



1407 W. North Temple  
Salt Lake City, Utah 84116

December 24, 2018

***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 03-035-14 – Quarterly Compliance Filing – 2018.Q3 Avoided Cost Input Changes**  
**Docket 18-035-23 – 2018.Q3 Avoided Cost Input Changes Quarterly Compliance Filing**

PacifiCorp (dba Rocky Mountain Power) hereby respectfully submits its quarterly Schedule 38 compliance filing. As requested by the Public Service Commission of Utah for voluminous filings, Rocky Mountain Power is providing seven (7) printed copies of the filing via overnight delivery.

Public Service Commission of Utah (Commission) orders dated October 31, 2005, and February 2, 2006, in Docket 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 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 September 25, 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 September 28, 2018 (1809 OFPC).

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

Update of signed contract queue and current potential QFs. The QF queue was revised to include 3,057 megawatt (MW) nameplate in this filing. The potential queue was 3,545 MW nameplate in the 2018.Q2 filing.

**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 Dave Johnston wind resource in 2030 and 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 decrease of approximately \$2.56/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

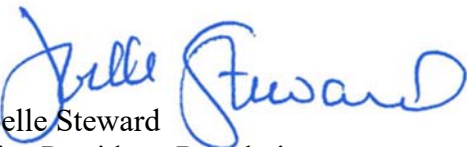
It is respectfully requested that all formal correspondence and requests regarding this compliance filing be addressed to:

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.Q3 – December 2018**

## Appendix A

### **PacifiCorp Avoided Cost (Partial Displacement Differential Revenue Requirement (PDDRR)) Model Updates through August 2018 Docket 03-035-14 / Docket 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 September 28, 2018 OFPC (1809 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 **September 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 June 29, 2018.

## **Long-Term Contracts**

- Long-term contracts which have prices that are indexed to market are consistent with the **1809 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 **November 2018**.
- 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 **November 2018**

## 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 November 2018.

## 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 December 2017.
- 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.
- Wyoming Central -> Wyoming Northeast transmission link included.

## 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	Name plate	CF	Capacity Contribution	Start Date
1	Soda Lake Geothermal	13.30	20.00		66.500%	2019 09 01

<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.



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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\* PacifiCorp's June 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: **537MW of wind resources are displaced by the QF queue. The incremental wind QF displaces 64 MW of Dave Johnston IRP proxy wind in 2030 and 16 MW of**

**Goshen IRP proxy wind in 2033. The Company retains 80% of the RECs associated with the QF starting in 2030, and 100% of the RECs starting in 2033.**

Year	IRP Additions (Nameplate MW)				Base Case Displacement (Deferred MW)				
	IRP Thermal	IRP Baseload Renewable	IRP Solar	IRP Wind	Thermal	Solar	Wind	FOT Summer	FOT Winter
2017	-	-	-	-	-	-	-	(11)	(11)
2018	-	-	-	-	-	-	-	(218)	(218)
2019	-	-	-	-	-	-	-	(171)	(171)
2020	-	-	-	-	-	-	-	17	17
2021	-	-	-	1,149	-	-	-	395	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	-	-	-	1,175	357
2029	-	-	-	1,149	-	-	-	1,175	758
2030	-	-	651	1,750	-	651	537	764	764
2031	-	-	745	1,750	-	745	537	699	699
2032	-	-	878	1,750	-	878	537	611	611
2033	-	-	1,854	2,550	-	1,854	537	17	17
2034	-	-	1,854	2,550	-	1,854	537	17	17
2035	-	-	1,860	2,883	-	1,860	537	14	14
2036	-	-	1,860	3,032	-	1,860	537	14	14

