Sarah Puzzo Utah Bar No. (19653)
Utah Clean Energy
215 S. 400 E.
Salt Lake City, UT 84111
(801) 363-4046
spuzzo@utahcleanenergy.org
Attorney for Utah Clean Energy

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. 24-035-04 PHASE I: REVENUE REQUIREMENT

PREFILED DIRECT TESTIMONY OF LOGAN MITCHELL, PH.D.

ON BEHALF OF

UTAH CLEAN ENERGY

PHASE I REVENUE REQUIREMENT

OCTOBER 17TH, 2024

TABLE OF CONTENTS

LIST OF FIGURES

I. INTRODUCTION AND QUALIFICATIONS

Q. Please state your name and business address.

A. My name is Dr. Logan Mitchell. My business address is 215 S. 400 E., Salt Lake City, Utah 84111.

Q. By whom are you employed and in what capacity?

A. I am employed by Utah Clean Energy ("UCE"), a non-profit public interest organization whose mission is to lead and accelerate the clean energy transformation with vision and expertise. We support the objectives of an affordable, reliable, and clean energy system. My role at UCE is as their Climate Scientist and Energy Analyst, and I lead our utility regulatory team.

Q. On whose behalf are you testifying?

A. I am testifying on behalf of UCE.

Q. Please review your professional experience and qualifications.

A. My academic background spans geology, paleoclimate, atmospheric chemistry, air quality, and analysis of emissions, and has given me a broad understanding of the nexus of energy, air quality, and climate issues. I have published 40+ peer-reviewed publications (several in publications like Science, Nature & PNAS), data products, editorials, reports, and white papers (ORCID[1], Google Scholar[2], Research Gate[3]). I have a BS in Geology with a minor in Oceanography and I obtained my PhD in Geology with a focus on Paleoclimatology in 2013 from Oregon State University. I completed a Postdoc and then was a Research Assistant Professor in the Department of Atmospheric Sciences at the University of Utah. I

---

[1] https://orcid.org/my-orcid?orcid=0000-0002-8749-954X
[2] https://scholar.google.com/citations?user=jhPZAbIAAAAJ&hl=en
[3] https://www.researchgate.net/profile/Logan-Mitchell-2

continue to maintain an Adjunct Professor appointment in the Department of Atmospheric Sciences at the University of Utah. I now lead Utah Clean Energy's utility regulatory team and have actively participated in a number of regulatory dockets and working groups, including Integrated Resource Planning, the Multi State Protocol ("MSP"), wildfire workshops, time of use rates, and interconnection standards.

II. PURPOSE OF TESTIMONY

Q. What is the purpose of Utah Clean Energy's direct testimony in the revenue requirement phase of this rate case?

A. The purpose of Utah Clean Energy's direct testimony in the revenue requirement phase of this rate case is to address the growing imbalance of climate-induced costs and risks borne between Rocky Mountain Power ("the Company" or "PacifiCorp"), its shareholders, and ratepayers. The Company's operations emit a substantial amount of greenhouse gases that are contributing to climate change; however, the Company seeks cost recovery of climate-induced impacts that would effectively shift the costs of climate-induced risks from the Company and its shareholders onto ratepayers. This cost- and risk-shifting would occur through the various mechanisms the Company proposes to address wildfire risks, including the Insurance Cost Adjustment for excess liability, third-party wildfire liability insurance, and a fire fund. Several drivers of Net Power Costs are also affected by climate-induced phenomenon, and the Company again seeks that ratepayers bear the full costs and risks associated with those impacts. In my testimony I will demonstrate that climate-induced risks are not exogenous to the Company's operations, draw on my background as a climate scientist to explain what is causing climate change, how it is already causing substantial costs and risks to energy systems and society at large, and how those risks would change in the future depending on future emission pathways. Finally, I will discuss the need for the Public Service Commission ("the Commission") to examine the balance of risks held by the Company and ratepayers to ensure the Company does not shift all climate-induced costs and risks to ratepayers and thereby has no incentive to address its carbon emissions that are contributing to climate change.

XVII. TESTIMONY

Q. Company testimony from Frank Graves, page 4, line 85, states: "PacifiCorp is facing an exogenous, largely climate-induced fire-risk phenomenon. Growing wildfire risk is similarly afflicting many other electric utilities and society at large." Are the escalating climate-induced wildfire risks facing PacifiCorp exogenous to the Company?

A. No, climate change is not an exogenous risk to PacifiCorp's operational activities. As I will establish in this testimony, carbon emissions from energy production contribute to climate change and associated climate-induced wildfire risks. PacifiCorp has had substantial historical and present carbon emissions, and the Company's most recent 2023 IRP Update has a substantial increase in carbon emissions that is not in alignment with industry trends. Therefore, the climate-induced fire risk PacifiCorp is facing is by definition *not* exogenous to their operations and indeed PacifiCorp's actions are actively contributing to increasing climate-induced wildfire risks that are afflicting electric utilities, rate payers and society at large.

Q. In addition to growing wildfire costs and risks, how are carbon emissions and therefore climate change affecting the electric system and rate payers?

