Q. Have you previously filed testimony in this docket?

A. Yes. I filed direct testimony in which I presented the Company's proposed framework to evaluate the costs and benefits related to Net Energy Metering ("NEM") customers.

PURPOSE AND SUMMARY

Q. What is the Company asking the Commission to approve in this proceeding?

A. To fulfill the requirement of Utah Code Ann §54-15-105.1, the Company requests the Commission adopt the Company's proposed two-part framework to evaluate the costs and benefits of the NEM program. I recommend the use of the avoided cost method to evaluate excess energy and a cost of service study (with NEM customers as a separate class) to evaluate electric service when no excess generation from the NEM customer exists. Specifically, I recommend the study-period length for the analysis be coincident with the time period that is being used for the applicable ratemaking procedure, typically known as the "test period". Doing so will allow the cost-benefit analysis and subsequent setting of rates for NEM customers to be dynamic and to change as needed through the same procedures that rates for all retail customers are set. Doing so creates a fair and equitable resolution for both NEM customers and non-NEM customers.

Q. After reading intervenors' direct testimony in this docket, what are your general observations?

A. The Company's proposed framework leverages two existing tools which have been used for years to determine rates for Utah customers – the class cost of service model, used to guide rate-setting for all retail customers; and the qualifying facility

("QF") avoided cost method that was recently implemented by this Commission and is now used to determine the value of energy provided to the grid by QFs. These two tools are best suited to analyze the costs and benefits of two separate aspects of the NEM program – the service the Company provides to customers participating in NEM for their own energy requirements (when their own generation is not sufficient to meet all of their energy needs); and the excess energy that NEM customers provide to the Company (when their generation exceeds their needs).

In their direct testimony, many of the intervening parties propose frameworks for calculating the costs and benefits of the NEM program that incorporate either conceptually or directly the cost of service study and the avoided cost method. While many of the proposed frameworks are conceptually similar to the Company's proposal, most include components, calculations, or methods that are not consistent with current and accepted ratemaking practices and Commission avoided cost orders that otherwise apply to all Utah retail customers.

Q. How is your rebuttal testimony organized?

A. I respond to each of the intervening parties' specific cost-benefit framework proposals. Like my direct testimony, my rebuttal testimony focuses on the framework used to evaluate the excess energy produced by NEM customers. Ms. Joelle R. Steward's testimony focuses on the costs and benefits of electric service to NEM customers when their generation does not exceed their own usage and the cost of service study and retail ratemaking principles in general. Lastly, Mr. Douglas L. Marx provides testimony related to distribution costs and system reliability issues caused by NEM customers.

Q. To which witnesses are you responding in your rebuttal testimony?

A. I respond specifically to the direct testimony of Utah Clean Energy, The Alliance for Solar Choice, and Sierra Club ("Joint Parties") witnesses Ben Norris and Tim Woolfe; Utah Office of Consumer Services ("OCS") witness Philip Hayet; and Utah Division of Public Utilities ("DPU") witness Robert A. Davis.

Q. Please summarize the key points of your rebuttal testimony.

A. I note the aspects of parties' proposals that are conceptually consistent with the Company's proposed framework and respond to those that are inconsistent with Commission-approved methods and ratemaking practices.

The Joint Parties' proposed framework incorporates an avoided cost concept similar to the Company's proposed concept. The Company's proposal, however, applies the avoided cost method to just the excess NEM energy whereas the Joint Parties' proposal applies to all NEM energy generation. Of greater concern is the Joint Parties' proposed method for determining the values for the various components of an avoided cost analysis, such as avoided capacity, avoided energy, etc. Many of their suggested calculations are not consistent with recent Commission-approved avoided cost models. Furthermore, their proposed framework includes value for components that are not verifiable and quantifiable or that do not currently accrue to retail customers, in contravention of the Commission's recent Order. Lastly, their proposal utilizes a long-term horizon that is inconsistent with the test period used to determine retail rates.

The OCS proposes a framework that is similar to the Company's proposal. When a short-term study period is used, the OCS proposal incorporates data from both the cost of service model and an avoided cost model to determine the costs and benefits of net metering. When a long-term study period is used, the OCS recommends the use of just the avoided cost analysis and refers to the Commission-approved avoided cost method for many of the inputs. The OCS discusses the importance of selecting the appropriate time period for use in the NEM cost-benefit analysis. I agree with the OCS' conclusion that a short-term study period that coincides with the period used for ratemaking (commonly known as the "test period") is appropriate for the NEM cost-benefit analysis. While the OCS and Company proposals are similar in that they use components of both the cost of service model and the avoided cost model in the short-term study, the use of the various components of those models differs. The OCS approach values all NEM generation using a form of avoided or marginal cost. The Company's approach uses actual cost of service to value NEM generation that does not exceed the customer's usage and the avoided cost method to value only excess generation that is delivered to the grid. Still, the Company's approach produces the exact model results that the OCS states are required.

