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BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH

In the Matter of the Application of Rocky Mountain Power for Approval of a Significant Energy Resource Decision and Request to Construct Wind Resource and Transmission Facilities

DOCKET NO. 17-035-40

DIRECT TESTIMONY OF KATE BOWMAN

ON BEHALF OF

UTAH CLEAN ENERGY

DATED this 5th day of December, 2017

Sophie Hayes
Attorney for Utah Clean Energy

Q. What is the purpose of your testimony?

A. As Utah Clean Energy's policy witness, I outline factors the Commission should consider related to PacifiCorp's application for approval of new wind resources and make recommendations based thereon.

Q. Could you please summarize your testimony?

A. Utah Clean Energy is supportive of PacifiCorp's investment in new Wyoming wind resources because the projects represent a step toward a cleaner, more renewable grid. It is Utah Clean Energy's position that it is in the best interest of ratepayers to transition PacifiCorp's resource mix to carbon-free renewable resources as quickly and as economically as possible, and PacifiCorp's proposed wind projects will help facilitate that transition. Utah Clean Energy has significant concerns about the development of the 2017 IRP, which resulted in the selection of the proposed Wyoming wind resources as a part of the preferred portfolio;¹ nonetheless, we believe PacifiCorp's application represents an opportunity to acquire economic renewable resources that will benefit Utah ratepayers. As part any order in this proceeding, Utah Clean Energy recommends that the Commission require the Company to evaluate economic retirements of its existing coal fleet and demonstrate that carbon emissions will decrease as a result of this investment. Utah Clean Energy has not taken a position on the Company's application for approval of the proposed transmission assets. I will review the testimony of other parties on this matter and may have additional comments on this subject thereafter.

¹ See Utah Clean Energy's initial comments in Docket No. 17-025-16, In the Matter of PacifiCorp's 2017 Integrated Resource Plan.

Q. What is Utah Clean Energy’s primary interest in this docket?

A. Utah Clean Energy’s primary interest in this docket is the electricity industry’s impact on climate change. Scientific consensus points to a need for a rapid reduction in carbon dioxide (CO₂) emissions, including a quicker transition to carbon-free renewable resources in the electricity sector.

Q. Are there regulations requiring the Company to reduce carbon emissions?

A. Not currently in Utah. The Clean Power Plan is in limbo while the Environmental Protection Agency formulates a formal plan for its repeal or replacement. There will likely be legal challenges to follow the EPA’s determination.

Q. Are there other reasons the Company should be reducing carbon emissions?

A. Yes. Regardless of the state of the Clean Power Plan, the science of climate change is clear that it is necessary to make significant reductions in carbon emissions in order to mitigate and adapt to inevitable impacts. Taking advantage of economic opportunities for carbon-free renewable resources benefits ratepayers and reduces risk over the long term by providing fossil fuel-free alternatives for generating electricity in the near term.

Q. Please describe conclusions from current analysis of climate change and its associated impacts.

A. The Climate Science Special Report (CSSR), the first of two volumes in the Fourth National Climate Assessment, was just released in November, 2017.² I’ve attached it to my testimony as Exhibit UCE 1—KB.

² The National Oceanic and Atmospheric Administration (NOAA) oversees the preparation of the Fourth National Climate Assessment (NCA4). The Climate Science Special Report (CSSR) is an assessment of the science of climate change and is designed to inform assessment of climate-related risks and decision-making about responses. The CSSR is overseen by a Steering Committee composed of representatives from NOAA, the National Aeronautics and Space Administration (NASA), and the Department of Energy (DOE), the US Global Change Research Program

The CSSR concludes that, “[I]t is extremely likely [95-100% likelihood] that human activities, especially emissions of greenhouse gases, are the dominant cause of the observed warming since the mid-20th century. For the warming over the last century, there is no convincing alternative explanation supported by the extent of the observational evidence.”³

The Report describes both documented and anticipated changes to the climate in response to human activities, including the following:

- Sixteen of the warmest years on record have occurred in the last 17 years.⁴
- Heatwaves have become more frequent in the United States, and recent record-setting hot years are projected to become common in the near future.⁵
- Annual average temperature in the contiguous United States has increased by 1.8°F (1.0°C) since 1901, and over the next few decades (2021–2050), annual average temperatures are expected to rise by about 2.5°F relative to the recent past.⁶
- The occurrence of large forest fires in the western United States has increased and is projected to further increase.⁷
- Trends of earlier spring melt and reduced snowpack are already affecting water resources in the western United States. Under higher CO₂ emissions scenario and without changes to current water resource management, long-duration droughts are more likely before the end of the century.⁸

(USGCRP), and three Coordinating Lead Authors. More information is available at:
<https://science2017.globalchange.gov/chapter/front-matter-about/>

The 36 page Executive Summary is attached as Exhibit A and is also available at:
https://science2017.globalchange.gov/downloads/CSSR2017_PRINT_Executive_Summary.pdf

³ USGCRP, 2017: Climate Science Special Report: Fourth National Climate Assessment, Volume I [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 470 pp, doi: 10.7930/J0J964J6. <https://science2017.globalchange.gov/>
See Executive Summary P3.

