energy Generation Savings 18

3. Generation Capacity Savings 19

4. Transmission Capacity Savings 20

5. Distribution Capacity Savings 21

6. Environmental Benefits 22

7. Economic Development Benefits 23

8. Grid Security Benefits 24

II. THE ALTERNATIVE VALUE OF SOLAR METHODOLOGIES ARE FLAWED AND WOULD NOT FULLY VALUE ROOFTOP SOLAR'S BENEFITS AND COSTS 24

A. APS's Short-Term Avoided Cost Methodology Ignores Many Benefits 25

B. TEP's "Utah Model" is a Cost of Service Analysis, Rather Than a Value of Solar Methodology, and It Would Ignore Many Benefits 26

C. A Utility-Scale Benchmarking Methodology Would Improperly Conflate the Value of Rooftop Solar With Wholesale Utility-Scale Solar Prices 28

1. APS and TEP's utility-scale solar methodologies should be rejected 28

a. Distributed solar and utility-scale solar are not interchangeable resources 29

b. Distributed solar and utility-scale solar are installed and operated by different entities operating in different markets 30

c. Utility-scale solar prices have no impact on the value distributed solar exports provide to customers without solar 31

d. Other states and utilities have not used the utility-scale benchmarking approach to value distributed solar 31

2. Staff's and RUCO's attempts to improve the utility-scale solar methodology should also be rejected 32

III. THE UTILITIES' COST OF SERVICE STUDIES ARE IRRELEVANT TO THE VALUE OF SOLAR ANALYSIS AND ARE CRITICALLY FLAWED 35

A. The Costs Analyzed in the Value of Solar Analysis Should Not Include The Utility's Costs to Provide Electricity to Solar Customers.................. 36

B. The Cost Of Service Studies Are Methodologically Flawed 36

1. APS's study overallocates costs to rooftop solar customers and inflates the alleged cost shift.. 37

2. TEP's study overallocates costs to rooftop solar customers and inflates the alleged cost shift.. 39

C. Vote Solar and Other Parties Were Unable to Fully Analyze the Cost of Service Studies 40

CONCLUSION 41

INTRODUCTION

The purpose of this "Value of Solar" proceeding is to determine a methodology for analyzing the benefits and costs of solar distributed generation ("DG"), or rooftop solar.[1] Vote Solar recommends the Commission adopt the long-term benefit and cost methodology. This methodology analyzes the full set of benefits and costs that occur when a rooftop solar customer exports energy to the grid. This approach would provide an important tool to help the Commission make reasonable and rational decisions on utility proposals to modify net metering, or solar rate design more generally. Moreover, adopting the long-term benefit and cost methodology in Arizona would be consistent with the numerous value of solar analyses conducted in other states.

The utilities have put forth numerous alternative methodologies for valuing rooftop solar. These alternative methodologies are flawed and should be rejected for three primary reasons. First, the alternative methodologies would not analyze the full set of benefits that result when rooftop solar customers export excess energy to the grid. Effectively ignoring certain types of benefits would undervalue solar. This would unreasonably skew the analysis and prevent the Commission from having the best information available when making decisions on net metering and solar rate design.

Second, the methodologies proposed by the utilities are not typically used elsewhere to value rooftop solar. The utilities frame their alternative methodologies as valid and commonly accepted approaches for valuing solar, but the long-term benefit and cost methodology is the only approach commonly used to value solar. Other jurisdictions have rarely, if ever, used the alternative methodologies for this task.

Third, the alternative methodologies are driven largely by the utilities' views on appropriate compensation for solar exports, rather than an attempt to accurately value

---

1 *See, e.g.*, Letter from Doug Little, Comm'r, Ariz. Corp. Comm'n, to Comm'rs and Interested Parties, at 1 (Dec. 22, 2015).

solar. The utilities' results-driven approach conflates two distinct inquiries: (1) calculating the value of rooftop solar exports, and (2) determining the compensation paid to solar customers for their exports. A value of solar analysis should determine the actual value of solar exports. The results of that analysis will provide important data that should then inform the subsequent policy decision on appropriate compensation. The value of solar analysis is the critical first step in this process, and the methodology for valuing solar should not be arbitrarily skewed and narrowed in scope because of the utilities' views on compensation.

For these reasons, if the Commission were to adopt one of the utilities' alternative methodologies, the results would do little to assist the Commission in future rooftop solar rate design decisions. It would also run counter to the value of solar methodologies typically used elsewhere, and it would fail to quell the recent rooftop solar controversies in Arizona.

BACKGROUND

I. A Full and Robust Value of Solar Analysis Would Provide an Important Tool When Utilities Seek to Modify Net Metering or Solar Rate Design.

Currently, rooftop solar customers receive retail rate compensation for the excess energy they generate and send to the grid under net metering. This retail rate compensation, or one-for-one kilowatt-hour ("kWh") offset, for exported energy is one of the foundational principles of net metering, and it is codified in the Commission's rules.[2] Net metering provides a simple and easily-understood method of valuing rooftop solar exports.[3] Numerous value of solar studies conducted elsewhere have found that net metering appropriately compensates—and may even undercompensate—solar customers for the excess energy they send to the grid.[4]

---

[2] A.A.C. R14-2-1801(M); *id.* R14-2-2302(11).

[3] Briana Kobor Direct Test. 6:24–26 (Feb. 25, 2016) ("Kobor Direct") (Ex. Vote Solar-7).

[4] *Id.* at 15:16–16:7.

The utilities have repeatedly claimed that net metering creates a subsidy for rooftop solar customers who do not fully pay for the services the utilities provide them.[5] The utilities have filed cost of service studies in this proceeding that allegedly document this cost shift and subsidy. But as discussed below, the studies suffer from numerous methodological flaws that overestimate the cost to serve solar customers and improperly inflate the alleged cost shift.[6] And more importantly, the utilities' subsidy claims fail to consider the entire picture. While the utilities undoubtedly provide rooftop solar customers with valuable products and services, solar customers <u>also</u> provide the utilities with valuable products and services when they export excess energy to the grid. By the utilities' own reasoning, if a utility does not fully compensate solar customers for the value of their exported energy, the utility and customers without solar would receive a subsidy. Accordingly, before any conclusions can be reasonably reached about whether solar customers receive or provide any subsidy, it is necessary to value the net benefits provided by rooftop solar exports.

A properly designed value of solar analysis accomplishes this critical task by determining the full set of benefits and costs that occur when solar customers export energy to the grid. If a full value of solar analysis shows that rooftop solar and net metering result in a net cost, it may indicate that the Commission should revisit the current net metering policy. But if the analysis shows a net benefit, it would inidicate that net metering should at least remain in place.

Arizona Public Service Company ("APS"), along with Tucson Electric Power Company and UNS Electric (collectively, "TEP"), have recently filed rate cases where they seek to dramatically alter solar policy by eliminating net metering or imposing

---

[5] *See, e.g.*, Decision No. 74202 at 3:10–26 (summarizing APS's claims that net metering causes a cost shift and subsidy).

[6] *See infra* pp. 35–41.

mandatory demand charges on solar customers.[7] In order for the Commission to make rational and reasonable decisions on these proposals, a full and robust value of solar analysis is necessary for each utility. Without this analysis, it is impossible to determine whether the current retail rate compensation for rooftop solar exports overcompensates solar customers, as the utilities claim. Moreover, without a value of solar analysis, the Commission cannot reasonably determine whether reducing the compensation for exports would appropriately compensate solar customers.

This proceeding provides an important and timely opportunity for the Commission to issue guidance regarding when a value of solar analysis is required and the proper methodology for conducting the analysis. If the Commission directs the utilities to conduct a full and fair value of solar analysis, it would provide invaluable information to inform any future rooftop solar rate design changes. It would also help reduce the recent controversies over rooftop solar in Arizona by ensuring that the Commission has analyzed all of rooftop solar's benefits before approving any change to solar policy or rate design.[8]

II. The Commission's Actions in This Proceeding Will Impact Individuals, Families, and Small Businesses Across Arizona Who Invest in Solar.

Individuals, families, and small businesses across Arizona install the rooftop solar systems that are the focus of this hearing. These individuals and businesses

---

7 *See, e.g.*, APS Rate Case, Docket No. E-01345A-16-0036, Appl. 11:11–17 (June 1, 2016) (proposing to eliminate net metering for new rooftop solar customers); UNSE Rate Case, Docket No. E-04204A-15-0142, UNSE Initial Post-Hr'g Br. 6:21–7:11 (Apr. 25, 2016) (proposing mandatory demand charges and eliminating net metering for new solar customers); TEP Rate Case, Docket No. E-01933A-15-0322, David Hutchens Direct Test. 24:7–25:14 (Nov. 5, 2015) (same).

8 Consistent with the general investigative nature of this docket, this brief discusses how a value of solar analysis should inform proposals to modify net metering as a policy matter. However, the fact that the value of solar results should inform these proposals does <u>not</u> mean the Commission should in fact modify net metering. There are many strong policy reasons for leaving net metering in place. Moreover, because the Commission's rules codify net metering, the utilities' recent proposals to eliminate net metering violate the law. *See, e.g.*, UNSE Rate

invest in solar for numerous reasons, such as reducing their electricity bills, "greening" their electricity use, and increasing their energy independence. Once these individuals and companies install solar panels on the roofs of their homes and businesses, the panels generate clean renewable energy that provides numerous benefits to the solar customer, the utility, and other customers without solar. Moreover, after the solar panels are installed on their roofs and begin producing clean renewable energy, these Arizonans continue on with their lives and businesses—just as their next door neighbors without solar do.

