March 11, 2022

Via Electronic Filing

Public Utility Commission of Oregon
Attn: Filing Center
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Re: In the Matter of PacifiCorp, dba Pacific Power, 2021 Integrated Resource Plan (Docket No. LC 77)

Enclosed please find Sierra Club's Comments on the Staff Report and Attachments for filing in the above-captioned docket. The confidential version of this filing will be provided to parties eligible to receive protected information under Protective Order No. 21-271 via encrypted password protected .zip folders.

If you have any questions or require any additional information, please do not hesitate to contact me.

Respectfully submitted,

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Enclosure

BEFORE THE PUBLIC UTILITY COMMISSION

OF OREGON

In the Matter of PACIFICORP d/b/a PACIFIC POWER, 2021 Integrated Resource Plan	LC 77

CERTIFICATE OF SERVICE

I hereby certify that on this 11th day of March, 2022, I have served a true and correct copy of the confidential version of **Sierra Club's Comments on the Staff Report** upon all eligible party representatives electronically via encrypted password protected .zip folders in compliance with OAR 860-001-0180.

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Dated this 11th day of March, 2022 at Oakland, CA.

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BEFORE THE PUBLIC UTILITY COMMISSION
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Sierra Club's Comments on Staff Report

Public Version

March 11, 2022

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Attachment 2	Confidential Attachment "OR UE-390 TAM (RalstonReplyTest) BRIDGER" to PacifiCorp's Response to Sierra Club Data Request 9.2
Attachment 3	Email from Carla Scarcella, PacifiCorp Senior Regulatory Attorney to Rose Monahan, Sierra Club (Jan. 26, 2022)
Attachment 4	PacifiCorp Response to Sierra Club Data Request 6.1
Attachment 5	Confidential Attachment "3112 Capacity Requirements P02-MMR (CO) Intl UTWY 2031 6-17-21" to PacifiCorp Response to Sierra Club Data Request 6.1

BEFORE THE PUBLIC UTILITY COMMISSION
OF OREGON

In the Matter of PACIFICORP d/b/a PACIFIC POWER, 2021 Integrated Resource Plan	LC 77

SIERRA CLUB'S COMMENTS ON STAFF REPORT
[PUBLIC VERSION]

I. Introduction

Sierra Club appreciates the opportunity to provide these comments in response to the Staff Report and Recommendations ("Staff Report"). As the Commission is aware, significant new information has recently come to light through Commission workshops and additional PLEXOS modeling conducted by PacifiCorp, meaning that neither the Staff Report nor intervenor opening comments were able to fully address certain issues. As noted in Sierra Club and NewSun's Joint Motion to Stay the Proceedings, the 2021 IRP has been plagued by a lack of access to information and insufficient time to review complex issues. These comments are Sierra Club's good-faith attempt to respond to both the Staff Report and additional information, including the new modeling results that PacifiCorp produced on March 3, 2022, that were disclosed after the Staff Report was filed. However, Sierra Club was unable to conduct necessary discovery,

particularly on the new PLEXOS sensitivity model run,[1] meaning that these comments are not as informed as they could be.

Nonetheless, Sierra Club is largely supportive of the Staff Report and the numerous recommendations put forth.[2] In addition, Sierra Club makes the following recommendations:

- The model sensitivity performed without must-take requirements for Jim Bridger ("No Minimum Scenario") should be considered for the preferred portfolio, as it reduces the PVRR by $156 million when compared to the top performing case P02-MM.
- Replacement energy for Jim Bridger under the No Minimum Scenario, estimated by Sierra Club to be on the order of [redacted] MW of new wind, should be considered in the upcoming all-source request for proposals ("RFP").
- The Commission should provide guidance to PacifiCorp that no additional investment in either the Black Butte or Bridger Coal Company mines will be authorized prior to a thorough prudency review of an updated long term fuel supply plan for Jim Bridger. In compliance with Commission Order 21-379,[3] that long term fuel supply plan should evaluate supplying Jim Bridger entirely with coal from the Bridger mine. It should also evaluate the feasibility of closing the Bridger mine in the [redacted] timeframe (or sooner) and fueling the Jim Bridger plant from stockpiled coal for the remainder of its life.
- If the No Minimum Scenario is not adopted as the preferred portfolio, the P02h sensitivity, which retired Jim Bridger Units 3 and 4 prior to 2030, should be considered for the preferred portfolio.
- For future IRPs, PacifiCorp should be directed to:
    - Conduct a re-optimization step if any post-modeling reliability adjustments are made;
    - Evaluate longer duration batteries and offshore wind to meet reliability needs;
    - Incorporate Idaho Power Company's planned early exit from Jim Bridger into its modeling assumptions;
    - Define a specific reliability metric for evaluating its resource portfolios along with a specific performance target; and

[1] Sierra Club issued discovery on March 4, 2022, one day after receiving the sensitivity model run and associated Bench Request responses, requesting an expedited response. PacifiCorp provided a response to one data request (SC 9.2) on March 9; however, Sierra Club did not receive any other responses prior to filing these comments.

[2] One notable exception, which is not addressed in these comments, is Staff's support for the proposed gas conversions at Jim Bridger 1 and 2. For the reasons set forth in Sierra Club's Opening Comments, Sierra Club continues to oppose that proposal.

[3] *In the Matter of PacifiCorp, dba Pacific Power, 2022 Transition Adjustment Mechanism*, Docket No. UE 390, Order No. 21-379 (Nov 1, 2021).

- Provide greater detail on when and where transmission constraints become binding (or close to binding) as the Long Term ("LT") model selected resources to fulfill the 13 percent reserve margin requirement.

II. Removing Highly Inappropriate Minimum Take Volume Assumptions from Jim Bridger Coal Supplies Yields Substantial Benefits and Would Affect the Near-Term Action Plan

Sierra Club is grateful for the Commission Staff's request that PacifiCorp perform a model sensitivity without must-take requirements for Jim Bridger ("No Minimum Scenario") as well as the ALJs' associated Bench Requests. PacifiCorp's responses reveal several significant and concerning issues with PacifiCorp's assumptions regarding minimum take coal volumes at the Jim Bridger power plant.

