BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH

In the Matter of the Application of Rocky Mountain Power for Authority To Increase its Retail Electric Utility Service Rates in Utah and for Approval of Its Proposed Electric Service Schedules and Electric Service Regulations.	**Docket No. 13-035-184**

SURREBUTTAL TESTIMONY OF NATHANAEL MIKSIS

ON BEHALF OF THE ALLIANCE FOR SOLAR CHOICE

RATE DESIGN (NET METERING)

JULY 17, 2014

SURREBUTTAL TESTIMONY OF NATHANAEL MIKSIS

Q. DID YOU PREVIOUSLY GIVE TESTIMONY IN THIS PROCEEDING?

A. Yes. I previously caused to be pre-filed both direct and rebuttal testimony on behalf of The Alliance for Solar Choice.

Q. HAVE YOU REVIEWED THE REBUTTAL TESTIMONY FILED BY ALL PARTIES ON JUNE 26, 2014?

A. Yes.

Q. WHAT IS THE PURPOSE OF YOUR SURREBUTTAL TESTIMONY?

A. The primary purpose of my surrebuttal testimony is to address several of the flawed or unsupported factual assertions made in the rebuttal testimony of Rocky Mountain Power ("Company") witnesses A. Richard Walje, Joelle R. Steward, Greg Duvall, and Douglas L. Marx. Secondarily, I respond to the rebuttal testimony submitted by Division of Public Utilities ("DPU") witness Stan Faryniarz, and the Office of Consumer Services ("OCS") witness Daniel E. Gimble.

Q. WITH THE NET METERING FACILITIES CHARGE AS THE ONLY COMPANY PROPOSAL BEING LITIGATED IN THIS PROCEEDING, WHAT IS YOUR UNDERSTANDING OF THE RANGE OF ISSUES UNDER DISPUTE?

A. As I understand the party positions, the primary issue is whether the Company has presented sufficient evidence to carry its burden of proof to justify the net metering facilities charge as just and reasonable. All parties submitting testimony on net metering issues, other than the Company, tend to agree that S.B. 208 requires the Commission to consider the costs and benefits of the net metering program and that the Company has not included a showing of the benefits of the net metering program in its application.[1] Moreover, the Commission's public notice expressed its intent that S.B. 208 would be implemented within the current proceeding. The rebuttal testimony of OCS witness Gimble recommends that the Commission establish a separate process to develop a method of evaluating the costs and benefits of the net metering program.[2] DPU witness Powell states that DPU does not oppose such a separate process from being instituted.[3]

[1] Although DPU Witness Powell appears to suggest that non-Company parties somehow bear the burden of proof and notes that they have "not successfully shown that net-metering benefits are not reflected in current rates." Rebuttal Testimony of Artie Powell at p. 3.
[2] Rebuttal Testimony of William Gimble at p. 4.
[3] Rebuttal Testimony of Artie Powell at pp. 3-4.

Utah Clean Energy, Sierra Club, UCARE, and TASC all oppose the Company's net metering facilities charge proposal on the grounds that the Company has not put forward sufficient evidence on the costs and benefits of the net metering program, as required by S.B. 208. These parties also call on the Commission to open a separate proceeding to develop a comprehensive cost-benefit framework that could be used in future rate cases.

OCS supports and DPU does not oppose the suggestion by intervenors that the Commission should open a separate proceeding to develop a cost-benefit framework. Despite the recognition that the benefits and costs of net metering are yet to be quantified, both OCS and DPU appear to support the Commission imposing a net metering facilities charge for policy reasons, even prior to a rigorous cost-benefit analysis is performed on the net metering program in the Company's service territory.

The Company continues to call for the approval of the proposed net metering facilities charge based on speculation about future impacts of distribution-connected solar and with unsupported assertions that benefits of net metering exceed alleged costs.

Q. WHY DO YOU RECOMMEND THAT THE COMMISSION CONSIDER ANY NET METERING CHARGE OR CREDIT IN THE COMPANY'S NEXT RATE CASE, RATHER THAN NOW?

A. There are several reasons for this recommendation. First, as is apparent from the direct and rebuttal testimony of all parties, the net metering program currently has, at most, a *de minimis* impact on the non-participating customers. Delaying the consideration of any charge or credit adjustment to the current net metering tariff, therefore, carries a very low risk of immediate, adverse ratepayer impacts.

Second, considering a new charge or credit for net metering customers in the next rate case would give the Commission time to convene a stakeholder process to develop a robust cost-benefit framework, which could serve as the template for determining the cost-effectiveness and policy value of net metering in future proceedings, including rate cases where the Company pro-actively seeks some change in the treatment of net metering customers.

Third, there are a large number of relevant cost-benefit proceedings getting underway at this time, in places with similar low penetrations of solar (e.g., Louisiana, South Carolina, Oklahoma). Just as the recent Nevada Public Service Commission's study showed a net benefit of the net metering program of $36

million in that state[4], it is possible that these other states' studies will prove informative to the best approach to capturing the costs and benefits of the net metering program in the context of overall energy policy in Utah.

