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BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS

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

POST-HEARING REPLY BRIEF
OF
ARIZONA INVESTMENT COUNCIL

Arizona Corporation Commission
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I. INTRODUCTION

This proceeding considered several issues, but focused on four in particular: (1) what is the cost to serve rooftop solar customers and how does that cost compare to the cost to serve the average residential electric customer; (2) are the characteristics of rooftop solar customers sufficient to make them a distinct rate class for cost of service purposes; (3) what are the rate design implications, if any, of the cost of service studies submitted by Arizona Public Service ("APS") and Tucson Electric Power / UNS Electric, Inc. ("TEP"); and (4) how should rooftop solar customers be compensated for the energy that they export to the electric grid?

While VoteSolar and The Alliance for Solar Choice ("TASC") have argued throughout this proceeding that the sole focus and outcome should be a methodology for valuing rooftop solar export energy, other parties agree that such a narrow scope fails both to respond to the Commission's stated interest in this docket and to capture other important impacts that a rooftop solar customer imposes on the utility system – including cost-shifts resulting from antiquated rate design. (*See, e.g.,* Exhibit AIC-2 (O'Sheasy Rebuttal Testimony) at 2; Procedural Order December 3, 2015 at 4:4-5.) A method for valuing exported rooftop solar cannot be created in a vacuum; instead, it must be determined based on a holistic view of rooftop solar and how solar fits into the electric grid.

Arizona Investment Council ("AIC") engaged in this proceeding to discuss the cost of serving rooftop solar customers and the value of rooftop solar, which encompasses more than a subjective determination of the price paid for exported solar power. AIC agrees with TEP Witness Carmine Tilghman who stated that the ultimate goal is to "transition [the electric] industry from a very regulated cost of service model into a more flexible, integrated, interactive utility of the future." (Tilghman Hearing Testimony, Tr. 632:9-12.) But the required evolution is not one-sided. Arizona's advanced energy future depends on the rooftop solar industry similarly evolving, along with "the regulators, rate designs, pricing signals, [and] technologies." (*Id.* at 632:18-19.) Any value of rooftop solar determined in this proceeding should foster the change necessary to put all technologies on a level playing field, recognizing the continuing importance of the electric grid and the fundamental policy goal that customers pay for the services that they use.

For these reasons, AIC advocates rate design reform to eliminate the current cross-subsidization of rooftop solar by non-rooftop solar customers. This can be accomplished by treating rooftop solar customers as a separate class for cost of service and rate making purposes and instituting three-part demand rates. AIC recommends that export power from rooftop solar customers be priced at the utility's avoided cost and based on a time-of-use or hourly basis. Finally, neither the value of exported power nor the value of distributed generation in general should be components of ratemaking; ratemaking should continue to be based on the sound principles of cost causation and rate design.

II. DISCUSSION OF ISSUES

A. AIC advocates to eliminate all subsidies: both those embedded in existing rate design and those caused by the retail rate export credit paid under the current net metering regime.

The evidence at hearing proved that solar customers are getting a "free ride on the utility system" under the combination of today's energy-only rate design and the existing net metering regime. (Overcast Hearing Testimony, Tr. 845:9.) That "free ride" is paid for by non-solar customers to the tune of more than $580 million each year for just APS alone. There is no public policy rationale to sustain a subsidy at that level. On the other hand, both evidence and policy support changing how, and how much, rooftop solar customers are compensated for the energy they generate. Rooftop solar customers are more expensive to serve than the average residential customer, and rate design should change to ensure that a rooftop solar customer pays for the utility services that he or she uses. Any exported energy should be compensated at avoided cost. Anything above avoided cost is a cost shift to non-rooftop solar customers. If the Commission determines to pay a rooftop solar customer more than the utility's avoided cost for exported energy – thus continuing the subsidy – the additional amount should be recovered from all customers (including rooftop solar customers) in a transparent manner, such as through a utility's fuel adjustment clause or renewable surcharge mechanism.

1. The evidence presented at hearing made clear that the cost of serving a rooftop solar customer is higher than the cost to serve the average residential customer – an increased cost that rooftop solar customers do not pay under the existing regulatory framework.

The cost of service studies ("COSS") submitted by both APS and TEP unequivocally demonstrate that the cost to serve a rooftop solar customer is higher than the cost to serve the average residential customer. (Exhibit APS-1 (Snook Direct Testimony), Exhibit TEP-1 (Tilghman Direct Testimony), and Exhibit TEP-3 (Overcast Direct Testimony).) Not only is the cost to serve rooftop solar customers higher, they currently pay significantly less than that cost. For example, in the APS service territory, rooftop solar customers on an energy-only two part rate are paying only 36 percent of the utility's cost to serve them. (Leland Hearing Testimony, Tr. 103:17-21.) That number rises to 72 percent if the solar customer takes service from APS on its current three part rate schedule, ECT-2. (*Id.*) Because rooftop solar customers are not paying their allocated share of costs, other customers pay more to make up the difference – this is the rooftop solar to non-rooftop solar "cost shift." And the cost shift is substantial – in the APS service territory, each individual rooftop solar customer on a two-part rate shifts $804 each year to non-rooftop solar customers, and the annual cost shift on the APS system for 2015 is over $580 million. (Leland Hearing Testimony, Tr. 116:15-25.)