The Staff Report notes that Staff "agrees with PacifiCorp that Plexos' advanced capabilities make the model capable of accurately reflecting the actual cost of dispatch at coal units. As long as the fuel price tiers modeled in Plexos match those in PacifiCorp's actual coal supply agreements, the Plexos modeling should be accurate and dispatch coal units at economically efficient levels."[4] Sierra Club does not dispute the notion that PLEXOS may be capable of more accurately modeling the multiple price tiers often included in PacifiCorp's coal supply agreements. However, as explained in our Opening Comments, the inclusion of future minimum take volumes, which are priced in the model at $0/MMBtu, is highly inappropriate when no such contractual requirements exist or when the contract could be readily renegotiated. Both of the two modeled coal supplies for Jim Bridger—Black Butte and the Bridger Coal Company ("BCC")—fall into these categories. For Black Butte, a contract does not exist beyond April

[4] Staff Report at PDF p. 5.

2022.[5] For BCC, the supply is from an affiliate mine whose production can be scaled down in the future at little or no cost.

When these inappropriate minimum take assumptions are removed from the model, as was done in the No Minimum Scenario, the results are significantly different than those presented in PacifiCorp's preferred portfolio. If adopted, the No Minimum Scenario would be substantially better for PacifiCorp customers than the IRP Preferred Portfolio.

A. Summary of the No Minimum Scenario

Based on the data files provided by PacifiCorp in response to the ALJs' Bench Request, the findings of the No Minimum Scenario can be summarized as follows:

- From 2022-2037, annual generation at Jim Bridger Units 3 and 4 is reduced by [redacted] percent on average, relative to PacifiCorp's IRP Portfolio.
- After 2030, there is [redacted] output from the plant.
- In 2025, the modeled reduction in energy output from Jim Bridger 3 and 4 (in GWh, relative to PacifiCorp's IRP) equates to the annual output from adding [redacted] of new Wyoming wind resources. Between 2025 and 2030, this number remains relatively stable.
- Removing the minimum take assumption reduces the PVRR by $156 million when compared to the top performing case P02-MM.

The significant difference in generation between the No Minimum Scenario and PacifiCorp's IRP Preferred Portfolio are illustrated in the confidential chart below.

[5] *In the Matter of the Application of PacifiCorp (U 901 E) for Approval of its 2022 Energy Cost Adjustment Clause and Greenhouse Gas-Related Forecast and Reconciliation of Costs and Revenue*, Proceeding No. A.21-08-004, PacifiCorp (U 901 E) Brief Summary of Dates that Existing Coal Supply Agreements Are Scheduled for Renewal (Nov. 10, 2021), *available at* https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M425/K516/425516818.PDF.

Confidential Figure 1. Jim Bridger Units 3 and 4 Generation Under the Preferred Portfolio and the No Minimum Scenario

Notably, the $156 million reduction in PVRR easily makes the No Minimum Scenario lower cost than PacifiCorp's Preferred Portfolio (P02-MM-CETA).

B. Problems with PacifiCorp's Characterization of the No Minimum Scenario

In its response to the ALJs' Bench Request, PacifiCorp claims that the $156 million (PVRR) benefit would be offset by the need to retrofit the plant to process coal from the Powder River Basin ("PBR"), to the tune of $ (PVRR).[6] PacifiCorp's claim that this PRB coal processing facility is needed rests on the idea that PacifiCorp would need to resort to PRB coal fuel in the event that take or pay provisions were not executed with its current suppliers (i.e., Black Butte, and BCC).[7] The Company claims that it would be "unrealistic" for its current suppliers to deliver significantly lower volumes of coal absent such take or pay provision.[8]

The Commission should be highly skeptical of these claims for the reasons explained below.

[6] Confidential PacifiCorp Response to ALJ Bench Request 1.
[7] PacifiCorp Response to ALJ Bench Request 1.
[8] *Id.*

First, it is not evident that any long-term coal supply agreements with minimum take obligations are actually necessary to meet the fueling requirements of Jim Bridger under the No Minimum Scenario. Based on the results provided in the confidential attachment to ALJ Bench Request 1-1, Sierra Club estimates that only [redacted] MMBtu (or [redacted] tons) of coal are needed *in total* to supply Jim Bridger units 3 and 4 from 2022 through 2037. This is approximately what PacifiCorp projected to mine from BCC *alone* over [redacted].[9] Thus, it is conceivable that PacifiCorp could continue BCC mine production for [redacted] at current production levels and produce enough coal to operate Jim Bridger through 2037 under the No Minimum Scenario. This would avoid the need to enter any long-term contracts with minimum take obligations.

At this point in time, Sierra Club does not have knowledge of PacifiCorp's ability to stockpile [redacted] tons of coal between both the BCC and Jim Bridger facilities. It is possible that this is already feasible given existing coal storage capabilities at these locations.[10] In the 2022 TAM, PacifiCorp's workpapers indicated that they intended to stockpile up to [redacted] tons at BCC during certain months.[11] However, it is possible that more coal could be stored there or at the Jim Bridger plant. Even if the maximum storage capability is no higher than approximately [redacted] tons, PacifiCorp could conceivably stop BCC mining after [redacted] and still have enough

[9] Confidential Attachments "OR UE-375 TAM (RalstonReplyTest) BRIDGER" and "OR UE-390 TAM (RalstonReplyTest) BRIDGER" to PacifiCorp's Response to Sierra Club Data Request 9.2 (provided as Sierra Club Attach. 1 and Attach. 2 respectively) (projecting [redacted] tons received from BCC in 2021 and [redacted] tons in 2022). Notably, the projections in Attachments 1 and 2 forecast PacifiCorp's share of production from BCC, meaning that additional coal would be produced for Idaho Power; *see also, PacifiCorp Will Close Jim Bridger Longwall Mine in November*, Coal Age (Sept. 23, 2021), *available at* https://www.coalage.com/breaking-news/pacificorp-will-close-jim-bridger-longwall-mine-in-november/ (noting that the BCC surface mine produced 1.5 million tons in 2020 and the underground mine produced 1.4 million within the first nine months of 2021).
[10] While Sierra Club issued data requests within one day of receiving the No Minimum Scenario, it was not able to receive responses prior to the deadline for filing its Comments on the Staff Report.
[11] Sierra Club Attach. 2, Confidential Attachment "OR UE-390 TAM (RalstonReplyTest) BRIDGER" to PacifiCorp Response to Sierra Club 9.2.

coal to meet the fueling requirements of the No Minimum Scenario. Neither of these scenarios would rely upon any future coal from Black Butte.

