



1407 W. North Temple  
Salt Lake City, Utah 84116

March 20, 2019

***VIA ELECTRONIC FILING***

Public Service Commission of Utah  
Heber M. Wells Building, 4<sup>th</sup> Floor  
160 East 300 South  
Salt Lake City, UT 84114

Attn: Gary Widerburg  
Commission Secretary

Re: **Docket No. 03-035-14 – Quarterly Compliance Filing – 2018.Q4 Avoided Cost Input Changes**  
**Docket No. 18-035-23 – 2018.Q4 Avoided Cost Input Changes Quarterly Compliance Filing**

PacifiCorp (dba Rocky Mountain Power) hereby respectfully submits its quarterly Schedule 38 compliance filing.

Public Service Commission of Utah (Commission) orders dated October 31, 2005, and February 2, 2006, in Docket No. 03-035-14 require the Company to keep a record of any changes, including data inputs, made to the Proxy model and the Generation and Regulation Initiative Decision Tool (GRID) model used in calculating avoided costs. The orders further require the Company to notify the Commission and Division of Public Utilities (DPU) of updates made to the models used in the approved Proxy and Partial Displacement Differential Revenue Requirement (PDDRR) avoided cost methodologies. The Commission order dated June 9, 2015 in Docket No. 14-035-140 requires the Company to identify routine and non-routine updates or modeling changes. Non-routine updates will become effective in three weeks if the update is unchallenged by any party or upon resolution by settlement or Commission action if challenged by any party.

No comments were filed challenging the Company's previous compliance filing, which was submitted to the Commission on December 24, 2018.

**Routine Updates**

The Company identifies the following routine updates to its avoided cost inputs since the previous filing:

1. **GRID Model Data Updates**

A number of data and modeling assumption updates have occurred in the GRID model since the last filing. **Appendix A** provides a summary of those updates.

2. **Official Forward Price Curve (OFPC)**

Update to the curve dated December 30, 2018 (1812 OFPC).

3. **Load Forecast Update**

Updated model with load forecast dated October 19, 2018

4. **Qualifying Facility (QF) Queue**

Update of signed contract queue and current potential QFs. The QF queue was revised to include 3,469 MW nameplate in this filing. The potential queue was 3,057 MW nameplate in the 2018.Q3 filing.

**Non-routine Update**

1. **GRID Topology Change**

The Wyoming Northeast transmission area has been split to reflect transmission constraints that exist between Wyoming East and Wyoming North. The constraints have become relevant as several potential QFs are in the Wyoming North transmission area.

**Additional Details**

Additional detail is provided below:

1. **GRID Data Updates** – A number of data and modeling assumption updates have occurred in GRID since the previous compliance filing. **Appendix A** provides a summary of those updates.
2. **Proxy / Partial Displacement Differential Revenue Requirement (PDDRR) Avoided Cost Methodology** – The proxy resources used in the PDDRR avoided cost methodology are consistent with the Company’s 2017 Integrated Resource Plan (IRP) Update filed with the Commission on May 1, 2018. The 2017 IRP Update preferred portfolio includes cost-effective solar and wind resources. The incremental thermal QF resource partially displaces summer and winter front office transactions (FOT) since the 2017 Update portfolio does not include any thermal resources. The incremental tracking solar QF resource partially displaces summer and winter FOTs during study period since the IRP solar resources from 2017 IRP Update portfolio are fully displaced by the potential QFs in the queue. The wind QF resource partially displaces summer and winter FOTs during 2019-2033 and partially displaces the Goshen Wind resource in 2033 from the 2017 IRP Update preferred portfolio.

3. **Impact to Avoided Cost Prices (\$/MWh)** – Provided as **Appendix B.1** is the \$/MWh impact of the above mentioned updates on avoided costs, compared to the previous compliance filing. The updates reflect a total increase of approximately \$0.13/MWh.
  - a. Avoided costs presented in **Appendix B.1** were calculated assuming a 100 MW 85 percent capacity factor thermal QF resource.
  - b. Avoided costs presented in **Appendix B.2** were calculated assuming an 80 MW 31.1 percent capacity factor single-axis tracking solar QF resource.
  - c. Avoided costs presented in **Appendix B.3** were calculated assuming an 80 MW 31 percent capacity factor wind QF resource.
4. **Major Changes from the Prior Study** – Provided as **Appendix C** is a \$/MWh step impact study of the routine updates from the prior study. Also provided in **Appendix C** is the incremental impact of each change from the prior step.

### Work Papers

The Company has also provided calculations with additional details on the following:

- Current QF queue and partial displacement adjusted for solar degradation; and
- FOT partial displacement

It is respectfully requested that all formal correspondence and requests regarding this compliance filing be addressed to:

By E-Mail (preferred): [datarequest@pacificorp.com](mailto:datarequest@pacificorp.com)

By Regular Mail: Data Request Response Center  
PacifiCorp  
825 NE Multnomah Street, Suite 2000  
Portland, OR 97232

Informal inquiries may be made to Jana Saba at (801) 220-2823, or Dan MacNeil at (503) 813-5523.

Very truly yours,



Joelle Steward  
Vice President, Regulation

cc: Service List (Docket No. 03-035-14)  
Service List (Docket No. 18-035-23)

**ROCKY MOUNTAIN POWER**  
**DESCRIPTION OF AVOIDED COST INPUT CHANGES**  
**2018.Q4 – March 2019**

## Appendix A

### **PacifiCorp Avoided Cost (Partial Displacement Differential Revenue Requirement (PDDRR)) Model Updates through February 2019 Docket No. 03-035-14 / Docket No. 18-035-23**

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Assumptions that have changed since the 2018.Q3 compliance filing are in **bold and underline**.

#### **GRID Scenario Study Period**

- January 1, 2019 through December 31, 2033 – 15-year study.
- Avoided cost prices starting in January 2019.

#### **Official Forward Price Curve (OFPC) (Gas and Electric Market Prices)**

- **Updated to PacifiCorp's December 31, 2018 OFPC (1812 OFPC)**
- Hourly Market Price Scalars consistent with 2017 IRP Update

#### **Fuel Prices (Coal)**

- Average and incremental coal costs based on forecast dated August 2018.
- Coal burn expense reflects incremental coal costs and coal take or pay minimum burn levels.

#### **Integrated Resource Plan (IRP) Resources**

- 2017 IRP Update filed with the Public Service Commission of Utah (UPSC) on May 1, 2018.
- Resource additions, including generating resources, and front office transactions (FOT), consistent with 2017 IRP Update (Table 8.1).
- Existing plant retirement consistent with 2017 IRP Update (Table 8.1).
- The GRID topology includes the Aeolus to Bridger/Anticline portion of Gateway West (Energy Gateway sub-segment D2), consistent with the preferred portfolio in the 2017 IRP Update. The Energy Gateway assumptions are described in more detail in Chapter 7 of the 2017 IRP Update.
- Wind resources contained in the load and resource balance for the 2017 IRP Update preferred portfolio that were not approved by the Utah or Wyoming Commission have been replaced by Front Office Transactions through 2029 and proxy wind resources in comparable locations starting in 2030. The replacement resources are deferrable.
  - Everpower Wind QF (Wyoming Northeast)
  - EV2020 Uinta Wind (Goshen)
  - Monticello Wind QF (Utah South)

## **REC Ownership:**

Consistent with the Commission's January 23, 2018 order in Docket No. 17-035-37, when a QF defers or avoids a renewable resource, the Company retains the RECs on behalf of ratepayers. When a QF's avoided capacity costs are not based on the costs of a renewable resource, the QF is entitled to the RECs associated with its output.

## **Hydro Resources**

- Hydro forecast prepared September 2018.
- 2017 hydro levels extended thereafter with known and measurable changes.
- Adjust Klamath dispatch to reflect current operating patterns.
- Update Mid-Columbia (Mid-C) generation forecast.

## **Discount Rate**

- 6.91 percent discount rate – 2017 IRP Update
- Discount rate is consistent with UPSC's order in Docket 11-035-T06.

## **Inflation Rates**

- Company's inflation rate forecast dated **December 2018**.

## **Levelized Prices (Nominal) @ 6.91 percent Discount Rate**

- 15 years 2019 through 2033.
- Levelized prices are for illustrative purposes only.

## **Load Forecast (Retail)**

- **20-year load forecast dated from October 19, 2019.**

## **Long-Term Contracts**

- Long-term contracts which have prices that are indexed to market are consistent with the **1812 OFPC**.
- Contracts are modeled based on 48 months ended June 2018.
- Qualifying Facility (QF) power purchase agreements (PPA) are assumed to terminate and not renew at the end of their current PPA term.
- Incorporates signed PPAs.

## **Market Capacity**

- Capacity set at 48-month average of all short-term firm (STF) sales ended **January 2019**.
- Mid-C and Palo Verde (PV) markets uncapped.
- Additional heavy load hour (HLH) and light load hour (LLH) sales limited to historical 48-month average less monthly executed STF contracts as of **January 2019**

## Potential Environmental Costs

- Potential environmental costs are excluded from fuel cost for net power costs (NPC) and plant commitment and dispatch decisions.

## Regulating Margin

- Requirements are modeled based on the Flexible Reserve Study used in the 2017 IRP.
- Incremental integration costs for wind and solar resources reflect Flexible Reserve Study results used in the 2017 IRP.

### Incremental Flex Capacity Costs (2016 \$/MWh)

	Regulation Reserve	System Balancing	Total
Wind	0.429	0.145	0.573
Solar	0.458	0.145	0.603

- Levelized integration costs for 2018-2032 for wind and solar are \$0.68/MWh and \$0.72/MWh, respectively.

## Contingency Reserve Calculation

- Reserve modeling reflects NERC / WECC reliability standard BAL-002-WECC-2 – contingency reserves set to 3 percent of retail load plus 3 percent of generating resources.
- Hourly retail load reserve calculation through 2021.
- Typical week retail load reserve calculation thereafter.

## Short-Term Firm (STF) Transactions

- Executed STF contracts as of January 2019.

## Size of the Avoided Cost Resource

- The avoided cost thermal resource is 100 MW with an 85 percent capacity factor and is located in the Utah North transmission bubble.
- The avoided cost tracking solar resource is 80 MW with a 31.1 percent capacity factor and is located in the Utah North transmission bubble.
- The avoided cost wind resource is 80 MW with a 31.0 percent capacity factor and is located in the Utah North transmission bubble.

## Thermal Resources

- Thermal resource operating characteristics updated to be consistent with current Company official characteristics.
- Forced outage, planned outage, and heat rate levels based on 48 months ended June 2018.

## Wind and Solar Resources

- Existing wind and solar generation profiles modeled using 2017 actual generation shape.<sup>1</sup>
- Wind and solar generation shaped to hourly using 2017 actual generation shape.<sup>1</sup>
- Non-PTC wind resources that are located in a constrained area and can be curtailed on an economic basis are dispatched within the GRID model.<sup>2</sup>
- Capacity contribution values used in this study reflect the values from the 2017 IRP, and are summarized below.

Renewable Type	Capacity Contribution - Percent of Nameplate	
	EAST	West
Wind	15.8%	11.8%
Solar – Fixed Mount	37.9%	53.9%
Solar –Tracking	59.7%	64.8%

## Transmission

- Short-term transmission modeled based on 48 months ended June 2018.
- The GRID topology includes the Aeolus to Bridger/Anticline portion of Gateway West (Energy Gateway sub-segment D2), consistent with the preferred portfolio in the 2017 IRP. The Energy Gateway assumptions are described in more detail in Chapter 4 of the 2017 IRP. In Docket No. 17-035-37, the Commission specifically identified that the 2021 Aeolus Wind and Aeolus-Bridger Anticline Transmission (Gateway segment D2) in the 2017 IRP be considered deferrable by Utah Wind QFs until a final Commission determination was made. As a result of the Utah Commission’s June 22, 2018 order approving the EV2020 Wind resources and Energy Gateway sub-segment D2, this transmission is no longer considered deferrable.
- **The loads and resources in the Wyoming Northeast transmission area have been reassigned to either the Wyoming East or Wyoming North transmission area and transmission limits between these areas are reflected in the GRID topology.**

<sup>1</sup> Starting in the 2013.Q4 Compliance filing, wind generation has been modeled hourly using actual generation shape. Potential resources were also modeled hourly when data was provided by the project developer. Since the 2016.Q4 compliance filing, all potential wind generation profiles have been shaped to an hourly profile using the hourly shape of nearby wind resources. Shaping does not alter the 12x24 wind generation profile. This change was made to make potential wind modeling more consistent with existing wind modeling. The hourly shaping of solar generation was identified as a non-routine change in the 2018.Q2 compliance filing.

<sup>2</sup> Wind dispatch was identified as a non-routine change in the 2018.Q2 compliance filing.



## IRP Partial Displacements (This Filing)

Provided in the table below are the QFs that have executed a PPA or are actively negotiating for a PPA. Signed resources are new and were not included in the 2017 IRP Update.

QF Queue						
No.	QF	Partial Displacement	Nameplate	CF	Capacity Contribution	Start Date
1	Soda Lake Geothermal	13.3	20.0		66.5%	2019 09 01
2	Sprague River (terminated)	-4.5	-7.0		64.8%	
3	Ivory Pine (terminated)	-6.5	-10.0		64.8%	
4	Deschutes Valley Water District (Opal Springs)	5.9	5.9		100.0%	2021 01 01
5	Cove Mountain Solar	34.6	58.0		59.7%	2020 12 31
6	Hunter Solar	59.7	100.0		59.7%	2020 12 31
7	Milford Solar	59.1	99.0		59.7%	2020 11 30
8	Milican Solar	29.2	45.0		64.8%	2020 12 31
9	Prineville Solar	35.6	55.0		64.8%	2020 12 31
10	Sigurd Solar	47.8	80.0		59.7%	2020 12 31
11	Three Sisters Irrigation District (200 kW)	0.2	0.2		100.0%	2018 11 05
12	Non-deferrable PPA_P1	72.8	122.0		59.7%	2020 11 01
13	Non-deferrable PPA_P2	46.6	78.0		59.7%	2022 05 01
14	Non-deferrable PPA_P3	59.7	100.0		59.7%	2023 07 01
15	Non-deferrable PPA_P4	59.7	100.0		59.7%	2025 06 01
16	Non-deferrable PPA_P5	59.7	100.0		59.7%	2026 08 01
17	Non-deferrable PPA_P6	29.9	50.0		59.7%	2028 06 01
18	Everpower	-37.9	-240.0		15.8%	2019 11 01
19	IRP17 WYAE WindUinta2020	-25.4	-161.0		15.8%	2020 11 01
20	Monticello Wind QF	-12.5	-79.2		15.8%	2021 12 31
21	Simplot Phosphates	0.0	13.3		0.0%	2018 02 01
22	Tesoro Non Firm	0.0	25.0		0.0%	2019 01 01
23	Kennecott Smelter Non Firm	0.0	31.8		0.0%	2019 01 01
24	Kennecott Refinery Non Firm	0.0	6.2		0.0%	2019 01 01
25	ExxonMobil	0.0	98.0		0.0%	2019 01 01
26	Tata Chemicals	0.0	30.0		0.0%	2019 01 01
27	Cedar Springs III Wind	19.0	120.0		15.8%	2020 12 31
28	Roseburg Weed QF	2.9	10.0		29.0%	2019 01 01
29	Slate Creek Hydro QF	0.6	4.2		14.0%	2019 01 01
30	Yakima Tieton Cowiche QF	1.0	1.5		67.0%	2019 01 01
31	COID Siphon QF	3.1	5.0		62.0%	2021 01 01