The DPU's proposed framework includes the use of two cost of service studies, one with NEM customers treated as full requirements customers and one that reflects their reduced usage due to their self-generation. As further described by Ms. Steward in her rebuttal testimony, their two-study proposal will probably produce a similar result as the Company's proposal which utilizes one cost of service study with NEM customers included as a separate rate class. The DPU includes excess NEM generation in the cost of service study, while I recommend it be valued at avoided cost. The excess NEM energy is no different to the Company nor our customers than energy the Company receives from a solar QF. It is incremental, intermittent energy that avoids or reduces some other supply-side resource, and therefore should be valued consistent with the avoided cost pricing used to set value for similar generation. This Commission has already made a determination of the value of incremental, intermittent solar energy through the establishment of the avoided cost method for QFs. Because NEM customers' excess energy is identical to our other customers as QF produced energy, and because the Commission has already established a value for QF energy production, it is both fair and consistent to value NEM customers' excess generation in the same fashion as QF energy production.

RESPONSE TO THE FRAMEWORK PROPOSED BY THE JOINT PARTIES

Q. Please summarize your understanding of the Joint Parties' proposed framework.

A. Joint Parties' witness Mr. Norris presents testimony on certain components that he and Joint Parties witness Mr. Woolf identify as key benefits to consider when evaluating NEM contributions to the grid. The seven components include:

- Avoided energy costs.
- Avoided capacity costs.
- Avoided transmission costs.
- Avoided distribution costs.
- Avoided cost of environmental compliance, including compliance with the US Environmental Protection Agency Clean Power Plan.

- Reduced risk.
- Reduced transmission and distribution line losses.

He then describes how to value each component. Parts of his framework use, in some manner, the Company's proposed cost of service study and the avoided cost methods. But certain aspects of the Joint Parties framework are inconsistent with prudent ratemaking principles and should be rejected or modified. Furthermore, implementing Mr. Norris' recommendations would be inefficient and would require several new studies and models. The Company's proposed framework utilizes methods that have already been approved by the Commission.

Finally, I also respond to several specific issues created by the Joint Parties' proposed framework.

Q. Please elaborate on those parts of the Joint Parties' proposal that are consistent with the Company's proposal.

A. The framework proposed by the Joint Parties is conceptually consistent with the Company's framework in the areas of <u>avoided energy costs</u> and <u>avoided capacity costs</u>. In those areas, the Joint Parties suggest utilization of a deferred or avoided future generation resource to determine avoided capacity costs (benefits) and a production cost model to determine avoided energy costs (benefits). The method is similar (with some modifications I address later) to the current Commission-approved QF pricing method. The Company's framework utilizes the avoided cost method to determine the cost-benefit of excess NEM customer generation in a manner similar to what is proposed by the Joint Parties. However, the framework proposed by the Joint Parties requires certain adjustments to be consistent with current Commission-approved avoided cost methods.

The Joint Parties' framework uses the avoided cost method for all NEM generation. The Company's framework also uses the avoided cost method, but only when excess NEM generation exists. When no excess NEM generation exists, the Company proposes the use of the cost of service study. Ms. Steward explains in her testimony why the cost of service model is more appropriate for use during times when NEM generation does not exceed the customer's load and how the Company's proposal in that scenario is more consistent with ratemaking principles and practices currently in place for all Utah customers.

Q. What modifications are needed to the portion of the Joint Parties proposed framework that addresses avoided energy and avoided capacity?

A. For avoided energy, Mr. Norris suggests using a production cost model to determine avoided energy costs. This is similar to the avoided cost method approved by the Commission in Docket No. 12-035-100 in which the Company's GRID model, which is a production cost model, is used to determine the marginal cost of energy each hour. Mr. Norris recommends performing two model runs, one without the solar resource and one with the solar resource, with the difference representing the avoided energy cost of the solar resource. The method approved by the Commission in Docket No. 12-035-100 also utilizes two model runs. The primary difference between Mr. Norris' approach and the Commission-approved avoided cost method is Mr. Norris uses, as the solar resource, the aggregation of several hundred individual distributed generation solar systems, while the Commission-approved avoided cost method utilizes a single proxy solar resource.

For purposes of the calculation of avoided energy value, the aggregation of data from hundreds of individual small solar resources is administratively burdensome and is not necessary to accurately determine avoided energy costs. In fact, most of the rooftop solar installations in the Company's service territory do not include a meter on the actual solar panels; thus, the Company would have no ability to gather the data required by Mr. Norris' framework. While the Company has developed a way to obtain reliable solar generation production data for a group of NEM customers through a load research study, the use of single proxy solar resource provides reasonable results for purposes of determining avoided energy costs.