Second, PacifiCorp explained during the Executive Session of the February 24, 2022 Workshop that [redacted] More specifically, the Company explained that [redacted] However, Company representative Brian Greer also explained that, [redacted] Thus, it's entirely realistic that PacifiCorp could meet the requirements of the No Minimum Scenario through 2037 simply through operations at the BCC mine. Under such a scenario, the minimum take assumptions for BCC could be substantially reduced, if not eliminated.

As is apparent, these findings also call into question the need for PacifiCorp to execute a new contract with the Black Butte mine—particularly one with a minimum take provision. Moreover, the ability for BCC alone to meet Jim Bridger's needs through 2037 also suggests that the PRB coal processing investment is not necessary and should not be viewed as an offsetting factor in the $156 million PVRR benefit of the No Minimum Scenario.

C. Jim Bridger Retirement Under the No Minimum Scenario

Irrespective of the foregoing issues on coal supply, Sierra Club also has significant concerns regarding PacifiCorp's claims about the appropriate retirement date for the Jim Bridger plant.

First, it is readily apparent from the results provided in the confidential attachment to ALJ Bench Request 1-1 that the Jim Bridger plant provides [redacted] energy value in any year after 2030. In fact, the hourly dispatch results provided in confidential attachment ALJ Bench Request 1-4 show that Jim Bridger 3 is [redacted]

[redacted]. Meanwhile, Jim Bridger 4 [redacted] [redacted][12]

Second, generation patterns for the two units as presented in the workpapers also raise additional questions about the model results relative to the units' technical constraints.[13] For example, the finding that Jim Bridger Unit 3 operates for only [redacted] hours in 2037 does not seem to match the PLEXOS inputs provided in the Company's original filing which included a minimum uptime significantly longer than [redacted] hours.[14] A similar mismatch occurs for Jim Bridger 4. This suggests that perhaps different modeling assumptions were applied in the 2037 timeframe simply to justify PacifiCorp's preferred plant retirement date.

Third, the results of the No Minimum Scenario show that the long-term ("LT") model, which PacifiCorp uses for making resource retirement decisions, assumed a [redacted] level of dispatch from Jim Bridger than did the more temporally granular short-term ("ST") PLEXOS model which includes hourly dispatch. In fact, the LT model for the No Minimum Scenario assumes that Jim Bridger dispatch would actually [redacted] while the ST model shows [redacted].[15] This suggests that the LT model is likely [redacted] in PacifiCorp's portfolio. Because the LT model is where resource retirement decisions are made, it is possible that this LT model run may contain systemic biases that inflate

[12] "Attach ALJ Bench Request 1-4 CONF.zip\JB34 Hourly Reserve Provision ST 48540 CONF" (provided as a confidential attachment to PacifiCorp's Response to ALJ Bench Request 1).
[13] "Attach ALJ Bench Request 1-4 CONF.zip\JB34 Hourly Generation ST 48540 CONF" (provided as a confidential attachment to PacifiCorp's Response to ALJ Bench Request 1).
[14] Confidential Plexos Inputs Workpaper accompanying PacifiCorp's 2021 IRP "Plexos Inputs - 2021 IRP 091021_CONF.xlsx."
[15] Confidential Attachment to PacifiCorp Response to ALJ Bench Request 1-1.

Jim Bridger's value thereby delaying Jim Bridger's retirement relative to the value demonstrated in the more granular ST model. Indeed, the No Minimum Scenario results suggest that the minimum take constraints may not have been removed from the LT model, but rather only removed from the ST model. Because of the limited time between receiving the modeling results and submitting these comments, Sierra Club was unable to confirm this hypothesis; however, it is supported by the fact that when comparing the annual generation output from the LT model of the No Minimum Scenario to the LT model of PacifiCorp's Preferred Portfolio, the two scenarios are virtually identical as shown in the table below:

Confidential Table 1. Jim Bridger Generation Output from the LT Model

	No Minimum	P02-MM-CETA
2021	[redacted]	
2022		
2023		
2024		
2025		
2026		
2027		
2028		
2029		
2030		
2031		
2032		
2033		
2034		
2035		
2036		
2037		

If the minimum take constraints were not actually removed from the LT model, then a) PacifiCorp's response was not fully responsive to the ALJs' bench request, and b) the

Commission should be highly skeptical of PacifiCorp's assertion that PLEXOS continues to select Jim Bridger Units 3 and 4 to run on coal through 2037.[16]

Sierra Club recommends that in future IRPs, the Company fully explain any discrepancies between the LT and ST models, including potential implications for coal retirement dates.

Finally, the fact that Jim Bridger [redacted] raises significant questions about the plant's reliability value and the need to keep this resource online for reliability purposes. PacifiCorp's results suggest that Jim Bridger provides some incremental reliability value in 2037. However, this is challenged by the fact that Jim Bridger Unit 3 is projected to [redacted] This finding also challenges the notion that a 500 MW nuclear resource would be needed as a replacement, which is what PacifiCorp has recommended in both its preferred case and the P02h variant, discussed below.

Accordingly, in contrast to PacifiCorp's assertions that the No Minimum Scenario supports operating Jim Bridger 3 and 4 through 2037, a more reasonable interpretation of the sensitivity is that Jim Bridger 3 and 4 should retire no later than [redacted], and potentially as early as [redacted].

D. The No Minimum Scenario—If Selected—Would Impact the Near-Term Action Plan and Upcoming All Source RFP as Well as Future Coal Supply agreements for Jim Bridger

The No Minimum Scenario shows substantially reduced output at Units 3 and 4 in all years beginning [redacted]. As the chart above shows, the discrepancy between Jim Bridger generation in the preferred portfolio and the No Minimum Scenario becomes most pronounced beginning in [redacted], meaning that if the No Minimum Scenario were to become the preferred

[16] PacifiCorp Response to ALJ Bench Request 1 ("PLEXOS LT optimization of the P02-MM study continues to select Jim Bridger Unit 3 and Jim Bridger Unit 4 to run on coal and generate energy through the existing end-of-life in 2037").

portfolio, the near-term action plan and the upcoming All Source RFP would be significantly impacted.