Total Signed MW	553.39	860.90			
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1	QF - 249 - OR - Solar	25.9	40.0	29.1%	64.8%	2019 12 31
2	QF - 279 - OR - Solar	25.9	40.0	31.0%	64.8%	2019 12 31
3	QF - 280 - OR - Solar	13.0	20.0	27.9%	64.8%	2019 01 01
4	QF - 281 - OR - Solar	25.9	40.0	24.5%	64.8%	2019 12 31
5	QF - 459 - WY - Solar	47.7	80.0	24.8%	59.7%	2020 01 01
6	QF - 308 - WY - Wind	12.6	80.0	46.6%	15.8%	2020 11 01
7	QF - 309 - WY - Wind	12.6	80.0	46.6%	15.8%	2020 11 01

8	QF - 310 - WY - Wind	12.6	80.0	46.6%	15.8%	2020 11 01
9	QF - 311 - WY - Wind	6.3	40.0	46.6%	15.8%	2020 11 01
10	QF - 406 - OR - Solar	51.8	80.0	27.1%	64.8%	2021 12 01
11	QF - 407 - OR - Solar	51.8	80.0	27.1%	64.8%	2021 12 01
12	QF - 408 - OR - Solar	51.8	80.0	26.7%	64.8%	2021 12 01
13	QF - 409 - OR - Solar	51.8	80.0	26.7%	64.8%	2021 12 01
14	QF - 410 - OR - Solar	51.8	80.0	26.7%	64.8%	2021 12 01
15	QF - 486 - OR - Solar	51.8	80.0	26.7%	64.8%	2021 12 01
16	QF - 487 - OR - Solar	51.8	80.0	26.7%	64.8%	2021 12 01
17	QF - 488 - OR - Solar	51.8	80.0	26.7%	64.8%	2021 12 01
18	QF - 328 - OR - Solar	29.8	46.0	28.7%	64.8%	2020 01 01
19	QF - 440 - OR - Solar	32.4	50.0	28.9%	64.8%	2019 06 01
20	QF - 411 - OR - Solar	32.4	50.0	27.5%	64.8%	2021 12 01
21	QF - 428 - WY - Solar	23.9	40.0	30.2%	59.7%	2021 08 01
22	QF - 429 - WY - Solar	23.9	40.0	30.2%	59.7%	2021 08 01
23	QF - 442 - WY - Solar	47.7	80.0	26.7%	59.7%	2022 01 01
24	QF - 497 - WY - Wind	12.6	80.0	36.8%	15.8%	2020 12 01
25	QF - 498 - WY - Wind	12.6	80.0	36.8%	15.8%	2020 12 01
26	QF - 499 - WY - Wind	12.6	80.0	36.8%	15.8%	2020 12 01
27	QF - 404 - ID - Solar	0.6	0.9	24.5%	59.8%	2019 04 01
28	QF - 502 - WY - Solar	47.7	80.0	30.8%	59.7%	2020 12 01
29	QF - 451 - OR - Gas	0.0	2.4	100.1%	0.0%	2019 01 01
30	QF - 515 - WY Wind	2.6	16.5	29.5%	15.8%	2019 01 01
31	QF - 503 - WY - Solar	44.7	74.9	28.5%	59.7%	2022 01 01
32	QF - 504 - WY - Solar	29.8	50.0	29.9%	59.7%	2022 01 01
33	QF - 505 - WY - Solar	60.7	80.0	38.6%	75.8%	2022 02 01
34	QF - 506 - WY - Solar	60.7	80.0	38.6%	75.8%	2022 02 01
35	QF - 509 - UT - Solar	60.7	80.0	38.6%	75.8%	2022 02 01
36	QF - 508 - WY - Solar	36.3	50.0	31.7%	72.7%	2022 02 01
37	QF - 510 - WY - Solar	60.7	80.0	38.6%	75.8%	2022 02 01
38	QF - 511 - WY - Solar	60.7	80.0	38.6%	75.8%	2022 02 01
39	QF - 512 - WY - Solar	60.7	80.0	38.6%	75.8%	2022 02 01
40	QF - 507 - UT - Solar	60.7	80.0	38.6%	75.8%	2022 02 01
41	QF - 513 - WY - Solar	34.6	58.0	28.2%	59.7%	2020 12 01
42	QF - 514 - WY - Gas	0.0	30.0	85.0%	0.0%	2020 01 01
Total Potential MW		1446.42	2608.76			
Total Partial Displacement		<b>1999.81</b>	<b>3469.66</b>			
43	Utah 2018.Q4	100.00	100.00	85.0%	100.0%	2019 01 01
Partial Displacement after QF		<b>2099.81</b>	<b>3569.66</b>			

*\* PacifiCorp's October 2018 load forecast includes incremental loads that are contingent upon the concurrent addition of renewable resources. To account for this, proxy renewable resources sufficient to meet the requirements embedded in the load forecast have been included in the queue of committed resources.*

After accounting for the QF queue, the capacity displacement associated with the proxy avoided cost resources in this filing were as follows:

- Thermal: No thermal resources are present in the 2017 IRP Update preferred portfolio. The incremental thermal QF displaces available FOTs for entire term.
- Tracking Solar: 1,860 MW of solar resources are displaced by the QF queue. After degradation, the incremental solar QF displaces available FOTs for entire term.
- Wind: **657 MW of wind resources are displaced by the QF queue. The incremental wind QF displaces 80 MW of Goshen IRP proxy wind in 2033. The Company retains 100% of the RECs starting in 2033.**

Year	IRP Additions (Nameplate MW)				Base Case Displacement (Nameplate MW)				
	IRP Thermal	IRP Baseload Renewable	IRP Solar	IRP Wind	Thermal	Solar	Wind	FOT Summer	FOT Winter
2019	-	-	-	-	-	-	-	(168)	(168)
2020	-	-	-	-	-	-	-	(109)	(109)
2021	-	-	-	1,149	-	-	-	355	303
2022	-	-	-	1,149	-	-	-	445	305
2023	-	-	-	1,149	-	-	-	419	310
2024	-	-	-	1,149	-	-	-	428	304
2025	-	-	-	1,149	-	-	-	538	317
2026	-	-	-	1,149	-	-	-	499	330
2027	-	-	-	1,149	-	-	-	500	343
2028	-	-	-	1,149	-	-	-	1,247	357
2029	-	-	-	1,149	-	-	-	1,489	758
2030	-	-	651	1,750	-	651	601	1,068	794
2031	-	-	745	1,750	-	745	601	1,004	809
2032	-	-	878	1,750	-	878	601	917	776
2033	-	-	1,854	2,550	-	1,854	657	315	315
2034	-	-	1,854	2,550	-	1,854	657	315	315
2035	-	-	1,860	2,883	-	1,860	657	312	312
2036	-	-	1,860	3,032	-	1,860	657	312	312

## IRP Partial Displacements (Previous Filing)

Thermal partial displacement was 1,736 MW in the base case and 1,836 MW in the avoided cost case as shown in the table below, adjusted for solar degradation:

QF Queue						
No.	QF	Partial Displacement	Name plate	CF	Capacity Contribution	Start Date
1	Soda Lake Geothermal	13.30	20.00		66.500%	2019 09 01
2	Sprague River (terminated)	-4.54	-7.00		64.800%	
3	Ivory Pine (terminated)	-6.48	-10.00		64.800%	
4	Deschutes Valley Water District (Opal Springs)	5.93	5.93		100.000%	2021 01 01
5	Cove Mountain Solar	34.63	58.00		59.700%	2020 12 31
6	Hunter Solar	59.70	100.00		59.700%	2020 12 31
7	Milford Solar	59.10	99.00		59.700%	2020 11 30
8	Milican Solar	29.16	45.00		64.800%	2020 12 31
9	Prineville Solar	35.64	55.00		64.800%	2020 12 31
10	Sigurd Solar	47.76	80.00		59.700%	2020 12 31
11	Three Sisters Irrigation District (200 kW)	0.20	0.20		100.000%	2018 11 05
12	Non-deferrable PPA_P1	59.70	100.00		59.7%	2020 07 01
13	Non-deferrable PPA_P2	59.70	100.00		59.7%	2022 05 01
14	Non-deferrable PPA_P3	59.70	100.00		59.7%	2023 07 01
15	Non-deferrable PPA_P4	59.70	100.00		59.7%	2025 06 01
16	Non-deferrable PPA_P5	59.70	100.00		59.7%	2026 08 01
17	Non-deferrable PPA_P6	29.85	50.00		59.7%	2028 06 01
18	Everpower	-37.92	-240.00		15.800%	2019 11 01
19	IRP17 WYAE WindUinta2020	-25.44	-161.00		15.800%	2020 11 01
20	Monticello Wind QF	-12.51	-79.20		15.800%	2021 12 31
21	Simplot Phosphates	0.00	13.30		0.000%	2018 02 01
22	Tesoro Non Firm	0.00	25.00		0.000%	2019 01 01
23	Kennecott Smelter Non Firm	0.00	31.80		0.000%	2019 01 01
24	Kennecott Refinery Non Firm	0.00	6.20		0.000%	2019 01 01
25	ExxonMobil	0.00	98.00		0.000%	2019 01 01
26	Tata Chemicals	0.00	30.00		0.000%	2019 01 01
Total Signed MW		526.88	720.23			

1	QF - 249 - OR - Solar	25.92	40.00	29.1%	64.800%	2019 12 31
2	QF - 279 - OR - Solar	25.92	40.00	31.0%	64.800%	2019 12 31
3	QF - 280 - OR - Solar	12.96	20.00	27.9%	64.800%	2019 01 01

4	QF - 281 - OR - Solar	25.92	40.00	24.5%	64.800%	2019 12 31
5	QF - 459 - WY - Solar	47.74	80.00	24.8%	59.700%	2020 01 01
6	QF - 478 - OR - Solar	3.56	5.50	22.9%	64.700%	2020 03 01
7	QF - 308 - WY - Wind	12.64	80.00	46.6%	15.800%	2020 11 01
8	QF - 309 - WY - Wind	12.64	80.00	46.6%	15.800%	2020 11 01
9	QF - 310 - WY - Wind	12.64	80.00	46.6%	15.800%	2020 11 01
10	QF - 311 - WY - Wind	6.32	40.00	46.6%	15.800%	2020 11 01
11	QF - 406 - OR - Solar	51.84	80.00	27.1%	64.800%	2021 12 01
12	QF - 407 - OR - Solar	51.84	80.00	27.1%	64.800%	2021 12 01
13	QF - 408 - OR - Solar	51.84	80.00	26.7%	64.800%	2021 12 01
14	QF - 409 - OR - Solar	51.84	80.00	26.7%	64.800%	2021 12 01
15	QF - 410 - OR - Solar	51.84	80.00	26.7%	64.800%	2021 12 01
16	QF - 486 - OR - Solar	51.84	80.00	26.7%	64.800%	2021 12 01
17	QF - 487 - OR - Solar	51.84	80.00	26.7%	64.800%	2021 12 01
18	QF - 488 - OR - Solar	51.84	80.00	26.7%	64.800%	2021 12 01
19	QF - 436 - WY - Solar	17.90	30.00	26.8%	59.700%	2020 01 01
20	QF - 437 - WY - Solar	47.74	80.00	29.0%	59.700%	2020 01 01
21	QF - 328 - OR - Solar	29.81	46.00	28.7%	64.800%	2020 01 01
22	QF - 440 - OR - Solar	32.40	50.00	28.9%	64.800%	2019 06 01
23	QF - 411 - OR - Solar	32.40	50.00	27.5%	64.800%	2021 12 01
24	QF - 489 - WY - Solar	47.27	79.22	28.3%	59.700%	2021 09 01
25	QF - 490 - WY - Solar	11.93	20.00	28.2%	59.700%	2021 09 01
26	QF - 492 - WY - Solar	47.74	80.00	29.5%	59.700%	2021 12 01
27	QF - 428 - WY - Solar	23.87	40.00	30.2%	59.700%	2021 08 01
28	QF - 429 - WY - Solar	23.87	40.00	30.2%	59.700%	2021 08 01
29	QF - 493 - WY - Solar	30.59	51.26	27.5%	59.700%	2021 09 01
30	QF - 495 - WA - Solar	51.84	80.00	27.4%	64.800%	2020 12 01
31	QF - 442 - WY - Solar	47.74	80.00	26.7%	59.700%	2022 01 01
32	QF - 497 - WY - Wind	12.64	80.00	36.8%	15.800%	2020 12 01
33	QF - 498 - WY - Wind	12.64	80.00	36.8%	15.800%	2020 12 01
34	QF - 499 - WY - Wind	12.64	80.00	36.8%	15.800%	2020 12 01
35	QF - 404 - ID - Solar	0.55	0.92	24.5%	59.800%	2019 04 01
36	QF - 502 - WY - Solar	47.74	80.00	30.8%	59.700%	2020 12 01
37	QF - 451 - OR - Gas	0.00	2.44	100.1%	0.000%	2019 01 01
38	QF - 505 - WY - Wind	2.61	16.50	29.5%	15.800%	2019 01 01
39	QF - 503 - WY - Solar	44.69	74.90	28.5%	59.700%	2022 01 01
40	QF - 504 - WY - Solar	29.84	50.00	29.9%	59.700%	2022 01 01
Total Potential MW		1209.43	2336.74			

Total Partial Displacement	<b>1736.31</b>	<b>3056.97</b>			
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**ROCKY MOUNTAIN POWER**

**UPDATE IMPACT – UPDATED AVOIDED COST STUDY**

**2018.Q4 – March 2019**

**Appendix B.1**  
**Avoided Cost Prices \$/MWh**  
**Utah 2018.Q4 Sch 38**

Year	Thermal Avoided Cost at 85.0% CF (2)	Solar Tracking Avoided Cost at 31.1% CF (2)	Wind Avoided Cost at 31.0% CF (2)	Thermal UT 2018.Q3 Filing	Solar Tracking UT 2018.Q3 Filing	Wind UT 2018.Q3 Filing	Thermal Difference	Solar Tracking Difference	Wind Difference
2019	\$23.35	\$23.44	\$19.28	\$20.92	\$21.31	\$17.95	\$2.43	\$2.13	\$1.32
2020	\$20.33	\$20.06	\$17.01	\$18.54	\$16.77	\$16.47	\$1.79	\$3.29	\$0.54
2021	\$15.26	\$12.09	\$14.12	\$16.37	\$11.72	\$15.16	(\$1.10)	\$0.37	(\$1.04)
2022	\$16.16	\$12.38	\$13.53	\$17.24	\$11.71	\$14.28	(\$1.08)	\$0.66	(\$0.76)
2023	\$20.62	\$14.78	\$20.10	\$20.94	\$14.04	\$19.38	(\$0.32)	\$0.74	\$0.72
2024	\$23.45	\$17.04	\$21.67	\$23.43	\$14.65	\$21.44	\$0.02	\$2.38	\$0.23
2025	\$25.19	\$17.96	\$23.13	\$25.35	\$15.50	\$23.12	(\$0.16)	\$2.46	\$0.01
2026	\$25.31	\$17.37	\$23.22	\$25.63	\$14.79	\$23.17	(\$0.32)	\$2.58	\$0.05
2027	\$25.99	\$17.74	\$23.30	\$26.28	\$14.83	\$23.46	(\$0.29)	\$2.91	(\$0.16)
2028	\$28.01	\$20.38	\$24.30	\$28.35	\$17.29	\$26.90	(\$0.34)	\$3.09	(\$2.60)
2029	\$32.47	\$23.65	\$31.82	\$33.73	\$21.47	\$32.93	(\$1.25)	\$2.18	(\$1.11)
2030	\$40.23	\$29.17	\$39.41	\$40.79	\$23.97	\$49.61	(\$0.57)	\$5.20	(\$10.19)
2031	\$42.65	\$31.55	\$41.07	\$41.95	\$24.75	\$49.45	\$0.70	\$6.81	(\$8.38)
2032	\$45.43	\$32.91	\$44.71	\$43.65	\$26.17	\$50.82	\$1.78	\$6.75	(\$6.12)
2033	\$49.79	\$34.85	\$50.95	\$50.42	\$30.86	\$53.32	(\$0.62)	\$3.98	(\$2.37)