## IRP Partial Displacements (Previous Filing)

Thermal partial displacement was 1,940 MW in the base case and 2,040 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	Tesoro Non Firm QF	0.00	25.00		0.0%	2018 01 01
2	Soda Lake Geothermal	13.30	20.00		66.5%	2019 09 01
3	Sprague River (terminated)	-4.54	-7.00		64.8%	
4	Ivory Pine (terminated)	-6.48	-10.00		64.8%	
5	Roseburg Dillard QF	0.00	20.00		0.0%	2018 03 01
6	Cove Mountain Solar	34.63	58.00		59.7%	2020 12 31
7	Hunter Solar	59.70	100.00		59.7%	2020 12 31
8	Milford Solar	59.10	99.00		59.7%	2020 11 30
9	Milican Solar	29.16	45.00		64.8%	2020 12 31
10	Prineville Solar	35.64	55.00		64.8%	2020 12 31
11	Sigurd Solar	47.76	80.00		59.7%	2020 12 31
12	Non-deferrable PPAs	328.35	550.00		59.7%	2020-2028
13	Everpower (removal)	-37.92	-240.00		15.8%	2019 11 01
14	EV2020 (removal)	-25.44	-161.00		15.8%	2020 11 01
15	Monticello Wind QF (removal)	-12.51	-79.20		15.8%	2021 12 31
Total Signed MW		520.75	554.80			

1	QF - 249 - OR - Solar	25.92	40.00	29.1%	64.8%	2019 12 31
2	QF - 279 - OR - Solar	25.92	40.00	31.0%	64.8%	2019 12 31
3	QF - 280 - OR - Solar	12.96	20.00	27.9%	64.8%	2019 01 01
4	QF - 281 - OR - Solar	25.92	40.00	24.5%	64.8%	2019 12 31
5	QF - 456 - WY - Gas	0.00	13.30	85.0%	0.0%	2018 02 01
6	QF - 427 - WY - Wind	11.99	75.90	46.7%	15.8%	2019 09 01
7	QF - 372 - WY - Solar	23.87	40.00	27.4%	59.7%	2019 06 30
8	QF - 459 - WY - Solar	47.74	80.00	24.8%	59.7%	2020 01 01
9	QF - 460 - WY - Solar	47.74	80.00	24.8%	59.7%	2020 01 01
10	QF - 462 - WY - Solar	47.74	80.00	23.3%	59.7%	2020 12 01
11	QF - 477 - OR - Solar	12.96	20.00	21.6%	64.8%	2020 07 01
12	QF - 478 - OR - Solar	3.56	5.50	22.9%	64.7%	2020 03 01
13	QF - 479 - UT - Gas	0.00	36.00	85.0%	0.0%	2018 04 01
14	QF - 308 - WY - Wind	12.64	80.00	46.6%	15.8%	2020 11 01
15	QF - 309 - WY - Wind	12.64	80.00	46.6%	15.8%	2020 11 01
16	QF - 310 - WY - Wind	12.64	80.00	46.6%	15.8%	2020 11 01
17	QF - 311 - WY - Wind	6.32	40.00	46.6%	15.8%	2020 11 01
18	QF - 406 - OR - Solar	51.84	80.00	27.1%	64.8%	2021 12 01

19	QF - 407 - OR - Solar	51.84	80.00	27.1%	64.8%	2021 12 01
20	QF - 408 - OR - Solar	51.84	80.00	26.7%	64.8%	2021 12 01
21	QF - 409 - OR - Solar	51.84	80.00	26.7%	64.8%	2021 12 01
22	QF - 410 - OR - Solar	51.84	80.00	26.7%	64.8%	2021 12 01
23	QF - 486 - OR - Solar	51.84	80.00	26.7%	64.8%	2021 12 01
24	QF - 487 - OR - Solar	51.84	80.00	26.7%	64.8%	2021 12 01
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33	QF - 492 - WY - Solar	47.74	80.00	29.5%	59.7%	2021 12 01
34	QF - 428 - WY - Solar	23.87	40.00	30.2%	59.7%	2021 08 01
35	QF - 429 - WY - Solar	23.87	40.00	30.2%	59.7%	2021 08 01
36	QF - 493 - WY - Solar	30.59	51.26	27.5%	59.7%	2021 09 01
37	QF - 453 - UT - Solar	47.74	80.00	26.9%	59.7%	2021 09 01
38	QF - 454 - UT - Solar	47.74	80.00	26.9%	59.7%	2021 09 01
39	QF - 455 - UT - Solar	47.74	80.00	26.9%	59.7%	2021 09 01
40	QF - 456 - UT - Solar	35.80	60.00	26.9%	59.7%	2021 09 01
41	QF - 495 - WA - Solar	51.84	80.00	27.4%	64.8%	2020 12 01
42	QF - 496 - WY - Gas	0.00	98.00	75.0%	0.0%	2019 01 01
43	QF - 435 - UT - Gas	0.00	25.00	85.0%	0.0%	2019 01 01
44	QF - WY - Gas	0.00	30.00	85.0%	0.0%	2019 01 01
45	QF - 365 - UT - Wind	12.64	80.00	31.4%	15.8%	2020 12 01
46	QF - 442 - WY - Solar	47.74	80.00	26.7%	59.7%	2020 07 01
47	QF - 497 - WY - Wind	12.64	80.00	36.8%	15.8%	2020 12 01
48	QF - 498 - WY - Wind	12.64	80.00	36.8%	15.8%	2020 12 01
49	QF - 499 - WY - Wind	12.64	80.00	36.8%	15.8%	2020 12 01
Total Potential MW		1419.96	2990.18			

