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BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH

In the Matter of PacifiCorp's 2017 Integrated Resource Plan	DOCKET NO. 17-035-16 Comments of Utah Clean Energy on 2017 IRP Update

I. INTRODUCTION

Utah Clean Energy is grateful for the opportunity to participate in the Integrated Resource Plan (IRP) public process and to submit comments in response to PacifiCorp's 2017 IRP Update. Utah Clean Energy has participated in the 2017 IRP process by submitting data requests related to the 2017 IRP Update and attending public input meetings, providing stakeholder feedback to PacifiCorp, filing data requests, and providing comments related to PacifiCorp's initial 2017 IRP. Utah Clean Energy's comments on the 2017 IRP are submitted in two parts:

1) Utah Clean Energy's comments related to PacifiCorp's coal unit analysis, the Intra-Hour Dispatch Credit, and PacifiCorp's modeling of coal, solar, and battery resources, provided herein.

2) Utah Clean Energy submits separate comments jointly with the Southwest Energy Efficiency Project (SWEEP) that focus on PacifiCorp's cuts to demand-side management ("DSM") targets and some of the benefits that DSM affords ratepayers, which we do not think the 2017 IRP Update adequately captured.

In comments on the 2017 IRP filed October 24, 2017 Utah Clean Energy recommended that the Commission not acknowledge the 2017 IRP, or the resulting Preferred Portfolio. Many of the issues we raised in comments on the 2017 have not been resolved in the 2017 IRP Update. We remain very concerned that the planning analysis failed to compare existing coal resources consistently with and comparably to any other present or future supply or demand-side resources. Although PacifiCorp did improve cost assumptions for solar and battery storage in the Supply-Side Resource Table in the 2017 IRP Update, there is significant room to improve PacifiCorp's modeling and consideration of renewable and distributed resources in the IRP process. Finally, PacifiCorp has introduced several new elements to the IRP process in the 2017 IRP update without any prior stakeholder engagement or feedback. We are concerned that two specific elements have not been sufficiently justified and will disadvantage certain types of resources: first, an update to the inputs used to derive wholesale power prices, and second, a new "intra-hour dispatch credit" that is applied selectively to coal resources. The recommendations that follow are intended to inform consideration of and improve the 2019 IRP process.

Utah Clean Energy's comments on the 2017 IRP Update address the following topics:

A. Direct PacifiCorp to conduct additional, comprehensive coal unit analysis and ensure that the 2019 IRP compares all resources, including existing coal resources, consistently with and comparably to other resources.
B. Direct PacifiCorp to exclude the Intra-Hour Dispatch Credit in the 2019 IRP unless the Company includes the credit for all eligible resources and presents it as a sensitivity.

C. Recommend that the Commission reject PacifiCorp's new assumptions used to derive hourly wholesale power prices and direct PacifiCorp to omit this change from the 2019 IRP.
D. Direct PacifiCorp to update supply-side resource prices for solar in the 2019 IRP to align with the price of recently procured resources and include pricing for Power Purchase Agreements (PPA).
E. Coordinate a robust stakeholder process and solicit stakeholder input prior to finalizing 2019 IRP studies to improve modeling of the full stack of value provided by energy storage in future IRPs.
F. Direct PacifiCorp to model customer-sited solar and an incentive for energy storage as supply-side resources in the 2019 IRP.

II. COMMENTS ON THE 2017 IRP UPDATE

A. Direct PacifiCorp to conduct additional, comprehensive coal unit analysis and ensure that the 2019 IRP compares all resources, including existing coal resources, consistently with and comparably to other resources.

In its comments for the 2017 IRP, Utah Clean Energy recommended that the Commission not acknowledge the 2017 IRP and the resulting preferred portfolio because, in part, PacifiCorp's analysis does not include "an evaluation of all present and future resources…on a consistent and comparable basis."[1] Specifically, the 2017 IRP failed to compare existing coal resources consistently with and comparably to any other present or future supply or demand-side resources.