Lastly, waiting until the next rate case will allow the Company to fill-in critical knowledge gaps that will provide much more precise assessments of the relative costs and benefits of the net metering program. As demonstrated below in my discussion of the Company's rebuttal testimony, the Company lacks the current data capabilities to provide an accurate assessment of costs and benefits. The Company should possess higher quality data heading into their next rate case, which could be plugged into the framework developed by stakeholders and the Commission in a separate proceeding at the conclusion of this rate case.

Q. YOU CLAIM IN YOUR DIRECT AND REBUTTAL TESTIMONY THAT THE COMPANY HAS NOT PRESENTED SUFFICIENT EVIDENCE OF COSTS AND BENEFITS. DID THE COMPANY'S

[4] The Nevada Public Service Commission hired a consultant, Energy and Environmental Economics ("E3"), to conduct a comprehensive evaluation of their net metering program, including policies that support customer investment in net metered systems. The E3 study concludes that net metering will result in rate savings to non-participating customers over the life of those systems. The study is *available at* http://puc.nv.gov/uploadedFiles/pucnvgov/Content/About/Media_Outreach/Announcements/Announcements/E3%20PUCN%20NEM%20Report%202014.pdf?pdf=Net-Metering-Study.

REBUTTAL TESTIMONY PROVIDE EVIDENCE IN RESPONSE TO THAT CRITICISM?

A. No. The overarching theme of the rebuttal testimony is that the record is sufficient to justify the proposed charge. I strongly disagree, based on several facts: some statements are made without supporting information, some of the information presented is inapplicable to the topic at hand, some statements made are contradicted by the company's own response to TASC's second data request, and there appears to be a general disagreement on who bears the burden of proof in this case. In light of the fact that the burden of proof is properly on the applicant seeking to impose a charge, it is my opinion that the infirmities in the Company's presentation, listed here, suggest that the Company has not put forward evidence that supports the charge the Company is seeking.

Q. HOW IS YOUR TESTIMONY STRUCTURED?

A. I begin with a brief summary of the points raised by the witnesses on topics concerning the sufficiency of the record to justify the proposed Net Energy Metering Facilities charge. I then address each witness' rebuttal testimony to which I am responding in turn.

Q. PLEASE SUMMARIZE THE WITNESSES' TESTIMONY TO WHICH YOU ARE RESPONDING.

I am responding to the following witnesses, in order:

- Witnesses Walje and Duvall cite a separate Utah PSC proceeding in which avoided costs for utility-scale solar PV were calculated and suggest that these values are applicable to the benefits side of the equation for distributed solar PV installations. They suggest that the difference between the avoided costs calculated in the other proceeding and the retail rates at which NEM customers are credited implies NEM customers are not paying their fair share through variable energy purchases, and therefore this difference justifies a NEM charge.
- Witness Steward introduces illustrative examples of average residential customers without solar DG, with solar DG and with energy efficiency (EE) measures. She suggests that the record justifies the conclusion that DG customers avoid their fair contribution to fixed costs.
- Witness Marx makes several statements that were unsupported or contradicted by the record. His testimony addresses alleged costs imposed on the system by NEM customers, claims that NEM customers derive value from the grid for which they are not charged, and provides anecdotal descriptions of events in other jurisdictions where fairly large solar facilities purportedly had a negative impact on grid operations and power quality.
- Witness Faryniarz uses a three-scenario example to support his contention that NEM customers cause the utility to under-recover its costs. He also suggests in rebuttal that intervenor Witnesses Rick Gilliam and Dustin Mulvaney failed

in their respective Direct Testimony to conclusively demonstrate that benefits of NEM outweigh costs, which I argue is not relevant due to the burden of proof resting with the utility proposing the charge and not with intervenors opposing it.

- Witness Gimble responded to my own direct testimony in which I mention that residential customers pay a disproportionate amount of RMP's generation and transmission revenue requirements compared to the volume of their energy purchases. He suggests that my simple example ignores the complexity of the COS Study and "does not comport with a more careful, in-depth analysis…" I agree in part (that a back-of-the-envelope calculation is no substitute for the extensive and in-depth study undertaken by multiple parties) and disagree in part (to the extent that certain assumption undergirding cost allocation factors should be rightfully questioned under cost-causation principles which are relevant to the present discussion).

I. COMPANY WITNESSES A. RICHARD WALJE AND GREG DUVALL

Q. WHAT IS MR. WALJE'S POSITION ON NEM CUSTOMERS' CONTRIBUTION TO DISTRIBUTION SYSTEM AND CUSTOMER SERVICES COSTS?

A. Mr. Walje writes that "[b]ecause of how the current net metering tariff works, net metering customers pay less for their use of the distribution system and customer services than they did before they installed distributed generation. In

essence, that portion of those distribution system and customer service costs that are not paid for by net metering customers still exist for the Company and are therefore recovered from non-net metering residential customers."[5]

Q. DO YOU AGREE WITH MR. WALJE'S POSITION?

A. No. Mr. Walje's point about reduced contribution of NEM customers to distribution and customer service costs is equally applicable to any customer who reduced their overall demand, and ignores the cost-causation principle of rate-making. The principle that customers should pay what they always paid is not good rate-making policy. As has been raised elsewhere repeatedly, proper alignment of rates with cost-causation or cost responsibility is a complex process with no single clear solution. Good compromise solutions involve allocating fixed costs to customers based on a combination of energy sales and contribution to system coincident peak demand. This approach requires analysis of customer class and sub-class demand patterns. In order to justify a charge to a sub-class, it is necessary to show that their demand pattern has caused a gap between their impact on system infrastructure and their contribution to its costs. I assert that the record does not support this.