A. Climate change has myriad effects on electricity systems, including affecting supply, delivery, and demand. Electricity supply can be affected by extreme weather events that disrupt facilities and infrastructure, high temperatures that can derate thermal generation resources, droughts that affect hydroelectric generation and of course wildfires. Delivery of electricity is also affected by climate change through impacts from extreme weather events impacting transmission, distribution lines causing power outages and other impacts, high temperatures also increase powerline sagging and reduce transmission efficiency and capacity, as well as again wildfire impacts. Lastly, climate change affects demand directly through generally higher temperatures as well as increasing the duration and severity of extreme heat events. The Fifth US National Climate Assessment, Chapter 5 provides an extensive discussion of these impacts, and includes the following graphical summary of them.

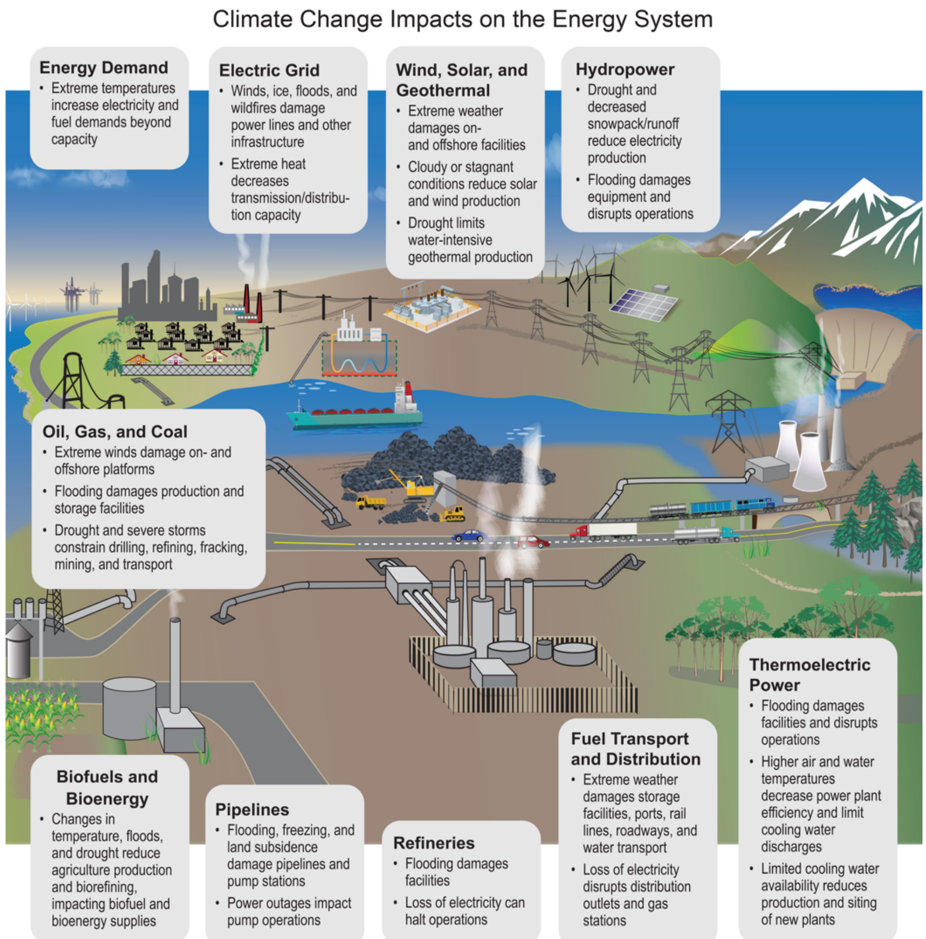

Figure 1. Aspects of the US energy system that are vulnerable to the effects of climate change. Source: Fifth US National Climate Assessment, Chapter 5

Q. Are any of these climate impacts on electricity systems material to this rate case?

A. Yes, climate change is already affecting PacifiCorp's electricity supply, delivery, and demand, and these additional costs are reflected in rate case Company witness testimony from Ramon Mitchell, who states (line 204-211): *"In calendar year 2022, like 2021, unforeseen weather events again drove increases in actual NPC, such as the multiple heat waves in the region during the summer of 2022 and ongoing drought conditions. These drivers increased peak period power prices and reduced hydro generation availability,* *respectively. Similarly, there was a historic cyclone event in the winter of 2022 that impacted power and natural gas prices. For example, average prices at the Opal natural gas trading hub were 424 percent higher in December 2022 as compared to December 2021 while peak power prices at the Mid-Columbia trading hub were 380 percent higher."* These kinds of events are expected consequences of climate change and should not be thought of as "unforeseen" weather events. As a case in point, PacifiCorp is now factoring in climate change assumptions into the IRP planning process to understand how warming temperatures affect demand, extreme weather, hydroelectric availability and timing, and other factors. These climate impacts, as noted in Mitchell's testimony, are driving increases in actual Net Power Costs ("NPC"), and PacifiCorp expects ratepayers to cover the entirety of the costs of these climate impacts.

