Sophie Hayes (12546)
Western Resource Advocates
307 West 200 South, Ste 2000
Salt Lake City, Utah 84101
Telephone No. (801) 212-9419
Email: sophie.hayes@westernresources.org

Steven S. Michel
Western Resource Advocates
409 E. Palace Avenue, Unit 2
Santa Fe NM 87501
Telephone No. (505) 820-1590
Email: smichel@westernresources.org

Attorneys for Western Resource Advocates

BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH

In the Matter of the Application of Rocky Mountain Power for Authority to Increase its Retail Electric Utility Service Rates in Utah and for Approval of its Proposed Electric Service Schedules and Electric Service Regulations	Docket No. 20-035-04

PREFILED DIRECT TESTIMONY OF

AARON J. KRESSIG

ON BEHALF OF

WESTERN RESOURCE ADVOCATES

September 15th, 2020

I. INTRODUCTION AND SUMMARY

Q: Please state your name, employer, position and business address.

A: My name is Aaron J. Kressig. I am employed by Western Resource Advocates ("WRA") in its Clean Energy Program as the Transportation Electrification Manager. My business address is 2260 Baseline Road, Suite 200, Boulder, Colorado 80302.

Q: Please describe WRA.

A: WRA is a nonprofit conservation organization dedicated to protecting the land, air and water of the West. WRA's Clean Energy Program develops and implements policies to reduce the environmental impacts of the electric power industry in the Interior West by advocating for a western electric system that provides affordable and reliable energy, reduces economic risks, and protects the environment through the expanded use of energy efficiency, renewable energy resources, and other clean energy technologies. WRA also advocates for policies which support beneficial electrification of the transportation sector in order to reduce carbon emissions, improve local air quality, and drive net economic benefits associated with electric transportation. WRA has offices in Salt Lake City, Utah; Boulder and Denver, Colorado; Carson City, Nevada; Phoenix, Arizona; and Santa Fe, New Mexico.

Q: Please describe your current duties, work experience, and educational background.

A: I lead WRA's efforts to promote policies and regulations which support the widespread adoption of electric vehicles in an effort to rapidly decarbonize the transportation sector in the inter-mountain West. My work focuses on policy analysis, legislative development, and regulatory support that is focused on state utility commissions, legislatures and other

regulatory agencies in Utah, Colorado, New Mexico, Arizona, Nevada and Wyoming. Before joining WRA in 2019, I worked at the World Resources Institute ("WRI") in Washington D.C. where I helped lead product development and power sector research for WRI's Climate and Energy programs. My research in that role included power sector forecasting, transmission and distribution planning, and development of tools to analyze renewable energy cost effectiveness. My educational background includes a Bachelor of Arts degree in Physical and Environmental Geography from the University of Missouri and a Master of Arts degree in Global Environmental Policy from American University. My master's focus was U.S. state level electricity policy and regulation. A more detailed description of my qualifications is listed as WRA Exhibit__(AJK-1).

Q: Have you previously testified before the Public Service Commission of Utah ("Commission")?

A: No.

Q: Have you previously testified before any utility commissions in other states?

A: Yes. I have testified before the Colorado Public Utilities Commission in proceedings related to line extension policy, rate cases, energy storage projects, distribution system planning, and applications for electric vehicle programs.

Q: On whose behalf are you testifying today?

A: I'm testifying on behalf of WRA.

Q: What is the purpose of your testimony?

A: My testimony is limited to addressing PacifiCorp's proposal to re-design Schedule 6A while discontinuing service for the current 6A schedule.

Q: What is PacifiCorp requesting in this proceeding?

A: As part of "Phase II" in the general rate case, PacifiCorp presented its functionalized cost of service study for the rate case test period and proposed rate spread and rate design changes for its major rate schedules, including for residential, general service, and lighting customers. My testimony is limited to responding to PacifiCorp's proposal to change its Schedule 6A rate design for general service customers.

