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**

Direct Testimony of
Allison Clements

On Behalf of
Sierra Club

June 8, 2017

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I. INTRODUCTION AND PURPOSE OF TESTIMONY

Q: Please state your name, address, and business affiliation.

A: My name is Allison Clements. I am founder and president of Goodgrid, LLC, an energy policy consulting firm. My business address is 307 W. 200 South, Suite 4001, Salt Lake City, UT 84101.

Q: Please describe your experience and qualifications.

A: I have 17 years of experience in energy policy analysis and design. Following law school, I spent five years as an attorney in private practice, initially as an energy regulatory attorney with Troutman Sanders LLP in Washington, DC and then as an associate in the project finance group at Chadbourne & Parke LLP in New York, NY. I then spent nine years focused on energy policy as an attorney with Natural Resources Defense Council. I spent the last six as Director of the Sustainable FERC Project coalition, focused on wholesale energy market design, transmission system planning, PURPA-related issues, grid interconnection and increasingly, policy issues related to the emergence of distributed energy resources. I earned a Bachelor of Science in Environmental Policy and Behavior from the University of Michigan and my law degree from George Washington University Law School. My curriculum vitae is attached to this testimony as Exhibit AC-1.

Q: On whose behalf are you testifying in this proceeding?

A: I am appearing on behalf of Sierra Club. The Sierra Club is a national, non-profit environmental and conservation organization dedicated to the protection of public health and the environment. Sierra Club is participating in this matter on behalf of itself and the approximately 5,300 Sierra Club members who live and purchase utility services in Utah.

Sierra Club's Utah members have a direct and substantial interest in this proceeding as the result of its potential impact on additional distributed solar deployment in Utah and on the environmental health and economic benefits that would result from the addition of significant penetrations of that additional deployment in the State.

Q: Have you previously testified or appeared as a witness before the Public Service Commission of Utah?

A: No.

Q: Do you have any exhibits?

A: Yes. Exhibit AC-1 is my curriculum vitae. Exhibit AC-2 is a table that summarizes and compares utilities' rooftop solar rate design proposals and regulatory outcomes in Nevada, Arizona and Colorado.

Q: What is the purpose of your testimony?

A: My testimony responds to the proposal and testimony filed with the Utah Public Service Commission (the "Commission") by PacifiCorp (d/b/a "Rocky Mountain Power" or the "Company") on November 9, 2016, related to rate design and other treatment of rooftop solar customers.[1] Specifically, this testimony provides background and context about rooftop solar and net metering rates in Utah. I also describe deficiencies with Rocky Mountain Power's attempt to quantify the costs and benefits of rooftop solar for Utah customers and explain what Rocky Mountain Power's alleged cost shift actually means for

[1] The Company's proposal would apply to residential net energy metering customers ("NEM"). Most, but not all, of these customers have rooftop solar arrays. For clarity, I use the term rooftop solar customers to describe residential distributed energy generators under existing NEM rates.

most Utah residents. Finally, I discuss the experiences of neighboring states that have already considered rooftop solar rate design and insights relevant to this proceeding.

Q: What are your recommendations?

A: I recommend that the Commission reject Rocky Mountain Power's request to impose a new three-part rate structure on rooftop solar customers. The structure punitively targets rooftop solar customers without fully considering the benefits that those customers provide to its system.

The Company has used an imprecise snapshot of its costs for one year, based on profiles provided by only 36 of its residential rooftop solar customers, to determine that by 2020 residential rooftop solar customers are going to impose costs of $27 million on Rocky Mountain Power's other residential customers. Deficiencies in the nature of and specific inputs to its studies render them insufficient to prove the cost shift the Company predicts will actually take place.

Even assuming Rocky Mountain Power's analysis is appropriate to rely on, which it is not, the proposal would have at best saved the majority of Rocky Mountain Power's residential customers less than 15 cents per month had it been implemented in 2015, the year on which the studies are based.[2] In contrast, adopting Rocky Mountain Power's proposal would almost certainly destroy the job growth currently underway in Utah's rooftop solar industry.

[2] See Table 5.

Rocky Mountain Power cites consumer protection and fairness as the rationale for its proposal, components of which have been rejected by state utility commissions across the country. Unfortunately, the proposal is not dissimilar from Nevada Energy's controversial 2015 proposal that effectively eliminated the rooftop solar industry in that state, at least for some period, and led to ongoing public dispute between the Governor's office, the utility commission, and the solar industry.

In addition, the purported cost shift is only one relatively modest example of cost shifts that necessarily occur in cost-based rate making, which by design burden some portion of a customer class differently than others. The only way to avoid intraclass cost shifting is to consider the true value of rooftop solar to Rocky Mountain Power's system, a concept rejected, to date, by both the Company and the Commission.

If this proposal is set aside, Rocky Mountain Power has an opportunity to work with stakeholders in a general rate case to achieve sustainable reform. Residential rates can be reformed in a manner that embraces the transition happening on its electricity system, allows Rocky Mountain Power to recover its costs, and provides for the continuing development and growth of the rooftop solar industry.

II. BACKGROUND ON ROOFTOP SOLAR CUSTOMERS' ELECTRICITY RATES IN UTAH

Q. How does Rocky Mountain Power determine the rates that its customers pay for electricity?

A. Rocky Mountain Power's customer base can be categorized, generally, as three different groups: residential, commercial and industrial customers. Rocky Mountain Power serves

these customers pursuant to rate tariffs called "schedules," which must be approved by the Public Service Commission. Although Rocky Mountain Power has over three dozen schedules that apply to different subsets of these customer groups, its base schedules for the three customer groups are: Schedules 1 and 3 (residential); Schedules 6, 6A and 6B (commercial); and Schedules 8 and 9 (industrial customers).[3]

To make changes to its rates, Rocky Mountain Power typically files a general rate case. A general rate case requires a significant and detailed filing by the Company, including data related to all aspects of the utility's business and operations (for example, capital expenditures, operations and maintenance costs, administrative and employee-related costs, generating fleet performance, customer demand), as well as forecasts and models about future customer demand and distribution system needs, as well as many types of likely costs.[4] Rocky Mountain Power filed its last general rate case, to increase retail rates, in 2014.[5]

Q. What rate does Rocky Mountain Power currently charges residential customers?

A. Most of Rocky Mountain Power's residential customers take service under Schedule 1. The electricity rate on Schedule 1 includes two parts: a monthly customer charge of $6, and a volumetric energy charge that includes a rate for each kilowatt hour ("kWh") that

[3] These schedules can be found at https://www.rockymountainpower.net/about/rar/uri.html.
[4] Utah regulations detailing general rate case requirements are found at Utah Admin. Code r. § 746-700-1 *et seq.*, https://rules.utah.gov/publicat/code/r746/r746-700.htm.
[5] *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 (Jan. 3, 2014), https://www.rockymountainpower.net/content/dam/rocky_mountain_power/doc/About_Us/Rates_and_Regulation/Utah/Regulatory_Filings/Docket_13_035_184/01-03-14_Direct_Testimony_and_Exhibits/cover_letter/1_Cover_Letter_and%20Application.pdf.

the residential customer consumes over the month.[6] Rocky Mountain Power's Schedule 3 provides a separate option for qualifying low-income residential customers that provides credits to relieve payment of some portion of qualifying customers' bills.

Figure 1: RMP Electric Schedule No. 1 Energy Charge

Energy Charge:

Billing Months - May through September inclusive
8.8498¢ per kWh first 400 kWh
11.5429¢ per kWh next 600 kWh
14.4508¢ per kWh all additional kWh

Billing Months - October through April inclusive
8.8498¢ per kWh first 400 kWh
10.7072¢ per kWh all additional kWh

The hourly rate under the residential schedules varies between summer and winter months based on the premise that Rocky Mountain Power's Customers use more electricity in the summer than winter. Since the distribution system is designed to meet the highest potential level of customer electricity demand, it is those last kWh in the summer that cost the most for the utility to provide.

Residential customers can also sign up for an optional time of use rate under Schedule 2 in lieu of Schedule 1's volumetric charges. Schedule 2 allows customers to pay different rates during summer months depending on whether they are using electricity during "peak" (1pm to 8pm on weekdays) or "off-peak" (all other) hours. Time of use rates

[6] All of Rocky Mountain Power's residential rates also include surcharges and taxes not considered here.

intend to provide a signal to customers to use energy during off-peak hours at lower rates, thereby providing an opportunity for customers to save money on their monthly bills.

Q. Do rooftop solar customers pay the same rates as other residential customers?

A. Yes, when they take electricity from the grid. Customers that have installed solar panels on their rooftops are able to use those panels to produce some portion of the energy they need to power their homes (and, increasingly, their cars).[7] By using self-produced energy, rooftop solar customers avoid purchasing some of the electricity they would have otherwise purchased from Rocky Mountain Power, and so they pay for less kWh than their total consumption. For the kWhs they do purchase from the Company, they pay the same rates as other residential customers.

Sometimes, rooftop solar customers produce more energy than they are using. At these times, their excess solar generation is exported onto the grid for use by other Rocky Mountain Power customers.

Q. What are the impacts of this excess generation on the distribution grid?

A. In small penetrations, not much. Right now, only 0.58% of all residential customers in Rocky Mountain Power's service territory have installed rooftop solar.[8] As the number of rooftop solar customers grows, rooftop solar has the potential to provide significant

[7] I will refer to residential net energy metering ("NEM") customers as "rooftop solar customers" throughout this testimony.

[8] Direct Testimony of Robert Meredith, RMM-1; *see* G. Barbose, *Putting the Potential Rate Impacts of Distributed Solar into Context* at 10 (Jan. 2017), https://emp.lbl.gov/publications/putting-potential-rate-impacts. Referring to that fact that average rooftop solar penetration levels are on average 0.6% of utilities' residential customer base, Lawrence Berkeley Laboratory's Division of Energy Analysis and Environmental Impacts states that "for the overwhelming majority of utilities, current PV penetration levels are far too low to result in any discernible effect on retail electricity prices, even under the most pessimistic assumptions about the value of solar and generous assumptions about compensation provided to solar customers (e.g., full NEM with volumetric rates).

benefits to Rocky Mountain Power's entire electricity system. These benefits translate into cost and pollution savings for all Rocky Mountain Power's customers, even those who have not installed their own rooftop solar panels. For example, material amounts of rooftop solar power can displace the need for distribution system investment. It also has the potential to reduce the need to invest in pollution controls for marginal power plants that run only during hours of high demand. In addition to cost savings, rooftop solar can provide significant pollution savings. I provide examples of the significant cost-saving benefits of rooftop solar below in Section IV.

