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BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH

In the Matter of PacifiCorp's 2021 Integrated Resource Plan	**Docket No. 21-035-09 Comments from Utah Clean Energy**

Thank you for the opportunity to provide comments on PacifiCorp's 2021 Integrated Resources Plan ("IRP"). PacifiCorp filed the 2021 IRP on September 15, 2021, and supplemental sensitivity studies on October 1, 2021. Utah Clean Energy's comments will focus on several of PacifiCorp's resource and technology decisions, beneficial electrification, and PacifiCorp's incorporation of Climate Change into the IRP. In sum, we recommend that the Public Service Commission ("Commission"): not acknowledge the Natrium nuclear plant until additional information regarding the plant is available and made public for modeling purposes; and also direct PacifiCorp to: (1) expand the diversity of resources in the supply side table; (2) improve the IRP's capacity to consider accelerated beneficial electrification; and (3) use the preferred portfolio dispatch of coal resources as a guide for future fuel supply contract negotiations and dispatch, and explore a more diverse array of climate change sensitivities in future IRPs.

I. UTAH INTEGRATED RESOURCE PLAN GUIDELINES AND REQUIREMENTS

The Commission established a set of guidelines for what utilities should include in their IRP process and report ("Utah IRP Guidelines" or "Guidelines"). The Guidelines define the IRP as "a utility planning process which evaluates all known resources on a consistent and comparable basis, in order to meet current and future customer electric energy services needs at the lowest total cost to the utility and its customers, and in a manner consistent with the long-run public interest."[1] Utah law also requires PacifiCorp to file its action plan with the Commission so the Commission may review and issue any guidance for PacifiCorp.[2] The Commission has previously described its review of an IRP as follows:

> Under the Commission's Guidelines, we consider whether to "acknowledge" [the] IRP []. Acknowledgment of the IRP means the filed IRP complies with regulatory requirements with regard to the planning process, but conveys no sense of regulatory approval of specific Company resource acquisition decisions. Instead, integrated resource planning is an open, public process through which all relevant supply-side and demand-side resources, and the factors influencing choice among them, are investigated in the search for the optimal set of resources given the expected combination of costs, risks and uncertainty over the long-run to provide electric service to customers.[3]

The IRP guidelines provide PacifiCorp and the Commission a forum for exploring short and long-term resource needs that is separate and distinct from the short-term resource procurement process. When exploring resource options, complying with the IRP Guidelines is vital to ensure consistent and comparable evaluation of a wide array of resource types that may contribute to the least-cost optimized portfolio, and protect the long-run public interest.

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[1] Public Service Commission Docket No. 90-2035-01, Order issued on June 18, 1992 ("92' Order"), page 41.
[2] Utah Code. Ann. § 54-17-301(1); Utah Administrative Code section R746-430-1.
[3] Docket No. 05-2035-01, Public Service Commission Order Issued on July 21, 2005, page 3; Docket No. 11-2035-01, Public Service Commission Order issued on March 22, 2012, pages 3-4; Docket No. 13-2035-01, Public Service Commission Order issued on January 2, 2014, page 5; Docket No. 15-035-04, Public Service Commission Order issued on January 8, 2016, page 6.

II. RESOURCE AND TECHNOLOGY DECISIONS IN THE 2021 IRP

Over a 20-year planning horizon, the least-cost, least-risk resource portfolio is likely to consist of both resources that are commercially available now with known costs, and resources that are on the cusp of commercial viability. This is because there are so many new technologies in development and establishing proof of concept. This trend is only going to continue throughout the planning horizon. The Utah IRP Guidelines require the IRP to consider "all present and future resources, including future market opportunities (both demand-side and supply-side), on a consistent and comparable basis."[4] This includes an "assessment of all technically feasible generating technologies including: renewable resources, cogeneration, power purchases from other sources, and the construction of thermal resources."[5] The end result of the IRP's analysis of these different resource options should be "the selection of the optimal set of resources given the expected combination of costs, risk and uncertainty."[6]

PacifiCorp included several new resources in the 2021 IRP and not all of them are currently commercially viable. Chief among them is a first of its kind nuclear plant and a non-emitting hydrogen peaker resource—the latter being a proxy for all resource with certain characteristics and dispatch profiles necessary to maintain a reliable grid. Given the IRP's focus on long-term risk, as well as lowest cost resources today, UCE believes that PacifiCorp would be doing its customers a disservice by not including up-and-coming resource technologies in the IRP planning process. As the Commission reaffirmed throughout the years, the IRP process is not meant to lock in resource decisions but rather to assess a wide variety of options "in the search for the optimal set of resources given the expected combination of costs, risks and

[4] 92' Order, page 42.
[5] *Id*. at 43.
[6] *Id*. at 41.

uncertainty over the long-run to provide electric service to customers."[7] At this point in time it is a reasonable assumption that we will procure resources that are not currently commercially viable over the next 20 years. Including some of these resources in IRP analysis now allows us to more efficiently plan for a future that includes these resources.