Schedule 6A is a "time of use" (TOU) rate option available to non-residential (general service) customers with load less than one megawatt (MW). A customer on Schedule 6A can save money, relative to Schedule 6, if they shift their usage to off-peak times. Customers with low load factors can also save money on Schedule 6A because the charges applied to each kW of demand are lower than on Schedule 6.[1]

In this case, the Company has proposed re-designing 6A rates to recover kilowatt (kW) based charges in a new way. Specifically, the Company has proposed a declining kWh per kW energy charge. The first 50 kWh for each kW of demand will be charged a higher rate than additional kWh per kW. According to the Robert Meredith, this structure "allows the Company to charge customers an average energy price that declines as load factor increases, much like demand charges do, but puts a cap on how high that average cost can be for low load factor customers."[2]

The Company states that the benefit of this proposed restructuring is for "types of processes with sporadic loads, such as direct current electric vehicle fast charging and arc

[1] Direct Testimony of Robert Meredith, lines 778-82.
[2] Direct Testimony of Robert Meredith, lines 790-92.

welding,"[3] because these types of customers are often faced with demand charges which take up a high proportion of their total bill. The Company further states that customers on the proposed rate "will effectively have the combined effect of their average demand and energy charges capped," and that this is appropriate because "limiting the very high average price paid by low load factor customers is in recognition that coincidence with peak declines with load factor."[4]

Q: Please summarize your testimony.

A: My testimony addresses the impacts of rate design on commercial electric vehicle ("EV") charging in general, and focuses on PacifiCorp's existing and proposed time-varying Schedule 6A rate options for the purposes of commercial EV charging. First, I describe the environmental and economic benefits which can result from widespread EV adoption and highlight the demonstrated interest of the Utah legislature in supporting the robust rollout of public charging stations to support EV adoption. Next, I highlight the importance of commercial EV rate design in supporting the proliferation of public and fleet charging stations, the challenges traditional commercial rate design poses for these customers, and the importance of low-load factor charging stations in supporting higher levels of EV adoption. Then, I analyze the impact of the current and proposed optional schedule 6A rates in the context of their suitability for electric vehicle charging stations, recommending the Commission keep optionality in rate design in order to support this burgeoning industry and meet Utah's legislative objectives. Finally, I discuss the benefits and best practices of dedicated commercial EV rates and recommend the Commission

[3] Direct Testimony of Robert Meredith, lines 795-96.
[4] Direct Testimony of Robert Meredith, lines 822-26.

require PacifiCorp to bring forth a specific commercial EV rate design by no later than January 1st, 2023.

Q: Please summarize your recommendations for the Commission.

A: I recommend the Commission:

- Approve and rename the proposed Schedule 6A (e.g. 6C), but also keep the existing Schedule 6A rate.
- Include special conditions in Schedule 6 rate tariffs to avoid excessive rate switching.
- Require PacifiCorp to bring forth an EV-specific commercial rate by no later than January 1st, 2023.
- Require PacifiCorp to consult with stakeholders on the development of its commercial EV rate design prior to filing it before the Commission.

II. DISCUSSION

The Challenges and Importance of Commercial Electric Vehicle Rate Design

Q: Please explain WRA's interest in supporting the adoption of electric vehicles.

A: As described in my introduction, WRA is a conservation organization that advocates for beneficial electrification; that is, replacing the direct use of fossil fuels with electricity in order to create environmental and economic benefits. Electrifying the transportation sector is a critical strategy to improving Utah's air quality, particularly along the Wasatch Front, and reducing its impact on climate change.

Electric vehicles offer substantial emissions benefits compared to traditional gasoline powered vehicles, both in terms of greenhouse gases and pollutants which drive local air pollution.[5] In 2018, an electric vehicle charged in Utah got an equivalent of 102 miles per gallon,[6] while a gasoline powered vehicle averaged just 22.3 miles per gallon in the U.S. in 2017.[7] Due to the much higher efficiency of EVs when compared to gasoline powered vehicles, widespread adoption of EVs has been widely identified as a critical strategy toward reducing the transportation sector's greenhouse gas emissions.

EVs are also essential to addressing Utah's persistent air quality challenges. A 2014 report from Envision Utah found that 57% of local emissions come from the transportation sector, and that "it is likely that no other single feasible strategy would have a greater impact on our air quality" than reducing transportation sector emissions.[8] Electric vehicles offer tremendous air quality benefits compared to gasoline powered ones, particularly in urban areas along the Wasatch Front where air quality concerns are the highest. Even when a portion of the power used to charge EVs comes from coal generation, there are substantial ozone benefits from switching from gasoline powered vehicles to electric ones.[9] And as Utah's electricity mix shifts away from coal toward