Increasing amounts of rooftop solar can also cause costs on the electricity system that must be considered. The need to understand the relationship between rooftop solar system costs and system benefits is not unique to Rocky Mountain Power. 31 states and the District of Columbia (or their utilities) have taken steps to conduct some version of a "value of solar" study over the last two years.[9] The outcomes of these studies vary widely, as involved parties define costs and benefits differently. Perhaps not surprisingly, the group of benefits considered by utility-conducted studies tend to be smaller, and over shorter time periods, than those studies conducted by third parties.[10]

[9] NC Clean Energy Technology Center, *The 50 States of Solar: 2016 Policy Review and Q4 Quarterly Report* at 22 (Jan. 2017).
[10] See D. Saha and M. Muro, Brookings Institution, *Rooftop Solar: Net Metering is a Net Benefit* (May 2016), https://www.brookings.edu/research/rooftop-solar-net-metering-is-a-net-benefit/; L. Hansen, V. Lacy & D. Glick, eLab, Rocky Mountain Institute, *A Review of Solar PV Benefit and Cost Studies* (Sept. 2013), https://d231jw5ce53gcq.cloudfront.net/wp-content/uploads/2017/04/eLab_DERBenefitCostDeck_Report_2013-1.pdf.

Q. You mentioned that rooftop solar customers pay the same as other retail customers for electricity they take from the grid. How does this work?

A. Customers who install rooftop solar panels self-supply a portion of their energy needs. During some hours, rooftop solar customers use more energy than their panels produce, and during those hours customers take energy from the distribution grid in addition to their self-produced supply. During other hours, customers' rooftop solar panels produce more energy than the customers need at that time. In these "excess generation" situations, customers send energy onto the distribution grid. Rocky Mountain Power credits customers for their excess energy via a mechanism called net metering.

Q. What is net metering and how does it work in Utah?

A. Net metering is the crediting mechanism that has enabled the rooftop solar industry to develop and grow in states across the country. Net metering works by crediting rooftop solar (and other distributed generation) customers for the excess kWhs they produce and send onto the grid. These customers are typically credited at the same rate that they, and all other residential customers, pay for electricity on a kilowatt-hour basis, known as the retail rate of electricity. Although the rules vary across states, net metering customers are generally able to roll over any excess credits that exist at the end of each month (in those months that the customers self-produce more kWhs than they consume) to offset the following month's purchase of kWhs. 41 states and the District of Columbia have rules to facilitate retail net metering.[11] In 2002, Utah's legislature established retail net

[11] *The 50 States of Solar* at 17. The report notes that four other states have statewide distributed generation compensation rules.

metering.[12] Under Utah's rules, retail rooftop solar customers receive net metering credits at the retail rate of electricity, and roll over excess credits monthly for one year. After a year, any excess credits that rooftop solar customers have not used expire.

Q. Why is PacifiCorp now proposing changes to Utah's net metering rules?

A. In 2014, the Utah Legislature passed S.B. 208, requiring the Commission to:

> (1) determine, after appropriate notice and opportunity for public comment, whether costs that the electrical corporation or other customers will incur from a net metering program will exceed the benefits of the net metering program, or whether the benefits of the net metering program will exceed the costs; and
>
> (2) determine a just and reasonable charge, credit, or ratemaking structure, including new or existing tariffs, in light of the costs and benefits.[13]

At the time S.B. 208 passed, the Commission was considering Rocky Mountain Power's last general rate case, which included a proposed monthly $4.25 facilities charge for residential rooftop solar customers. In that case, the Commission determined that the proposed charge put the cart before the horse in terms of determining whether rooftop solar costs and benefits justified an increased charge. The Commission rejected the proposed facilities charge and opened this proceeding to implement the intent of S.B. 208; that is, to consider the costs and benefits of net metering in Rocky Mountain Power's territory and then determine whether any rate changes are warranted.[14]

[12] H.B. 7, *Net Metering of Electricity*, now codified at Utah Code Ann. § 54-15-101, *et. seq.*, https://le.utah.gov/~2002/bills/static/HB0007.html.
[13] S.B. 208, now codified at Utah Code Ann. § 54-15-102 *et seq.*, https://le.utah.gov/~2014/bills/static/SB0208.html.
[14] *Report and Order*, Docket No. 13-035-184 at p. 69 (Aug. 29, 2014), https://pscdocs.utah.gov/electric/13docs/13035184/260065%2013035184rao.pdf.

Q. Has the Commission made any decisions yet in the current proceeding?

A. Yes. At the end of 2015, the Commission determined that Rocky Mountain Power should use a cost of service study approach, considered below in Section IV, to determine the costs and benefits of rooftop solar on Rocky Mountain Power's system.[15] One year later, Rocky Mountain Power filed a proposal to address sub-sections (1) and (2) of S.B. 208 together in one proceeding. Its proposed changes are the subject of this proceeding and my testimony.[16]

After Rocky Mountain Power's filing, every one of the organizations that intervened in the proceeding, including the Division of Public Utilities and Office of Consumer Services, filed motions to dismiss, motions for summary judgment (or partial summary judgment) and/or motions to show cause. In these motions, intervenors cited the following concerns, among others, about Rocky Mountain Power's proposal: that Utah law does not allow the Commission to establish rates outside of a general rate case; that PacifiCorp was engaging in "single-issue ratemaking," which is also prohibited by state regulations; that PacifiCorp conflated sub-sections (1) and (2) of S.B. 208's requirements; and that the filing itself was substantively deficient in several regards.[17]

[15] *Order*, Docket No. 14-035-114 (Nov. 10, 2015) ("November 2015 Order"), https://pscdocs.utah.gov/electric/14docs/14035114/270449%2014035114o.pdf.
[16] PacifiCorp filing, Docket No. 14-035-114 (Nov. 9, 2016), https://pscdocs.utah.gov/electric/14docs/14035114/290022CvrLtrNEMComp11-9-2016.pdf.
[17] The Division of Public Utilities filed a Motion for Partial Summary Judgement and the Office of Consumer Services filed Motion to Dismiss or in the alternative, a Motion for Order to Show Cause. All other intervening parties filed full Motions to Dismiss (some with alternatives). *See Consolidated Order Denying Dispositive Motions*, Docket No. 14-035-114 (Feb. 23, 2017) ("February 2017 Order") (containing descriptions of the intervening parties' motions and a summary of their arguments on pages 2-4 of the Commission's February 2017 order denying the motions), https://pscdocs.utah.gov/electric/14docs/14035114/291848140351114coddm2-23-2017.pdf.

In a February 2017 Order, the Commission rejected all the motions, and so we are now moving forward with substantive consideration of Rocky Mountain Power's proposal.

III. ROCKY MOUNTAIN POWER'S CURRENT PROPOSAL TO DISCRIMINATE AGAINST ROOFTOP SOLAR CUSTOMERS

Q. How are Rocky Mountain Power's rooftop solar customers currently charged for electricity each month?

A. Like all other Rocky Mountain Power residential customers, rooftop solar customers currently take electricity service under one of the existing residential rate schedules. So, they pay two separate components on their monthly electricity bills, in addition to taxes and surcharges. First, they pay a $6 fixed monthly customer charge. Second, they pay the same per kilowatt-hour charge as all other residential customers for the energy they purchase from Rocky Mountain Power. That rate ranges between 8.8 and 14.5 cents per kWh depending on the time of use and total volume. (See Figure 1, above). For net metering customers, that amount of energy that is incremental to what they self-produce. The second (energy) charge is subject to net metering; that is, the charge rooftop solar customers pay the Company is net of any credits they receive, at the retail rate, for any excess generation they produce and send onto the grid.

Q. What changes has Rocky Mountain Power proposed for rooftop solar customers?

A. Rocky Mountain Power has proposed an entirely new and dramatically different rate structure for its residential rooftop solar customers. Rather than treating these customers like other residential customers, Rocky Mountain Power wants to put rooftop customers into a separate rate class and establish a new Schedule 5 that involves a complicated

three-part rate structure. Customers without rooftop solar would continue to take service under the existing residential schedules.

The proposed Schedule 5 rate would include: (1) a fixed monthly customer charge increase from $6 to $15; (2) a peak demand charge equal to $9.02/kilowatt ("kW"); and (3) a volumetric energy charge equal to 3.8143 cents/kWh for all energy purchased from Rocky Mountain Power, net of any excess generation credits. I provide more specifics about each of these components below.

Q. Why is Rocky Mountain Power proposing this set of changes?

A. Rocky Mountain Power justifies its proposed separate class and three-part rates for customers based on the claim that solar customers are hampering the utility's ability to recover the costs of building and maintaining its entire electricity system. The Company suggests that since rooftop solar customers are producing their own energy and therefore collectively buying fewer and fewer kWhs of energy from the utility, recovery of the total costs necessary to run the entire system now depends on a shrinking group of residential customers without rooftop panels. In theory, this means Rocky Mountain Power will someday have to increase energy rates to close that gap, which in turn would mean that non-solar customers would allegedly be paying more than their "fair" share.

Rocky Mountain Power refers to this concept of rooftop solar customers not paying for their fair share of system costs, and customers without rooftop solar having to pay more, as a "cost shift" from rooftop solar customers to the rest of Rocky Mountain Power's residential customers.

Q. If the Commission accepts Rocky Mountain Power's proposal, will rates for customers without rooftop solar go down?

A. No. To be clear, customers without rooftop solar in Rocky Mountain Power's territory have not experienced increased bills because of the growth in rooftop solar customers. And, the Company is not proposing any change to non-solar customer rates in this proceeding. It is only proposing to increase rates for rooftop solar customers. Non-solar customers will not see any rate impact unless Rocky Mountain Power files a new general rate case sometime in the future.

Q. Do Rocky Mountain Power's concerns about cost shifting justify its proposal?

A. No. It is true that Rocky Mountain Power's rooftop solar customers are buying fewer kWhs of energy than they were before they installed solar panels. However, the Company's consideration of any purported cost shift has been narrow and lacks real consideration of the benefits that rooftop solar brings to all Rocky Mountain Power's Utah customers. The Company has also failed to point out that cost shifts within electricity customer classes are a common reality of cost-of-service rate design. This solar to non-solar customer cost shift is, by all likely accounts, modest relative to the many other dynamic cost shifts that take place within the utility's residential class. Finally, any actual cost shift would not be felt by non-solar customers unless and until Rocky Mountain Power actually files for a new rate case to change their energy charges. Even when such a rate case occurs, the impact to the system is so small, and there are so many other competing issues in a general rate case, that any cost impact would likely be lost in the noise of rate making.