15-Year Levelized Prices (Nominal) @ 6.910% Discount Rate (1) (3)										
2019-2033	\$/MWh	\$26.38	\$20.15	\$24.40	\$26.25	\$17.53	\$25.76	\$0.13	\$2.62	(\$1.36)
							0.5%	15%		-5%

Footnotes:

- (1) Discount Rate - 2017 IRP Update
- (2) Total Avoided Costs with Capacity, based on stated CF
- (3) 15-Years: 2019 - 2033, levelized monthly

**Table 1**  
**Avoided Cost Prices**  
**Utah 2018.Q4 - 100.0 MW and 85.0% CF**

Total Price @

Year	Capacity Price \$/kW-yr	Energy Only Price \$/MWh <sup>(2)</sup>	85.0% Capacity Factor \$/MWh
2019	\$0.00	\$23.35	\$23.35
2020	\$0.00	\$20.33	\$20.33
2021	\$0.00	\$15.26	\$15.26
2022	\$0.00	\$16.16	\$16.16
2023	\$0.00	\$20.62	\$20.62
2024	\$0.00	\$23.45	\$23.45
2025	\$0.00	\$25.19	\$25.19
2026	\$0.00	\$25.31	\$25.31
2027	\$0.00	\$25.99	\$25.99
2028	\$0.00	\$28.01	\$28.01
2029	\$0.00	\$32.47	\$32.47
2030	\$0.00	\$40.23	\$40.23
2031	\$0.00	\$42.65	\$42.65
2032	\$0.00	\$45.43	\$45.43
2033	\$0.00	\$49.79	\$49.79
2034	\$0.00	\$52.30	\$52.30
2035	\$0.00	\$53.41	\$53.41
2036	\$0.00	\$55.63	\$55.63
2037	\$0.00	\$56.85	\$56.85
2038	\$0.00	\$58.10	\$58.10

15 Year Starting 2019

20 year Levelized Prices (Nominal) @ 6.91% Discount Rate (1) (3)

\$/kW	\$0.00		
\$/MWh		\$26.38	\$26.38

20 Year Starting 2019

15 year Levelized Prices (Nominal) @ 0.00% Discount Rate (1) (3)

\$/kW	\$0.00		
\$/MWh		\$30.42	\$30.42

15 Year Starting 2020

15 year Levelized Prices (Nominal) @ 0.00% Discount Rate (1) (3)

\$/kW	\$0.00	\$27.74	\$27.74
\$/MWh			

Footnotes:

(1) Discount Rate - 2017 IRP Update

(2) 'Energy Only' is the GRID calculated costs and includes some capacity costs.



**Table 2**  
**Avoided Energy Costs - Scheduled Hours (\$/MWh)**  
**Utah 2018.Q4 - 100.0 MW and 85.0% CF**

Year	Annual	Winter Season					Summer Season				Winter Season		
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Energy Only</b>													
2019	23.35	30.57	22.35	16.71	14.89	15.62	17.19	56.58	32.34	20.59	15.89	17.20	19.40
2020	20.33	18.66	18.69	15.80	13.99	14.49	15.11	53.32	26.45	20.51	14.63	14.00	17.59
2021	15.26	16.04	15.84	15.22	10.98	12.49	12.42	21.78	18.51	15.71	11.92	15.38	16.70
2022	16.16	16.45	20.23	14.01	14.11	15.24	15.10	16.99	15.57	14.78	15.82	16.96	18.95
2023	20.62	20.66	21.16	16.01	19.12	19.03	19.37	22.41	22.79	19.22	19.29	23.50	24.85
2024	23.45	24.96	24.19	21.32	21.35	21.23	20.24	25.60	23.47	20.62	23.57	27.33	27.45
2025	25.19	28.12	27.03	23.73	22.98	21.64	20.47	27.58	27.07	22.92	23.95	28.00	28.76
2026	25.31	28.11	27.56	23.85	22.80	21.33	21.09	28.73	27.42	21.00	24.56	28.04	29.16
2027	25.99	30.91	29.70	25.26	24.54	22.23	21.28	29.27	25.62	23.15	24.95	27.76	27.33
2028	28.01	28.46	28.02	21.96	22.59	26.42	24.71	36.36	36.21	29.05	26.06	27.56	28.41
2029	32.47	31.91	31.74	25.09	25.42	26.98	27.45	43.45	46.01	37.19	28.77	30.49	34.82
2030	40.23	39.42	41.09	33.21	32.02	32.59	32.02	58.10	56.49	46.54	34.41	35.93	40.53
2031	42.65	43.09	42.97	34.81	34.22	33.73	34.46	61.98	59.24	49.27	36.16	38.04	43.34
2032	45.43	44.76	45.04	42.16	37.03	36.84	32.98	66.44	61.91	52.00	39.26	40.35	45.72
2033	49.79	49.12	49.31	40.63	39.03	38.71	36.15	75.24	70.93	58.36	43.98	43.41	51.88
2034	52.30	52.78	53.86	42.46	42.28	39.39	38.16	78.27	74.77	59.33	44.52	47.23	53.98
2035	53.41	56.68	56.97	40.90	44.37	39.08	37.90	77.31	78.84	61.69	44.83	44.88	57.02
2036	55.63	55.07	54.43	41.73	41.90	40.70	40.26	81.92	82.74	69.04	49.85	48.19	60.84

**Table 4**  
**Burnertip Natural Gas Price Forecast**  
**Utah 2018.Q4 - 100.0 MW and 85.0% CF**

Year	PacifiCorp		
	Delivered IRP - Utah Greenfield Fuel Cost	Delivered IRP West Side Fuel Cost	Delivered IRP - Wyo NE Fuel Cost
2016	\$2.32	\$2.30	\$2.35
2017	\$2.67	\$3.32	\$2.66
2018	\$2.61	\$3.23	\$2.60
2019	\$2.47	\$2.38	\$2.21
2020	\$2.14	\$2.02	\$1.98
2021	\$2.09	\$1.95	\$1.93
2022	\$2.62	\$2.47	\$2.45
2023	\$3.20	\$3.04	\$3.03
2024	\$3.69	\$3.60	\$3.52
2025	\$4.07	\$3.97	\$3.89
2026	\$4.28	\$4.19	\$4.10
2027	\$4.25	\$4.15	\$4.07
2028	\$4.19	\$4.09	\$4.01
2029	\$4.53	\$4.43	\$4.35
2030	\$5.11	\$5.00	\$4.92
2031	\$5.45	\$5.32	\$5.26
2032	\$5.80	\$5.64	\$5.60
2033	\$6.17	\$5.96	\$5.97
2034	\$6.52	\$6.27	\$6.32
2035	\$6.28	\$5.94	\$6.08
2036	\$6.38	\$5.99	\$6.17
2037	\$6.76	\$6.34	\$6.55
2038	\$7.27	\$6.84	\$7.06
2039	\$7.74	\$7.32	\$7.53
2040	\$7.99	\$7.55	\$7.77

Official Forward Price Curve Forecast dated Dec 31, 2018

**Table 5**

**Utah 2018.Q4 - 100.0 MW and 85.0% CF  
January 2019 through December 2038**

**Nominal Avoided Costs Calculated Monthly**

<b>20 Year Starting 2019</b>	\$ 249,393,451	\$ -	\$ 249,393,451	\$ 8,197,076	\$30.42
<b>Nominal NPV at 6.91% Discount Rate</b>					
<b>15 Year Starting 2019</b>	\$ 185,664,777	\$ -	\$ 185,664,777	\$ 7,038,138	\$26.38
<b>15 Year Starting 2020</b>	\$ 195,282,765	\$ -	\$ 195,282,765	\$ 7,038,503	\$27.74

Month	Energy	Capacity \$	Total	Total	AC Price
	Avoided \$	85.0% CF	Dollars	MWH	85.0% CF
Jan-19	1,933,351	-	1,933,351	63,240	30.57
Feb-19	1,276,432	-	1,276,432	57,120	22.35
Mar-19	1,056,897	-	1,056,897	63,240	16.71
Apr-19	911,544	-	911,544	61,200	14.89
May-19	987,874	-	987,874	63,240	15.62
Jun-19	1,051,915	-	1,051,915	61,200	17.19
Jul-19	3,578,010	-	3,578,010	63,240	56.58
Aug-19	2,044,984	-	2,044,984	63,240	32.34
Sep-19	1,260,112	-	1,260,112	61,200	20.59
Oct-19	1,004,943	-	1,004,943	63,240	15.89
Nov-19	1,052,931	-	1,052,931	61,200	17.20
Dec-19	1,226,673	-	1,226,673	63,240	19.40
Jan-20	1,179,907	-	1,179,907	63,240	18.66
Feb-20	1,105,854	-	1,105,854	59,160	18.69
Mar-20	999,351	-	999,351	63,240	15.80
Apr-20	856,211	-	856,211	61,200	13.99
May-20	916,063	-	916,063	63,240	14.49
Jun-20	924,851	-	924,851	61,200	15.11
Jul-20	3,371,666	-	3,371,666	63,240	53.32
Aug-20	1,672,816	-	1,672,816	63,240	26.45
Sep-20	1,255,141	-	1,255,141	61,200	20.51
Oct-20	925,407	-	925,407	63,240	14.63
Nov-20	856,693	-	856,693	61,200	14.00
Dec-20	1,112,178	-	1,112,178	63,240	17.59
Jan-21	1,014,240	-	1,014,240	63,240	16.04
Feb-21	904,544	-	904,544	57,120	15.84
Mar-21	962,686	-	962,686	63,240	15.22
Apr-21	672,141	-	672,141	61,200	10.98
May-21	789,911	-	789,911	63,240	12.49
Jun-21	759,952	-	759,952	61,200	12.42
Jul-21	1,377,466	-	1,377,466	63,240	21.78
Aug-21	1,170,640	-	1,170,640	63,240	18.51
Sep-21	961,432	-	961,432	61,200	15.71
Oct-21	753,748	-	753,748	63,240	11.92
Nov-21	941,230	-	941,230	61,200	15.38
Dec-21	1,055,799	-	1,055,799	63,240	16.70
Jan-22	1,040,490	-	1,040,490	63,240	16.45
Feb-22	1,155,667	-	1,155,667	57,120	20.23
Mar-22	886,078	-	886,078	63,240	14.01
Apr-22	863,687	-	863,687	61,200	14.11
May-22	964,017	-	964,017	63,240	15.24
Jun-22	924,098	-	924,098	61,200	15.10
Jul-22	1,074,261	-	1,074,261	63,240	16.99
Aug-22	984,837	-	984,837	63,240	15.57
Sep-22	904,321	-	904,321	61,200	14.78
Oct-22	1,000,599	-	1,000,599	63,240	15.82
Nov-22	1,037,681	-	1,037,681	61,200	16.96
Dec-22	1,198,187	-	1,198,187	63,240	18.95
Jan-23	1,306,362	-	1,306,362	63,240	20.66

Month	Energy	Capacity \$	Total	Total	AC Price
	Avoided \$	85.0% CF	Dollars	MWH	85.0% CF
Feb-23	1,208,939	-	1,208,939	57,120	21.16
Mar-23	1,012,380	-	1,012,380	63,240	16.01
Apr-23	1,170,185	-	1,170,185	61,200	19.12
May-23	1,203,402	-	1,203,402	63,240	19.03
Jun-23	1,185,737	-	1,185,737	61,200	19.37
Jul-23	1,416,930	-	1,416,930	63,240	22.41
Aug-23	1,441,206	-	1,441,206	63,240	22.79
Sep-23	1,176,081	-	1,176,081	61,200	19.22
Oct-23	1,219,803	-	1,219,803	63,240	19.29
Nov-23	1,438,026	-	1,438,026	61,200	23.50
Dec-23	1,571,547	-	1,571,547	63,240	24.85
Jan-24	1,578,274	-	1,578,274	63,240	24.96
Feb-24	1,430,788	-	1,430,788	59,160	24.19
Mar-24	1,348,086	-	1,348,086	63,240	21.32
Apr-24	1,306,505	-	1,306,505	61,200	21.35
May-24	1,342,837	-	1,342,837	63,240	21.23
Jun-24	1,238,610	-	1,238,610	61,200	20.24
Jul-24	1,619,073	-	1,619,073	63,240	25.60
Aug-24	1,484,357	-	1,484,357	63,240	23.47
Sep-24	1,261,702	-	1,261,702	61,200	20.62
Oct-24	1,490,770	-	1,490,770	63,240	23.57
Nov-24	1,672,650	-	1,672,650	61,200	27.33
Dec-24	1,736,062	-	1,736,062	63,240	27.45
Jan-25	1,778,068	-	1,778,068	63,240	28.12
Feb-25	1,544,187	-	1,544,187	57,120	27.03
Mar-25	1,500,435	-	1,500,435	63,240	23.73
Apr-25	1,406,212	-	1,406,212	61,200	22.98
May-25	1,368,521	-	1,368,521	63,240	21.64
Jun-25	1,252,670	-	1,252,670	61,200	20.47
Jul-25	1,744,316	-	1,744,316	63,240	27.58
Aug-25	1,712,209	-	1,712,209	63,240	27.07
Sep-25	1,402,729	-	1,402,729	61,200	22.92
Oct-25	1,514,313	-	1,514,313	63,240	23.95
Nov-25	1,713,611	-	1,713,611	61,200	28.00
Dec-25	1,819,027	-	1,819,027	63,240	28.76
Jan-26	1,777,657	-	1,777,657	63,240	28.11
Feb-26	1,574,399	-	1,574,399	57,120	27.56
Mar-26	1,508,485	-	1,508,485	63,240	23.85
Apr-26	1,395,273	-	1,395,273	61,200	22.80
May-26	1,349,067	-	1,349,067	63,240	21.33
Jun-26	1,290,505	-	1,290,505	61,200	21.09
Jul-26	1,816,938	-	1,816,938	63,240	28.73
Aug-26	1,733,818	-	1,733,818	63,240	27.42
Sep-26	1,285,224	-	1,285,224	61,200	21.00
Oct-26	1,553,120	-	1,553,120	63,240	24.56
Nov-26	1,716,206	-	1,716,206	61,200	28.04
Dec-26	1,844,162	-	1,844,162	63,240	29.16
Jan-27	1,955,010	-	1,955,010	63,240	30.91
Feb-27	1,696,581	-	1,696,581	57,120	29.70
Mar-27	1,597,157	-	1,597,157	63,240	25.26
Apr-27	1,502,098	-	1,502,098	61,200	24.54
May-27	1,405,762	-	1,405,762	63,240	22.23
Jun-27	1,302,395	-	1,302,395	61,200	21.28
Jul-27	1,851,284	-	1,851,284	63,240	29.27
Aug-27	1,619,953	-	1,619,953	63,240	25.62
Sep-27	1,417,056	-	1,417,056	61,200	23.15
Oct-27	1,578,060	-	1,578,060	63,240	24.95
Nov-27	1,698,906	-	1,698,906	61,200	27.76
Dec-27	1,728,400	-	1,728,400	63,240	27.33
Jan-28	1,799,705	-	1,799,705	63,240	28.46