[5] Jordan L. Schnell et al., *Air Quality Impacts from the Electrification of Light-Duty Passenger Vehicles in the United States*, 208 Atmospheric Environment 95-102 (2020), *available at* https://www.sciencedirect.com/science/article/abs/pii/S1352231019302183.
[6] David Reichmuth, *Are Electric Vehicles Really Better for the Climate? Yes. Here's Why*, Union of Concerned Scientists Blog (Feb. 11, 2020, 2:08 PM), https://blog.ucsusa.org/dave-reichmuth/are-electric-vehicles-really-better-for-the-climate-yes-heres-why.
[7] BUREAU OF TRANSPORTATION STATISTICS, AVERAGE FUEL EFFICIENCY OF U.S. LIGHT DUTY VEHICLES, https://www.bts.gov/content/average-fuel-efficiency-us-light-duty-vehicles.
[8] ENVISION UTAH, HOW WE GROW MATTERS 3 (2014), https://gardner.utah.edu/wp-content/uploads/EU-Air-Quality-Action-Team-Recommendations.pdf.
[9] NORTHWESTERN UNIVERSITY, ELECTRIC VEHICLE ADOPTION IMPROVES AIR QUALITY AND CLIMATE OUTLOOK: OZONE POLLUTION REDUCED EVEN WHEN ELECTRICITY IS PRODUCED BY COMBUSTION SOURCES (April 12, 2019), *available at* www.sciencedaily.com/releases/2019/04/190412122912.htm.

renewable energy, the electricity used to power EVs will grow cleaner, increasing the air quality and climate benefits.

Not only do electric vehicles offer tremendous environmental benefits, but they also offer economic benefits for Utahns. EVs offer substantial fueling and maintenance cost reductions for those that chose to purchase them,[10] and *efficient* charging of electric vehicles will put downward pressure on utility electric rates, to the benefit of all utility ratepayers.[11]

Q: Is there policy support for transportation electrification in Utah?

A: Yes, there is significant policy support in Utah for transportation electrification. In 2020, the Utah legislature passed two bills to facilitate widespread deployment of EV charging infrastructure throughout the state, in the interest of promoting increased electric vehicle adoption. H.B. 259, Electric Vehicle Charging Network (now codified in the Utah Code at Section 72-1-215(2)), requires the Utah Department of Transportation, in consultation with other state agencies and private entities to develop a "statewide electric vehicle charging network plan" that includes the following:

> [S]trategies to ensure that electric vehicle charging stations are available: (a) at strategic locations as determined by the department by June 30, 2021; (b) at incremental distances no greater than every 50 miles along the state's interstate highway system by December 31, 2025; and (c) along other major highways within the state as the department finds appropriate.[12]

10 "ENERGY SAGE, DO ELECTRIC CARS SAVE MONEY?, https://www.energysage.com/electric-vehicles/advantages-of-evs/do-electric-cars-save-money/ (last visited Sep. 14, 2020).
11 JASON FROST, MELISSA WHITED, AND AVI ALLISON, ELECTRIC VEHICLES ARE DRIVING ELECTRIC RATES DOWN (Synapse Energy Economics, February 2019), *available at* https://www.synapse-energy.com/sites/default/files/EVs-Driving-Rates-Down-8-122.pdf.
12 U.C.A. Section 72-1-215(2).

HB 396, Electric Vehicle Charging Infrastructure Amendments (codified at Utah Code Section 54-4-41), directs the Public Service Commission to authorize an electric vehicle charging infrastructure program that includes a transportation plan that promotes "the deployment of utility-owned vehicle charging infrastructure in the public interest" and "the availability of utility vehicle charging service."[13] The Utah legislature acknowledged the environmental and economic benefits from a utility's engagement in transportation electrification – specifically to "reduce transportation sector emissions" and provide the "utility's customers significant benefits that may include revenue from utility vehicle charging service that offsets the large-scale electric utility's costs and expenses."[14]

The public interest standard under this statute requires the Commission to evaluate, among other things, whether the program "enables the significant deployment of infrastructure that supports electric vehicle battery charging service and utility-owned vehicle charging infrastructure in a manner reasonably expected to increase electric vehicle adoption."[15]

Additionally, *The Utah Roadmap* – prepared by the Kem C. Gardner Policy Institute at the request of the Utah legislature – identified electric vehicles as a near term priority for improving air quality and addressing causes and impacts of a changing climate. Milepost

[13] U.C.A. Section 54-4-41.
[14] U.C.A. Section 54-4-41(7).
[15] U.C.A. Section 54-4-41(4).