[5] Rebuttal Testimony of Richard Walje, lines 36-39.

Q. WHAT DO MR. WALJE AND MR. DUVALL SAY REGARDING ANY VALUE OF SOLAR STUDIES THAT ARE APPROPRIATE TO THIS PRESENT PROCEEDING?

A. Mr. Walje testifies that Mr. Duvall, in rebuttal testimony, "shows that the range of credits net metering customers receive for their PV generation is well above the value of PV solar determined in the Qualifying Facilities docket. And that this value is applicable to distributed solar generation provided by net metering customers."[6]

For his part, Mr. Duvall writes "[t]he Commission addressed the value of solar recently in Docket No. 12-035-100 where it determined the avoided cost applicable to solar QFs and does not need to reinvent the wheel now. There is no reason to apply different standards to rooftop solar versus a QF with regard to energy value, capacity value, integration costs or the imputation of environmental costs or other adders. These were all decided in Docket No. 12-035-100…. Mr. Miksis presents his Exhibits B and C indicating they represent best practices for methodological approaches to quantify the costs and benefits of net metering for distributed solar, but fails to include the method recently adopted by the Commission in Utah for valuation for solar QFs."[7]

[6] Rebuttal Testimony of Richard Walje, lines 52-55.
[7] Rebuttal Testimony of Gregory Duvall, lines 99-110.

Q. DO YOU AGREE WITH THESE PERSPECTIVES?

A. No, I do not. Based on RMP's response to TASC Data Request 2.19(a), Mr. Duvall appears to be referring to an ongoing QF avoided cost proceeding (14-035-T04). The method proposed for valuing solar QF's in that proceeding is not specific to customer-sited distributed solar PV installations, and may be in fact inappropriate for several reasons. The $0.03/kWh avoided cost that RMP mentions for 2015 does not account for the myriad categories of costs avoided by having distributed generation at a customer's site (such as transmission and distribution-related fixed costs, lines losses, increased reliability through geographic diversity of PV installations reducing the vulnerability of production levels to local weather phenomena, among others). In fact, RMP's response to TASC's second data request includes this:

> *TASC: "Is it Mr. Duvall's contention that there is no difference, in terms of energy value, line losses, generation capacity value, and transmission and distribution value, between large-scale solar farms and rooftop systems that serve onsite load and are often located close to load centers?" RMP: "No."*[8]

[8] *See* TASC Surrebuttal Exhibit A (RMP Response to TASC's Second Set of Data Requests), Question 2.18(d) at p. 8.

By asserting that the solar PV value calculated for large utility-scale projects is applicable to rooftop solar, RMP is implying that there is no difference attributable to line losses and transmission and distribution value, or that the difference is negligible enough to be ignored. Without a positive showing of this fact, a charge based on an inapplicable value of solar QF study is not justified.

Additionally, in the proceeding that determined the valuation for solar QFs, RMP acknowledged that an identified transmission constraint could impact avoided costs, but in their data response they conceded that they had not calculated locationally-differentiated avoided costs.[9] Other things equal, the value of solar in an import-constrained region, or load zone, would be higher than one in an export-constrained region.

Finally, in the referenced docket, the avoided costs are reduced by integration costs that were determined as proxies by the Commission until a full solar integration study was performed. The Commission called for this solar integration study to be completed by RMP, but in its response to TASC's second data request, RMP conceded that they had not performed this study.[10] A solar integration study will be necessary to accurately calculate the utility-scale solar avoided costs, but it is important to note that solar integration costs are not,

[9] Response to TASC Data Request 2.19(c), TASC Surrebuttal Exhibit A at p. 10.
[10] Response to TASC Data Request 2.18, TASC Surrebuttal Exhibit A at p. 8.

according to RMP's data request response, paid for by the utility; where any transformer upgrades or other changes to the system are required to interconnect a DG system, the costs are paid by the customer.[11]

Q. WHAT ELSE DOES MR. DUVALL SAY REGARDING THE SOLAR PV QF DOCKET?

A. Mr. Duvall writes "[a]s previously described, the Commission has already addressed the value of solar to Utah customers as it relates to QF power in another docket and the Company has identified the costs shifted to non-NEM customers when an existing residential customer becomes a NEM customer. *Given the large difference between the costs and benefits, there should be no question that a charge to NEM customers is warranted* (emphasis added)."[12]

Q. WHAT IS YOUR RESPONSE?

A. First, I would point to the previous answer regarding the QF power value. The cost shift to which Mr. Duvall refers is based on a RMP estimate that included all fixed costs (generation, transmission and distribution), while the context of this proceeding is restricted to distribution-related costs. As I stated in

[11] Response to TASC Data Request 2.11, TASC Surrebuttal Exhibit A at pp. 3-4.
[12] Rebuttal Testimony of Gregory Duvall, lines 85-90.

my rebuttal testimony, we should be very clear which fixed costs are being considered when any estimate of cost-shifting is used to support a NEM charge.[13]