Month	Energy	Capacity \$	Total	Total	AC Price
	Avoided \$	85.0% CF	Dollars	MWH	85.0% CF
Feb-28	1,657,809	-	1,657,809	59,160	28.02
Mar-28	1,388,829	-	1,388,829	63,240	21.96
Apr-28	1,382,774	-	1,382,774	61,200	22.59
May-28	1,670,997	-	1,670,997	63,240	26.42
Jun-28	1,512,238	-	1,512,238	61,200	24.71
Jul-28	2,299,641	-	2,299,641	63,240	36.36
Aug-28	2,289,935	-	2,289,935	63,240	36.21
Sep-28	1,777,590	-	1,777,590	61,200	29.05
Oct-28	1,648,283	-	1,648,283	63,240	26.06
Nov-28	1,686,880	-	1,686,880	61,200	27.56
Dec-28	1,796,628	-	1,796,628	63,240	28.41
Jan-29	2,017,906	-	2,017,906	63,240	31.91
Feb-29	1,813,157	-	1,813,157	57,120	31.74
Mar-29	1,586,587	-	1,586,587	63,240	25.09
Apr-29	1,555,650	-	1,555,650	61,200	25.42
May-29	1,706,326	-	1,706,326	63,240	26.98
Jun-29	1,679,729	-	1,679,729	61,200	27.45
Jul-29	2,747,994	-	2,747,994	63,240	43.45
Aug-29	2,909,507	-	2,909,507	63,240	46.01
Sep-29	2,275,994	-	2,275,994	61,200	37.19
Oct-29	1,819,164	-	1,819,164	63,240	28.77
Nov-29	1,866,095	-	1,866,095	61,200	30.49
Dec-29	2,202,298	-	2,202,298	63,240	34.82
Jan-30	2,492,786	-	2,492,786	63,240	39.42
Feb-30	2,346,866	-	2,346,866	57,120	41.09
Mar-30	2,100,217	-	2,100,217	63,240	33.21
Apr-30	1,959,480	-	1,959,480	61,200	32.02
May-30	2,060,694	-	2,060,694	63,240	32.59
Jun-30	1,959,608	-	1,959,608	61,200	32.02
Jul-30	3,674,200	-	3,674,200	63,240	58.10
Aug-30	3,572,262	-	3,572,262	63,240	56.49
Sep-30	2,848,077	-	2,848,077	61,200	46.54
Oct-30	2,176,002	-	2,176,002	63,240	34.41
Nov-30	2,199,201	-	2,199,201	61,200	35.93
Dec-30	2,562,804	-	2,562,804	63,240	40.53
Jan-31	2,724,752	-	2,724,752	63,240	43.09
Feb-31	2,454,504	-	2,454,504	57,120	42.97
Mar-31	2,201,337	-	2,201,337	63,240	34.81
Apr-31	2,094,126	-	2,094,126	61,200	34.22
May-31	2,133,292	-	2,133,292	63,240	33.73
Jun-31	2,108,899	-	2,108,899	61,200	34.46
Jul-31	3,919,714	-	3,919,714	63,240	61.98
Aug-31	3,746,044	-	3,746,044	63,240	59.24
Sep-31	3,015,279	-	3,015,279	61,200	49.27
Oct-31	2,287,037	-	2,287,037	63,240	36.16
Nov-31	2,327,960	-	2,327,960	61,200	38.04
Dec-31	2,741,076	-	2,741,076	63,240	43.34
Jan-32	2,830,738	-	2,830,738	63,240	44.76
Feb-32	2,664,381	-	2,664,381	59,160	45.04
Mar-32	2,666,222	-	2,666,222	63,240	42.16
Apr-32	2,266,169	-	2,266,169	61,200	37.03
May-32	2,329,738	-	2,329,738	63,240	36.84
Jun-32	2,018,249	-	2,018,249	61,200	32.98
Jul-32	4,201,832	-	4,201,832	63,240	66.44
Aug-32	3,915,236	-	3,915,236	63,240	61.91
Sep-32	3,182,268	-	3,182,268	61,200	52.00
Oct-32	2,483,047	-	2,483,047	63,240	39.26
Nov-32	2,469,470	-	2,469,470	61,200	40.35
Dec-32	2,891,353	-	2,891,353	63,240	45.72
Jan-33	3,106,324	-	3,106,324	63,240	49.12

Month	Energy	Capacity \$	Total	Total	AC Price
	Avoided \$	85.0% CF	Dollars	MWH	85.0% CF
Feb-33	2,816,425	-	2,816,425	57,120	49.31
Mar-33	2,569,569	-	2,569,569	63,240	40.63
Apr-33	2,388,422	-	2,388,422	61,200	39.03
May-33	2,448,264	-	2,448,264	63,240	38.71
Jun-33	2,212,588	-	2,212,588	61,200	36.15
Jul-33	4,757,911	-	4,757,911	63,240	75.24
Aug-33	4,485,615	-	4,485,615	63,240	70.93
Sep-33	3,571,783	-	3,571,783	61,200	58.36
Oct-33	2,781,115	-	2,781,115	63,240	43.98
Nov-33	2,656,649	-	2,656,649	61,200	43.41
Dec-33	3,281,027	-	3,281,027	63,240	51.88
Jan-34	3,337,621	-	3,337,621	63,240	52.78
Feb-34	3,076,595	-	3,076,595	57,120	53.86
Mar-34	2,685,186	-	2,685,186	63,240	42.46
Apr-34	2,587,725	-	2,587,725	61,200	42.28
May-34	2,491,257	-	2,491,257	63,240	39.39
Jun-34	2,335,653	-	2,335,653	61,200	38.16
Jul-34	4,949,812	-	4,949,812	63,240	78.27
Aug-34	4,728,437	-	4,728,437	63,240	74.77
Sep-34	3,631,029	-	3,631,029	61,200	59.33
Oct-34	2,815,431	-	2,815,431	63,240	44.52
Nov-34	2,890,438	-	2,890,438	61,200	47.23
Dec-34	3,413,578	-	3,413,578	63,240	53.98
Jan-35	3,584,662	-	3,584,662	63,240	56.68
Feb-35	3,253,892	-	3,253,892	57,120	56.97
Mar-35	2,586,498	-	2,586,498	63,240	40.90
Apr-35	2,715,653	-	2,715,653	61,200	44.37
May-35	2,471,388	-	2,471,388	63,240	39.08
Jun-35	2,319,531	-	2,319,531	61,200	37.90
Jul-35	4,889,128	-	4,889,128	63,240	77.31
Aug-35	4,985,709	-	4,985,709	63,240	78.84
Sep-35	3,775,212	-	3,775,212	61,200	61.69
Oct-35	2,834,826	-	2,834,826	63,240	44.83
Nov-35	2,746,590	-	2,746,590	61,200	44.88
Dec-35	3,606,178	-	3,606,178	63,240	57.02
Jan-36	3,482,317	-	3,482,317	63,240	55.07
Feb-36	3,219,980	-	3,219,980	59,160	54.43
Mar-36	2,638,989	-	2,638,989	63,240	41.73
Apr-36	2,564,517	-	2,564,517	61,200	41.90
May-36	2,573,897	-	2,573,897	63,240	40.70
Jun-36	2,464,130	-	2,464,130	61,200	40.26
Jul-36	5,180,872	-	5,180,872	63,240	81.92
Aug-36	5,232,643	-	5,232,643	63,240	82.74
Sep-36	4,225,038	-	4,225,038	61,200	69.04
Oct-36	3,152,445	-	3,152,445	63,240	49.85
Nov-36	2,949,416	-	2,949,416	61,200	48.19
Dec-36	3,847,803	-	3,847,803	63,240	60.84
Jan-37	3,558,928	-	3,558,928	63,240	56.28
Feb-37	3,177,343	-	3,177,343	57,120	55.63
Mar-37	2,697,047	-	2,697,047	63,240	42.65
Apr-37	2,620,937	-	2,620,937	61,200	42.83
May-37	2,630,523	-	2,630,523	63,240	41.60
Jun-37	2,518,341	-	2,518,341	61,200	41.15
Jul-37	5,294,851	-	5,294,851	63,240	83.73
Aug-37	5,347,761	-	5,347,761	63,240	84.56
Sep-37	4,317,989	-	4,317,989	61,200	70.56
Oct-37	3,221,798	-	3,221,798	63,240	50.95
Nov-37	3,014,303	-	3,014,303	61,200	49.25
Dec-37	3,932,454	-	3,932,454	63,240	62.18
Jan-38	3,637,225	-	3,637,225	63,240	57.51

Month	Energy	Capacity \$	Total	Total	AC Price
	Avoided \$	85.0% CF	Dollars	MWH	85.0% CF
Feb-38	3,247,244	-	3,247,244	57,120	56.85
Mar-38	2,756,382	-	2,756,382	63,240	43.59
Apr-38	2,678,597	-	2,678,597	61,200	43.77
May-38	2,688,395	-	2,688,395	63,240	42.51
Jun-38	2,573,744	-	2,573,744	61,200	42.05
Jul-38	5,411,338	-	5,411,338	63,240	85.57
Aug-38	5,465,412	-	5,465,412	63,240	86.42
Sep-38	4,412,985	-	4,412,985	61,200	72.11
Oct-38	3,292,678	-	3,292,678	63,240	52.07
Nov-38	3,080,618	-	3,080,618	61,200	50.34
Dec-38	4,018,968	-	4,018,968	63,240	63.55

**Appendix B.2**  
**Avoided Cost Prices \$/MWh**  
**Utah 2018.Q4 Sch 38**

Year	Thermal Avoided Cost at 85.0% CF (2)	Solar Tracking Avoided Cost at 31.1% CF (2)	Wind Avoided Cost at 31.0% CF (2)	Thermal UT 2018.Q3 Filing	Solar Tracking UT 2018.Q3 Filing	Wind UT 2018.Q3 Filing	Thermal Difference	Solar Tracking Difference	Wind Difference
2019	\$23.35	\$23.44	\$19.28	\$20.92	\$21.31	\$17.95	\$2.43	\$2.13	\$1.32
2020	\$20.33	\$20.06	\$17.01	\$18.54	\$16.77	\$16.47	\$1.79	\$3.29	\$0.54
2021	\$15.26	\$12.09	\$14.12	\$16.37	\$11.72	\$15.16	(\$1.10)	\$0.37	(\$1.04)
2022	\$16.16	\$12.38	\$13.53	\$17.24	\$11.71	\$14.28	(\$1.08)	\$0.66	(\$0.76)
2023	\$20.62	\$14.78	\$20.10	\$20.94	\$14.04	\$19.38	(\$0.32)	\$0.74	\$0.72
2024	\$23.45	\$17.04	\$21.67	\$23.43	\$14.65	\$21.44	\$0.02	\$2.38	\$0.23
2025	\$25.19	\$17.96	\$23.13	\$25.35	\$15.50	\$23.12	(\$0.16)	\$2.46	\$0.01
2026	\$25.31	\$17.37	\$23.22	\$25.63	\$14.79	\$23.17	(\$0.32)	\$2.58	\$0.05
2027	\$25.99	\$17.74	\$23.30	\$26.28	\$14.83	\$23.46	(\$0.29)	\$2.91	(\$0.16)
2028	\$28.01	\$20.38	\$24.30	\$28.35	\$17.29	\$26.90	(\$0.34)	\$3.09	(\$2.60)
2029	\$32.47	\$23.65	\$31.82	\$33.73	\$21.47	\$32.93	(\$1.25)	\$2.18	(\$1.11)
2030	\$40.23	\$29.17	\$39.41	\$40.79	\$23.97	\$49.61	(\$0.57)	\$5.20	(\$10.19)
2031	\$42.65	\$31.55	\$41.07	\$41.95	\$24.75	\$49.45	\$0.70	\$6.81	(\$8.38)
2032	\$45.43	\$32.91	\$44.71	\$43.65	\$26.17	\$50.82	\$1.78	\$6.75	(\$6.12)
2033	\$49.79	\$34.85	\$50.95	\$50.42	\$30.86	\$53.32	(\$0.62)	\$3.98	(\$2.37)

15-Year Levelized Prices (Nominal) @ 6.910% Discount Rate (1) (3)										
2019-2033	\$/MWh	\$26.38	\$20.15	\$24.40	\$26.25	\$17.53	\$25.76	\$0.13	\$2.62	(\$1.36)
							0.5%	15%		-5%

Footnotes:

- (1) Discount Rate - 2017 IRP Update
- (2) Total Avoided Costs with Capacity, based on stated CF
- (3) 15-Years: 2019 - 2033, levelized monthly



**Table 1**  
**Avoided Cost Prices**  
**Utah 2018.Q4\_Solar - 80.0 MW and 31.0% CF**

Total Price @

Year	Capacity Price \$/kW-yr	Energy Only Price \$/MWh <sup>(2)</sup>	31.0% Capacity Factor \$/MWh
2019	\$0.00	\$23.44	\$23.44
2020	\$0.00	\$20.06	\$20.06
2021	\$0.00	\$12.09	\$12.09
2022	\$0.00	\$12.38	\$12.38
2023	\$0.00	\$14.78	\$14.78
2024	\$0.00	\$17.04	\$17.04
2025	\$0.00	\$17.96	\$17.96
2026	\$0.00	\$17.37	\$17.37
2027	\$0.00	\$17.74	\$17.74
2028	\$0.00	\$20.38	\$20.38
2029	\$0.00	\$23.65	\$23.65
2030	\$0.00	\$29.17	\$29.17
2031	\$0.00	\$31.55	\$31.55
2032	\$0.00	\$32.91	\$32.91
2033	\$0.00	\$34.85	\$34.85
2034	\$0.00	\$38.03	\$38.03
2035	\$0.00	\$39.76	\$39.76
2036	\$0.00	\$43.49	\$43.49
2037	\$0.00	\$44.48	\$44.48
2038	\$0.00	\$45.46	\$45.46

15 Year Starting 2019

20 year Levelized Prices (Nominal) @ 6.91% Discount Rate (1) (3)

\$/kW	\$0.00		
\$/MWh		\$20.15	\$20.15

20 Year Starting 2019

15 year Levelized Prices (Nominal) @ 0.00% Discount Rate (1) (3)

\$/kW	\$0.00		
\$/MWh		\$23.08	\$23.08

15 Year Starting 2020

15 year Levelized Prices (Nominal) @ 0.00% Discount Rate (1) (3)

\$/kW	\$0.00	\$20.47	\$20.47
\$/MWh			

Footnotes:

(1) Discount Rate - 2017 IRP Update

(2) 'Energy Only' is the GRID calculated costs and includes some capacity costs.