> PacifiCorp ran "Regional Haze" screening scenarios, which created seven different coal plant retirement schedules.[2] In all subsequent capacity expansion modeling, coal resource retirement assumptions were locked in, as dictated by specific Regional Haze scenarios. In other words, coal plants were not "allowed" to compete with other resources in subsequent capacity expansion modeling. The timing and magnitude of run-rate capital and operations and maintenance costs for each coal unit were set within System Optimizer, and new resources were unable to compete with and replace them on a consistent and comparable basis.[3]

[1] Docket No. 17-035-16, Utah Clean Energy Comments filed October 24, 2017, Page 2.
[2] PacifiCorp 2017 Integrated Resource Plan, Volume 1. April 4, 2017, Page 180.
[3] Docket No. 17-035-16, Utah Clean Energy Comments filed October 24, 2017, Page 3.

PacifiCorp addressed this point in its response comments in the 2017 IRP process by stating that it would conduct additional unit-by-unit analysis of its coal resources to inform the 2019 IRP.[4] They cautioned, however, that the study may not provide a complete, portfolio-level view of the economics of PacifiCorp's coal portfolio, or capture system costs associated with stacked retirements.[5]

On June 28, 2018, PacifiCorp presented findings from its unit-by-unit analysis of its coal fleet and, as the PacifiCorp predicted, the study did not provide a complete, portfolio-level view of the economics of PacifiCorp's coal portfolio.[6] Neither did the study capture system costs associated with stacked retirements.[7] In the "Conclusions and Next Steps" slide from PacifiCorp's presentation, PacifiCorp said it would "use [the results of the study] to prioritize additional early retirement analysis for the 2019 IRP."[8] Specifically, PacifiCorp concluded that it will "incorporate 2019 IRP assumption updates as available and expand the analyses for evaluation using PaR," and "develop 'stacked' early retirement scenarios using the SO model and PaR and supplement these results with operational and system-reliability assessments."[9]

These findings indicate PacifiCorp's recognition that early coal-unit retirements may be beneficial to ratepayers, pending additional study. This conclusion is corroborated by a coal unit

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[4] Rocky Mountain Powers Reply Comments, December 15, 2017 – Page 18. *Found at* *https://pscdocs.utah.gov/electric/17docs/1703516/298525RMPReplyComm12-15-2017.pdf*.
[5] *Id.*
[6] Integrated Resource Plan 2019 IRP Public Input Meeting, June 28-29, 2018 – Page 34. F*ound at* ttp://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/2019_IRP/PacifiCorp_2019_IRP_PIM_June_28-29_2018_PUBLIC.pdf
[7] *Id.*
[8] *Id*.
[9] *Id*.

analysis the Sierra Club commissioned Energy Strategies to perform.[10] The Energy Strategies report says that "[a]s the cost of renewable energy and natural gas decline, it is reasonable to consider whether the continued operation of PacifiCorp's coal units is warranted if lower cost resource options exist."[11] Energy Strategy's study concluded that eleven of PacifiCorp's twenty-four coal units "were consistently shown to be higher regardless of the replacement power scenario."[12] In order to ensure that the Preferred Portfolio is the least-cost and least-risk option, it is imperative that the 2019 IRP not only value coal units appropriately, but that the SO model is allowed to freely choose coal resources outside of the confines of the regional haze analysis.

The Commission should direct PacifiCorp to provide its expanded coal unit analysis in the 2019 IRP. This analysis should be a complete, portfolio-level view of the economics associated with PacifiCorp's coal portfolio so PacifiCorp may make coal unit retirement decisions, if appropriate. This is important for the 2019 IRP to ensure that ratepayers are truly served by the least-cost and least-risk resources. Further, time is of the essence as PacifiCorp now has a narrow window in which to leverage the Federal Production Tax Credit and Investment Tax Credits for renewable resources before they phase out. Now is the time to make investments in renewable resources while they can be acquired at a lower cost, and a portfolio-level view of the economics of PacifiCorp's coal fleet will help provide information about

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[10] Sierra Club commissioned Report from Energy Strategies, *found at* https://www.sierraclub.org/sites/www.sierraclub.org/files/PacifiCorp-Coal-Valuation-Study.pdf ("this study found that eleven of PacifiCorp's coal units, representing 2,730 megawatts (MW), are consistently higher cost than replacement energy options, and in many cases substantially so. This reality poses a fundamental question of whether some of PacifiCorp's coal units are in fact least cost resources").
[11] *Id.*
[12] *Id.*

potential opportunities to replace more expensive resources with lower cost renewables in the near future.

