Rocky Mountain Power
Docket No. 16-035-36
Witness: Robert M. Meredith

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF UTAH

ROCKY MOUNTAIN POWER

Direct Testimony of Robert M. Meredith

January 2017

Q. Please state your name, business address and present position with PacifiCorp dba Rocky Mountain Power ("the Company").

A. My name is Robert M. Meredith. My business address is 825 NE Multnomah St, Suite 2000, Portland, Oregon, 97232. My present position is Manager, Pricing and Cost of Service.

QUALIFICATIONS

Q. Please describe your education and professional background.

A. I graduated magna cum laude from Oregon State University in 2004 with a Bachelor of Science degree in Business Administration and a minor in Economics. In addition to my formal education, I have attended various industry-related seminars. I have worked for the Company for 12 years in various roles of increasing responsibility in the Customer Service, Regulation, and Integrated Resource Planning departments. I have over six years of experience preparing cost of service and pricing related analyses for all of the six states that PacifiCorp serves. I assumed my present position in March 2016.

Q. Have you testified in previous regulatory proceedings?

A. Yes. I have previously filed testimony on behalf of the Company in regulatory proceedings in Utah, California, and Washington.

PURPOSE AND SUMMARY

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to present and support the Company's proposed time of use ("TOU") pricing pilot for residential customers who own or lease a plug-in electric vehicle ("PEV"). The Company's proposed pilot ("EV TOU Pilot") is offered

in compliance with Utah Code Ann. §54-20-103 in the Sustainable Transportation and Energy Plan Act ("STEP Act") which provides for the Commission, before July 1, 2017, to authorize the Company to establish a program that promotes customer choice in electric vehicle charging equipment, and service that includes time of use pricing for electric vehicle charging.

Q. Please summarize the proposed EV TOU Pilot.

A. The Company proposes an EV TOU Pilot for residential customers that would include a group enrolled in a load research study and would also be available for up to 1,000 additional customers with PEVs to enroll. The rates for the proposed EV TOU Pilot on proposed Schedule 2E would include two simple options: (1) energy charges with a moderate difference in price between on- and off-peak periods; and, (2) on- and off-peak energy charges with a larger price differential. The on-peak time period for the proposed rates would be 3:00 p.m. to 8:00 p.m. during the summer months of May through September, and 8:00 a.m. to 10:00 a.m. and 3:00 p.m. to 8:00 p.m. during the winter months of October through April excluding weekends and holidays. The Company proposes rates become effective July 1, 2017. The Company proposes closing the schedule to new service at the end of 2020, so that a final report to the Commission can be prepared in 2021.

BACKGROUND

Q. Why did the Company not seek approval of an EV TOU Pilot when it filed its initial Application to implement programs authorized by the STEP Act on September 12, 2016?

A. As indicated in the Application on paragraphs 73 through 75, at that time the Company

was in the process of initiating a series of workshops with stakeholders to discuss how to best design a pilot that would provide the greatest benefit for customers while considering the diverse perspectives of the different parties.

Q. How many workshop sessions were held to discuss an EV TOU pilot?

A. Five workshops were held on: September 27, 2016; October 25, 2016; November 10, 2016; December 8, 2016; and January 6, 2017. Additionally, on November 3, 2016, the Division of Public Utilities hosted a webinar in which the Regulatory Assistance Project gave a presentation about time of use rates to interested stakeholders.

Q. Did you participate in all the workshop sessions?

A. Yes. I attended each of the workshop sessions in-person and helped facilitate the discussions.

Q. What organizations attended the workshops?

A. The organizations represented included the Company, the Division of Public Utilities ("DPU"), the Office of Consumer Services ("OCS"), Utah Clean Energy ("UCE"), the Utah Governor's Office of Energy Development, Western Resource Advocates ("WRA"), Utah Association of Energy Users ("UAE"), Sierra Club, Breathe Utah, Southwest Energy Efficiency Project ("SWEEP"), and Utah Citizens Advocating Renewable Energy ("UCARE").

Q. What topics were discussed at these workshops?

A. The topics discussed at these sessions included core principles of the pilot, goals of the pilot, features of the pilot, time of use periods, and rate design.

