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State of Utah
DEPARTMENT OF COMMERCE
Office of Consumer Services

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To: Utah Public Service Commission

From: Office of Consumer Services
Michele Beck, Director
Béla Vastag, Utility Analyst
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Date: March 4, 2022

Re: PacifiCorp's 2021 Integrated Resource Plan - Docket No. 21-035-09

Background

On September 1, 2021, Rocky Mountain Power (RMP) filed PacifiCorp's 2021 Integrated Resource Plan (IRP) with the Public Service Commission of Utah (PSC). The PSC issued a Scheduling Order on September 20, 2021 setting a schedule for comments on the IRP, with initial comments due March 4, 2022. Accordingly, the Utah Office of Consumer Services (OCS) submits these initial comments on PacifiCorp's 2021 IRP.

Recommendation Concerning IRP Guidelines and Acknowledgement

The OCS recommends that the PSC not acknowledge PacifiCorp's 2021 IRP. The OCS reviewed the IRP in the context of Utah's IRP requirements and PacifiCorp's evaluation of resources and concluded that the selection of its preferred portfolio has not complied with several sections of Utah's IRP Standards and Guidelines as outlined in the PSC's Report and Order in Docket No. 90-2035-01 (Guidelines).[1] The inclusion of non-existent, speculative Natrium nuclear and non-emitting peaker resources and the exclusion of new gas-fired resources violates the following Guidelines:

- 1. Definition: "Integrated resource planning is a utility planning process which evaluates all **known** resources on a **consistent and comparable basis**…" (emphasis added)

[1] https://pscdocs.utah.gov/electric/90docs/Report%20and%20Order%2090-2035-01%206-18-92.pdf, see pages 36 – 40.

- 1. Definition: "…The process should result in the selection of the optimal set of resources **given the expected combination of costs, risk and uncertainty**." (emphasis added)

- 4. b. "An evaluation of all **present and future resources**, including future market opportunities…**on a consistent and comparable basis**." (emphasis added)

- 4. b. ii. "An assessment of **all technically feasible generating technologies** including: renewable resources, cogeneration, power purchases from other sources, and the **construction of thermal resources**. (emphasis added)

- 4. h. "An **evaluation of the financial, competitive, reliability and operational risks** associated with the various resource options and **how the action plan addresses these risks**…" (emphasis added)

Currently, no Natrium nuclear or 100% hydrogen-fueled non-emitting peaker resources have ever existed in the US. In addition, there are no systems in place to provide the large scale supply of fuel (either HALEU[2] for the nuclear or green hydrogen for the non-emitting peaker)[3] for these hypothetical resources. These risks and many others (as explained further below in these comments) are not accounted for in the IRP for these proposed resources. Clearly, Guidelines 1., 4.b., 4.b.ii. and 4.h. noted above have been violated. On the other hand, natural gas-fired generator technology is well proven and there are over 280 units currently under construction or in planning stages here in the US alone.[4] The exclusion of natural gas-fired resources also violates the Utah IRP Guidelines listed above.

Furthermore, PacifiCorp has also violated IRP Guideline 4. g. which states:

- 4. g. PacifiCorp's IRP will include: "An evaluation of the cost-effectiveness of the resource options **from the perspectives of** the utility and **the different classes of ratepayers**." (emphasis added)

In its 2019 IRP comments, the OCS specifically requested that PacifiCorp provide a customer rate (i.e. ratepayer) impact analysis as it had done in past IRPs because the 2019 IRP Action Plan included $7.3 billion of new resources.[5] However, the requested analysis was not provided. The PSC referenced this issue in its Order on the 2019 IRP and stated "…should a party believe that more information or analysis is appropriate during the IRP process, it is free to seek such information through the IRP process…"[6]

[2] HALEU = High-Assay Low-Enriched Uranium

[3] In the 2021 IRP, PacifiCorp models the non-emitting peaker as combustion turbine generator burning 100% hydrodgen. Using green hydrogen produced by the electrolysis of water ensures the non-emitting peaker resource is not responsible for any CO_2 emissions.

