BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH

In the Matter of the Investigation of the Costs and Benefits of PacifiCorp's Net Metering Program	))))))	Docket No. 14-035-114 DPU Exhibit 1.0 DIR

DIRECT TESTIMONY

OF

ROBERT A. DAVIS

ON BEHALF OF THE

UTAH DIVISION OF PUBLIC UTILITIES

July 30, 2015

TABLE OF CONTENTS

Introduction

Q: Please state your name and occupation.

A: My name is Robert A. Davis. I am employed by the Division of Public Utilities (Division) of the Utah Department of Commerce as a Utility Analyst in the Energy Section.

Q: What is your business address?

A: My business address is 160 East 300 South, 4th Floor, Salt Lake City, Utah, 84114.

Q: On whose behalf are you testifying?

A: The Division.

Q: Do you have any exhibits that you are filing along with your testimony?

A: Yes I do. DPU Exhibit 1.1, Appendix A, offers an overview of the workgroup sessions conducted by the Division in this docket. DPU Exhibit 1.2, is a slide from a presentation prepared by PacifiCorp (Company) comparing solar peak production to system peak on a single circuit in Salt Lake City where the Company performed a solar study in 2010.

Q: Please summarize your educational and professional experience.

A: I received a Master's in Business Administration with Master's Certificates in Finance and Economics from Westminster College in May of 2005. I am a Certified Valuation Analyst (CVA) by the National Association of Valuators and Analysts. I am a Certified General Appraiser in the State of Utah. I have been employed with the Division since May of 2012 where I have worked on various telecommunications and energy related assignments.

Prior to my present position, I was employed for approximately seven years at the Utah State Tax Commission in the Centrally Assessed Property Tax Division-Utilities Section where I assessed telecommunication, energy and airline companies for property tax purposes.

Prior to working for the Property Tax Division, I was employed as an Electronic Engineering Technician at Fairchild Semiconductor for 22 years.

Q: Have you testified before the Public Service Commission of Utah (Commission) on prior occasions?

A: Yes I have.

Purpose and Summary of Testimony

Q: What is the purpose of your testimony in this proceeding?

A: My testimony is primarily intended to explain the Division's recommendation that the Commission should adopt a "cost of service" framework for evaluating net metering customers' costs and benefits to the system. Specifically, similar to the evaluation of avoided costs, the Division recommends that two separate cost of service studies be conducted. The first study would treat net metering customers as full requirements or load customers ignoring their net metering. The second study would treat them as net metering customers with their net loads. The difference in the two studies should reveal to a great degree the benefits net metering customers bring to the system through a reduction in costs. This method of evaluation will capture and quantify reduced allocations to Utah through existing inter-jurisdictional allocation protocols as well as costs imposed on other customers. The Division believes such an approach represents a reasonable and prudent approach to a general framework and is consistent with recent Commission directives. Further, it should prove flexible as increased information about such customers and their effects becomes available.

Organizationally, my testimony proceeds as follows: (1) I give a brief background of this Docket; (2) I summarize the Division's recommendation and proposal for an analytical framework to be used in future net metering related proceedings; (3) I summarize the complexities of distributed generation (DG) from the utility's and net metering customers' perspectives, respectively; (4) I discuss the consideration and use of Demand Side Management (DSM) tests and the Division's current position on the use of the tests for DG; and (5) I summarize the Division-led workgroup sessions.

Docket Background

Q: Will you provide a brief history of this docket?

A: Yes. On August 29, 2014, at the conclusion of the Company's last general rate case, Docket No. 13-035-184, the Commission opened this docket to adopt a framework to determine the costs and benefits of the Company's net metering program.

The Commission scheduled this docket to progress in steps. The first step occurred on November 5, 2014 when the Company presented its plan for performing a load and research study focused on residential net metered customers and a schedule for the study's completion in September 2015.

During the March 16, 2015 follow-up technical, status and scheduling conference, the Commission outlined the second step, a series of workgroups to be led by the Division to explore an appropriate analytical framework to be used to determine costs and benefits of net metering. (November 21, 2014 Notice). Further guidelines offered by the Commission can be found in DPU Exhibit 1.1, Appendix A.