Virtually every party in this matter agrees that a significant cost-shift is occurring, (*See, e.g.,* Huber Hearing Testimony, Tr. 1494:1-6; Exhibit TEP-3 (Overcast Direct Testimony) at 36; Solganick Hearing Testimony, Tr. 1337: 9-10; and Exhibit AIC-2 (O'Sheasy Direct Testimony) at 19:1-3) and that rooftop solar customers will continue "getting a free ride from the system" until a three-part rate structure or another rate design solution is instituted. (Overcast Hearing Testimony, Tr. 845:9.) In addition, the current policy of month to month banking of retail energy credits exacerbates this cost shift. This policy has promoted overproduction and exportation of energy by customers in the non-summer months in order to "bank" enough retail credit "to get through the summer months without having to pay for the energy generated and delivered by the utility that was consumed by the customer." (Exhibit TEP-1 (Tilghman Direct Testimony) at 5:2-4.) However, the value of energy produced in non-summer months is not of equivalent value to energy consumed by the customer in summer peak demand months. (*Id.* at 5:4-6.) This "price differential between high load, high cost periods and low load, low cost periods" is being shifted to non-solar customers. (Exhibit TEP-3 (Overcast Direct Testimony) at 13:15-16.)

2. Rooftop solar customers should be treated as a separate rate class for cost of service and rate design purposes.

The characteristics of rooftop solar customers are sufficiently different from the average residential customer to treat them as a separate class for COS and rate design purposes. (Exhibit TEP-3 (Overcast Direct Testimony) at 38:17-18 and Snook Hearing Testimony, Tr. 104:6-9.) There is little doubt that rooftop solar customers and the average residential customer are not similarly situated. Indeed, as Dr. Edwin Overcast testified after conducting a detailed cost of service study of TEP's customers, "based on the actual data for the customers with rooftop solar and the regular use customers," rooftop solar customers do not fall within the normal variations of a statistical residential class. (Overcast Hearing Testimony, Tr. 847:18-19). For rooftop solar and non-rooftop solar customers to remain in the same class is "[s]tatistically not possible . . . [because] they are just very different load shapes." (Overcast Hearing Testimony, Tr. 846:19-23.)

The load shape variations between rooftop solar and non-rooftop solar customers occur because the two customer groups have different noncoincident peaks (NCP); the typical residential class NCP occurs in the summer, while the rooftop solar customer's NCP occurs in the springtime (Overcast Hearing Testimony, Tr. 847:23-25 – 848:2-3.) Rooftop solar customers generally have their largest exports of power to the electric grid during the springtime months because the temperatures are low (thus not requiring the use of air conditioners) and the rooftop solar system's production is high – this situation is when a rooftop solar customer makes maximum use of the facilities, with energy flowing onto the grid, thus creating negative load for that customer's home. (Overcast Hearing Testimony, Tr. 848:5-10). This bidirectional flow uses the electric grid system in a way that is fundamentally different than what it was designed to accommodate – a change that utilities must address to ensure grid reliability. (Exhibit TEP – 1 (Tilghman Direct Testimony) at 16:4-15.)

On the other hand, non-rooftop solar residential customers use the electric grid most during the summer, with a positive load flowing towards their house – a time during which rooftop solar customers draw very small, if any, loads (they are using what they generate and export very little onto the grid). From this, it is clear that rooftop solar customer and the average residential customers have different load shapes and rate characteristics, making it appropriate to treat them as different classes for cost of service and rate making purposes. (Exhibit APS-2 (Snook Rebuttal Testimony) at 4:18-22 and O'Sheasy Hearing Testimony, Tr. 588:11-25 – 589:1-7.)

Some parties argue that rooftop solar customers have comparable usage patterns to seasonal customers, vacant homes and customers that use energy efficiency measures. (*See, e.g.,* Exhibit VoteSolar-7 (Kobor Direct Testimony) at

9:14-16.) But no evidence did or can support such a claim. Rooftop solar customers differ greatly from the previously mentioned customers because seasonal customers, vacant homes and energy efficient homes "never have any negative load on the system." (Overcast Hearing Testimony, Tr. at 864:11-12).