Q. How would you characterize the workshops?

A. The workshop sessions were very productive and engaging. The different stakeholder

groups in attendance were thoughtful and provided good recommendations for the pilot. The Company's EV TOU Pilot proposal is far more robust than it would have been absent the sessions and the valuable input shared by the different parties.

Q. To what extent does the Company's proposed EV TOU Pilot reflect agreement among the parties?

A. The Company's proposed EV TOU Pilot reflects the general direction and several specific elements agreed upon by the participating stakeholders. Nonetheless, the Company's proposal does not constitute a formal agreement. All parties may file testimony regarding any aspects of the Company's proposal.

Q. Why does the Company's proposed EV TOU Pilot only include new rate offerings for residential customers who charge PEVs?

A. The parties in the workshops prioritized a TOU pilot for residential customers, since non-residential customers are often already subject to or have options available for time-variant pricing. As further PEV adoption occurs in the Company' service territory and the Company gains experience with the landscape of PEV charging, the Company may, in conjunction with implementing STEP, explore alternative rate design options for PEV charging that occurs away from the home.

EV TOU PILOT CORE PRINCIPLES

Q. What were the core principles discussed at the workshops?

A. The core principles for an EV TOU Pilot that were discussed include encouraging electric vehicle adoption, minimizing cost shifting, promoting economic efficiency, ease of use/customer acceptance, and gaining a better understanding of electric vehicle charging behavior.

Q. Please describe the core principle of encouraging electric vehicle adoption.

A. An important goal for the EV TOU Pilot is to encourage electric vehicle adoption. For a time of use rate to encourage electric vehicle adoption, it must provide an opportunity for customers to achieve real potential savings from charging their electric vehicles during off-peak periods.

Q. Please describe the core principle of minimizing cost shifting.

A. While it is important for the EV TOU Pilot to encourage electric vehicle adoption, it is also important that any new rates do not unduly shift costs to other customers, either directly or indirectly. To accomplish this goal, it will be important for rates to closely align with cost of service and send a signal to avoid future costs to customers. Accordingly, it is important for the pilot to be limited to a small number of customers so that the impact of any rate design(s) can be thoroughly studied before they would be made available on a more widespread basis.

Q. Please describe the core principle of promoting economic efficiency.

A. A time of use rate should induce customer behavior that promotes economic efficiency. A change in customer behavior that keeps usage away from the times of the Company's peaks, if adopted by a sufficiently large number of customers over a sufficiently long period of time, may yield benefits for the Company's system and allow it to avoid or defer making investments. While the Company does not believe that the scale of this pilot will itself provide a significant reduction in peak capacity to loads, it does believe that it will learn about the potential capability for these rates to affect customer behavior that could potentially be broadened to more customers on a larger scale. Additionally, the discussions on this principle recognized some need for flexibility to adapt rates for

on-peak time periods in the future as conditions change. More broadly, the stakeholders also discussed the need for general education to encourage off-peak charging even for those customers not participating in the EV TOU Pilot.

Q. Please describe the core principle of ease of use/customer acceptance.

A. This principle captures the idea that rates should be simple and easy for customers to understand. There should also be a reasonable opportunity for customers to respond to the price signals that are present in their rates.

Q. Please describe the core principle of gaining a better understanding of electric vehicle charging behavior.

A. For the costs of the pilot to be in the interest of customers, lessons should be learned and experience gained concerning time of use rates for customers who own or lease electric vehicles, which will inform future programs and/or rate designs.

EV TOU PILOT GOALS

Q. What were the overall goals that the Company and stakeholders hoped to accomplish from the pilot?

A. The work group discussed the goals of having a robust time of use rate pilot for residential customers who own or lease an electric vehicle that would broadly conform to the principles discussed above, with the ultimate deliverable being a comprehensive report to the Commission at the pilot's conclusion.