For avoided capacity, Mr. Norris suggests calculating the effective capacity of the solar resource (the capacity factor) and then multiplying by the avoided capacity cost of the assumed resource used for the displaced energy.[1] This approach is identical to the method approved by the Commission in Docket No. 12-035-100. The only difference lies in Mr. Norris' calculation of the capacity factor. He suggests using the average production over a certain number of peak hours, using the peak 100 hours as a suggestion. In its June 26, 2015 Order Approving Capacity Contribution Study and CF Method Values in Docket No. 14-035-140, the Commission approved capacity contribution values for wind and solar QFs for the purpose of calculating Schedule 38 avoided cost capacity payments. The order requires PacifiCorp to apply a 34.1 percent capacity contribution for fixed solar QFs and a 39.1 percent capacity contribution for tracking solar QFs for the purpose

[1] Direct Testimony of Ben Norris, pages 6-7.

of determining Schedule 38 capacity payments.[2] I recommend the use of the Commission-approved avoided cost method, which includes these capacity contribution values, to determine the avoided capacity value for purposes of a net metering program cost-benefit framework.

Q. What aspects of the Joint Parties' proposal are <u>not</u> consistent with the Company's proposal?

A. The components related to the <u>avoided transmission costs</u>, <u>avoided distribution costs</u>, <u>avoided cost of environmental compliance</u>, <u>cost-benefit of reduced risk</u>, and <u>cost-benefit of reduced transmission and distribution losses</u> are inconsistent with the Company's framework, inconsistent with findings made by this Commission related to avoided costs, and inconsistent with prudent cost allocation and ratemaking practices and policies. Furthermore, many of these components are not quantifiable and verifiable at this time and should therefore be excluded.

Q. How is the Joint Parties' proposal related to avoided transmission costs inconsistent with current avoided cost methods?

A. For avoided transmission costs, Mr. Norris suggests using existing transmission costs allocated to Utah as a proxy of future transmission costs.[3] This is inconsistent with the method approved by the Commission in an April 9, 2006 order in Docket No. 03-035-14 and therefore should not be used for purposes of determining avoided transmission capacity costs as part of the NEM program cost-benefit framework. In that docket, the Commission determined avoided transmission costs

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[2] June 26, 2015 Order Approving Capacity Contribution Study and CF Method Values, Docket No. 14-035-140, page 18.

[3] Direct Testimony of Ben Norris, pages 7, lines 136-137.

are the transmission capital investments new QF resources may avoid or defer as a result of the QF's location on the Company's transmission system. The avoided transmission capacity costs are to be calculated using a case-by-case method identifying QF project-specific net benefits to planned Company transmission facilities.[4] To date, no QF facility has demonstrated avoidance or deferral of a transmission capital investment under this case-by-case method. This is primarily due to the large size of most transmission upgrades compared to the comparably smaller size of most QFs. This size gap is even greater when evaluating distributed generation.

The use of existing "in-rates" transmission costs as a proxy for future costs is not reasonable in that it does not consider in isolation the cost of planned transmission projects, if any, in the Company's integrated resource plan and falsely assumes that any future transmission costs will be identical to costs in rates for past projects. It is also inconsistent with the current QF avoided cost method for avoided transmission capacity costs. In that case-by-case analysis approach utilizing the system impact study, no QF has been identified as avoiding or deferring a major transmission project and therefore no avoided transmission capacity value has been applied to a QF resource. The Company recommends using the case-by-case approach for the NEM cost-benefit test for this component, with no benefit being applied unless a verifiable and quantifiable deferral or avoidance occurs.

[4] In the Matter of the Application of PacifiCorp for Approval of an IRP-based Avoided Cost Methodology for QF Projects Larger than One Megawatt, Docket No. 03-035-14, April 19, 2006 Order, page 3 and page 10.

This approach is further supported by the Company's current ratemaking practices. Customers are not charged different transmission rates depending on where they live within the state. The same concept should apply to the determination of avoided transmission capacity costs as they relate to the NEM program cost-benefit analysis for excess energy produced by NEM customers and sent to the grid in a manner similar to QF energy.

For NEM energy that is used to offset a customer's own load, the Company continues to recommend the use of the cost of service study to perform the cost-benefit analysis for transmission capacity costs, as further explained by Ms. Steward in her direct and rebuttal testimony.

Q. What is your response to Mr. Norris' suggested method to calculate avoided distribution costs?

A. I agree with Mr. Norris when he states that distribution costs for reliability-related purposes should not be included as a "benefit" created by the NEM program because they are not avoidable by distributed solar. It is reasonable to assume that <u>all</u> distribution assets are required for reliability purposes in the context of NEM since NEM customers are constantly utilizing the distribution assets to either import power to meet needs not covered by their own rooftop generation or exporting excess energy that exceeds their own usage.