Customers that engage in energy efficiency programs retain a load shape that is very similar to the average APS residential customer, whereas a rooftop solar customer does not. (Exhibit APS-1 (Snook Direct Testimony) at 24:21-23.) Energy efficiency customers typically reduce energy consumption by 5-10 percent, whereas rooftop solar customers have a 70 percent reduction in energy consumption only during certain periods of the day, creating a far different load pattern. Moreover, unlike rooftop solar, energy efficiency measures do not result in sudden and dramatic increases to that customer's load requirements. As APS Witness Snook explains, "[i]f an efficient air conditioner does not turn on, the customer's load goes away – the air conditioner is not working. If a solar system suddenly stops producing energy, however, the customer's load must just as suddenly be served by utility generation." (*Id.* at 25:3-6.) There are thus numerous justifications for treating rooftop solar and energy efficiency customers differently.

3. Rate design must change to ensure that rooftop solar customers pay for the utility services that they use both when they are and are not exporting energy to the grid.

The COSSs demonstrate that rooftop solar customers are not paying their allocated costs and are thus being subsidized by non-rooftop solar customers through a cost-shift. The cost-shift can be corrected through the implementation of a rate design that better recovers costs from those who cause them (a "cost-based" rate structure). AIC, APS, and TEP all support a three-part demand rate as the best available cost-based rate structure to address the cost-shift, as does Staff. As Staff witness Howard Solganick succinctly said of three-part demand rates, "[t]hey work."

(Solganick Hearing Testimony, Tr. 1319:6.) Staff witness Solganick further testified that the three-part demand rate "automatically sends the proper price signals and prices more accurately than a two-part rate," providing superior pricing signals that allow "customers to react in the way that fits them whether it is intensity of demand or amount of usage or timing of usage." (Solganick Hearing Testimony, Tr. 1319:9-11 and 1319:2-4.)

A three-part demand rate is comprised of (1) a customer charge, which includes charges for billing, metering and maintaining a minimum sized system; (2) a demand charge, which includes charges for the impact to the utility system due to fluctuations in a customer's individual demand; and (3) an energy charge, which is the cost of the energy delivered (or may include additional fixed costs if the demand charge was set too low). (Solganick Hearing Testimony, Tr. 1415-1416.) A three-part rate is a more dynamic cost recovery method because it better aligns cost with cost causation and automatically sends the proper price signals, providing even more and various pricing signals that allow "customers to react in the way that fits them whether it is intensity of demand or amount of usage or timing usage." (Solganick Hearing Testimony, Tr. 1319:9-11 and 1319:2-4.) If properly designed, three-part rates create price signals that can "incentivize solar to capture more of the peak," thus spurring the market to invest in new technologies that can benefit both the electric system and a customer's wallet. (Brown Hearing Testimony, Tr. 1009:22-23.) AIC advocates specifically for a three-part demand rate that sets the energy charge as close to the utility's avoided cost as possible. (Exhibit AIC-1 (O'Sheasy Direct Testimony at 18-19.)

Three-part demand rates provide better price signals to customers, thereby allowing them to manage (*i.e.* save) demand in addition to managing their energy consumption. (Exhibit APS-1 (Snook Direct Testimony) at 24:17-19.) Saving on a three-part rate is not limited to non-solar residential customers; rooftop solar customers can also save by monitoring their production through smart phone technology. In fact, TEP Witness Tilghman describes his own experience being a rooftop solar customer and saving with a three-part demand rate:

> I would actually argue that it's a little easier for a DG customer [to save] because the one thing we do know is, by and large, every renewable system that's out there today, my own included, I have an app. It's on my phone. I can tell almost instantaneously what my production is. I can monitor that production. I can easily transfer my load to the periods where I'm producing my solar. . . I understand a lot of us work, but the demand charge was only Monday to Friday, sort of on the on-peak hours. But, by and large, you do have the opportunity to shift those loads either on the weekend, the mornings, or when the solar is producing. (Tilghman Hearing Testimony, Tr. 636:17-25 – 637:1-14.)

TASC contends that an energy-only time-of-use (TOU) rate or a minimum bill would adequately address the cost-shift issues, but neither option offers an adequate solution. Relying on a TOU rate does not solve the problem because approximately 70 percent of a customer's costs are fixed or vary only with a customer's demand. (Exhibit APS-2 (Snook Rebuttal Testimony) at 8:5-9.) This is why using an energy-only price, even a TOU price, will never accurately reflect the cost of providing service. (*Id.*) And while minimum bills may collect some amount of additional fixed costs, they can over-charge high-use customers and under-charge low use customers, creating yet another rate design that "distort[s] customer price signals." (Exhibit AIC-2 (O'Sheasy Rebuttal Testimony) at 5:19-20.) Minimum bills simply cannot be designed in a way that is reasonable, fair and effective. (Exhibit APS-2 (Snook Rebuttal Testimony) at 8:15-17.)