II. COMPANY WITNESS JOELLE R. STEWARD

Q. IN HER REBUTTAL TESTIMONY, WHAT IS MS. STEWARD'S POSITION ON NEM CUSTOMERS' CONTRIBUTION TO SYSTEM COSTS?

A. Ms. Steward states "[a]s I explained in my direct testimony for cost of service, distribution system costs are incurred and allocated to customer classes based on customers' contribution to either the distribution system peak (substations and primary lines), the non-coincidental peak (line transformers and secondary lines) or by the number of customers (service lines and meters)… As a result, the reduction in billed consumption for net metering customers does not fully recover the costs that their usage imposes on the distribution system so other residential customers pay those costs."[14]

Q. DO YOU AGREE WITH THIS PERSPECTIVE?

A. No. The company has not provided actual data on NEM customer contribution to distribution system peak, coincident system peak or non-

[13] Rebuttal Testimony of Nathanael Miksis, page 10 line 19 to page 11 line 11.
[14] Rebuttal Testimony of Joelle Steward, lines 176-189.

coincident peak.[15] Without this data, it is not possible to positively show that NEM customers are avoiding their responsibility for distribution system costs through lower energy sales.

Q. WHAT DOES MS. STEWARD PRESENT IN COMPARING CUSTOMERS WHO UNDERTAKE ENERGY EFFICIENCY UPGRADES VERSUS THOSE WITH ON-SITE SOLAR DG?

A. Ms. Steward writes "Diagram C below shows an average profile for a residential customer compared to a customer that installs a high efficiency air conditioner. This shows that in addition to overall lower usage, the customer's usage at the peak is reduced… [M]ost residential demand-side measures result in the customer reducing energy consumption at the time of the system peak, improving load shape and load factor and ultimately the class and system load factor. In contrast, when a customer adds distributed generation, the customer's peak energy production may not be coincident with the peak usage of the grid."[16]

Q. WHAT IS YOUR RESPONSE TO MS. STEWARD'S CONCLUSION?

A. No data was provided to demonstrate load shapes and load factors of NEM customers, as requested by TASC in Data Request 2.2. RMP referred TASC to

[15] Response to TASC Data Request 2.2, TASC Surrebuttal Exhibit A at p. 1.
[16] Rebuttal Testimony of Joelle Steward, lines 208-220.

Ms. Steward's testimony at lines 151-158, which showed a modeled typical customer.

By comparing Steward's Diagram A at lines 151-158 with Diagram C at line 210, it is clear that both rooftop solar and high efficiency AC reduce peak load, with the reduction from the former at approximately 40%, while the high efficiency AC EE program reduces peak load less than 20%. While load factor (a measure of average load to peak load) is one metric to evaluate a customer's reliance on system infrastructure during peak periods, a more direct one is contribution to system coincident peak (CP), which is in fact used to allocate fixed costs in the COS study. In Ms. Steward's example it appears that rooftop solar has a greater reduction in contribution to CP, and that the customer with rooftop solar contributes only about 60% of the residential class average to system CP. Additionally, RMP does not support the statement that most residential measures reduce consumption at system peak. Indeed, residential lighting is likely the most frequently deployed residential EE measure, and yet it has limited impact on reducing system CP.

However, it's important to step back and understand that even if the effect of EE and DG were identical, the current proposal to assess NEM customers a fixed charge would not apply to customers who have invested in EE. If the impact of NEM on a customer's CP were equal to that from EE, the NEM charge would

constitute disparate treatment of similarly situated customers. As it stands, the customers aren't similarly situated; NEM customers appear (from Ms. Steward's Diagrams) to have a contribution to system CP that is even lower than EE customers, making the NEM charge constitute both disparate and punitive treatment.

Q. DOES MS. STEWARD OFFER ANY OTHER RELEVANT OBSERVATIONS ON CHARACTERISTICS OF NEM CUSTOMERS?

A. Yes, Ms. Steward writes "[w]ith net metering customers being a new type of partial requirements customer, with significantly different load pattern and load factor than the typical residential customer for which the current two-part rates are designed, a three-part rate is a better rate design. Additionally, a separate rate structure for this sub-class could reflect time of use differentiation in rates that will provide more accurate price signals than the current tier block rate structures and provide better incentives to customers with distributed generation to maximize the benefits to the grid and the customers it serves."[17]

Q. WHAT IS YOUR RESPONSE?

A. While I showed earlier that the data record is insufficient to draw firm conclusions about actual NEM customers, I agree with Ms. Steward's statements

[17] Rebuttal Testimony of Joelle Steward, lines 265-272.

here that time-differentiated rates and other rate designs may be an improvement on the current structure. Rather than pursuing NEM charges to try and increase revenue collection to match unsupported claims of cost-to-serve, a more constructive approach is to "provide better incentives to customers with distributed generation to maximize the benefits to the grid." The commission may want to accomplish this with optional rate designs that align customer decision-making with utility planning, and reward customers for making investments and behavior changes that can provide value to the grid. This could entail time-differentiated energy rates, optional dynamic rates, or some type of critical peak pricing, but should not automatically focus on the mandatory imposition of demand charges. Demand charges are a crude tool for aligning customer cost-causation with revenue collection, particularly since a customer's peak demand during a time-period may not coincide with system or local circuit peak. With demand charges, PV customers may in fact consistently reduce the draw on the grid during system peak times, yet if their peak demand occurred because of cloud cover on a non-peak day, they will likely be charged as if they had no beneficial impact on system coincident peak.