Q. Please explain the "demand charge" concept.

A. A demand charge is an extra cost on a customer's bill that measures and charges for the maximum amount of energy a customer uses at a point in time across the month. Unlike an energy charge, which looks at a customer's total energy use, a demand charge is based on a snapshot of the customer's peak usage. The demand charge concept is familiar in the context of large industrial electricity customers, but one that has not been used for, nor in my perspective currently makes much sense for, residential electricity customers. Demand charges are intended to recover those utility costs involved in building out the system to accommodate peak demand periods while sending a price signal that discipline customers' energy use during peak periods.

Q. What do you mean by peak demand and peak periods?

A. System engineers, including those who work for Rocky Mountain Power, plan the distribution system – the combination of transmission and distribution poles, wires and other infrastructure – that, together with power plants and power purchases, serve Rocky Mountain Power's customers. The distribution system must be sufficient to transport and deliver reliably the maximum amount of electricity that all the utility's customers may collectively demand at the same time – known as the "peak demand."

The system must reliably accommodate those few hours, days or weeks of the year that customers' aggregate demand is at its highest – the peak demand periods. Think of hot July weeks in Salt Lake City when everyone runs their air conditioners full blast, and those lucky enough to have pools have their pumps going at the same time. Freezers and

refrigerators are working extra hard to keep food cold, all on top of typical customer demand for electricity. These are the types of conditions that lead to peak demand periods. Planning to meet customers' collective electricity demand for the vast majority of hours of the year, when that demand is well below the peak, is not sufficient. If Rocky Mountain Power fails to ensure the system is robust enough to handle these peak periods, it risks system stress, line outages and potentially damaging blackouts.

Q. What is the difference between coincident and non-coincident peak demand?

A. Coincident peak demand is the type I just described, the highest collective demand across the entire system, or some portion of that system, at the same time. Non-coincident peak demand, differently, is the peak demand of one customer, or one group of customers, regardless of whether that peak matches the overall system peak.

Rocky Mountain Power's proposed demand charge is based on each rooftop solar customer's non-coincident peak demand. It would be a monthly recurring charge that is recalculated each month based on the customer's peak usage for that month.

Q. How does Rocky Mountain Power's proposed demand charge work?

A. Under the Company's proposal, rooftop solar customers would be charged $9.02 per kilowatt for the total number of kilowatts they happen to be using during their highest use interval each month, during Company-determined peak periods. Rocky Mountain Power has proposed the interval is a one-hour period within the following peak periods: from October to April, weekdays 8 to 10am and 3 to 8pm; and from May to September, weekdays 3 to 8pm.

I provide two examples of how the demand charges may work, and their potential unintended consequences, below.

Q. Why in your perspective is a demand charge inappropriate for residential customers?

A. As I mentioned, demand charges have been used in the industrial customer class, to recover costs of industrial customers' contribution to necessary system buildout and maintenance. This kind of charge may be justified for industrial customers that use enough energy to contribute meaningfully to determinations about the size and reliability-related costs of the system. Moreover, industrial customers tend to have the capability to monitor their energy use to at least recognize, and even respond to, price signals that demand charges are designed to send –that providing customers with electricity is more expensive during periods of peak demand.

Residential customers, differently, do not individually implicate system needs in the same way that larger industrial customers do, even if their peak use coincides with system peaks. For example, a single large factory can have a real and noticeable impact on total grid demand if it turns large machinery on or off. Residential customers, however, have almost no perceptible impact on the grid based on their own individual usage. A residential customer could turn off every appliance they have, and the grid would barely notice unless hundreds or thousands of other customers did the same thing at the same time.

Demand charges similarly do not make sense from an incentive standpoint. If a large factory has an incentive to turn off a large piece of machinery at a high-demand time, the grid as a whole will benefit by the reduced demand. However, most residential customers, even those that pay enough attention that they want to install rooftop solar, are not in a position to respond to demand price signals. And even if an individual customer did respond to flatten out their demand, the total impact to the grid from any single customer at a given hour would be nearly imperceptible.

In other words, residential demand charges are confusing and do not work. Residential demand charges represent a large step beyond time of use rates, which, while more intuitive, require work to align customer behavior. The proposed demand charge is a poor proxy for attempting to align rooftop customers' cost of service with the rates they are charged for that service.

Q. Is it common for other utilities to apply demand charges to retail rooftop solar customers, as Rocky Mountain Power has proposed?

A. Not successfully. Over the last few years, several utilities have attempted to impose a demand charge on rooftop solar customers as a response to declining sales of electricity (10 investor-owned utilities tried in 2015, five of them similarly tried in 2016). However, no state has approved a mandatory residential demand charge in the last two years. Of the four decisions related to proposed residential demand charges in 2016, all four were denied or removed from proposals as part of a settlement.[18]

[18] *The 50 States of Solar* at 32.

Q. What would Rocky Mountain Power's proposed demand charge mean for its residential rooftop solar customers in Utah?

A. Customers subject to the demand charge would have to consider multiple variables to avoid potentially large excess charges. First, the customer would have to know whether they were in the Company's designated "peak period." During the winter, that period is weekdays 8 to 10am and 3 to 8pm. During the summer, the period shifts to just weekdays 3 to 8pm. Next, the customer must monitor how much energy they are using for any given hour during that period and spread out the use of appliances to avoid running up kWs within the same hour. Finally, the customer would have to be disciplined about their behavior every weekday during the month. If you over-use on just one day, you set your demand charge for the entire month.

Q. That sounds difficult and confusing. What would be the impact to a customer's bill if they do not pay attention to all of those variables?

A. It is not difficult to imagine a situation in which rooftop solar customers would experience significant increases in their bills. Two examples may prove illustrative.

Example 1:

First, imagine a high energy-use Rocky Mountain Power customer who has installed rooftop solar. This customer averages 1,000 kWh of electricity use during July, net of the energy she produces with her own panels. Based on PacifiCorp's bill frequency analysis, the customer's bill in July 2015 was $104.94 (again, after application of retail rate credits for excess energy the customer sent back onto the grid). What does the Company's proposed demand charge mean for this customer?

Let's say it's a hot, cloudy Friday in July 2015 and this customer rushes home from work at 4pm to get ready for arriving weekend guests. When she arrives, she already has some electricity demand, as her fridge, lights and existing plug loads are collectively about 1kW. It has been cloudy all day and the panels are not producing much energy, basically just covering this inflexible load. She immediately turns on her air conditioner, which she runs for the full hour (4kW). She also turns on her pool heater (4kW) and filter (1.5kW), anticipating her guests will enjoy an evening swim. Then she starts cleaning. She washes a large load of sheets and pillow cases on warm (2.3kW for 30 minutes) and then puts them in the dryer (4kW for 40 minutes). She cleans the kitchen and turns on the dishwasher (2kW).[19]

Assuming this is the customer's peak electricity demand hour across the month, her demand charge at this point would be $137.63, which is already more than her total bill, including energy credits, under the existing rate structure.

Table 1: Customer 1 Demand Charge

Demand Source	Demand	Demand Charge
Fridge, lights and plug use	1kW	$9.02
Air conditioner	4kW	$36.08
Pool heater and filter	5.5kW	$49.61
Washing machine (30 min)	3.15kW	$28.41
Dryer (remaining 30 min)		
Dishwasher (40 minute cycle)	2kW	$14.43
Total Demand Charge		**$137.63**

[19] The kW numbers used in this example are consistent with numbers provided recently by the Brattle Group, http://www.brattle.com/system/publications/pdfs/000/005/276/original/Residential_Demand_Charges_An_Overview.pdf?1458061233, and Silicon Valley Power, http://www.siliconvalleypower.com/for-residents/save-energy/appliance-energy-use-chart. Recognizing every appliance is different, these numbers are intended to be illustrative.

Table 2: Customer 1 Total Bill[20]

Existing Bill Structure		**PacifiCorp Proposal**	
Customer Charge	$6.00	*Customer Charge*	$15.00
Energy Charge	$98.94	*Demand Charge*	$137.63
		Energy Charge	$38.14
Total Bill	**$104.94**		**$190.77**

Example 2:

Now consider Customer 2, a lower average electricity user (500 kWh, net of self-produced energy) during the same hot July. Her bill for July 2015 would have been $47.31. This customer engages in the same scenario as Customer 1, but without a swimming pool and with slightly more efficient or smaller appliances.

Table 3: Customer 2 Demand Charge

Demand Source	**Demand**	**Demand Charge**
Fridge, lights and plug use	1kW	$9.02
Air conditioner	3.5kW	$31.57
Washing machine (30 min)	2.75kW	$24.80
Dryer (remaining 30 min)		
Dishwasher (40 minute cycle)	1.75kW	$12.63
Total Demand Charge		**$78.02**

The demand charge alone for Customer 2 would cost $30.71 more than her total monthly bill under the current rate structure.

[20] For ease of example, this total bill does not include the energy credits that the customer receives for it excess energy contributions to the grid. It assumes 1,000 kWh of use net of self production. If the example were to incorporate energy credits' impact on Customer 1's bill, the value of those credits would be less under PacifiCorp's proposal than under the existing rate structure since the Company is proposing to reduce credits for excess generation from the current retail rate to 3.8143 cents/kWh. Continuing to assume incorporation of the energy credits' impact, if Customer 1 had a significant amount of credits from previous months, which is unlikely in light of her high use, the energy portion of her bill under both the existing and proposed rate structures would decrease. In addition, this bill example does not include any fees, surcharges, which would increase the bills the same amount, or taxes, which are unnecessary for illustrative purposes.

Table 4: Customer 2 Total Bill [21]

Existing Bill Structure		**PacifiCorp Proposal**	
Customer Charge	$6.00	*Customer Charge*	$15.00
Energy Charge	$41.31	*Demand Charge*	$78.02
		Energy Charge	$19.07
Total Bill	**$47.31**		**$112.09**

Just to play out the scenario, what happens if this customer adds in additional electricity use during this peak hour of demand? If she vacuums the house (.75 kW) for 30 minutes, it will cost her an additional $3.38 in demand charge. Drying and curling her hair for 30 minutes (collectively, 1.5kW) would cost $6.77. Perhaps unlikely, but if she heated the oven (2kW) and threw in a frozen pizza that takes 30 minutes to cook, she may add another $9.02.