Q. What is the main driver of climate change?

A. The Fourth US National Climate Assessment ("NCA") states: "*Many lines of evidence demonstrate that human activities, especially emissions of greenhouse gases from fossil fuel combustion, deforestation, and land-use change, are primarily responsible for the climate changes observed in the industrial era, especially over the last six decades.*"[4]

Q. How much of the observed warming can be attributed to human activities?

A. Again, the Fourth NCA examined all of the known factors that affect the climate and found that: "*Over the last century, changes in solar output, volcanic emissions, and natural variability have only contributed marginally to the observed changes in climate. No natural cycles are found in the observational record that can explain the observed increases in the heat content of the atmosphere, the ocean, or the cryosphere since the*

[4] https://nca2018.globalchange.gov/chapter/2/

industrial era. Greenhouse gas emissions from human activities are the only factors that can account for the observed warming over the last century; there are no credible alternative human or natural explanations supported by the observational evidence." The report then quantifies the amount of warming that can be attributed to human activities and found that: "*Observed warming over the period 1951–2010 was 1.2°F (0.65°C), and formal detection and attribution studies conclude that the likely range of the human contribution to the global average temperature increase over the period 1951–2010 is 1.1°F to 1.4°F.*"[5] In other words, formal attribution studies have found that human activities contribute 104% of the observed global average temperature increase. That means that, in the absence of human activity, the climate system would be expected to be very gradually cooling, and instead virtually all of the rapid warming we have observed in recent decades is attributed to human activities.

Q. Is there scientific consensus about how human activities including energy generation are causing climate change?

A. Yes, there is broad scientific consensus that human activities are causing climate change. Virtually every leading scientific organization worldwide has issued public statements endorsing that position. NASA maintains a select list of these organizations and their statements on their website.[6]

Q. What levels of climate warming pose risks for society?

A. The climate system is incredibly complex, so to facilitate judgement about societal risks, the "reasons for concern" ("RFC") framework was developed in 2001. The RFC framework illustrated societal risks using a "burning embers" diagram across five topic

[5] https://nca2018.globalchange.gov/chapter/2/
[6] https://science.nasa.gov/climate-change/scientific-consensus/

areas: Unique and threatened systems; Extreme climate events; Distribution of impacts; Aggregate impacts; and Large-scale discontinuities. Since 2001 the RFC framework has been periodically updated in scientific assessment reports. Over time as the scientific understanding of the societal risks of climate change increased, the level of risk has shifted towards lower temperatures. The following figure[7] shows how the RFC framework has changed across the following Intergovernmental Panel on Climate Change ("IPCC") reports: TAR (2001)[8], AR4 (Smith et al., 2009)[9], AR5 (2014)[10], and SR15 (2018)[11]. The dashed lines in the figure below connect the midpoints between undetectable and moderate risks, and moderate and high risk. There are two key points to understand about this figure. First, the scientific understanding over time has shifted towards finding higher societal risks at lower amounts of climate warming. Second, the upper dashed line between moderate and high risk occurs between 1.5°C and 2°C across all of the RFC areas of societal risk.

---

[7] Zommers, Zinta, Philippe Marbaix, Andreas Fischlin, Zelina Z. Ibrahim, Sean Grant, Alexandre K. Magnan, Hans-Otto Pörtner, et al. "Burning Embers: Towards More Transparent and Robust Climate-Change Risk Assessments." *Nature Reviews Earth & Environment* 1, no. 10 (October 2020): 516–29. https://doi.org/10.1038/s43017-020-0088-0.

[8] IPCC, 2001: Summary for policymakers. In *Climate Change 2001: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change* (McCarthy, J. J., Canziani, O. F., Leary, N. A., Dokken, D. J. & White, K. S., eds) (Cambridge Univ. Press, Cambridge, UK and New York, NY, USA) https://www.ipcc.ch/report/ar3/wg2/

[9] Smith, Joel B., Stephen H. Schneider, Michael Oppenheimer, Gary W. Yohe, William Hare, Michael D. Mastrandrea, Anand Patwardhan, et al. "Assessing Dangerous Climate Change through an Update of the Intergovernmental Panel on Climate Change (IPCC) 'Reasons for Concern.'" Proceedings of the National Academy of Sciences 106, no. 11 (March 17, 2009): 4133–37. https://doi.org/10.1073/pnas.0812355106.

[10] IPCC, 2014: Topic 2 – Future climate changes, risk and impacts. In *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Core writing team, Pachauri, R. K. & Meyer, L. A., eds) (IPCC, Geneva, Switzerland) https://www.ipcc.ch/report/ar5/syr/

[11] Matthews, J. B. R. in *Global Warming of 1.5°C.An IPCC Special Report on the Impacts of Global Warming of 1.5°C Above Pre- industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty* (eds Masson- Delmotte, V. et al.) 539 ‒ 562 (IPCC, 2018).