The fact that residential and small commercial customers install rooftop solar is a key distinction between rooftop solar and other centralized generation resources, which are built and operated by large and sophisticated energy companies. The utilities, however, have attempted to blur this critical distinction. The utilities have compared rooftop solar customers to wholesale power generators, utility-scale solar developers, and traditional partial requirements customers.[9] But rooftop solar customers are different than these entities in many critical ways. For example, the individuals and companies that install solar panels on the roofs of their homes and businesses almost certainly do not do so with the aim of making a significant profit on their solar investments. In fact, the Commission's rules ensure this is the case by expressly limiting the purpose and size of rooftop solar systems.[10] The vast majority of households and small businesses that install rooftop solar are also neither large and sophisticated energy businesses nor industrial consumers. Instead, they are residential and small commercial customers, and they remain so after they install

Case, Docket No. E-04204A-15-0142, Vote Solar Initial Post-Hr'g Br. 12:4–14:19 (Apr. 25, 2016).

9 *See, e.g.*, Bradley Albert Rebuttal Test. 2:4–22, 8:12–24 (Apr. 7, 2016) ("Albert Rebuttal") (Ex. APS-6); Carmine Tilghman Rebuttal Test. 5:8–15, 8:7–8 (Apr. 7, 2016) ("Tilghman Rebuttal") (Ex. TEP-2); H. Edwin Overcast Rebuttal Test. 36:23–37:2 (Apr. 7, 2016) ("Overcast Rebuttal") (Ex. TEP-4).

solar. This stands in stark contrast to a wholesale power generator that generates and sells electricity as a business enterprise, or the typical industrial partial requirements customer whose business operations require complex energy management.[11] The impacts of the Commission's actions in this proceeding will not fall on these large and sophisticated companies, but will instead impact individuals, families, and small businesses across the state who invest in solar.

DISCUSSION

I. THE COMMISSION SHOULD REQUIRE A VALUE OF SOLAR ANALYSIS THAT ANALYZES THE FULL SET OF LONG-TERM BENEFITS AND COSTS.

A. The Long-Term Benefit and Cost Methodology Comprehensively Values Rooftop Solar.

Vote Solar recommends the Commission adopt the long-term benefit and cost methodology for valuing solar, which analyzes the entire range of benefits and costs that result when a solar customer exports energy to the grid.[12] The specifics of the recommended methodology are discussed in detail below. A critical threshold point, however, is that the long-term benefit and cost methodology comprehensively analyzes all of the relevant costs and benefits that occur during the economic life of a rooftop solar system, which is typically twenty to thirty years. The alternative methodologies recommended by the utilities would only incorporate a smaller subset of these benefits and costs, and would thus not accurately value solar exports.

---

10 A.A.C. R14-2-2302(13)(b), (d).

11 *See* Tr. 1623:24–1625:20 (Volkmann Test.).

12 Kobor Direct 25:20–36:7 (Ex. Vote Solar-7); Briana Kobor Rebuttal Test. 35:16–37:13 (Apr. 7, 2016) ("Kobor Rebuttal") (Ex. Vote Solar-8). The long-term benefit and cost methodology has also been referred to as the "long-term avoided cost" methodology. *See, e.g.*, Bradley Albert Direct Test. 20:1 (Feb. 25, 2016) ("Albert Direct") (Ex. APS-5). The methodology considers the full set of long-term benefits provided by solar, and some of these benefits are not typically classified as avoided costs (e.g., environmental, economic development, and grid security benefits). To avoid any confusion, Vote Solar refers to this approach as the long-term benefit and cost methodology.

Value of solar analyses that look at the long-term benefits and costs of solar are not new or novel. Many states have recognized the importance of valuing rooftop solar, and there have been numerous value of solar analyses conducted elsewhere.[13] In fact, there have been several value of solar analyses conducted in the past regarding the value of rooftop solar in APS's service territory.[14] Significantly, while the specific methodologies vary, the vast majority of value of solar analyses have utilized the long-term benefit and cost approach.[15] Tellingly, the phrase "value of solar analysis" is often used as short-hand for this approach.[16] In contrast, the utilities' alternative methodologies are not typically used to value rooftop solar.

The long-term benefit and cost methodology would put Arizona on the path toward developing sound policies not just for rooftop solar, but for other emerging technologies as well. Rooftop solar may be the first distributed energy resource to gain significant penetration levels in Arizona, but there are other technologies on the horizon.[17] Valuing distributed resources by looking comprehensively at all of their benefits and costs will help Arizona make optimal policy decisions and put new technologies on a level playing field.[18] In contrast, selectively analyzing just some categories of benefits based on the technology and the utilities' policy preferences

---

13 Kobor Direct 15:14–16:7 (Ex. Vote Solar-7); Thomas Beach Direct Test. 3:7–10:11 (Feb. 25, 2016) ("Beach Direct") (Ex. TASC-26); *see also* John Sterling Direct Test. *passim* (Feb. 25, 2016) ("Sterling Direct") (Ex. APS-4) (discussing the Tennessee Valley Authority value of solar analysis).

14 Kobor Direct 14:3–15:13 (Ex. Vote Solar-7).

15 Kobor Rebuttal 35:18–36:4 (Ex. Vote Solar-8).

16 *See id.* at 35:18–19. APS witness Ashley Brown's testimony confirms this point. Mr. Brown launches a broad polemic against value of solar analyses, but what he is attacking is the long-term benefit and cost methodology. Ashley Brown Direct Test. *passim* (Feb. 25, 2016) ("Brown Direct") (Ex. APS-8). Surely, if Mr. Brown thought the utilities' alternative methodologies were actually value of solar analyses as the phrase is commonly understood, he would not have attacked value of solar analyses in such broad and categorical terms.

17 *See, e.g.*, Curt Volkmann Direct Test. 28:3–32:22 (Feb. 25, 2016) ("Volkmann Direct") (Ex. Vote Solar-3).

18 *Id.* at 30:15–27, 32:7–22.

would create unnecessary confusion and uncertainty, and it could cause Arizona to undervalue and underinvest in beneficial technologies.

The utilities object to the long-term benefit and cost methodology because analyzing the value of future benefits and costs is necessarily predictive, and future forecasts are not always entirely accurate.[19] However, forecasting future events and costs in this manner is an integral part of a utility's operations. For example, utilities develop integrated resource plans that analyze future conditions and select future resources over a fifteen-year planning period. The results of these plans influence the utilities' decisions on which resources to build or purchase.[20] The fact that the plans involve predictive forecasts does not negate their value. Similarly, the Commission should not shy away from a value of solar methodology that analyzes the full set of benefits and costs provided by rooftop solar simply because the analysis would involve forecasting future values. Moreover, to ensure accuracy, the results should be updated periodically to reflect recent events and the latest projections.

The utilities also raise a number of concerns with the long-term benefit and cost methodology that reflect their policy views on compensating solar exports. For example, the utilities claim that while a full value of solar analysis may be useful in the long-term planning process, the Commission should not use the results to set rates because rates must be based on historical cost of service principles.[21] However, this conflates the value of solar analysis with subsequent policy decisions regarding compensation. While the value of solar results should be a key piece of information that informs the decision on compensation, the results should not automatically

---

19 *See, e.g.*, Albert Direct 22:13–19 (Ex. APS-5); Brown Direct 21:2–22:15 (Ex. APS-8).

20 Leland Snook Rebuttal Test. 6:6–8 (Apr. 7, 2016) ("Snook Rebuttal") (Ex. APS-2).

21 *See, e.g.*, Albert Direct 22:5–19 (Ex. APS-5); H. Edwin Overcast Direct Test. 44:15–20 (Feb. 25, 2016) ("Overcast Direct") (Ex. TEP-3); David Hedrick Direct Test. 13:13–14:2 (Feb. 25, 2016) (Ex. GCSECA-1).

determine the compensation paid for solar exports.[22] The analyses should remain distinct, and this proceeding should focus only on the value of solar methodology.

Moreover, even if these compensation issues were relevant here, there is an important distinction between the rates solar customers pay for the electricity they purchase from the utility and the compensation they receive for exports. Rates are based on historical cost of service, while compensation for exports should be informed by a value of solar analysis. Currently, solar customers' rates and the compensation they receive for exports are the same under net metering. But if the Commission were to modify net metering as the utilities have requested, that would not be the case. In those circumstances, the rates solar customers pay for electricity delivered by the utility would continue to be based on historical cost of service. But there is no similar requirement for compensating solar exports. If the Commission contemplates modifying the compensation rate for exports, it should consider the full set of benefits and costs attributable to exports in order to make a fully informed decision.[23]

Similarly, the utilities argue the Commission should not use the value of solar results to set compensation because other generation resources are not compensated based on value.[24] APS states: "If we're going to use a VOS analysis to establish prices, then why in the world don't we do that for nuclear, coal, natural gas, wind, and every other resource?"[25] According to APS, "[i]t is very difficult to discern any justification

---

[22] *See, e.g.*, Kobor Rebuttal 5:10–14 (Ex. Vote Solar-8).

[23] Ultimately, APS appears to recognize this important distinction between rates and compensation for exports, stating "[a]lthough [value of solar studies] are not used to set rates, it is within the Commission's discretion to use these studies in establishing the amount paid for energy exported by rooftop solar systems." Albert Direct 22:11–13 (Ex. APS-5); *see also* Tilghman Direct Test. 7:16–18 (Feb. 25, 2016) ("Tilghman Direct") (Ex. TEP-1) (if the methodology includes "external, societal, and future benefits," the Commission "would have the opportunity and flexibility to set these additional cost and savings values at their discretion in the Company's rate case").