[4] S&P Global power plant data, accessed February 23, 2022. The 280+ natural gas fueled turbine units represent over 65,000 MW of capacity.

[5] See OCS's February 4, 2020 comments on PacifiCorp's 2019 IRP, Docket No. 19-035-02, pages 3 to 5. (https://psc.utah.gov/2019/01/28/docket-no-19-035-02/)

[6] Utah PSC Order, Docket No. 19-035-02, May 13, 2020, page 20, Section E.

Heeding the PSC's advice, the OCS submitted stakeholder feedback form "2021.089" to PacifiCorp requesting that the missing 2019 IRP customer rate impact analysis be completed for the 2021 IRP.[7] Indeed, with the yet-to-be-built 2020 RFP resources included in the 2021 IRP Action Plan coupled with the incremental new resources from the 2021 IRP (see the 2021 IRP Action Plan section of these comments below for details), the 2021 IRP Action Plan will significantly exceed the $7.3 billion of investment in the 2019 Action Plan and this requested customer rate impact analysis is now even more important.

PacifiCorp's response to our feedback form pointed to Volume II, Appendix J and Volume I, Chapter 9 of the 2021 IRP for the requested customer rate impact analysis.[8] Unfortunately, the referenced customer rate impact analysis is not what the OCS requested or what ratepayers need to see. PacifiCorp compares the 2021 preferred portfolio (see IRP pages 291 – 292 and Figure 9.30) to cases P02, P03, BAU1 and BAU2 which all contain the 2020 RFP final shortlist resources, the Natrium nuclear resource, the Gateway South and Boardman-to-Hemmingway transmission lines and other costly new resources. Understanding what the significant cost impacts will be on ratepayers from acquiring such a substantial amount of new resources can only be accomplished by comparing them to a base case or a benchmark that does not include all the expensive changes outlined in the 2021 IRP Action Plan and PacifiCorp's 2021 IRP should not be acknowledged without this information.[9] The OCS requests that the PSC order PacifiCorp to provide this information in all future IRPs as a compliance requirement associated with Utah IRP Guideline 4g.

The 2021 IRP Process Was Again Delayed and Limited Stakeholder Input

Typically, PacifiCorp's public IRP process takes approximately 9 months, starting in June of the prior year and ending in March, just before the IRP is to be filed. However, the 2021 IRP process, just like the 2019 IRP process, involved significant delays. With two IRPs in a row being significantly delayed, this appears to be the new norm for PacifiCorp.

The 2021 IRP was scheduled to be filed on March 31, 2021. On March 15, 2021, the PSC approved PacifiCorp's request for an extension of the filing deadline to September 1, 2021. The OCS supported the filing extension because the delays affecting PacifiCorp would probably not allow time for adequate review of modeling results or allow parties time to provide meaningful input or request follow-up analyses. However, it is notable that even with the additional 5 months of time, PacifiCorp still did not allow time for adequate stakeholder feedback as the final preferred portfolio was not presented to stakeholders until August 27, 2021 only 4 days before the September 1 filing date. Adding to the frustration, several scheduled meetings throughout the process were rescheduled or canceled and presentation materials were provided only 2 or 3 days before most meetings, with the presentation being provided on the morning of the day of the meeting for the last three IRP Public Input meetings held in July and August.

[7] See: https://www.pacificorp.com/energy/integrated-resource-plan/comments.html, then listing 2021.89.
[8] See 2021 IRP, Appendix J, page 214 and Chapter 9, page 291.
[9] The PSC's Order on the 2019 IRP stated on page 25: "The lack of linkage between the extensive capital costs identified in the 2017 preferred portfolio, which we approved with reservations, and the substantial new and additional capital costs inherent in the 2019 Action Plan further supports our decision to decline to acknowledge or approve it."

Going forward, the OCS requests that PacifiCorp assign more resources to the IRP process so that stakeholders can have a more timely and predictable IRP public input process in the future, one that does not limit stakeholder feedback at the very end of the IRP public process when important modeling results and resource decisions are presented.