Additionally, UCE requests that the Commission direct PacifiCorp to allow the SO model to consider coal units outside the confines of the regional haze analysis. The SO model's ability to select (or refrain from selecting) any of PacifiCorp's resources freely is the only way to equip the Commission and the public with the information necessary to determine whether the preferred portfolio represents the least-cost, least-risk resources, and to comply with the requirement that all resources are evaluated on a on a consistent and comparable basis.

B. Direct PacifiCorp to exclude the Intra-Hour Dispatch Credit in the 2019 IRP unless the Company includes the credit for all eligible resources and presents it as a sensitivity

The Intra-Hour Dispatch Credit is a new element that PacifiCorp introduced to the 2017 IRP Update.[13] PacifiCorp states that this credit is necessary to account for sub-hourly resource benefits and generation flexibility that its hourly dispatch models do not currently capture. This credit is intended to represent the benefit of dispatching a coal unit that participates in the Energy Imbalance Market ("EIM") on an intra-hour basis, and is included as an offset in the fixed O & M costs for each unit generating this credit. PacifiCorp has explained in stakeholder meetings that the benefit accrues when a coal unit can be ramped up or down on an intra-hour basis, relative to its base schedule, in order to respond to intra-hour changes in load or price signals.

[13] PacifiCorp's 2017 IRP Update, page 67 ("in the 2017 IRP Update, PacifiCorp incorporated unit specific intra-hour dispatch credits as part of its 2017 IPR preferred portfolio and coal studies. . . .").

The 2017 IRP Update states that PacifiCorp incorporated this credit in the preferred portfolio analysis and the coal studies for select coal units that have already generated an intra-hour dispatch credit.[14] PacifiCorp also noted that energy storage and natural gas resources may also provide these intra-hour dispatch benefits.[15] The Commission should direct PacifiCorp to exclude this credit from future IRP processes until PacifiCorp shows that it is applying the credit to all resources capable of providing these intra-hour flexibility services, and is therefore comparing resources on a consistent and comparable basis. As PacifiCorp stated in the 2017 IRP update, the credit only applied to coal units, but PacifiCorp later reiterated that storage and natural gas resources may also be eligible for the credit. By applying the credit only to coal units in the IRP, PacifiCorp is applying a benefit to one generating resource for a service that multiple other types of resources can or do provide. This selective application of a benefit precludes the company from comparing resources on a consistent and comparable basis over the course of the IRP planning horizon. The Commission should direct PacifiCorp to exclude the intra-hour dispatch credit from the 2019 IRP unless the Company applies this credit to all resources that are capable of providing intra-hour dispatch services during the planning horizon.

To be clear, we appreciate that PacifiCorp is attempting to quantify benefits that can accrue when resources are dispatched on a sub-hourly basis, and that are not currently captured in modeling. However, it is inappropriate to apply any intra-hour credit only to coal units, since other resources, including energy storage and renewable resources equipped with appropriate

[14] *Id.*
[15] *Id.*

controls, are capable of ramping up and down quickly to provide the same sub-hourly benefits. Further, stakeholders know very little about how PacifiCorp generates and applies this credit, which creates ambiguity regarding how the credit affects the selection of the Preferred Portfolio. If the Company wishes to move forward with the intra-hour dispatch credit, the Commission should direct PacifiCorp to include information in the 2019 IRP that explains which resources are capable of providing these intra-hour flexibility benefits and an explanation of how the value of each resource changes when the credit is applied.

UCE also requests information about any additional costs associated with generating this credit, such as the operating and maintenance costs associated with running coal units as peakers to derive intra-hour benefits from the EIM. Running coal resources as peakers will inevitably increase the wear and tear on the units, creating a need for capital upgrades and repairs. At the same time, PacifiCorp's own coal unit analysis suggests additional research is warranted to identify the benefits of early coal unit retirement. The risk that coal units will retire early enhances the need for analysis and application of the intra-hour flexibility services from other resources.

The Commission should direct PacifiCorp to exclude the Intra-Hour Dispatch Credit from the 2019 IRP. If PacifiCorp does include an intra-hour dispatch credit in the 2019 IRP, the credit must be applied to all eligible resources, and PacifiCorp should include more detailed analysis about resource eligibility and impacts to operations and maintenance costs. If included, the Intra-Hour Dispatch Credit should be as a sensitivity so that parties can understand how the credit impacts resource modeling and selection.