One of the best principles of cost-based rate making is that it can be transparent and fair. Accurate price signals based on actual cost and cost causation minimize subsidization and require customers to pay their "fair share." (Exhibit AIC-1 (O'Sheasy Direct Testimony) at 6:20-27.) On the other hand, if "elements outside the cost of service regime [are used] in order to benefit one particular resource or industry" during the rate-setting process, a subsidy could be created that "could result in inter and intra class cross-subsidies, skewed price signals, and rate instability." (O'Sheasy Hearing Testimony, Tr. 523:21-25.) If rates are not cost based, there is a fundamental fairness question as well as a long run sustainability question. (O'Sheasy Hearing Testimony, Tr. 525:1-7.) Also, if rates are not based on costs, a cost-shift is most likely occurring with one customer paying more than his or her allocated amount, which at its best could be considered an inadvertent subsidy. (Solganick Hearing Testimony, Tr. 1341:13-15.) If the Commission wishes to continue to subsidize rooftop solar, it should do so in a clear and transparent manner, and not cloak it in rate design.

The best and most efficient way to eliminate the cross-subsidization and cost-shift between rooftop solar and non-rooftop solar customers would be to implement three-part demand rates with an energy charge set at the utility's avoided cost.

4. Rooftop solar customers should be paid avoided cost for excess energy exported from their solar generator to the electric grid.

Payments for excess energy exports from rooftop solar customers should be based on the utility's short term avoided costs (primarily avoided fuel, O&M, and losses) and, to the extent practical, be calculated on a time-of-use or hourly basis. (O'Sheasy Hearing Testimony, Tr. at 509:1-4.) AIC's position defines excess energy exports or excess energy generation as the amount of rooftop solar output in excess of a customer's site load *in each hour*, not on a monthly basis. Even TASC's witness agrees that if calculating only the exports, "you need to do the analysis on an hourly basis, considering both the hourly DG output and hourly loads of the DG customer to determine when the exports occur." (Beach, Hearing Testimony, Tr. 1854:11-14.) "The credits would be based upon the specific hour in which the customer's solar DG output flowed on the utility grid." (O'Sheasy Direct Testimony at 14:20-21.) This type of compensation is transparent and prevents a subsidy that would have occurred had the rooftop solar export been priced at above-market rates -- a compensation regime that is fair and sustainable to all stakeholders.

B. AIC's View on Other Parties' Positions.

1. Staff

Staff recommends that a methodology, or methodologies, be developed and adopted by the Commission to value rooftop solar exports, which the utilities would be required to present as evidence in their rate cases. (Broderick, Hearing Testimony, Tr. at 2344:15.) While Staff acknowledges that a cost-shift between rooftop solar customers and non-rooftop solar customers occurs, and that ultimately three-part rate design is the best solution to address that cost shift, (Solganick Hearing Testimony, Tr. 1337) it proposes in this matter the adoption of one or both of the below methodologies to value export rooftop solar energy:

- The avoided cost methodology – start by setting the price for exported energy at the utility's avoided energy costs along with appropriate losses specific to that utility and/or its interconnected system, and consider adders for transmission and distribution where appropriate and proven. (Exhibit Staff-2 (Solganick Direct Testimony) at 19:12-14.) Staff provided a matrix in Staff Witness Solganick Direct Testimony that summarized the factors used to compare rooftop solar on the same playing field as other technologies. (*Id.* Exhibit HS-3.)
- The advanced resource comparison methodology – compensate for exported energy at the weighted average cost of a utility's PPAs for solar generation and utility-owned solar facilities. (Broderick Hearing Testimony, Tr. at 2341:5-14)

Staff supports both of these methodologies and does not favor one over the other. (Broderick Hearing Testimony, Tr. at 2341:18-19).

Of the two methodologies, AIC prefers the avoided cost methodology because it better reflects the costs and cost-savings resulting from distributed generation of various types. By blending and averaging historical prices of a utility's solar facilities (both utility-owned and contracted through PPAs), the resource comparison methodology asks current customers to pay more for rooftop solar today because older technology was more expensive, depriving customers of the benefit of marginal prices. (Overcast Hearing Testimony, Tr. at 871:23-24.) For example, less than ten years ago, PPA prices were 14 cents per kWh, but have dropped to as low as four cents per kWh in just the past year. (Tilghman, Hearing Testimony, Tr. at 623:11-12.) By paying today's rooftop solar customers a rate that includes a portion of the higher costs from older PPAs and utility-owned projects, the resource comparison method would deprive current customers the benefit of innovation and cost-effectiveness – an unjust and unequitable solution. (*See, e.g.,* Tilghman Hearing Testimony, Tr. at 623:18-21.) The resource comparison methodology does not provide customers with the benefit of using more efficient marginal cost prices, a result that is not sound public policy. (Overcast Hearing Testimony, Tr. at 871:23-24.)