The 2021 IRP Action Plan

The Action Plan outlines immediate (in the next 2 to 4 years) actions that PacifiCorp will take to deliver the near term deliverables detailed in the preferred portfolio. The 2021 IRP Action Plan includes the following new generation and storage resources:[10]

From the 2020 RFP and installed by end of 2024:
- 1,792 MW of new wind
- 1,302 MW of new solar
- 697 MW of new batteries (200 MW standalone and 497 MW paired with solar)

Installed by end of 2026:
- 745 MW of new wind
- 600 MW of new solar
- 300 MW of new batteries (paired with solar)[11]

Installed by end of 2028:
- 500 MW Natrium nuclear reactor (including storage)

The OCS notes that it is highly unusual to see an unproven technology such as the Natrium nuclear demonstration project in an IRP Action Plan confirming that this project is receiving special treatment by PacifiCorp.

The addition of the new resources above also requires the construction of several major new transmission lines which are also included in the Action Plan. These major transmission lines are:

- Gateway South, a new 416 mile, 500 kV line, online by end of 2024
- Boardman-to-Hemmingway, a new 290 mile, 500 kV line, by end of 2026
- Gateway West Segment D.1, a new 59 mile, 230kV line, by end of 2024

The Natrium Nuclear Resource Is Fraught with Uncertainties and Tremendous Risk

In the Action Plan list of resources outlined above, PacifiCorp has included its first ever nuclear resource. PacifiCorp's decision to include the Natrium nuclear project in its preferred portfolio because it is least cost, least risk defies belief.

[10] See page 8 of the 2021 IRP, Preferred Portfolio Highlights
[11] IRP Chapter 7, Table 7.1 shows Solar + Storage having the battery component rated at 50% of system power.

As an experimental technology, the Natrium nuclear demonstration project by definition cannot be adequately compared to existing PacifiCorp generating resources. As discussed at the beginning of these comments, the PSC's ordered IRP Standards and Guidelines for PacifiCorp require the company to evaluate "all present and future resources, including future market opportunities …, on a consistent and comparable basis". In the 2021 IRP executive summary, PacifiCorp states the Natrium project is the first time the company has ever selected nuclear technology as part of its least-cost, least-risk preferred portfolio. In addition, the OCS notes that the Natrium project is a new, first of its kind nuclear technology. Thus, it is clear that all cost and operational projections for the Natrium project are unsupported by real-world data, i.e. actual commercial operation of such a plant. We recognize that PacifiCorp utilized proxies for the Natrium technology in its modeling, but we question the reliability of the data used to proxy an experimental nuclear technology that was ultimately selected as part of the preferred portfolio. As a matter of fact, PacifiCorp states that the specific costs and performance data for the Natrium project are confidential and are not provided in the IRP document.[12] The OCS asserts that the Natrium technology is unable to be adequately compared to other known resources that have a history of successful construction and operation.

Using a developer's initial projected costs for a nuclear project in the 2021 IRP modeling, especially for a new and commercially untested nuclear technology, is an unrealistic approach. The recent development of new nuclear plants in the US has seen tremendous delays and cost increases from their original forecasts.

Recent development of nuclear projects in the United States have a history of large cost-overruns. While the OCS understands that the federal government, through the Department of Energy, will be funding half of the costs (up to $2 billion) of the Natrium demonstration project, the overall large costs of a nuclear plant still leaves Utah's ratepayers with considerable risk of substantial cost-overruns. We present three examples of recent nuclear projects that demonstrate the risk for cost-overruns with this type of resource:

- **UAMPS – Carbon Free Power Project.** This Utah Associated Municipal Power Systems (UAMPS) project is a small modular reactor (SMR) nuclear plant to be built by NuScale and located near Idaho Falls, Idaho. While news reports quote the leaders of the project that it will move forward, the project has been downsized from twelve to six SMRs due in part to significantly increasing cost projections. The NuScale SMR plant has seen cost projections rise 45% from $4.2 billion in 2018 to $6.1 billion in 2020.[13] Following reports of these rising costs, eight of the 36 supporters of the project backed out of the deal.[14] Also, a newly released report by the Institute for Energy Economics and Financial Analysis (IEEFA) criticizes the