On July 1, 2015, the Commission issued its "Conclusions of Law on Statutory Interpretation and Order Denying Motion to Strike." The Commission ordered that for purposes of performing the analysis under Utah Code Ann. § 54-15-105.1(1), the relevant costs and benefits are those that accrue to the utility or its non-net metering customers in their capacity as ratepayers of the utility. Costs or benefits that do not directly affect the Company's cost of service will not be included in the final framework to be established in this phase of the docket. (July 1, 2015 Order).[1]

Recommendation

Q: Will you please offer your recommendation to the Commission?

A: Yes. The Division believes the Commission should adopt a type of cost of service framework for determining how to apportion costs and benefits to net metering customers. The Division has not found the use of DSM tests to be beneficial as an analytical framework to determine costs and benefits of net metering to the utility and its other non-net metering customers. The Division in its earlier comments had initially thought that the DSM tests would be more useful. After further evaluation, the Division

1 Commission's "Order RE: Conclusions of Law on Statutory Interpretation and Order Denying Motion to Strike" at p. 17.

does not believe that a DSM test framework will readily lead to the development of a reasonable rate structure. On the other hand, a cost of service framework will naturally lend itself to that end.

The result of the net metering statute's command is a payment, charge, or combination thereof made to net metering customers for their impact on the system. A cost of service study is generally a starting point for establishing what set of costs and revenues are appropriately assigned to each group of customers. In fact, some of the identifiable and quantifiable costs and benefits of net metering customers are already included in the cost of service model through a reduction in Utah's apportioned revenue requirement.

Any other pertinent costs and benefits could be considered outside the cost of service model in some fashion, similar to the way avoided capacity costs are defined outside of the Generation and Regulation Initiative Decision (GRID) model. For these reasons, the cost of service model offers the best basic framework to use for calculation of costs and benefits of net metering to the utility and its customers.

Cost of Service Framework

Q: Will you describe the Division's proposed cost of service approach and how the Commission can use it as a framework for future proceedings?

A: Yes. As I previously described, the Division recommends conducting two cost of service studies. While the Division's initial proposal is to focus on residential customers, the concept could be expanded to include non-residential net metering customers in the future.

In the first study, net metering customers would be treated as full requirements customers. That is, their total loads (their total on site usage including their own production and that taken from the Company) would be included in the Company's revenue requirement and the cost of service models. For this first study, any excess on-site generation would be ignored, that is, the excess generation would not be used or recognized as a decrement to both Utah's total demand and energy loads or to any classes' loads. The total revenue requirement allocations, including the allocation factors, to Utah and to the classes would be preserved for comparison to results from a second run of the models.

In the second study, net metering customers would be treated or entered into the models at their net loads, including any excess generation.[2] A comparison of the results from the two studies would indicate the benefits from net metering to Utah and to the specific customer or rate class. Other costs and benefits not captured in the Company's revenue requirement or costs of service models that naturally fall under a cost of service study umbrella, could be evaluated separately. For example, the Company has previously demonstrated that because fixed costs are collected through volumetric rates, these costs are partially shifted to non-net metering customers and

2 It is not clear that the Company can at this time adequately forecast excess generation from net metering customers. Additionally, it may be preferable to leave out excess generation from the studies so as not to create incentives for customers to purposely over-size systems for the purpose of net metering.

are reflected in higher energy rates for all customers within the class.

Further details of how the studies are to be conducted and what costs and benefits to include can be determined once the Commission makes a final decision on the framework. Such an approach will necessitate more decisions about how to construct the studies and properly identify costs assignable to the specific group of customers.

Q: Is the Division advocating creating a new class of customers - net metering customers?

A: Not at this time. More information about net metering customers' load profiles is needed before one can determine to what extent such customers differ from existing rate classes. The Company's current load research study should provide data that will help address that issue. However, nothing in the Division's suggested framework requires or prohibits the creation of a new class. The cost of service framework is useful for identifying the costs and benefits in either scenario. The result of the inquiry can then be used in constructing charges and credits for such customers regardless of whether net metering customers remain under Schedule 1 or are separated into their own class.

<u>Complexities of Distributed Generation</u>

Q: Will you summarize for the Commission some of the complexities of DG?