Five from the report recommends that Utah position itself as "the market-based EV state."[16]

The legislature's recognition of the environmental and economic benefits of EVs and the passage of these bills indicates their support for the buildout of EV charging stations and widespread EV adoption.

Q: If the legislature has already directed PacifiCorp to develop a robust network of public charging stations, why is addressing rate design in this rate case important?

Although electric vehicles offer tremendous environmental and economic benefits relative to gasoline-powered vehicles, they still face barriers to widespread adoption. Utah's decision to legislatively require the expansion of publicly available charging stations is an important step, but rate design challenges continue to threaten the economic viability of charging stations. Indeed, one of the most critical steps toward unlocking the benefits of EVs is through thoughtful rate design, which can drive greater EV adoption while simultaneously ensuring that charging occurs in hours when grid capacity is underutilized. WRA is providing testimony in this case to advocate for the development of commercial electric rates, which can reduce barriers to EV adoption while ensuring charging is done in a way that benefits all utility ratepayers, and ensure a more rapid and equitable adoption of electric vehicles in Utah.

[16] KEM C. GARDNER POLICY INSTITUTE, THE UTAH ROADMAP: POSITIVE SOLUTIONS ON CLIMATE AND AIR QUALITY (2020), *available at* https://gardner.utah.edu/utahroadmap/.

Q: Why is rate design such an important factor for public charging stations to be economically viable?

A: Public and commercial EV charging presents a unique demand on electricity systems. There are several unique characteristics of EV charging as an electric load: it is intermittent, with brief periods of very high usage, and it is also flexible. Direct Current Fast Charging ("DCFC") stations operate at a high capacity—ranging from 50 kw to up to 350 kw, with newer stations increasingly taking higher capacities in an attempt to reduce charging times and enhance driver experience.[17] Although DCFC stations use high volumes of electricity when they are being utilized, their load factors today tend to remain quite low, despite a trend of increasing utilization as EV adoption expands across the country.

Finally, public and commercial charging has the potential to be a flexible load. This is particularly true for commercial EV fleets, or EV fleets used for business, which typically have long periods of time when they are not driving and can recharge. If rate design provides sufficient price signals to allow for lower cost, off-peak charging, then fleet operators are likely to make the necessary adjustments to concentrate charging at those times and reap the cost savings.[18] Public charging also has the potential to be flexible if rates are designed to pass on price signals to drivers: charging customers can learn to avoid using public charging during on-peak periods because of higher costs. These

[17] EV SAFE CHARGE, DC FAST CHARGING EXPLAINED, https://evsafecharge.com/dc-fast-charging-explained/ (last visited Sep. 14, 2020).
[18] CERES, CALIFORNIA TRUCKING ASSOCIATION, AND NAVIGANT, THE ROAD TO FLEET ELECTRIFICATION (2020), *available at* https://www.ceres.org/sites/default/files/reports/2020-05/The%20Road%20to%20Fleet%20Electrification.pdf.

unique characteristics of EV charging stations create both opportunities and challenges in designing rates which encourage efficient use of the utility's electric system while not being overly burdensome on EV charging customers.

Traditional commercial rate designs were not developed with the unique characteristics of EV charging in mind, and these rates penalize charging stations' usage patterns rather than taking advantage of their inherent flexibility. The problem is particularly acute for DCFC stations, which are "a unique use-case characterized today by relatively high-power capacity and low-energy utilization" which leads to a situation where "demand charges often can far exceed the cost for energy usage."[19] Under a traditional commercial rate design, this leads to demand charges taking up large portions of a charging station owner's electricity bill. With low EV market penetration and current public fast charging rates, demand charges can constitute up to 90% of electricity costs for some charging stations.[20] This is particularly true for low-load factor charging stations, which are critical to supporting the burgeoning EV market. Rate designs with traditional demand charges can thus be a significant barrier to accomplishing the Utah legislature's goals of increasing access to public fast charging across the state as they decrease the economic viability of charging stations.