[12] See 2021 IRP, page 206.
[13] https://www.utilitydive.com/news/design-updates-financial-shakeup-prompt-utilities-to-rethink-structure-of/589262/, article dated November 25, 2020.
[14] https://www.science.org/content/article/several-us-utilities-back-out-deal-build-novel-nuclear-power-plant , November 4, 2020.

updated cost projections and construction timeline of the UAMPS project as still overly optimistic.[15]

- **Southern Company (Georgia, US) – Vogtle Expansion Project.** Recent news reports state that this conventional nuclear technology expansion project is being delayed again as cost projections continue to rise. Overall, the anticipated cost of the project has increased 114% from $14 billion in 2012 to $30 billion in 2022.[16] Also, the project is five years late after the completion date was pushed back four times.[17]

- **South Carolina Electric and Gas (SCE&G) – V.C. Summer Expansion Project.** News reports indicate that this nuclear project experienced cost-overruns and construction delays that ultimately led to the cancellation of the project after $4.9 billion was already spent. The reactors were originally projected to cost $9.8 billion but analysts estimate it could have cost $23 billion (an increase of 135%) if the project had continued to completion. Ultimately, under great financial stress, the parent company of SCE&G was acquired by Dominion Energy. However, customers will still have to pay Dominion $2.3 billion over the next two decades (to recover some of the $4.9 billion spent on the project).[18]

PacifiCorp claims that removing the Natrium nuclear project from the preferred portfolio increases costs by $133 million (see case "P02e-No Nuc" and 2021 IRP Chapter 9, page 280). In other words, the modeling is saying that including the Natrium project will save ratepayers $133 million by the end of 2040. Based on currently in-progress nuclear projects described above, it is highly likely that the Natrium project will also have cost overruns. Assuming this project is currently budgeted at $4 billion[19], just a 5% cost overrun is $200 million, which could easily wipe out any of the modeled financial benefits. But we reiterate, the cost assumptions of the Natrium project are confidential and not transparent, so the ability of stakeholders to assess the accuracy of the modeling and the projected savings is hindered.

In addition to the financial risk of pursuing a novel nuclear technology, the Natrium project comes with substantial additional uncertainty and risk:

- Obtaining US Nuclear Regulatory Commission (NRC) approvals for the technology, design, construction and operation of the proposed plant.

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[15] https://www.power-eng.com/nuclear/report-claims-serious-problems-with-proposed-nuscale-smr/ February 18, 2022.

[16] https://www.wabe.org/30b-georgia-power-nuclear-plant-delayed-up-to-6-more-months/, article dated February 17, 2022, costs are actually over $33 billion when including payments from Westinghouse.

[17] The Atlanta Journal-Constitution, February 17, 2022. https://www.ajc.com/news/business/georgias-plant-vogtle-nuclear-expansion-hit-with-new-delays-costs/IPLQ4TUKGJH3TBAQYL7MX5KU7I/

[18] The failed V.C. Summer nuclear project: A timeline, December 4, 2018. https://www.chooseenergy.com/news/article/failed-v-c-summer-nuclear-project-timeline/

[19] Bill Gates' $4 bln high-tech nuclear reactor set for Wyoming coal site https://www.reuters.com/business/energy/bill-gates-4-bln-high-tech-nuclear-reactor-set-wyoming-coal-site-2021-11-17/

- Supplying the reactor's HALEU fuel which currently has no US domestic suppliers.
- Potential construction delays that push its online date well past the current forecast of 2028.
- A first of its kind nuclear plant may not operate as planned, i.e. may have operational challenges.
- Challenges with the storage and disposal of radioactive nuclear waste.
- Difficulties obtaining state and local permitting for a nuclear project.
- PacifiCorp has no experience operating a nuclear plant (nor does TerraPower).

With so many uncertainties and risks, including this speculative project in the least cost, least risk portfolio stretches credulity.