A: Yes. DG of the type operated by most net metering customers is solar photovoltaic (PV) generation. Without storage, such generation uses the utility infrastructure in unique ways. Generally speaking, it appears that the intermittent nature of this type of DG results in relatively unstable loads with little measureable reduction in peak load. Further, with DG, the utility has to be concerned about system reliability, balancing of the system and unintentional islanding[3] to name a few issues.

At lower penetration levels, the aforementioned differences are not a considerable problem for the utility. However, as higher DG penetrations are reached, utilities may begin to see effects such as additional wear and tear on distribution system equipment, needs for substation upgrades, re-conductoring of power lines, added safety equipment for systems and personnel and Front Office Transactions (FOTs) to keep the system balanced.[4]

Depending on the type and class of generation resource, DG penetration levels can change the efficiencies of thermal power plants because of different usage and cycling profiles.[5] These possible inefficiencies could be captured in the Division's proposed framework as changes in costs as a result of DG.

In reality, DG on any circuit served by the utility can potentially cause operational problems for the utility and its customers. Conversely, DG on a circuit can potentially help the utility and its customers. Either way, DG requires more attention than single-direction dispatchable energy from the utility leading to additional costs

3 Islanding is when the grid goes offline for whatever reason but DG resources continue to supply power keeping portions of the distribution system energized.
4 See "WWSIS." (September 2012). NREL. http://www.nrel.gov/docs/fy12osti/55999.pdf and "Impacts of Wind and Solar on Fossil-Fueled Generators." (August 2012). NREL. http://www.nrel.gov/docs/fy12osti/53504.pdf.
5 Ibid.

offset by benefits as the utility keeps the system balanced and reliable.[6]

Q: Do DG customers rely on the Company's transmission and distribution grid?

A: Yes. There are several ways in which net metering customers use or rely on the grid to support their net metering. For example, net metering customers may rely on the grid to synchronize their system and provide reliable power by maintaining the frequency and voltage. Net metering customers may also rely on the grid to supply the necessary amperage to start appliances or other electric devices with high startup requirements. Excess generation is put to the grid during periods of generation and pulled from the grid when systems aren't generating to meet that same customer's load requirement. When this excess generation is credited to the net metering customer, the grid essentially provides the net metering customer virtual storage. Finally, the Company provides backup power and services to net metering customers when their systems' production is insufficient to meet their immediate loads anytime of the day or during less than optimal atmospheric conditions.

While the Division has done some research on these issues, we have not found any evidence to definitively quantify them. While we do not fully understand the cost implications and impacts at this time, these are the types of costs that could be included under the cost of service framework as more information becomes available.

Q: Do you believe the utility receives benefits as a result of DG customers?

---

6 See "WWSIS-2." (September 2012). NREL. http://www.nrel.gov/docs/fy13osti/57874.pdf.

A: Yes. The benefits provided by net metering to the grid include avoided energy costs, avoided capacity costs, avoided reserve capacity costs, avoided transmission and distribution costs, and avoided line losses. To the extent these benefits are not captured in a typical cost of service model run, the Commission and parties will need to consider how to incorporate them into the cost of service framework in future proceedings. Other types of costs and benefits, such as those occurring because of future development of smart inverters or other technologies that change generation and load profiles, can also be incorporated later as they are better understood.[7]

Q: Do net metering customers reliably offset system peak load?

A: The data we have does not indicate meaningful offsets to system peak loads. Whether in terms of monthly coincident peak, annual system peak or even class peak, net metering customers do not yet offer a steady and predictable offset to system peak load that can be relied upon in capacity planning at any level despite some potential coincidental contributions.