However, a balance must be struck between the need to examine new technologies that may have less certain costs and risks, and established resources. Utilities should use as much precision as possible when evaluating all resources, including those that are nascent or looking for proof of concept, so the IRP models have as much up-to-date information as possible when selecting resources to be part of the preferred portfolio. In our view, it is more reasonable for cost and technology inputs to be less certain in the latter years of the IRP process—outside the action plan window—than the near-term. This allows the utility to use the IRP to identify how new resources may interact with its system and what infrastructure may be required to build them. The resource inputs should allow the model to select a resource at its optimum location, using best available and transparent cost information, and include a wide variety of resource options to maximize the model's chance of selecting resources that prove out over time. Following these best practices ensures consistent and comparable comparison of a variety of resources with different technologies and commercial deployment timelines.

The question of what, and how many resource types should be included in the IRP modeling is certainly not new to the Utah IRP process. In the 2007 IRP, several parties argued that the utility did not review technically feasible resources on a consistent and comparable basis

[7] Docket No. 05-2035-01, Public Service Commission Order issued on July 21, 2005, page 3; *see also* Docket No. 11-2035-01, Public Service Commission Order issued on March 22, 2012, pages 3-4; Docket No. 13-2035-01, Public Service Commission Order issued on January 2, 2014, page 5; Docket No. 15-035-04, Public Service Commission Order issued on January 8, 2016, page 6.

because several resources were excluded or restricted to proxy resources in the IRP modeling.[8] The utility responded by arguing that proxy resources are sufficient to identify a need, then a competitive solicitation process will select actual resources.[9] The Commission disagreed with the utility in its Order, reiterating that the IRP is exactly the place to review a diverse range of resources with "costs and risks of different types, amounts and timing of resources that serve the public interest in the long run."[10] The Commission went on to "direct the Company to evaluate a full spectrum of supply-side and demand-side options which have different characteristics regarding size, dispatchability, expected cost, expected risks and lead time for construction."[11]

It is clear from the 2021 IRP that new or developing technologies will play an important role in meeting future resource needs, and that there is some uncertainty about the specific technologies and their cost and risk profiles. In the short-term, there is a clear need for "no regrets" investments today to satisfy an increasing customer load, and to mitigate cost and risk during the action plan window. For example, hybrid solar and storage resources, energy efficiency and demand response are low-cost flexibility-resources that will help reduce near and future energy needs, cost, and risk. But as newer technologies arrive, it is important that the IRP take an expansive view of potential resources considered in the supply side table over the planning horizon. For example, long-term or multi-day storage technologies, green hydrogen resources, and advanced demand response and distributed resources paired with non-wires alternatives for the distribution and transmission systems are all examples of resources that may not be fully mature, in the market as a whole or on PacifiCorp's system, but that can play a

[8] Docket No. 07-2035-01, Public Service Commission Order issued on February 6, 2008, pages 18-24.
[9] *Id*. at 22-23.
[10] *Id*. at 23, ("While it is reasonable the Company will carry forward its analytical process in selecting among actual, rather than proxy, resources in a competitive solicitation, this does not replace the importance of the IRP in understanding the expected costs and risks of different types, amounts and timing of resources that serve the public interest in the long run").
[11] *Id*.

substantial role in maintaining reliable service in the years to come. The two-year IRP cycles provide regular opportunities to update these inputs and assumptions, providing a sufficient hedge against the accompanying uncertainties. The IRP is the appropriate venue to explore as many technically feasible resources as possible because it is the most robust planning tool capable of analyzing the tradeoffs between different cost and risk scenarios.

In the following subsections, we discuss specific resource decisions from the 2021 IRP and provide support or recommendations for future IRPs.

1. *There are too many uncertain variables and inputs regarding the Natrium nuclear plant to model this resource on a consistent and comparable basis in this IRP.*

For the first time, PacifiCorp's model selected a nuclear facility in the preferred portfolio. The plant would provide 345 MW of baseload energy, with a molten salt storage component supporting a maximum output of 500 MW.[12] PacifiCorp did not include this resource in the supply side table because "the specific costs and performance assumptions for the Natrium advanced nuclear demonstration project are confidential."[13] There are several more ambiguities regarding this resource, such as an uncertain regulatory approval process, the likelihood of unanticipated delays is construction, and whether a reliable fuel source exists.