**Table 2**  
**Avoided Energy Costs - Scheduled Hours (\$/MWh)**  
**Utah 2018.Q4\_Solar - 80.0 MW and 31.0% CF**

Year	Annual	Winter Season					Summer Season				Winter Season		
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Energy Only</b>													
2019	23.44	24.29	14.69	13.27	11.34	13.52	18.03	66.13	36.44	19.91	14.61	14.24	15.90
2020	20.06	12.40	12.43	12.10	10.98	12.94	15.34	59.94	27.69	19.10	11.27	12.15	14.28
2021	12.09	10.78	9.67	7.91	7.04	10.38	10.97	20.11	17.42	12.37	9.70	12.99	12.67
2022	12.38	13.15	11.71	9.19	8.44	12.15	14.07	16.14	15.97	7.84	12.85	14.34	11.66
2023	14.78	13.21	12.88	5.15	8.61	14.07	18.30	18.79	21.34	12.39	14.45	18.17	19.17
2024	17.04	16.54	13.61	12.29	12.55	16.19	17.62	23.26	19.79	14.58	17.86	20.14	19.92
2025	17.96	18.22	15.44	15.01	14.12	15.39	18.06	22.28	22.08	16.37	18.83	19.85	20.38
2026	17.37	15.70	14.53	11.51	14.61	15.07	18.28	23.13	22.14	14.35	18.88	20.03	18.19
2027	17.74	16.86	13.85	13.80	14.66	13.75	18.80	23.26	22.32	15.28	19.38	20.37	19.69
2028	20.38	18.06	15.00	11.67	9.88	19.24	22.08	30.72	30.97	18.92	19.17	20.93	21.14
2029	23.65	20.24	18.37	13.22	12.57	19.54	24.91	37.12	37.43	23.56	20.64	22.70	24.91
2030	29.17	24.11	21.76	15.78	18.54	24.22	28.71	51.68	45.92	29.79	26.38	19.71	24.36
2031	31.55	26.04	21.97	19.80	20.98	24.19	30.56	54.01	48.84	32.60	26.66	27.33	30.00
2032	32.91	25.70	23.08	19.35	21.82	26.92	29.84	58.94	50.64	33.75	29.28	27.25	31.12
2033	34.85	26.81	24.72	20.62	21.22	27.30	31.37	55.01	60.99	37.60	29.45	29.63	37.99
2034	38.03	29.86	27.57	22.55	23.88	25.76	34.17	71.44	64.32	37.47	29.55	31.43	39.52
2035	39.76	32.38	27.66	18.32	24.51	28.25	33.74	71.65	68.61	40.92	30.71	31.34	58.49
2036	43.49	33.48	26.23	20.82	25.20	31.05	36.47	76.53	72.13	51.73	36.94	35.41	64.67

**Table 4**  
**Burnertip Natural Gas Price Forecast**  
**Utah 2018.Q4\_Solar - 80.0 MW and 31.0% CF**

Year	PacifiCorp		
	Delivered IRP - Utah Greenfield Fuel Cost	Delivered IRP West Side Fuel Cost	Delivered IRP - Wyo NE Fuel Cost
2016	\$2.32	\$2.30	\$2.35
2017	\$2.67	\$3.32	\$2.66
2018	\$2.61	\$3.23	\$2.60
2019	\$2.47	\$2.38	\$2.21
2020	\$2.14	\$2.02	\$1.98
2021	\$2.09	\$1.95	\$1.93
2022	\$2.62	\$2.47	\$2.45
2023	\$3.20	\$3.04	\$3.03
2024	\$3.69	\$3.60	\$3.52
2025	\$4.07	\$3.97	\$3.89
2026	\$4.28	\$4.19	\$4.10
2027	\$4.25	\$4.15	\$4.07
2028	\$4.19	\$4.09	\$4.01
2029	\$4.53	\$4.43	\$4.35
2030	\$5.11	\$5.00	\$4.92
2031	\$5.45	\$5.32	\$5.26
2032	\$5.80	\$5.64	\$5.60
2033	\$6.17	\$5.96	\$5.97
2034	\$6.52	\$6.27	\$6.32
2035	\$6.28	\$5.94	\$6.08
2036	\$6.38	\$5.99	\$6.17
2037	\$6.76	\$6.34	\$6.55
2038	\$7.27	\$6.84	\$7.06
2039	\$7.74	\$7.32	\$7.53
2040	\$7.99	\$7.55	\$7.77

Official Forward Price Curve Forecast dated Dec 31, 2018

Table 5

Utah 2018.Q4 Solar - 80.0 MW and 31.0% CF  
January 2019 through December 2038

Nominal Avoided Costs Calculated Monthly

20 Year Starting 2019	\$	53,359,167	\$	-	\$	53,359,167	\$	2,311,736	\$23.08
<b>Nominal NPV at 6.91% Discount Rate</b>									
15 Year Starting 2019	\$	40,295,991	\$	-	\$	40,295,991	\$	1,999,406	\$20.15
15 Year Starting 2020	\$	40,726,273	\$	-	\$	40,726,273	\$	1,989,542	\$20.47

Month	Energy	Capacity \$	Total	Total	AC Price
	Avoided \$	30.7% CF	Dollars	MWH	30.7% CF
Jan-19	255,908	-	255,908	10,534	24.29
Feb-19	173,226	-	173,226	11,790	14.69
Mar-19	242,057	-	242,057	18,247	13.27
Apr-19	240,610	-	240,610	21,209	11.34
May-19	331,925	-	331,925	24,553	13.52
Jun-19	470,223	-	470,223	26,084	18.03
Jul-19	1,561,120	-	1,561,120	23,608	66.13
Aug-19	861,630	-	861,630	23,646	36.44
Sep-19	415,045	-	415,045	20,843	19.91
Oct-19	246,941	-	246,941	16,897	14.61
Nov-19	162,015	-	162,015	11,381	14.24
Dec-19	138,870	-	138,870	8,735	15.90
Jan-20	129,991	-	129,991	10,481	12.40
Feb-20	154,644	-	154,644	12,436	12.43
Mar-20	219,704	-	219,704	18,156	12.10
Apr-20	231,635	-	231,635	21,103	10.98
May-20	316,021	-	316,021	24,430	12.94
Jun-20	398,006	-	398,006	25,954	15.34
Jul-20	1,408,005	-	1,408,005	23,490	59.94
Aug-20	651,364	-	651,364	23,527	27.69
Sep-20	396,079	-	396,079	20,738	19.10
Oct-20	189,537	-	189,537	16,813	11.27
Nov-20	137,601	-	137,601	11,324	12.15
Dec-20	124,120	-	124,120	8,692	14.28
Jan-21	112,431	-	112,431	10,429	10.78
Feb-21	112,925	-	112,925	11,672	9.67
Mar-21	142,969	-	142,969	18,065	7.91
Apr-21	147,842	-	147,842	20,998	7.04
May-21	252,263	-	252,263	24,308	10.38
Jun-21	283,378	-	283,378	25,824	10.97
Jul-21	469,925	-	469,925	23,373	20.11
Aug-21	407,780	-	407,780	23,410	17.42
Sep-21	255,317	-	255,317	20,635	12.37
Oct-21	162,280	-	162,280	16,729	9.70
Nov-21	146,396	-	146,396	11,267	12.99
Dec-21	109,612	-	109,612	8,648	12.67
Jan-22	136,403	-	136,403	10,377	13.15
Feb-22	136,023	-	136,023	11,614	11.71
Mar-22	165,163	-	165,163	17,975	9.19
Apr-22	176,382	-	176,382	20,893	8.44
May-22	293,928	-	293,928	24,186	12.15
Jun-22	361,628	-	361,628	25,695	14.07
Jul-22	375,259	-	375,259	23,256	16.14
Aug-22	371,926	-	371,926	23,293	15.97
Sep-22	160,933	-	160,933	20,532	7.84
Oct-22	213,858	-	213,858	16,645	12.85
Nov-22	160,771	-	160,771	11,211	14.34
Dec-22	100,299	-	100,299	8,605	11.66
Jan-23	136,395	-	136,395	10,325	13.21

Month	Energy	Capacity \$	Total	Total	AC Price
	Avoided \$	30.7% CF	Dollars	MWH	30.7% CF
Feb-23	148,834	-	148,834	11,555	12.88
Mar-23	92,134	-	92,134	17,885	5.15
Apr-23	178,931	-	178,931	20,788	8.61
May-23	338,707	-	338,707	24,065	14.07
Jun-23	467,918	-	467,918	25,566	18.30
Jul-23	434,817	-	434,817	23,140	18.79
Aug-23	494,539	-	494,539	23,176	21.34
Sep-23	253,077	-	253,077	20,429	12.39
Oct-23	239,268	-	239,268	16,562	14.45
Nov-23	202,675	-	202,675	11,155	18.17
Dec-23	164,098	-	164,098	8,562	19.17
Jan-24	169,938	-	169,938	10,273	16.54
Feb-24	165,907	-	165,907	12,190	13.61
Mar-24	218,789	-	218,789	17,796	12.29
Apr-24	259,629	-	259,629	20,684	12.55
May-24	387,565	-	387,565	23,945	16.19
Jun-24	448,208	-	448,208	25,438	17.62
Jul-24	535,506	-	535,506	23,024	23.26
Aug-24	456,379	-	456,379	23,060	19.79
Sep-24	296,293	-	296,293	20,327	14.58
Oct-24	294,296	-	294,296	16,479	17.86
Nov-24	223,535	-	223,535	11,099	20.14
Dec-24	169,669	-	169,669	8,519	19.92
Jan-25	186,259	-	186,259	10,222	18.22
Feb-25	176,594	-	176,594	11,440	15.44
Mar-25	265,692	-	265,692	17,707	15.01
Apr-25	290,699	-	290,699	20,581	14.12
May-25	366,627	-	366,627	23,825	15.39
Jun-25	457,003	-	457,003	25,311	18.06
Jul-25	510,520	-	510,520	22,909	22.28
Aug-25	506,738	-	506,738	22,945	22.08
Sep-25	331,144	-	331,144	20,225	16.37
Oct-25	308,759	-	308,759	16,397	18.83
Nov-25	219,193	-	219,193	11,044	19.85
Dec-25	172,775	-	172,775	8,476	20.38
Jan-26	159,686	-	159,686	10,171	15.70
Feb-26	165,352	-	165,352	11,383	14.53
Mar-26	202,782	-	202,782	17,618	11.51
Apr-26	299,186	-	299,186	20,478	14.61
May-26	357,319	-	357,319	23,706	15.07
Jun-26	460,341	-	460,341	25,185	18.28
Jul-26	527,216	-	527,216	22,794	23.13
Aug-26	505,413	-	505,413	22,830	22.14
Sep-26	288,876	-	288,876	20,124	14.35
Oct-26	308,045	-	308,045	16,315	18.88
Nov-26	220,137	-	220,137	10,988	20.03
Dec-26	153,435	-	153,435	8,434	18.19
Jan-27	170,665	-	170,665	10,120	16.86
Feb-27	156,863	-	156,863	11,326	13.85
Mar-27	241,951	-	241,951	17,530	13.80
Apr-27	298,621	-	298,621	20,376	14.66
May-27	324,434	-	324,434	23,587	13.75
Jun-27	471,122	-	471,122	25,059	18.80
Jul-27	527,563	-	527,563	22,680	23.26
Aug-27	506,994	-	506,994	22,716	22.32
Sep-27	305,883	-	305,883	20,023	15.28
Oct-27	314,598	-	314,598	16,233	19.38
Nov-27	222,669	-	222,669	10,933	20.37
Dec-27	165,200	-	165,200	8,392	19.69
Jan-28	181,837	-	181,837	10,069	18.06

Month	Energy	Capacity \$	Total	Total	AC Price
	Avoided \$	30.7% CF	Dollars	MWH	30.7% CF
Feb-28	179,221	-	179,221	11,948	15.00
Mar-28	203,634	-	203,634	17,442	11.67
Apr-28	200,354	-	200,354	20,274	9.88
May-28	451,507	-	451,507	23,470	19.24
Jun-28	550,556	-	550,556	24,934	22.08
Jul-28	693,207	-	693,207	22,567	30.72
Aug-28	700,005	-	700,005	22,603	30.97
Sep-28	377,027	-	377,027	19,923	18.92
Oct-28	309,616	-	309,616	16,152	19.17
Nov-28	227,677	-	227,677	10,879	20.93
Dec-28	176,523	-	176,523	8,350	21.14
Jan-29	202,772	-	202,772	10,019	20.24
Feb-29	205,990	-	205,990	11,213	18.37
Mar-29	229,456	-	229,456	17,355	13.22
Apr-29	253,549	-	253,549	20,173	12.57
May-29	456,308	-	456,308	23,352	19.54
Jun-29	618,107	-	618,107	24,809	24.91
Jul-29	833,441	-	833,441	22,454	37.12
Aug-29	841,842	-	841,842	22,490	37.43
Sep-29	467,003	-	467,003	19,824	23.56
Oct-29	331,662	-	331,662	16,071	20.64
Nov-29	245,682	-	245,682	10,824	22.70
Dec-29	206,978	-	206,978	8,308	24.91
Jan-30	240,340	-	240,340	9,969	24.11
Feb-30	242,750	-	242,750	11,157	21.76
Mar-30	272,466	-	272,466	17,268	15.78
Apr-30	372,052	-	372,052	20,072	18.54
May-30	562,756	-	562,756	23,235	24.22
Jun-30	708,584	-	708,584	24,685	28.71
Jul-30	1,154,672	-	1,154,672	22,342	51.68
Aug-30	1,027,584	-	1,027,584	22,377	45.92
Sep-30	587,539	-	587,539	19,724	29.79
Oct-30	421,799	-	421,799	15,991	26.38
Nov-30	212,264	-	212,264	10,770	19.71
Dec-30	201,347	-	201,347	8,267	24.36
Jan-31	258,328	-	258,328	9,919	26.04
Feb-31	243,890	-	243,890	11,101	21.97
Mar-31	340,174	-	340,174	17,182	19.80
Apr-31	419,075	-	419,075	19,971	20.98
May-31	559,219	-	559,219	23,119	24.19
Jun-31	750,657	-	750,657	24,561	30.56
Jul-31	1,200,712	-	1,200,712	22,230	54.01
Aug-31	1,087,367	-	1,087,367	22,265	48.84
Sep-31	639,875	-	639,875	19,626	32.60
Oct-31	424,235	-	424,235	15,911	26.66
Nov-31	292,893	-	292,893	10,716	27.33
Dec-31	246,781	-	246,781	8,225	30.00
Jan-32	253,682	-	253,682	9,869	25.70
Feb-32	270,250	-	270,250	11,710	23.08
Mar-32	330,804	-	330,804	17,096	19.35
Apr-32	433,626	-	433,626	19,871	21.82
May-32	619,170	-	619,170	23,004	26.92
Jun-32	729,282	-	729,282	24,439	29.84
Jul-32	1,303,636	-	1,303,636	22,119	58.94
Aug-32	1,121,796	-	1,121,796	22,154	50.64
Sep-32	659,080	-	659,080	19,528	33.75
Oct-32	463,515	-	463,515	15,831	29.28
Nov-32	290,572	-	290,572	10,663	27.25
Dec-32	254,672	-	254,672	8,184	31.12
Jan-33	263,254	-	263,254	9,820	26.81