“Extremely likely” is defined as having a 95-100% likelihood. See Executive Summary P

⁴ Climate Science Special Report: Fourth National Climate Assessment, Volume I. Executive Summary, P4.

⁵ *Ibid.* P2.

⁶ *Ibid.* P2

⁷ *Ibid.* P2

⁸ *Ibid.* P2

- “The global atmospheric carbon dioxide (CO₂) concentration has now passed 400 parts per million (ppm), *a level that last occurred about 3 million years ago* [emphasis added], when both global average temperature and sea level were significantly higher than today. Continued growth in CO₂ emissions over this century and beyond would lead to an atmospheric concentration not experienced in tens to hundreds of millions of years.”⁹

The conclusions from the CSSR are clear, noting “[T]here is broad consensus that the further and the faster the Earth system is pushed towards warming, the greater the risk of unanticipated changes and impacts, some of which are potentially large and irreversible.”¹⁰ The CSSR states that major emissions reductions are necessary to avoid the worst impacts of climate change. In order to limit global annual average temperature rise to 3.6°F (2°C) or less, compared to preindustrial levels, net global carbon dioxide emissions will need to be reduced substantially by 2040, and become zero or negative later in the century.¹¹ In order to have a two-thirds chance of limiting warming to 2°C, future global CO₂ emissions must remain below 230 gigatons. Without significant reductions in CO₂ emissions, we will exceed this threshold in *approximately 20 years* [emphasis added].¹²

To quote the CSSR, “choices made today will determine the magnitude of climate change risks beyond the next few decades.”¹³

⁹ *Ibid.* P2

¹⁰ *Ibid.* P2

¹¹ *Ibid.* P22

¹² *Ibid.* P22-23. This projection assumes global emissions greater than or equal to the RCP4.5 scenario, which is the second lowest of four CO₂ emissions scenarios included in the CSSR. See P7 for additional information about scenarios used in the CSSR.

¹³ *Ibid.* P22

Immediate action is necessary to avoid the most severe impacts of climate change and a more costly future. For this reason, investments in economic renewable resources today are prudent to ensure an affordable transition for ratepayers. PacifiCorp's proposed investment in wind should not eclipse the Company's continued reliance on fossil fuel resources. According to Company witness Daniel MacNeil in another docket, "Even with the 2021 Wyoming wind resources, coal generation represents roughly half of the Company's retail load over the next 10 years, while natural gas generation represents roughly 20 percent."¹⁴ This is not the portfolio of a company that is appropriately considering long-term risk, and PacifiCorp will need to do much more than invest in this wind project to effectively transition to carbon-free resources. Nonetheless, this investment in wind is a step in the right direction.

Q. What is the connection between climate change and electricity generation?

A. Electricity generation represents our greatest opportunity to avoid the worst impacts of climate change. The combustion of fossil fuels is the largest single source of CO₂ emissions in the US, accounting for about 35 percent of US CO₂ emissions.¹⁵ It is in the best interest of ratepayers for PacifiCorp to transition to carbon-free resources as quickly as possible to avoid higher costs in the future.

Although the U.S. and Utah do not currently have policies that require a reduction in carbon emissions, advancements in understanding the effects of climate change paint a clear picture of the real costs associated with continued reliance on fossil fuels. Climate

¹⁴ Docket No. 17-035-37, "In the Matter of Rocky Mountain Power's 2017 Avoided Cost Input Changes Quarterly Compliance Filing." Daniel MacNeil Rebuttal Testimony, lines 285 – 287.

¹⁵ U.S. Environmental Protection Agency, "Overview of Greenhouse Gas Emissions".
<https://www.epa.gov/ghgemissions/overview-greenhouse-gases#carbon-dioxide>.

change will result in higher temperatures, more severe heat events, and increased forest fires in the western United States, which will certainly impact PacifiCorp's ability to provide reliable and affordable electricity. Significant action is necessary in the next decade to limit the impacts of climate change, and the costs of both addressing climate change and dealing with its impacts will only rise the longer we wait.