Q. What insights can be drawn from these two examples?

A. These examples provide several insights. Initially, they counter the predicted bill impacts Rocky Mountain Power has provided.[22] If customers are not careful about their usage, they could experience dramatically higher bills under the demand charge than under the current rate structure.

The examples above also demonstrate the inappropriateness of a demand charge for residential customers. There are numerous scenarios in which customers' peak demand period may go well above the assumptions made by Rocky Mountain Power. Unlike an industrial customer that can monitor its peak demand throughout the day, residential

[21] Example 2 assumes 500 kWh energy use net of any self production. It includes the same caveats described for Example 1 in footnote 23.
[22] Direct Testimony of Joelle R. Steward, JRS-7.

customers are busy living their lives. In order to avoid a high demand charge, residential customers would have to spread out their activities at home over a longer period of time. But that is just not practical for most people with busy lives. That same July hour used in the example above might be the only time a working mom finds free to do her weekly chores; it may be someone preparing to host a party at their home, or simply regular life as a family of teenagers cooking, doing chores, showering and/or watching television around the same time.

Q. Would demand charges benefit the system as a whole?

A. No. At least two problems arise from the imposition of demand charges on residential solar customers. First, the customers receive inefficient price signals. No incentive exists to reduce consumption when one bad afternoon can result in more than doubling a monthly electricity bill. Second, residential customers are not used to thinking about electricity usage from a demand charge perspective. Even sophisticated energy users would require education around how the new demand structure implicates their use. The result is a failure in achieving the goal demand charges are intended to satisfy.

Q. The Company's proposed rate structure would lower the energy charge ($/kWh) for rooftop solar customers from the amounts in Figure 1, above (8.8 to 14.5 cents per kWh), to 3.81 cents. What impact does this change to the energy charge have?

A. The decrease in energy charge allows Rocky Mountain Power to pay rooftop solar customers less than half of the current per kilowatt hour rate for customers' provision of energy to the grid. Reducing the energy charge also flips the incentive to conserve energy

on its head. We have been learning for years to reduce energy consumption by installing more efficient appliances, setting the air conditioner to run less, and generally conserving resources. Reducing the energy charge on customer bills negates all of that education and instead teaches customers not to worry as much about their overall energy usage. This is the wrong message to send. Ultimately, it risks higher overall aggregate usage, which means more power plants running longer hours, more burning of coal and natural gas, and more air and water pollution.

Q. Please summarize your concerns with Rocky Mountain Power's proposed changes to treatment of its rooftop solar customers.

A. Under the veil of customer fairness, Rocky Mountain Power's proposed three-part rate structure unfairly and unnecessarily punishes Rocky Mountain Power's rooftop solar customers. The high fixed rate, inappropriate demand charge and reduced volumetric charge put in place rates sure to dramatically impede the state's rooftop solar industry while not getting to the bottom of Rocky Mountain Power's longer-term need for rate reform to ensure cost recovery in a time of changing electricity system dynamics.

IV. PUTTING ROCKY MOUNTAIN POWER'S PURPORTED COST SHIFT INTO CONTEXT

Q. Rocky Mountain Power claims there is a cost shift among its residential customers due to net metering of rooftop solar customers. What does a cost shift mean in this context?

A. First, I disagree that Rocky Mountain Power's analysis is sufficient to demonstrate a cost shift is occurring. As I discuss in more detail below, Rocky Mountain Power's

assessment does not consider multiple benefits that rooftop solar customers provide to the system. By ignoring these long-term benefits and only looking at near-term costs, the analysis is incomplete and pre-destined to discriminate against rooftop solar. Even setting aside those concerns and taking Rocky Mountain Power's argument at face value, it is important to consider just how small an impact this purported cost shift would have on the average customer.

Q. What is Rocky Mountain Power's view of the cost shift?

A. It is a reality that as the number of rooftop solar customers in Rocky Mountain Power's territory grows, the number of kWhs that customers purchase from the utility goes down. The Company suggests that it recovers 93% of its residential cost of service from the volumetric energy portion of its rates (as opposed to from the $6 customer fixed charge and other fees). It claims that since rooftop solar customers are buying less energy, they are paying for less of the cost the utility incurs to serve them. Specifically, PacifiCorp's analysis suggests rooftop solar customers are paying only 61% of their cost of service. This reduction in cost recovery, the argument goes, means that an increasingly smaller group of residential customers without rooftop solar are left to cover the costs that residential rooftop solar customers are no longer paying. Rocky Mountain Power therefore developed an analysis suggesting that residential rooftop solar customers imposed $1.7 million in costs on other residential customers in 2015. The Company further claims that the cost shift amount could grow to $27 million annually by 2020.[23]

[23] Direct Testimony of Joelle R. Steward at p. 3:37-42.

Q. Do you think Rocky Mountain Power's studies are sufficient to support its cost shift contention?

A. No. The Company conducted two studies for this proceeding – an Actual Cost of Service Study ("ACOS") and a Counterfactual Cost of Service Study ("CCOS") – which it uses as the basis for its cost shifting argument. Unfortunately, deficiencies in these studies render them insufficient to demonstrate that any level of cost shift is occurring or likely to occur.

Q. But didn't the Commission require Rocky Mountain Power to use cost of service studies to examine the costs and benefits of rooftop solar on its system?

A. Yes. In its November 2015 Order, the Commission required Rocky Mountain Power to use these studies to consider rooftop solar's costs and benefits to the system. However, analyses are only capable of presenting outputs within the parameters that the study tools provide. While COS studies may be useful in providing a one-year snapshot, limitations in the form of studies themselves render them insufficient, alone, as the basis for new rate structures. Nothing in the Commission's November 2015 Order compelled Rocky Mountain Power to propose a new, punitive rate structure for rooftop solar customers, which is what the Company has done here. By submitting a filing that it suggests satisfy subsections (1) and (2) of S.B. 208, as I noted Section I, PacifiCorp has attempted to conflate two necessary conversations – first, the merits of the CFCOS and ACOS study results, and next any steps necessary to propose a legitimate rate structure.

Q. What are the limitations with Rocky Mountain Power's CFCOS and ACOS?

A. The studies fail to allow contemplation of long-term benefits that distributed solar resources provide to Rocky Mountain Power's system. By design, a cost of service study is limited to a one-year snapshot of costs. The analysis is therefore short-sighted, especially as applies to a relatively new type of resource, the benefits of which are conceptually understood for the Company's system but not contemplated beyond a backward-looking 12-month period. Thanks to growing amounts of rooftop solar coming online, the fixed costs that Rocky Mountain Power is concerned with recovering become, over time, avoidable costs. Examples from around the country and in Utah demonstrate the ability to avoid transmission, distribution and generation investments due to load growth predictions rendered inaccurate by energy efficiency and demand-side resources. In addition, Rocky Mountain Power is basing its analysis on the production profiles of only 36 residential rooftop solar customers. As noted by several other intervenors, this 2015 snap shot based on such a small number of its customers does not provide a strong basis for establishing new and dramatically different residential rates.

Q. Can you provide some examples of using rooftop solar and other distributed energy resources adding benefit by avoiding the need for expensive investment?

A. Yes. In California, PG&E recently cancelled over $190 million in planned low-voltage transmission and distribution investments because of lower than expected demand due to the growth of rooftop solar and energy efficiency.[24]

In New York, Con Edison was able to invest $200 million on a combination of fuel cells, energy efficiency, and local solar generation in lieu of spending $1.2 billion on a new substation on the distribution system.[25] Questions about the need for any investment to address the original distribution grid issue have since been raised, but the concept of avoiding a legitimate need for a substation upgrade remains relevant.

In the Northeast, incorporating future energy efficiency savings into the regional load forecast of grid operator, ISO-NE, in 2012, contributed to lower projected demand, and enabled ISO-NE to indefinitely defer $416 million in planned transmission upgrades determined to no longer be necessary.[26]

Here in Utah, the legislature has encouraged and the Commission has approved initial attempts to use demand-side resources to address distribution line issues and incur savings. Specifically, the Commission approved the Company investing $5 million in

[24] *See* CAISO 2015-2016 Transmission Plan, starting at page 319, for list of cancelled projects, https://www.caiso.com/Documents/Board-Approved2015-2016TransmissionPlan.pdf and comments by PG&E on cancellation rationale at https://www.greentechmedia.com/articles/read/Californians-Just-Saved-192-Million-Thanks-to-Efficiency-and-Rooftop-Solar.
[25] *See* New York Governor Cuomo announcement (Dec. 12, 2014), https://www.governor.ny.gov/news/governor-cuomo-announces-new-clean-energy-initiatives-grow-economy-and-protect-environment.
[26] Acadia Center, *Investing in Energy Efficiency to Optimize the Electric System, Spur Markets and Achieve Consumer and Environmental Benefits* (2015), http://acadiacenter.org/wp-content/uploads/2015/06/Acadia-Center_Efficiency-Proposal-for-New-York.pdf.

energy storage and solar to address voltage issues for a line on which it has exhausted all capacitive voltage issue correction factors.[27] Rocky Mountain Power estimates the traditional distribution upgrade investment would have been $8 to $14 million.

In addition, augmenting distribution capacity can cost anywhere between $100 and $500 per kilowatt (making annualized values $10 to $50 per kilowatt-year).[28] A useful study examining the value of energy efficiency to mitigating marginal line losses, and thus avoiding these distribution costs, represents the idea that rooftop solar can have a significant impact in avoiding future Rocky Mountain Power investment.[29]

Q. So, in summary, you disagree with Rocky Mountain Power's contention that a cost shift is happening?

A. Yes. I think that the limited one-year snapshot of the ACOS and CFCOS fail to account for the significant benefits that rooftop solar can provide to the Company's system. I think my concern is especially important to consideration of the benefits of a relatively new resource (at least in the aggregate) like rooftop solar, which although understood to provide benefits need to look beyond a 12-month period for more insight into specific valuation.

[27] Utah Public Service Commission, Phase I Report and Order, Docket No. 16-035-36 at 10, 14 (Dec. 29, 2016), https://pscdocs.utah.gov/electric/16docs/1603536/290994%201603536porao%2012-29-2016.pdf.
[28] J. Lazar and X. Baldwin, Regulatory Assistance Project, *Valuing the Contribution of Energy Efficiency to Avoided Marginal Line Losses and Reserve Requirements* at 6 (Aug. 2011), http://www.raponline.org/wp-content/uploads/2016/05/rap-lazar-eeandlinelosses-2011-08-17.pdf.
[29] J. Lazar and X. Badlwin, *Valuing the Contribution of Energy Efficiency to Avoided Marginal Line Losses and Reserve Requirements* at 6.