C. Recommend that the Commission reject PacifiCorp's new assumptions used to derive hourly wholesale power prices and direct PacifiCorp to omit this change from the 2019 IRP.

PacifiCorp introduced new assumptions for deriving wholesale power prices in the 2017 IRP Update, which resulted in marked changes to the shapes of the forecast 2021 and 2036 Price Profiles. These Price Profiles influence the selection of resources for the Preferred Portfolio by System Optimizer.[16] PacifiCorp's changes put solar resources at a disadvantage for selection in the Preferred Portfolio during a time when only a few years remain to acquire solar resources at a lower cost by leveraging the 30% Investment Tax Credit. However, the trend which PacifiCorp cites as necessitating the change – the growth of large-scale solar resources without accompanying storage – is changing quickly.

In the past, PacifiCorp has used five years of hourly Powerdex price data to develop its hourly price scalars. In the 2017 IRP Update, PacifiCorp replaced this data with one year of day-ahead hourly market price data available from the California Independent System Operator (CAISO). PacifiCorp asserts that the change is necessary because hourly prices are increasingly influenced by growth in solar resources across the region. The use of one year CAISO hourly market price data results in a "peakier" Price Profile that places more value on energy provided in the morning (6 – 8 AM) and evening (6 – 9 AM) and less value on energy provided during the middle of the day.

[16] PacifiCorp's 2017 IRP Update, page 55, Figure 5.1 - 2021 and 2036 Price Profiles.

It is true that solar capacity has grown significantly in recent years, and that solar produces energy during daylight hours with a consistent generation profile. However, PacifiCorp does not address other significant policy and market trends which are likely to affect the wholesale market for solar energy generation going forward. Further, reliance on one year of CAISO market price data instead of five years of data makes PacifiCorp's analysis more vulnerable to distortion from isolated events that cause market price fluctuations.

California is the leading state for solar growth with over 22 GW of solar capacity and a Renewable Portfolio Standard which requires that 50% of California's electricity come from renewable resources by 2030.[17] California utilities are also mandated to procure 1,325 MW of energy storage by 2024 and an additional 500 MW of behind-the-meter energy storage. An additional state incentive program provides $448 million of incentives for large-scale and residential storage projects, which has resulted in 73 MW of incentivized battery storage deployment to date.[18] The significant planned investments in battery storage in California will help to mitigate daily peaks in energy pricing as batteries are used to shift excess power produced by solar during the day to morning and evening peak hours. The growth of electric vehicles also has the potential to impact hourly price scalars, and time-of-use rates that encourage daytime charging can shift load to times of peak solar production. The price curves that exist today will continue to change as deployment of battery storage and electric vehicle charging catches up with the deployment of solar.

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[17] *See* Solar Energy Industries Association, California Solar, *found at* https://www.seia.org/state-solar-policy/california-solar.
[18] SGIP Program Statistics, https://energycenter.org/sgip/statistics, accessed July 10, 2018.

One year of CAISO market price data will reflect a narrower temporal and geographic scope compared to the five year Powerdex data PacifiCorp has used in past IRPs. Reliance on just one year of data will capture historic events in wholesale markets that may not be representative of long-term trends. For example, in October 2016 a massive gas leak in Aliso Canyon forced a major gas storage facility to shut down and caused natural gas prices to rise.[19]

Finally, PacifiCorp introduced these updated price scalars as part of the evaluation process used to compare results from the 2017S Solar RFP to PacifiCorp's Combined Resources (a portfolio of new wind resources, repowered wind resources, and a new transmission line.) An Independent Evaluator reviewed PacifiCorp's RFP process and concluded, of the hourly price scalars, that "the alternative price profile was a reasonable way to examine potential downside risks to customers of committing to solar resources."[20] The Independent Evaluator characterizes the new price scalar as a sensitivity appropriate for examining potential disadvantages of a specific resource type, not an improved data input that should be relied upon as a base assumption of the Company's IRP.