PacifiCorp's response to the ALJs' Bench Request did not provide details on specific resource additions in the No Minimum Scenario. However, Sierra Club estimates that reducing Jim Bridger's output under this scenario could equate to replacement energy on the order of over [redacted] MW of new wind in the 2025-2030 timeframe. Thus, a significant amount of additional new renewable resources would likely be needed under the No Minimum Scenario but would not otherwise be procured if PacifiCorp's preferred portfolio is pursued instead. Sierra Club recommends that such incremental resources be considered within the upcoming All Source RFP.

The No Minimum Scenario further raises questions about any future coal supply agreement with Black Butte and continued operations at BCC beyond [redacted]. Specifically, and as described above, because Jim Bridger's generation is substantially reduced, it is likely that PacifiCorp could meet the entirety of the plant's coal supply needs from BCC alone. Sierra Club recognizes that coal supply agreements are reviewed in the Company's Transition Adjustment Mechanism ("TAM") proceedings. Sierra Club recommends that the Commission not allow any cost recovery related to Black Butte coal supplies after April 2022 until a thorough prudency review has been completed, which should include all evidence from this IRP proceeding. The same should be true for BCC, *i.e.*, the Commission should not allow any cost recovery for further production from the mine until after the Commission has had an opportunity to thoroughly evaluate the mine's operating plan through the TAM. Sierra Club would expect that operating plan to evaluate the feasibility of supplying all of Jim Bridger's coal through BCC under the No Minimum Scenario and decommissioning the BCC mine as early as [redacted] or sooner.

III. Even When Minimum Take Requirements Are Included at Jim Bridger, the P02h Variant, Which Modeled Early Retirement of Jim Bridger 3 and 4 by 2030, Indicates that Early Retirement Would Be Beneficial to Ratepayers

In addition to the No Minimum Scenario demonstrating that Jim Bridger Units 3 and 4 should be ramped down to [redacted], output after 2030, the P02h variant case also demonstrates that early closure would be beneficial to ratepayers, even with its inappropriate inclusion of minimum take requirements. This is true because PacifiCorp inappropriately forced in an expensive nuclear resource in 2030 in the P02h scenario which was likely unnecessary.

The Staff Report notes that "PacifiCorp's choice of a nuclear plant as a reliability resource" in P02h "lacked transparency and supporting analysis . . . and could have been sub-optimal."[17] Sierra Club strongly concurs with this assessment. As described below, additional information obtained through discovery since Sierra Club's Opening Comments confirms that the nuclear plant forced into the P02h variant was unsupported and likely unnecessary. If, instead, PacifiCorp had allowed the model to select smaller or lower cost resources, such as solar plus storage with longer duration batteries (e.g., 6 or 8 hours), non-emitting peakers, off-shore wind, or expanded demand side management, P02h would have been undoubtedly lower cost than the preferred portfolio.

A. PacifiCorp's Decision to Add a 500 MW Nuclear Plant in 2030 in the P02h Variant Was Not Based on Any Comprehensive Analysis or Modeling of Reliability

As Sierra Club noted in its Opening Comments, PacifiCorp's preferred IRP portfolio (P02-MM) was first modeled using the LT model to economically select resources. This initial portfolio was then subject to subsequent reliability adjustments based on the more detailed ST model results that revealed instances of unserved energy on an hourly basis. Using this method, PacifiCorp's

[17] Staff Report at PDF p. 24.

selected a 500 MW nuclear plant to be added in 2038 following Jim Bridger retirement under their P02-MM scenario.

However, PacifiCorp does not appear to have conducted similarly comprehensive modeling, with hourly resolution, for each of the variant cases, including P02h. When Sierra Club requested the same hourly data files used for the reliability adjustments in the P02-MM model run, but for the P02h scenario, PacifiCorp informed Sierra Club that, "there are no additional hourly data files for the P02h variant case . . . the same hourly data files already provided . . . for the P02-MM case were relied upon for assessing reliability of the P02h case."[18] In other words, PacifiCorp performed no additional analysis for the P02h variant that would have justified manual decisions made outside of the model, such as the addition of a 500 MW nuclear plant in 2030, after Jim Bridger retirement and similar to the P02-MM case which added a nuclear plant in 2038.

In essence, PacifiCorp simply assumed that, because it chose to add a 500 MW nuclear plant to the P02-MM portfolio in 2038 when Jim Bridger Units 3 and 4 retire, the same nuclear plant should be added if the units retire by 2030 under the P02h variant. This assumption is highly inappropriate because the loads and resources in the 2030 timeframe are not equivalent to those in 2038. Meanwhile, as PacifiCorp confirmed in its Reply Comments, it did not perform any re-optimization of portfolios after making reliability adjustments, including the second nuclear addition in P02h. (This error is further discussed directly below in Section IV.)

These additional revelations only serve to underscore several points raised in Sierra Club's Opening Comments. For example, it supports the conclusion that the early retirement of Jim Bridger 3 and 4 is likely to be the most economic option among those evaluated by PacifiCorp

[18] Email from Carla Scarcella, PacifiCorp Senior Regulatory Attorney to Rose Monahan, Sierra Club (Jan. 26, 2022) (provided as Sierra Club Attach. 3).

because one of the primary reasons that the P02h variant appears more expensive than P02-MM is due to the addition of a very expensive nuclear unit in 2030. However, as PacifiCorp has admitted, it did not perform a detailed hourly analysis on the P02h variant case to justify the need for a second nuclear addition in the 2030 timeframe.

B. Analysis of ST Hourly Data Files Shows that the Additional Nuclear Plant in the P02h Variant Case Was Likely Unnecessary

Even if it was appropriate for PacifiCorp to rely on the same ST hourly data files produced for P02-MM to assess reliability needs under P02h—which it was not—those hourly data files do not demonstrate that a nuclear resource was necessary following Jim Bridger retirement. Instead, Sierra Club believes that a less expensive or smaller resource could have sufficed to meet PacifiCorp's reliability needs in 2030 under the P02h variant. If the 2030 nuclear unit were replaced with a smaller or less expensive resource, such as solar plus storage with longer duration batteries (e.g., 6 or 8 hours), expanded DSM, or non-emitting peakers then the P02h variant could easily become lower cost than the preferred portfolio.