Based on the criteria discussed above for technically feasible generating resources that should be considered, this resource should not have been included in the 2021 IRP, but may be included in future IRP's if additional information becomes available and is made public for modeling purposes. To the best of our knowledge, PacifiCorp has not identified a source of fuel

[12] 2021 IRP volume I, page 204.
[13] *Id.*

for this resource, and there is no current fuel source available in the United States.[14] Accordingly, the fuel costs are unknown at this time. Without identifying a source of fuel and its costs, much less the final total capital costs that ratepayers will pay, it is unreasonable to expect that PacifiCorp can model this resource on a consistent and comparable basis to other resources.

Additionally, the timeline for this project could easily follow in the wake of other nuclear facilities and be delayed for a variety of reasons.[15] Before any action is taken in furtherance of procuring this resource, the risk of delays should be studied in greater detail to see what happens to the preferred portfolio if delays manifest. Especially since this resource is scheduled to come online very close to the action plan window—within the scope of the 2022 All Source RFP Commercial Operation Date requirement. Further, the 2021 IRP action plan calls for commercial agreements and community action plans to be in place for this resource at the end of 2022, and employee training to begin by 2025. These are serious commitments to make without having a reasonable basis for knowing that this resource will obtain regulatory approval, much less that its modeling conformed to the Utah IRP Guidelines. Finally, the model was not allowed to select an optimal location for the resource. PacifiCorp locked it in as a replacement to the Naughton plant, which creates some ambiguity regarding whether the resources in the preferred portfolio are optimized.[16]

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[14] Hogan Lovells, *HALEU Developments: Overview of the Issue, Recent NEI White Paper, and NRF Staff Rulemaking Request*, January 21, 2022, *found at*: https://www.hlnewnuclear.com/2022/01/haleu-developments-overview-of-the-issue-recent-nei-white-paper-and-nrc-staff-rulemaking-request/, (noting that the only current option to purchase this fuel today is to buy it from Russia).

[15] "The risks of delay and budget overrun are especially significant in first-of-a-kind (FOAK) engineering projects." World Nuclear Association, *Lessons-Learned in Nuclear Construction*, *found at*: https://world-nuclear.org/getattachment/e9c28f2a-a335-48a8-aa4f-525471a6795a/REPORT-Lesson-learning-in-Nuclear-Construction.pdf.aspx; *see also* Power, *American Nuclear Society warns advanced reactors face 'significant deployment delays' unless DOE accelerates HALEU availability program*, February 15, 2022, *found at:* https://www.powermag.com/press-releases/american-nuclear-society-warns-advanced-reactors-face-significant-deployment-delays-unless-doe-accelerates-haleu-availability-program/; World Energy, *More Delays Likely for Vogtle Nuclear Plant*, August 2, 2019, *found at*, https://www.world-energy.org/article/1127.html.

[16] 2021 IRP volume I, page 5.

Given that this resource technology has never been built before, and material regulatory risk applies to its construction, as well as a lack of clarity on the source of fuel, actual cost information that ratepayers would bear, and a lack of location optimization in the modeling, we do not believe that this resource is technically feasible under the Utah IRP Guidelines at this time. Nor was this resource considered on a consistent and comparable basis to other supply side resources. The full costs associated with this nuclear resource are unknown, and as a result, it is difficult to verify that it is a lower cost and risk option than alternatives. For these reasons, the Commission should not acknowledge this resource selection in the 2021 IRP. Moving forward, the Commission should direct PacifiCorp to only consider resources that have transparent cost information and a reasonable risk profile, both from a regulatory and operational or fuel procurement perspective, to ensure that only technically feasible resources are modeled on a consistent and comparable basis.

2. *PacifiCorp's no new gas policy is warranted given the unfavorable economics relative to alternatives and high risk of stranding new gas resources.*

PacifiCorp's decision not to model new gas resources is appropriate considering the trends toward decarbonization, the risk of stranded costs, and the increasing price gap between natural gas and alternative resources. The utility noted that new gas resources depreciate over "30 – 40 years."[17] Several states in PacifiCorp's service territory have announced intentions to decarbonize their energy mix soon, creating a substantial risk of stranding any new gas resource. PacifiCorp also noted that these state policies restrict the feasibility of obtaining the permits needed to site and operate new gas plants.[18] It is reasonable to question whether a resource is

[17] *Id*. at page 245.
[18] *Id*.

technically feasible if there is material risk in obtaining the necessary permits to build the resource.

Further, new gas resources simply are not cost competitive with alternative options. PacifiCorp's 2020 All Source RFP produced zero gas resource bids. Outside of PacifiCorp's system, market estimates of energy resource costs show that gas plants, especially gas peaking plants, are more expensive than wind and solar. In fact, wind and solar costs have fallen so significantly that their prices are approaching the marginal cost of continuing to operate fully depreciated gas assets.[19] Because of these risks, it is reasonable for PacifiCorp to no longer view new gas plants as technically feasible under the IRP Guidelines and remove this resource from consideration in IRP supply side analysis.