2. VoteSolar

VoteSolar believes that this proceeding should only address the price paid for rooftop solar exports and advocates the use of a benefit/cost test to value exported energy, specifically, the ratepayer impact measure ("RIM") test plus societal adders. (Exhibit VoteSolar-7 (Kobor Direct Testimony) 4:17-19; 49:20-21.) If the Commission chooses to value all rooftop solar output (on-site consumption in addition to exports), VoteSolar recommends the use of the societal cost test. (*Id.* at

49:22-23.) Within both of these methodologies, VoteSolar would consider the levelized cost of electricity as examined over the useful life of the rooftop solar system; a discount rate; near-term forecasts for DG penetration; analysis of capacity benefits on a continuous basis to capture modularity unique to rooftop solar; and inclusion of a full accounting of utility distributed solar costs, energy generation savings, generation capacity savings, transmission capacity savings, distribution capacity savings, environmental benefits, economic development benefits and grid security benefits. (*Id.* at 50:1-11.) AIC strongly opposes VoteSolar's proposed method. As the evidence at hearing made clear, VoteSolar's proposal is biased to over-compensate today's solar customers for benefits that may or may not be realized in the future. (Albert Hearing Testimony, Tr. 371-372, 405; O'Sheasy Hearing Testimony, Tr. 516.)

For example, VoteSolar indicates that it makes sense to use a cost-benefit test like those used to value energy efficiency measures because rooftop solar "only differs [from energy efficiency]. . . in its ability to export energy to the electric grid." (*Id.* at 4:11-13.) Such a concept is fundamentally misleading. Indeed, the ability to export power is precisely why rooftop solar customers have such a significantly different load pattern that they should be evaluated as their own subset of class. Energy efficiency customers have far better load factors than rooftop solar customers, a point that was supported with real evidence repeatedly during the hearing. (Snook Hearing Testimony, Tr. 304-306 and Tilghman Hearing Testimony, Tr. 606:1-2.)

Moreover, the evidence is undisputed that the RIM and societal cost test analyses used in energy efficiency and integrated resource planning dockets are used only to determine what energy efficiency programs and resources are valuable to offer, not to calculate the value of the programs. (Overcast Hearing Testimony, Tr. 877:12-21.) They are never used to set rates, as VoteSolar would have them do for rooftop solar exported energy here. (Exhibit APS-3 (Snook Rebuttal Testimony) at

5:20-24 and 7:22-26.) To the contrary, energy efficiency customers receive the benefit of their energy savings when the savings actually occur and result in a reduced cost of service in a later rate case. (O'Sheasy Hearing Testimony, Tr. 590:10-14.) Using the methodologies that VoteSolar proposes to compensate solar customers for exported energy will pay rooftop solar customers today for future savings that will likely not occur. (Albert Hearing Testimony, Tr. 371:6-9 and Exhibit TEP-2 (Tilghman Rebuttal Testimony) at 15:9-11.)

Even if the Commission accepted the use of a cost-benefit test as the methodology to value exported rooftop solar, the inputs advocated by VoteSolar are seriously flawed. The major issues with VoteSolar's proposed methodology are (1) levelizing the cost of electricity over the useful life of the rooftop solar system (generally 20-30 years); and (2) using near-term forecasts for rooftop solar penetration. Using the 20-30 year useful life of a system with a year one penetration analysis is self-serving to the benefit of VoteSolar's solar interests and results in a fundamental mismatch. As Staff testified, if the Commission is going to analyze the costs over 20-30 years, 20-30 year rooftop solar penetration levels should also be used. (Solganick Hearing Testimony, Tr. 1430:12-24.)

That mismatch aside, levelizing the "value of solar" over a 20-30 year period is itself problematic because any rate based on that future look is certain to be wrong. In essence, VoteSolar proposes to move forward some of the benefits of solar ("benefits" from their perspective) that may or may not occur later in the system's life and pay a portion of those potential future benefits to rooftop solar customers today. (Solganick Hearing Testimony, Tr. 1350:1-5.) Of course, the likelihood of that export payment being fair is slim to none, because circumstances will undoubtedly change over the course of two or three decades that will prevent the perceived benefit from occurring at the assumed level, if it occurs at all. (*See, e.g., id.*)

Staff Witness Solganick raised additional concerns about long-term analyses, explaining that "[t]he use of too low or too high of a discount rate should be avoided as this tilts the valuation high." (Exhibit Staff-3 (Solganick Rebuttal Testimony) at 13:5-6 and Solganick Hearing Testimony, Tr. 1350:7-12.) The evidence at the hearing was unequivocal on this point: forecasts are always wrong. Getting the price right depends entirely on luck. (Tilghman Hearing Testimony, Tr. 811:7-9; Solganick Hearing Testimony, Tr. 1353:17-18, 1355:14-22, 1598:12-16; and Hendricks Hearing Testimony, Tr. 1050:21-25 – 1051: 1-3.) Even if the price paid for the benefit miraculously proves right, it will most likely have been paid by customers who are not able to take advantage of it. (Tilghman Hearing Testimony, Tr. 684:24-25 – 685:1-17.)