[19] GREAT PLAINS INSTITUTE, ANALYTICAL WHITE PAPER: OVERCOMING BARRIERS TO EXPANDING FAST CHARGING INFRASTRUCTURE IN THE MIDCONTINENT REGION (July 2019), *available at* https://scripts.betterenergy.org/reports/GPI_DCFC_Analysis_July_2019.pdf.
[20] Chris Nelder, *Rate Design Best Practices for Public Electric-Vehicle Chargers* (Rocky Mountain Institute Blog, April 2017), https://rmi.org/rate-design-best-practices-public-electric-vehicle-chargers/.

Q: Why are low-load factor charging stations critical to supporting the EV market?

A: EV charging stations with low load factors are critical for two primary reasons. Firstly, most stations tend to start off with a low-load factor, which then grows over time. Load factor increases as customers become aware of the new stations and as electric vehicle adoption increases and more public charging is needed. Secondly, some stations located in remote areas may never see their load factor greatly increase, even though they are essential to allowing for long distance travel in an EV. Concern about the lack of access to public charging stations, or "range anxiety," is often cited as the number one perceived barrier to electric vehicle adoption.[21] Thus, although charging stations in remote areas may not ever reach high load factors, they are essential to assuring Utahns that an EV can meet all of their transportation needs.

Q: Are you suggesting subsidies for low-load factor EV charging stations?

A: No. While some utilities have created "demand charge holidays", or temporary freezes to demand charges at EV charging stations, this is not what I am suggesting. Such arrangements are temporary fixes to persistent challenges in EV rate design, and do not follow best practices in rate design.

This is not a matter of subsidies; rates should be developed to reflect actual system costs imposed by EV charging, but also to take advantage of these customers' inherent flexibility. The truth is that demand charges are not only overly-penalizing to EV charging, but they are also not very reflective of the actual costs imposed by charging

[21] *See, e.g.*, COLORADO ENERGY OFFICE, ELECTRIC VEHICLE CONSUMER JOURNEY MAPPING AND ROADMAP WORKSHOP (June 2020) (this report from ESource commissioned by the Colorado Energy Office cited range anxiety as the number one perceived barrier non-EV drivers have which discourages them from purchasing an EV).

stations to the utility system. PacifiCorp notes that even though "demand or capacity is an important and significant cost driver," when load factor "is very low, it is less likely that the customer's peak demand will coincide with the same time that the Company's system peaks."[22] Indeed, for customers with a low load factor, demand charges are a blunt tool for assessing usage during utility system peaks.

Time-differentiated rates, with a sufficient price variance between on-peak and off-peak costs, can be more effective at encouraging energy consumption in off-peak periods without overly penalizing station hosts with high demand charges.

Keeping Optionality in Schedule 6 Will Better Support the Nascent Commercial Electric Vehicle Charging Market

Q: Please briefly summarize PacifiCorp's proposal to adjust its Schedule 6 rate offerings.

A: PacifiCorp proposes to eliminate its existing 6A rate design and replace it with a new 6A rate design. For consistency's sake, I will refer to the current rate as the "existing 6A rate design" and the new proposal as the "proposed 6A rate design." PacifiCorp has also proposed to eliminate existing Schedule 6B. WRA has not taken a position on PacifiCorp's proposal to eliminate 6B.

[22] Direct Testimony of Robert Meredith, lines 801-09.

Q: What is the difference between the existing 6A rate design and the proposed 6A rate design?

A: As the Company states in the Direct Testimony of Robert Meredith, the ultimate impact to customers who would take service under the proposed 6A rate design would be to have "their average demand and energy charges capped."[23] The Company states the intent of the redesign is that "limiting the very high average price paid by low load factor customers is in recognition that coincidence with peak declines with load factor."[24]

Q: So, would PacifiCorp's proposed changes to schedule 6A benefit low-load factor EV charging stations?

A: Yes. The proposed changes to Schedule 6A would benefit charging stations with a load factor below 5%, with the benefits of this rate design being most apparent the lower the load factor.[25] Although the proposed rate would not shift entirely away from demand charges, the changes would limit the disproportionately high demand charges that very low load factor (e.g. rural and early stage) charging stations face.

Q: Does PacifiCorp's proposed 6A rate alleviate your concerns about rate offerings available to EV charging stations?