3. The Commission should direct PacifiCorp to include a wider variety of resource technologies in the supply side table.

As noted above, the IRP is the best forum to explore different scenarios of resource types, costs, risks, and build times to identify the optimum cost-effective portfolio that accounts for long-run risks to the public. Use of proxy resources, while certainly more efficient, does not capture the full potential of new resources with unique benefits, costs, and risk profiles. We recommend that the Commission direct PacifiCorp to include a wider variety of resources in the 2023 supply side table to better account for these new resources.

Consistent with our recommendation above, we are not suggesting that PacifiCorp should include resources that do not have reasonable cost estimates, regulatory pathways, or fuel supplies, which may struggle to be compared on a consistent and comparable basis. But resources with reasonably known costs should not be discounted simply because on a marginal

[19] Lazard's Levelized Cost of Energy Analysis—Version 15.0, page 2, footnote 5, *found at*: https://www.lazard.com/media/451881/lazards-levelized-cost-of-energy-version-150-vf.pdf.

cost basis they appear to be more expensive than alternative resources. Cost is not the only factor considered in the IRP. The Commission previously found the 2011 IRP "deficient in providing sufficient analysis of the tradeoffs between costs, risks, customer rate impact, supply reliability, resource diversity, and the future uncertainty of greenhouse gas and RPS policies, particularly for the Preferred Portfolio."[20] This discussion of tradeoffs cannot happen unless a diverse range of resources are considered.

Further, it is not a foregone conclusion that the cheapest resources are always the best for customers. The Commission said in the IRP Guidelines that "[h]igher cost resources would be acquired when it is in the interests of the Company and its ratepayers to reduce the risks associated with future regulations."[21] Greenhouse gas regulations and regional haze regulations represent a significant risk to a large portion of PacifiCorp's resource fleet. This is all the more reason to expand the supply side table to additional emission-free resources that may appear more cost effective, but that also may mitigate environmental and regulatory risks.

The technologies and resources that should be expanded or included in the 2023 supply side table could be simply expanding the amounts and locations of current supply side resources, giving the model greater flexibility to optimize placement and amount of these resources, and including entirely new technologies. New technologies could include aggregated distributed energy resources and new storage options including several different flow battery technologies. Commercial demonstrations of flow battery technologies are currently underway, including a 21 MW / 8.4 MWh vanadium flow battery paired with solar in Alberta,[22] a 1 MW / 150 hour iron

[20] Docket No. 11-2035-01, Public Service Commission Order issued on March 22, 2012, page 7.
[21] 92' Order, page 12.
[22] PV Magazine, *Canada's largest solar-powered vanadium flow battery*, February 3, 2022, *found* at: https://www.pv-magazine.com/2022/02/03/canadas-largest-solar-powered-vanadium-flow-battery/.

flow battery under construction at Great River Energy in Minnesota,[23] and a 15 MW / 1500 MWh iron flow battery planned by Georgia Power collaborating with Form Energy.[24] San Diego Gas & Electric recently completed a four-year pilot of a 2 MW / 8 MWh micro-grid powered by a vanadium redox flow battery.[25] It appears that flow batteries will be considered in the 2023 IRP, but only a 20 MW resources with 160 MWh, and the specific type of flow battery has yet to be revealed. Even though these storage technologies and other resources may be more expensive than lithium-ion storage resources, the different characteristics, such as longer-term output and the ability to site these resources as transmission and distribution upgrade alternatives, may generate additional tradeoff benefits that will not be identified unless these resources are given a chance to be modeled.

We acknowledge that we cannot be certain which new technologies will ultimately go on to play a role in the future energy grid and given their early stage of development, their costs profiles will likely change over time. However, the supply-side table should include as many feasible technologies and resources as practicable to ensure that the preferred portfolio is optimized for "costs and risks of different types, amounts and timing of resources that serve the public interest in the long run."[26] We recommend that the Commission direct PacifiCorp to include a greater array of technically feasible resource options, including but not limited to additional storage options and additional amounts and locations for existing resources, to generate an understanding of the cost and risk tradeoffs between different resource portfolios.

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[23] Green River Energy, *Long-duration battery project in the works*, June 17, 2020, *found* at: https://greatriverenergy.com/long-duration-battery-project-in-the-works/.
[24] Utility Dive, *Form Energy announces partnership with Georgia Power to test 100-hour iron-air battery*, February 10, 2022, *found at*, https://www.utilitydive.com/news/form-energy-announces-partnership-with-georgia-power-to-test-100-hour-iron-/618626/.
[25] Natural Gas Intelligence, *SDG&E Charges Forward with Battery-Powered Microgrids, Touts Success of Four-Year Pilot Project*, February 9, 2022, *found at*, https://www.naturalgasintel.com/sdge-charges-forward-with-battery-powered-microgrids-touts-success-of-four-year-pilot-project/.
[26] Docket No. 07-2035-01, Public Service Commission Order issued on February 6, 2008, page 23.