Additionally, this type of valuation does nothing to further the market to develop new technologies. The value of solar pricing methods that Ms. Kobor advocates do not send price signals that would open the market to new third-party technologies, but are rather "an elaborate method to sort of justify cross-subsidization and relatively primitive pricing." (Brown Hearing Testimony, Tr. 1010:14-16.) Sometimes taking a step back is necessary, to be able too see that "the ultimate goal here [is] not simply to make sure that rooftop solar is the only component that [utilities and customers] have. . . [but rather] to enable all of the other technologies that [are] going to actually help transition this grid," into the grid of the future. (Tilghman Hearing Testimony, Tr. 625:5-8.)

3. TASC

Like VoteSolar, TASC advocates to value exported rooftop solar energy by using a benefit/cost test that considers the long-term benefits and cost of rooftop solar over the full expected life of the system. TASC asserts that rooftop solar is a demand side resource like energy efficiency or demand response, and therefore should be judged using the same methodology. TASC's proposal suffers from the same fundamental flaws described with respect to VoteSolar's proposal above. Moreover, TASC's analysis demonstrates the extreme danger in misapplying such a method; indeed, just two errors in TASC Witness Beach's application of the methodology resulted in dramatically inflated values and a flawed conclusion that the benefits of solar outweigh the costs, which in fact they do not. (*See, e.g.,* Albert Hearing Testimony, Tr. 363:13-16.)

The long-term avoided cost component of TASC Witness Beach's benefit/cost test has two critical errors. First, his analysis fails to "factor in that grid scale solar PV could provide the same benefits as residential PV at a significantly lower cost than the avoided cost that he calculated for conventional generation sources." (Albert Hearing Testimony, Tr. 375:17-20.) As APS Witness Albert explained, "failure to consider alternative means to obtain the same value violates one of the most basic principles of electric utility resource planning: identifying the least cost manner of meeting an identified resource need." (Exhibit APS-6 (Albert Rebuttal Testimony) at 2:6-8.) By including a natural gas generator rather than the lower cost of grid scale solar, TASC Witness Beach violated that rule. (Albert Hearing Testimony, Tr. 363:20-24.)

TASC Witness Beach's second error was to base his calculation on the output of the entire rooftop solar system, rather than to base it on export energy alone. APS's actual meter data shows that over half of the rooftop solar output is export energy, so using this data incorrectly will "dramatically affect his analysis results." (Albert Hearing Testimony, Tr. 363:6-8 and 364:5.) When APS Witness Albert recalculated the analysis to account for export energy alone, he arrived at a significantly lower number of around 4.9 cents a kilowatt hour compared to the 27 cent per kWh value of rooftop solar that Mr. Beach calculated. (Albert Hearing Testimony, Tr. 376:1-2; and Exhibit TASC-26 (Beach Direct Testimony) Figure 1 at iii.) Put another way, a mere two errors in Mr. Beach's calculation overestimated the value of rooftop solar by more than 500 percent. (Albert Hearing Testimony, Tr. 374:7-8.)

As Mr. Beach's faulty conclusion demonstrates, the Commission should not adopt a benefit/cost methodology to determine the rate at which to compensate exported energy because there are too many subjective variables that skew the value calculation in one direction or another. By using subjective benefits instead of evidence based costs, there is no way to get it right, which means that the rate will never be able to be shown just and reasonable.

4. RUCO

RUCO supports methodologies in this proceeding that consider the full output of rooftop solar, and not just the exported value; (Huber Hearing Testimony, Tr. 1489:16-18) and that "strive to be unbiased not be unduly favorable to either utilities of DG provides." (Exhibit RUCO-2 (Huber Direct Testimony) at 8:21-22.) In either the methodology or the calculation, RUCO would not include "benefits that are really hard to quantify or based on value judgements or are in an arena that is just so far outside the scope of the ACC, it doesn't make sense." (Huber Hearing Testimony, Tr. 1503:16-19.) AIC agrees with RUCO that subjective benefits outside the scope of the Commission's authority should not be included in a methodology.

RUCO has submitted a methodology that purportedly blends the two options that Staff has proposed and includes some cost of service based principles, titled market fixed contract method. As described in RUCO's supplemental comments filed on June 22, 2016, the proposed methodology "[p]rovides a solar adopter a fixed price 20-year contract that can be either applied to all production or just PV system exports. The choice would be the customer's. The credit rate for this option will start at either the avoided cost methodology rate or the utility scale proxy value. As more customers signed up, the rate drops for new customers in a predictable and gradual manner. . ." (Notice of Filing RUCO Comments, Policy Options for Value Solar Docket, June 22, 2016.)

