BEFORE THE ARIZONA CORPORATION COMMISSION

Bob Stump, Chairman
Gary Pierce, Commissioner
Brenda Burns, Commissioner
Bob Burns, Commissioner
Susan Bitter Smith, Commissioner

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

Docket No. E-00000J-14-0023

ORIGINAL

JOINT COMMENTS OF THE SOLAR ENERGY INDUSTRIES ASSOCIATION AND THE ARIZONA SOLAR ENERGY INDUSTRIES ASSOCIATION ON THE BENEFITS AND COSTS OF DISTRIBUTED GENERATION (DG)

Overview

The Solar Energy Industries Association (SEIA)[1] and its Arizona chapter (ARISEIA) appreciate the opportunity to submit these comments in response to Staff's letter dated January 27, 2014. Both SEIA and ARISEIA participated in the net energy metering (NEM) proceeding that ultimately led to the creation of this docket and we look forward to participating in the upcoming workshop process. SEIA and ARISEIA believe that distributed generation resources, particularly solar PV, provide significant value to all Arizona electricity customers. A transparent and accurate assessment of this value by the Commission will be an important step forward in Arizona's historic and continued support for the emerging rooftop PV industry. As requested by Staff, our comments address the following issues: 1) the relevance and significance of the suggested cost and benefit categories, 2) recommendations for other DG-related issues to be considered, 3) the process and methodology for assigning monetary values, and 4) recommendations for workshop presenters.

1. Relevance and significance of Staff's suggested cost and benefit categories

a) All the benefits identified by Staff are relevant and should be considered

As part of the Technical Conference on Distributed Energy held by Arizona Public Service (APS) in 2013, two different "Value of Solar" studies were conducted to assess the value of DG (the SAIC/APS Study and Crossborder Study). Both of these studies looked primarily at the

[1] The comments contained in this filing represent the position of SEIA and ARISEIA as organizations, but not necessarily the views of any particular member with respect to any issue.

costs and benefits of DG to APS ratepayers. However, SEIA and ARISEIA note that the Commission's obligation as a decision-making body is not just to ratepayers, but also to the public at large. Thus, in addition to the costs and benefits included in these studies, the Commission should attempt to quantify all the costs and benefits that affect the public interest. This includes costs and benefits to society such as those identified by Staff under the broad areas of Security & Reliability, Environmental, and Social. Including these benefits is consistent with the approach commonly used for other demand-side resources through a Societal Cost Test. It is also consistent with the approach taken by other states, such as a recent DG valuation conducted for New Jersey and Pennsylvania which included value components for Security Benefits, Social Benefits, and Environmental Benefits.[2] It may be helpful to workshop participants if Staff distinguished between costs and benefits that primarily affect ratepayers versus those that affect society at large (which also includes ratepayers).

b) Workshops should devote more attention to benefit categories that are likely to be more significant.

While all the categories mentioned deserve attention, certain cost and benefit categories are likely to be small and should not distract from a thorough review of the more significant ones. SEIA and ARISEIA recommend that Staff review existing DG cost-benefit studies to gain insight into which categories might be most significant. The recent report *A Review of Solar PV Benefit and Cost Studies* published by the Rocky Mountain Institute (RMI) is a useful resource for this purpose.[3] Some of the larger benefit categories quantified in virtually every study in the RMI review include:

- Avoided Energy Costs (including line losses)
- Avoided Generation Capacity Costs
- Avoided Transmission and Distribution Costs

Furthermore, for simplicity, some identified benefits could be considered as a single category. For instance, Avoided Fixed Operations and Maintenance Costs could be included as part of Avoided Generation Capacity Costs (aka Avoided Power Plant Capital Costs).

c) Staff should distinguish between categories that are truly costs and benefits versus those that are inputs or assumptions.

In Staff's proposed list of benefit and cost categories, some items listed are in fact inputs to other cost and benefit categories, rather than true costs or benefits themselves. These include

- Capacity value (MW)
- PV system orientation
- Line losses (%)

Prior to the workshops, Staff should update and clarify the list of categories with basic definitions. Materials developed by SEIA, ARISEIA and other stakeholders during the APS Technical Workshop may be helpful in this regard.