In discovery request SC 6.1,[19] PacifiCorp was asked to provide any LT and ST model work papers as well as supporting reliability assessment work papers for any preliminary resource portfolios that PacifiCorp developed for the 2021 IRP, prior to applying the granularity and reliability adjustments or any subsequent portfolio refinements. According to PacifiCorp's response, two LT portfolios were run *without* adjustments and used to develop the granularity and reliability adjustments:

- PLEXOS study number 3112 (P02-MMR (CO,NG) Intentional)
- PLEXOS study number 2993 (P02-MMR (CO,NG) Intl UTWY)

[19] PacifiCorp Response to Sierra Club Data Request 6.1 (provided as Sierra Club Attach. 4).

These preliminary portfolios were primarily used to evaluate the difference in resource value between the LT and ST models in order to understand which resource options could produce reliable portfolios. Although the difference between those two studies is not clearly explained, PacifiCorp produced a set of workpapers for both studies. Each set included a workpaper for each year from 2025 to 2040,[20] detailing the hourly data of unserved energy. For the PLEXOS 3112 study, unserved energy was [redacted] for half of those years while for the rest it ranged from [redacted] MW on an annual basis. For example, in year 2031, there are [redacted] of projected unserved energy:[21]

[redacted]

These shortages occur in [redacted].[22] It is thus possible that additional energy could be available in the system, but may be constrained in the model; however, such details are not available in the workpapers. Results for other years are similar with [redacted] being the highest amount of unserved energy experienced in one of the system areas in the 3112 run up to 2032. The workpapers also reveal some shortages in the system's regulation reserves during some summer days.

Given the [redacted], it is far from clear how PacifiCorp concluded that a 500 MW nuclear addition in 2030 was needed in the P02h case. PacifiCorp's Reply Comments state that early retirement of Jim Bridger 3 and 4 "accelerated the need for additional long duration resources that could run

[20] The Confidential Attachments to PacifiCorp Response to Sierra Club Data Request 6.1 include workpapers for years 2026-2040 for study 2993, and 2025-2040 for study 3112.
[21] Confidential Attachment "3112 Capacity Requirements P02-MMR (CO) Intl UTWY 2031 6-17-21" to PacifiCorp Response to Sierra Club Data Request 6.1 (provided as Sierra Club Attach. 5).
[22] *Id.*

around the clock. The best fit was nuclear located at the Jim Bridger site."[23] However, given the [redacted] there does not appear to be substantial evidence that a nuclear plant was the "best fit" or "least cost" option. Sierra Club acknowledges that the level of unserved energy could increase with the earlier retirement of Jim Bridger 3 and 4. However, PacifiCorp has not produced sufficient hourly generation data to show when Jim Bridger will be operating in 2031 under its preferred portfolio, nor has it provided evidence that the unserved energy would reach such high levels that a nuclear plant was the only viable replacement resource.

PacifiCorp did indicate that, "[t]he duration and timing of shortfalls identified by control area in a given year is what led to specific resource selections."[24] While this statement still does not provide much insight into how resources, such as a nuclear plant added to P02h, were identified and selected, it does appears that PacifiCorp may have developed some sort of criteria for determining which resources are needed to resolve reliability problems under different conditions. However, if these criteria exist, they were not provided as part of the IRP filing. Alternatively, it is possible there are no specific, reviewable criteria and PacifiCorp made these additions *ad hoc* or merely based on individual "professional judgment."

This latter approach would be consistent with PacifiCorp's Reply which stated that "[t]he proxy nuclear resources were selected economically using the entirety of data the LT, MT and ST stages of the model provided."[25] This statement suggests that no specific model result or criteria was relied upon, and instead it was primarily PacifiCorp's judgement that determined the type and magnitude of the reliability-based resource adjustments.

[23] PacifiCorp Reply Comments at 17.
[24] *Id*. at 18.
[25] *Id*. at 35.

In sum, without having additional information on the unserved energy if Jim Bridger 3 and 4 retired in 2030 or how PacifiCorp systematically identified appropriate replacement resources, any resource additions seem subjective and not the result of proper analysis.

C. The P02h Scenario Could Replace the Preferred Portfolio Without Shifting Costs Amongst PacifiCorp's Jurisdictions in Order to Comply with State Specific Policies

The Staff Report expresses some hesitancy regarding whether the P02h scenario could be appropriately substituted for the preferred portfolio, noting that if PacifiCorp's "intent is to make sure that each state is assigned the costs associated with its legislative requirements instead of sharing costs of state-specific policy among jurisdictions," then it is reasonable for PacifiCorp not to select the P02h portfolio.[26] Staff refrained from opining on whether ensuring that each state pays exclusively for its own policies is the best planning approach.[27] Nonetheless, Sierra Club is not arguing that states outside of Washington should pay for the costs of implementing CETA. Rather, Sierra Club's argument is that the P02h variant case may *inherently* comply with CETA without adding any additional costs to the system. As a result, there would be no sharing of costs between the states associated with CETA compliance because the least-cost portfolio would already be CETA compliant.

IV. Reoptimizing After Reliability Adjustments Is Not Irrelevant

Sierra Club raised in Opening Comments that the Company should have re-optimized the portfolio after making reliability adjustments, as for P02h discussed above. The Company disputed that recommendation stating that it is "irrelevant" because at the conclusion of its analysis "there is nothing left to optimize."[28] The Staff Report does not explicitly address this

[26] Staff Report at PDF p. 13.
[27] *Id.*
[28] PacifiCorp Reply Comments at 17.

issue; however, Sierra Club addresses it because the failure to reoptimize portfolios after making *ad hoc* reliability adjustments significantly impacts the final portfolios and is contrary to how PacifiCorp approached energy efficiency and demand-side management.

First, PacifiCorp's statement that re-optimization is "irrelevant" is simply untrue. By making reliability adjustments, PacifiCorp has effectively altered the starting conditions, which then require re-optimization in order to ensure that the final portfolio does not include unnecessary supply side resources. Ideally, this re-optimization would occur by redoing the LT modeling step after it was determined what specific additional reliability resources were needed. For example, in the P02h case, PacifiCorp forced in a 500 MW nuclear unit in 2030 as a reliability adjustment. If this 500 MW nuclear addition in 2030 were set as a precondition of the LT model run, then the remaining resources selected by the reoptimized LT model in the 2031-2040 timeframe would undoubtedly be different than those selected in the initial LT model run. In other words, these remaining resources could be reoptimized with a new set of starting conditions that includes the 500 MW nuclear addition. Upon running such a re-optimization step, it's conceivable that fewer remaining resource additions would be needed in the 2031-2040 timeframe relative to what PacifiCorp has presently included in the P02h case. Consequently, in the case of re-optimization, the new portfolio would be lower cost than the one that has not been re-optimized.