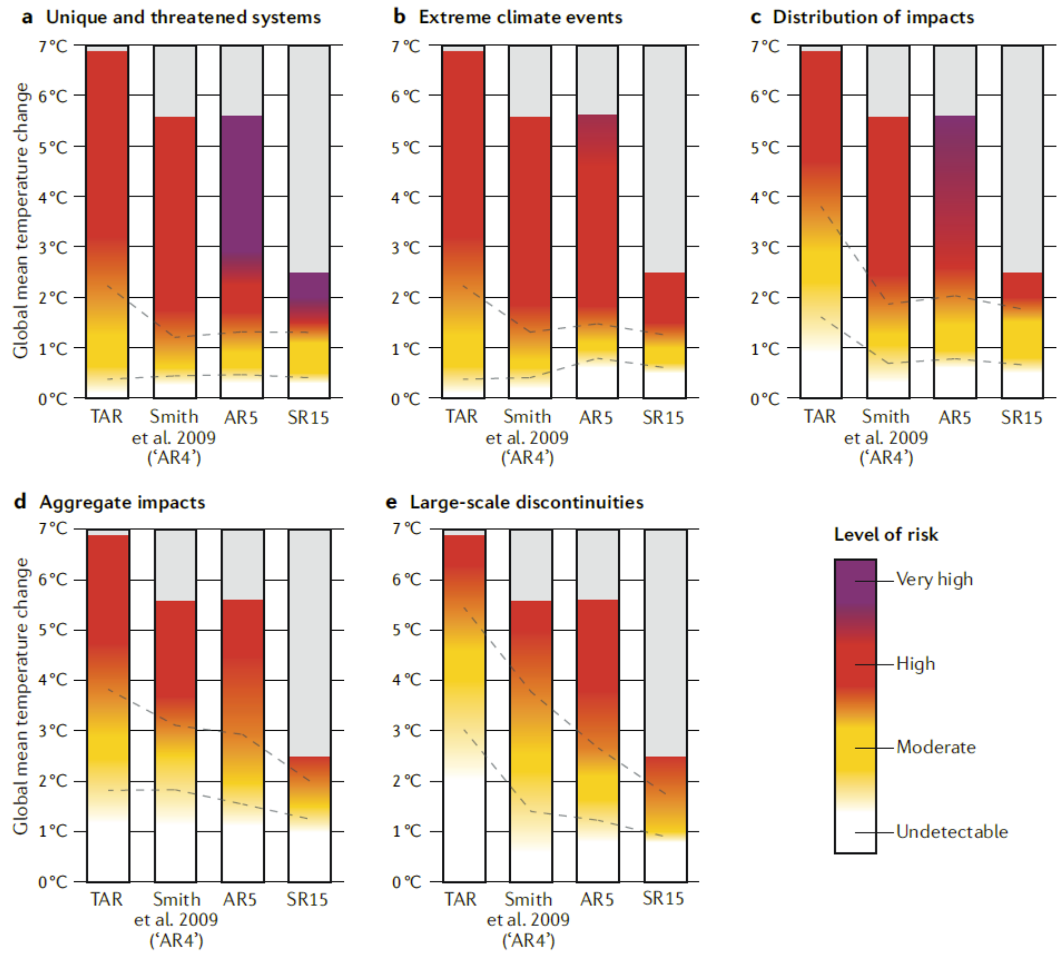

Fig. 3 | **Comparison of risk thresholds across Intergovernmental Panel on Climate Change assessments.** Burning embers link the global mean surface temperature increase to estimates of risk to unique and threatened ecosystems (panel **a**), extreme climate or weather events (panel **b**), distribution of impacts (panel **c**), aggregate impacts (panel **d**) and large-scale discontinuities (called large-scale singular events in the Fifth Assessment Report (AR5) and the Special Report on Global Warming of 1.5 Degrees (SR15)) (panel **e**). All burning embers are presented with the same colour and temperature scale, removing technical details that varied between the original publications. Grey areas at the top of each column correspond to temperatures above the assessed range in the corresponding report. Dashed lines connect the midpoints between undetectable and moderate risk, and moderate and high risk. Risks transitions have generally shifted towards lower temperatures with updated scientific understanding. See Supplementary Information for details. TAR, Third Assessment Report. Figure produced using the Ember Factory online application.

Figure 2. Comparison of risk thresholds across Reason for Concern topics across the following Intergovernmental Panel on Climate Change (IPCC) reports which are represented by the four bars in each subplot: TAR (2001), AR4 (Smith et al., 2009), AR5 (2015), and SR15 (2018).

Q. What are some examples of how moving from moderate to high level of risk in the chart above can be related to real world impacts?

A. Take the RFC "Extreme climate events" category for example that assesses risks to human health, livelihoods, assets, and ecosystems from weather and climate extreme events such as heat waves, hurricanes, heavy rain, drought, flooding, and wildfires. At a global surface temperature warming of 1.1°C (average in 2011-2020)[12], we are already experiencing impacts that are causing a sharp rise in the number of climate related billion-dollar weather and climate disasters. In 2023 the US experienced the highest number of billion-dollar disasters on record, 28 in total[13] as illustrated in the figure below.