Q. Ok. Let's assume for purposes of discussion that Rocky Mountain Power's purported cost shift is happening. How significant is the cost shift for Rocky Mountain Power's residential customers without rooftop solar?

A. Rocky Mountain Power's purported cost shift is not significant at this point, nor is it unique. Cost shifting among customers of the same rate class is simply a reality of cost of service rate design due to its design around average customers, not individual customers. "Rates reflect average costs to serve average ratepayers in a given class, and are not designed to align costs and revenues for each individual ratepayer."[30]

A wide variance in the types of customers who exist within Rocky Mountain Power's residential class necessitate that relative contributions to utilities' fixed costs are uneven. For just two examples:

- Customers who live in apartment buildings are charged the same rate per kilowatt hour of electricity use as rural customers who live in single family homes acres or even miles down the road from their closest neighbors, even though the distribution costs of providing electricity to these two groups is very different. While electricity delivery to apartment dwellers involves one above or below ground distribution line and several sub-meters, delivery to rural customers includes significantly higher investment in poles and wires necessary to reach each customer, as well as the potential for significant line losses not incurred in service to urban customers.

- A more specific example relates to customers with pools. Residential customers in the western United States who own swimming pools (with pool pumps installed before 2012) use roughly 49% more electricity on an annual basis than non-pool owning residential customers, and over half of that difference in use stems

[30] Ari Peskoe, Texas Journal of Oil, Gas, and Energy Law Vol 11:2, *Unjust, Unreasonable and Unduly Discriminatory – Electric Utility Rates and the Campaign Against Rooftop Solar* at 181 (2016) (internal citations omitted). This article provides an excellent discussion of the history of utilities attempts to use arguments defending and denying cost shifts depending on their shareholders' interests in various situations over the last several decades.

directly from operating the pool and not related lifestyle factors.[31] To the extent any pool pumping occurs during periods of high demand in the summer, pool owners may actually materially contribute to Rocky Mountain Power's overall system peak (and the infrastructure necessary to serve it), unlike most other customers in the residential class, but pay the same per kilowatt hour rate for electricity.

Numerous other examples exist. Further complicating the intraclass shift is the reality that intraclass shifts are dynamic in the short- and longer-term. Each time a customer or group of customers change their energy use, the relative cost burden of residential customers changes. In addition, volumetric rate design involves a cost shift over time. Investment in generation and distribution and transmission capacity infrastructure usually occurs in a "lumpy" fashion. Consider these additional examples:

- Second homes. During the months that individuals with second homes in Utah's mountains are staying in them, they are high energy users and are perhaps contributing to system costs commensurate with their specific cost of service. However, during the months they are not staying in their vacation homes, they may be paying minimum bills that do not cover the full costs related to maintaining their interconnection and reliable service.

- New capacity. As described by Witness Woolf in his direct testimony on behalf of Sierra Club and the other Joint Parties during the first phase of this proceeding[32] (among other examples), when a utility installs a new power plant to meet increasing demand due to new customers or increasing electricity use by existing customers, all customers pay for the new plant. However, existing customers who haven't increased their use, or customers geographically distant from the new power plant, may not experience reliability or cost benefits.

- Intergenerational inequity. A new power plant comes online all at once, or in a limited number of phases. This means that existing customers are paying for more

[31] A July 2012 Oracle analysis, based on Opower data, used a sample of 2.04 million homes (318,000 with pools and 1.72 million without pools) in the portions of the Western U.S. with moderate climates. For consistency purposes, only homes heated by natural gas were included in the analysis. These numbers do not contemplate pool heating, which is largely done by natural gas heaters. Pool pumps are becoming increasingly efficient. Study summary available at https://blogs.oracle.com/utilities/homes-with-pools-use-49-more-electricity-but-its-not-just-because-of-the-pool.

[32] Direct Testimony of Tim Woolf at p.12:241-248.

generation capacity than they need in order to accommodate future growth. Although retail residential customers payments over previous years may have contributed to the equity involved in a capacity investment, it is the retail residential customers at the time of construction of a power plant (or distribution line) investment is completed who receive benefits of the project, despite the fact that customers who have moved away contributed to the costs of the plant (or line) without ever reaping the benefits.

Q. What do these examples tell us?

A. Cost shifts are a regular part of cost-of-service rate design. Rocky Mountain Power has not provided any evidence to suggest that the specific cost shift it is calling out here, that of residential rooftop solar customers to other residential customers, is any more significant than any other cost shift that necessarily exists under this regulatory regime. On the contrary, the position may imply false importance of one cost shift that is likely dwarfed by some combination of other existing cost shifts daily. In any case, one year ACOS and CFCOS studies do not provide a sufficient basis to support the rate design that Rocky Mountain Power suggests is necessary.

In addition, as noted in in the previous phase of this docket by Witness Woolf, who served as a Commissioner for the Massachusetts Department of Public Utilities while it addressed similar issues, "regulators and utilities have an obligation to balance the goal of minimizing customer inequities with the other goals of providing safe, reliable, efficient, low-cost electricity services."[33] Fairness is not the only rate design principle that must be balanced, and precision in intraclass fairness is impossible.

[33] Direct Testimony of Tim Woolf at p.13:267-269.

Rocky Mountain Power cannot address these example and all other existing cost shifts in a manner resulting in perfectly fair rates that avoid cost shifts for every type of customer. It would be unrealistic to separate each grouping of customers out into their own separate class as the number of classes would prove unwieldy. Consider just a few of the possible distinctions that may be made: an air-conditioned house class, a dwelling with more than five people class, a house with electric heater class, an apartment class, a suburban class, a vacation home class, etc. Some customers may fit into more than one class, underscoring the complexity of cost shifting and the inability of rate design to perfectly solve for all cost-shifting. The potential for unintended consequences abounds in trying to address just one cost shift to the exclusion of many others.

Q. Why do you think Rocky Mountain Power has focused on this one particular type of potential cost shift?

A. Rocky Mountain Power uses the cost shift argument as a mean to propose a rate structure punitive to rooftop solar customers. Rocky Mountain Power is a monopoly that has never faced competition as it does from the rooftop solar industry. Across the country, utilities have viewed the emerging rooftop solar industry as a threat, and have proactively tried to ward off its success in violation of rate making principles and just and reasonable rate principles. Rocky Mountain Power's sister companies NV Energy and MidAmerican Energy – all owned by Berkshire Hathaway Energy – have in the past submitted similar rate proposals that did and would have severely harmed the rooftop solar industry in their states.

V. QUANTIFYING ROCKY MOUNTAIN POWER'S COST SHIFT

Q. What does Rocky Mountain Power's purported cost shift mean for Rocky Mountain Power's residential customers who do not have rooftop solar?

A. In order to get a sense of the impact of Rocky Mountain Power's purported cost shift, I calculated how the burden would be spread across Rocky Mountain Power's residential customers.[34] Using the monthly bill frequency analysis provided in UCE Attachment 6.3, I divided Rocky Mountain Power's 2015 residential customers into three categories of energy users: low, medium and high, and determined that the burden across these categories would be as described in Table 5.[35]

[34] Table 5 is intended as illustrative. For ease of that illustration, I considered only Schedule 1 customers and did not include Schedule 3 customers. The impact of the relatively small number of customers taking service under Schedule 3 would be to increase the number of customers across which the burden is spread, thereby reducing the total burden on a per customer basis.

[35] The number of total bills that Rocky Mountain Power issued according to its bill frequency analysis in 2015 was 722,755. Robert Meredith's analysis in RMM1 suggests 754,063 customers for the same year. I utilized the number of customers included in the bill frequency analysis. Increasing the number of customers would presumably have the effect of decreasing the amount of individual customer burden represented in Table 5. Also note that these numbers include the .58% of customers that were rooftop solar customers in 2015. Removing them would have a modest, but countervailing impact on individual burdens. Assuming, conservatively, that all 4,390 rooftop solar customers fell in the 0-400 kWh low energy use tier, the net annual cost per customer increase would be less than two cents.

Table 5: Impact of Purported Net Metering-Related Cost Shift on Rocky Mountain Power's Residential Customers

Residential Use Per Customer kWh Tier				
Annually	**0-400**	**401-800**	**801+**	**Total**
# Customers	203,653	283,980	235,122	722,755
Total Bill (Schedule 1)	$68,000,043	$210,244,605	$420,988,989	$699,233,637
Tkwh Total	601,146,325	1,990,530,340	3,708,774,364	6,300,451,029
% Tkwh Total	9.5%	31.6%	58.9%	100.0%
Net Metering Impact by kWh Tiers				
	0-400	**401-800**	**801+**	**Total**
# Customers	203,653	283,980	235,122	722,755
Total Net Metering Cost	$158,291	$524,135	$976,574	$1,659,000
Net Cost / (benefit) per customer	$0.78	$1.85	$4.15	$2.30
Total Bill per year	$334	$740	$1,791	$2,381,758
% Cost increase	0.23%	0.25%	0.23%	

Q. What do your calculations demonstrate?

A. If Rocky Mountain Power had adjusted their rates to recoup the purported cost shift in 2015, most residential customers would have experienced a **less than $2 impact for the entire year**. The numbers in Table 5 demonstrate that in 2015, the burden of Rocky Mountain Power's suggested cost shift was equal to about $2.30 across all customers. High energy users would have experienced the highest burden, but even those customers would have experienced only about a $4.15 impact on average for the entire year. For low-use customers (less than 400 kWh) and medium-use customers (401-800 kWh), the average impact would have been about 78 cents and $1.85 for the year, respectively. **That equates to about 6.5 cents and 14.4 cents per month for each group**.

Q. How does this compare to the impact that rooftop solar customers would feel?

A. Going back to my illustrative examples above in Section III, the impact to rooftop solar customers could be much more significant. The hypothetical high-use rooftop solar customer I described above saw a monthly bill increase of $85.83 under the proposed rate structure. The low-use customer saw a monthly bill increase of $64.78.

Q. Can you use this analysis to predict how the burden will be spread across residential customers in future years?

A. Not very well. The problem with only considering the 2015 snapshots of costs and implied benefits is that those costs and benefits will change over time. Even keeping the number of customers and their use constant, the amount of burden would be inflated to the extent that the benefits of rooftop solar in the longer term have a higher value than they did in the ACOS and CFCOS.