AIC appreciates RUCO's attempt to present a middle-ground in this proceeding, but remains concerned that the proposal would inevitably overcompensate rooftop solar customers for benefits that they will not actually bring to the system over the term of that 20 year contract. If the goal is a regulatory regime that continues to subsidize the solar industry, there are more transparent and less expensive ways to do so that will not result in rate disparity between future generations of rooftop solar customers.

5. APS

APS provided testimony on three different methodologies for determining the value of exported rooftop solar, but refrained from recommending any one of the three over the other. (Albert Hearing Testimony, Tr. 360:13-15.) The three methodologies are: short-term avoided cost methodology; long-term avoided cost methodology; and adjusted grid scale approach. The short-term avoided cost methodology calculates what APS would have paid at the Palo Verde hub to obtain the exact same amount of energy that APS received from exported rooftop solar energy, at the exact same time. (Albert Hearing Testimony, Tr. 360:20-25.) The long-term avoided cost methodology involves using forecasting tools and assumptions; similar to what is used to conduct resource planning studies in which various resource alternatives are compared, to estimate the value of exported rooftop solar. (Albert Hearing Testimony, Tr. 361:10-15.) The adjusted grid-scale approach starts with using the current market price for long-term grid-scale solar PPAs, which is then adjusted for recognized valuation differences between grid-scale and rooftop solar (such as energy losses, generation energy, capacity value, and curtailability).

(Exhibit APS-5 (Albert Direct Testimony) at 28:26-27-29:1-5 and Albert Hearing Testimony, Tr. 362:14-15.)

Of the three methodologies recommended by APS, AIC supports the short-term avoided cost methodology. If either of the other two alternatives is chosen, AIC proposes including the difference between avoided cost and the resulting payment in the utility's fuel adjustment clause or renewable energy surcharge and requiring that all customers – with and without rooftop solar – be required to pay the additional sum.

APS additionally advocates evaluating "for ratemaking purposes residential solar customers as a unique subclass within the residential customer group," and using three-part demand rates to eliminate the cross-subsidization and cost-shift between rooftop solar customers and non-rooftop solar customers. (Snook Hearing Testimony, Tr. 104:7-9.) AIC agrees.

6. TEP

TEP's recommendation for a methodology would use "the larger utility scale facility connected to a company's distribution facility [as] an appropriate proxy for measuring the value of distributed generation," and using that proxy as the value of rooftop solar exported energy. (Tilghman Hearing Testimony, Tr. 600:5-6 and 600:17-21.)

TEP acknowledges that there are other ways of valuing exported rooftop solar energy, such as decoupling each component of distributed generation and valuing each individual component. Should the Commission choose to adopt such a method, TEP recommends using a similar model to what has been adopted in Utah. (*Id.* at 601:13-18.) In the Utah model, there are two categories of benefits and costs of distributed generation. The first category is comprised of benefits and costs such as fuel savings, variable O&M costs, and certain loses, which are quantifiable based on the cost of service model, and can be assigned as a value to a particular customer. (*Id.*

at 601:19-25.) The second category is comprised of benefits and costs such as forward-looking capacity savings potential and societal benefits, which are not quantifiable based on the cost of service model. (*Id.* at 602:1-2.) The value assigned to the second category of items would be a policy question for the Commission. (*Id.* at 601:2-4.) TEP is not opposed to this decoupling methodology, as long as it included a recovery mechanism for the unquantifiable costs that are not recovered through traditional rate design. (*Id.* at 4-7.)

AIC disagrees with TEP's proposal to the extent it would result in a payment for exported energy above avoided cost. If the Commission wants to subsidize rooftop solar, the payment above avoided cost should be transparent and separately accounted for so that customers know the level of and reason for the subsidy.

TEP acknowledges and discusses a customer's right and ability to offset their on-site load with rooftop solar, but also notes that it creates a cost-shift that should be addressed through rate design – specifically three-part demand rates. (Tilghman, Hearing Testimony, Tr. 600:22-25 and 601:1-2.) Through the analysis of its own COSS, TEP determined that on average, each rooftop solar customers was subsidized between \$873.72- \$966.72 per year. (Exhibit TEP – 3 (Overcast Direct Testimony) at 5.) This cross-subsidy could be remedied through the implementation of three-part demand rates – where cost and cost causation is more appropriately aligned. TEP additionally advocates for creating a separate class for rooftop solar customers for COS and rate making purposes. As discussed in detail above, a separate class is necessary for customers who use the system differently than average residential customers. (*Id.* at 13:3-13.) Rooftop solar customers can sell excess energy back to the system, under "banking" they can use the grid for virtual storage, and sometimes they have negative load. (*Id.* at 13:7-16.) And as Dr. Overcast explains, rooftop solar customers are a perfect example of a separate class because they use the electric grid for much more than the one way delivery of kWhs. (*Id.*)

AIC strongly supports both of these positions: three-part demand rates will reduce the cross-subsidization between rooftop solar customers and non-rooftop solar customer, and rooftop solar customers should be treated as a separate class for cost of service and rate making purposes.