Total Partial Displacement	<b>1940.71</b>	<b>3544.98</b>
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50	Utah 2018.Q2	100.00	100.00	85.0%	100.0%	2018 01 01
Partial Displacement after QF		<b>2040.71</b>				

**ROCKY MOUNTAIN POWER**

**UPDATE IMPACT – UPDATED AVOIDED COST STUDY**

**2018.Q3 – DECEMBER 2018**

**Appendix B.1**  
**Avoided Cost Prices \$/MWh**  
**Utah 2018.Q3 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.Q2 Filing	Solar Tracking UT 2018.Q2 Filing	Wind UT 2018.Q2 Filing	Thermal Difference	Solar Tracking Difference	Wind Difference
2019	\$20.92	\$21.31	\$17.95	\$18.84	\$17.47	\$16.38	\$2.08	\$3.84	\$1.57
2020	\$18.54	\$16.77	\$16.47	\$16.60	\$14.31	\$15.52	\$1.94	\$2.46	\$0.96
2021	\$16.37	\$11.72	\$15.16	\$15.17	\$10.73	\$13.97	\$1.19	\$0.99	\$1.19
2022	\$17.24	\$11.71	\$14.28	\$14.08	\$8.35	\$13.51	\$3.16	\$3.36	\$0.77
2023	\$20.94	\$14.04	\$19.38	\$14.83	\$9.42	\$14.13	\$6.11	\$4.62	\$5.25
2024	\$23.43	\$14.65	\$21.44	\$16.50	\$10.25	\$15.02	\$6.93	\$4.40	\$6.42
2025	\$25.35	\$15.50	\$23.12	\$21.90	\$12.77	\$20.16	\$3.45	\$2.73	\$2.96
2026	\$25.63	\$14.79	\$23.17	\$23.57	\$11.91	\$22.52	\$2.06	\$2.88	\$0.65
2027	\$26.28	\$14.83	\$23.46	\$24.50	\$13.77	\$23.78	\$1.78	\$1.06	(\$0.31)
2028	\$28.35	\$17.29	\$26.90	\$27.98	\$16.72	\$27.17	\$0.37	\$0.57	(\$0.28)
2029	\$33.73	\$21.47	\$32.93	\$32.15	\$19.22	\$31.76	\$1.58	\$2.25	\$1.17
2030	\$40.79	\$23.97	\$49.61	\$39.32	\$25.01	\$37.72	\$1.47	(\$1.04)	\$11.89
2031	\$41.95	\$24.75	\$49.45	\$40.92	\$28.40	\$39.42	\$1.03	(\$3.65)	\$10.03
2032	\$43.65	\$26.17	\$50.82	\$44.51	\$28.01	\$40.45	(\$0.86)	(\$1.84)	\$10.38
2033	\$50.42	\$30.86	\$53.32	\$46.79	\$29.08	\$50.26	\$3.63	\$1.79	\$3.06