Q. Please describe how climate change might impact electricity generation in Utah.

A. Recent assessments of the impacts of climate change, as described above, identify trends that will impact electricity generation. Rising temperatures are likely to increase the frequency and duration of peak load events that the utility must serve in the summer months. A rise in the incidence of forest fires could increase damage to infrastructure and resulting grid outages. Disruptions in seasonal water availability affects dispatch of hydro resources and thermal resources (which rely on water for cooling). Utah's Recommended State Water Strategy notes that "A warming climate poses serious challenges for Utah's water future and our ability to plan and prepare for that future."¹⁶ What's more, Utah may experience changes that are more severe than national trends. While the climactic trends themselves will impact electricity generation in Utah, increased variability and unpredictability will make long-term planning processes more difficult and subject to uncertainty.

The following is a summary of observed and projected changes in temperature, precipitation, and snowpack for Utah and the Southwest:

- Temperature:

¹⁶ Governor's Water Strategy Advisory Team, "Recommended State Water Strategy," July 2017.
http://www.envisionutah.org/images/FINAL_Recommended_State_Water_Strategy_7.14.17_5b15d.pdf. P 70

- In general, Utah’s climate has warmed at a rate of two to four times that of the global climate.¹⁷
- The frequency of heat waves (6-day periods with a maximum temperature above the 90th percentile) is projected to increase, particularly the Southwest.¹⁸
- Precipitation:
 - Reductions in snowfall and earlier snowmelt at altitudes high enough for snow could result in disruptions to western U.S. water delivery systems that are expected to lead to more frequent hydrological drought conditions.¹⁹
- Snowpack
 - A reduction in snow water equivalent of 18.9% by 2050 and 78.7% is projected by 2100 in the Uinta and Wasatch Ranges.²⁰
 - Assuming no change to water resource management practices, several important western U.S. snowpack reservoirs effectively disappear by 2100.²¹

Q. Will climate change impact Utahns in other ways?

A. Yes. The effects of climate change have varied and widespread consequences that will impact Utahns’ health and our economy.

- Ground Level Ozone –

Ground level ozone is an air pollutant that can cause permanent lung damage, in addition to shortness of breath, coughing, and sore throat.²² As temperatures rise, the number of bad ozone days is expected to increase, since heat accelerates the chemical reactions that cause ozone. Utah exceeded the EPA’s standard for ozone 22 times in summer and fall of 2017.²³

- Tourism and recreation –

¹⁷ *Ibid.* P70.

¹⁸ Climate Science Special Report: Fourth National Climate Assessment, Volume I., Chapter 6.

¹⁹ Climate Science Special Report: Fourth National Climate Assessment, Volume I., Chapter 8.

²⁰ *Ibid.*

²¹ *Ibid.* 8

²² U.S. Environmental Protection Agency, “Health Effects of Ozone Pollution.” <https://www.epa.gov/ozone-pollution/health-effects-ozone-pollution>.

²³ Utah Department of Environmental Quality, “Ozone: Dog Days of Summer Have Us All Panting for Cleaner Air.” September 11, 2017. <https://deq.utah.gov/news/ozone-summer-air>.

Projected decreases in snowpack will have severe economic consequences for Utah's tourism and recreation industries. A report commissioned by the Park City Foundation estimates that by 2030 a decrease in snowpack will result in \$120.0 million in lost output and 1,137 lost jobs. By 2050, these numbers rise to \$160.4 -\$392.3 million in lost output and 1,520 – 3,717 lost jobs.²⁴

- Agriculture –
Higher temperatures and droughts are likely to interfere with Utah's farms and cattle ranches, fires may impair livestock operations, and reduced water availability would create challenges for ranches and irrigated farms.²⁵

Q. Are financial institutions taking climate change risk seriously?

- A. Yes. On November 28, 2017, Moody's issued a press announcement describing how climate risk could impact local government credit ratings and the importance of taking steps to mitigate risk.

The release explains,

“Moody's analysts weigh the impact of climate risks with states and municipalities' preparedness and planning for these changes when we are analyzing credit ratings. Analysts for municipal issuers with higher exposure to climate risks will also focus on current and future mitigation steps and how these steps will impact the issuer's overall profile when assigning ratings.”²⁶

Q. Are there other (non-climate) benefits of transitioning PacifiCorp's resource mix to renewables?

- A. Yes. Renewable resources have no fuel costs, which allows ratepayers to avoid risk associated with uncertain fuel costs and fuel price volatility. Inverter-based renewable

²⁴ Stratus Consulting. “Climate Change in Park City: An Assessment of Climate, Snowpack, and Economic Impacts.” September 29, 2009. <http://www.parkcitygreen.org/Documents/2009-Climate-Change-in-Park-City-Report.aspx>. Page 6-2.