Month	Energy	Capacity \$	Total	Total	AC Price
	Avoided \$	30.7% CF	Dollars	MWH	30.7% CF
Feb-33	271,730	-	271,730	10,991	24.72
Mar-33	350,820	-	350,820	17,011	20.62
Apr-33	419,581	-	419,581	19,772	21.22
May-33	624,817	-	624,817	22,889	27.30
Jun-33	762,820	-	762,820	24,316	31.37
Jul-33	1,210,763	-	1,210,763	22,008	55.01
Aug-33	1,344,412	-	1,344,412	22,043	60.99
Sep-33	730,532	-	730,532	19,430	37.60
Oct-33	463,953	-	463,953	15,752	29.45
Nov-33	314,365	-	314,365	10,609	29.63
Dec-33	309,384	-	309,384	8,143	37.99
Jan-34	291,769	-	291,769	9,771	29.86
Feb-34	301,510	-	301,510	10,936	27.57
Mar-34	381,590	-	381,590	16,926	22.55
Apr-34	469,755	-	469,755	19,673	23.88
May-34	586,729	-	586,729	22,774	25.76
Jun-34	826,661	-	826,661	24,195	34.17
Jul-34	1,564,431	-	1,564,431	21,898	71.44
Aug-34	1,410,663	-	1,410,663	21,933	64.32
Sep-34	724,388	-	724,388	19,333	37.47
Oct-34	463,153	-	463,153	15,674	29.55
Nov-34	331,738	-	331,738	10,556	31.43
Dec-34	320,229	-	320,229	8,103	39.52
Jan-35	314,835	-	314,835	9,722	32.38
Feb-35	301,011	-	301,011	10,881	27.66
Mar-35	308,598	-	308,598	16,841	18.32
Apr-35	479,724	-	479,724	19,575	24.51
May-35	640,150	-	640,150	22,660	28.25
Jun-35	812,140	-	812,140	24,074	33.74
Jul-35	1,561,235	-	1,561,235	21,789	71.65
Aug-35	1,497,409	-	1,497,409	21,823	68.61
Sep-35	787,139	-	787,139	19,236	40.92
Oct-35	478,976	-	478,976	15,595	30.71
Nov-35	329,182	-	329,182	10,504	31.34
Dec-35	471,549	-	471,549	8,062	58.49
Jan-36	323,889	-	323,889	9,673	33.48
Feb-36	301,020	-	301,020	11,478	26.23
Mar-36	348,904	-	348,904	16,757	20.82
Apr-36	490,909	-	490,909	19,477	25.20
May-36	699,998	-	699,998	22,547	31.05
Jun-36	873,480	-	873,480	23,953	36.47
Jul-36	1,659,195	-	1,659,195	21,680	76.53
Aug-36	1,566,345	-	1,566,345	21,714	72.13
Sep-36	990,168	-	990,168	19,140	51.73
Oct-36	573,129	-	573,129	15,517	36.94
Nov-36	370,109	-	370,109	10,451	35.41
Dec-36	518,765	-	518,765	8,022	64.67
Jan-37	331,015	-	331,015	9,673	34.22
Feb-37	297,034	-	297,034	11,082	26.80
Mar-37	356,580	-	356,580	16,757	21.28
Apr-37	501,709	-	501,709	19,477	25.76
May-37	715,398	-	715,398	22,547	31.73
Jun-37	892,697	-	892,697	23,953	37.27
Jul-37	1,695,697	-	1,695,697	21,680	78.22
Aug-37	1,600,804	-	1,600,804	21,714	73.72
Sep-37	1,011,951	-	1,011,951	19,140	52.87
Oct-37	585,738	-	585,738	15,517	37.75
Nov-37	378,251	-	378,251	10,451	36.19
Dec-37	530,178	-	530,178	8,022	66.09
Jan-38	338,297	-	338,297	9,673	34.97

Month	Energy	Capacity \$	Total	Total	AC Price
	Avoided \$	30.7% CF	Dollars	MWH	30.7% CF
Feb-38	303,569	-	303,569	11,082	27.39
Mar-38	364,425	-	364,425	16,757	21.75
Apr-38	512,746	-	512,746	19,477	26.33
May-38	731,137	-	731,137	22,547	32.43
Jun-38	912,336	-	912,336	23,953	38.09
Jul-38	1,733,003	-	1,733,003	21,680	79.94
Aug-38	1,636,022	-	1,636,022	21,714	75.34
Sep-38	1,034,214	-	1,034,214	19,140	54.03
Oct-38	598,624	-	598,624	15,517	38.58
Nov-38	386,573	-	386,573	10,451	36.99
Dec-38	541,842	-	541,842	8,022	67.55



**Appendix B.3**  
**Avoided Cost Prices \$/MWh**  
**Utah 2018.Q4 Sch 38**

Year	Thermal Avoided Cost at 85.0% CF (2)	Solar Tracking Avoided Cost at 31.1% CF (2)	Wind Avoided Cost at 31.0% CF (2)	Thermal UT 2018.Q3 Filing	Solar Tracking UT 2018.Q3 Filing	Wind UT 2018.Q3 Filing	Thermal Difference	Solar Tracking Difference	Wind Difference
2019	\$23.35	\$23.44	\$19.28	\$20.92	\$21.31	\$17.95	\$2.43	\$2.13	\$1.32
2020	\$20.33	\$20.06	\$17.01	\$18.54	\$16.77	\$16.47	\$1.79	\$3.29	\$0.54
2021	\$15.26	\$12.09	\$14.12	\$16.37	\$11.72	\$15.16	(\$1.10)	\$0.37	(\$1.04)
2022	\$16.16	\$12.38	\$13.53	\$17.24	\$11.71	\$14.28	(\$1.08)	\$0.66	(\$0.76)
2023	\$20.62	\$14.78	\$20.10	\$20.94	\$14.04	\$19.38	(\$0.32)	\$0.74	\$0.72
2024	\$23.45	\$17.04	\$21.67	\$23.43	\$14.65	\$21.44	\$0.02	\$2.38	\$0.23
2025	\$25.19	\$17.96	\$23.13	\$25.35	\$15.50	\$23.12	(\$0.16)	\$2.46	\$0.01
2026	\$25.31	\$17.37	\$23.22	\$25.63	\$14.79	\$23.17	(\$0.32)	\$2.58	\$0.05
2027	\$25.99	\$17.74	\$23.30	\$26.28	\$14.83	\$23.46	(\$0.29)	\$2.91	(\$0.16)
2028	\$28.01	\$20.38	\$24.30	\$28.35	\$17.29	\$26.90	(\$0.34)	\$3.09	(\$2.60)
2029	\$32.47	\$23.65	\$31.82	\$33.73	\$21.47	\$32.93	(\$1.25)	\$2.18	(\$1.11)
2030	\$40.23	\$29.17	\$39.41	\$40.79	\$23.97	\$49.61	(\$0.57)	\$5.20	(\$10.19)
2031	\$42.65	\$31.55	\$41.07	\$41.95	\$24.75	\$49.45	\$0.70	\$6.81	(\$8.38)
2032	\$45.43	\$32.91	\$44.71	\$43.65	\$26.17	\$50.82	\$1.78	\$6.75	(\$6.12)
2033	\$49.79	\$34.85	\$50.95	\$50.42	\$30.86	\$53.32	(\$0.62)	\$3.98	(\$2.37)

15-Year Levelized Prices (Nominal) @ 6.910% Discount Rate (1) (3)										
2019-2033	\$/MWh	\$26.38	\$20.15	\$24.40	\$26.25	\$17.53	\$25.76	\$0.13	\$2.62	(\$1.36)
							0.5%	15%		-5%

Footnotes:

- (1) Discount Rate - 2017 IRP Update
- (2) Total Avoided Costs with Capacity, based on stated CF
- (3) 15-Years: 2019 - 2033, levelized monthly

**Table 1**  
**Avoided Cost Prices**  
**Utah 2018.Q4\_Wind - 80.0 MW and 31.0% CF**

Total Price @

Year	Capacity Price \$/kW-yr	Energy Only Price \$/MWh <sup>(2)</sup>	31.0% Capacity Factor \$/MWh
2019	\$0.00	\$19.28	\$19.28
2020	\$0.00	\$17.01	\$17.01
2021	\$0.00	\$14.12	\$14.12
2022	\$0.00	\$13.53	\$13.53
2023	\$0.00	\$20.10	\$20.10
2024	\$0.00	\$21.67	\$21.67
2025	\$0.00	\$23.13	\$23.13
2026	\$0.00	\$23.22	\$23.22
2027	\$0.00	\$23.30	\$23.30
2028	\$0.00	\$24.30	\$24.30
2029	\$0.00	\$31.82	\$31.82
2030	\$0.00	\$39.41	\$39.41
2031	\$0.00	\$41.07	\$41.07
2032	\$0.00	\$44.71	\$44.71
2033	\$154.91	(\$6.09)	\$50.95
2034	\$158.32	(\$6.49)	\$51.81
2035	\$161.80	(\$5.16)	\$54.42
2036	\$165.36	(\$7.03)	\$53.68
2037	\$169.00	(\$7.13)	\$55.05
2038	\$172.72	(\$7.29)	\$56.26

15 Year Starting 2019

20 year Levelized Prices (Nominal) @ 6.91% Discount Rate (1) (3)

\$/kW	\$6.22		
\$/MWh		\$22.11	\$24.40

20 Year Starting 2019

15 year Levelized Prices (Nominal) @ 0.00% Discount Rate (1) (3)

\$/kW	\$28.70		
\$/MWh		\$18.04	\$28.61

15 Year Starting 2020

15 year Levelized Prices (Nominal) @ 0.00% Discount Rate (1) (3)

\$/kW	\$13.00	\$21.26	\$26.05
\$/MWh			

Footnotes:

(1) Discount Rate - 2017 IRP Update

(2) 'Energy Only' is the GRID calculated costs and includes some capacity costs.

**Table 2**  
**Avoided Energy Costs - Scheduled Hours (\$/MWh)**  
**Utah 2018.Q4\_Wind - 80.0 MW and 31.0% CF**

Year	Annual	Winter Season					Summer Season				Winter Season		
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Energy Only</b>													
2019	19.28	30.11	20.55	15.56	15.21	15.27	14.43	31.38	23.52	17.31	14.21	15.27	16.92
2020	17.01	17.20	17.75	15.54	13.55	13.04	12.96	30.83	20.17	17.74	12.31	11.12	18.81
2021	14.12	14.91	15.54	15.78	13.50	11.06	11.74	16.94	15.78	13.81	9.48	13.91	16.38
2022	13.53	13.55	18.09	12.48	13.95	13.36	13.43	11.48	12.08	12.07	14.24	13.30	15.88
2023	20.10	19.69	17.67	23.96	20.33	17.96	17.48	15.44	27.61	16.67	18.85	21.33	22.95
2024	21.67	25.60	23.65	21.69	21.44	19.84	18.47	18.77	21.00	18.04	21.38	25.63	25.21
2025	23.13	26.80	26.67	22.58	23.19	20.89	18.78	24.12	22.44	20.94	21.38	25.56	25.00
2026	23.22	27.26	26.19	23.32	24.40	21.18	19.01	24.87	22.90	19.82	22.18	24.92	23.66
2027	23.30	29.25	17.15	24.94	25.29	21.15	19.73	25.20	23.47	21.49	20.63	26.01	24.33
2028	24.30	26.84	21.25	4.09	16.58	25.21	23.16	31.74	32.39	28.16	24.15	25.74	25.67
2029	31.82	32.10	29.94	27.51	28.03	26.44	25.85	38.05	42.73	36.83	26.46	28.44	33.85
2030	39.41	38.75	41.12	38.67	32.69	31.60	31.12	47.78	52.77	46.14	32.36	35.28	38.51
2031	41.07	41.81	41.86	34.44	36.21	33.23	33.09	51.80	54.37	48.94	33.49	36.00	40.91
2032	44.71	43.62	45.48	54.88	39.61	34.98	30.70	54.75	57.30	52.44	37.23	38.44	41.45
2033	(6.09)	(4.01)	(24.57)	(15.93)	(21.95)	(14.88)	(6.28)	2.65	12.35	8.27	(0.99)	(10.70)	(13.35)
2034	(6.49)	(7.18)	(28.64)	(19.28)	(24.18)	(11.94)	(8.06)	2.75	14.06	8.39	1.35	(9.98)	(13.46)
2035	(5.16)	(6.95)	(17.08)	(16.91)	(23.97)	(12.80)	(7.20)	1.86	14.76	9.33	0.98	(8.31)	(11.57)
2036	(7.03)	(7.82)	(26.34)	(18.74)	(25.10)	(14.48)	(7.24)	1.60	15.17	7.97	(3.49)	(10.08)	(13.02)

**Table 3**  
**2017 IRP Update ID Wind Resource**  
**38% Capacity Factor**

Year	Estimated Capital Cost	Fixed Capital Cost at Real Levelized	Fixed O&M	Fixed Costs	Variable O&M	Tax Credit	Total Resource Costs	Total Resource Costs	Wind Integration Cost
	\$/kW	\$/kW-yr	\$/kW-yr	\$/MWh	\$/MWh	\$/MWh	\$/MWh	\$/kW-yr	\$/MWh
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(h)

**2017 IRP Update ID Wind Resource - 38% Capacity Factor**

2016									
2017			\$37.57	\$11.29	\$0.00	-	\$11.29	\$37.57	\$0.59
2018			\$38.43	\$11.54	\$0.00	\$0.00	\$11.54	\$38.43	\$0.60
2019			\$39.28	\$11.80	\$0.00	\$0.00	\$11.80	\$39.28	\$0.61
2020			\$40.18	\$12.07	\$0.00	\$0.00	\$12.07	\$40.18	\$0.62
2021			\$41.14	\$12.36	\$0.00	\$0.00	\$12.36	\$41.14	\$0.63
2022			\$42.13	\$12.66	\$0.00	\$0.00	\$12.66	\$42.13	\$0.65
2023			\$43.14	\$12.96	\$0.00	\$0.00	\$12.96	\$43.14	\$0.67
2024			\$44.18	\$13.27	\$0.00	\$0.00	\$13.27	\$44.18	\$0.69
2025			\$45.15	\$13.56	\$0.00	\$0.00	\$13.56	\$45.15	\$0.71
2026			\$46.14	\$13.86	\$0.00	\$0.00	\$13.86	\$46.14	\$0.73
2027			\$47.16	\$14.17	\$0.00	\$0.00	\$14.17	\$47.16	\$0.75
2028			\$48.24	\$14.49	\$0.00	\$0.00	\$14.49	\$48.24	\$0.77
2029			\$49.35	\$14.83	\$0.00	\$0.00	\$14.83	\$49.35	\$0.79
2030			\$50.49	\$15.17	\$0.00	\$0.00	\$15.17	\$50.49	\$0.81
2031			\$51.65	\$15.52	\$0.00	\$0.00	\$15.52	\$51.65	\$0.83
2032			\$52.84	\$15.87	\$0.00	\$0.00	\$15.87	\$52.84	\$0.85
2033	\$1,420	\$100.91	\$54.00	\$46.54	\$0.00	\$0.00	\$46.54	\$154.91	\$0.87
2034		\$103.13	\$55.19	\$47.56	\$0.00	\$0.00	\$47.56	\$158.32	\$0.89
2035		\$105.40	\$56.40	\$48.61	\$0.00	\$0.00	\$48.61	\$161.80	\$0.91
2036		\$107.72	\$57.64	\$49.68	\$0.00	\$0.00	\$49.68	\$165.36	\$0.93
2037		\$110.09	\$58.91	\$50.77	\$0.00	\$0.00	\$50.77	\$169.00	\$0.95
2038		\$112.51	\$60.21	\$51.89	\$0.00	\$0.00	\$51.89	\$172.72	\$0.97
2039		\$114.99	\$61.53	\$53.03	\$0.00	\$0.00	\$53.03	\$176.52	\$0.99
2040		\$117.52	\$62.88	\$54.19	\$0.00	\$0.00	\$54.19	\$180.40	\$1.01
2041		\$120.11	\$64.26	\$55.39	\$0.00	\$0.00	\$55.39	\$184.37	\$1.03
2042		\$122.87	\$65.74	\$56.66	\$0.00	\$0.00	\$56.66	\$188.61	\$1.05