7. Other Parties

Sulphur Springs Valley Electric Cooperative and Grand Canyon State Electric Cooperative Association (collectively the "Co-Ops") also agree that Arizona's current policy for valuing exported rooftop solar exacerbates the loss of fixed costs (thus creating a cost-shift) by requiring the Co-Ops "to pay (via energy credits) the full retail rate for energy generated by the members, even though the retail rate far exceeds the value of the excess generation." (Exhibit GCSECA – 1 (Hendricks Direct Testimony) at 9:24-25 -10:1-2.) Instead of full retail rates, the Co-Ops propose that avoided costs be used to calculate the compensation for exported rooftop solar generation. (*Id* at 2-3.)

The Co-Ops avoided cost rates are calculated based on the wholesale fuel and energy cost per kWh charged by their wholesale providers, since the Co-Ops do not produce their own power but rather buy from third parties. (*Id.* 10:17-19.) Therefore, the Co-Ops argue that avoided costs for them should only include fuel and energy costs (regardless of how other utilities define avoided cost) for two reasons. First, any potential reduction in capacity requirements created by rooftop solar does not translate into a reduction in capacity costs for the Co-Ops because their wholesale energy contract includes a fixed charge payment for the cost of capacity generation – so any small reduction due to rooftop solar does not reduce this amount. (*Id.* at 10:19-25 – 11:1-5.) Second, rooftop solar does not reduce distribution costs because of intermittency and lack of reliability of rooftop solar. (Hendrick Hearing Testimony, Tr. 1040:5-8.) As Co-Ops Witness Hendrick's explained, "customer[s] with rooftop

DG must still rely on power provided from the electric grid during times when the DG unit is not operating, or when the DG unit does not provide sufficient generation to serve the customer's entire load. As a result, the size of the facilities required to provide service to a customer with DG is no different than for the standard customer without DG." (*Id.* at 1040:8-14.)

The Co-Ops argue that because of their inherent differences compared to other utilities, regardless of what methodology is adopted for other utilities, the "true" avoided cost methodology is what should be adopted for them. Even so, the Co-Ops present rational arguments for why an avoided cost methodology should be adopted for *all* Arizona utilities. While Co-Ops generally serve a more rural and dispersed customer base, those characteristics are not what justify a change to existing rooftop solar policy. Instead, the inherent nature of how a rooftop solar customer uses the grid coupled with the existing rate design/net metering regime supports the use of the avoided cost methodology. (Exhibit GCSECA – 1 (Hendricks Direct Testimony) at 12:14-25 – 13:2-4 and Hendricks Hearing Testimony, Tr. 1045:5-25 – 1046:1-9.) And that regulatory structure applies to all Arizona utilities alike.

The International Brotherhood of Electrical Workers, AFL-CIO, CLC Local Unions 1116, 387, and 769 ("IBEW"), have provided a unique perspective to this discussion because the Arizona Constitution recognizes employees of public service corporations as stakeholders on par with customers. (*See e.g.,* Exhibit IBEW-1 (Northrup Direct Testimony) at 9:1-6.) They agree that through the current rate design scheme and payments for excess rooftop solar generation, there is a cost-shift occurring from rooftop solar customers to non-rooftop solar customer. (*Id.* at 8:19-21.) Even as rooftop solar generation grows, it will need to use the electric grid, which in turn must be maintained and built by IBEW workers. IBEW's Witness Northrop describes the situation that IBEW's workers face; it is "[t]he fact that these utilities will not receive a fair price for their services [that] jeopardizes job stability for utilities workers, and reduces utilities' ability to provide a safe and efficient workplace." (*Id.* at 7-21-23.)

It is IBEW's position that utility rates must be cost based – specifically rates should be broken down "according to the costs incurred by the utility in providing it, such as transmission, distribution, customer service. . ." (Exhibit IBEW-1 (Northrup Direct Testimony) at 9:21-22 – 10:1.) Specifically, they are supportive of three-part demand rates that recover costs based on how those costs were incurred, similar to SRP's new Customer Generation Price Plan (E-27). (*Id.* at 9:19-20.) AIC agrees that three-part demand rates are appropriate to address the cost shift.

III. CONCLUSION

For the foregoing reasons, AIC respectfully requests that the administrative law judge adopt a method for valuing exported rooftop solar energy based on the utility's avoided costs and calculated on an hourly or time-of-use basis. AIC additionally believes that to truly correct problems surrounding the issues in this matter, rooftop solar customers should be treated as a separate class for cost of service and ratemaking purposes and that the rooftop solar to non-rooftop solar customer cost shift be mitigated by changes to residential rate design, such as through the implementation of a three-part demand rate.

RESPECTFULLY SUBMITTED this 20th day of July, 2016.

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