Second, PacifiCorp's Reply Comments implicitly acknowledged that re-optimization would be preferable because the Company performed a re-optimization step for energy efficiency and demand response selections.[29]

[29] *Id.* at 78 ("After the reliability adjustments described above, the Company also re-optimized energy efficiency and demand response selections to ensure all cost-effective demand-side resources were included").

However, because this re-optimization was narrowly focused on demand-side resources, it likely had the effect of reducing the overall energy efficiency and demand response in portfolios where additional supply-side reliability resources were added. If the Company felt it necessary to conduct a re-optimization step for demand-side resources, it is unclear why a similar re-optimization shouldn't be considered for supply-side resources.

Sierra Club recommends that for future IRPs, PacifiCorp should be required to conduct a re-optimization step if any post-modeling reliability adjustments are made.

V. Idaho Power's Share of Jim Bridger

In Opening Comments, Sierra Club observed that PacifiCorp did not consider the potential cost of absorbing Idaho Power Company's share of Jim Bridger after 2028. While the Staff Report did not address this issue, Sierra Club notes that in the Executive Session of the February 24, 2022 Commission Workshop, which occurred after the Staff Report was filed, PacifiCorp disclosed that although the vast majority of its IRP analysis did not consider Idaho Power's planned early exit from Jim Bridger, the Company did take into account that exit for modeling [redacted] at the plant. Specifically, PacifiCorp explained that [redacted]. This action underscores Sierra Club's argument, which is that the IRP should explore uncertainties through scenario analysis and that PacifiCorp's failure to incorporate Idaho Power's anticipated exit meant that the 2021 IRP did not provide a robust picture of the potential costs and risks of continued operation at Jim Bridger past 2028.

Sierra Club recommends that in future IRPs, PacifiCorp be directed to incorporate Idaho Power's planned early exit from Jim Bridger.

VI. Low Capex at Jim Bridger

Staff points out that, while the variable costs of operating Jim Bridger are relatively high, its fixed costs are relatively low stating that "[redacted]."[30] Sierra Club does not dispute this finding based on historical data. However, it is worth noting that PacifiCorp has recently announced its intention to "issue a Request For Proposal (RFP) for carbon capture facilities to be added to Jim Bridger Units 3 and/or 4."[31] If carbon capture facilities were ultimately installed at Jim Bridger, this would significantly increase the fixed O&M and run rate capital costs at the plant.

VII. PacifiCorp's Planning Approach Dismisses Proven Technologies in Favor of Unproven Ones

The Staff Report rightfully notes that "PacifiCorp did not evaluate all known resources on a consistent and comparable basis[,]" specifically noting that "optimistic" assumptions were made for resources such as the Natrium plant, while "competing non-emitting but not-widely-deployed resources" did not receive the same level of optimism.[32] Sierra Club concurs with this conclusion. For instance, PacifiCorp considered just four main resource options when incorporating specific adjustments to final resource portfolios to account for reliability: 1) standalone storage, 2) solar plus storage (with a 100% nameplate 4-hour duration battery), 3) nuclear, and 4) non-emitting peakers. While, the first two of these represent relatively mature technologies that have been successfully deployed, the last two represent nascent technologies

[30] Staff Report at PDF p. 12.
[31] *Governor Gordon Brokers Deal to Keep Jim Bridger Power Plant Open*, State of Wyoming (Feb. 17, 2022), *available at* https://governor.wyo.gov/media/news-releases/2022-news-releases/governor-gordon-brokers-deal-to-keep-jim-bridger-power-plant-open.
[32] Staff Report at PDF p. 46.

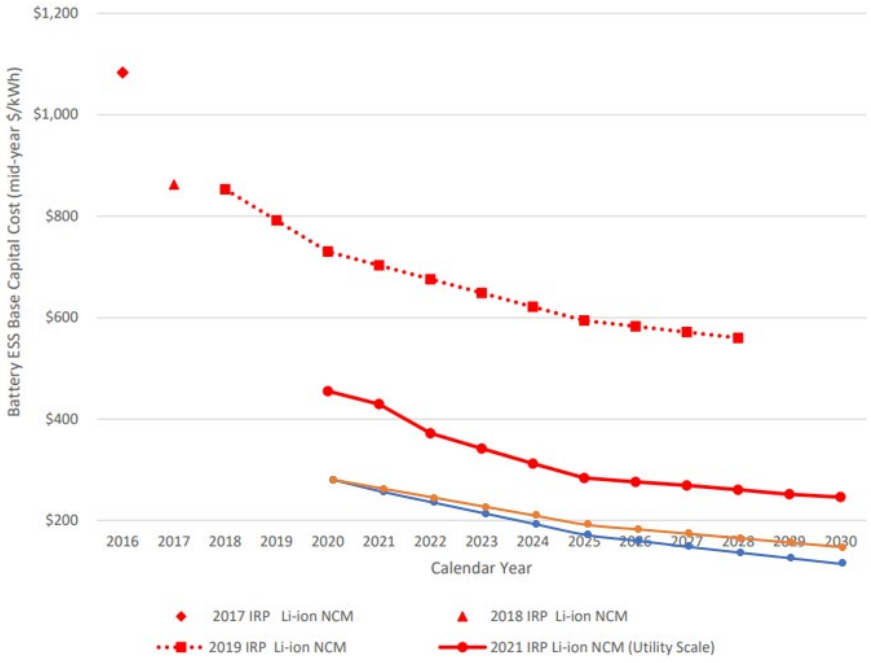
that have yet to be proven commercially viable and are likely to be quite costly. Yet, other technologies, like longer duration batteries and offshore wind, were not considered at all.