I recommend excluding avoided distribution costs for excess energy (the energy produced that exceeds the NEM customer's load and is exported to the GRID) because the distribution system is clearly being used to move that energy. My recommendation is further supported by the rebuttal testimony of Company witness Mr. Marx. In his testimony, he discusses how the distribution system is impacted by NEM generation. He concludes that NEM generation likely does not avoid any distribution costs and in fact may result in higher distribution costs.

Ms. Steward outlines in her direct testimony the Company's recommendation for evaluating avoided distribution costs during periods when the NEM customer generation meets or is less than the NEM customer's load. Her recommended framework consists of creating a separate class of service for NEM customers and then allocating costs based on the cost of service model.

Q. How has Mr. Norris defined avoided environmental compliance costs?

A. Mr. Norris defines these costs (benefits) as "…the utility's ability to avoid costs to install and operate pollution control measures that are necessary to comply with environmental regulations such as the Regional Haze rule, ambient air quality standards, water quality standard, and possible greenhouse gas reductions stemming from Section 111(d) of the Clean Air Act".[5]

Q. Has the Commission established guidelines for what criteria should be included in the NEM cost-benefit analysis?

A. Yes. The Commission established two criteria for inclusion in the cost-benefit analysis:

1) The cost-benefit analysis can only include costs and benefits that accrue to customers in their capacity as ratepayers of the utility, and
2) The costs and benefits considered must be quantifiable and verifiable.[6]

[5] Direct Testimony of Ben Norris, page 9 line 185 through page 10 line 188.
[6] July 1, 2015 Docket No. 14-035-114 Order Re: Conclusions of Law on Statutory Interpretation and Order Denying Motion to Strike.

Q. Do avoided environmental compliance costs, as described by Mr. Norris, meet both criteria?

A. Verifiable and quantifiable costs that accrue to customers meet the criteria. Speculative costs that cannot currently be measured and that do not currently accrue to customers do not. Any costs associated with environmental compliance that have already been incurred by the Company and will be recovered through retail rates will be accounted for in Ms. Steward's proposed cost of service framework (through reduced cost allocations). Those costs are quantifiable and verifiable, and they accrue to customers through rates. Those costs meet both criteria and can be considered.

For excess NEM energy, the Company proposes to use the QF avoided cost as the cost-benefit framework. The Company's IRP takes into account known environmental compliance obligations.[7] Those obligations are considered when the IRP selects the lowest-cost, least-risk resource portfolio and may result in a certain type of resource (such as a renewable resource) as a required resource addition in the planning horizon. The next deferrable or avoidable resource in the IRP planning horizon is the basis upon which the QF avoided capacity and energy costs are determined under the current Commission-approved avoided cost method. The Company's proposed framework for excess NEM customer energy uses QF avoided costs as the framework for the cost-benefit test.

As I described earlier, Ms. Steward's proposed framework utilizes the cost of service model that includes all environmental compliance costs that already

[7] PacifiCorp 2015 Integrated Resource Plan, pages 26-39.

accrue to ratepayers. Therefore, evaluation and inclusion of environmental compliance costs in these two scenarios (the avoided cost method and the cost of service study) is appropriate and consistent with the Commission's criteria because those costs are quantifiable and verifiable and accrue to customers. Inclusion of any other forecasts or estimates of environmental compliance costs is highly speculative, not quantifiable, not currently accruable to customers, and not consistent with the Commission's criteria. Those types of costs should not be considered in the cost-benefit framework. Mr. Norris references Section 111(d) of the Clean Air Act. The projected compliance costs, if any, associated with compliance with the Clean Air Act are not currently quantifiable and verifiable since the exact rules and requirements are not yet known. Speculative costs and benefits do not meet the criteria set forth by the Commission for inclusion in the framework and should not be considered.

Q. Do you agree with Mr. Norris that "reduced risks" should be considered as a benefit of the NEM program?

A. No. Mr. Norris incorrectly assumes that a hedge reduces risk and therefore provides a monetary benefit to customers. Hedging reduces volatility but neither reduces or causes risk. For each of the risks that Mr. Norris describes there is an equal chance of upside and downside, meaning future values are just as likely to be lower than the forecast as they are to be higher than the forecast. When the Company purchases power from QFs under fixed price contracts, no additional value is assigned to the QF for hedging or risk mitigation benefits. In Docket No. 12-035-100, which dealt with renewable avoided cost methodology for Schedule 38, the Commission heard various arguments from parties regarding whether some additional value should be granted to QFs for reduced risk, but ultimately in its order the Commission stated that "we approve no specific adjustments to value fuel price hedging, fuel price volatility or environmental risk."[8] The Company agrees that no benefit should be considered related to "reduced risk" in the NEM program cost-benefit framework. It would be inconsistent with the Commission's treatment of QFs to provide a value assignment to NEM customer's excess generation based on hypothetical reductions in fuel and environmental risks.

Q. Do you agree with Mr. Norris that reduced transmission and distribution line losses should be included in the framework?