Q. What key information will be included in the report to the Commission?

A. The work group discussed two broad categories of information to include in the report: usage characteristics for pilot participants, including changes thereto as a result of the pilot offerings, and customer experience with time of use rates. Specifically the work

group discussed the report containing, at a minimum, the following details:

- Estimated capacity reduction at the time of the Company's peaks
- Graphical illustrations of the differences in hourly energy consumption
- Differences in overall energy consumption
- Average annual bill savings
- Total change in annual revenue
- Timing and extent of enrollment
- Customer retention rate
- Survey responses to the following questions:
    - Where did the customer hear about the rate?
    - How satisfied is the customer with the rate?
    - Does the customer think she saved money?
    - Why did the customer enroll in the rate?
    - What changes did the customer make to save money on the rate?
    - Did the rate make any difference in the customer's decision to buy or lease an EV?
    - Does the customer have central air conditioning or electric heat?
    - How many and what type of electric vehicles does the customer have?
    - Does the customer use a level 1 or a level 2 charger?
    - To what extent does the customer charge her electric vehicle(s) away from home?
    - Did the customer recommend the rate to her friends?
    - What were the customer's biggest challenges of being on the rate?

EV TOU PILOT PROPOSAL

Q. Please provide an overview of the Company's proposed EV TOU Pilot program.

A. The Company proposes a residential EV TOU Pilot under which two different rate options would be explored. Both options would include a simple, straight forward rate design that would have the current Schedule 1 customer charge level along with on-peak and off-peak energy charges. One of the options would have a moderate differential between on- and off-peak energy charges and the other option would have a larger differential to provide greater potential bill savings depending on customer behavior.

Under the Company's proposal, two groups of customers would be enrolled. The first group called the Random Assignment Group ("RAG") would be part of a load research study under which the Company would measure the difference in peak capacity for customers enrolled in both of the rate options relative to a control group. The Company would recruit for the RAG from a list of customers that have a PEV registered with the Utah Department of Motor Vehicles ("DMV"). Customers who agree to be a part of the RAG would participate until a full year of data on the load research study is collected and would receive a "thank you" payment of $200 at the end of that period. A second group called the Available to Select Group ("ASG") would be comprised of customers who choose to enroll in one of the rate options. To be eligible to participate in the EV TOU Pilot, customers in this group would need to send in a copy of their DMV registration to the Company. The ASG would be limited to 1,000 customers on a first-come first-served basis. To induce participation in the pilot, incentives under proposed Schedule 120 would be awarded to customers who enrolled

in one of the rate options. A discussion of these incentives is contained in the testimony of Company witness Mr. William J. Comeau.

Q. What timing does the Company propose for the EV TOU Pilot?

A. The Company requests Commission approval of the proposed EV TOU Pilot effective July 1, 2017. After approval is received, the Company would recruit customers for the RAG with the goal of achieving its required load research study size by the end of December 31, 2017. Customers who are selected and agree to be on the load research study would remain on either rate option 1, rate option 2, or a control group that would remain on Schedule 1 until data is collected for the full group for a one year period. Simultaneous with recruitment in the RAG, customers in the ASG could begin enrolling in one of the two rate options. At the end of 2020, the Company would no longer accept applications to enroll in the rates, so that a report could be filed with the Commission before the end of 2021 detailing the pilot's findings.

LOAD RESEARCH STUDY

Q. Please describe the Company's plans for a load research study for the proposed EV TOU Pilot.

A. As part of the Company's proposed EV TOU Pilot, the Company would develop a load research study under which load characteristics would be measured for customers on the two rate options and a control group of customers with PEVs on Schedule 1. Customers would be randomly selected for inclusion in each of these groups from out of the population of customers who have PEVs registered with the DMV. To find these customers and approach them with the opportunity to participate in the load research study, the Company may need to purchase a list of DMV registrations and work through

a third party intermediary to ensure privacy.

From this list of customers, the Company will determine the sample size needed for each group to ensure that its load research study achieves the precision level of ±10% at the 90% confidence level. Until the Company begins working with the EV population data, it will not know the exact number of customers it will need for the load research study. The Company will begin developing its samples and recruiting customers for the RAG as soon as it receives approval from the Commission for the EV TOU Pilot. The Company plans to have its load research study in place by December 31, 2017. Exhibit No. RMP___(RMM-1) includes a more detailed overview of the process for selecting and recruiting customers for the load research study. Exhibit No. RMP___(RMM-2) includes the technical details concerning the load research study's design.