PacifiCorp should have considered longer duration batteries for a number of reasons. First, PacifiCorp noted in reply comments that "the storage component of proxy solar with storage resources in the portfolio was increased from 50 percent of the PV resource capacity to 100 percent of the PV resource capacity."[33] This was an important step to obtain more reliability value from solar plus storage; however, it also suggests that increasing the battery size even further (e.g., to 150 percent or 200 percent) might yield even further reliability benefits. If connected as a DC-coupled resource, such an oversized storage system would in essence equate to a longer duration battery storage system that could better fit within PacifiCorp's assumed interconnection limits. This would have been an appropriate step before moving to untested resource options. Second, although PacifiCorp has raised concerns over the cost of longer duration batteries, PacifiCorp's storage cost assumptions were significantly higher than the National Renewable Energy Laboratory's ("NREL") Advanced Technology Baseline 2021 and further did not match the reality of actual project costs as informed by the recent all-source RFP bids.

The 2021 IRP's Figure 7.5, in Volume I, (reproduced below) shows the forecast of storage costs that informed the Company's modeling. In addition to the IRP's cost curves, we have overlaid the NREL assumptions with an orange line (moderate) and a blue line (advanced).

[33] PacifiCorp Reply Comments at 76.

Figure 2. Figure 7.5 from PacifiCorp 2021 IRP Volume I



Additionally, PacifiCorp should also have considered off-shore wind. On a global scale, off-shore wind resources also have a successful track record. While off-shore wind is variable, it has a relatively consistent output profile that might provide substantial reliability benefits to complement solar plus storage. Sierra Club believes this option, and others, should have also been considered throughout the IRP process and particularly when making reliability adjustments, in advance of other more speculative options. In sum, PacifiCorp appears to have skipped over several known resource options in favor of speculative options like the Natrium nuclear plant.

Table 2. Logical Progression of Increasingly Reliable Resources

Reliability Resource	Solar PV + 4hr storage @ 25% nameplate	Solar PV + 4hr storage @ 50% nameplate	Solar PV + 4hr storage @ 100% nameplate	Solar PV + 4hr storage @ 150% nameplate	Solar PV + 4hr storage @ 200% nameplate	Off-shore Wind + Storage	Non-Emitting Peaker	Nuclear
PacifiCorp's IRP	2019	2021 (initial option)	2021 (final option)	(not included)	(not included)	(not included)	Included	Included
Logical Progression	✓	✓	✓	✓	✓	✓	✓	✓

VIII. Planning Reserve Margin Requirements and Reliability Metrics

In its initial comments, Sierra Club raised several concerns regarding PacifiCorp's use of a 13 percent planning reserve margin requirement in its modeling, which Staff's Report acknowledges. Staff's similar concerns helped lead to inclusion of PacifiCorp's planning reserve margin on the agenda at the February 24, 2022 workshop. Additional information obtained both through discovery and during the February 24, 2022 workshop has alleviated some of Sierra Club's initial concerns;[34] however, other concerns still remain and Sierra Club recommends that the Commission require updated information prior to an acknowledgment decision:

A. Reliability Metrics

First it is not clear what specific reliability criteria PacifiCorp is using to determine whether the preferred portfolio (or any of the variants and sensitivities studied) are sufficiently reliable.

[34] Namely, Sierra Club has less concern with two issues originally raised. First, Sierra Club is less concerned with PacifiCorp's use of a 13 percent planning reserve margin as a model input because it appears the input was applied as more of an interim modeling step, rather than a targeted outcome linked to a specific reliability metric. Second, since its initial comments were filed, Sierra Club learned that although the 13 percent margin was applied to individual load areas, resources can contribute to the reserve margin from neighboring load areas, as long as there is sufficient transmission capability. This alleviates most of Sierra Club's concern about PacifiCorp taking advantage of its geographic diversity.

Standard industry practice would use metrics such as loss of load expectation ("LOLE"), loss of load probability ("LOLP"), or expected unserved energy ("EUE") as benchmarks for reliability performance. For example, one of the most common standards used is an LOLE of 0.1/yr, which equates to an expected loss of load of one day every ten years.

However, PacifiCorp's IRP has not provided any information on how this resource selection process, and the subsequent portfolios, perform with respect to the reliability metrics mentioned above. For each portfolio, PacifiCorp did provide values for the Energy Not Served ("ENS") expressed as "Average Annual ENS, 2021-2040 % of Average Load." However, PacifiCorp did not specify what threshold for the ENS values it considered acceptable or reliable.

Going forward, Sierra Club recommends that the Commission require PacifiCorp to define a specific reliability metric for evaluating its resource portfolios along with a specific performance target. For example, a reasonable approach could be to define any portfolio with a LOLE value <0.1/yr as being reliable.

B. Binding Transmission Limits

Second, while it was not initially clear from PacifiCorp's IRP, Sierra Club's understanding is that PacifiCorp allows for capacity resources in each of PacifiCorp's 15 load areas to contribute towards the 13 percent reserve margin in other load areas, if there is sufficient transmission available. While Sierra Club supports this approach, PacifiCorp has not provided much transparency around when and where these transmission limits may become binding when attempting to meet the 13 percent reserve margin target. This information is important for several reasons. First, disclosure of transmission limits would allow stakeholders to assess the reasonableness of PacifiCorp's assumptions within its own system. Second, this information would assist project developers to identify the locations with the greatest need and opportunity

for development. Going forward, Sierra Club recommends that PacifiCorp provide greater detail on when and where transmission constraints become binding (or close to binding) as the LT model selects resources to fulfill the 13 percent reserve margin requirement.

IX. Staff's Request for Comment on Hydrogen Load

The Staff Report requested that "stakeholders provide any responses to Staff's Opening Comments on incorporating flexible hydrogen load onto PacifiCorp's system in their Reply Comments."[35] Sierra Club notes that hydrogen-based energy technologies have recently seen significant interest in the trade press and investment communities, including significant funding in the 2021 Bipartisan Infrastructure Bill. However, large-scale deployments have still yet to be realized. Sierra Club is hopeful that green hydrogen—e.g., hydrogen energy produced with renewable energy—can play an important, if limited, role in the clean energy future, but is also wary that there are many challenges and pitfalls that could upend this progress.

Regarding the notion of flexible hydrogen load, it is worth noting that opportunities to capture excess renewable energy production (i.e., avoided curtailment) are very limited at present. While curtailments may increase in the future, this still likely represents a fairly limited amount of energy in MWh that hydrogen load could absorb through electrolysis. Additionally, the number of hours where a hydrogen-capable peaker might be dispatched is also likely to be very limited and represents a form of "seasonal storage."