[2] http://mseia.net/site/wp-content/uploads/2012/05/MSEIA-Final-Benefits-of-Solar-Report-2012-11-01.pdf
[3] http://www.rmi.org/elab_empower

2. Recommendations for other DG-related issues to be considered

a) Additional Cost and Benefit Categories

While Staff's proposed list of costs and benefits includes many of the commonly identified categories, it omits some important benefits of DG. SEIA and ARISEIA suggest adding the following benefit categories to Staff's list:

- *Off-system Sales:* DG reduces the net load that utilities must serve. Therefore, the addition of DG can free up generation capacity and enable utilities to increase their off-system sales of energy or capacity. These off-system sales have the potential to provide significant benefits to either ratepayers or shareholders and need to be quantified. Moreover, intersystem sales of capacity may be able to mitigate reductions in solar capacity value at higher penetrations. This consideration means that the energy value of DG is unlikely to drop below the wholesale value of power in the regional market.
- *Rate Stability:* One important feature of DG is its ability for capacity to be added in small discrete increments over time. This contrasts with traditional utility-owned capacity where a large plant is placed into service and added to the utility's rate base all at once. Thus DG has the potential to benefit ratepayers by adding capacity more gradually and thus mitigating the rate shock associated with the costs of surplus capacity associated with large "lumpy" capital investments. SEIA and ARISEIA suggest that the workshops explore ways to quantify this value.

b) Additional Inputs or Assumptions to Cost and Benefit Categories

- *Planning Reserve Margins:* Utilities must plan their system to have sufficient capacity to serve their forecasted peak load plus a reserve margin based on that peak load. Demand-side resources such as DG reduce the utility's load obligation, which has the dual effect of contributing capacity while also reducing the required reserve margins, thereby amplifying the capacity benefit from DG.[4] This aspect should be considered when valuing avoided generation capacity costs.
- *Capacity Line Losses:* One of the categories Staff identifies is Avoided Line Losses. As noted above, line losses are really an input to both avoided energy and capacity values. SEIA and ARISEIA suggest that Staff clarify that the line losses avoided by DG applies to both energy *and* capacity. Both of these line loss values should be estimated using their marginal values (i.e. during the times of day that DG systems are actually producing energy).
- *Locational Value of Avoided Transmission and Distribution System Investment:* One shortcoming of current methods for valuing DG is the difficulty in determining the locational value of DG installations on the utility's distribution grid. Locational value arises from the ability for DG to defer specific upgrades on the transmission and distribution system. Providing a better way to accurately determine this locational value

[4] For instance in Tucson Electric Power's 2012 Integrated Resource Plan (see: http://images.edocket.azcc.gov/docketpdf/0000135609.pdf), the company anticipated a retail demand of 2597 MW in year 2016 (see Table 4). This would suggest a 15% Planning Reserve Margin equal to about 390 MW. However, the actual Planning Reserve Margin specified in the plan is only 360 MW (see Table 5) due to the effects of distributed resources.

of DG would be a major breakthrough as it could ultimately incentivize more targeted deployment of DG and potentially reduce overall system costs to all ratepayers. To the extent feasible, SEIA and ARISEIA recommend that the Commission include the locational aspect of the DG valuation by obtaining utility-specific data on distribution loads, distribution expansion plans, and load growth rates.

3) Process and methodology for assigning monetary values

The process and methodology for assigning monetary values to costs and benefits is arguably more important than selecting which cost and benefit categories to include and should be a primary focus of the workshops. Some methodological issues may pertain to a single cost or benefit category, while others apply to *all* categories and may warrant their own separate discussion (e.g. the choice of a discount rate). SEIA and ARISEIA offer the following recommendations for the Commission's approach:

***a) Staff should adopt the approach and recommendations developed in* A Regulator's Guidebook: Calculating the Benefits and Costs of Distributed Solar Generation.**

In October 2013, the Interstate Renewable Energy Council (IREC) – a non-profit organization -- published a document titled *A Regulator's Guidebook: Calculating the Benefits and Costs of Distributed Solar Generation.*[5] This guidebook offers a standardized approach for calculating the costs and benefits of DG and can help inform the Commission as it develops its methodology. The guidebook is based on a meta-analysis of best practices identified from 16 studies of DG cost-benefit studies from around the country. Importantly, the guidebook recognizes that the calculated value of DG may be different between utilities but that the methodology should remain the same regardless of the company or jurisdiction. At a minimum, the Commission workshops should seek to answer the Key Questions identified in the guidebook:

- Q1: What discount rate will be used?
- Q2: What is being considered – all generation or exports only?
- Q3: Over what timeframe will the study examine the benefits and costs of DG?
- Q4: What does utility load look like in the future?
- Q5: What level of market penetration for DG is assumed in the future?
- Q6: What models are used to provide analytical inputs?
- Q7: What geographic boundaries are assumed in the analysis?
- Q8: What system boundaries are assumed?
- Q9: From whose perspective are benefits and costs measured?
- Q10: Are benefits and costs estimated on an annualized or levelized basis?