EV TOU PILOT TIME PERIODS

Q. What time periods would be on-peak and off-peak under the Company's proposed EV TOU Pilot?

A. The Company proposes an on-peak period of 3:00 p.m. to 8:00 p.m. during the summer months of May through September, and 8:00 a.m. to 10:00 a.m. and 3:00 p.m. to 8:00 p.m. during the winter months of October through April. All weekends and holidays would be excluded from the on-peak hours. All other hours would be off-peak.

Q. Why did the Company select these periods for on- and off-peak?

A. To determine the most appropriate times for on-peak energy charges to apply, the Company examined the timing of both system coincident and distribution coincident peaks over the last five class cost of service studies filed with the Commission. This

examination showed that most peaks occurred in the late afternoon/early evening timeframe in the summer months and both in the late afternoon/early evening and morning during the winter. To promote rates that are simple and easy for customers to understand, the Company identified time periods that capture the vast majority of those peaks for both seasons. The Company also proposes to use the same defined periods for Summer (May - September) and Winter (October - April) as current rates. The proposed on-peak periods include the timing of 94 percent of the peaks. Exhibit No. RMP___(RMM-3) shows the hourly occurrence of peaks in the Summer and Winter seasons and the on-peak period.

EV TOU PILOT PRICES

Q. What are the Company's proposed rates for the EV TOU Pilot?

A. The Company's proposed rates include two different options that both contain the customer charge from Schedule 1 as well as an on-peak energy charge and an off-peak energy charge. Unlike Schedule 1, neither rate option contains inverted tier pricing. The first option contains a moderate differential between on- and off-peak prices. The second option contains a larger differential. Table 1 below includes the Company's proposed prices for both options:

Table 1. Proposed EV TOU Pilot Prices

	Rate Option 1	Rate Option 2
Customer Charge - 1 Phase	$ 6.00	$ 6.00
Customer Charge - 3 Phase	$ 12.00	$ 12.00
On-Peak kWh (cents\kWh)	22.2755	34.3753
Off-Peak kWh (cents\kWh)	6.7881	3.4003

Rate Option 1 reflects an approximately 3:1 differential between the on- and off-peak rates and option 2 reflects a differential of about 10:1.

Q. How do the Company's proposed prices compare to the Company's current optional Schedule 2 time of day tariff?

A. The differential for Schedule 2 between on- and off-peak prices is much smaller than the proposed prices at about 1:1½. Because of this smaller differential, the potential savings that a customer may receive for shifting usage to the off-peak period is less than either of the Company's proposed pilot rate options.

Q. Is the Company proposing to cancel its current optional Schedule 2 time of day tariff?

A. No. The Company is not proposing any changes to Schedule 2. Customers may continue to enroll in the Schedule 2 tariff.

Q. How much could a customer save on her bill with the proposed EV TOU pilot rates?

A. If a customer whose overall monthly usage and profile are similar to the average shifted 50 percent of her usage away from the on-peak period, she could expect to save about 12 percent or $10 monthly under option 1 and about 28 percent or $22 monthly under option 2. Exhibit No. RMP___(RMM-4) includes a bill comparison that shows the impacts of participating in the EV TOU Pilot and shifting usage away from the on-peak period for the average profile customer at various usage levels. Page 1 shows a billing comparison for proposed rate option 1 and page 2 shows the same for proposed rate option 2. For context with the Company's current residential time of day offering, a billing comparison is shown on page 3.

Q. How does the incremental cost to "fuel" a PEV for a customer under these proposed rate options compare to the cost under the Company's current residential rate offerings as well as to fueling an internal combustion engine ("ICE") vehicle?

A. Assuming a customer charges her PEV during the off-peak period, the cost under these two proposed rate options compares very favorably. Exhibit No. RMP___(RMM-5) shows an estimate of the incremental cost to "fuel" a vehicle that drives 1,157 miles per month under Schedule 1 rates, Schedule 2 time-of-day rates, and proposed EV TOU Pilot option 1 and 2 rates for a PEV as well as for an ICE vehicle that gets 36 miles to the gallon with gasoline that costs $2.25 a gallon. Compared to buying gasoline, a customer charging a PEV with electricity purchased under Schedule 1 could save about $30 a month. A customer charging during the off-peak period under Schedule 2 could save nearly $33 a month. Customers on the Company's proposed EV TOU Pilot rate option 1 and 2 who charge off-peak could save about $47 and $59, respectively, on the cost to "fuel" their vehicles relative to gasoline. Notably, these estimated savings are based upon the average fuel efficiency (36 miles per gallon) for a new light-duty vehicle, which may be significantly higher than the fuel efficiency that most customers are able to achieve with their existing ICE vehicles. If a customer is considering replacement of a less efficient ICE vehicle, that customer could expect to save even more with a PEV.