A: No, it does not. Although PacifiCorp's proposal will reduce costs for very low load factor customers, once load factors approach 5%, proposed 6A actually leads to a substantial increase in energy costs. The breakeven point in terms of load factor between the two

[23] Direct Testimony of Robert Meredith, lines 822-28.
[24] Direct Testimony of Robert Meredith, lines 822-28.
[25] WRA Exhibit__(AJK-2), Schedule 6 & 6A computations.

rates appears to be somewhere between 2.5% and 5%. While it is important to consider the impacts of demand charges on very low-load factor customers, the proposed schedule 6A is not an ideal solution for EV charging. For example, while the proposed 6A does reduce the average kWh rate 28% for customers with a load factor of 2.5% or less, by the time load factor reaches 5%, the proposed 6A rate is already 12.8% more expensive on an average kWh rate basis than the existing 6A. For customers with a load factor between 7.5% and 15% the proposed rate is more than 10% more expensive, and although costs between the existing and proposed 6A rates are closer as load factor exceeds 20%, the existing 6A rate remains the more attractive option on an average kWh rate basis.[26]

While it is true that some EV stations are at a load factor of 2.5% or below, I suspect many stations in Utah already have a load factor which makes the existing 6A rate more attractive than the proposed redesign. As EV adoption continues to grow in Utah, so too will utilization at public and fleet charging stations, and there will be more stations which will benefit more from the existing 6A design than the Company's proposed redesign.

See Table 1 below for a detailed comparison of the Company's current and proposed 6A rates. This table, which I have abbreviated from WRA Exhibit__(AJK-2), compares the average kWh rate under the current and proposed Schedule 6A rates at different load factors. As you can see, the proposed 6A rate design provides relief to very low load factor customers, but then quickly becomes more expensive than the existing rate when load factor approaches 5%. The full table is provided as WRA Exhibit__(AJK-2).

[26] WRA Exhibit__(AJK-2), Schedule 6 & 6A Computations.

Table 1: Comparison of Current and Proposed 6A at Different Load Factors

			Average kWh Rate			
			Schedule 6		Schedule 6A	
Load Factor	kW	kWh	Current	Proposed	Current	Proposed
2.5%	500	10,800	$ 0.813	$ 0.839	$ 0.381	$ 0.274
5.0%	500	21,600	$ 0.425	$ 0.438	$ 0.241	$ 0.272
7.5%	500	32,400	$ 0.296	$ 0.305	$ 0.194	$ 0.231
10.0%	500	43,200	$ 0.231	$ 0.238	$ 0.171	$ 0.198
15.0%	500	64,800	$ 0.166	$ 0.171	$ 0.148	$ 0.164
20.0%	500	86,400	$ 0.134	$ 0.138	$ 0.136	$ 0.147
25.0%	500	108,000	$ 0.114	$ 0.118	$ 0.129	$ 0.137
30.0%	500	129,600	$ 0.101	$ 0.105	$ 0.124	$ 0.130

Q: What do you estimate the average load factor of EV charging stations in Utah is?

A: I do not have direct access to such data[27] because most EV charging companies do not share this type of data for proprietary reasons. Determining this information is difficult, not only because there is not data directly available for Utah, but because this type of information quickly goes out of date. For example, in August 2017 there were 677,080

[27] PacifiCorp provided WRA with data on the load factors of customers on the existing 6A rate. However, this data did not differentiate EV charging stations from non-EV charging customers so it was not appropriate data to support a discussion specifically on the load factors of public charging stations.

EVs in the US, and just three years later in August 2020, there were 1,545,321 EVs.[28] As the number of electric vehicles rapidly increases, so too will utilization at public charging stations. So, when trying to understand electric vehicle charging station load factor, it's important to look at the most recently available data.

A July 2020 report from Xcel Energy in Colorado provides a useful estimate of the range of load factors at public fast charging stations. In June 2020, EV charging stations participating in Xcel Energy's dedicated commercial EV rate had an average load factor of 9%, with load factors at individual stations ranging from 2% to 16%.[29] Half of customers on the commercial EV rate had load factors under 5%, and half had load factors exceeding 5%.[30] Even though EV adoption is higher in Colorado than it is in Utah, this data indicates that load factors at many charging stations is already exceeding 5%, and that as Utah continues to see greater adoption of EVs, more and more customers will be at or above a 5% load factor, where the current 6A rate is more economically viable than the proposed 6A rate.

Q: If this is true, then what are you recommending?

A: I recommend the Commission approve the proposed 6A, but retitle it something else, like 6C.[31] Additionally, WRA is proposing the Company continue to offer the existing 6A rate.