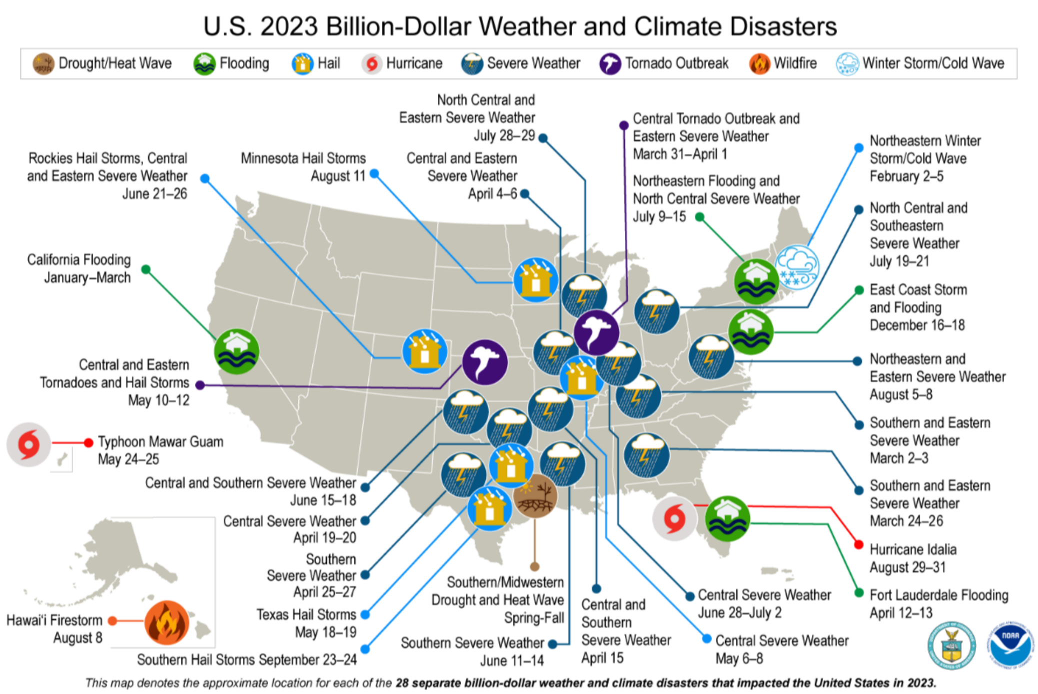

Figure 3. NOAA's Billion-Dollar weather and climate disasters across the US in 2023.

[12] IPCC, 2023: Summary for Policymakers. In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, pp. 1-34, doi: 10.59327/IPCC/AR6-9789291691647.001

[13] https://www.noaa.gov/news/us-struck-with-historic-number-of-billion-dollar-disasters-in-2023

NOAA also provides a time series showing how these billion-dollar weather and climate disasters are increasing in frequency and cost:

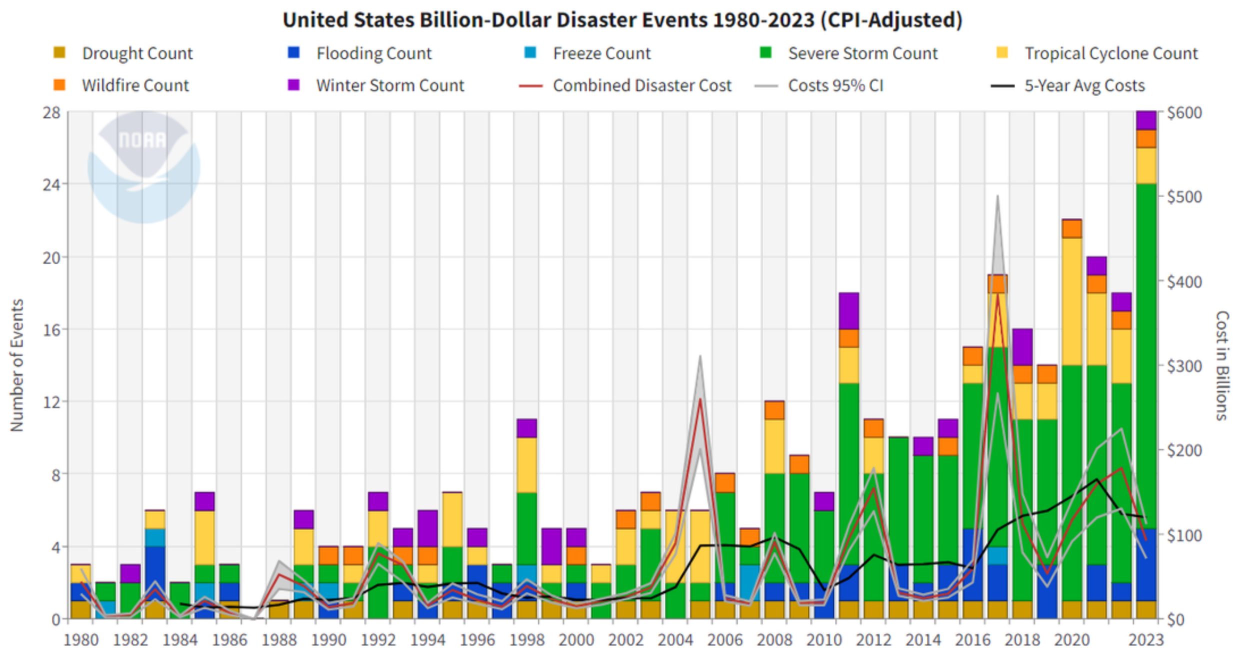

Figure 4. NOAA's Billion-dollar weather and climate disasters since 1980.

Up-to-date counts of billion-dollar disasters for 2024 are currently not available because hurricane Helene, which was itself made more extreme by climate change[14], has recently been severely impacted NOAA's climate and weather data repository, the National Center for Environmental Information that is located in Asheville, NC. These are the kind of extreme climate impacts that we are seeing at a global surface warming level of 1.1°C, which I will note is in the "moderate" level of risk for Extreme climate events in the Reasons for Concern burning embers figure above.

[14] https://yaleclimateconnections.org/2024/10/climate-change-made-hurricane-helene-and-other-2024-disasters-more-damaging-scientists-find/.