**Sources, Inputs and Assumptions**

Source:	(c)(f)	Plant Costs - 2017 IRP Update - Table 5.4 & 5.5
	(a)	Plant capacity cost
	(b)	= (a) x 0.0710599128799291
	(d)	= ((b) + (c)) / (8.76 x 38.0%)
	(g)	= (d) + (f)
	(h)	Plant Costs - 2017 IRP Update - Table 5.4 & 5.5

2017 IRP Update ID Wind Resource - 38% Capacity Factor	
Wind	Cost and Input Assumptions

2033 \$	\$1,420	Plant capacity cost	\$/kW-yr
2017 \$	\$37.57	Fixed O&M, plus on-going capital cost	\$/kW-yr
2017 \$	0.59	Integration Cost	\$/MWH
2017 \$	\$0.00	Variable O&M	\$/MWH
2017 \$		Tax Credit \$/MWh	\$/MWH
	7.106%	Payment Factor	
	38%	Capacity Factor	

Company Official Inflation Forecast Dated December 31, 2018					
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2017	2.0%	2026	2.2%	2035	2.2%
2018	2.3%	2027	2.2%	2036	2.2%
2019	2.2%	2028	2.3%	2037	2.2%
2020	2.3%	2029	2.3%	2038	2.2%
2021	2.4%	2030	2.3%	2039	2.2%
2022	2.4%	2031	2.3%	2040	2.2%
2023	2.4%	2032	2.3%	2041	2.2%
2024	2.4%	2033	2.2%	2042	2.3%
2025	2.2%	2034	2.2%	2043	2.3%

**Table 4**  
**Burnertip Natural Gas Price Forecast**  
**Utah 2018.Q4\_Wind - 80.0 MW and 31.0% CF**

Year	PacifiCorp		
	Delivered IRP - Utah Greenfield Fuel Cost	Delivered IRP West Side Fuel Cost	Delivered IRP - Wyo NE Fuel Cost
2016	\$2.32	\$2.30	\$2.35
2017	\$2.67	\$3.32	\$2.66
2018	\$2.61	\$3.23	\$2.60
2019	\$2.47	\$2.38	\$2.21
2020	\$2.14	\$2.02	\$1.98
2021	\$2.09	\$1.95	\$1.93
2022	\$2.62	\$2.47	\$2.45
2023	\$3.20	\$3.04	\$3.03
2024	\$3.69	\$3.60	\$3.52
2025	\$4.07	\$3.97	\$3.89
2026	\$4.28	\$4.19	\$4.10
2027	\$4.25	\$4.15	\$4.07
2028	\$4.19	\$4.09	\$4.01
2029	\$4.53	\$4.43	\$4.35
2030	\$5.11	\$5.00	\$4.92
2031	\$5.45	\$5.32	\$5.26
2032	\$5.80	\$5.64	\$5.60
2033	\$6.17	\$5.96	\$5.97
2034	\$6.52	\$6.27	\$6.32
2035	\$6.28	\$5.94	\$6.08
2036	\$6.38	\$5.99	\$6.17
2037	\$6.76	\$6.34	\$6.55
2038	\$7.27	\$6.84	\$7.06
2039	\$7.74	\$7.32	\$7.53
2040	\$7.99	\$7.55	\$7.77

Official Forward Price Curve Forecast dated Dec 31, 2018

**Table 5**

**Utah 2018.Q4\_Wind - 80.0 MW and 31.0% CF  
January 2019 through December 2038**

**Nominal Avoided Costs Calculated Monthly**

<b>20 Year Starting 2019</b>	\$ 43,062,104	\$ 25,222,867	\$ 68,284,971	\$ 2,387,098	\$28.61
<b>Nominal NPV at 6.91% Discount Rate</b>					
<b>15 Year Starting 2019</b>	\$ 45,313,363	\$ 4,691,101	\$ 50,004,464	\$ 2,049,534	\$24.40
<b>15 Year Starting 2020</b>	\$ 43,585,609	\$ 9,809,621	\$ 53,395,230	\$ 2,049,648	\$26.05

Month	Energy	Capacity \$	Total	Total	AC Price
	Avoided \$	31.0% CF	Dollars	MWH	31.0% CF
Jan-19	496,946	-	496,946	16,505	30.11
Feb-19	283,590	-	283,590	13,802	20.55
Mar-19	262,403	-	262,403	16,862	15.56
Apr-19	220,250	-	220,250	14,482	15.21
May-19	218,256	-	218,256	14,297	15.27
Jun-19	258,637	-	258,637	17,930	14.43
Jul-19	647,691	-	647,691	20,642	31.38
Aug-19	505,491	-	505,491	21,488	23.52
Sep-19	364,795	-	364,795	21,070	17.31
Oct-19	286,982	-	286,982	20,190	14.21
Nov-19	307,981	-	307,981	20,169	15.27
Dec-19	335,719	-	335,719	19,837	16.92
Jan-20	283,828	-	283,828	16,505	17.20
Feb-20	256,367	-	256,367	14,442	17.75
Mar-20	261,996	-	261,996	16,862	15.54
Apr-20	196,170	-	196,170	14,482	13.55
May-20	186,455	-	186,455	14,297	13.04
Jun-20	232,314	-	232,314	17,930	12.96
Jul-20	636,472	-	636,472	20,642	30.83
Aug-20	433,458	-	433,458	21,488	20.17
Sep-20	373,884	-	373,884	21,070	17.74
Oct-20	248,483	-	248,483	20,190	12.31
Nov-20	224,367	-	224,367	20,169	11.12
Dec-20	373,144	-	373,144	19,837	18.81
Jan-21	246,008	-	246,008	16,505	14.91
Feb-21	214,438	-	214,438	13,802	15.54
Mar-21	266,030	-	266,030	16,862	15.78
Apr-21	195,557	-	195,557	14,482	13.50
May-21	158,087	-	158,087	14,297	11.06
Jun-21	210,522	-	210,522	17,930	11.74
Jul-21	349,626	-	349,626	20,642	16.94
Aug-21	339,141	-	339,141	21,488	15.78
Sep-21	291,032	-	291,032	21,070	13.81
Oct-21	191,339	-	191,339	20,190	9.48
Nov-21	280,448	-	280,448	20,169	13.91
Dec-21	324,857	-	324,857	19,837	16.38
Jan-22	223,604	-	223,604	16,505	13.55
Feb-22	249,675	-	249,675	13,802	18.09
Mar-22	210,440	-	210,440	16,862	12.48
Apr-22	202,094	-	202,094	14,482	13.95
May-22	191,024	-	191,024	14,297	13.36
Jun-22	240,758	-	240,758	17,930	13.43
Jul-22	236,999	-	236,999	20,642	11.48
Aug-22	259,504	-	259,504	21,488	12.08
Sep-22	254,214	-	254,214	21,070	12.07
Oct-22	287,549	-	287,549	20,190	14.24
Nov-22	268,327	-	268,327	20,169	13.30
Dec-22	314,952	-	314,952	19,837	15.88
Jan-23	325,019	-	325,019	16,505	19.69

Month	Energy	Capacity \$	Total	Total	AC Price
	Avoided \$	31.0% CF	Dollars	MWH	31.0% CF
Feb-23	243,899	-	243,899	13,802	17.67
Mar-23	404,026	-	404,026	16,862	23.96
Apr-23	294,405	-	294,405	14,482	20.33
May-23	256,711	-	256,711	14,297	17.96
Jun-23	313,463	-	313,463	17,930	17.48
Jul-23	318,747	-	318,747	20,642	15.44
Aug-23	593,231	-	593,231	21,488	27.61
Sep-23	351,265	-	351,265	21,070	16.67
Oct-23	380,528	-	380,528	20,190	18.85
Nov-23	430,223	-	430,223	20,169	21.33
Dec-23	455,337	-	455,337	19,837	22.95
Jan-24	422,568	-	422,568	16,505	25.60
Feb-24	341,491	-	341,491	14,442	23.65
Mar-24	365,802	-	365,802	16,862	21.69
Apr-24	310,459	-	310,459	14,482	21.44
May-24	283,683	-	283,683	14,297	19.84
Jun-24	331,201	-	331,201	17,930	18.47
Jul-24	387,542	-	387,542	20,642	18.77
Aug-24	451,174	-	451,174	21,488	21.00
Sep-24	380,011	-	380,011	21,070	18.04
Oct-24	431,650	-	431,650	20,190	21.38
Nov-24	516,905	-	516,905	20,169	25.63
Dec-24	500,076	-	500,076	19,837	25.21
Jan-25	442,269	-	442,269	16,505	26.80
Feb-25	368,045	-	368,045	13,802	26.67
Mar-25	380,699	-	380,699	16,862	22.58
Apr-25	335,897	-	335,897	14,482	23.19
May-25	298,652	-	298,652	14,297	20.89
Jun-25	336,781	-	336,781	17,930	18.78
Jul-25	497,811	-	497,811	20,642	24.12
Aug-25	482,079	-	482,079	21,488	22.44
Sep-25	441,221	-	441,221	21,070	20.94
Oct-25	431,585	-	431,585	20,190	21.38
Nov-25	515,506	-	515,506	20,169	25.56
Dec-25	495,887	-	495,887	19,837	25.00
Jan-26	449,916	-	449,916	16,505	27.26
Feb-26	361,528	-	361,528	13,802	26.19
Mar-26	393,246	-	393,246	16,862	23.32
Apr-26	353,310	-	353,310	14,482	24.40
May-26	302,860	-	302,860	14,297	21.18
Jun-26	340,764	-	340,764	17,930	19.01
Jul-26	513,444	-	513,444	20,642	24.87
Aug-26	492,150	-	492,150	21,488	22.90
Sep-26	417,624	-	417,624	21,070	19.82
Oct-26	447,736	-	447,736	20,190	22.18
Nov-26	502,579	-	502,579	20,169	24.92
Dec-26	469,261	-	469,261	19,837	23.66
Jan-27	482,791	-	482,791	16,505	29.25
Feb-27	236,755	-	236,755	13,802	17.15
Mar-27	420,598	-	420,598	16,862	24.94
Apr-27	366,246	-	366,246	14,482	25.29
May-27	302,395	-	302,395	14,297	21.15
Jun-27	353,712	-	353,712	17,930	19.73
Jul-27	520,101	-	520,101	20,642	25.20
Aug-27	504,328	-	504,328	21,488	23.47
Sep-27	452,719	-	452,719	21,070	21.49
Oct-27	416,564	-	416,564	20,190	20.63
Nov-27	524,571	-	524,571	20,169	26.01
Dec-27	482,722	-	482,722	19,837	24.33
Jan-28	443,060	-	443,060	16,505	26.84



Month	Energy	Capacity \$	Total	Total	AC Price
	Avoided \$	31.0% CF	Dollars	MWH	31.0% CF
Feb-28	306,859	-	306,859	14,442	21.25
Mar-28	69,013	-	69,013	16,862	4.09
Apr-28	240,108	-	240,108	14,482	16.58
May-28	360,459	-	360,459	14,297	25.21
Jun-28	415,197	-	415,197	17,930	23.16
Jul-28	655,198	-	655,198	20,642	31.74
Aug-28	695,889	-	695,889	21,488	32.39
Sep-28	593,298	-	593,298	21,070	28.16
Oct-28	487,677	-	487,677	20,190	24.15
Nov-28	519,166	-	519,166	20,169	25.74
Dec-28	509,197	-	509,197	19,837	25.67
Jan-29	529,746	-	529,746	16,505	32.10
Feb-29	413,267	-	413,267	13,802	29.94
Mar-29	463,813	-	463,813	16,862	27.51
Apr-29	405,954	-	405,954	14,482	28.03
May-29	378,015	-	378,015	14,297	26.44
Jun-29	463,466	-	463,466	17,930	25.85
Jul-29	785,384	-	785,384	20,642	38.05
Aug-29	918,098	-	918,098	21,488	42.73
Sep-29	776,004	-	776,004	21,070	36.83
Oct-29	534,274	-	534,274	20,190	26.46
Nov-29	573,561	-	573,561	20,169	28.44
Dec-29	671,432	-	671,432	19,837	33.85
Jan-30	639,531	-	639,531	16,505	38.75
Feb-30	567,515	-	567,515	13,802	41.12
Mar-30	652,082	-	652,082	16,862	38.67
Apr-30	473,394	-	473,394	14,482	32.69
May-30	451,843	-	451,843	14,297	31.60
Jun-30	557,965	-	557,965	17,930	31.12
Jul-30	986,363	-	986,363	20,642	47.78
Aug-30	1,133,825	-	1,133,825	21,488	52.77
Sep-30	972,246	-	972,246	21,070	46.14
Oct-30	653,379	-	653,379	20,190	32.36
Nov-30	711,520	-	711,520	20,169	35.28
Dec-30	763,920	-	763,920	19,837	38.51
Jan-31	690,115	-	690,115	16,505	41.81
Feb-31	577,815	-	577,815	13,802	41.86
Mar-31	580,732	-	580,732	16,862	34.44
Apr-31	524,445	-	524,445	14,482	36.21
May-31	475,165	-	475,165	14,297	33.23
Jun-31	593,331	-	593,331	17,930	33.09
Jul-31	1,069,280	-	1,069,280	20,642	51.80
Aug-31	1,168,304	-	1,168,304	21,488	54.37
Sep-31	1,031,161	-	1,031,161	21,070	48.94
Oct-31	676,091	-	676,091	20,190	33.49
Nov-31	726,156	-	726,156	20,169	36.00
Dec-31	811,601	-	811,601	19,837	40.91
Jan-32	719,953	-	719,953	16,505	43.62
Feb-32	656,773	-	656,773	14,442	45.48
Mar-32	925,352	-	925,352	16,862	54.88
Apr-32	573,640	-	573,640	14,482	39.61
May-32	500,109	-	500,109	14,297	34.98
Jun-32	550,452	-	550,452	17,930	30.70
Jul-32	1,130,194	-	1,130,194	20,642	54.75
Aug-32	1,231,344	-	1,231,344	21,488	57.30
Sep-32	1,104,847	-	1,104,847	21,070	52.44
Oct-32	751,701	-	751,701	20,190	37.23
Nov-32	775,356	-	775,356	20,169	38.44
Dec-32	822,211	-	822,211	19,837	41.45
Jan-33	(66,134)	1,032,733	966,599	16,505	58.57