III. INCREASED ELECTRIFICATION OF TRANSPORTATION AND BUILDING SECTORS

Lawmakers at the state and Federal level promote electrification as a key pathway to meet air quality and greenhouse gas emission goals. These policies will accelerate building and transportation electrification faster than previously anticipated. Specific to Utah, the passage of the Federal Bipartisan Infrastructure Law ("BIL") and approval of the Rocky Mountain Power Electric Vehicle Infrastructure Program ("EVIP") is expected to bring historic amounts of investment to transportation electrification. In addition, recent analysis from Energy and Environmental Economics Inc. ("E3") finds that electrification technology such as heat pumps are more affordable to operate than a natural gas furnace in most of the climate zones in Utah.[27] Given the favorable economics of electric appliances, in addition to the BIL and the EVIP, it is more important than ever that PacifiCorp accounts for this accelerated growth in load in its IRP. This section provides recommendations on how PacifiCorp should consider increased electrification in future IRPs.

First, PacifiCorp must accurately model the increased load growth in the base case of the IRP. Over the next 10 years our building and transportation sectors will increasingly electrify. PacifiCorp's practice of using historical data to model load growth, then adjusting after the fact for electrification growth is no longer a reasonable predictor of expected load growth because it is too conservative to identify the full range of possibilities.

In its next IRP PacifiCorp should consider adopting a modeling methodology that incorporates more than historical data and include probabilistic sensitivities that are better suited

[27] Energy and Environmental Economics Inc., *The Economics of All-Electric New Construction in Utah* (2022), *found at*: https://www.ethree.com/wp-content/uploads/2022/02/Economics-of-All-Electric-New-Construction-in-Utah.pdf.

to address: (1) increases in variable daily or hourly load profiles due to electrification; (2) changed loads resulting from the effects of climate change; and (3) more frequent and sever adverse weather events. An updated, more granular modeling process could give stakeholders a better understanding of how to cost-effectively meet the increased demand to maintain reliability.

Second, this increased electrification represents the single greatest load growth opportunity in recent history in Utah. Setting aside investments in efficiency, the lowest cost sources of generation are variable. Given the increased load, and the inevitable increase in variable generation, PacifiCorp should identify and develop as many flexible resources as possible. The Company should include plans for direct load control of electric vehicles, time of use ratemaking, demand response aggregation, and use of other distributed energy resources to maximize flexibility of the distribution system. These resources could appear as measures in the conservation potential assessment, and/or used as options in the modeling tools used to identify non-wires alternatives to transmission and distribution system upgrades.

Third, the IRP should reconsider how it models investments in energy efficiency to better align with actual demand side management program savings. Research from the Lawrence Berkeley National Laboratory confirms that energy efficiency is still the cheapest resource, at about 3¢/kWh saved.[28] In addition, distributed energy resources (DERs) such as energy efficiency "promote[] greater reliability and resilience at the Bulk Power System, the Distribution System, and Demand Side Management Level."[29] The average actual MWh savings

[28] Berkeley Lab, *Still the One: New Study Finds Efficiency Remains a Cost Effective Electricity Resource*, July 22, 2021, *found at*: https://emp.lbl.gov/news/still-one-new-study-finds-efficiency-remains (importantly, "about half of the savings that occur during times of peak demand — for most regions, in summer — cost utilities less than $100 per kilowatt (kW) saved. Three-quarters of the peak demand reductions cost less than $200 per kW saved.").
[29] Berkeley Lab, *Quantifying Grid Reliability and Resilience Impacts of Energy Efficiency: Examples and Opportunities*, December 2021, *found at*: https://emp.lbl.gov/publications/quantifying-grid-reliability-and.

from the previous five years is 326,177 MWh/year (2016-2020).[30] In contrast, the average MWh savings for the first five years of Class 2 DSM selected in the 2021 IRP is only 264,833 MWh/year (2021-2025). This is 23% lower than the actual DSM achieved in the previous 5 years. This issue is explored further in our comments with SWEEP, but resolving this discrepancy will help the IRP better plan for higher levels of electrification by incorporating more cost effective energy efficiency into the portfolio.