Q. What are some examples of the climate fueled societal impacts in the other "Reasons for Concern" areas?

A. Here is a brief explanation of the kinds of climate fueled societal impacts in the RFC areas[15]. RFC1 is Risks to unique and threatened systems, which encompass ecological and human systems that have restricted geographic range by climate-related conditions, such as coral reefs, mangrove ecosystems, biodiversity hotspots, and tropical glaciers. RFC2 is Extreme climate events including extreme temperature and precipitation events, such as those tracked by NOAA's billion-dollar weather and climate disasters discussed above. RFC3 is Risks associated with uneven distribution of impacts, such as diverging impacts across geographic locations, income and wealth, gender, age, or other physical and socioeconomic characteristics. An example of the uneven distribution of impacts is the widespread flooding in Pakistan in 2022[16], where around 10% of the entire country was flooded, affecting 33 million people in that developing nation. The floods were caused by heavier than usual monsoon rains, melting glaciers, and a severe heat wave, all of which are linked to climate change. RFC4 is Risks associated with aggregate impacts, which reflect globally aggregated metrics such as lives affected, monetary damage, number of species at risk of extinction, or global scale ecosystem degradation. RFC5 is Risks associated with large-scale singular events or tipping points in the climate system that are large, relatively abrupt, sometimes irreversible changes in physical, ecological, or social systems. Examples of this include disintegration of Greenland or the West Antarctic ice sheets leading large and rapid sea level rise, sudden loss or dieback of the Amazon forest

---

[15] O'Neill, Brian C., Michael Oppenheimer, Rachel Warren, Stephane Hallegatte, Robert E. Kopp, Hans O. Pörtner, Robert Scholes, et al. "IPCC Reasons for Concern Regarding Climate Change Risks." *Nature Climate Change* 7, no. 1 (January 2017): 28–37. https://doi.org/10.1038/nclimate3179.

[16] https://en.wikipedia.org/wiki/2022_Pakistan_floods

or coral reefs, triggering widespread arctic permafrost melting, or collapse of the Atlantic Meridional Overturning Circulation that would change climate patterns globally. Any of the RFC5 risks pose systemic risks to society because they would cause severe and widespread global economic and ecosystem disruptions.

Q. Given the enormous risks posed by climate change to society, what efforts are being taken to limit emissions?

A. Since climate change poses enormous risks to society, in recent years there have been efforts to develop a global framework to reduce emissions. These negotiations culminated in 195 countries ratifying the Paris Agreement which seeks to avoid the worst impacts of climate change by keeping warming well below 2°C, and pursuing efforts to limit warming below 1.5°C[17]. These targets are based on the scientific understanding of the societal risks posed by climate change discussed above. So, regardless of the political considerations of specific international agreements, the underlying science of climate change clearly establishes that to avoid the worst impacts of climate change, we need to immediately reduce emissions to limit future warming. Under the Paris Agreement, individual countries submit national climate plans, known as Nationally Determined Contributions ("NDCs"). Over time as technology develops, NDCs are refined and tightened. The US's NDC to the Paris Agreement targets economy-wide greenhouse gas emissions reductions of 50-52% by 2030, using a 2005 emissions baseline[18].

---

[17] https://unfccc.int/process-and-meetings/the-paris-agreement
[18] https://unfccc.int/sites/default/files/NDC/2022-06/United%20States%20NDC%20April%2021%202021%20Final.pdf

Q. How much would emissions need to be reduced in the electricity sector to achieve US economy-wide greenhouse gas emission reductions of 50-52% by 2030?

A. This was recently examined in a research study that used six coupled energy-economy models to investigate sectoral emission reductions needed to reach the economy wide emission reduction target[19]. The electricity sector is the simplest and most cost-effective system to decarbonize, and this report found that the most cost-effective near-term emission reductions come from the electricity sector. To achieve US economy wide emission reduction of 50-52% in 2030, the electricity sector must reduce greenhouse gas emissions by 80% by 2030. This analysis provides critical guidance to the entire electricity sector in the US about the amount of emission reductions needed to address climate change.

Q. What percent of greenhouse gas emissions does the electricity sector contribute at the national level and in Utah?

A. According to the EIA, the US Electric Power sector accounts for 30% of total US energy related greenhouse gas emissions in 2023[20]. Within Utah, the electricity sector has a significantly higher share of the state's total greenhouse gas emissions at 48% in 2021.[21]

Q. Do PacifiCorp's carbon emissions contribute to climate change?

A. Yes, PacifiCorp's carbon emissions contribute to climate change. In 2023, 63.8% of Pacificorp's electricity generation is from the burning of fossil fuel resources[22] that emit carbon dioxide and contribute to climate change.

---

[19] Bistline, John, Nikit Abhyankar, Geoffrey Blanford, Leon Clarke, Rachel Fakhry, Haewon McJeon, John Reilly, et al. "Actions for Reducing US Emissions at Least 50% by 2030." *Science* 376, no. 6596 (May 27, 2022): 922–24. https://doi.org/10.1126/science.abn0661.

[20] https://www.eia.gov/environment/emissions/carbon/

[21] https://www.eia.gov/environment/emissions/state/

[22] Form EIA-930, accessed from https://www.eia.gov/electricity/gridmonitor/about

Q. How is climate change related to cumulative carbon emissions?

A. The level of warming that is driving climate impacts is directly related to cumulative carbon emissions. Once CO_2 is emitted from a power plant, it will remain in the atmosphere for 300 to 1000 years, or the duration of many human lives[23]. Because of its long lifetime in the atmosphere, the amount of warming in the climate system is proportional to cumulative carbon emissions, meaning that every ton of carbon emitted leads to more climate warming. Chapter 5 of the IPCC Sixth Assessment Report (AR6) states "*There is a near-linear relationship between **cumulative CO_2 emissions** and the increase in global mean surface air temperature (GSAT) caused by CO_2 over the course of this century for global warming levels up to at least 2°C relative to pre-industrial.*"[24].