A cost-benefit study that analyzes actual long-term cost to serve and considers rate designs other than a fixed or demand charge with the goal of finding a first-best solution to the related problems of price/cost alignment and meaningful price signaling could satisfy all parties.

Q. WHAT DOES MS. STEWARD CONCLUDE REGARDING THE SUFFICIENCY OF THE RECORD TO JUSTIFY A NEM CHARGE AT THIS TIME?

A. In her rebuttal testimony, Ms. Steward includes the following Q&A:

"**Q. Should the Commission wait and see the outcome of the load study the Company has initiated before adopting a net metering facilities charge in this proceeding?** A. No. There is sufficient evidence presented in this case that shows that the negligible benefits, if any, do not offset the costs incurred for the distribution system and customer services to support the proposed net metering facilities charge at this time."[18]

Q. DO YOU AGREE WITH MS. STEWARD'S CONCLUSION?

A. No, I strongly disagree. As I have shown earlier there is not sufficient evidence showing with any confidence what the costs and benefits of the NEM program specifically and DG systems generally, let alone that one is greater than another. This information will not be available until a cost-benefit analysis is done.

III. COMPANY WITNESS DOUGLAS L. MARX

[18] Rebuttal Testimony of Joelle Steward, lines 273-279.

Q. WHAT OBSERVATIONS DOES MR. MARX MAKE REGARDING NEM CUSTOMERS' USE OF THE GRID?

A. Mr. Marx writes that "[d]ue to the high cost of energy storage devices such as batteries with corresponding charge controllers and special inverters, nearly all NEM customers refrain from installing energy storage systems. Even the grid-connected customers who do install energy storage systems tend to not use them regularly, preferring instead to use the grid for storage because it is less costly and will extend the life of their batteries."[19]

Q. DID RMP PROVIDE SUPPORTING DATA FOR THESE CONCLUSIONS?

A. No. TASC requested any information the Company has to support Mr. Marx' assertions in testimony of customer storage installations and their use of on-site storage versus use of the power grid for storage purposes. RMP responded that they maintain no information on NEM customers with on-site storage.[20]

Without this information, it is not possible to positively state that NEM customers have this particular use of the grid. What information remains to evaluate NEM customers' use of the grid is measurement of their contribution to coincident system peak, which the utility does not measure directly but generalizes from an

[19] Rebuttal Testimony of Douglas Marx, lines 98-105.
[20] Response to TASC Data Request 2.9, TASC Surrebuttal Exhibit A at p. 2.

average customer with a modeled rooftop solar facility from PVWatts, and their non-coincident peak use, which the utility does not measure either (at least as far as the current record shows). As I addressed above, in Ms. Steward's rebuttal testimony (lines 151-158), she shows that peak demand hour production of a 3.2 kW system for an average customer offsets nearly 2/5, or 40%, of that customer's demand. A reasonable conclusion is that the solar DG customer has a 40% lower contribution to system coincident peak (CP) than a non-solar DG customer.[21] Because CP is used in Cost-of-Service to allocate fixed costs, a reasonable interpretation is that a customer with this pattern of usage and a 3.2 kW solar DG system bears only 60% of class average responsibility for fixed generation and transmission costs.

Q. WHAT OTHER OBSERVATIONS DOES MR. MARX MAKE REGARDING NEM CUSTOMERS' USE OF OR IMPACT ON THE GRID?

A. Mr. Marx writes about RMP's affiliate companies in jurisdictions outside of Utah. He writes that "[RMP affiliate] Pacific Power has incurred the cost of

[21] While the diagrams are titled "Distribution Peak Day," it is not clear that the respective summer and winter load curves are appreciably different from what would occur on system peak days. Additionally, the values labeled "load factor" do not comport with the load factor value for the residential class included in the COS study (Steward Direct Testimony Exhibit LLL, Sheet "Pages 7-9"), 15%.

replacing distribution system transformers to accommodate the increasing levels of NEM customers in its service territory."[22]

Q. WAS THIS STATEMENT SUPPORTED BY EVIDENCE?

A. No, according to RMP's data request response, this is not accurate. TASC asked RMP in its second data request, "If a transformer replacement is required to accommodate interconnection of a NEM system, does the customer or the utility pay the cost of replacing the transformer? Please answer for each of Pacific Power's jurisdiction." In each jurisdiction, the customer pays for the transformer upgrade. This is also the case in RMP's Utah jurisdiction.[23]

Q. WHAT ELSE DID MR. MARX SAY REGARDING NEGATIVE IMPACTS ON THE GRID AND ON OTHER CUSTOMERS RELATING TO GRID-INTERCONNECTED SOLAR SYSTEMS?