SEIA and ARISEIA also supports IREC's recommendations in response to each of these questions as specified in the report, which are also provided as an Appendix to these comments.

[5] http://www.irecusa.org/wp-content/uploads/2013/10/IREC_Rabago_Regulators-Guidebook-to-Assessing-Benefits-and-Costs-of-DSG.pdf

b) Staff should be cognizant of the major uncertainties in key assumptions and perform sensitivity analyses on these assumptions.

Staff should be cognizant that certain inputs and assumptions involve uncertainties that can have a dramatic impact on valuation results. For example, altering a key assumption such as future natural gas prices can significantly change the avoided energy costs. The Commission should pay close attention to ensure that these inputs and assumptions are not selected in a manner that is unfairly weighted against DG. Where possible, it would be wise to conduct sensitivity analyses around these key inputs to understand their impact on the valuation. Some inputs with major uncertainties include:

- Inflation rate
- Future natural gas prices
- Future load growth and load shape
- Future resource mix (including plant retirements)
- Future environmental rules, restrictions, or mitigation costs that may alter the resource mix

c) Staff should draw from the avoided cost valuation experience for Demand-Side Management (DSM) programs and measures

Robust methodologies have already been established for evaluating the costs and benefits of Demand Side Management (DSM). The Commission should draw upon this experience where possible. For instance, one issue that stakeholders wrestled with during APS' Technical Conference was how to quantify Market Price Mitigation. However, sophisticated techniques have already been developed to quantify this market price effect for DSM programs that may also be applicable for DG. A recent example is illustrated in the *Avoided Energy Supply Costs in New England: 2013 Report*,[6] which identified an avoided cost of 3.44 cents/kWh due to Market Price Mitigation (aka Demand Reduction Induced Price Effects) for the New England region.

d) Valuation methodologies should reflect the differences between commercial and residential DG installations

Commercial and residential DG installations each have distinct characteristics that will undoubtedly lead to different valuations. For instance, commercial installations frequently feature tracking systems that provide a relatively higher capacity value than fixed tilt rooftop systems. Commercial systems also tend to have a higher fraction of energy consumed on site and thus fewer exports. SEIA and ARISEIA recommends that the workshop process identify value components that are likely to be different for commercial and residential DG and develop separate methodologies accordingly.

e) Develop a technical reference manual for measuring DG value

Inevitably there will be disagreement between parties on which value categories are included and how they are computed. Furthermore, since this is a relatively novel issue, some methodologies are not yet well defined. We suggest that a constructive outcome of this proceeding would be for Staff to create a technical reference manual that is publicly available and periodically updated at

[6] http://www.synapse-energy.com/Downloads/SynapseReport.2013-07.AESC.AESC-2013.13-029-Report.pdf

least biannually. Similar manuals have been developed under the Commission's direction for energy efficiency.[7] This will offer stakeholders the opportunity to improve the valuation over time as methodologies are refined.

f) Work with an independent consultant

Accurately analyzing the costs and benefits of DG involves a significant time investment by individuals with strong technical expertise. While Staff undoubtedly has the capability to perform this analysis, it may be advisable to hire an independent consultant who also has experience with avoided cost or DG valuation to conduct technical study work. Staff should also identify any resources available for this purpose through free technical assistance programs.

g) Consider customer focus groups or polling as a method for assessing specific benefits

Some categories of costs and benefits involve values strictly determined by customer preferences (for instance, how much would customers be willing to pay for additional fuel price hedging?). Staff should consider conducting customer focus groups or polling to understand how customers value these benefits. Examples of these benefit categories include:

- Ratepayer/consumer interest,
- Fuel price hedging.

SEIA and ARISEIA would be happy to work with Staff in designing these customer-focused efforts.