As such, Sierra Club expects that the development of green hydrogen for use exclusively in the power sector could be very limited and likely cost prohibitive. However, there are other industries that could utilize green hydrogen and may make the case for usage in the power sector

[35] Staff Report at PDF p. 19.

more compelling. Sierra Club recommends that Staff and PacifiCorp consider opportunities to leverage the production of green hydrogen for use in other sectors. For example, there may be a much larger market for green hydrogen in heavy industry, steel, diesel fuel and/or long-haul transportation.

Additionally, Sierra Club believes any green hydrogen source considered should adhere to specific sourcing criteria to ensure that it is truly environmentally beneficial (and not detrimental).

X. Data Transparency and Stakeholder Collaboration

The Staff Report begins by noting that "Staff's concerns regarding the 2021 IRP are generally around transparency and accuracy of the modeling inputs. Regarding transparency, typographical errors and inaccurate data provided in the IRP create confusion and frustration for stakeholders . . . ."[36] Sierra Club once again agrees with Staff's comments and is similarly concerned with PacifiCorp's approach to data transparency as part of its overall collaboration with stakeholders throughout the IRP development process. Most notably, a large portion of the data files that PacifiCorp provided were only provided as late as December 2021 even though these model runs were completed as much as six months prior, in June 2021. Moreover, these data files were not provided as part of PacifiCorp's IRP filing and were only produced in response to a Sierra Club data request (e.g., SC 6.1). It is unclear why PacifiCorp did not offer to provide these results as they were being developed, in the spirit of a true stakeholder collaboration. Sierra Club believes that providing stakeholders with earlier access to these materials—including during the informal

[36] *Id.* at 3.

stakeholder process and prior to filing—would have provided a much more constructive dialog and likely would have led to improvements to PacifiCorp's plan before it was filed.

Sierra Club understands that PacifiCorp's IRP and management teams may perceive risks with publicizing data and information for a plan that is not completed. However, we also believe that this lack of information is counterproductive to fostering a collaborative and collegial stakeholder process that is focused on achieving the best solutions for the public interest.

Sierra Club is also troubled by PacifiCorp's repeated attempts across multiple proceedings to suggest that coal issues should be addressed elsewhere. Whereas the Company has argued in TAM and other fuel recovery proceedings that long-term decision making, like entering into new multiyear coal supply agreements, is an issue for the IRP, PacifiCorp's Reply Comments stated that "[c]oal supply strategy is multi-faceted, especially at the Company's larger plants, so specific details of future coal procurement are beyond the scope of the IRP."[37] It cannot be true that neither the IRP nor the TAM is the appropriate venue to consider long-term fueling issues, and Sierra Club is concerned that this attitude is further indicative of the Company's lack of transparency with both stakeholders and the Commission.

Dated: March 11, 2022

Respectfully submitted,

/s/ Rose Monahan

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[37] PacifiCorp Reply Comments at 21.

Attachment 1

Confidential Attachment "OR UE-375 TAM (RalstonReplyTest) BRIDGER" to PacifiCorp's Response to Sierra Club Data Request 9.2

Sierra Club Attachment 1 contains confidential information and has been served upon the Commission and each party on the service list eligible to receive confidential information pursuant to Protective Order 21-271.

Attachment 2

Confidential Attachment "OR UE-390 TAM (RalstonReplyTest) BRIDGER" to PacifiCorp's Response to Sierra Club Data Request 9.2

Sierra Club Attachment 2 contains confidential information and has been served upon the Commission and each party on the service list eligible to receive confidential information pursuant to Protective Order 21-271.

Attachment 3

Email from Carla Scarcella, PacifiCorp Senior Regulatory Attorney to Rose Monahan, Sierra Club (Jan. 26, 2022)

Rose Monahan <rose.monahan@sierraclub.org>

LC-77 - Sierra Club's 6th Set of Data Requests

Scarsella, Carla (PacifiCorp) <Carla.Scarsella@pacificorp.com> Wed, Jan 26, 2022 at 10:37 AM
To: "Monahan, Rose" <rose.monahan@sierraclub.org>, Edward Burgess <eburgess@strategen.com>
Cc: Gloria Smith <gloria.smith@sierraclub.org>, "Baker, Randy (PacifiCorp)" <Randy.Baker@pacificorp.com>

Rose-

You are correct that there are no additional hourly data files for the P02h variant case, and that the same hourly data files already provided in response SC 6.1 for the P02-MM case were relied upon for assessing reliability of the P02h case.

[Quoted text hidden]

Attachment 4

PacifiCorp Response to Sierra Club Data Request 6.1

LC 77 / PacifiCorp
December 22, 2021
Sierra Club Data Request 6.1

Sierra Club Data Request 6.1

Please provide any LT model work papers, ST model work papers and supporting reliability assessment work papers, for any preliminary resource portfolios PacifiCorp developed for the 2021 IRP prior to applying the Granularity and Reliability Adjustments or any subsequent portfolio refinements.

Response to Sierra Club Data Request 6.1

PacifiCorp's planning process must ensure that portfolios produced are reliable. The preliminary portfolios listed below were primarily used to evaluate the difference in resource value between the Long-Term (LT) model and the Short-Term (ST) model in order to understand which options could be counted on to produce reliable portfolios.

The following LT portfolios (with PLEXOS study numbers) were run without adjustments and used to develop the Granularity and Reliability adjustments:

- PLEXOS study number 3112 (P02-MMR (CO,NG) Intentional)
- PLEXOS study number 2993 (P02-MMR (CO,NG) Intl UTWY)

Please refer to Confidential Attachment SC 6.1, which provides the LT work papers and the ST hourly capacity requirements.

Confidential information is designated as Protected Information under the protective order in this proceeding and may only be disclosed to qualified persons as defined in that order.

Attachment 5

Confidential Attachment "3112 Capacity Requirements P02-MMR (CO) Intl UTWY 2031 6-17-21" to PacifiCorp Response to SC 6.1

Sierra Club Attachment 5 contains confidential information and has been served upon the Commission and each party on the service list eligible to receive confidential information pursuant to Protective Order 21-271.