While limited in application, in 2010, the Company commissioned a study[8] of a single circuit in the North-East corner of the Salt Lake valley where one hundred percent of usable rooftop space was devoted to distributed solar PV generation. The Company determined that by the time the system was reaching its peak load, the solar generation

7 See "Advanced Inverter Functions to Support High Levels of Distributed Solar." (November 2012). NREL. http://www.nrel.gov/docs/fy15osti/62612.pdf.
8 See the Company's "Smart Grid Pilot Solar Energy Study." (January 2011). http://www.psc.utah.gov/utilities/electric/13docs/13035184/257447Exhibit%20A%20to%20Marx%20Rebuttal%20Testimony%20-%204_Exhibit_RMP_DLM_1R%206-26-2014.pdf.

on the circuit under study was producing less than seven percent of the needed system peak load requirement.[9] The solar peak capacity contribution occurred earlier in the day as shown in DPU Exhibit 1.2. Of course, atmospheric conditions and the timing and magnitude of the daily system peak can swing that number up or down. The point is simply that a large consistent reduction to capacity needs does not seem to be present even on broad penetrations. Some increment of capacity, however, might be reliable with wide enough penetration and geographic dispersion.

The Company's study concluded that even at the high penetration assumptions, needed distribution infrastructure upgrades in that particular area would not be avoided. Furthermore, under realistic assumptions of ramp or uptake rates of roof-top solar by local residents, the needed upgrades would not be significantly delayed.

Application of Demand Side Management Tests

Q: Do you recommend that the Commission utilize DSM tests to determine costs and benefits of net metering?

A: No. The Division does not find DSM tests effective when used as an analytical framework for evaluating net metering costs, benefits, and charges.

Q: In previous comments, the Division tentatively supported the use of the DSM tests. Why has the Division changed its position?

A: Modifications to the tests would be needed to capture the dynamics of DG to

9 See the Company's "Neighborhood Solar-Ability of neighborhood solar to defer new electrical facilities." Power Point Presentation. Available upon request.

make the tests applicable in the net metering cases. Such modifications would be significant enough that the tests, while sharing some nomenclature, would no longer be DSM tests if they were to be useful for evaluating the costs and benefits of net metering programs.

Additionally, as previously mentioned, while use of the DSM tests with significant modifications may lead to some measure of costs and benefits, those measurements will not readily transfer to a reasonable rate structure. Rather than making significant changes to existing tests designed for a different purpose, the Commission should use the more closely rate-design-related cost of service approach the Division recommends.

Division-Led Workgroup Sessions

Q: Will you briefly summarize the four workgroup sessions held with the parties, a description of which is provided in Appendix A to this testimony?

A: Yes. First, the Commission's statement[10] that it was seeking to establish a framework was not clear to participants. Whether the Commission intends to emerge from this docket with a formula into which data can be inserted to arrive at a net cost or benefit, merely a general approach to valuation of the Company's net metering program, or something else is still not clear some of the participants. As a result of this confusion, it was not clear what the goal of the workgroup sessions should be.

The workgroup never reached a consensus on applicable costs and benefits to be

---

10 "In the next step, we intend to establish the appropriate analytical framework for making the required determinations under Utah Code Ann. § 54-15-105.1." Commission's "Notice" issued March 9, 2015 at p. 1.

considered or how to bill and compensate net metering customers for participating in the net metering program without impacting non-net metering customers. Although the workgroup sessions were informative, the outcome and usefulness of the workgroup was inconclusive, ending in no agreement between the parties.

Conclusion

Q: Please summarize the Division's recommendations.

A: The Commission should adopt a framework based on cost of service principles. Such principles are widely known and used. They can be supplemented as necessary as more data concerning net metering customers' effects on the system and other types of customers becomes available. Some of the identifiable and quantifiable costs and benefits are already included in the revenue requirement calculation and cost of service model. Those costs and benefits should be identified so they are not counted twice. Any other appropriate costs and benefits not already included in the revenue requirement process should be identified and considered along with the cost of service model as proposed by the Division as the study proceeds.

As the Commission determined in its July 1, 2015 order, the relevant costs and benefits are judged from the point of view of the utility and its other customers. The net metering customers should be compensated fairly for their excess generation supplied to the grid while other customers should not bear additional costs as a result of net metering customers' unique use of the electrical system.

Finding the balance between compensating net metering customers while keeping the utility healthy to provide clean reliable power is not an easy task. Solving this dilemma will likely get harder as DG penetration increases. The Division's proposed framework allows using a well-known tool to evaluate costs and benefits of the net metering program with whatever available data exists now and at the time of future filings. As additional evidence emerges, it can be factored into the framework without requiring current speculation about unknown cost and revenue impacts.

Q: Does this conclude your direct testimony?

A: Yes it does.