2019-2033	15-Year Levelized Prices (Nominal) @ 6.910% Discount Rate (1) (3)	\$/MWh	\$26.25	\$17.53	\$25.76	\$23.69	\$15.46	\$22.56	\$2.56	\$2.07	\$3.20
									11%	13%	14%

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.Q3 - 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	\$20.92	\$20.92
2020	\$0.00	\$18.54	\$18.54
2021	\$0.00	\$16.37	\$16.37
2022	\$0.00	\$17.24	\$17.24
2023	\$0.00	\$20.94	\$20.94
2024	\$0.00	\$23.43	\$23.43
2025	\$0.00	\$25.35	\$25.35
2026	\$0.00	\$25.63	\$25.63
2027	\$0.00	\$26.28	\$26.28
2028	\$0.00	\$28.35	\$28.35
2029	\$0.00	\$33.73	\$33.73
2030	\$0.00	\$40.79	\$40.79
2031	\$0.00	\$41.95	\$41.95
2032	\$0.00	\$43.65	\$43.65
2033	\$0.00	\$50.42	\$50.42
2034	\$0.00	\$53.02	\$53.02
2035	\$0.00	\$53.26	\$53.26
2036	\$0.00	\$55.95	\$55.95
2037	\$0.00	\$57.13	\$57.13
2038	\$0.00	\$58.33	\$58.33

15 Year Starting 2019

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

\$/kW	\$0.00		
\$/MWh		\$26.25	\$26.25

20 Year Starting 2019

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

\$/kW	\$0.00		
\$/MWh		\$30.36	\$30.36

15 Year Starting 2020

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

\$/kW	\$0.00	\$27.90	\$27.90
\$/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.Q3 - 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	20.92	22.68	19.58	15.49	13.91	15.01	16.99	49.74	27.00	21.30	15.24	15.68	17.82
2020	18.54	20.64	18.44	14.58	14.65	14.47	15.31	32.67	25.17	21.11	14.33	14.65	16.14
2021	16.37	17.78	15.98	14.69	14.19	14.67	13.52	20.53	19.52	17.49	13.18	16.27	18.40
2022	17.24	21.53	20.20	14.71	14.52	14.91	15.10	17.92	15.94	16.10	17.25	17.68	21.12
2023	20.94	22.97	21.85	20.37	19.80	18.82	17.90	20.47	23.95	20.20	20.59	22.83	21.52
2024	23.43	26.17	23.92	21.93	21.82	19.82	20.04	26.92	23.81	23.04	22.16	25.02	26.41
2025	25.35	27.86	27.86	24.58	24.26	21.46	20.43	27.26	26.56	24.83	25.75	26.05	27.32
2026	25.63	28.13	28.27	23.78	25.67	21.77	20.89	29.33	26.94	25.49	23.88	26.66	26.89
2027	26.28	32.92	27.77	24.38	26.00	21.81	22.07	29.55	28.48	25.19	23.63	24.84	28.66
2028	28.35	27.96	30.64	25.22	23.60	25.39	24.67	36.18	34.96	31.02	24.90	27.75	27.88
2029	33.73	32.74	36.11	25.76	27.86	29.05	27.58	48.44	44.69	39.74	30.35	28.98	33.32
2030	40.79	38.38	39.58	31.39	31.68	30.93	32.83	67.66	54.97	47.55	37.76	35.71	40.49
2031	41.95	42.53	43.58	38.73	34.18	36.40	35.14	48.87	55.63	50.31	38.82	36.17	42.76
2032	43.65	44.24	43.91	31.98	35.23	37.97	33.09	56.94	60.69	53.14	41.42	39.00	45.71
2033	50.42	48.03	45.30	38.75	39.04	39.73	35.80	80.66	69.65	58.98	46.27	42.68	58.80
2034	53.02	51.88	52.68	41.83	42.33	37.88	37.90	84.76	72.92	59.58	47.15	45.50	60.94
2035	53.26	55.76	56.76	40.71	41.78	37.69	38.56	82.54	74.67	59.37	47.37	43.48	59.81
2036	55.95	54.33	55.20	42.78	41.96	39.84	40.06	87.49	78.97	68.60	52.54	46.12	62.59