Q. Then what is the value of providing this information as part of your testimony?

A. The relative burden of the cost shift demonstrated in Table 5 underscores the reality that the sky is not falling. Currently, the cost shift is not imposing demonstrably significant costs on low energy users, and the percentage impact of the cost shift across all groups of users remains in the 0.2% range (less than one-quarter of one percent). While that impact may grow over time, it is such a small amount that even in 2017 the Commission and other stakeholders have more than enough time to devise sustainable and less punitive rate design solutions in the context of a general rate case. A decision by the Commission

that rate changes are not warranted based on the analysis provided pursuant to Phase I, alone, is well within the discretion provided to the Commission in S.B. 208.

Q. Please summarize your concerns with Rocky Mountain Power's predicted cost shift and its proposed changes to the treatment of its rooftop solar customers.

A. Blaming an unfair burden on its customer base, Rocky Mountain Power is attempting to use a purported cost shift as the basis for a totally new rate structure that will be punitive to rooftop solar customers. Even assuming some amount of cost shift is or will take place, which has not been proven, it is only one relatively modest example of cost shifts that necessarily occur throughout the utility system for various reasons. Rocky Mountain Power is choosing to target one group of customers – rooftop solar customers – on the basis of limited studies that suggest that most residential customers would save less than 15 cents per month. And if the Commission considered the full benefits that rooftop solar provides to the system, that cost would either shrink or go away altogether.

This proposal is bad policy that will ultimately harm Utah by stopping in its tracks an industry that has been a promising source of strong job growth in Utah. The remainder of my testimony discusses the repercussions that have occurred in other states when other utilities have tried to implement similar policies.

VI. ROOFTOP SOLAR RATE DESIGN INSIGHTS FROM NEIGHBORING STATES

Q: How active have state utility commissions across the country been in considering distributed solar generation policies over the last year?

A. Very active. In 2016, nearly every state utility commission considered rate design or other policy issues related to rooftop solar resources.[36] In at least one instance, in Colorado, the involved utility, distributed solar industry, consumer advocates, environmental organizations and other stakeholders were able to reach settlement agreement on a rate design plan to move beyond "net metering 1.0." In other instances, as was the case in Nevada, failure to find workable solutions resulted in a contested decision with punitive outcomes for rooftop solar customers and devastating impacts on the rooftop solar industry in the state, at least for some period.

Q. Are there specific net metering rate design experiences that are informative for this Proceeding?

A. Yes. The specific experiences in our neighboring states – Nevada, Arizona and Colorado – are informative. The proceedings provide insights about specific rate design proposals, the process by which rate designs are determined, and the policy and economic impacts related to the decisions, to the extent they are available.

Q. Let's start with the most controversial decision, in Nevada.

A. As has been well publicized, Nevada's controversial treatment of rates for rooftop solar customers had debilitating impacts on the rooftop solar industry, as well as further

[36] *50 States of Solar* at 9.

regulatory, legislative and political repercussions. Just this week, the Nevada legislature passed S.B. 405, to restore net metering for residential customers with a declining compensation rate for excess generation, down to an eventual floor of 75 percent of the retail rate.[37] Governor Sandoval has signaled his intention to sign the bill. The new law is likely to restore the state's rooftop solar industry, but the process to get here has been painful.

Q. Please provide a brief history of the events that have taken place in Nevada over the last few years related to rate design for rooftop solar customers.

A. In 2013, the Nevada legislature passed a law requiring the Public Utility Commission of Nevada ("PUCN") to study the costs and benefits of net metering.[38] The ensuing study, completed by a third-party consultant, demonstrated net present benefits to all residential customers because of the existing net metering policy.

In May 2015, the legislature passed a bill making several changes to the state's net metering policy, including setting the aggregate cap on net metering to 235 MW (slightly less than prior cap). The law also empowered the PUCN to approve separate rate classes for rooftop solar customers.

[37] Nevada Senate Bill 405, *Establishes certain protections for and ensures the rights of a person who uses renewable energy in this State and revises provisions governing net metering*, https://www.leg.state.nv.us/Session/79th2017/Bills/Amendments/A_AB405_R1_1100.pdf; *see* S. Whaley, "Sandoval says he will sign bill to bring rooftop solar back to Nevada," *Las Vegas Review-Journal* (Jun. 5, 2017), https://www.reviewjournal.com/news/2017-legislature/sandoval-says-he-will-sign-bill-to-bring-rooftop-solar-back-to-nevada/.

[38] Nevada Assembly Bill 428, *Revises provisions related to energy*, passed into law June 11, 2013, http://www.leg.state.nv.us/Session/77th2013/Reports/history.cfm?billname=AB428.

At the end of July 2015 and in response to the legislation, NV Energy, the state's largest investor owned utility, submitted a proposal overhauling treatment of net metering to the PUCN, outside of a general rate case context.[39] NV Energy's proposal was structurally very close to the current proposal that Rocky Mountain Power is now pursuing. The similarities of these proposals are not necessarily surprising given that NV Energy and Rocky Mountain Power share the same corporate parent, Berkshire Hathaway Energy. While the case was proceeding, NV Energy announced that it had hit its net metering cap several months prior to the expectations it expressed to the legislature and before the PUCN had made a determination about an interim rate structure.[40]

Q. What specifically did NV Energy propose in July 2015 and what did the PUCN decide?

A. Based on a cost of service study, NV Energy proposed to move residential rooftop solar customers into a separate class and charge them the following rate: an increased fixed monthly service charge ($18.15 up from $12.75 for all customers); a new monthly demand charge ($14.33/kW for the highest-use period over the monthly billing period); and a reduced volumetric energy charge of $0.058/kWh. The utility also proposed an optional time of use rate for residential rooftop solar customers. Importantly, NV Energy's proposal included grandfathering existing rooftop solar customers under the outgoing rate structure as to minimize impacts on investments made under different rate expectations.

[39] See Public Utility Commission of Nevada, Docket No. 15-07041.
[40] S. Whaley, "NV Energy says cap on net metering reached," *Las Vegas Review-Journal* (Aug. 21, 2015), https://www.reviewjournal.com/business/nv-energy-says-cap-on-net-metering-reached/.

In December 2015, following contentious hearings, the PUCN rejected NV Energy's proposed demand charge, but it: (1) approved formation of a separate rate class; (2) tripled the proposed service charge for that class over a four-year period (to a high of $38.51); and (3) decreased the volumetric charge from the residential retail rate of 11 cents/kWh to 2.6 cents/kWh over the same four-year period. The PUCN also rejected the utility's proposal to grandfather existing customers, thereby moving all rooftop solar customers to the new rate structure.[41] The new rate structure "fundamentally alter[ed] the economics of rooftop solar in Nevada."[42]

The PUCN relented to some pressure and issued a modified final order that slowed institution of NV Energy's fixed and volumetric rate changes over the subsequent 12 years, until 2028.[43]

Q. What were the order's repercussions?

A. The order resulted in instant and widely publicized fallout (one analysis remarked it "turned ratemaking into national news")[44] and a series of contentious interactions between intervening parties and the PUCN, as well as public blame between the rooftop solar industry and the Governor.

[41] Proposed Order, Docket No. 1507041 (PUCN Dec. 21, 2015) ("December 2015 Order"), http://pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2015_THRU_PRESENT/2015-7/8305.pdf.
[42] L. Davies and S. Carley, The Electricity Journal Vol. 30:1, *Emerging Shadows in National Solar Policy? Nevada's Net Metering Transition* in Context at 10 (Jan.-Feb. 2017), https://ssrn.com/abstract=2875878.
[43] Modified Final Order, Docket No. 1507041 (PUCN Feb. 12, 2016), http://pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2015_THRU_PRESENT/2015-7/9692.pdf
[44] L. Davies and S. Carley, *Emerging Shadows in National Solar Policy? Nevada's Net Metering Transition.*

Q. Are there aspects of this "widely publicized" fallout that are informative in the context of this Utah docket?

A. Yes, several. First, the events in Nevada had an immediate and significant impact on the rooftop solar industry in Nevada. SolarCity announced the elimination of 550 jobs.[45] Sunrun announced it would cease operations in the state, impacting "hundreds" of additional jobs.[46] In 2014, Nevada was first of all states across the country in solar jobs per capita.[47] The 2016 Solar Jobs Census confirmed a 5% loss in Nevada solar jobs from the previous year, including a 32% loss in installation jobs that was offset by utility scale development and related manufacturing.[48] According to the Census, Nevada was one of only four states in the country to experience an actual decline in solar jobs during 2016.[49] The Census predicted an incremental 22% decline in solar jobs during 2017. In addition, new solar installations dropped 92 percent in the first quarter of 2016.[50]

Second, ongoing legal and regulatory responses to the December 2015 order resulted in continuing uncertainty for the distributed solar industry and the energy industry more generally for close to two years. The Nevada Legislature's passing of S.B. 405 this week,

[45] *See* Press Release, SolarCity (Jan. 6, 2016), http://www.solarcity.com/newsroom/press/following-nevada-pucs-decision-punish-rooftop-solar-customers-solarcity-forced.
[46] *See* Press Release, Sunrun (Jan. 7, 2016), https://www.sunrun.com/why-sunrun/about/news/press-releases/sunrun-end-nevada-operations-response-anti-solar-ruling.
[47] *See* Press Release, The Solar Foundation (Feb. 12, 2015), http://www.thesolarfoundation.org/press-release-nv-census-2014/
[48] Solar Foundation, *National Jobs Census 2016* at Appendix A, http://www.thesolarfoundation.org/wp-content/uploads/2017/02/National-Solar-Jobs-Census-2016-Appendix-A.pdf (Feb. 2017).
[49] Solar Foundation, *National Jobs Census 2016*.
[50] L. Davies and S. Carley, *Emerging Shadows in National Solar Policy? Nevada's Net Metering Transition* at 11 (citing D. Saha and M. Muro, footnote 10).

as noted, will work to restore some of the damage done, but not without significant consternation and invested resources since 2015.

Third, contention among involved parties played out in the media and politics. Solar companies issued press releases condemning the actions of the PUC and Governor Sandoval, and the PUCN Chair, the Governor and solar CEOs publicly aired their grievances. The Governor issued a press release implicating the CEO and announced he would not reappoint Commissioner David Noble, who presided over the net metering proceeding.

The political fallout from the decision also became a major factor in the 2016 election. During 2016, a ballot initiative that will provide for retail choice in Nevada – essentially allowing customers to bypass the utility in some instances – passed by an overwhelming majority.[51] The Initiative requires an additional vote in 2018 to become a constitutional amendment.