²⁵ U.S. Environmental Protection Agency, “What Climate Change Means for Utah,” August 2016.

<https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-ut.pdf>.

²⁶ Moody's Investor Service, “Climate change is forecast to heighten US exposure to economic loss placing short- and long-term credit pressure on US states and local governments.” November 28, 2017.

https://www.moodys.com/research/Moodys-Climate-change-is-forecast-to-heighten-US-exposure-to--PR_376056.

resources also provide ancillary services that have reliability and resiliency benefits, such as synthetic inertia, frequency response, and voltage control.

Q. Do you have concerns about PacifiCorp's 2017 IRP process?

A. Yes. Utah Clean Energy agrees with other stakeholders in the IRP docket who are concerned about the 2017 IRP process, including inputs and assumptions that informed the IRP, the transparency of the IRP development process, and PacifiCorp's failure to appropriately evaluate economic coal plant retirements.²⁷ Despite our concerns with the IRP process as a whole, I believe the Wyoming wind resources as proposed by PacifiCorp represent a significant opportunity to capture new resources that will benefit ratepayers at an extremely low cost. The time-limited nature of the PTC warrants an accelerated schedule for the acquisition of these resources.

Q. Does this project demonstrate that there are likely other opportunities to pursue extremely low cost renewable resources before the expiration of the PTC and ITC?

A. Yes. Investment in this resource should not replace or preclude additional investments in renewables when they are cost effective. In fact, it is likely that there are additional opportunities for cost-effective investments in renewable resources within PacifiCorp's system, including solar resources in Utah. For this reason, Utah Clean Energy recommended that PacifiCorp acquire solar resources called for later in the IRP in the near term while ratepayers can benefit from historic low prices and the Federal Investment Tax Credit.²⁸

²⁷ See Utah Clean Energy's initial comments in Docket No. 17-025-16, In the Matter of PacifiCorp's 2017 Integrated Resource Plan.

²⁸ *Ibid.* P16

Q. Could changes to the corporate tax rate, as are currently proposed by Congress, impact the economic benefits of the proposed wind projects?

A. As I understand it, changes to the corporate tax rate are not likely to have a significant impact on the value of Production Tax Credits (PTCs). While a reduction in the corporate tax credit will reduce the total tax liability of corporations, taxpayers are permitted to carry PTC credits back to the preceding tax year and forward to the following 20 years. Testimony on this issue provided by Greg Jenner on behalf of the Interwest Energy Alliance in Docket No 20000–520-EA-17 before the Wyoming Public Service Commission is attached as Exhibit UCE 2—KB.

That being said, the final contents of Congress' tax plan are still to be determined and other provisions could impact the economic benefits of renewable energy projects. I will review the testimony of other parties on this matter and may have additional comments thereafter.

Q. Are there other ways PacifiCorp can maximize the benefits of the proposed Wyoming wind resource for ratepayers regardless of the tax incentive?

A. Yes. As previously discussed, the proposed Wyoming wind resources will provide the most benefits to ratepayers to the extent that they result in meaningful reductions to carbon dioxide emissions. Carbon emissions reductions do not result from the production of clean energy alone; rather they result from a reduction in the use of fossil fuel resources. To maximize benefits from these projects to ratepayers, PacifiCorp should demonstrate that the proposed wind projects will result in significant and sustained lower carbon dioxide emissions. Meaningful carbon emissions reductions will only occur to the extent that PacifiCorp reduces its reliance on fossil fuel resources, operates its existing

fossil fuel resources more efficiently, and retires its existing fossil fuel resources on an accelerated schedule.

In order to maximize the value of PacifiCorp's proposed investment in new wind, the utility must consider the changing circumstances of its entire system and comprehensively examine whether new resources should replace existing ones, including those owned by the utility or acquired by contract. Therefore, Utah Clean Energy recommends the Utah Commission require the same analysis as is under consideration as part of the Oregon IRP docket (LC 67). Specifically, the Commission should require PacifiCorp to assess in a transparent manner the economics of its coal units and demonstrate whether keeping them online is truly part of an optimal least cost, least risk portfolio.²⁹

²⁹ Oregon Commission Staff's recommendations are available at <http://edocs.puc.state.or.us/efdocs/HAC/lc67hac111634.pdf>, beginning at page 30.