**Table 4**  
**Burnertip Natural Gas Price Forecast**  
**Utah 2018.Q3 - 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	\$2.71	\$2.77	\$2.71
2018	\$2.33	\$2.31	\$2.32
2019	\$2.21	\$2.07	\$2.07
2020	\$2.11	\$1.98	\$2.01
2021	\$2.17	\$2.04	\$2.11
2022	\$2.70	\$2.54	\$2.63
2023	\$3.23	\$3.06	\$3.15
2024	\$3.70	\$3.61	\$3.62
2025	\$4.07	\$3.98	\$3.99
2026	\$4.28	\$4.19	\$4.19
2027	\$4.25	\$4.15	\$4.16
2028	\$4.19	\$4.09	\$4.11
2029	\$4.52	\$4.42	\$4.44
2030	\$5.10	\$4.99	\$5.01
2031	\$5.44	\$5.31	\$5.34
2032	\$5.79	\$5.62	\$5.69
2033	\$6.16	\$5.95	\$6.06
2034	\$6.52	\$6.27	\$6.42
2035	\$6.28	\$5.94	\$6.18
2036	\$6.38	\$5.99	\$6.27

Official Forward Price Curve Forecast dated Sep 28, 2018

Table 5

Utah 2018.Q3 - 100.0 MW and 85.0% CF  
January 2019 through December 2036

Nominal Avoided Costs Calculated Monthly

20 Year Starting 2019	\$ 248,825,183	\$ -	\$ 248,825,183	\$ 8,197,076	\$30.36
<b>Nominal NPV at 6.91% Discount Rate</b>					
15 Year Starting 2019	\$ 184,774,084	\$ -	\$ 184,774,084	\$ 7,038,138	\$26.25
15 Year Starting 2020	\$ 196,402,443	\$ -	\$ 196,402,443	\$ 7,038,503	\$27.90

Month	Energy	Capacity \$	Total	Total	AC Price
	Avoided \$	85.0% CF	Dollars	MWH	85.0% CF
Jan-19	1,434,133	-	1,434,133	63,240	22.68
Feb-19	1,118,256	-	1,118,256	57,120	19.58
Mar-19	979,668	-	979,668	63,240	15.49
Apr-19	851,511	-	851,511	61,200	13.91
May-19	949,305	-	949,305	63,240	15.01
Jun-19	1,039,911	-	1,039,911	61,200	16.99
Jul-19	3,145,383	-	3,145,383	63,240	49.74
Aug-19	1,707,248	-	1,707,248	63,240	27.00
Sep-19	1,303,319	-	1,303,319	61,200	21.30
Oct-19	963,516	-	963,516	63,240	15.24
Nov-19	959,552	-	959,552	61,200	15.68
Dec-19	1,127,129	-	1,127,129	63,240	17.82
Jan-20	1,305,071	-	1,305,071	63,240	20.64
Feb-20	1,090,845	-	1,090,845	59,160	18.44
Mar-20	921,959	-	921,959	63,240	14.58
Apr-20	896,714	-	896,714	61,200	14.65
May-20	915,058	-	915,058	63,240	14.47
Jun-20	936,997	-	936,997	61,200	15.31
Jul-20	2,066,097	-	2,066,097	63,240	32.67
Aug-20	1,591,572	-	1,591,572	63,240	25.17
Sep-20	1,291,973	-	1,291,973	61,200	21.11
Oct-20	906,211	-	906,211	63,240	14.33
Nov-20	896,497	-	896,497	61,200	14.65
Dec-20	1,020,805	-	1,020,805	63,240	16.14
Jan-35	3,526,290	-	3,526,290	63,240	55.76
Feb-35	3,242,327	-	3,242,327	57,120	56.76
Mar-35	2,574,494	-	2,574,494	63,240	40.71
Apr-35	2,556,965	-	2,556,965	61,200	41.78
May-35	2,383,305	-	2,383,305	63,240	37.69
Jun-35	2,360,025	-	2,360,025	61,200	38.56
Jul-35	5,220,055	-	5,220,055	63,240	82.54
Aug-35	4,722,273	-	4,722,273	63,240	74.67
Sep-35	3,633,227	-	3,633,227	61,200	59.37
Oct-35	2,995,715	-	2,995,715	63,240	47.37
Nov-35	2,661,158	-	2,661,158	61,200	43.48
Dec-35	3,782,363	-	3,782,363	63,240	59.81
Jan-36	3,435,608	-	3,435,608	63,240	54.33
Feb-36	3,265,804	-	3,265,804	59,160	55.20
Mar-36	2,705,442	-	2,705,442	63,240	42.78
Apr-36	2,568,199	-	2,568,199	61,200	41.96
May-36	2,519,616	-	2,519,616	63,240	39.84
Jun-36	2,451,860	-	2,451,860	61,200	40.06
Jul-36	5,532,958	-	5,532,958	63,240	87.49
Aug-36	4,993,804	-	4,993,804	63,240	78.97
Sep-36	4,198,200	-	4,198,200	61,200	68.60
Oct-36	3,322,855	-	3,322,855	63,240	52.54
Nov-36	2,822,395	-	2,822,395	61,200	46.12
Dec-36	3,958,437	-	3,958,437	63,240	62.59