Q. What takeaways are important for this Rocky Mountain Power proceeding?

A. Nevada is a cautionary tale for Utah. NV Energy claimed that the same type of "cost-shift" that Rocky Mountain Power is now claiming here. NV Energy's proposed solution was also remarkably similar to the rate structure at consideration here. Both proposals contain high fixed charges, unprecedented demand charges, and reductions in volumetric credits for rooftop solar customers.

[51] *See* Associated Press, "Energy Choice Initiative Passes in Nevada," *Reno Gazette-Journal* (Nov. 9, 2016), http://www.rgj.com/story/news/politics/2016/11/09/energy-choice-initiative-passes-nevada/93528566/.

While some of the animosity that Nevada experienced can certainly be avoided in Utah, the potential for long-term damage to the rooftop solar industry is real. The industry in Nevada basically packed up and left the day after the PUCN's initial decision. This market uncertainty has prevailed for two years. In addition, the PUCN order resulted in unnecessary political animosity on the part of rooftop solar customers. The detrimental impacts experienced in Nevada can be avoided by working towards a more gradual, and equitable approach to address Rocky Mountain Power's needs in a way that considers the electricity system's changing reality.

Q. Are there any other states you would raise as informative case studies for this PacifiCorp proceeding?

A. Yes, another state that has engaged in net metering considerations that may provide insight for Utah, not wholly without drama, is Arizona.

Q. Please provide a summary of the beginning of the net metering debate in Arizona.

A. Not surprisingly, Arizona was an early rooftop solar adapter state. In mid-2009, the utility had approximately 900 rooftop solar systems installed in its service territory. By mid-2013, that number increased to over 18,000 rooftop systems.[52] The Arizona Corporation Commission ("ACC") made its first direct decision regarding changes to net metering rate design in 2013, in response to an Arizona Public Service Company ("APS")-proposed monthly fee increase for rooftop solar customers. The ACC rejected the

[52] *See* H. Trabish, "Arizona Preserves Net Metering by Charging a Small Fee to Solar Owners," *Greentech Media* (Nov. 15, 2013), https://www.greentechmedia.com/articles/read/Charging-a-Fee-to-Solar-Owners-Preserves-Net-Metering-in-Arizona.

proposal (but for a modest, interim monthly demand fee averaging $5/month) and recommended the issue be addressed in a general rate case.[53]

This decision came after a paid public relations campaign by APS intended to discourage adoption of net metering, as well as some public contention over whether the sitting, elected ACC commissioners should be allowed to consider the net metering proceedings considering significant campaign donations from APS.[54]

Q. What happened next?

A. In 2015, APS again tried to increase rates on rooftop solar customers by filing a proposed increase in the monthly fixed fee that would have averaged $21 per customer. In August 2015, the ACC issued an order agreeing with APS.[55] Opponents of the decision filed re-hearing requests and charged two sitting ACC commissioners with bias and conflict of interest based on over $3 million in campaign donations the commissioners had received from APS.[56, 57]

In an ostensible attempt to stop public dispute among interested parties, APS agreed to withdraw its fee increase proposal in exchange for the ACC opening a value of solar

[53] Arizona Corporation Commission, Order, Decision No. 74202 at P 56, Docket No. E-01345A-33-0248 (Dec. 3, 2013), http://docket.images.azcc.gov/0000149849.pdf
[54] *See* H. Trabish, "Arizona Utility Funds Solar Smear Campaign, Saying It Is 'Obligated to Fight," *Greentech Media* (Oct. 22, 2013), https://www.greentechmedia.com/articles/read/arizona-utility-admits-funding-anti-solar-ad-campaign.
[55] Arizona Corporation Commission, Order, Decision No. 75251, Docket No. E-01345A-13-0248 (Aug. 31, 2015), http://docket.images.azcc.gov/0000165990.pdf.
[56] Application for Rehearing of Decision No. 75251, Docket No. E-01345A-13-0248 (Sep. 17, 2015), http://docket.images.azcc.gov/0000166188.pdf.
[57] *See* J. Pyper, "APS Proposes to Withdraw Fee Increase for Solar Customers," *Greentech Media* (Sep. 27, 2015), https://www.greentechmedia.com/articles/read/aps-proposes-to-withdraw-fee-increase-for-solar-customers.

docket to investigate rooftop solar costs and benefits.[58] The ACC approved APS' request, closed the docket and ordered APS to submit a general rate case in 2016.[59]

The public dispute did not stop there. In Spring 2016, both the solar industry and APS developed competing ballot initiatives.[60,61] Governor Doug Ducey's office was able to mediate discussions between SolarCity and APS that lead to withdrawal of both ballot initiatives, but did not otherwise make progress.[62]

The value of solar proceeding ran through 2016. Wide participation and significant national attention focused on the docket. On January 3, 2017, the ACC issued an order ending net metering for new customers. It determined that going forward rates for excess generation should be based on the value of solar and use a five-year rolling average of utility-scale power purchase agreement prices as an index.[63] The decision also ultimately grandfathered customers who submitted applications by December 31, 2016.

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[58] Motion to Amend of Arizona Public Service Company, Docket No. E-01345A-13-0248 (Sept 25, 2015), https://www.azenergyfuture.com/getmedia/49cbe3e0-7055-4b10-81aa-bcc5a557e752/APSProposal_092515.pdf/?ext=.pdf. The unusually colorful introduction to APS' withdrawal filing began, "in their most aggressive display of political gamesmanship to date, TASC and its allies have shown their true colors."]

[59] Arizona Corporation Commission, Order Rescinding Dec. No. 75251, Dismissing APS's Motion to Reset and Closing Docket No. E-01345A-13-0248 (Sep. 17, 2015), http://docket.images.azcc.gov/0000166188.pdf.

[60] Yes on Solar, Application for Initiative (Apr. 24, 2016), http://apps.azsos.gov/election/2016/general/ballotmeasuretext/C-09-2016.pdf.

[61] Proposed Amendment, Arizona HCR 2039, http://www.azleg.gov/FormatDocument.asp?inDoc=/legtext/52leg/2R/proposed/S.HCR2039SHOOTER.DOC.htm&Session_ID=115 and Proposed Amendment, Arizona HCR 2041, http://www.azleg.gov/FormatDocument.asp?inDoc=/legtext/52leg/2R/proposed/S.HCR2041LESKO.DOC.htm&Session_ID=115.

[62] H. Trabish, "Inside the deal that averted a net metering ballot showdown in Arizona," *Utility Dive* (May 3, 2016), http://www.utilitydive.com/news/inside-the-deal-that-averted-a-net-metering-ballot-showdown-in-arizona/418392/.

[63] Arizona Corporation Commission, Opinion and Order, Decision No. 75859, Docket No. E-00000J-I4-0023 (Jan. 3, 2017), http://docket.images.azcc.gov/0000176114.pdf.

Q. Did APS eventually file a rate case?

A. Yes, in July 2016, APS filed a rate case that included a fixed charge of $24/month and a mandatory demand charge of $16.40/kW during summer months. The proposal also included a decline in excess generation rates from retail to wholesale rates over time. APS and intervenors proposed a settlement on a deal in March 2017 that eliminated mandatory demand charge, created four rate design options for rooftop solar customers, and grandfathered existing customers under the current rate design. The rate designs include a time of use option that includes a fixed fee plus a grid access charge to be determined in a separate ongoing proceeding, two demand-based plans that have a $13 fixed fee but no grid access charge, and a demand-based pilot.[64]

Q. Is the proceeding in which parties proposed a settlement complete?

A. No. Unfortunately, there is still ongoing dispute about whether some of the Commissioners should recuse themselves from participating in the docket due to financial support from APS and its parent company. In fact, one commissioner made a motion to stay proceedings and make disqualification rulings about two other commissioners.[65]

[64] Arizona Corporation Commission, Staff's Notice of Filing Settlement Term Sheet, Docket No. E-01345A-16-0036 (Mar. 1, 2017), http://docket.images.azcc.gov/0000177680.pdf.
[65] Arizona Corporation Commission, Motion for Determination of Disqualification and for Stay of Proceeding Pending Full Investigation, Docket No. E-01345A-16-0036 (Apr. 27, 2017), http://docket.images.azcc.gov/0000179345.pdf.

Q. Were there other impacts to the solar industry in Arizona?

A. Yes. The experience of the Salt River Project, a non-jurisdictional power district serving the Phoenix area, is also useful in demonstrating the potential severe impacts of dramatic changes to rooftop solar rate design.

In December 2014, based on the rationale that it was failing to recover its fixed costs and that a cost shift was occurring from rooftop solar customers to other residential customers, Salt River Project proposed a new rate structure for rooftop solar customers.[66] At the time, Salt River Project had just under 1 million total customers with 12,000 rooftop solar customers. Salt River Project's board of managers approved the rate proposal, which includes a $32 monthly, fixed service, a demand charge, and a reduction in volumetric rates from 9 cents to 5 cents/kWh.[67] The demand charge would vary based on system size, but during summer peak would cost rooftop solar customers for their 30-minute peak energy use. Credit Suisse estimated average monthly bill impacts of the new rate at around $50 per customer, and declared the economics of rooftop solar in the Project's territory "effectively nonviable" after the decision.[68]

[66] Salt River Project Agricultural Improvement and Power District, Proposed Adjustments to SRP's Standard Electric Price Plans Effective with the April 2015 Billing Cycle (Dec. 12, 2014), http://www.srpnet.com/prices/priceprocess/pdfx/BlueBook.pdf.
[67] Salt River Project, Standard Electric Price Plans Effective with the April 2015 Billing Cycle, https://www.srpnet.com/prices/business/PDFX/April2015RatebookPUBLISHED.pdf.
[68] Credit Suisse, *Solar Snippet – More Salty than Sweet: Salt River Project Approves Increased Fees for Solar* (Feb. 27, 2015), https://research-doc.credit-suisse.com/docView?sourceid=em&document_id=x619887&serialid=6jxJlICJC3rOczhU7lHO3AMEnp7EWG5656D76TMOX%2fA%3d.