[28] ATLAS EV HUB, NATIONAL EV MARKET DASHBOARD (last visited Sep. 14, 2020, https://www.atlasevhub.com/materials/national-ev-sales/.
[29] Xcel Energy Colorado Proceeding 19AL-0290E, *Secondary Voltage Time-Of-Use Electric Vehicle Service Report #1* (July 31st 2020).
[30] *Id.*
[31] WRA notes that PacifiCorp proposes to eliminate the existing 6B rate option. If the Commission approves of this decision the "proposed 6A rate" could be retitled "6B."

Q: Why does WRA recommend keeping the existing 6A rate?

A: As I have previously mentioned, the proposed 6A is better for very low-load factor customers, while the existing 6A is actually better for customers whose load factor is approximately 5% or higher. While it is important to ensure good rate designs are available for early stage and remote charging stations, it is also unfair to shift more mature charging station customers to a new rate which decreases their profitability, right as they are likely beginning to see their utilization increase. These more mature charging stations likely endured a period of unprofitability when they had lower utilization and faced excessive demand charges. Given this, we should not now penalize these stations by shifting them to a new rate which decreases their profitability compared to the rate they have already been participating on.

Q: Why do you think keeping optionality in rate design is important for PacifiCorp in this instance?

A: As I have mentioned, rate design is critically important for the deployment of EV charging stations. EV stations, in turn, are essential to ensure rapid deployment of electric vehicles. Thus, rate design is essential to support Utah's goals of rapidly accelerating the adoption of EVs. Yet neither PacifiCorp's proposed or existing Schedule 6A rates are ideal for all EV charging circumstances, as there is a notable divide in the suitability of the current and proposed Schedule 6A rates depending on load factor. The effectiveness of a given rate design for a given charging station is determined by a number of variables, such as different load factors, different charging capacity, and the controllability of the charging load. Keeping optionality available between PacifiCorp's existing and proposed

Schedule 6A rates would ensure there is a wider range of available rates to fit the diverse needs of different charging applications.

Q: How do you avoid excessive rate switching between the different schedule 6 rate designs?

A: Several of PacifiCorp's optional tariffs have "special conditions," which lay out additional requirements related to participation in a given rate schedule. For example, Schedule 2, an optional time of use rate for residential customers, has the following special condition: "Customer on this tariff schedule shall have a term of not less than one year. Service will continue under this schedule until Customer notifies the Company to discontinue service."[32] Schedule 2E has the same provision.[33] I would suggest that in order to avoid excessive rate switching between different schedule 6 rates, the Commission require a similar "special conditions" provision to be included in the existing and proposed 6A schedules.

Q: If PacifiCorp were to implement all of your recommendations, do you think there would be sufficient rate designs available for EV charging stations for the foreseeable future?

A: No, I don't. I think the rate designs PacifiCorp has available, in addition to the proposed 6A, are not ideal for commercial EV charging. They may be sufficient for the time being,

[32] PacifiCorp Electric Service Schedule No. 2, *available at* https://www.rockymountainpower.net/content/dam/pcorp/documents/en/rockymountainpower/rates-regulation/utah/rates/002_Residential_Service_Optional_Time_of_Day_Rider_Experimental.pdf
[33] PacifiCorp Electric Service Schedule No. 2E, *available at* https://www.rockymountainpower.net/content/dam/pcorp/documents/en/rockymountainpower/rates-regulation/utah/rates/002E_Residential_Service_Electric_Vehicle_Time_of_Use_Pilot_Option_Temporary.pdf

but the Public Service Commission should follow suit of commissions around the country who are requiring utilities to propose EV-specific commercial rates. Recent research based upon observation of commercial EV rates implemented around the country is beginning to reach similar conclusions about the benefits of commercial EV rate design and best practices when constructing these rates.[34] I would argue that PacifiCorp's existing and proposed Schedule 6A rates, while better than the Schedule 6 rate, do not fully meet many of the best practices in EV rate design.

Best Practices in EV Rate Design and Recommendations for Commercial EV Rates

Q: What are you recommending in this section of your testimony?

A: In this final section of my testimony, I recommend the Commission require PacifiCorp to bring forth an EV-specific rate design by January 1st, 2023. I also discuss the reasons why commercial rate designs for EVs are important, and best practices emerging from across the country.

Q: Why do you recommend PacifiCorp bring forth a commercial rate design explicitly for EVs by no later than January 1st, 2023?