**Appendix B.2**  
**Avoided Cost Prices \$/MWh**  
**Utah 2018.Q3 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.Q2 Filing	Solar Tracking UT 2018.Q2 Filing	Wind UT 2018.Q2 Filing	Thermal Difference	Solar Tracking Difference	Wind Difference
2019	\$20.92	\$21.31	\$17.95	\$18.84	\$17.47	\$16.38	\$2.08	\$3.84	\$1.57
2020	\$18.54	\$16.77	\$16.47	\$16.60	\$14.31	\$15.52	\$1.94	\$2.46	\$0.96
2021	\$16.37	\$11.72	\$15.16	\$15.17	\$10.73	\$13.97	\$1.19	\$0.99	\$1.19
2022	\$17.24	\$11.71	\$14.28	\$14.08	\$8.35	\$13.51	\$3.16	\$3.36	\$0.77
2023	\$20.94	\$14.04	\$19.38	\$14.83	\$9.42	\$14.13	\$6.11	\$4.62	\$5.25
2024	\$23.43	\$14.65	\$21.44	\$16.50	\$10.25	\$15.02	\$6.93	\$4.40	\$6.42
2025	\$25.35	\$15.50	\$23.12	\$21.90	\$12.77	\$20.16	\$3.45	\$2.73	\$2.96
2026	\$25.63	\$14.79	\$23.17	\$23.57	\$11.91	\$22.52	\$2.06	\$2.88	\$0.65
2027	\$26.28	\$14.83	\$23.46	\$24.50	\$13.77	\$23.78	\$1.78	\$1.06	(\$0.31)
2028	\$28.35	\$17.29	\$26.90	\$27.98	\$16.72	\$27.17	\$0.37	\$0.57	(\$0.28)
2029	\$33.73	\$21.47	\$32.93	\$32.15	\$19.22	\$31.76	\$1.58	\$2.25	\$1.17
2030	\$40.79	\$23.97	\$49.61	\$39.32	\$25.01	\$37.72	\$1.47	(\$1.04)	\$11.89
2031	\$41.95	\$24.75	\$49.45	\$40.92	\$28.40	\$39.42	\$1.03	(\$3.65)	\$10.03
2032	\$43.65	\$26.17	\$50.82	\$44.51	\$28.01	\$40.45	(\$0.86)	(\$1.84)	\$10.38
2033	\$50.42	\$30.86	\$53.32	\$46.79	\$29.08	\$50.26	\$3.63	\$1.79	\$3.06

2019-2033	15-Year Levelized Prices (Nominal) @ 6.910% Discount Rate (1) (3)	\$/MWh	\$26.25	\$17.53	\$25.76	\$23.69	\$15.46	\$22.56	\$2.56	\$2.07	\$3.20
									11%	13%	14%

Footnotes:

- (2) Total Avoided Costs with Capacity, based on stated CF
- (3) 15-Years: 2019 - 2033, levelized monthly