Finally, given the low-cost and variability of clean energy resources that PacifiCorp intends to implement, DERs will play a larger role in creating reliability and resilience for the grid. A recent report from the International Panel of Climate Change ("IPCC") concluded that "energy generation diversification, including with renewable energy resources and generation that can be decentralised (sic) depending on context (e.g., wind, solar, small scale hydroelectric) and demand side management (e.g., storage, and energy efficiency improvements) can reduce vulnerabilities to climate change, especially in rural populations."[31] PacifiCorp should be exploring ways in which to achieve more DR and DER penetration than they currently have.

One way to help accomplish this would be increased transparency and public involvement in distribution system planning. Many utilities are required to conduct a stakeholder process at the distribution level, like what occurs during an IRP process.[32] Policy at the local, state and national level is driving the Energy Transition from fossil fuels in our homes and cars to renewably generated electricity.[33] At the same time, Utah is among the fastest growing states

[30] Rocky Mountain Power Utah Energy Efficiency and Peak Reduction Annual Report from 2016-2020. Available at https://www.pacificorp.com/environment/demand-side-management.html.
[31] IPCC Sixth Assessment Report, *Summary for Policymakers*, page SPM-26, February 27, 2022, *found at*: https://report.ipcc.ch/ar6wg2/pdf/IPCC_AR6_WGII_SummaryForPolicymakers.pdf.
[32] *See, e.g.*, PacifiCorp, Oregon Distribution System Planning, https://www.pacificorp.com/energy/oregon-distribution-system-planning.html.
[33] *See, e.g*. Salt Lake City, Redevelopment Agency Electric Building Incentive, available at https://www.slc.gov/mayor/2021/12/15/redevelopment-agency-moves-needle-on-mayor-mendenhalls-air-quality-

in the nation, with a large amount of residential infill adding new stresses to the distribution grid. A public planning process focused on ensuring a flexible, resilient, and reliable distribution system would allow stakeholders to help PacifiCorp design a modern distribution system that leverages several distributed technologies, avoids more costly transmission and distribution upgrades, and creates substantial resiliency benefits. As PacifiCorp has said before, a transparent, public process is essential because "[resource planning] decisions can have ... significant economic and environmental consequences," which will be borne by customers.[34]

To summarize, local, state, and national governments are implementing policies that promote electrification of our built environment and our transportation sector. Electrification in Utah is affordable[35], and Utah is embracing this change through a multitude of policies, programs, and through increased customer demand.[36] Investor-Owned Utilities must play a leadership role in the coming electrification process, and part of that leadership is adequately planning for it in the IRP.

Accordingly, regarding increased electrification PacifiCorp should consider incorporating the following into its 2023 IRP and beyond:

(1) Adopt a more iterative planning model that accounts for increased load from increased electrification, changed load from climate change effects, and for more frequent extreme weather events.
(2) Identify and account for all flexibility benefits from supply side, DR, and DERs.
(3) Better align the DSM evaluation process in the IRP with actual program savings from Utah.
(4) Create a stakeholder process that is focused on the distribution system to help create a flexible, resilient, and reliable distribution system as electrification progresses.

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goals-with-new-sustainable-development-policy/ (local incentives for building electrification), see also e.g., Rocky Mountain Power Electric Vehicle Infrastructure Program (neighborhood and community charging), *also see* Federal Highway Administration National Electric Vehicle Infrastructure Formula Program, *found at* https://www.fhwa.dot.gov/bipartisan-infrastructure-law/nevi_formula_program.cfm (transportation corridor electrification).

[34] PacifiCorp's 2019 IRP, Appendix C – Public Input Process, page 59.

[35] *Supra* at 21.

[36] *Supra* at 25

IV. INCORPORATING MEANINGFUL CLIMATE CHANGE AND DECARBONIZATION ANALYSIS INTO THE IRP

Incorporating environmental externalities into the IRP process has been one of the core tenants of the IRP in Utah since the Guidelines were formed. The "external costs associated with the electric utility industry are uncertain, but clearly not zero" and "without some form of government intervention current market forces cannot adequately address the externality problem."[37] Environmental externalities, including government regulation and the need to respond to climate change, can "alter the value of [] resources and force the acquisition of replacements. Thus, changing regulations can raise internal costs through changes in operation of current plant or requirements to add control technology or the purchase of emission permits. Such costs will ultimately be borne by either the ratepayer or the stockholder."[38]

The Guidelines require the IRP to include two components related to environmental externalities:

> [T]he Commission concludes that an analysis of environmental risk must be included in the Company's IRP. The analysis should include the quantification of actual emissions as well as a range of dollar values for external costs for each acquisition strategy. In addition, the analysis should include an appraisal of how operations of existing and future resources might be affected and how this would impact costs.[39]

In addition to these requirements, the IRP Guidelines require more general consideration of the "long-run public interest." The Guidelines and comments from stakeholders during previous IRPs consider the "long-run public interest" to include "consideration of environmental ramifications of the production and consumption of electric energy services. All other things

[37] 92' Order, page 11-12.
[38] 92' Order, page 12 ("Higher cost resources would be acquired when it is in the interests of the Company and its ratepayers to reduce the risks associated with future regulations").
[39] '92 Order, page 13.

being equal, the Company will be expected to pursue resource acquisitions that minimize adverse environmental impacts as a method of reducing risk."[40]

These provisions of the Guidelines impose an obligation on PacifiCorp to account for climate change and its incumbent costs and risks to PacifiCorp's operations in its IRP to the greatest extent possible. PacifiCorp will not be able to accurately identify the full range of applicable costs and risks that are relevant to the long-run public interest if this factor is not adequately studied.