[24] Brown Direct 15:7–19 (Ex. APS-8); Michael O'Sheasy Direct Test. 18:4–10 (Feb. 25, 2016) (Ex. AIC-1); Tilghman Rebuttal 15:5–7 (Ex. TEP-2).

[25] Brown Direct 15:15–16 (Ex. APS-8).

for singling [rooftop solar] out" for different treatment.[26] Again, the Commission should not approve an unduly narrow value of solar methodology because of a utility's concerns about how the Commission would use the results. And in any event, there is an obvious justification for compensating rooftop solar differently than other generation resources. Individuals, families, and small businesses install rooftop solar primarily for on-site use, while sophisticated energy companies build the nuclear, coal, gas, and other large-scale generation resources APS mentions. As discussed below, households and businesses that install rooftop solar face restrictions on the solar panels' location, purpose, and size that these other entities do not face.[27]

Moreover, the "market" for exported rooftop solar energy is different than the market for these other resources. Although APS would prefer to price resources based on markets or costs, it is infeasible to price rooftop solar exports in the same manner as large-scale centralized resources.[28] For example, there is only one possible "purchaser" for a rooftop solar system's excess energy: the utility.[29] Compensating each solar customer based on the cost of her system is also impractical because the utilities have thousands of solar customers with system costs that can vary widely. Given the difficulties in fairly and efficiently pricing solar exports based on markets or costs, a value of solar analysis is an important tool to ensure utilities appropriately compensate solar customers for the value of the excess energy they send to the grid.

The Residential Utility Consumer Office ("RUCO") agrees that rooftop solar compensation should reflect value, and that a "hybrid approach" is necessary because of "administrative challenges" with pricing solar based on costs.[30] Resolving these compensation issues should wait until a later day, after a full and fair value of solar

---

[26] *Id.* at 15:17–19.
[27] *See infra* pp. 30–31.
[28] *See, e.g.*, Brown Direct 5:6–9 (Ex. APS-8).
[29] *See, e.g.*, Tr. 1134:18–1135:2 (Brown Test.).

analysis has been conducted. The purpose of this proceeding is to develop the methodology that will fairly and accurately value rooftop solar exports in Arizona, and the long-term benefit and cost methodology will best accomplish this important task.

B. Key Structural Issues and General Principles for the Value of Solar Analysis

In addition to the specific methodological guidance discussed in the next subsection, the Commission should clarify for the utilities and other stakeholders several general principles regarding the value of solar analysis.

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

The electricity produced by rooftop solar panels is first consumed on-site, and any excess energy produced by the panels is sent to the grid. There is general agreement that the value of solar analysis should examine the value of rooftop solar exports.[31] Focusing on the value of exports reflects the fact that every customer has the right to purchase as much, or as little, electricity from the utility as they wish.[32] As Staff has explained: "[W]hat happens behind the meter is the customer's business. Whether load is reduced by conservation, insulation, high efficiency appliances, storage or the installation of a DG system that is solely the customer's right and decision . . . ."[33] It is only when a rooftop solar customer exports excess energy to the grid that the value of that energy—and the compensation the customer receives for that energy—should be at issue. Consequently, the analysis should examine the value of solar exports to customers without solar.[34]

---

30 Lon Huber Direct Test. 2:13–21 (Feb. 25, 2016) ("Huber Direct") (Ex. RUCO-2).

31 Kobor Rebuttal 6:11–7:18 (Ex. Vote Solar-8).

32 Kobor Direct 8:18–9:16 (Ex. Vote Solar-7).

33 Howard Solganick Direct Test. 7:8–11 (Feb. 25, 2016) (Ex. S-2).

34 While the value of solar analysis should focus on the value of rooftop solar exports, the underlying analysis may properly include data for both exports and solar energy consumed on-site. APS has criticized The Alliance for Solar Choice ("TASC") witness Thomas Beach for using generation data for the entire rooftop solar system, rather than using generation data

2. The analysis should be used to inform any modifications to net metering or rooftop solar rate design.

The fundamental purpose of a value of solar analysis is to determine the net benefits (or net costs) that rooftop solar exports provide to customers without solar. The results will help determine whether the compensation paid to solar customers for their exports appropriately reflects the value of the exported energy. The results should thus provide a useful tool to evaluate the appropriateness of rooftop solar rate design, including net metering.[35] Vote Solar does not recommend that the compensation rate for solar exports be automatically set based on the value of solar results. Instead, the results would provide important data for evaluating the reasonableness of the compensation paid to solar customers for solar exports. If the results from a robust value of solar analysis show a net benefit, it would support continuing net metering. And if the results showed a net cost, it would help the Commission evaluate possible modifications to net metering and develop an alternative export rate.[36] The value of solar analysis thus provides critical information for the decision-making process. Without a robust analysis, the Commission will be unable to make reasonable and fully-informed decisions on the pending utility proposals to alter net metering and solar rate design.

3. A value of solar analysis should be required whenever a utility seeks to modify net metering or solar rate design.

As discussed above, there has been some dispute over whether a value of solar analysis should be used in rate cases.[37] An up-to-date value of solar analysis should be required in any proceeding where a utility seeks to modify net metering or rooftop

---

for exports only. Albert Rebuttal 2:23–27 (Ex. APS-6). However, if generation data specific to exports is unavailable, it is acceptable to use the generation data used by Mr. Beach. APS's claim that this is a significant flaw in Mr. Beach's analysis is without merit.

[35] Kobor Direct 8:2–14 (Ex. Vote Solar-7).

[36] *Id.* at 12:4–16.

[37] *See supra* pp. 8–9.

solar rate design. It is imperative that an updated analysis is conducted whenever a utility makes such a proposal, as the results will provide critical and necessary information for evaluating the proposal. APS, TEP, and UNSE have all filed rate cases in which they propose to eliminate net metering and modify rooftop solar rate design.[38] Consequently, the utilities should conduct a value of solar analysis as part of those rate cases. And if a utility makes similar proposals outside of a rate case, as the utilities have done in the recent past, a value of solar analysis should be required in those proceedings too.[39] If the Commission develops a robust and standardized approach for valuing solar, calculating the net benefits of solar should be straightforward and would not unduly complicate future proceedings. Moreover, the value of solar analysis will provide critical data that will be necessary to support any changes to net metering or solar rate design.

4. The analysis should determine the value rooftop solar exports provide to customers without solar.

An important threshold issue is from whose perspective the benefits and costs of rooftop solar should be measured. This threshold issue will determine the types of benefits and costs that will be included in the analysis. Vote Solar recommends that the analysis determine the value of rooftop solar exports to non-participating customers without solar.[40] The aim of the analysis should be to determine whether customers without solar are paying a fair price for rooftop solar exports, based on the value provided by the solar energy. This value should include the impacts on utility rates and the environmental, economic development, and grid reliability benefits.[41]

---

38 *See supra* pp. 3–4 & n.7.

39 *See, e.g.*, TEP Appl., Docket No. E-01933A-15-0100 (Mar. 25, 2015).

40 Kobor Direct 18:4–13 (Ex. Vote Solar-7).

41 *Id.* at 18:7–11. TASC has examined the value of solar on APS's system from multiple perspectives, including the value rooftop solar provides to solar customers, other ratepayers, and the system and society as a whole. Thomas Beach Rebuttal Test. 16:1–20:21 (Apr. 7, 2016) ("Beach Rebuttal") (Ex. TASC-27); Beach Direct Ex. 2, at 2–3 (Ex. TASC-26). Vote Solar

5. The analysis should use a realistic near-term forecast of rooftop solar penetration.

The value of a rooftop solar system may vary based on the overall penetration of solar in the service territory. At high penetration levels, the value of an additional system may be less than at lower penetration levels. Despite recent growth, the overall penetration level of distributed solar in Arizona remains low and accounts for only a small proportion of the total energy supplied by the utilities.[42] Accordingly, to accurately determine the value of rooftop solar, the analysis should use a realistic near-term forecast of rooftop solar penetration over the next one to three years.[43] If the analysis assumes higher penetration levels that will not occur until further into the future, it will undervalue the current and near-term rooftop solar systems installed in Arizona. As penetration increases in the future, the analysis should be updated to provide a more accurate assessment of the value provided by the additional systems.

Staff claims this would create a "dichotomy" with the fact that the analysis should determine the costs and benefits that accrue over the twenty- to thirty-year economic life of the solar panels.[44] However, there is no inconsistency in this approach. The aim of the analysis should be to determine the value of solar exports from systems that are currently installed or will be installed in the near-term. The benefits and costs of these systems will accrue over their economic life, so the analysis should cover the twenty- to thirty-year lives of these systems. Given the current and near-term penetration levels, these systems do not create any measurable integration costs or a peak shift. If future solar installations increase penetration levels to the

---

supports this approach, as it provides additional data on the value of rooftop solar that is useful for the Commission, the utilities, and other stakeholders. In addition, if the Commission decides to consider the value of solar energy consumed on-site, in addition to the value of exports, the value should be examined from the societal perspective, rather than from the perspective of customers without solar. Kobor Direct 20:21–21:3 (Ex. Vote Solar-7).

42 *Id.* at 24:10–13.