A: Commercial electric rates specifically dedicated to EV charging service have the potential to reduce barriers to electric vehicle adoption, while still being cost-based and charging users for the price of the energy they are consuming. While allowing for

[34] *See, e.g.*, CARL LINVILL, RATE DESIGN TO MAXIMIZE GRID BENEFITS: SMART EV RATE DESIGN IS SMART RATE DESIGN (CPUC ZEV Rate Design Forum, Regulatory Assistance Project, June 7, 2018), available at https://www.raponline.org/wp-content/uploads/2018/06/rap_linvill_cpuc_zev_rate_design_2018_june_7.pdf; Chris Nelder, *Rate Design Best Practices for Public Electric-Vehicle Chargers* (Rocky Mountain Institute Blog, April 2017), https://rmi.org/rate-design-best-practices-public-electric-vehicle-chargers/; and SYNAPSE ENERGY ECONOMICS, BEST PRACTICES IN ELECTRIC VEHICLE RATE DESIGN, https://www.synapse-energy.com/project/best-practices-electric-vehicle-rate-design (last visited Sep. 14, 2020).

proposed 6A and existing 6A to exist together would allow optionality in the short term and offer some cost savings compared to Schedule 6, neither of these rate designs shifts sufficiently away from demand charges. This leads to a rate that penalizes low-usage customers, while not necessarily ensuring that their load is managed to avoid the Company's system peaks. My recommendation gives the Company sufficient time to confer internally, study best practices in, and seek feedback on existing rate design elsewhere to inform the development of an effective, cost-based commercial EV rate.

Q: What would you identify as best practices in Commercial EV rate design?

A: Since EV charging stations began being installed across the country, researchers, advocates, and rate design experts have identified the barriers that traditional commercial EV rate design poses for the viability of electric vehicle charging stations. Subsequently, a body of literature is quickly forming on the subject, supported by a growing body of data from rates which have been implemented in various parts of the country.[35]

Building off this growing body of literature, here are the five principles of commercial EV rate design I would propose PacifiCorp follow in any future EV dedicated Commercial rate:

1. Rates should promote efficient use of fixed system resources, which should lead to reduced costs for all utility customers.
2. Rates should be easy to understand and charges should be predictable.

[35] *See*, *supra*, note 34.

3. When the effectiveness of a rate is dependent on customers shifting usage into lower cost hours, EV drivers should see those price signals. Otherwise, there is little reason to think the rate will be effective at shifting load into lower-cost periods.
4. Rates should be designed with specific end-users and use cases in mind. Commercial EV charging customers are not monolithic; for example, commercial fleet charging has a different charging pattern than a public fast charging station.
5. Demand charges should be avoided as much as possible, particularly demand charges that are based on load that does not coincide with peak demand.

Q: What is an example of rate that would meet all of these principles you have laid out?

A great example of a rate which meets all these principles is a time-differentiated rate in which demand charges are eliminated entirely and costs of service are recovered through increased volumetric energy charges, and station hosts pass those charges on to EV drivers. In such a rate design, price signals are easy to understand, costs are fully recovered, and prices can be easily passed on to drivers; all of which provide sufficient incentive for EV charging to shift into off-peak periods when grid capacity can be used more efficiently. This type of rate structure would be ideal for both fleet charging and public fast charging stations.

Q: Do you have any final recommendations for the Commission?

A: Yes. I recommend that PacifiCorp hold at least two stakeholder meetings to gather feedback on the development of its Commercial EV rate prior to bringing its proposal to the Commission no later than January 1st, 2023. This will ensure that a wide array of

parties will be able to provide input and feedback on the proposed Commercial EV rate and hopefully increase buy-in from key stakeholders before the Company's filing.

III. RECOMMENDATIONS

Q: Please reiterate your recommendations to the Public Service Commission.

A: For all of the reasons discussed in my testimony, I make the following recommendations to the Commission:

- Approve PacifiCorp's proposed Schedule 6A, but rename it, and keep the existing Schedule 6A.
- Include special provisions in the Schedule 6 rates to ensure excessive rate switching is avoided.
- Require PacifiCorp to propose a commercial rate design specifically for EV customers, no later than January 1st, 2023.
- Require PacifiCorp to hold at least two stakeholder meetings to gather input and solicit feedback on the Commercial EV rate before filing the rate with the Commission.

Q: Does this conclude your testimony?

A: Yes, it does.