The IPCC recently concluded that "[i]t is unequivocal that human influence has warmed the atmosphere, ocean and land. Widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred."[41] These changes have increased the frequency of extreme weather events including "increases in the frequency of concurrent heatwaves and droughts on the global scale; fire weather in some regions of all inhabited continents; and compound flooding in some locations."[42]

As is pertains to energy systems, a more recent IPCC report issued on February 27, 2022, noted that "Key infrastructure systems including . . . energy will be increasingly vulnerable if design standards do not account for changing climate conditions."[43] PacifiCorp itself has noted that climate change and its attendant consequences create "the potential for increasingly extreme

[40] '92 Order, page 20; Docket No. 07-2035-01, Public Service Commission Order issued on February 6, 2008, page 24, *found at*: https://pscdocs.utah.gov/electric/07docs/07203501/07203501RO.pdf, ("The Division recommends future IRPs discuss, and where possible, quantify all externalities, both positive and negative, that can be identified, including societal health effects from activities associated with the Company's operations, climate change, and impacts on local and regional economies. The Committee recommends the Commission provide more specific direction to the Company on its inclusion and use of externality values in order to provide a more robust picture of all costs involved with certain resource choices."

[41] World Meteorological Organization, of behalf of the United Nations Secretary-General, *United in Science 2021, A multi-organization high-level compilation of the latest climate science information*, page 15, https://library.wmo.int/doc_num.php?explnum_id=10794.

[42] *Id*. at 17.

[43] IPCC Sixth Assessment Report, *Summary for Policymakers*, page SPM-12, *found at*: https://report.ipcc.ch/ar6wg2/pdf/IPCC_AR6_WGII_SummaryForPolicymakers.pdf.

weather and [] underlying reliability challenges that may be caused as part of its planning process."[44] It is clear that climate change and its accompanying costs and risks will affect PacifiCorp's system, and as such, PacifiCorp should be studying how climate change will affect its resources decision in the IRP, and how it can decarbonize its system to mitigate the consequences of climate change for its customers. However, PacifiCorp's IRP's to date have not meaningfully explored either of these goals.

PacifiCorp did include one "climate scenario" sensitivity in its 2021 IRP to comply with the requirements of a Washington law, which included an updated load forecast based on projected temperatures and hydrological conditions, and assumed costs for the social cost of greenhouse gasses. While this is a helpful start to understanding how climate change might affect the load forecast, additional sensitivities using a variety of assumptions that include more variables beyond temperature change and hydro conditions are necessary to fully develop an understanding of the costs and risks associated with climate change. PacifiCorp did also discuss how climate change may affect certain resources moving forward. The utility noted that "[t]he effect of extreme weather events associated with climate change is an evolving area of research that is growing in importance as renewable, intermittent resources dependent upon wind, solar, and hydrologic conditions comprise an increasing proportion of utility resource portfolios."[45]

Other utilities and third-party analysts have begun incorporating climate change considerations into their IRPs. A recent "Review of Water and Climate Change Analysis in Electric Utility Integrated Resource Planning" noted that three IRPs tackled thermal water

[44] PacifiCorp's 2021 IRP, Volume I, page 115.
[45] *Id.* at 119.

constraints resulting from climate change directly.[46] The Report also depicted the power plant water stress in central Utah and Wyoming as medium to extremely high, indicating a higher probability that PacifiCorp's resources that rely on water may be affected by water constraints.[47] The Tennessee Valley Authority also perform "a climate sensitivity case . . . to explicitly study the impact on cooling capacity at thermal plants in a climate change case."[48] A recent report from E3 entitled "Resource Adequacy in the Desert Southwest" also notes the intersection of all resources, including thermal resources, and climate change. The report reads, in relevant part, "climate change will continue to shift the distribution of possible weather conditions in the coming decade. . . . Weather impacts the electricity system in many ways—it affects the level of electric demand, wind and solar production patterns, thermal plant efficiency, hydrological conditions – and unprecedented extremes may have unanticipated impacts in this complex system."[49]

PacifiCorp discussion of how climate change will affect its system is a start, but we need to be studying these affects now because we are already feeling the effects of climate change. Further, PacifiCorp's discussion of how climate change will affect its system in the 2021 IRP focus exclusively on how it will affect wind, solar, hydro resources, and increase wildfire risk. There was no discussion of how climate change might affect its thermal fleet, or how its existing thermal resources are contributing to climate changes. Both of which are relevant and necessary to fully evaluate the risks to customer flowing from climate change.