43 *Id.* at 24:4–19.

point where the benefits decrease, the net value of those future, additional systems may be less. But those future, additional installations would not reduce the value provided by the systems installed today. The solution is to value the net benefits provided by the current rooftop solar systems over their lifetimes, and to update the analysis periodically to determine the value of incremental, future solar installations.[45]

6. The analysis should include all rooftop solar, both residential and commercial/industrial.

The Commission's Renewable Energy Standard and Tariff rules require utilities to procure certain amounts of distributed generation from both the residential and commercial sectors.[46] Similarly, the Commission's net metering rules apply to all "end-use retail [c]ustomers served under a Utility's rate schedule."[47] As a result, the value of solar analysis should determine the value of all rooftop solar in a utility's territory, both residential and commercial/industrial.[48] While the value of solar discussion tends to focus on residential solar, analyzing the value of all rooftop solar systems installed by households and businesses is important because limiting the analysis to residential customers undervalues solar. This is because residential solar customers typically pay higher per-kWh rates than commercial and industrial customers, who often have demand charges that reduce their kWh rate. The primary cost in the value of solar analysis is thus higher for residential customers. The result is that the net benefits of residential rooftop solar systems may be less than the net benefits provided by commercial and industrial solar installations. Accordingly, the value of all rooftop solar systems should be analyzed.

---

44 Howard Solganick Rebuttal Test. 15:10–21 (Apr. 7, 2016) (Ex. S-3).

45 Tr. 1715:24–1717:10 (Kobor Test.).

46 A.A.C. R14-2-1805(D) (A utility "shall meet one-half of its annual [DG] requirement from residential applications and the remaining one-half from non-residential, non-utility applications.").

47 *Id.* R14-2-2301, R14-2-2302(7).

48 Kobor Direct 21:4–24 (Ex. Vote Solar-7).

7. **The analysis should use an appropriate discount rate.**

Because the analysis should evaluate costs and benefits over the twenty- to thirty-year economic life of a rooftop solar system, selecting an appropriate discount rate is important for accurate results. The analysis determines the value provided by solar exports to customers without solar, and as a result the discount rate should reflect the time value of money to those customers. Vote Solar thus recommends the Commission use a societal discount rate similar to the rate of inflation.[49]

TEP claims the societal discount rate is inappropriate and the weighted average marginal cost of capital should be used instead.[50] APS makes a similar recommendation.[51] These weighted average cost of capital rates are based on the utilities' cost of capital, and they are thus inappropriate for this analysis. The analysis should be approached from the perspective of ratepayers, not the utility. As a result, the utilities' cost of capital should not be used to discount the future benefits of these systems. While the societal discount rate should be applied to all costs and benefits in the analysis, at a minimum the analysis should use the societal discount rate for benefit categories that are separate from utility costs, such as environmental, economic development, and grid security benefits.[52]

8. **Transparent and reliable data is key.**

To ensure an impartial and independent analysis, Vote Solar recommends the utilities retain an independent third-party to conduct the analysis.[53] TEP claims that with sufficient Commission guidance, the utilities could conduct an objective value of solar analysis as part of their rate cases, which would be subject to review by

---

49 *See id.* at 23:5–23.
50 Overcast Rebuttal 52:5–8 (Ex. TEP-4).
51 Albert Rebuttal 26:20–23 (Ex. APS-6).
52 Kobor Direct 23:19–23 (Ex. Vote Solar-7).
53 *Id.* at 50:13–26.

intervenors.[54] In either case, the utilities must provide much of the data necessary for the analysis, and it is imperative that the data is transparent and reliable. Moreover, regardless of who conducts the analysis, it is critical that other parties are able to fully review the analysis. As discussed below, there are significant transparency issues with the cost of service studies the utilities have provided in this proceeding, which have limited Vote Solar and other parties' ability to substantively review the utilities' analyses.[55] These issues caution against allowing the utilities to conduct the value of solar analysis, and they underscore the need for the Commission to ensure the analysis is transparent and subject to full review by all parties.

C. Value of Solar Methodology

Vote Solar recommends the Commission adopt the long-term benefit and cost methodology summarized below. Consistent with Chairman Little's guidance, this methodology examines eight categories of benefits and costs that result when households and businesses export solar power to the grid.[56]

1. Utility Distributed Solar Costs

The first core benefit and cost category is Utility Distributed Solar Costs.[57] This category quantifies the costs a utility incurs when rooftop solar customers export excess energy to the grid. The two types of utility costs resulting from rooftop solar exports are: (1) the compensation the utility pays to solar customers for exported energy, and (2) net integration costs.[58]

The utility's cost of compensating solar customers for exported energy is the primary cost in the analysis. Under net metering, utilities compensate solar

---

54 Tilghman Rebuttal 14:1–19 (Ex. TEP-2).
55 *See infra* pp. 40–41.
56 *See* Letter from Doug Little, at 1–2 (Dec. 22, 2015) (listing seven categories of benefits and costs).
57 Kobor Direct 26:17–27:22 (Ex. Vote Solar-7).
58 *Id.* at 26:19–21.

customers for exports at the retail rate, so the current compensation costs are easily calculated. In order to quantify the levelized costs over the twenty- to thirty-year life of a rooftop solar system, forecasting future compensation rates for exports is necessary.[59] Reliable and transparent data from the utilities will be important, and parties should be able to fully assess the reasonableness of a utility's projections.

The utility's integration costs include the direct administrative costs related to rooftop solar exports and any required ancillary services.[60] Integration costs are typically minimal at lower penetration levels, such as the current penetration levels in Arizona.[61] In fact, TEP and UNSE are unable to quantify any additional operational expenses that are attributable to rooftop solar.[62] Integration costs (and benefits) can also vary based on location.[63] Accordingly, to improve the accuracy of the analysis and encourage deployment of rooftop solar and other distributed energy resources at locations providing the greatest value, the Commission should require utilities to conduct a hosting capacity analysis.[64] This hosting capacity analysis would provide important information regarding the locations on the distribution system that can accommodate rooftop solar (and other distributed energy resources) with minimal interconnection costs.

2. Energy Generation Savings

The second category of benefits and costs is Energy Generation Savings.[65] When a solar customer exports energy to the grid, the utility will generate (or purchase) less energy from conventional, centralized power plants. Thus, each kWh of

---

[59] *Id.* at 27:3–18.

[60] *See* Volkmann Direct 5:19–13:11 (Ex. Vote Solar-3).

[61] *See* Beach Direct 16:20–22 (Ex. TASC-26).

[62] Tr. 689:10–690:20 (Tilghman Test.).

[63] Volkmann Direct 5:24–6:20 (Ex. Vote Solar-3).

[64] *Id.* at 6:21–8:3.

[65] Kobor Direct 27:23–29:23 (Ex. Vote Solar-7); *see also id.* Ex. BK-2, at 21–22 ("IREC Guidebook").

exported solar energy offsets the need for a kWh of energy generated from the marginal generation plant.[66]

The energy generation savings will vary depending on the utility and the timing of solar exports.[67] Once the marginal generator or generators for the utility is identified, the avoided cost of energy from that generator should be calculated. Often the marginal generator is a natural gas-fired power plant, and in those circumstances the avoided cost of energy reflects natural gas prices, heat rate, and variable operations and maintenance costs.[68] Vote Solar witness Briana Kobor's direct testimony describes in more detail how this analysis should be conducted.[69]

In addition, because solar exports offset the need for energy at or near customer load, energy generation savings should also include avoided line losses associated with delivering electricity from a centralized generating station to the customer load.[70] Because line losses may vary by season and time of day, the avoided line loss calculation should reflect the marginal line losses expected during the time periods when rooftop solar exports occur.

3. Generation Capacity Savings

The third benefit and cost category is Generation Capacity Savings.[71] When solar customers export energy to the grid, it reduces the utility's need to build generation capacity to meet peak demand. Peak demand in Arizona typically occurs in the late afternoon during the summer months, which is when rooftop solar systems produce energy. Thus, solar energy contributes to meeting the system's peak demand.

---

66 Kobor Direct 27:25–28:4 (Ex. Vote Solar-7).
67 *Id.* at 28:7–14.
68 *Id.* at 28:15–19.
69 *Id.* at 28:20–29:23.
70 *Id.* at 29:12–23.
71 *Id.* at 29:24–31:28; *see also* IREC Guidebook at 24–26.

APS suggests rooftop solar provides minimal generation capacity savings.[72] However, APS's and the other utilities' integrated resource plans show otherwise. APS's plan determined that rooftop solar would contribute 119 megawatts ("MW") to system peak capacity in 2020.[73] TEP projected that rooftop solar would contribute 41 MW to system peak capacity in 2020, while UNSE forecast an 8 MW peak capacity contribution in 2020.[74] Because the utilities' own integrated resource plans show that rooftop solar can reliably contribute to system peak, the analysis should credit solar exports for reducing or delaying the need for additional system capacity.

Ms. Kobor's direct testimony discusses how to calculate generation capacity savings in more detail.[75] As she explains, the generation capacity analysis should account for the modularity of rooftop solar installations and the marginal benefits of additional solar capacity. It is improper to base the analysis on large tranches of "lumpy" capacity additions and assume that solar provides no capacity benefits until a utility eliminates or defers a large capacity addition. Moreover, an effective load carrying capability study should be conducted to determine the level of solar export capacity that can reliably contribute to the system peak. In addition, the analysis should reflect the marginal avoided line losses resulting from the fact that exports serve nearby load, and the ability of rooftop solar to reduce capacity reserve margins to ensure reliability during emergencies.