Q. How did the Company develop these rates?

A. To estimate billing determinants for the proposed EV TOU pilot, the residential billing determinants used in the last general case were augmented to include estimates of the

volume of energy in the on- and off-peak periods based upon the profile from the residential load research study used in the last general rate case. For rate option 2, the Company examined the unit costs from the cost of service study in the last general rate case and identified the per kilowatt hour ("kWh") energy-related cost for the residential class to be the basis for the off-peak energy rate. From the estimated residential billing determinants used in the last general rate case, the on-peak energy charge for option 2 was set to collect the remaining revenue requirement from the residential class after prices were applied for the customer charge and the off-peak energy charge. As a result, the proposed rates are revenue neutral for the average residential customer profile.

For rate option 1, the off-peak is set to halfway between the average residential price for energy of 10.1759 cents per kWh and the 3.4003 cents per kWh that is shown to be energy-related from the cost of service study. Like option 2, the on-peak energy charge is set by determining the remaining revenue requirement after determining the amount recovered from the customer charge and off-peak energy charge.

Page 1 of Exhibit No. RMP___(RMM-6) shows the estimated billing determinants, the prices for both the Company's proposed EV TOU Pilot rate options, and a demonstration that both rate options would produce the same overall revenue as was established in the year two prices from the general rate case that were made effective on September 15, 2015. Page 2 of Exhibit No. RMP___(RMM-6) shows the unit costs for the residential class from the cost of service study that were used to set the off-peak energy charges. To develop these unit costs, the class cost of service study

from the last general rate case was modified so that the overall cost of service for the residential class was adjusted to the step 2 revenue of $684,856,226.[1]

Q. Why is the Company proposing these particular rates?

A. The Company believes that these two rate options align well with the principles discussed at the work group sessions and will meet the goals of the pilot.

Q. Please describe how these rate options align with the core principles discussed at the work group sessions.

A. Both options are well poised to encourage electric vehicle adoption, because they present significant potential bill savings for customers who enroll. These rates also do not include inclining tier block energy charges which raise the cost of energy consumption that is in excess of certain thresholds each month. Since a PEV may be a significant new load for a customer, inclining block energy charges are a potential barrier to adoption.

To minimize cost shifting, the Company's proposed rates have been designed to utilize the information from the class cost of service study. The on-peak period closely corresponds with the timing of the Company's different peaks that are used in its class cost of service studies and the basis for off-peak energy charges is the energy-related component of unit costs found in the cost study. The intention of this rate design is that shifting of consumption from the on-peak period to the off-peak period and resultant customer bill savings would correspond to a reduction in load at the time of the peaks and therefore a reduction in cost responsibility.

[1] The step 2 price change became effective September 1, 2015 and reflects the currently effective base revenues for the Company.

The proposed rates would promote economic efficiency, since they would provide a strong incentive for customers to avoid charging their electric vehicle at the times when the Company's system peaks occur. Keeping electric vehicle charging as well as other household energy usage away from the Company's peaks has the potential to mitigate the need for investments that could otherwise be required to serve new electric vehicle load. Furthermore encouraging electric vehicle charging during off-peak times has the potential to flatten out the Company's load profile and increase utilization of the Company's existing assets.

The proposed rate options would be easy for customers to comprehend, since they only contain three major elements.[2] The rates include a customer charge, an on-peak energy charge, and an off-peak energy charge. They do not include inverted block pricing.

Since the proposed rates are sufficiently different from the Company's current residential time of use option (Schedule 2), the Company expects to gain experience and learn from time of use options whose differentials and potential for bill savings are greater. Through its load research study, the Company believes that these rate options will enable the Company to learn valuable information about the usage behaviors of its customer base who own or lease PEV's.