A. Reduced transmission and distribution line losses should be included only if and to the extent they are clearly identifiable and measurable. Mr. Norris suggests that each of the benefit components should be grossed up by avoided line losses. This approach is overly simplistic and will not accurately reflect the impact of net metering on line losses. Under the avoided cost method, line losses are evaluated on a case-by-case basis and must be measurable. Under Ms. Steward's cost of service framework, line losses are accounted for in the cost of service model.

Furthermore, assessing a specific line loss percentage for a unique group of customers is not consistent with current ratemaking principles and current Open Access Transmission Tariff ("OATT") practices. For example, a customer who lives in a remote area of the service territory is not charged a higher line loss cost than a customer who is in a more densely populated area. And a customer who lives

[8] Page 42 of the Commission's Order on Phase II Issues in Docket No. 12-035-100 dated August 16, 2013.

next door to a power plant does not receive a discounted line loss charge compared to a customer who lives many miles from a generation source. Similarly, in the OATT, losses are assessed based on the delivery voltage and not on distance or an actual measurement of incurred losses.

Q. Now that you have addressed the seven cost-benefit components used by the Joint Parties witnesses, are there any other statements or assumptions included in their testimony that are inconsistent with the Company's analysis?

A. Yes. I will now address issues related to the certain assumptions and statements found in Mr. Woolf's testimony.

Q. On page 5 of Mr. Woolf's testimony, he presents Table 1 that indicates that the rate impacts of NEM customers to non-participating customers may be very modest. Please comment.

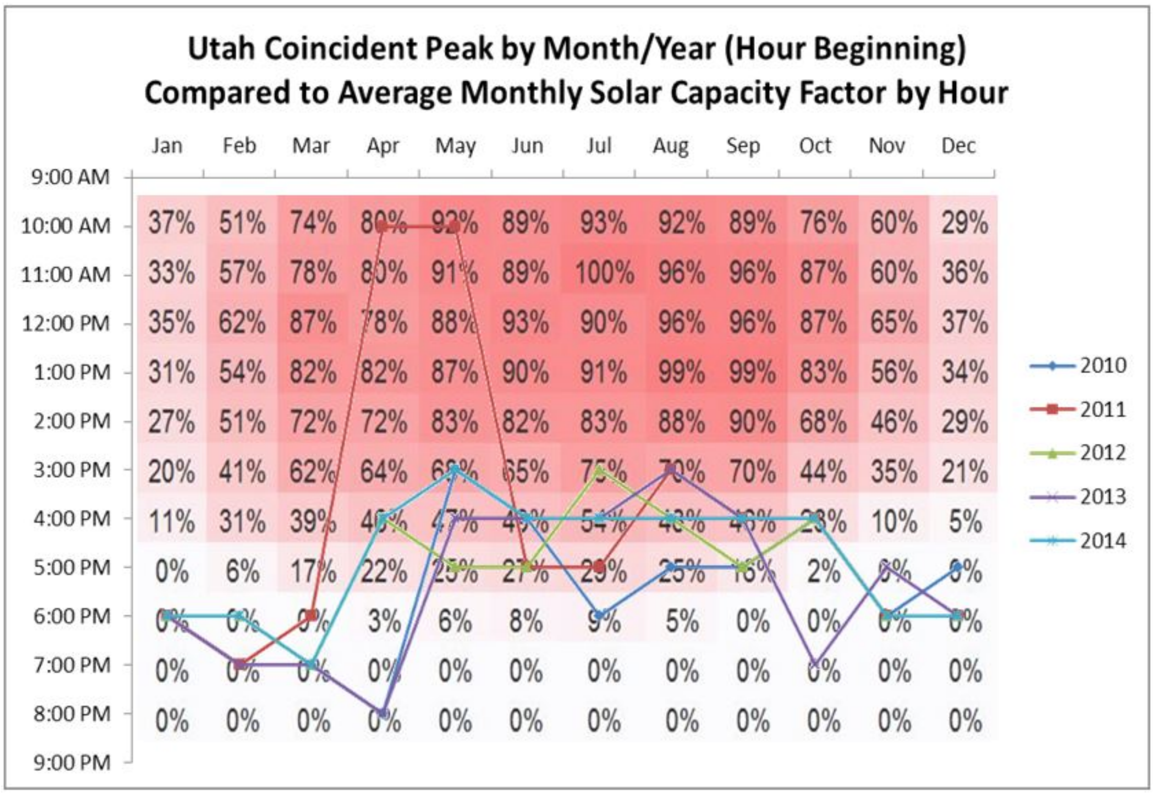
A. Mr. Woolf's findings and conclusions are based on an estimation of avoided costs that is not consistent with actual avoided costs. The range of avoided cost values that Mr. Woolf uses for his analysis are quite high. In fact, even the *low* end of his range is well *above* current avoided costs and well above the 20 year levelized price found in the last six large solar QF power purchase agreements executed by the Company. As I indicated on page 18 of my direct testimony, the current Schedule 37 rate for a 20 year levelized PPA is $52 per MWh. Mr. Woolf utilizes a range of $60 to $116 per MWh for his conclusions shown in Table 1. History shows us that Mr. Woolf's estimations are significantly over-stated.