4. Transmission Capacity Savings

The fourth category of benefits and costs is Transmission Capacity Savings.[76] Solar exports can decrease the peak load at substations and provide congestion relief,

---

[72] *See, e.g.*, Brown Direct 27:1–30:20 (Ex. APS-8); Albert Direct 23:6–12 (Ex. APS-5).
[73] Kobor Direct 30:10 (Ex. Vote Solar-7).
[74] *Id.*
[75] *Id.* at 30:16–31:28.
[76] *Id.* at 32:1–11; Volkmann Direct 16:17–19:19 (Ex. Vote Solar-3); *see also* IREC Guidebook at 26–29.

which allows the utility to defer or eliminate transmission system upgrades.[77] This benefit category quantifies the avoided transmission capacity costs attributable to rooftop solar.

The utilities acknowledge that rooftop solar can provide transmission capacity savings, but they suggest the benefits are minimal.[78] Other states, however, recognize the transmission capacity benefits of rooftop solar and other distributed energy resources, and they are in the process of developing methodologies for calculating these benefits.[79] Moreover, there have been several recent examples elsewhere of the significant transmission capacity savings that can result from rooftop solar and other distributed energy resources.[80]

As Vote Solar witness Curt Volkmann describes in detail, transmission and distribution capacity savings can vary based on circuit and location, so the analysis should use a detailed marginal cost of service methodology to value both transmission and distribution capacity.[81] In addition, the methodology should credit rooftop solar for transmission capacity benefits even if there is not an imminent capacity expansion project in the local area, as small and incremental contributions to transmission capacity also provide real benefits.[82]

5. Distribution Capacity Savings

The fifth benefit and cost category is Distribution Capacity Savings.[83] Similar to the transmission capacity benefits discussed above, rooftop solar provides distribution capacity savings by allowing the utility to defer or eliminate distribution

---

77 Volkmann Direct 16:23–17:3 (Ex. Vote Solar-3).

78 *See, e.g.*, Albert Rebuttal 22:25–23:6 (Ex. APS-6); Tilghman Direct 21:4–23 (Ex. TEP-1).

79 Volkmann Direct 17:4–18:3 (Ex. Vote Solar-3).

80 *Id.* at 31:5–14, 32:1–6; Tr. 1620:13–1621:8 (Volkmann Test.).

81 Volkmann Direct 18:5–10 (Ex. Vote Solar-3).

82 *Id.* at 18:11–19:19.

83 *Id.* at 19:20–21:18; Kobor Direct 32:12–22 (Ex. Vote Solar-7); *see also* IREC Guidebook at 26–29.

system upgrades. Mr. Volkmann has provided an example of how rooftop solar and other distributed energy resources can provide significant distribution capacity savings.[84] The detailed marginal cost of service methodology discussed above regarding transmission capacity savings would also quantify the distribution capacity savings. In addition, rooftop solar should similarly be credited for distribution capacity savings based on incremental peak demand reductions, even if a utility does not have imminent plans for a distribution system project.[85]

6. Environmental Benefits

The sixth category of benefits and costs is Environmental Benefits. Rooftop solar produces clean, renewable energy that provides numerous environmental benefits. As Ms. Kobor discusses in detail, four types of environmental benefits should be included in the analysis: (1) avoided utility compliance costs, (2) avoided carbon pollution benefits, (3) avoided non-carbon air pollution benefits, and (4) water conservation benefits.[86]

The utilities acknowledge that solar provides environmental benefits, but they claim it is difficult or impossible to quantify these benefits.[87] However, Ms. Kobor and Mr. Volkmann have explained how the analysis can in fact quantify the types of environmental benefits listed above.[88] Moreover, even if some environmental benefits are difficult to quantify, it is unreasonable to simply ignore the benefits as if they do not exist. APS witness John Sterling has described how the Tennessee Valley

---

84 Volkmann Direct 31:15–25 (Ex. Vote Solar-3).

85 *Id.* at 21:6–9.

86 Kobor Direct 32:23–35:4 (Ex. Vote Solar-7); *see also* IREC Guidebook at 32–35; Volkmann Direct 22:1–26:7 (Ex. Vote Solar-3) (discussing water conservation benefits).

87 *See, e.g.*, Albert Direct 13:22–14:5 (Ex. APS-5); Albert Rebuttal 26:5–15 (Ex. APS-6); Tilghman Direct Ex. CT-1 at 6 (Ex. TEP-1).

88 Kobor Direct 32:23–35:4 (Ex. Vote Solar-7); Volkmann Direct 22:1–26:7 (Ex. Vote Solar-3).

Authority incorporated these types of environmental benefits into its value of solar analysis, and a similar process could be used here.[89]

The utilities also argue that because utility-scale solar provides similar environmental benefits to distributed rooftop solar, a "grid-scale benchmarking" methodology provides a simpler and superior way to value these benefits.[90] But as discussed below, the utility-scale methodology is flawed and it is inappropriate to value distributed solar based on wholesale utility-scale solar prices.[91] Moreover, the wholesale prices that utilities pay for utility-scale solar do not actually quantify the many environmental benefits provided by solar. As a result, the environmental benefits provided by rooftop solar should be valued in the manner that Mr. Kobor and Mr. Volkmann have described. This approach is similar to how value of solar analyses conducted elsewhere have valued environmental benefits.[92]

7. Economic Development Benefits

The seventh category of benefits and costs is Economic Development Benefits.[93] Selling and installing solar systems on homes and businesses creates local jobs for contractors, installers, sales associates, and distribution workers. In addition to the direct impacts of these local jobs, the solar industry creates additional tax revenues for state and local jurisdictions as solar employees purchase supplies and goods. As Ms. Kobor explains, there are several ways to measure these economic benefits, including an economic input-output analysis that examines the potential multiplier impacts of solar, or by quantifying the tax enhancement value caused by increased employment.[94]

---

89 Sterling Direct 5:13–6:6, 10:12–12:2 (Ex. APS-4).
90 *See, e.g.*, Albert Direct 28:16–22 (Ex. APS-5); Tilghman Direct 4:13–17 (Ex. TEP-1).
91 *See infra* pp. 28–35.
92 *See, e.g.*, IREC Guidebook at 32–35.
93 Kobor Direct 35:5–20 (Ex. Vote Solar-7); *see also* IREC Guidebook at 35.
94 Kobor Direct 35:5–20 (Ex. Vote Solar-7).

8. Grid Security Benefits

The eighth category of benefits and costs is Grid Security Benefits.[95] When households and businesses across a utility's service territory install rooftop solar systems, they can provide important reliability benefits by avoiding service interruptions and providing backup power during outages. As Mr. Volkmann explains, the analysis can calculate the grid security and reliability benefits based on the number and duration of avoided outages, multiplied by the estimated cost of an interruption.[96] TEP claims rooftop solar does not provide these benefits because the current Institute of Electrical and Electronics Engineers ("IEEE") standards require rooftop solar to disconnect from the grid during an outage.[97] However, Mr. Volkmann has explained that the IEEE is currently amending those standards, and thus these benefits may soon materialize.[98] Accordingly, the value of solar analysis should consider these benefits.

II. THE ALTERNATIVE VALUE OF SOLAR METHODOLOGIES ARE FLAWED AND WOULD NOT FULLY VALUE ROOFTOP SOLAR'S BENEFITS AND COSTS.

The utilities and other parties have put forth numerous alternative methodologies for analyzing the value of solar. For example, APS proposes a short-term avoided cost methodology and a utility-scale solar benchmarking method.[99] TEP proposes both a utility-scale benchmarking method and a "Utah Model" that uses cost of service hypotheticals.[100] Staff has endorsed both an avoided cost approach and a modified version of the utility-scale solar benchmarking method. RUCO criticizes the

---

95 *Id.* at 36:1–7; Volkmann Direct 26:8–28:2 (Ex. Vote Solar-3); *see also* IREC Guidebook at 29–32.

96 Volkmann Direct 26:29–27:20 (Ex. Vote Solar-3).

97 Overcast Rebuttal 44:16–45:3 (Ex. TEP-4).

98 Tr. 1634:19–1635:18 (Volkmann Test.).

99 Albert Direct 17:1–19:26, 27:14–32:17 (Ex. APS-5).

100 Tilghman Rebuttal 2:21–3:26 (Ex. TEP-2).

utility-scale method, but would use it as the starting point for a "step-down" approach that would incrementally decrease the value of solar on a pre-determined schedule.[101]

The common flaw in all of these methodologies is that they would not fully and fairly value the benefits and costs of rooftop solar. In addition, adopting one of these alternative methodologies, rather than the long-term benefit and cost approach, would run counter to the methodologies used in most other jurisdictions. These alternative methodologies also improperly conflate the value of solar analysis with the utilities' views on compensation for solar exports. Consequently, if the Commission were to adopt one of these narrow methodologies, it would undervalue solar and do little to assist the Commission in future decisions regarding solar.

A. APS's Short-Term Avoided Cost Methodology Ignores Many Benefits.

APS has proposed a short-term avoided cost methodology that would set the value of solar based on the avoided energy costs and energy losses that occur in a historical year.[102] Under this methodology, the utility would analyze rooftop solar exports in a specific historical year, and then calculate the resulting avoided energy costs and energy losses.[103] This methodology is flawed because it would ignore many benefits, such as transmission and distribution capacity savings, and environmental, economic development, and grid security benefits. A methodology that categorically ignores many benefits by design would not accurately value solar exports. As a result, the short-term avoided cost methodology would be of limited use in designing sound solar policies and evaluating solar rate design changes.