Month	Energy	Capacity \$	Total	Total	AC Price
	Avoided \$	31.0% CF	Dollars	MWH	31.0% CF
Feb-33	(339,093)	1,032,733	693,640	13,802	50.26
Mar-33	(268,614)	1,032,733	764,120	16,862	45.32
Apr-33	(317,903)	1,032,733	714,831	14,482	49.36
May-33	(212,688)	1,032,733	820,045	14,297	57.36
Jun-33	(112,604)	1,032,733	920,129	17,930	51.32
Jul-33	54,690	1,032,733	1,087,423	20,642	52.68
Aug-33	265,397	1,032,733	1,298,130	21,488	60.41
Sep-33	174,188	1,032,733	1,206,922	21,070	57.28
Oct-33	(19,980)	1,032,733	1,012,754	20,190	50.16
Nov-33	(215,820)	1,032,733	816,913	20,169	40.50
Dec-33	(264,798)	1,032,733	767,936	19,837	38.71
Jan-34	(118,532)	1,055,467	936,935	16,505	56.77
Feb-34	(395,256)	1,055,467	660,211	13,802	47.83
Mar-34	(325,067)	1,055,467	730,399	16,862	43.32
Apr-34	(350,131)	1,055,467	705,336	14,482	48.70
May-34	(170,745)	1,055,467	884,721	14,297	61.88
Jun-34	(144,494)	1,055,467	910,973	17,930	50.81
Jul-34	56,814	1,055,467	1,112,281	20,642	53.89
Aug-34	302,185	1,055,467	1,357,651	21,488	63.18
Sep-34	176,874	1,055,467	1,232,341	21,070	58.49
Oct-34	27,168	1,055,467	1,082,634	20,190	53.62
Nov-34	(201,266)	1,055,467	854,201	20,169	42.35
Dec-34	(267,048)	1,055,467	788,419	19,837	39.74
Jan-35	(114,761)	1,078,667	963,905	16,505	58.40
Feb-35	(235,753)	1,078,667	842,914	13,802	61.07
Mar-35	(285,136)	1,078,667	793,531	16,862	47.06
Apr-35	(347,163)	1,078,667	731,504	14,482	50.51
May-35	(183,021)	1,078,667	895,646	14,297	62.64
Jun-35	(129,129)	1,078,667	949,537	17,930	52.96
Jul-35	38,399	1,078,667	1,117,066	20,642	54.12
Aug-35	317,112	1,078,667	1,395,779	21,488	64.96
Sep-35	196,587	1,078,667	1,275,253	21,070	60.52
Oct-35	19,776	1,078,667	1,098,443	20,190	54.41
Nov-35	(167,623)	1,078,667	911,044	20,169	45.17
Dec-35	(229,536)	1,078,667	849,130	19,837	42.81
Jan-36	(129,055)	1,102,400	973,345	16,505	58.97
Feb-36	(380,344)	1,102,400	722,056	14,442	50.00
Mar-36	(315,996)	1,102,400	786,404	16,862	46.64
Apr-36	(363,487)	1,102,400	738,913	14,482	51.02
May-36	(207,091)	1,102,400	895,309	14,297	62.62
Jun-36	(129,821)	1,102,400	972,579	17,930	54.24
Jul-36	32,985	1,102,400	1,135,385	20,642	55.00
Aug-36	325,963	1,102,400	1,428,363	21,488	66.47
Sep-36	167,965	1,102,400	1,270,365	21,070	60.29
Oct-36	(70,469)	1,102,400	1,031,931	20,190	51.11
Nov-36	(203,224)	1,102,400	899,176	20,169	44.58
Dec-36	(258,325)	1,102,400	844,075	19,837	42.55
Jan-37	(131,894)	1,126,667	994,773	16,505	60.27
Feb-37	(375,308)	1,126,667	751,359	13,944	53.88
Mar-37	(322,948)	1,126,667	803,719	16,862	47.67
Apr-37	(371,484)	1,126,667	755,183	14,482	52.14
May-37	(211,647)	1,126,667	915,019	14,297	64.00
Jun-37	(132,677)	1,126,667	993,990	17,930	55.44
Jul-37	33,711	1,126,667	1,160,377	20,642	56.22
Aug-37	333,135	1,126,667	1,459,801	21,488	67.94
Sep-37	171,661	1,126,667	1,298,327	21,070	61.62
Oct-37	(72,019)	1,126,667	1,054,648	20,190	52.24
Nov-37	(207,695)	1,126,667	918,971	20,169	45.56
Dec-37	(264,008)	1,126,667	862,659	19,837	43.49
Jan-38	(134,795)	1,151,467	1,016,671	16,505	61.60

Month	Energy	Capacity \$	Total	Total	AC Price
	Avoided \$	31.0% CF	Dollars	MWH	31.0% CF
Feb-38	(383,565)	1,151,467	767,902	13,944	55.07
Mar-38	(330,053)	1,151,467	821,414	16,862	48.72
Apr-38	(379,656)	1,151,467	771,810	14,482	53.29
May-38	(216,304)	1,151,467	935,163	14,297	65.41
Jun-38	(135,596)	1,151,467	1,015,871	17,930	56.66
Jul-38	34,452	1,151,467	1,185,919	20,642	57.45
Aug-38	340,464	1,151,467	1,491,930	21,488	69.43
Sep-38	175,437	1,151,467	1,326,904	21,070	62.98
Oct-38	(73,604)	1,151,467	1,077,863	20,190	53.39
Nov-38	(212,265)	1,151,467	939,202	20,169	46.57
Dec-38	(269,816)	1,151,467	881,651	19,837	44.44

**ROCKY MOUNTAIN POWER**

**STEP STUDY BETWEEN PRIOR FILING AND CURRENT FILING**

**2018.Q4 – March 2019**

**2019 - 2033, Nominal Levelized Payment at 6.910% Discount Rate**

	<b>2019 - 2033</b>		<b>2020 - 2034</b>		<b>2021 - 2035</b>	
2017.Q3 As Filed	\$26.27		\$27.92		\$29.96	
OFPC	\$0.30		-\$0.12		-\$0.24	
LoadFcst	\$0.06		\$0.12		\$0.18	
Queue	-\$1.62		-\$1.61		-\$1.86	
Generic	\$0.89		\$0.93		\$1.01	
NonRoutine	\$0.49		\$0.52		\$0.55	
2018.Q4 As Filed	\$25.90	\$0.12	\$27.24	-\$0.16	\$29.05	-\$0.36

## Appendix C

### Utah Quarterly Compliance Filing Step Study between 2018.Q4 and 2018.Q3 Compliance Filing Avoided Cost Impact of Changing Assumptions \$/MWH (1)

Year	OFPC (2)	LoadFcst	Queue	Generic	NonRoutine	Total Impact
2019	\$ 3.95	\$ (0.50)	\$ (1.96)	\$ 0.58	\$ 0.35	\$ 2.43
2020	\$ 1.11	\$ (0.40)	\$ 0.57	\$ 0.09	\$ 0.43	\$ 1.79
2021	\$ (0.58)	\$ (0.00)	\$ (1.42)	\$ 0.40	\$ 0.50	\$ (1.10)
2022	\$ (0.66)	\$ (0.52)	\$ (1.42)	\$ 0.51	\$ 1.02	\$ (1.08)
2023	\$ (0.20)	\$ 0.59	\$ (2.72)	\$ 2.03	\$ (0.02)	\$ (0.32)
2024	\$ 0.53	\$ 0.14	\$ (1.81)	\$ 1.00	\$ 0.16	\$ 0.02
2025	\$ (0.59)	\$ 0.35	\$ (1.12)	\$ 1.14	\$ 0.07	\$ (0.16)
2026	\$ 0.02	\$ 0.33	\$ (1.62)	\$ 0.75	\$ 0.21	\$ (0.32)
2027	\$ (0.50)	\$ 0.12	\$ (0.98)	\$ 0.88	\$ 0.19	\$ (0.29)
2028	\$ 0.27	\$ 0.46	\$ (2.59)	\$ 1.13	\$ 0.38	\$ (0.35)
2029	\$ (0.58)	\$ 0.18	\$ (3.26)	\$ 1.83	\$ 0.57	\$ (1.25)
2030	\$ (0.24)	\$ 0.09	\$ (2.32)	\$ 0.95	\$ 0.94	\$ (0.57)
2031	\$ (0.40)	\$ 0.50	\$ (1.70)	\$ 1.02	\$ 1.29	\$ 0.70
2032	\$ 0.26	\$ 0.30	\$ (1.05)	\$ 0.95	\$ 1.32	\$ 1.78
2033	\$ (0.44)	\$ 0.21	\$ (2.20)	\$ 0.90	\$ 0.90	\$ (0.62)
2034	\$ (0.42)	\$ 0.17	\$ (2.53)	\$ 1.15	\$ 0.92	\$ (0.72)
2035	\$ 0.16	\$ 0.28	\$ (1.87)	\$ 0.63	\$ 0.96	\$ 0.15
2036	\$ 0.29	\$ 0.15	\$ (1.74)	\$ 0.25	\$ 0.72	\$ (0.33)

#### Nominal Levelized Payment at 6.910% Discount Rate (3)

2019 - 2033	\$ 0.30	\$ 0.06	\$ (1.62)	\$ 0.89	\$ 0.49	\$ 0.12
2020 - 2034	\$ (0.12)	\$ 0.12	\$ (1.61)	\$ 0.93	\$ 0.52	\$ (0.16)
2021 - 2035	\$ (0.24)	\$ 0.18	\$ (1.86)	\$ 1.01	\$ 0.55	\$ (0.36)

- (1) Studies are sequential. The order of the studies would affect the price impact.
- (2) Official Forward Price Curve Dated December 2018
- (3) Discount Rate - 2017 IRP Update

## Appendix C

### Utah Quarterly Compliance Filing Step Study between 2018.Q4 and 2018.Q3 Compliance Filing Total Avoided Cost Prices \$/MWH (1) (4)

Year	2018.Q3 As Filed	OFPC (2)	LoadFcst	Queue	Generic	NonRoutine
2019	\$20.92	\$24.87	\$24.37	\$22.42	\$23.00	\$23.35
2020	\$18.54	\$19.64	\$19.24	\$19.81	\$19.90	\$20.33
2021	\$16.37	\$15.79	\$15.79	\$14.37	\$14.77	\$15.26
2022	\$17.24	\$16.58	\$16.06	\$14.64	\$15.15	\$16.16
2023	\$20.94	\$20.74	\$21.33	\$18.61	\$20.63	\$20.62
2024	\$23.43	\$23.96	\$24.10	\$22.29	\$23.29	\$23.45
2025	\$25.35	\$24.75	\$25.10	\$23.98	\$25.12	\$25.19
2026	\$25.63	\$25.65	\$25.97	\$24.35	\$25.10	\$25.31
2027	\$26.28	\$25.79	\$25.90	\$24.92	\$25.80	\$25.99
2028	\$28.35	\$28.62	\$29.08	\$26.49	\$27.62	\$28.01
2029	\$33.73	\$33.15	\$33.34	\$30.07	\$31.90	\$32.47
2030	\$40.79	\$40.56	\$40.64	\$38.33	\$39.28	\$40.23
2031	\$41.95	\$41.55	\$42.05	\$40.34	\$41.36	\$42.65
2032	\$43.65	\$43.91	\$44.21	\$43.16	\$44.11	\$45.43
2033	\$50.42	\$49.98	\$50.19	\$47.99	\$48.89	\$49.79
2034	\$53.02	\$52.60	\$52.77	\$50.24	\$51.38	\$52.30
2035	\$53.26	\$53.42	\$53.69	\$51.82	\$52.45	\$53.41
2036	\$55.95	\$56.25	\$56.39	\$54.65	\$54.90	\$55.63

#### Nominal Levelized Payment at 6.910% Discount Rate (3)

2019 - 2033	\$26.27	\$26.57	\$26.63	\$25.01	\$25.90	\$26.39
2020 - 2034	\$27.92	\$27.80	\$27.92	\$26.31	\$27.24	\$27.76
2021 - 2035	\$29.96	\$29.72	\$29.90	\$28.04	\$29.05	\$29.60

- (1) Studies are sequential. The order of the studies would affect the price impact.
- (2) Official Forward Price Curve Dated December 2018
- (3) Discount Rate - 2017 IRP Update
- (4) Capacity costs are allocated assuming an 85% capacity factor.

## Appendix C

### Utah Quarterly Compliance Filing Step Study between 2018.Q4 and 2018.Q3 Compliance Filing GRID Calculated Energy Avoided Cost Prices \$/MWH (1)

Year	2018.Q3 As Filed	OFPC	LoadFcst	Queue	Generic	NonRoutine
2019	\$20.92	\$24.87	\$24.37	\$22.42	\$23.00	\$23.35
2020	\$18.54	\$19.64	\$19.24	\$19.81	\$19.90	\$20.33
2021	\$16.37	\$15.79	\$15.79	\$14.37	\$14.77	\$15.26
2022	\$17.24	\$16.58	\$16.06	\$14.64	\$15.15	\$16.16
2023	\$20.94	\$20.74	\$21.33	\$18.61	\$20.63	\$20.62
2024	\$23.43	\$23.96	\$24.10	\$22.29	\$23.29	\$23.45
2025	\$25.35	\$24.75	\$25.10	\$23.98	\$25.12	\$25.19
2026	\$25.63	\$25.65	\$25.97	\$24.35	\$25.10	\$25.31
2027	\$26.28	\$25.79	\$25.90	\$24.92	\$25.80	\$25.99
2028	\$28.35	\$28.62	\$29.08	\$26.49	\$27.62	\$28.01
2029	\$33.73	\$33.15	\$33.34	\$30.07	\$31.90	\$32.47
2030	\$40.79	\$40.56	\$40.64	\$38.33	\$39.28	\$40.23
2031	\$41.95	\$41.55	\$42.05	\$40.34	\$41.36	\$42.65
2032	\$43.65	\$43.91	\$44.21	\$43.16	\$44.11	\$45.43
2033	\$50.42	\$49.98	\$50.19	\$47.99	\$48.89	\$49.79
2034	\$53.02	\$52.60	\$52.77	\$50.24	\$51.38	\$52.30
2035	\$53.26	\$53.42	\$53.69	\$51.82	\$52.45	\$53.41
2036	\$55.95	\$56.25	\$56.39	\$54.65	\$54.90	\$55.63

#### Nominal Levelized Payment at 6.91% Discount Rate (3) (4)

2019 - 2033	\$26.27	\$26.57	\$26.63	\$25.01	\$25.90	\$26.39
2020 - 2034	\$27.92	\$27.80	\$27.92	\$26.31	\$27.24	\$27.77
2021 - 2035	\$29.96	\$29.72	\$29.90	\$28.04	\$29.05	\$29.61

- (1) Studies are sequential. The order of the studies would affect the price impact.
- (2) Official Forward Price Curve Dated December 2018
- (3) Discount Rate - 2017 IRP Update
- (4) 15-Year Nominal Levelized Payment (2018-2032)



**Appendix C**

**Utah Quarterly Compliance Filing  
Step Study between 2018.Q4 and 2018.Q3 Compliance Filing  
Capacity Avoided Cost Prices**

Year	\$/kW-Year		\$/MWH (1)	
	2018.Q3 (3)	2018.Q4 (3)	2018.Q3 (3)	2018.Q4 (3)
2019	-	-	-	-
2020	-	-	-	-
2021	-	-	-	-
2022	-	-	-	-
2023	-	-	-	-
2024	-	-	-	-
2025	-	-	-	-
2026	-	-	-	-
2027	-	-	-	-
2028	-	-	-	-
2029	-	-	-	-
2030	-	-	-	-
2031	-	-	-	-
2032	-	-	-	-
2033	-	-	-	-
2034	-	-	-	-
2035	-	-	-	-
2036	-	-	-	-

Nominal Levelized Payment at 6.910% Discount Rate (2)

2019 - 2033	\$0.00	\$0.00	\$0.00	\$0.00
2020 - 2034	\$0.00	\$0.00	\$0.00	\$0.00
2021 - 2035	\$0.00	\$0.00	\$0.00	\$0.00

(1) Capacity costs are allocated assuming an 85% capacity factor.

(2) (3) Discount Rate - 2017 IRP Update

(3) No Capacity costs-All of the 2017 IRP Thermal resources are deferred due to the size of the Queue

## CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing **Quarterly Compliance Filing – Avoided Cost Input Changes** in Docket Nos. 03-035-14 and 18-035-23 was served upon the following by e-mail on March 20, 2019.

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