Q. On page 5 of his testimony, Mr. Woolf claims that "PV generation is essentially a free resource to the utility system, and it is provided at a time when power costs are typically at their highest." Do you agree?

A. I completely disagree. Generation from NEM customers is <u>not</u> a free resource since NEM participants are currently compensated at their *full retail rate* for energy, which can be as high as $14.45 cents per kWh for residential customers. Additionally, there are administrative costs associated with billing and administering the net metering program. Furthermore, under current NEM design, NEM customers can generate excess energy that the Company must "store" and then return to the NEM customer at a later time when the customer's generation is less than their load. This storage service, which may last a day, a month, or even carry energy from one month to the next, is currently provided free of charge to NEM customers, even though the Company must maintain the system that is "storing" the energy for those customers. Hence it is not without costs and cannot be accurately called "free".

Regarding his unsupported assertion that PV generation is provided at a time when power costs are typically at their highest; his statement is inconsistent with actual data for Utah. Power costs, like most commodities, tend to be highly correlated to demand. The higher the demand for electricity, the higher the cost. To assess Mr. Woolf's claim, the Company performed an analysis to determine the capacity factor for a solar resource at Utah's monthly coincident peak hours. To perform the analysis, the Company determined the monthly coincident peak hour for Utah for each month over a five-year period (2010-2014) and then compared the solar output (the capacity factor) of a hypothetical solar resource in the Salt Lake Valley[9] during those same hours. On average, the solar resource produced at a 24 percent capacity factor during the monthly coincident peak hours. Graph 1 shows the time of the monthly Utah coincident peaks for 2011-2014. On the graph, in the background for each hour, the capacity factor for the hypothetical solar project is shown. Table 1 shows the same data in tabular form.

Graph 1



[9] Study performed by Black & Veatch, 2013; Salt Lake City, UT solar resource, fixed tilt.

Table 1

Utah Coincident Peak* & Corresponding Fixed Tilt Solar Capacity Factor for a Salt Lake City, UT Solar Project

	2010		2011		2012		2013		2014	
	Peak Hour	*Solar CF %*	*Peak Hour*	*Solar CF %*	*Peak Hour*	*Solar CF %*	*Peak Hour*	*Solar CF %*	*Peak Hour*	*Solar CF %*
Jan	6:00 PM	0%	6:00 PM	0%	6:00 PM	0%	6:00 PM	0%	6:00 PM	0%
Feb	7:00 PM	0%	7:00 PM	0%	6:00 PM	0%	7:00 PM	0%	6:00 PM	0%
Mar	7:00 PM	0%	6:00 PM	0%	7:00 PM	0%	7:00 PM	0%	7:00 PM	0%
Apr	8:00 PM	0%	10:00 AM	80%	4:00 PM	46%	8:00 PM	0%	4:00 PM	46%
May	3:00 PM	68%	10:00 AM	92%	5:00 PM	25%	4:00 PM	47%	3:00 PM	68%
Jun	4:00 PM	49%	5:00 PM	27%	5:00 PM	27%	4:00 PM	49%	4:00 PM	49%
Jul	6:00 PM	9%	5:00 PM	29%	3:00 PM	75%	4:00 PM	54%	4:00 PM	54%
Aug	5:00 PM	25%	3:00 PM	70%	4:00 PM	48%	3:00 PM	70%	4:00 PM	48%
Sep	5:00 PM	16%	4:00 PM	46%	5:00 PM	16%	4:00 PM	46%	4:00 PM	46%
Oct	4:00 PM	23%	4:00 PM	23%	4:00 PM	23%	7:00 PM	0%	4:00 PM	23%
Nov	6:00 PM	0%	6:00 PM	0%	6:00 PM	0%	5:00 PM	0%	6:00 PM	0%
Dec	5:00 PM	0%	6:00 PM	0%	6:00 PM	0%	6:00 PM	0%	6:00 PM	0%

* Mountain Time - Hour Beginning

Of the 60 monthly coincident peak hours in this study, the solar resource was producing *zero* output during 28 of those hours. In other words, during almost half the coincident peak hours, the solar resource was not producing *any* energy. And during the coincident peak hours that solar was producing, the solar resource capacity factor averaged only 44 percent. Mr. Woolf's speculation that PV generation is provided at a time when power costs are typically highest is not accurate based on actual data from Utah.

Q. On page 9 of his testimony, Mr. Woolf includes a discussion of the RIM test for DSM and characterizes "lost revenues" as not being a "new" cost created by DSM or NEM programs. Do you agree with him?