4) Recommendations for workshop presenters.

SEIA and ARISEIA recommend that Tom Beach, Principal at Crossborder Energy, be considered as a workshop presenter due to his extensive experience with DG valuation issues across several states. Contact information for Mr. Beach is included below:

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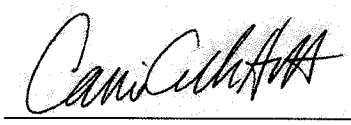
About Crossborder Energy: Since 1989, Crossborder Energy has provided expert testimony, strategic advice, market intelligence, and economic consulting services on market and regulatory issues in the natural gas and electric industries on a wide range of issues including market and avoided cost pricing, marginal costs, and rate design issues concerning natural gas and electric utilities and natural gas pipelines. Crossborder has significant experience on state-level issues concerning DG, including the following: solar PV rate design, PV program design, cost-effectiveness of net energy metering and DG, the design of Renewable Portfolio Standards, and the calculation of bill credits for community solar facilities.

SEIA and ARISEIA may suggest additional workshop presenters at a later date.

[7] http://images.edocket.azcc.gov/docketpdf/0000150538.pdf

Respectfully submitted this 14th day of February, 2014,



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Appendix

The following recommendations are excerpted from A Regulator's Guidebook: Calculating the Benefits and Costs of Distributed Solar Generation.[8]

Q1: What discount rate will be used?
Recommendation: We recommend using a lower discount rate for DSG than a typical utility discount rate to account for differences in DSG economics.[9]

Q2: What is being considered – all generation or exports only?
Recommendation: We recommend assessing only DSG exports to the grid.

Q3: Over what timeframe will the study examine the benefits and costs of DG?
Recommendation: Expect DSG to last for thirty years, as that matches the life span of the technology given historical performance and product warranties. Interpolate between current market prices (or knowledge) and the most forward market price available or data that can accurately be estimated, just as planners do for fossil-fired generators that are expected to last for decades.

Q4: What does utility load look like in the future?
Recommendation: Given that NEM resources are interconnected behind customer meters, and result in lower utility loads, the utility can plan for lower loads than it otherwise would have. In contrast, other DSG rate or program options involving sale of all output to the utility do not reduce utility loads, but rather the customer facilities contribute to the available capacity of utility resources.

Q5: What level of market penetration for DG is assumed in the future?
Recommendation: The most important penetration level to consider for policy purposes is the next increment: what is likely to happen in the next three to five years. If a utility currently has 0.1% of its needs met by DSG, consideration of whether growth to 1% or even 5% is cost-effective is relevant, but consideration of whether higher penetrations are cost-effective can be considered at a future date.

Q6: What models are used to provide analytical inputs?
Recommendation; Transparent input models that all stakeholders can access will establish a foundation for greater confidence in the results of the DSG studies. When needed, the use of non-disclosure agreements can be used to overcome data sharing sensitivities.

Q7: What geographic boundaries are assumed in the analysis?
Recommendation: It is important to account for the range in local values that characterize the

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[8] http://www.irecusa.org/wp-content/uploads/2013/10/IREC_Rabago_Regulators-Guidebook-to-Assessing-Benefits-and-Costs-of-DSG.pdf

[9] SEIA notes that Massachusetts DPU Order No. 8-50-A illustrates a precedent, and provides a rationale, for using a discount rate based on a low-risk investment (rather than the weighted average cost of capital) when evaluating demand-side resources: http://www.ma-eeac.org/Docs/6_DPU%20Proceedings%20Page/Other%20Related%20DPU%20Orders/08-50-A%20Order.pdf

broader geographical area selected for the study. In some cases, quantification according to similar geographical sub-regions may be appropriate.

Q8: What system boundaries are assumed?
Recommendation: It may also be appropriate to consider impacts associated with adjacent utility systems, especially at higher (above 10%) penetration levels of DSG.

Q9: From whose perspective are benefits and costs measured?
Recommendation: We recommend that ratepayer and societal benefits and costs should be assessed.

Q10: Are benefits and costs estimated on an annualized or levelized basis?
Recommendation: We recommend use of a levelized approach to estimating benefits and costs over the full assumed DSG life of 30 years. Levelization involves calculating the stream of benefits and costs over an extended period and discounting to a single present value. Such levelized estimates are routinely used by utilities in evaluating alternative and competing resource options.