A. Mr. Marx included information about events in Oregon experienced by an RMP affiliate. He wrote that "Pacific Power also found that two solar customer generation units in Oregon with installed capacities of 500 kilowatts ("kW") and 363 kW each were having issues with line protection devices. This led to rapid voltage fluctuation of 5.3 percent every 15 seconds. These two projects are interconnected to Pacific Power's 12.5 kilovolt distribution circuit serving a total

[22] Rebuttal Testimony of Douglas Marx, lines 139-141.
[23] Response to TASC Data Request 2.11, TASC Surrebuttal Exhibit A at pp. 3-4.

of 1760 customers. The voltage fluctuations triggered by these solar projects propagated into Pacific Power's distribution system, causing operational issues to not only the distribution circuit they were connected to, but also the adjacent circuit. A total of 2515 customers were affected by this event, several of whom complained about voltage fluctuation and light flicker. On investigation, we determined that the customer generation reclosing device was operating incorrectly and was the root cause of the problem. Further, a significant amount of time, effort and money was spent by the Company to identify and mitigate the problem."[24]

Q. DO YOU AGREE THAT THESE EVENTS ARE RELEVANT TO THE CURRENT DISCUSSION ABOUT NEM CUSTOMERS IN RMP'S UTAH TERRITORY?

A. No, I strongly disagree. Mr. Marx' testimony appears to conflate large commercial/industrial scale solar generation units with small residential customer-sited rooftop solar. It is not reasonable to conclude that issues with two large PV installations can be interpreted to apply to many smaller distributed systems. In fact, TASC requested information in its second data request on customer complaints regarding voltage fluctuation and/or light flicker in RMP's Utah territory. Also requested were data indicating whether the complaints were from

[24] Rebuttal Testimony of Douglas Marx, lines 146-157.

customers on circuits that also contained distributed solar and whether the complaints were attributable to the solar installations. There were a total of 4 such complaints between January 2013 and June 2014, one of which on a circuit that did not contain DG solar, and three that were. RMP was unable to determine whether these complaints were attributable to the solar installations.[25]

Q. DID MR. MARX MENTION ANY OTHER ACTUAL OR HYPOTHETICAL CIRCUMSTANCES IN WHICH NEM CUSTOMERS DID OR COULD HAVE A NEGATIVE IMPACT ON THE POWER GRID?

A. Yes, he wrote that "[w]hen the distributed generation exceeds the load on the circuit and events occur that require RMP's protective equipment to isolate that circuit, the delay in the inverters to disconnect from the system will create an overvoltage condition."[26]

Q. DID RMP FURNISH ANY EVIDENCE THAT THIS EVENT HAD ACTUALLY HAPPENED?

[25] Response to TASC Data Request 2.12(d), TASC Surrebuttal Exhibit A at p. 6.
[26] Rebuttal Testimony of Douglas Marx, lines 231-234.

A. No, TASC requested information on events such as this one Mr. Marx mentioned. The Company responded that no, this has not occurred on its system to the best of its knowledge.[27]

Q. DID MR. MARX OFFER ANY TESTIMONY REGARDING THE EQUIVALENCIES OR DIFFERENCES BETWEEN NEM CUSTOMERS AND CUSTOMERS WITH ENERGY EFFICIENCY INVESTMENTS?

A. Yes, Mr. Marx wrote about solar DG that "[w]hen the solar system is not available, the total energy requirements must be met by the distribution system. In contrast, energy efficiency reduces the actual energy requirements for the end-use device. For instance, a 100 watt incandescent lamp produces about 1400 lumens. A fluorescent lamp producing the same lumen output consumes only 22 watts. This reduction in energy requirement will be seen for the entire life of the lamp, energy efficiency contributes to a reduction in the customer's peak demand whereas customer generation does not."[28]

Q. DO YOU AGREE WITH THIS CHARACTERIZATION?

A. No, lighting load doesn't generally coincide with system summer peak, whereas solar PV production does. In this context, solar PV would be a better

[27] Response to TASC Data Request 2.15, TASC Surrebuttal Exhibit A at p. 7.
[28] Rebuttal Testimony of Douglas Marx, lines 261-268.

source of on-site net load reduction than lighting. Neither is lighting the greatest potential form of energy efficiency. McKinsey Report "Sizing the Potential of Behavioral Energy Efficiency" says that Heat, Hot Water, AC, Refrigeration and Wet Cleaning all have higher potential savings as a percentage of US nontransportation residential energy use (5-6%, 4.0-5.4%, 2-3%, 1-1.6% and 1.5-2%, respectively, with lighting at 0.8-1.5%). The energy efficiency category that most closely matches solar PV output (AC) is also the category that most closely matches system summer peak load.

IV. DPU WITNESS STAN FARYNIARZ

Q. YOU WROTE EARLIER THAT YOU BELIEVE MR. FARYNIARZ MAY HAVE MISCHARACTERIZED OR MISATTRIBUTED THE BURDEN OF PROOF FOR DEMONSTRATING WHETHER NEM COSTS EXCEED THE BENEFITS OR VICE VERSA. PLEASE EXPLAIN.

A. Mr. Faryniarz writes that "[t]he cost benefit analyses discussed in Mr. Gilliam and Mr. Mulvaney's direct testimonies do not make a conclusive case that the benefits of net metering clearly outweigh the costs for residential customers."[29] However, the burden to impose a charge or credit is to demonstrate

[29] Rebuttal Testimony of Stan Faryniarz, lines 37-39.

positively that costs outweigh benefits or that benefits outweigh costs. Since the company is proposing a charge, they bear the burden of proof. Any arguments about benefits of net metering should be understood in two contexts: First, they will be useful in performing a full cost-benefit analysis, and second, they rightly introduce doubt into the unproven assumption that costs outweigh benefits which is being used to justify a charge before a cost-benefit analysis is done. Mr. Faryniarz concedes that RMP "has not produced enough evidence on the benefits or the costs of the NEM program."[30]

Q. YOU EARLIER MENTIONED AN EXAMPLE THAT MR. FARYNIARZ USES TO DEMONSTRATE UTILITY UNDER-RECOVERY DUE TO NEM CUSTOMER ON-SITE GENERATION. PLEASE EXPLAIN.