A. No. NEM customers are currently compensated for their excess generation at full retail energy rates. This is an incremental cost that will ultimately be paid for by non-participating customers. All else being equal, new incremental residential NEM generation will increase costs for non-participating customers if the payment or credit to NEM customers for their excess generation exceeds the value of the energy that is provided.

Q. Later on in this discussion, Mr. Woolf makes the assertion that "(m)aintaining low utility system costs should be given priority over minimizing rates." Do you agree with this principle?

A. Not necessarily. For instance, NEM results in a reduction in revenues from participating customers. The overall utility cost may be reduced by the program (for example the cost of fuel might go down because rooftop generation may displace thermal generation), but costs may be *higher* for non-participating customers than they would otherwise be if the lost revenue does not equal the value of the generation provided by the NEM customers. For example, if net metering lowers utility costs by 3 cents per kWh in saved fuel, but the lost revenue from participating customers equals 14.45 cents, overall utility costs will go down but costs to non-participants will go up because the lost revenues from NEM customers is now made up by non NEM customers. The costs that *all* the Company's customers must pay, participating or not, must be considered.

RESPONSE TO THE FRAMEWORK PROPOSED BY THE OCS AS PRESENTED BY MR. PHILIP HAYET

Q. What is your understanding of OCS witness Mr. Hayet's recommendation for calculating the costs and benefits of NEM?

A. Mr. Hayet recommends identifying appropriate costs and benefits, determining the appropriate time period for the analysis, and then computing the net present value of the difference between the costs and the benefits. For the costs, he recommends including program administrative costs, integration costs, distribution costs, and lost revenues. For the benefits, he recommends including avoided energy costs, avoided capacity costs, avoided transmission costs, avoided distribution costs, and avoided line losses. For a long-term study period, he essentially proposes to calculate a value for the generation provided by NEM customers (to determine the benefit to non-participants) by using a long-term "avoided cost" analysis and then compares that benefit to the cost of the net metering program (which includes the lost revenues and other program costs).[10]

Mr. Hayet then addresses the importance of the study period length to be used in the analysis, and how different lengths should be used depending on the objective of the study. Mr. Hayet then presents an example of how his framework would be implemented under a short-term study period by calculating short-term avoided costs as a benefit and reduced recovery of embedded fixed costs as a cost to non-participating customers.

Q. Are the cost-benefit categories used by Mr. Hayet similar to those used by the Company and by other parties in their proposed frameworks?

A. Yes. The basic categories used by Mr. Hayet were also used by the Company in its two-part framework. The Joint Parties' also include the same basic categories in their proposed framework, as described by Mr. Norris and Mr. Woolf.

Q. What does Mr. Hayet say regarding the study period length that should be used when performing the cost-benefit analysis?

A. Mr. Hayet suggests a long-term study period be used only if the objective is to

[10] Direct Testimony of Philip Hayet, page 7.

determine the long-term impact on the utility (and not the impact to customers), similar to what is used for resource planning. However, if the objective is to guide the development of proper rates, the time period should be consistent with the ratemaking planning horizon.

Q. How would the study assumptions under Mr. Hayet's framework be developed if the study period were shorter in length, which he suggests is appropriate when the objective is to develop rates?

A. Mr. Hayet suggests the costs should be reflective of what the utility will incur at the present time, and should only include costs and benefits that are typically found in the utility's cost of service study.[11]

Q. You just described how Mr. Hayet presents both a long-term and a short-term framework. What is his conclusion regarding the appropriate study period to be used for the NEM cost-benefit analysis?

A. On page 12 lines 278-279 of his direct testimony, Mr. Hayet states:

> "It would simply be inappropriate to use the results of a long-term cost and benefit analysis in a ratemaking analysis, since rates are normally set based on current estimates of costs, not costs determined ten or twenty years out in time."

Mr. Hayet recommends utilizing the short-term study period when the objective is to develop rates.

Q. Is the ultimate objective of this proceeding to develop rates?

A. Yes. Ultimately the NEM statute requires the governing authority to "determine a

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[11] Direct Testimony of Philip Hayet, page 13, lines 288-290.

just and reasonable charge, credit, or ratemaking structure, including new or existing tariffs, in light of the costs and benefits."[12]

Q. What is the Company's recommendation related to the study period length that is most appropriate for the NEM cost-benefit analysis?

A. Similar to Mr. Hayet, the Company recommends the study period be coincident with the ratemaking period used to establish rates for all retail customers. This interpretation is consistent with the Commission's direction that costs and benefits only be considered if they accrue to customers in their capacity as ratepayers. Rates are set based on the test period established in the applicable ratemaking dockets. The Company recommends its proposed cost of service framework for the NEM cost-benefit analysis utilize the same test period as that used to establish the underlying retail rates for NEM customers and all customers. This allows the analysis to change dynamically as costs and benefits that accrue to customers change in various ratemaking procedures.