The utilities acknowledge that this methodology would not incorporate certain benefits, but they claim ignoring future benefits is reasonable because the benefits

---

101 *See* Briana Kobor Suppl. Resp. Test. 1:23–2:5 (June 13, 2016) ("Kobor Suppl. Resp.") (discussing RUCO's updated proposal).

102 Albert Direct 17:1–19:26 (Ex. APS-5).

may not materialize if solar customers do not continue to operate their solar panels in the future.[104] However, there is no evidence that a meaningful proportion of solar customers will pay for and install solar panels, and then stop operating them before the end of their useful lives. In fact, the utilities have claimed in their current rate cases that the continued growth of rooftop solar in the future necessitates rate design changes.[105] This belies their suggestion here that future solar benefits may not materialize because customers might stop operating their systems. In addition, the analysis would examine the collective value of thousands of rooftop solar systems installed across a service territory, so even if a small proportion of customers were to stop operating their systems it would not materially impact the analysis.[106] Tellingly, although APS lists the short-term avoided cost methodology as a potential option for valuing solar, no parties specifically endorsed this methodology at the hearing.

B. TEP's "Utah Model" Is a Cost of Service Analysis, Rather Than a Value of Solar Methodology, and It Would Ignore Many Benefits.

TEP has proposed the "Utah Model" for valuing solar. This approach would compare two cost of service studies, which would purportedly allow the Commission "to determine if there is a cost or benefit that should be applied to the DG customer based on known and measurable costs and benefits currently collected through rates."[107]

The "Utah Model" is a seriously flawed method for valuing solar for several reasons. First, this approach is not actually a value of solar analysis at all, but is instead a cost of service analysis. The heart of this approach involves conducting two cost of service studies and comparing their results, which would supposedly show the net costs or benefits attributed to solar customers. But as discussed below, a value of

---

103 *Id.* at 17:22–28, 18:1–4.

104 *Id.* at 19:9–26; Overcast Direct 46:23–25 (Ex. TEP-3).

105 *See supra* pp. 3–4 & n.7.

106 Kobor Rebuttal 31:4–18 (Ex. Vote Solar-8).

107 Tilghman Direct 7:11–13 (Ex. TEP-1).

solar analysis and a cost of service study are different types of analyses and are fundamentally distinct.[108] A cost of service study may provide helpful information on the costs a utility incurs to provide solar customers with electricity—but it does not provide data on the value of rooftop solar exports, which is the aim of the analysis.

Second, the "Utah Model" only considers benefits and costs that occur during the historical cost of service test year. Thus, this approach would ignore the future benefits that accrue over the life of a rooftop solar system, and entire categories of benefits that cost of service studies do not incorporate (e.g., environmental, economic development, and grid security benefits). TEP seems to suggest this approach would consider these benefits, as they would be "defined" and the Commission "would have the opportunity and flexibility to set these additional cost and savings values at [its] discretion in the Company's rate case."[109] But merely identifying these benefits, while delaying any quantification or analysis of them until some later proceeding, would effectively ignore the benefits in the analysis. Instead, the value of solar methodology itself should comprehensively analyze the full set of benefits and costs.

Third, even if the "Utah Model" were a valid approach for valuing rooftop solar—which it is not—the methodology is problematic. The premise is to compare hypothetical costs based on the assumption that rooftop solar never existed. This hypothetical exercise requires assumptions regarding what solar customer consumption and utility costs would have been if customers had not installed solar. This creates challenges associated with determining a solar customer's load shape, as well as projecting how utility costs would have changed but for rooftop solar offsetting a portion of the solar customer's load.[110]

---

108 *See infra* p. 36.

109 Tilghman Direct 7:15–18 (Ex. TEP-1).

110 Kobor Rebuttal 27:11–17 (Ex. Vote Solar-8).

For these reasons, the "Utah Model" is an inappropriate method for valuing solar. The preferred approach would be to (1) conduct a value of solar analysis that evaluates the full set of long-term benefits and costs associated with solar exports, and (2) conduct a traditional cost of service study that analyzes the cost to serve solar customers based on delivered load. The "Utah Model" conflates these distinct analyses and should be rejected.

C. A Utility-Scale Benchmarking Methodology Would Improperly Conflate the Value of Rooftop Solar with Wholesale Utility-Scale Solar Prices.

1. APS's and TEP's utility-scale solar methodologies should be rejected.

The utilities have supported "grid-scale benchmarking" methodologies that use wholesale utility-scale solar prices as a proxy for the value of distributed solar.[111] APS's recommended approach would start with current market prices for utility-scale PV power purchase agreements ("PPAs"), and then slightly adjust those prices for the "recognized valuation differences" between distributed and utility-scale solar.[112] TEP states that the utility-scale solar PPA price itself is a "viable proxy to the value of DG," and in TEP's and UNSE's current rate cases they propose that the single, most-recent utility-scale PPA would set the compensation rate for solar exports.[113] The utilities claim the utility-scale methodology is simple and focuses on the lowest-cost solar resource.[114] But the utility-scale approach is an improper method to value distributed solar because it conflates two distinct resources that are installed and operated by two very different types of entities operating in different markets. Thus, the wholesale price of utility-scale solar has no bearing on the value of distributed solar.

---

111 Albert Direct 27:14–32:18 (Ex. APS-5); Tilghman Rebuttal 2:21–3:1 (Ex. TEP-2).
112 Albert Direct 28:25–29:5 (Ex. APS-5).
113 Tilghman Direct 3:15–19 (Ex. TEP-1); Tilghman Rebuttal 2:25 (Ex. TEP-2).
114 Tilghman Rebuttal 2:17–22, 3:3–4 (Ex. TEP-2); Albert Direct 32:13–18 (Ex. APS-5).

a. Distributed solar and utility-scale solar are not interchangeable resources.

The utility-scale methodology is improper because distributed solar and utility-scale solar are distinct generation resources that are not interchangeable with one another. The smaller and decentralized nature of distributed solar sited at the point of customer service provides unique benefits that a utility-scale solar project does not. These benefits include: (1) higher generation capacity value due to the geographic diversity of distributed solar systems spread across a utility's territory, (2) potentially greater avoided distribution costs and grid services from distributed solar, and (3) greater local employment benefits.[115] In addition, because rooftop solar is a distributed energy resource, it can provide unique grid services that a large, centrally-located utility-scale solar project cannot.[116] The utilities recognize some of these differences between the two resources, yet their recommended methodologies would not sufficiently account for many of these differences.[117]

Notably, the Commission and several other states have already recognized that distributed solar and utility-scale solar are not interchangeable resources. Arizona's Renewable Energy Standard and Tariff includes a DG "carve-out," which requires utilities to meet 30% of the overall renewables requirements with distributed solar or other distributed resources.[118] The renewable energy standards of several other states contain similar DG carve-outs.[119] If distributed solar and utility-scale solar truly

---

115 Kobor Rebuttal 34 n.78 (Ex. Vote Solar-8); *see also* Beach Direct 29:1–32:45 (Ex. TASC-26) (discussing additional distributed solar benefits); Beach Rebuttal 9:9–18, 24:7–17 (Ex. TASC-27) (same).

116 Volkmann Direct 28:7–29:4, 30:15–32:6 (Ex. Vote Solar-3).

117 *See* Albert Direct 30:1–32:10 (Ex. APS-5); Tilghman Rebuttal 2:22–25 (Ex. TEP-2).

118 A.A.C. R14-2-1805(B).

119 *See, e.g.*, 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).

provided interchangeable value, there would be no reason for Arizona and other states to specifically require minimum levels of distributed solar. The fact that multiple states have enacted DG carve-outs is strong evidence that all solar resources are not identical, and distributed solar in particular provides unique benefits and value.

b. Distributed solar and utility-scale solar are installed and operated by different entities operating in different markets.

Valuing distributed solar based on utility-scale prices is also improper because the two types of solar resources are installed by very different types of entities who operate in different markets with distinct regulatory constraints. Thousands of individuals, families, and small businesses across Arizona install distributed solar on the roofs of their homes and offices. In contrast, utilities and sophisticated energy companies build and operate utility-scale solar projects.

Distributed solar is also subject to numerous regulatory constraints that a utility-scale solar project does not face. A household or small business that installs rooftop solar must locate the solar panels on the roof of their home or business, or elsewhere on their premises.[120] A utility-scale developer, however, can strategically choose where to develop their projects to maximize their profits. In addition, a household or small business that installs rooftop solar must do so for the primary purpose of providing "part or all of the [customer's] requirements."[121] In contrast, a developer builds a utility-scale solar project for the primary purpose of selling energy for profit. A household or business that installs rooftop solar must also limit the size of the solar system to provide no more than 125% of the customer's total load.[122] A utility-scale solar project does not face any size limitations.

---

120 A.A.C. R14-2-2302(13)(a).

121 *Id.* R14-2-2302(13)(b).

122 *Id.* R14-2-2302(13)(d).

In addition, distributed solar and utility-scale solar operate in very different markets. Utility-scale developers can sell the electricity they generate to numerous buyers by bidding into a number of utility requests for proposals. In contrast, there is no competitive market for rooftop solar customer participation. Rooftop solar customers must deliver their exports to the utility, and they cannot enter into a contract with another individual or entity to purchase their excess electricity. Solar customers participate in the electricity market only incidentally by design, due to the regulatory constraints on the purpose and size of distributed solar systems. A utility-scale solar developer thus sells power into a very different market than an individual or small business with rooftop solar does.

c. Utility-scale solar prices have no impact on the value distributed solar exports provide to customers without solar.