A. Mr. Faryniarz, in rebuttal testimony to the direct testimony of Witness Rick Gilliam and suggests that he mischaracterized the costs and benefits of NEM customers serving neighboring load, and offers an example with three scenarios, showing in turn, no solar generation, partial solar production offsetting some of a NEM customer's on-site load, and energy exports from the NEM customer to serve their neighbor's load.[31]

[30] Rebuttal Testimony of Stan Faryniarz, lines 49-50.
[31] Rebuttal Testimony of Stan Faryniarz lines 95-141.

Q. DO YOU BELIEVE THIS EXAMPLE SUFFICIENTLY DEMONSTRATES THE SCENARIOS MR. FARNIARZ SETS UP?

A. No, Mr. Faryniarz ignores the principle of cost causation in allocation of fixed costs and ignores the approved fixed customer charge. If Customer 1 has a lower-than-average coincident peak (CP) and non-coincident peak (NPC) while Customer 2 has a load pattern that matches the general residential customer class, Customer 1 should bear responsibility for a lower allocation of generation, transmission and distribution fixed costs. The following table (based on Mr. Faryniarz') demonstrates the three scenarios with the customer charge, slightly modified rates to maintain revenue neutrality ($0.094/kWh), and conservative estimates of differentiated cost allocation between customers (assuming Customer 1 has a 10% lower CP and NCP):

Table 1: Net Energy Metering Cost Recovery (from Faryniarz, p. 8), with Customer Charge, Revenue Neutral Energy Rates, and Adjusted Customer Contribution to Coincident Peak

	Scenario A		Scenario B		Scenario C	
	Cust. 1	Cust. 2	Cust. 1 (w/Solar)	Cust. 2	Cust. 1 (w/Solar)	Cust. 2
Energy Use (kWh)	1000	1000	1000	1000	1000	1000
Solar Generation (kWh)	0	0	500	0	1500	0
Bill (Net Credit) from Sales	$94.00	$94.00	$47.00	$94.00	($47.00)	$94.00
Fixed Charge	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00
Utility Generation (kWh)	1000	1000	500	1000	0	500
Utility Variable Costs	$50.00	$50.00	$25.00	$50.00	$0.00	$25.00
Utility Fixed Costs	$45.00	$50.00	$45.00	$50.00	$45.00	$50.00
Utility Revenues	$100.00	$100.00	$53.00	$100.00	($41.00)	$100.00
Utility Costs	$95.00	$100.00	$70.00	$100.00	$45.00	$75.00
Revenue Surplus (Deficit)	$5.00	$0.00	($17.00)	$0.00	($86.00)	$25.00
Surplus (Deficit) Total	$5.00		($17.00)		($61.00)	

If we account for the fixed charge and reduced fixed costs from distributed generation (as reflected in a conservative 10% reduction in CP and NCP relative

to the residential class as a whole), the utility in fact has a revenue surplus in Scenario A and unrecovered costs in Scenarios B and C of $17 and $61 ($86 - $25) compared with Mr. Faryniarz' calculation of $25 and $75, respectively. The following points should also be considered:

- Avoided variable costs are generally higher during the hours of solar production. While this example considers energy costs as flat $0.05/kWh, actual marginal production costs can be significantly higher in peak periods, at times exceeding retail rates.
- Improved cost allocation of distribution-related assets should consider coincident peak demand on individual circuits. If net load of customers on a circuit is complementary (if during peak periods solar customers are serving their neighbors' load in addition to their own), the solar customers generating power during peak periods should be allocated a significantly smaller share of distribution-related costs.
- A 10% reduction in CP and NCP is conservative given that summer coincident peak generally occurs between 4 PM and 5 PM. This coincides with a PV system in Utah producing a little under half of its daily maximum production (source: PVWatts). A greater reduction in CP and NCP would imply greater savings in utility fixed costs.
    - In fact, using the three-scenario example above, if a NEM customer reduces their CP and NCP to half of the residential customer class, the

revenue surplus/(deficit) for the three scenarios becomes $25 surplus, $3 surplus and ($41) deficit. Assuming that scenario A is off-peak hours or the "retail customer" state (11 of 24 hours), scenario B is shoulder hours or the "energy efficiency" state (10 of 24 hours) and scenario C is the peak hours or "export" state (3 of 24 hours), then the utility in fact would have a weighted revenue surplus of $7.58 due to the NEM customer's production. Of course, this ignores the lumpiness of fixed costs, but in the long-term, when NEM penetration affects RMP investment decisions in T&D, the observation is relevant.