Q. What are PacifiCorp's past, present, and future projected CO_2 emissions?

A. Rocky Mountain Power reports its emissions as a function of its six-state parent corporation, PacifiCorp. Between 2011 and 2022, PacifiCorp's system wide cumulative CO_2 emissions were 560 million metric tons (MMT), or on average 48.35 MMT CO_2 per year, according to PacifiCorp's 2023 IRP. For comparison purposes, total economy wide CO_2 emissions for Utah were 62.1 MMT in 2021. PacifiCorp's 2023 Integrated Resource Plan projects that between 2023 and 2050, PacifiCorp will emit a cumulative 293 MMT of CO_2. In its 2023 IRP Update, PacifiCorp increased their projected cumulative CO_2 emissions to 407 MMT of CO_2, which represents a 39% increase in cumulative CO_2 emissions compared to the 2023 IRP. Since there is a near-linear relationship between cumulative CO_2 emissions and warming, the most recent 2023 IRP Update that would

[23] https://science.nasa.gov/earth/climate-change/greenhouse-gases/the-atmosphere-getting-a-handle-on-carbon-dioxide/

[24] https://www.ipcc.ch/report/ar6/wg1/chapter/chapter-5/#Remaining

begin to be implemented during the Test Period of this rate case will exacerbate future warming. Additionally, during the Test Period, PacifiCorp is not making the investments in new zero fuel cost, low-carbon emitting resources that would be needed to reduce their carbon emissions, even though doing so would also reduce their exposure to fuel supply disruptions and price volatility that are also driving increased costs in this rate case.

Q. How does PacifiCorp's emissions trajectory compare to the electricity sector guidance of 80% emission reduction by 2030?

A. In PacifiCorp's 2023 IRP, the company projected that they would reduce their CO_2 emissions by 78% in 2030 compared to a 2005 baseline, which is largely in line with achieving the amount of electricity sector emission reductions needed to meet the US goal of 50-52% economy wide emission reductions. However, PacifiCorp's 2023 IRP Update projected significantly lower deployment of low-carbon resources and as a result, the updated emission reduction plan only reduces emissions by 63% in 2030. That plan, enabled by cost recovery in this rate case, would put PacifiCorp out of alignment with the rest of the US electricity sector's emission reduction target.

Q. Will addressing climate change meaningfully affect future wildfire risks?

A. Yes, increasing wildfire risks are directly related to the changing climate. This question has been addressed in several recent studies. Jones et al. 2022 summarized it succinctly in one of their Key Points: "*The frequency and severity of fire weather has increased in recent decades and is projected to escalate with each added increment of warming.*"[25] Another

---

[25] Jones, Matthew W., John T. Abatzoglou, Sander Veraverbeke, Niels Andela, Gitta Lasslop, Matthias Forkel, Adam J. P. Smith, et al. "Global and Regional Trends and Drivers of Fire Under Climate Change." *Reviews of Geophysics* 60, no. 3 (2022): e2020RG000726. https://doi.org/10.1029/2020RG000726.

study, Jain et al. 2024,[26] examined the record breaking 2021 fire weather season that was initiated by a large regional heat dome in the Pacific Northwest that also affected Utah. This study is important because it explains in detail the mechanistic connection between climate change and wildfire risks. It explains: "*There is a well-established link between large-scale (ie. synoptic) atmospheric patterns—such as the large amplitude ridge that caused the heat dome — and surface fire weather conditions that contribute to fire spread. Specifically, synoptic-scale weather analyses have shown that ridge-like patterns in upper-air tropospheric flow are frequently associated with atmospheric blocking events and that such events promote fuel aridity and fire activity.*" The study then quantifies the amplification of the heat dome due to climate change by using the implicit relationship between warming and geopotential heights. It found that the heat dome was 59% longer, 34% larger, had 6% higher maximum amplitude and was overall 86% stronger than the same event would have been without climate change. The study concludes: "*Climate change will continue to magnify heat dome events, increase fire danger, and enable extreme synchronous wildfire in forested areas of North America."* In another very recent analysis[27], Curasi et al. 2024 examined wildfire burned area in Canada across differing future greenhouse gas emission scenarios. Under elevated emission scenarios, wildfire burned areas increased about five times modern norms by the century's end. However, under a reduced emission scenario that holds global temperatures to below 2°C, wildfire burned area and associated impacts at the end of the century would remain similar to

---

[26] Jain, Piyush, Aseem Raj Sharma, Dante Castellanos Acuna, John T. Abatzoglou, and Mike Flannigan. "Record-Breaking Fire Weather in North America in 2021 Was Initiated by the Pacific Northwest Heat Dome." *Communications Earth & Environment* 5, no. 1 (April 22, 2024): 1–10. https://doi.org/10.1038/s43247-024-01346-2.

[27] Curasi, Salvatore R., Joe R. Melton, Vivek K. Arora, Elyn R. Humphreys, and Cynthia H. Whaley. "Global Climate Change below 2 °C Avoids Large End Century Increases in Burned Area in Canada." *Npj Climate and Atmospheric Science* 7, no. 1 (October 1, 2024): 1–11. https://doi.org/10.1038/s41612-024-00781-4.

modern conditions. While this analysis focused on Canada, their findings are indicative of what we would expect to observe across North America forest ecosystems.

Q. Does shifting of climate-induced costs and risks from the Company that is contributing to climate change to ratepayers create a moral hazard situation?