The value of solar analysis should calculate the net benefits solar exports provide to customers without solar. The utilities have argued that utility-scale solar provides many of the same benefits, but at a lower price. But this argument ignores the fact that the utilities do no not offer their customers access to utility-scale solar at wholesale PPA prices. Customers without solar simply purchase delivered energy from the utility at the full retail rate. They will thus generally be indifferent to, and unaware of, whether the energy they consume comes from their neighbor's rooftop solar system or from a distant centralized power plant.[123] Accordingly, the price the utilities pay for utility-scale solar has no bearing on the value of distributed solar.

d. Other states and utilities have not used the utility-scale benchmarking approach to value distributed solar.

Finally, it is telling that the utilities have not pointed to any other jurisdictions that have used the utility-scale methodology to calculate the value of solar. Vote Solar is not aware of any other jurisdiction that has ever used utility-scale benchmarking to value distributed solar. While Vote Solar supports the deployment of all forms of solar—including rooftop solar, community solar, and utility-scale solar—valuing rooftop solar based on wholesale utility-scale prices is unreasonable and would undervalue rooftop solar. This would undercut the continued growth of rooftop solar in Arizona, and it would prolong the contentious rooftop solar disputes.

2. Staff's and RUCO's attempts to improve the utility-scale solar methodology should also be rejected.

Staff and RUCO have offered pointed criticisms of the utility-scale approach in their recent supplemental testimony, and both parties have attempted to improve the methodology. Unfortunately, these attempts to improve the utility-scale approach are unsuccessful and do not—and cannot—address the fundamental problems with using utility-scale solar prices as a proxy for the value of distributed solar.

Staff witness Tom Broderick testified on June 13, 2016, that using a single utility-scale PPA to value solar is problematic because the results would be highly variable and the utility could artificially lower the value of distributed solar by selectively choosing the PPA that would set the distributed solar value. Furthermore, Staff's additional data requests and analysis have highlighted how using a single PPA or only a subset of recent PPAs would unreasonably lower the value of distributed solar. Staff's analysis shows that if a weighted average approach is used instead, the value attributed to distributed solar would be significantly higher.[124]

The fact that the value of distributed solar could vary so widely depending on which utility-scale PPAs are used and the parameters employed powerfully demonstrates the arbitrary nature of this methodology and that utility-scale solar PPAs are not a reasonable proxy for the value of distributed solar. When a rooftop solar system exports energy to the grid it results in certain benefits and costs, which

[123] Kobor Rebuttal 34:20–25 (Ex. Vote Solar-8).

the long-term benefit and cost methodology quantifies. The net value of that system's exports do not, and should not, change based on the price the utility paid for its most recent utility-scale PPA, or some subset of historical PPAs. For these reasons, the Commission should not adopt any variation of the utility-scale methodology. But if the Commission were to endorse a utility-scale approach despite these significant flaws, Staff's weighted average approach is superior to the utilities' methodologies.

RUCO witness Lon Huber's supplemental testimony on June 9, 2016, discussed how the primary benefit of the utility-scale solar approach is its supposed simplicity, but in reality the approach is complex and there are many subjective and arbitrary decisions that must be made.[125] Vote Solar agrees with this point. However, despite his criticisms of the utility-scale approach, Mr. Huber has recommended using the method to set the initial value of distributed solar and then incrementally decreasing the value over time on a pre-determined schedule. Unfortunately, Mr. Huber's methodology would only add to the problems of the utility-scale approach. As discussed, using utility-scale solar prices to set the initial value of distributed solar is unreasonable. Arbitrarily decreasing that value over time would only add an additional layer of unreasonableness. The value assigned to rooftop solar should reflect the actual value of the resource. If the value of exports does in fact decline over time due to increased penetration or other factors, the analysis should reflect that. But the value of solar should not arbitrarily decline based on policy considerations that are divorced from the actual value of the resource. Mr. Huber's approach conflates the value of rooftop solar and the compensation paid for exports. The value of solar

124 *See* Exs. S-12, 13, 14.
125 *See* Kobor Suppl. Resp. 1:23–2:5.

methodology should not be compromised or skewed to reflect a party's view of the appropriate compensation rate.[126]

Mr. Huber's "step-down" approach is similar in some respects to failed legislation in Maine that would have compensated solar exports in a similar manner. The experience in Maine provides a good example of how the parties here have tended to conflate two distinct inquiries: how to value solar and how to compensate solar exports. The Maine legislature sponsored a 2015 value of solar study that used the long-term benefit and cost approach. The study concluded the levelized benefits of rooftop solar are 33.7 ¢/kWh.[127] In a separate action, the Maine legislature passed legislation—which the Governor vetoed—that would have eliminated net metering and reduced compensation for exports on a "step-down" basis. Thus, Maine analyzed the value of solar using the long-term benefit and cost methodology, and then in a separate proceeding the state proposed altering the compensation paid for exports. Arizona should similarly value rooftop solar exports using the full, long-term methodology before considering any changes to compensation.[128]

The conflation of the value of solar analysis with the compensation issue is a common thread underlying the alternative methodologies. Other jurisdictions have

---

[126] RUCO's June 22, 2016 comments also endorse using an avoided cost approach to initially set the value of solar, and then similarly "stepping-down" that value over time. The same fundamental problems would remain with this "step-down" approach, as it would still arbitrarily decrease the value of rooftop solar in a manner that does not reflect any actual decrease in value.

[127] Kobor Direct 16:1 (Ex. Vote Solar-7).

[128] Importantly, while the failed Maine legislation would have decreased the export rate as rooftop solar penetration increased, it would not have been a one-way downward ratchet as Mr. Huber has proposed here. Instead, the Maine approach would have included an automatic adjustment mechanism that would have increased compensation rates if a review every six months showed the market was not growing fast enough to meet the penetration targets. L.D. 1649, 127th Leg., 2d Reg. Sess., at 11:18–23 (Me. 2016), *available at* https://goo.gl/gQGQbV. In addition, the Maine approach had several similarities to Vote Solar's recommendations here. For example, the Maine approach would have allowed for self-consumption, and it would have established an administratively-set export price for residential and small commercial solar customers. *Id.* at 10:38–11:17, 11:24–28.

not typically used these alternative methodologies to value solar, yet the utilities have proposed doing so here because of their policy views on compensation for solar exports. The purpose of this proceeding, however, is to develop a methodology for valuing solar. As this proceeding has shown, selecting the proper methodology for valuing solar is challenging in itself. Adding policy concerns regarding compensation to the mix unnecessarily complicates this task. Resolution of these compensation issues should wait until a later time, after a full and fair value of solar analysis is conducted and a utility has proposed a concrete compensation proposal. At that point, the Commission and the stakeholders should be equipped with the information they need to make a reasonable and fully-informed decision on compensation. Keeping these distinct issues separate and focusing only on the value of solar methodology in this proceeding will simplify the Commission's task here. It is also more likely to result in a robust and fair value of solar methodology that will better inform those later discussions.

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

At the Commission's request, the utilities have filed cost of service studies that purport to quantify a cost shift caused by solar customers.[129] Evidence from these cost of service studies is irrelevant to this value of solar proceeding. A value of solar analysis should determine the value of solar exports. In contrast, a cost of service study quantifies the costs a utility incurs to provide electricity to customers, and these types of costs are not included in a value of solar analysis. In addition, even if the cost of service studies were relevant, the Commission should make no findings based on them because they suffer from serious methodological flaws that overestimate the cost to serve solar customers. There are also significant transparency issues because Vote Solar and other parties were unable to fully analyze the study results.

A. The Costs Analyzed in the Value of Solar Analysis Should Not Include the Utility's Costs to Provide Electricity to Solar Customers.

The value of solar analysis determines the net value provided by rooftop solar exports. The costs of solar exports to the utility and customers without solar are: (1) the cost of compensating solar customers for exports, and (2) integration costs.[130] Cost of service studies, in contrast, analyze the historical costs a utility has incurred to provide its customers with electricity. Calculating the costs and revenues associated with providing electricity to solar customers is an independent and distinct analysis from valuing the net benefits provided by rooftop solar exports. As APS has explained, a value of solar analysis and a cost of service study are "fundamentally different" types of analyses.[131] A properly-designed cost of service study may provide useful data in a rate case, where the parties can analyze both the value of solar and the cost to serve solar customers. But the cost of service studies filed in this proceeding are irrelevant to the primary issue here, which is determining a methodology for valuing solar exports. APS appears to ultimately agree with this point, as none of the value of solar methodologies it has discussed would incorporate its cost of service study results.[132]

B. The Cost of Service Studies Are Methodologically Flawed.

Even if the cost of service studies were relevant to the value of solar analysis—which they are not—the studies and their results are methodologically flawed and overestimate the costs to serve solar customers and inflate the alleged cost shift. Consequently, the Commission should not issue any findings based on the study results and it should not approve the cost of service study methodologies.

---

129 *See, e.g.*, Leland Snook Direct Test. 3:10–5:20 (Feb. 25, 2016) ("Snook Direct") (Ex. APS-1); Overcast Direct 4:24–5:24 (Ex. TEP-3).

130 *See supra* pp. 17–18.

131 Snook Direct 29:14 (Ex. APS-1).

132 *See* Albert Direct 16:16–32:17 (Ex. APS-5).