V. OCS WITNESS DANIEL E. GIMBLE

Q. YOU MENTIONED EARLIER THAT MR. GIMBLE, IN HIS REBUTTAL TESTIMONY ON BEHALF OF OCS, RESPONDED TO YOUR DIRECT TESTIMONY OF A "BACK OF THE ENVELOPE" ESTIMATE OF RESIDENTIAL CUSTOMERS' DISPROPORTIONATE CONTRIBUTION TO RMP'S REVENUE REQUIREMENTS FOR GENERATION AND TRANSMISSION COSTS AS COMPARED WITH THEIR VOLUMETRIC ENERGY SALES. PLEASE ELABORATE.

A. Mr. Gimble rightly mentions that the COS study is a complex undertaking, highlighting that significant effort is expended to reach the approximately 35% allocation of revenue requirements (and specifically the 31.1% allocation of

generation and transmission-related costs which I calculated in my direct testimony) to the residential class.[32] For the purposes of considering the justification of the NEM charge in this proceeding, several salient points on the COS study should be highlighted:

- While it is possible to precisely determine responsibility for variable energy costs (because each kWh consumed must be met by one kWh produced, plus losses, at a known cost based on fuel prices, unit heat rates and loss factors), assigning responsibility for fixed costs by contrast is an exercise in judgment and discretion[33]. A simple method to allocate fixed costs would be in direct proportion to variable energy sales, which is the "back of the envelope" method I used in direct testimony.
- Because fixed costs are largely incurred to ensure that peak load can be reliably met, a reasonable alternative to allocating costs based on energy sales is to incorporate some measure of a customer's reliance on the system during peak load periods. Because actual data of direct measurement of each

[32] Rebuttal Testimony of William Gimble, lines 357-381.
[33] In reality, production costs and line losses are functions of many factors and change over time, even from one hour or fraction of an hour to another. Without meters that measure demand at comparable time scales, it is not possible to attribute energy consumed with exact production costs (doing so would allow so-called dynamic or real-time pricing, where customers paid the actual instantaneous marginal energy costs). As it stands, monthly metering requires RMP to allocate variable costs based on aggregate energy consumed, which is a reasonable approximation of what could be measured directly with better information. Fixed costs, on the other hand, are impossible to allocate precisely even with perfect information. There is no single best answer.

residential customer's instantaneous load during peak periods is currently unavailable, a class approximation is used, in order to ensure that as a class, residential customers bear a responsibility for generation and transmission fixed costs commensurate with their aggregated load during peak periods.

- The approved factor for allocating many generation and transmission-related fixed costs that Mr. Gimble references in rebuttal is the 75/25 demand-energy classification method, titled "F10" in the COS study. This factor is weighted at 75% of each class' instantaneous demand at the time of coincident system peak (measured in kW) and 25% of each class' percentage of aggregate energy consumption during the test year (measured in kWh). In the COS study, the residential F10 factor was 0.33270, a 75%/25% weighting of the demand and energy factors (0.35044 and 0.27948, respectively).
- As a class then, residential customers are allocated about 33.3% of many generation and transmission-related fixed costs. Because the NEM charge is intended to recover fixed costs from a sub-set of customers, the burden is on the Company to show that these customers continue to have class-average contributions to system coincident peak load. Without actual data, estimates from solar production models (such as PVWatts) are necessary. So far, the available model data cast doubt that these customers are avoiding their fair share of fixed costs, compared with class average and with other customers who reduce consumption.

VI. CONCLUSION

Q. BASED ON THE REBUTTAL TESTIMONY THAT YOU ADDRESS ABOVE, DO YOU HAVE A RECOMMENDATION TO THE COMMISSION FOR HOW TO ADDRESS THE PROPOSED NET METERING FACILITIES CHARGE AND THE IMPLEMENTATION OF S.B. 208?

A. Yes, I do. As most parties have observed, S.B. 208 requires the Commission to take a comprehensive look at the net metering program. First, the Company did not make any attempt to quantify the benefits of residential net metering, or to even identify the possible categories of value that might be considered as the benefits of the net metering program. Second, the Company's application and supporting testimony focuses on the "lost revenue" implication of net metering, but fail to clearly identify which costs are properly considered as costs of the net metering program. Based on such an incomplete picture, I believe it is not possible for the Commission to make findings of fact on the relative costs and benefits of the net metering program, as required by S.B. 208 and as indicated in the April 16, 2014 public notice issued in this proceeding. I recommend that the Commission decline to make the findings of fact required by S.B. 208 based on an inadequate record put forward by the Company, the party that filed the Application and that should bear the burden of proving that the costs of net metering outweigh the benefits.

Additionally, I strongly recommend that the Commission open a separate proceeding to establish a methodological framework to consider the costs and benefits of the net metering proceeding. I anticipate that the issue of intra-class equity of net metering will be a recurring one and it would be benefit the efficiency of future proceedings to have a Commission-approved valuation framework in place. I would recommend that the process, itself, should be transparent and collaborative and maximizing "buy in" from the diverse range of stakeholders participating before the Commission that are affected by this issue. Apart from intervenors with a direct interest in the growth of the solar industry, I believe OCS witness Gimble presents compelling reasons for the Commission to open a separate proceeding to approach this task.[34]

Q. DOES THIS CONCLUDE YOUR SURREBUTTAL TESTIMONY?

A. Yes.

[34] Rebuttal Testimony of William Gimble at p. 4, lines 100-118.