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[46] Pacific Northwest National Laboratory, *A Review of Water and Climate Change Analysis in Electric Utility Integrated Resources Planning*, October 2021, page, 13, https://epe.pnnl.gov/pdfs/Water_in_IRP_whitepaper_PNNL-30910.pdf.
[47] *Id*. at 8.
[48] *Id*. at 14.
[49] Energy, Environmental Economics, *Resource Adequacy in the Desert Southwest*, February 2022, *found at*: https://www.ethree.com/wp-content/uploads/2022/02/E3_SW_Resource_Adequacy_Final_Report_FINAL.pdf (this report also calls into questions "uncertainties regarding the future impact of climate change on . . . [the] performance of natural gas generators during increasingly extreme weather conditions. . . .").

In past IRPs, the Commission has directed PacifiCorp to address various climate change related issues through scenario analysis. Stating "[w]e encourage PacifiCorp to engage stakeholders in developing scenarios to address and update key uncertainties."[50] Utah Clean Energy recommends that the Commission direct PacifiCorp to work with stakeholders in the 2023 IRP to include a more diverse range of climate change scenarios to better evaluate the costs and risks that climate change will impose on its system moving forward.

Sensitivities that we believe are relevant include identifying the lowest cost decarbonization pathway for PacifiCorp. It is well established that climate change poses unprecedented risks to our society, and identifying how PacifiCorp will transition to a non-emitting resource portfolio at the least cost is a vital risk consideration for its customers. These sensitivities could also study how the portfolio changes with new load forecasts or changes in resource dispatch profiles for all resources.

Lastly, we recommend that the Commission direct PacifiCorp to use its coal unit dispatch from the preferred portfolio as its primary guide when negotiating new fuel supply agreements and real time dispatch. PacifiCorp's coal fleet is a substantial contributor to climate change. The need to line up real-time dispatch of PacifiCorp's coal fleet with the 2021 IRP emission reductions is a necessary first step to decarbonize its energy portfolio on a timeline that can help meaningfully avoid the worst consequences of climate change.

V. RECOMMENDATIONS:

In sum, Utah Clean Energy recommends that the Commission take the following actions in the 2021 IRP:

[50] Docket No. 13-2035-01, Public Service Commission Order issued on January 2, 2014, page 27.

- The Commission should not acknowledge the Natrium nuclear plant in the 2021 IRP because there are too many uncertain variables and inputs regarding this resource to model it on a consistent and comparable basis. Moving forward, the Commission should direct PacifiCorp to only consider resources that have transparent cost information and a reasonable risk profile, both from a regulatory and operational or fuel procurement perspective, to ensure that only technically feasible resources are modeled on a consistent and comparable basis.
- The Commission should acknowledge PacifiCorp's decision to not model new gas resources given the trends toward decarbonization, the risk of stranded costs, and the increasing price gap between natural gas and alternative resources.
- The Commission should direct PacifiCorp to include a greater array of technically feasible resource options, including additional storage options, aggregated distributed energy resources, and additional amounts and locations for existing resources, to generate an understanding of the cost and risk tradeoffs between different portfolios.
- Regarding electrification, PacifiCorp should consider incorporating the following into its 2023 IRP and beyond:
    - Adopt a more iterative planning model that accounts for increased load from increased electrification, changed load from climate change effects, and for more frequent extreme weather events.
    - Identify and account for all flexibility benefits from supply side, DR, and DERs.
    - Better align the DSM evaluation process in the IRP with actual program savings from Utah.
    - Create a stakeholder process that is focused on the distribution system to help create a flexible, resilient, and reliable distribution system as electrification progresses.
- The Commission should direct PacifiCorp to work with stakeholders in the 2023 IRP to include a more diverse range of climate change scenarios to better evaluate the costs and risks that climate change will impose on its system moving forward, one of which should be a scenario that evaluates the least cost least risk pathway to a very low emission portfolio.
- The Commission should also direct PacifiCorp to use its coal unit dispatch from the preferred portfolio as its primary guide when negotiating new fuel supply agreements and real time dispatch.

DATED March 4, 2022.

Respectfully submitted,

/s/ Hunter Holman

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CERTIFICATE OF SERVICE
Docket No. 21-035-09

I hereby certify that a true and correct copy of the foregoing was served by email this 4th day of March 2022, on the following:

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