The new data inputs capture less temporal and geographic variety than the Company's past data inputs, and the issue the Company identifies as the impetus for the change – the growth of solar resources unaccompanied by storage resources – is unlikely to persist. This fundamental change to the inputs of the IRP could disadvantage the selection of solar resources in the Preferred Portfolio when a narrow window of time remains to acquire these resources at lower

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[19] *See* Reuters, California Natgas Prices Spike Higher Due Aliso Canyon Outage, *found at* https://www.reuters.com/article/usa-natgas-california-idUSL1N18U1RE.

[20] Docket No. 17-035-40, Rocky Mountain Power Testimony filed on May 15, 2018, Page 377 - Solar IE Report page 25 *found at* https://pscdocs.utah.gov/electric/17docs/1703540/302095RedacRMPSurrTestEx5-15-2018.pdf.

costs by using the 30% Federal Investment Tax Credit ("ITC"). We recommend that the Commission direct PacifiCorp to return to the use of five year Powerdex data in the 2019 IRP.

D. Direct PacifiCorp to update supply-side resource prices for solar in the 2019 IRP to align with the price of recently procured resources and include pricing for Power Purchase Agreements (PPA).

PacifiCorp has a time-limited opportunity to acquire extremely low-cost solar resources before the ITC begins to step down from its current value at 30% in 2021. It is critical that the 2019 IRP model solar resources appropriately in order to identify and capture this waning opportunity for ratepayers before it is too late. PacifiCorp's cost estimates for solar resources remain higher than market benchmark prices and higher even than the cost of solar resources PacifiCorp has recently procured. Additionally, the Company should include PPA prices in its supply-side resource cost estimates to evaluate PPAs against other types of supply-side resources.

In comments on the 2017 IRP, UCE recommended that the 2017 IRP Action Plan be revised to include a solar RFP and, depending on the results, that PacifiCorp procure solar resources now while ratepayers can capitalize on low prices and the ITC. We appreciate that PacifiCorp subsequently issued the 2017S Solar RFP and has since chosen to procure 437 MW of new solar resources (337 MW in Utah).[21] We continue to recommend that PacifiCorp procure solar resources in the near term while the 30% Federal ITC is still available.

[21] 2019 Integrated Resource Plan (IRP) Public Input Meeting, July 26 – 27, 2018. Page 23 – *found at* http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/2019_IRP/PacifiCorp_2019_IRP_July_26-27_2018_Public_Input_Meeting.pdf

While the Total Resource Cost for Solar PV in the 2017 IRP Update is lower than the cost modeled in the 2017 IRP, it remains high compared to bids that the Company received in response to their own RFP and the price for solar resources the Company plans to procure. The cost for Solar PV included in the Supply-Side Resource Table (Table 5.6) ranges from $33.36/MWh to $41.26/MWh. This is on the high end of the weighted average nominal levelized PPA prices for solar received in response to the 2017S RFP ($28.47/MWh to $37.24/MWh), and well above the average levelized prices for the solar resources the Company chose to acquire (under $26/MWh) in response to the Solar RFP.[22] The Company's assumed capital costs ($1,364/kW - $1,427/kW) are about 30% higher than National Renewable Energy Lab (NREL) benchmark costs for utility-scale solar projects ($1,030/kW - $1,110/kW) from Q1 of 2017 – more than a year ago.[23] The cost of solar has continued to fall, and the 2017 IRP Update calls for more solar than the 2017 IRP (a total of 1,860 MW compared to 1,040 MW), but calls for the acquisition of solar to begin in 2030, a delay of two years. We continue to assert it is in the best interest of ratepayers for the Company to acquire solar resources called for in the Preferred Portfolio in the near term, while the 30% Federal ITC is still available.

We have concerns that other modeling assumptions are disadvantaging solar resources in a way that will deny ratepayers the benefits of these lower-priced resources. As described further in our comments, we have significant concerns about the hourly price-scalars (Discussed in

[22] Id.
[23] National Renewable Energy Laboratory (NREL), U.S. Solar Photovoltaic System Cost Benchmark: Q1 2017, page vi, Figure ES-1. NREL PV system cost benchmark summary (inflation adjusted), 2010 – 2017, *found at* https://www.nrel.gov/docs/fy17osti/68925.pdf.

section II(C)) and intra-hour dispatch credit (Discussed in section II(B)) introduced in the 2017 IRP Update, and how these changes will impact the selection of solar in the System Optimizer.