PROPOSED SCHEDULE 2E

Q. Please describe the Company's proposed Schedule 2E.

A. Exhibit No. RMP___(RMM-7) contains the Company's proposed tariff for Schedule

[2] The rates also include an $8 minimum bill for single-phase and a $16 minimum bill for three-phase. Considering that the proposed rates are for customers who charge PEV's, it is unlikely that minimum bills will occur very often for these customers.

2E - Residential Service - Electric Vehicle Time-of-Use Pilot Option as well as revised tariff index sheets. The Schedule 2E tariff contains the proposed prices for rate option 1 and rate option 2. Along with much of the same language included on Schedule 1 - Residential Service, proposed Schedule 2E includes a guarantee payment and a provision that customers on the pilot may not also participate in Net Metering or Subscriber Solar. Like the Company's Schedule 2, Schedule 2E also includes a special condition that commits the customer to being on the tariff for a one year period and limits participation to customers who meet certain creditworthiness criteria. Proposed Schedule 2E would be subject to the same adjustment schedules as Schedule 1. If the pilot is approved, the Company plans to file modified adjustment schedules which would show the prices for Schedule 2E prior to the effective date of Schedule 2E.

Q. What is the guarantee payment and what is its purpose?

A. If over the course of the customer's first year on time of use rates, the customer's total energy costs are greater than 10 percent over what costs would have been for the same period under Schedule 1 rates, the Company will make a guarantee payment to refund the difference in excess of 10 percent. The purpose of the guarantee payment is to provide some assurance and protection for customers who enroll that they will not face a severely adverse annual billing impact from their decision to participate. I believe that offering this guarantee payment under which customers will face no greater than a 10 percent increase in their annual bills for the first year will help the Company sign up customers for the rate while still keeping some skin in the game for them to change their behavior.

Q. Why does the Company propose excluding customers on the pilot from also participating in Net Metering or Subscriber Solar?

A. In order to preserve the integrity of the pilot as it relates to PEV owners and the statistical sample, and based upon some of the feedback from the discussions during the workshops, the Company determined that co-participation in both the EV TOU Pilot and net metering would make investigating time of use rate options for customers with electric vehicles overly complicated and challenging. Furthermore in Docket No. 14-035-114, the Company has a pending request with the Commission for a new rate schedule for new residential net metering customers.

The Company's proposed Schedule 2E excludes participation in the Subscriber Solar Program, because the billing system is not currently set up to handle both rate structures.

EV TOU PILOT COST

Q. What costs would be incurred for the EV TOU Pilot?

A. For each participant on the EV TOU Pilot, a meter capable of measuring on-peak and off-peak energy would need to be installed at a cost of about $200 for labor and equipment. The Company requests recovering the cost of meters for the EV TOU Pilot through funds collected for the STEP program. In addition to the cost of a meter, the Company will provide customers with up to a $200 incentive to participate in the EV TOU Pilot. As part of its Plug-In Electric Vehicle Incentive Pilot Program detailed in the testimony of Mr. Comeau, the Company may budget for up to $200,000 annually to fund both the meters and incentives. Costs will also be incurred to market the program to potential participants, purchase PEV registration data, and survey

customers. These costs may be a part of the marketing budget included for the Plug-In Electric Vehicle Incentive Pilot Program as detailed in Mr. Comeau's direct testimony.

CONCLUSION

Q. Please summarize your testimony.

A. The Company's proposed EV TOU Pilot is reasonable, in the public interest, and fulfills the requirement of the STEP Act for the Company to provide time of use pricing for electric vehicle charging. The Company's proposed EV TOU Pilot will encourage electric vehicle adoption in a way that minimizes cost shifting, promotes economic efficiency, and is easy for customers to understand and accept. The Company also expects to learn about the behaviors and adoption rates of customers who have electric vehicles and are on time of use pricing.

Q. What is your recommendation for the Commission?

A. The Company recommends that the Commission approve the Company's plans for its EV TOU Pilot along with its proposed Schedule 2E, effective July 1, 2017.

Q. Does this conclude your direct testimony?

A. Yes.