1. APS's study overallocates costs to rooftop solar customers and inflates the alleged cost shift.

APS has presented a cost of service study allegedly showing that rooftop solar customers on two-part rates shift approximately $29-$67 per month in costs to customers without solar.[133] However, APS's study is methodologically flawed in several key ways that inflate the utility's cost shift allegations.

First, APS's cost of service study is flawed because it did not allocate costs to solar customers based on the delivered load that APS actually provided them.[134] Instead, APS chose to allocate costs to solar customers based on the customers' total load, which included load that was served on-site by the solar system.[135] This overstates the cost to serve solar customers, as APS allocated costs for electricity that the utility did not provide them. It is inappropriate and inequitable to allocate utility costs to solar customers based on services APS did not provide. Instead, APS should have allocated costs to solar customers based on the services that were actually provided by APS, which is delivered load. APS and the other utilities have claimed the load profile of solar customers is so unique that they should be singled-out for different rate treatment.[136] But rather than using that load profile to allocate costs to solar customers, APS used a hypothetical load profile that assigned solar customers additional costs. APS allocates costs to other customers based on delivered load, and APS should allocate costs to solar customers in the same manner.

As Vote Solar witness Briana Kobor has shown, APS's decision to allocate costs based on total load, rather than delivered load, significantly skews the results.

---

133 Snook Direct 3:18–22 (Ex. APS-1).

134 Kobor Rebuttal 10:1–13:20 (Ex. Vote Solar-8).

135 Specifically, the 2014 cost of service data shows that for the average solar customer on energy-based rates, APS delivered 10,600 kWh to the customer and the customer's rooftop solar system generated 4,100 kWh that was consumed on-site. *Id.* at 14:4–8. Yet APS's study allocated costs to that customer based on the entire load of 14,700 kWh, rather than allocating costs based on the 10,600 kWh of electricity that APS actually delivered to the customer.

Specifically, APS's approach overestimates energy-related and peak demand-related costs by 28-38%.[137] Because these costs drive approximately 63% of the revenue requirement, overestimating these costs by such a large degree has a substantial impact on the study results. APS's approach also inflates the costs related to non-coincident peak by 3-7%, and individual maximum peak by 7-10%.[138]

Second, APS's attempts to "credit" solar customers for the value of solar are flawed and do not appropriately value the benefits of solar.[139] To account for the value of exports, APS credited customers for the solar system's entire energy production at a rate of 2.895 ¢/kWh, which is the rate applied to net excess generation under net metering.[140] APS also credited solar customers for self-provided capacity by crediting a portion of the production demand cost.[141] These credits do not adequately compensate for the flaws in APS's approach because they do not fully credit solar customers for any of the numerous other benefits provided by solar.[142] Rather than allocating costs based on a solar customer's entire load and then partially crediting the customer for a small proportion of solar benefits, the simpler and preferred approach would be to allocate costs to solar customers based on what the utility actually provides: delivered load.

Third, APS has understated the revenues received from solar customers for the electricity APS provided them.[143] APS claims solar customers shift costs to other customers by comparing the costs allocated to solar customers against the revenues collected from those customers. But APS skewed both sides of this equation. As discussed, APS distorted the cost calculation by allocating costs to solar customers for

---

136 *See, e.g.*, Snook Direct 11:22–13:24, 26:15–27:11 (Ex. APS-1).
137 Kobor Rebuttal 17:3–6 (Ex. Vote Solar-8).
138 *Id.* at 17:7–8.
139 *Id.* at 13:23–14:26.
140 *Id.* at 14:8–10.
141 *See id.* at 14:15–26; William Monsen Rebuttal Test. 17:14–18:2 (Apr. 7, 2016) ("Monsen Rebuttal") (Ex. TASC-29).
142 Tr. 132:10–134:24 (Snook Test.); Monsen Rebuttal 16:4–18:19, 19:21–30 (Ex. TASC-29).

services that APS did not actually provide. APS also skewed the revenue calculation by improperly understating the revenues it received from solar customers for their electricity purchases. APS did so by totaling the revenues received by solar customers and then subtracting the compensation APS paid the customers for exports. APS should have stopped at the first step. The compensation APS pays solar customers for exported energy should not be part of the cost of service study because those costs are not related to providing solar customers with electricity. Although APS has correctly recognized that a cost of service study and a value of solar analysis are "fundamentally different" types of analyses, it conflated the two in its cost of service study.[144] By overestimating costs and understating revenues in this manner, APS has improperly inflated the alleged cost shift caused by solar customers.

Ms. Kobor's rebuttal testimony describes these methodological flaws in greater detail.[145] APS did not dispute Ms. Kobor's testimony on these issues at the hearing.

2. TEP's study overallocates costs to rooftop solar customers and inflates the alleged cost shift.

TEP's cost of service study suffers from some of the same flaws as the APS study. Similar to APS's study, the TEP cost of service study understates the revenues received from solar customers by subtracting the compensation TEP pays for solar exports from the overall revenues TEP receives from solar customers for their electricity purchases.[146] As discussed previously, the cost of service study should analyze the costs and revenues associated with the energy TEP delivers to solar customers. Including the costs TEP incurs for purchasing exported energy in the cost of service study conflates two distinct analyses and results in an overly-inflated cost shift. In addition, while the TEP study did allocate costs to solar customers based on

143 Kobor Rebuttal 17:15–18:7 (Ex. Vote Solar-8).
144 *See* Snook Direct 29:14–15 (Ex. APS-2).
145 Kobor Rebuttal 9:10–21:5 (Ex. Vote Solar-8).

delivered load for most categories, TEP incorrectly allocated delivery costs.[147] As Mr. Volkmann explained, TEP mischaracterized the maximum peak demand that rooftop solar customers place on the distribution system.[148] As a result, TEP overallocated costs to solar customers, which skews the results.

TEP's study has an additional methodological flaw. When calculating the revenues received from solar customers, TEP used the actual revenues received during the 2015 test year in its recently-filed rate case.[149] But TEP calculated the costs to serve solar customers based on its recent rate case costs, which include a 12% requested increase in non-fuel revenue requirements.[150] The cost calculation is thus arbitrarily inflated by 12% compared to the revenue calculation. This improperly skews the analysis and further inflates the alleged cost shift. Ms. Kobor's rebuttal testimony describes these methodological flaws and other issues with TEP's cost of service study in greater detail.[151] TEP also did not dispute Ms. Kobor's testimony on these issues at the hearing.

C. Vote Solar and Other Parties Were Unable to Fully Analyze the Cost of Service Studies.

RUCO has stated that transparency and accessibility are two key features of a value of solar analysis.[152] Vote Solar agrees, and these principles should also extend to the utilities' cost of service studies. But unfortunately, the APS and TEP cost of service studies in this proceeding were lacking in transparency and accessibility. Both utilities used third-party proprietary systems to develop the cost of service studies, and this limited Vote Solar and other parties' ability to fully analyze the studies and their

---

146 *Id.* at 24:6–12.
147 Tr. 1714:10–20 (Kobor Test.).
148 Tr. 1629:22–1630:1 (Volkmann Test.).
149 Kobor Rebuttal 23:23–24:5 (Ex. Vote Solar-8).
150 *Id.* at 23:23–24:5, 24:13–25:3.
151 *Id.* at 21:6–27:24.
152 Huber Direct 8:23–9:4 (Ex. RUCO-2).

results.[153] For example, APS used a new cost of service model with a proprietary back-end, and it provided Vote Solar with a proxy model and spreadsheets containing the inputs and outputs to the model.[154] This data, however, did not allow Vote Solar and other parties to fully evaluate and assess results under alternate scenarios.

Vote Solar raised these transparency and accessibility issues with APS and TEP during discovery, and both utilities made efforts to explain the proprietary systems and assist Vote Solar in its review of the studies. While Vote Solar appreciates the utilities' efforts, Vote Solar remained unable to fully review the studies in a timely manner. Because the cost of service studies are ultimately irrelevant to the value of solar analysis, Vote Solar should not be unduly prejudiced by its inability to fully review the studies in this proceeding. But if the Commission were to conclude that the studies are relevant, these transparency and accessibility issues provide further cause to reject the studies. Moreover, the transparency and accessibility issues encountered in this proceeding are strong evidence that the Commission should ensure that future value of solar analyses are transparent and fully reviewable by all parties, and that it is preferable for an independent third-party to conduct the analysis.

CONCLUSION

Vote Solar recommends that 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's specific recommendations on the value of solar methodology are detailed above. Vote Solar also recommends that 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.

---

153 *See* Kobor Rebuttal 8:18–9:9 (Ex. Vote Solar-8).

154 *Id.* at 8 n.12; Ex. Vote Solar-9 (demonstrating the inaccessibility of APS's working model); Tr. 1709:15–1712:24 (Kobor Test.) (discussing transparency issues in greater detail).

DATED this 20th day of July, 2016.

By [signature]
Timothy M. Hogan
ARIZONA CENTER FOR LAW IN THE PUBLIC INTEREST
514 W. Roosevelt Street
Phoenix, Arizona 85003

Michael A. Hiatt
EARTHJUSTICE
633 17th Street, Suite 1600
Denver, Colorado 80202

Chinyere A. Osuala
EARTHJUSTICE
48 Wall Street, 19th Floor
New York, NY 10005

Attorneys for Vote Solar

ORIGINAL and 13 COPIES of the Foregoing filed this 20th day of July, 2016, with:

Docketing Supervisor
Docket Control
Arizona Corporation Commission
1200 W. Washington
Phoenix, AZ 85007

COPIES of the foregoing Electronically mailed this 20th day of July, 2016, to:

All Parties of Record