Utah Clean Energy looks forward to a discussion of modeling solar resources as part of the 2019 IRP stakeholder engagement process, including a thorough evaluation of new modeling elements introduced by the Company in the 2017 IRP Update. It is essential that the 2019 IRP accurately capture solar costs to ensure ratepayers do not miss out on benefits from investment in solar while the ITC is still in place. As a starting point, we recommend that the Commission direct PacifiCorp to update supply-side resource prices for solar in the 2019 IRP to align with the price of solar resources PacifiCorp is procuring in response to the solar RFP and include PPA prices in its supply-side resource cost estimates.

E. Coordinate a robust stakeholder process and solicit stakeholder input prior to finalizing 2019 IRP studies to improve modeling of the full stack of value provided by energy storage in future IRPs.

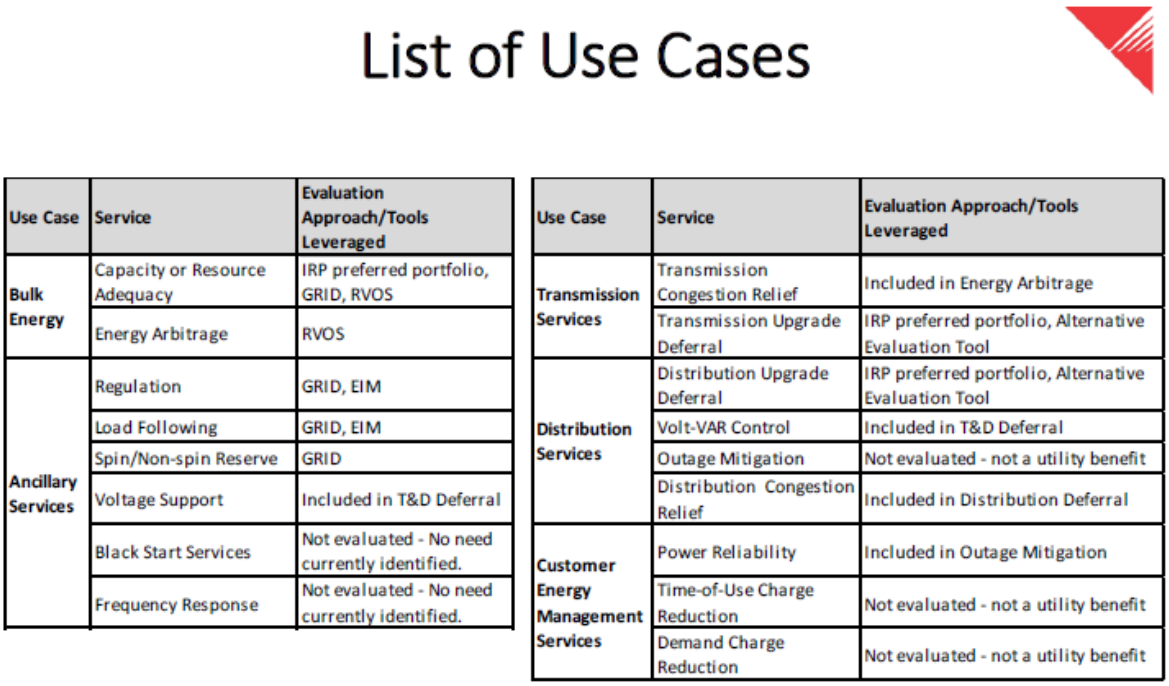
Energy storage deployment in the United States is projected to triple this year.[24] More than 800 MW of advanced storage has been deployed in the U.S., IRPs from other utilities in 2016 and 2017 have selected storage as an economic resource, and utility resource procurements have found storage to be more economic than traditional generation and infrastructure options.[25] As the cost of energy storage continues to fall, this technology will enable a cleaner, more

[24] Reuters, U.S. Energy Storage Market to Nearly Triple This Year: Report, *found at* https://www.reuters.com/article/us-usa-batteries-report/u-s-energy-storage-market-to-nearly-triple-this-year-report-idUSKCN1GI135.
[25] Energy Storage Association, Advanced Energy Storage in Integrated Resource Planning (IRP), *found at* http://energystorage.org/system/files/attachments/esa_irp_primer_2018_final.pdf.

flexible, and more resilient grid. However, in order to capture the diverse and wide-ranging applications for energy storage in utility planning and modeling, it is essential to use up-to-date cost assumptions for battery technology and begin modernizing utility planning processes to account for all of the value streams energy storage can provide. It is imperative that the Company coordinate a robust stakeholder discussion, including technical workshops, during the development of the 2019 IRP to understand how to best model battery storage in future IRPs. If the IRP process does not correctly capture the value that energy storage can provide, from a wide variety of value streams, ratepayers are at risk of imprudent resource selections.