873 **Q. What happened after the board of managers approved Salt River Project's new rate**
874 **structure?**
875 **A.** SolarCity determined its applications fell of 96% in the month following the rate change
876 and the company sued Salt River Project for violation of antitrust laws.[69] Salt River
877 Project's own analysis one year after the rate change demonstrates that only 14% of
878 rooftop solar customers are saving money under the new rate structure, while the rest are
879 "paying significantly higher bills."[70]

880 **Q. How did the debate around rooftop solar rate design impact solar industry jobs in**
881 **Arizona?**
882 **A.** Yes. According to the National Solar Jobs Census, Arizona experienced a 24.8% decline
883 in solar industry jobs from 2014 to 2015 – the period in which the APS and Salt River
884 Project rate changes got approved – representing a loss of 2,278 jobs.[71] In 2016,
885 Arizona's job numbers started to make up a small amount of the difference, adding back
886 388 jobs for a 5.6% growth rate from 2015.[72]

[69] J. Pyper, "SolarCity Files Lawsuit Against Salt River Project for Antitrust Violations," *Greentech Media* (Mar. 3, 2015), https://www.greentechmedia.com/articles/read/solarcity-files-lawsuit-against-salt-river-project-for-antitrust-violations. The U.S. District Court for Arizona has stayed the suit, pending Salt River Project's appeal to the U.S. Court of Appeals for the 9th Circuit for the district court's denial of summary judgment.
[70] R. Randazzo, "SRP data shows some solar customers save money with demand rates," *Arizona Republic* (Mar. 25, 2016), http://www.azcentral.com/story/money/business/energy/2016/03/25/srp-data-shows-some-solar-customers-save-money-demand-rates/81886548/.
[71] The Solar Foundation, Arizona Solar Jobs Profile, Solar Jobs Census 2015, https://www.solarstates.org/#state/arizona/counties/solar-jobs/2015.
[72] The Solar Foundation, Arizona Solar Jobs Profile, Solar Jobs Census 2016, https://www.solarstates.org/#state/arizona/counties/solar-jobs/2016.

Q. What insights can be delineated from the Arizona experience?

A. In Arizona, dramatic initial proposals to address a perceived threat by utilities from the rooftop solar industry caused animosity that at best will have significantly delayed an acceptable outcome and put the breaks on the state's rooftop solar industry in the process. If the APS settlement is approved, it will still have taken two years longer than it may otherwise have to amicably resolve the situation. The negative impact on the solar industry and jobs in the state was less dramatic than experienced in Nevada but as significant. And resources are still being directed at getting past the political controversy related to the ACC.

In addition, APS' proposed settlement includes four different rate options for residential rooftop solar customers. The results are complicated relative to the rate design agreed upon in Colorado. It is not clear that such a complicated outcome is necessary or at all desirable in Utah at this point.

Q: Are there any states that provide a more optimistic outcome related to finding a compromise amenable to the utility, the rooftop solar industry and other stakeholders?

A. Fortunately, yes. Colorado. A settlement-driven compromise on a new net metering rate structure in that state left all involved stakeholders claiming victory.

Q: Please explain the recent consideration of rate design for rooftop solar customers in Colorado.

A. In 2013, the Colorado Public Utility Commission ("CPUC") began in earnest to consider net metering issues. It commenced an informational proceeding specific to whether the expansion of rooftop solar in the state merited changes Colorado's net metering or retail renewable distributed generation rules.[73] After hearing from the utility, national experts, commissioners from other states and other stakeholders, Colorado's commissioners decided that despite the growth in distributed generation to date (over 15,000 customers at that point), they did not need to change the rules governing net metering. Therefore, they closed the docket.[74]

Q. When did the issue of rate design for distributed solar customers come back before the Colorado Commission?

A. In early 2016, PSCo made three filings with the CPUC that parties recognized addressed related issues: (1) a rate case intended to overhaul existing rate tariffs that included, among other things, a proposed grid use charge for residential and small commercial customers,[75] (2) a request for tariff approval that would allow customers to purchase solar energy from PSCo-owned or purchased resources,[76] and (3) PSCo's proposed 2017-2019

[73] Public Utilities Commission of Colorado, Decision Opening Proceeding, Proceeding No. 14M-0235E (Mar. 12, 2014), https://www.dora.state.co.us/pls/efi/EFI_Search_UI.Show_Decision?p_dec=19926&p_session_id=.
[74] Public Utilities Commission of Colorado, Decision Closing Proceeding, Proceeding No. 14M-0235E (Aug. 26, 2015), http://coseia.org/wp-content/uploads/2016/01/NEM-DECISION.pdf.
[75] Public Utilities Commission of Colorado, Proceeding No. 16AL-0048E (Jan. 25, 2016), https://www.dora.state.co.us/pls/efi/EFI.Show_Docket?p_session_id=284520&p_docket_id=16AL-0048E.
[76] Public Utilities Commission of Colorado, Proceeding No. 16A-0055E (Jan. 27, 2016), https://www.dora.state.co.us/pls/efi/EFI.Show_Docket?p_session_id=284520&p_docket_id=16A-0055E.

RES compliance plan.[77] The parties entered into settlement conversations and agreed to a settlement across the three proceedings in August 2016.[78]

Q. Are there any takeaways from Colorado that may be useful to incorporate as the Commission considers Rocky Mountain Power's proposal in this docket?

A. The settling parties in Colorado demonstrated an overarching recognition of the interconnected nature of dockets considering rate design, renewable purchase tariff schedules, and other dockets like rate design for electric vehicles. The reality of an increasingly distributed and interconnected distribution system necessitates comprehensive rate design consideration and the avoidance of siloed but related proceedings. Just and reasonable rates require consideration of all aspects of the evolving electricity grid, which are being driven in significant part by factors outside the utility or any one class of customers' control, together in a manner that optimizes across the system. Although PSCo and stakeholders did not get all the way there, they did manage to break down three separate silos in which rate design related to the transitioning electric system were under consideration.

In addition, the settlement produced noteworthy specific outcomes, including rejection of a fixed charge, implementation of a trial time of use rate program, and evolved treatment of excess energy for rooftop solar customers.

[77] Public Utilities Commission of Colorado, Proceeding No. 16A-0139E (Feb. 29, 2016), https://www.dora.state.co.us/pls/efi/EFI.Show_Docket?p_session_id=284520&p_docket_id=16A-0139E.
[78] Non-Unanimous Comprehensive Settlement Agreement, Proceeding Nos. 16AL-0048E; 16A-0055E; 16A-0139E (Aug. 15, 2016), http://coseia.org/wp2016/wp-content/uploads/2016/11/Non-Unanimous-Comprehensive-Settlement-Agreement_FINAL.pdf.

Q. Can you tell me more about Colorado's proposed Grid Use Charge and the settlement outcome that removed it while implementing trial time of use rates?

A. In its rate case, PSCo had proposed a Grid Use Charge intended to recover distribution costs via a "fixed" fee based on each customer's 12-month rolling energy use average, along with a corresponding reduction in volumetric energy costs that had historically been used to recover distribution system costs. The resulting three-docket settlement dispensed with the Grid Use Charge and instead established a trial energy-only time of use residential rate program through 2019 with the intent of establishing more broadly applicable time of use rates in 2020. In conjunction, the parties agreed to establish some sort of decoupling mechanism, which I will describe below.

Q. How did the parties treat excess generation from rooftop solar customers in the settlement agreement?

A. The settling parties agreed to monthly netting commensurate with the time of use rates. Because of requirements in a Colorado law, the settlement had to provide a roll-over option or a cash-out option. Both options captured the monthly netting concept.[79]

Q. Finally, was decoupling a key component of the Colorado settlement agreement?

A. Yes. As part of the settlement agreement, all parties (except the Colorado Consumer Counsel) agreed not to oppose PSCo's separate application for revenue decoupling. The decoupling proceeding is close to completion with a CPUC Administrative Law Judge

[79] Colorado Rev. Stat. § 40-2-124(1)(e)(I)(B); *see* Non-Unanimous Comprehensive Settlement Agreement at 36-40.

recommending approval of a full coupling mechanism for PSCo's residential and small commercial customers.[80]

Decoupling could provide a solution to at least one part of Rocky Mountain Power's concern over declining revenues due to the growth of rooftop solar in Utah. Decoupling could serve as a simple and direct complement to the ultimate rate design determined in this proceeding or a future rate case, to provide Rocky Mountain Power comfort in this era of a changing resource mix.

Q. Did consideration of charges and rate design related to net metering have an impact on Colorado's distributed solar industry between 2013 and today?

A. Unlike some of the controversy around solar rate design in nearby states, almost all the settling parties in Colorado heralded some portion of the rooftop solar rate design settlement as a victory.[81] In addition to substantive outcomes, parties reported relationship and trust-building as an important outcome of the process.[82]

Colorado has seen significant and consistent job growth in the solar industry over the last several years. In 2016, during the period settlement negotiations were taking place around

[80] Public Utilities Commission of Colorado, Recommended Decision, Proceeding No. 16A-0546E (May 2, 2017); http://coseia.org/wp2016/wp-content/uploads/2017/05/DECOUPLING-Rec-Decision-Decoupling-R17-0337_16A-0546E-1-1.pdf. The parties are continuing to brief the issue of protection for low-income customers pursuant to the recommended decoupling mechanism.
[81] 8 parties supported settlement on all issues; 26 total parties signed onto some portion of the decision.
[82] See., e.g., A. Svaldi, "Xcel Energy pilot programs will charge extra for electricity used in high-demand periods," *Denver Post* (Aug. 15, 2016), http://www.denverpost.com/2016/08/15/xcel-energy-pilot-programs-will-charge-extra-for-electricity-used-in-high-demand-periods/; H. Trabish, "Rocky Mountain compromise: Inside Xcel's landmark Colorado solar settlement," *Utility Dive* (Aug. 22, 2016), http://www.utilitydive.com/news/rocky-mountain-compromise-inside-xcels-landmark-colorado-solar-settlement/424843/.

rate design, Colorado supported over 6,000 solar jobs, representing a 20% increase from 2015.[83] Over 80% of these jobs were in the residential solar industry.

Q. What conclusions do you draw from the experiences of these various states?

A. I have included Exhibit AC-2 to testimony, which is a table of the various utility proposals and their final outcomes. Overall, the biggest lesson from these experiences is that an overly reactive response to rate design can have a destructive impact on job creation in the state. The uncertainty created in Nevada and Arizona is not good for business. In contrast, Colorado provides an example where collaboration and gradualism have allowed the rooftop solar industry to grow without harming non-solar customers.

Q. Does this conclude your testimony?

A. Yes.

[83] See The Solar Foundation, National Solar Jobs Census 2015, https://www.solarstates.org/#state/colorado/counties/solar-jobs/2015. These numbers were increases from 2013, during which Solar Foundation determined 3,600 jobs (although the comparisons from 2013 to 2016 are not perfect as the methodology used in each year is not identical), http://www.thesolarfoundation.org/wp-content/uploads/2015/02/Solar-State-Fact-Sheet_FINAL.pdf.