The OCS does not object to PacifiCorp exploring the possibility of adding a Natrium nuclear reactor to its system as a "one-off" demonstration project, as long as customers are not required to pay higher costs than the Natrium's IRP modeled costs, especially if the higher costs exceed the next most cost-effective alternatives that would have been selected by the model. It is not unreasonable for PacifiCorp to include one Natrium nuclear reactor in its IRP so long as it strictly maintains, and transparently demonstrates, the cost effectiveness of that plant. However, it is premature to model such a plant for selection until the technology and costs are established and proven.

PacifiCorp Has Filed with FERC to Evaluate Eleven Pumped Hydro Storage Projects Which Are Not in the IRP

In October 2021, PacifiCorp filed applications with the Federal Energy Regulatory Commission (FERC) for preliminary permits proposing to study the feasibility of eleven pumped hydro storage projects.[20] If the permits are approved, they will give PacifiCorp the first right to file licensing applications for these projects. PacifiCorp did not evaluate or discuss these eleven projects in the 2021 IRP document. In its Oregon IRP proceeding, PacifiCorp stated that "Inclusion of the 11 pumped storage projects in the 2021 IRP would have been premature."[21] The OCS submits that including the Natrium nuclear and the hydrogen-fueled non-emitting peakers in the 2021 IRP is also premature.

The 2021 IRP Does Not Allow New Gas-Fired Resources

Page 164 of the IRP states "PacifiCorp ultimately did not allow new gas-fired resources in its portfolio selection process". On page 244 of the IRP, PacifiCorp provides one paragraph justifying its decision to not allow new gas-fired resources. The reasons provided for the gas exclusion include risk of stranded assets, difficulties obtaining permits and no new natural gas resources were bid into the 2020 All Source RFP. The OCS is not persuaded by these reasons especially since PacifiCorp raises concerns in the 2021 IRP about system reliability due to closure of coal-fired units and expansion of intermittent solar and wind

[20] See: https://www.newsdata.com/water_power_west/hydro_licensing/pacificorp-mulls-developing-6-600-mw-of-pumped-storage-projects/article_17fa1a78-46b3-11ec-81e8-23f364326c54.html and https://www.pacificorp.com/energy/storage.html

[21] Oregon PUC, Docket No. LC 77, PacifiCorp Reply Comments, December 23, 2021, page 38.

resources.[22] Instead of relying on speculative nuclear and non-emitting peaker resources, the IRP should allow gas-fired resources, especially gas peakers, to help ensure system reliability.

In its 2019 IRP, PacifiCorp signaled to the market that is was planning for solar, wind and battery resources in the near-term Action Plan. It is no surprise that no gas-fired resources were bid into the 2020 RFP. It is circular logic to say there is limited development of gas-fired resources because none were bid into PacifiCorp's RFP when PacifiCorp signaled that none were wanted. As noted earlier in these comments, there are currently over 280 natural gas fired units under construction or under development in the US, representing over 65,000 MW of capacity.

Besides the nuclear and non-emitting peaker projects, PacifiCorp's 2021 IRP is also relying on battery storage for ensuring system reliability (see Action Plan section above). Large scale battery resources are still relatively new to the industry and may have unknown limitations (see the difficulties experienced at the 400 MW Moss Landing battery facility in California).[23] Uncertainties with the operation of large batteries is another reason to allow new gas-fired resources in the IRP planning process.

Summary and Recommendations

This IRP does not comply with Guidelines 1., 4.b., 4.b.ii. 4.g., and 4.h. As a result, the preferred portfolio contains a resource mix (both due to what was included and what was excluded) that carries an unsupported and unacceptable risk for Utah customers.

Due to these deficiencies, the OCS recommends the following:

- the PSC not acknowledge PacifiCorp's 2021 IRP, and
- the PSC order PacifiCorp to provide sufficient rate impact analyses for the 2021 IRP and all future IRPs.

CC: Chris Parker, Division of Public Utilities
Joelle Steward, Rocky Mountain Power
Distribution List

[22] See IRP pages 8, 19-20, 135, 150, 220-224 and 229.
[23] https://www.montereycountyweekly.com/blogs/news_blog/moss-landing-battery-plant-down-indefinitely-after-second-incident-in-5-months/article_fd119cb6-8ec6-11ec-882f-db4faf6c0495.html, article dated February 15, 2022.