Energy storage is unlike any other resource currently modeled in the Company's IRP because energy storage can be used to provide a wide variety of services. For example, Oregon Commission Staff identified the following list of use cases, which the Company presented at a 2019 IRP stakeholder meeting on July 26, 2018.

Table 1. List of Use Cases for Energy Storage[26]



List of Use Cases

Use Case	Service	Evaluation Approach/Tools Leveraged
Bulk Energy	Capacity or Resource Adequacy	IRP preferred portfolio, GRID, RVOS
	Energy Arbitrage	RVOS
Ancillary Services	Regulation	GRID, EIM
	Load Following	GRID, EIM
	Spin/Non-spin Reserve	GRID
	Voltage Support	Included in T&D Deferral
	Black Start Services	Not evaluated - No need currently identified.
	Frequency Response	Not evaluated - No need currently identified.

Use Case	Service	Evaluation Approach/Tools Leveraged
Transmission Services	Transmission Congestion Relief	Included in Energy Arbitrage
	Transmission Upgrade Deferral	IRP preferred portfolio, Alternative Evaluation Tool
Distribution Services	Distribution Upgrade Deferral	IRP preferred portfolio, Alternative Evaluation Tool
	Volt-VAR Control	Included in T&D Deferral
	Outage Mitigation	Not evaluated - not a utility benefit
	Distribution Congestion Relief	Included in Distribution Deferral
Customer Energy Management Services	Power Reliability	Included in Outage Mitigation
	Time-of-Use Charge Reduction	Not evaluated - not a utility benefit
	Demand Charge Reduction	Not evaluated - not a utility benefit

9 POWERING YOUR GREATNESS

The 2017 IRP Update included energy storage in the Supply-Side Resource Table for the first time, capturing cost information for 7.2 MWh/day Lithium Ion and Flow batteries (See Table 5.6 – Updated Supply-Side Resource Table). We recommend that the Company improve modeling for energy storage by convening technical workgroups to gather stakeholder input related to modeling energy storage prior to finalizing studies for the 2019 IRP.

[26] Integrated Resource Plan 2019 IRP Public Input Meeting, July 26-27, 2018. Page 9. *Found at* - http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/2019_IRP/PacifiCorp_2019_IRP_July_26-27_2018_Public_Input_Meeting.pdf.

While the inclusion of battery storage in the supply-side resource table is an important first step towards evaluating energy storage as a resource option, it does not allow for a comprehensive evaluation of the full stack of value streams that energy storage can supply. Energy storage is unlike any other generating resource currently in use by the utility because it has many diverse applications at every level of the grid and is highly scalable, from utility-scale projects like PacifiCorp's 5 MWh STEP project to customer-sited products like the 13.5 kWh Tesla Powerwall. In order to understand how these various value streams are best modeled in the Company's IRP, and how other utilities across the country are addressing this new market development, we recommend the Company convene energy storage technology workgroups with the utility, technical experts, and interested stakeholders to understand how to best capture the complete value of storage. The Company completed an Energy Storage Valuation framework for Oregon Docket UM-1847, [27] and we recommend that the Company include this in the 2019 IRP, garner feedback from stakeholders, and use it as a starting point to improve modeling of energy storage in future IRPs.

F. Direct PacifiCorp to model customer-sited solar and an incentive for energy storage as supply-side resources in the 2019 IRP.

PacifiCorp's IRP modeling practices do not accurately account for generation from customer-sited solar and energy storage. In order to evaluate whether customer-sited distributed energy resources are part of a least-cost, least-risk portfolio, PacifiCorp should allow them to

[27] 2019 Integrated Resource Plan (IRP) Public Input Meeting, July 26-27, 2018. Slides 8, 13, and 14 – *found at* http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/2019_IRP/PacifiCorp_2019_IRP_July_26-27_2018_Public_Input_Meeting.pdf

compete against other resources in the Supply-Side Resource Table for selection in the Preferred Portfolio. This only becomes more necessary as the amount of distributed energy resources on the grid, including customer-sited battery storage, continues to grow.