For the excess NEM generation, the Company proposes a framework that utilizes QF avoided costs as the basis for the benefit. The avoided costs in Schedule 37 and currently available under Schedule 38 are calculated for up to a 20-year term, but values are typically provided by month or year. The Company recommends using the avoided cost price that coincides with the test period used for the cost of service study used in the applicable ratemaking procedure. While longer term contracts are available to QFs, the QF contracts include credit terms,

[12] *In the Matter of the Application of Rocky Mountain Power for Authority to Increase its Retail Electric Utility Rates in Utah for Approval of its Proposed Electric Service Schedules and Electric Service Regulations*, Docket No. 13-035-184, Report and Order, p. 58 (August 29, 2014).

security deposits, performance guarantees, liquidated damages, default provisions, and termination rights that are not found in arrangements between NEM customers and the utility. Those contractual terms protect the utility and its customers from non-performance and are essential to mitigating the risks associated with long-term contracts. Since these protective contract terms are not available to the Company for NEM generators, shorter term valuations are appropriate. If a NEM customer desires a longer term contractual arrangement for their generation, it has the option of self-certifying as a QF and obtaining a contract under the applicable QF tariff.

Q. Mr. Hayet appears to use an avoided cost calculation to evaluate excess NEM generation. Do you agree with that approach?

A. Yes. Excess NEM generation should be treated similar to a supply side resource since it is not consumed by a customer behind its own meter but is instead pushed to the grid in a manner similar to a QF. The QF method determines what other supply side resource is avoided by this excess generation, and then determines the value of the excess generation based on that avoided resource. It determines the marginal benefit of the excess generation to the system. I recommend excess NEM generation be valued using the avoided cost method, as described in my direct testimony.

Q. Are there differences in the calculation of the "costs" component of Mr. Hayet's proposed framework and the "costs" component of the Company's proposed avoided cost framework?

A. Yes, there are some minor differences. The primary and largest "cost" component is the lost revenues. The Company and Mr. Hayet are in agreement on the calculation of that cost component. Mr. Hayet suggests additional cost components related to integration costs and distribution costs be added to lost revenues. The Company’s proposal does not make a specific adjustment or add costs (incremental to the cost of service results) to account for solar integration costs in the cost of service study, but such an adjustment would be reasonable if included because those costs are not directly captured in the cost of service study. Solar integration costs are accounted for in the avoided cost method. The Company’s proposal includes distribution costs incurred by NEM customers as part of the cost of service framework described by Ms. Steward. In the avoided cost method, an adjustment for incremental distribution costs attributed to excess NEM generation may be reasonable, as described by Company rebuttal witness Mr. Marx.

Q. Please summarize your recommendation after reviewing Mr. Hayet’s proposed framework.

A. Mr. Hayet’s proposal is reasonable in approach, lists many of the same cost and benefit categories as the Company, and is performed in a similar manner under his short-term study period. The Company’s approach is more closely aligned with existing ratemaking tools and principles and is more precise in its treatment of excess energy. The Company’s proposed framework distinguishes between two important aspects of the NEM program – the service the Company provides NEM customers when generation does not exceed load; and the excess energy NEM customers deliver to the Company when generation exceeds load. The Company’s framework evaluates both of these aspects with tools that have been used for years, are frequently updated, and are considered by the Commission as reliable enough to guide the rates which all existing retail customers pay and to calculate the payments made to QFs. I continue to recommend the use of the Company's proposed framework to complete the cost-benefit analysis, but would not object to specific inclusion of solar integration costs in the cost of service study (as additional costs attributable to the net metering program) and inclusion of incremental distribution costs related to excess NEM energy as suggested by Mr. Hayet.

RESPONSE TO THE FRAMEWORK PROPOSED BY THE DPU AS PRESENTED BY MR. ROBERT A. DAVIS

Q. What is your understanding of DPU witness Mr. Davis' recommendation for calculating the costs and benefits of net metering?

A. Mr. Davis recommends conducting two cost of service studies. The first study would treat NEM customers as full requirements customers, and the second study would treat NEM customers as partial requirements customers and would take into account their net load, including any excess generation.[13]

Q. What are the similarities and differences between the DPU's proposed framework and the Company's proposed framework?

A. Like Mr. Hayet and the Company, Mr. Davis recommends using components of the Company's established cost of service model as the basis for the cost benefit analysis. Ms. Steward includes in her rebuttal testimony a comparison of the DPU's proposed cost of service framework and the Company's proposed cost of service framework. Regarding the treatment of excess energy, Mr. Davis proposed to include excess NEM energy in the cost of service model, which essentially values

[13] Direct Testimony of Robert A. Davis, page 7.

it at embedded cost. Excess NEM energy should be valued at avoided costs and not at embedded costs.

Q. Does this conclude your rebuttal testimony?

A. Yes.