A. Yes, shifting of the costs and risks posed by climate impacts from the Company that is contributing to those impacts to rate payers creates a moral hazard situation. Mirriam-Webster defines a moral hazard situation as: "a situation in which a party is incentivized to risk causing harm because another party is obligated to remedy the consequences of the harm caused."

Q. What specifically is the moral hazard situation in this rate case?

A. The moral hazard in this case arises from PacifiCorp's handling of climate-induced risks. As my testimony has established, the Company's carbon emissions contribute to climate change. Climate change in turn escalates a wide range of climate costs and risks, including wildfire risks and other climate-induced drivers of Net Power Costs. Yet PacifiCorp expects ratepayers to shoulder the financial burden of these risks via higher wildfire insurance premiums, the Wildfire Mitigation Balancing Account, and higher Net Power Costs driven by climate related events. If ratepayers are expected to bear these climate-induced costs and risks alone, the Company lacks incentive to reduce its emissions and mitigate its own contributions to risks facing its system. Notably, there is no mention of reducing carbon emissions as a strategy to address climate change and its impact on wildfire risks in the testimonies of either Ms. Steward or Mr. Berreth. This is even though climate-driven wildfire risk is by itself a major factor driving the Company's cost increases in this rate case.

Q. Given that wildfires and other costs associated with carbon emissions are *not* exogenous to PacifiCorp's operations, what should the Commission do to address this issue in this rate case?

A. It is my recommendation that the Commission evaluate and consider the imbalance of costs and risks shared between ratepayers and the Company and shareholders for recovery of proposed costs associated with climate risk. A key step is to recognize that these costs and risks, particularly those linked to wildfires and other climate-induced factors, are not external or exogenous to the Company's operations, but are, in part, driven by the company's carbon emissions. This is especially important to consider and evaluate when developing new regulatory tools that transfer climate risks borne by the Company and shareholders onto ratepayers. This would include the Insurance Cost Adjustment and any Fire Funds as discussed by Company witnesses Steward, Coleman, and Graves. The Commission should also weigh the balance of these risks when evaluating the Wildfire Mitigation Balancing Account as discussed by Company witnesses Steward.

Q. Outside of this current rate case, are there strategies that the Commission could take to incentivize the Company to balance climate costs and risks among shareholders and ratepayers?

A. Yes. Many state utility regulators already adopt incentive regulation frameworks that tie cost recovery to utility performance.[28] The Commission could explore a similar approach regarding the Company's costs associated with climate and wildfire risk by encouraging cost-effective emission reductions as a prerequisite to recovery of those costs. Aligning the

[28] Joskow & Schmalensee, Incentive Regulation for Electric Utilities, 4 YALE J. ON REG.1 (1986) available at .https://openyls.law.yale.edu/bitstream/handle/20.500.13051/8344/05_4YaleJonReg1_1986_1987_.pdf?sequence=2&isAllowed=y.

Company's financial incentives to actions that reduce emissions, while maintaining an affordable and reliable system addresses the root causes of the increasing climate-related costs and risks that PacifiCorp is facing. Through this type of strategy or mechanism, the Commission could maintain reliability and affordability goals while ensuring that PacifiCorp and its shareholders bear some responsibility for mitigating its contribution to the risks facing its system, rather than passing these ever-increasing costs and risks onto ratepayers.[29]

XVIII. CONCLUSIONS

Q. Please summarize your conclusions.

A. The Company is facing increased climate and wildfire risks to its system, which exposes the Company and ratepayers to increased costs. However, these risks are not exogenous to the Company's operations since carbon emissions from human activities, particularly from the burning of fossil fuels for energy production, are driving climate change. The changing climate system then in turn increases wildfire induced costs and risks as well other climate fueled utility related costs for ratepayers and utilities. PacifiCorp seeks to manage these risks to its system by passing their costs and risks onto ratepayers via mechanisms such as the Insurance Cost Adjustment and third-party liability funds, as well as through the Wildfire Mitigation Balancing Account. Yet PacifiCorp bears responsibility to help shoulder some of those costs because the fossil fuels on its system contribute to climate

[29] Inara Scott, Teaching an Old Dog New Tricks: Adapting Public Utility Commissions to Meet Twenty-First Century Climate Challenges, 38 HARV. ENV'T L. REV. 371, 375–76 (2014), available at https://ir.library.oregonstate.edu/downloads/3b591b75v; *see also* Jonas J. Monast*,* Ratemaking as Climate Adaptation Governance, Frontiers of Climate J., (2021) available at https://scholarship.law.unc.edu/cgi/viewcontent.cgi?article=1560&context=faculty_publications.

change and hence contribute to climate related risks and costs. If PacifiCorp is permitted to shift climate-induced risks and costs onto ratepayers without addressing its emissions, then it has no incentive to mitigate the activities contributing to the factors increasingly impacting its system. When evaluating higher NPC tied to climate events and new balancing accounts or similar regulatory mechanisms that pass costs and risks on to ratepayers, it is prudent to carefully examine those costs and risks and ensure there is some balance between the Company, its shareholders, and ratepayers. Therefore, I recommend that the Commission evaluate the distribution of climate-induced costs and risks, and in particular wildfire risk, between ratepayers and PacifiCorp's shareholders in this rate case. I also recommend that in future proceedings the Commission explore options that would ensure the Company is incentivized to mitigate its contribution to the climate risks facing its system by tying cost recovery mechanisms for wildfire and other climate fueled costs to cost-effective emission reductions.

Q. Does that conclude your testimony?

A. Yes.