Like other supply-side resources, customer-sited distributed energy resources provide energy to the grid, and utilities can procure distributed energy resources in a targeted manner to meet a need for not only energy, but capacity, or reliability services. Distributed energy resources can be acquired on a wide scale, to provide energy to the grid, or on a narrow scale, in response to a need at a specific location on the grid. Unlike supply-side resources, ratepayers need not cover the full cost of a distributed energy resource, so they can be extremely cost-effective for ratepayers. Utilities are procuring packages of customer-sited distributed energy resources, including solar, storage, and energy efficiency, in place of traditional investments in new infrastructure, finding that a package of customer-sited resources can be more cost-effective. For example, in its 2017 IRP, Arizona Public Service (APS) examined customer-sited resources, including energy efficiency, traditional demand response, rooftop solar, and energy storage, as supply side resources. This analysis led to the selection of demand response and microgrids, energy efficiency, and distributed generation as part of APS' portfolio and APS is procuring those customer-sited resources through customer-facing programs.[28]

Customer-sited energy storage, in particular, can provide services that are very similar to energy efficiency or demand response, and the Company should model an incentive program for

[28] Energy Storage Association, Advanced Energy Storage in Integrated Resource Planning (IRP), *found at* http://energystorage.org/system/files/attachments/esa_irp_primer_2018_final.pdf.

customer-sited energy storage as a supply-side resource. Customer-sited energy storage can be used to reduce energy usage during times of peak demand, through time-of-use rates, and can be operated as a dispatchable resource that the utility can control and call upon when needed.

The Company currently models customer-sited distributed generation as a decrement to load. The 2017 IRP Update included a methodological update for the treatment of customer-sited energy resources, weighting the generation shape attributable to distributed energy resources based on the actual customer adoption rates of seven different types of distributed energy resources (CHP reciprocating engines, CHP micro-turbines, small hydro, commercial and residential solar PV, and commercial and residential small wind). Previously, the Company used an average of the load shapes for the seven types of distributed energy resources without regard for relative adoption rates. We agree that it is logical to account for the differences in different types of distributed energy resources when creating generation curves for these resources. Customers are increasingly choosing to pair rooftop solar generation with battery storage, so we recommend that the Company work with its vendor to gather information about customer adoption of energy storage and develop a representative generation curve for a customer with solar and energy storage. Although we believe that it is most appropriate to model customer-sited distributed generation, including solar and energy storage, as supply-side resources, if the Company does continue to rely on the Private Generation Study to account for the energy produced by these resources then it should be updated to accurately account for customer adoption of and load shapes resulting from battery storage.

III. CONCLUSION AND RECOMMENDATIONS

Utah Clean Energy appreciates the opportunity to provide comments related to the 2017 IRP Update and hopes these recommendations can inform the development of the 2019 IRP. In

addition to these comments, Utah Clean Energy submitted separate comments jointly with SWEEP on the DSM program cuts and additional DSM-related benefits that the 2019 IRP should include.

Utah Clean Energy requests that the Commission direct PacifiCorp to:

- Include a complete, portfolio-level view of the economics associated with PacifiCorp's coal portfolio;
- Allow the SO to consider coal units outside the confines of the regional haze analysis;
- Exclude the Intra-Hour Dispatch Credit from the 2019 IRP unless the Company includes the credit for all eligible resources and presents it as a sensitivity;
- Include an analysis of which resources are eligible for the Intra-Hour Dispatch Credit, what additional costs are associated with operating resources to receive the credit, and how the credit is generated;
- Continue using five years of hourly Powerdex price data to develop its hourly price scalars;
- Update supply-side resource prices for solar in the 2019 to align with the price of recently procured resources and include pricing for PPAs;
- Coordinate a robust stakeholder process and solicit stakeholder input to improve modeling of the full stack of value provided by energy storage in future IRPs; and
- Model customer-sited solar and an incentive for energy storage as supply-side resources in the 2019 IRP.

RESPECTFULLY SUBMITTED,

Utah Clean Energy

/s/ Hunter Holman

Hunter Holman

Attorney for Utah Clean Energy