**Table 1**  
**Avoided Cost Prices**  
**Utah 2018.Q3\_Solar - 80.0 MW and 30.9% CF**

Total Price @

Year	Capacity Price \$/kW-yr	Energy Only Price \$/MWh <sup>(2)</sup>	30.9% Capacity Factor \$/MWh
2019	\$0.00	\$21.31	\$21.31
2020	\$0.00	\$16.77	\$16.77
2021	\$0.00	\$11.72	\$11.72
2022	\$0.00	\$11.71	\$11.71
2023	\$0.00	\$14.04	\$14.04
2024	\$0.00	\$14.65	\$14.65
2025	\$0.00	\$15.50	\$15.50
2026	\$0.00	\$14.79	\$14.79
2027	\$0.00	\$14.83	\$14.83
2028	\$0.00	\$17.29	\$17.29
2029	\$0.00	\$21.47	\$21.47
2030	\$0.00	\$23.97	\$23.97
2031	\$0.00	\$24.75	\$24.75
2032	\$0.00	\$26.17	\$26.17
2033	\$0.00	\$30.86	\$30.86
2034	\$0.00	\$33.65	\$33.65
2035	\$0.00	\$33.89	\$33.89
2036	\$0.00	\$38.51	\$38.51
2037	\$0.00	\$39.34	\$39.34
2038	\$0.00	\$40.17	\$40.17

15 Year Starting 2019

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

\$/kW	\$0.00		
\$/MWh		\$17.53	\$17.53

20 Year Starting 2019

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

\$/kW	\$0.00		
\$/MWh		\$20.12	\$20.12

15 Year Starting 2020

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

\$/kW	\$0.00	\$17.72	\$17.72
\$/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.Q3\_Solar - 80.0 MW and 30.9% 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	21.31	27.01	14.26	11.89	10.98	12.88	16.50	61.20	25.25	18.81	13.41	16.04	16.45
2020	16.77	16.38	12.47	11.37	11.56	11.97	14.50	35.34	21.58	17.24	9.83	16.92	16.49
2021	11.72	13.07	10.87	9.30	10.12	11.57	11.74	13.36	15.29	9.13	10.51	12.75	13.62
2022	11.71	17.56	12.16	10.25	8.34	10.40	12.64	15.56	12.51	9.01	11.68	10.44	11.90
2023	14.04	14.88	13.14	11.61	13.34	10.31	14.16	18.97	17.00	9.85	13.51	16.75	17.38
2024	14.65	16.16	14.45	12.50	12.74	12.21	14.96	19.08	15.27	11.70	13.42	18.09	19.51
2025	15.50	17.79	14.57	14.69	14.34	12.88	15.31	17.81	16.77	12.58	16.24	17.69	19.44
2026	14.79	16.22	14.66	11.12	13.60	11.98	15.32	19.00	16.63	11.73	14.14	17.07	19.31
2027	14.83	17.81	10.49	13.65	14.05	10.45	16.15	19.38	16.86	11.26	13.62	16.86	20.27
2028	17.29	16.71	16.86	12.12	11.15	15.37	18.48	25.27	23.45	13.84	13.33	19.54	20.81
2029	21.47	20.28	19.11	12.67	13.40	17.95	20.63	40.46	27.48	18.24	17.39	21.24	24.88
2030	23.97	23.51	21.03	14.67	18.31	17.57	24.95	34.42	34.25	22.55	20.79	23.88	30.25
2031	24.75	24.97	22.17	17.07	18.66	21.82	26.11	24.45	37.66	26.08	22.65	23.47	31.33
2032	26.17	25.19	22.89	16.21	15.19	22.21	24.65	37.57	38.16	26.65	25.21	24.99	34.06
2033	30.86	25.38	24.66	16.68	19.11	22.10	24.92	51.77	47.60	29.51	23.19	25.29	69.96
2034	33.65	29.05	26.91	18.63	21.25	19.19	26.42	68.28	50.27	29.32	23.82	26.59	71.87
2035	33.89	31.67	28.61	16.85	18.44	21.24	28.23	67.63	52.12	26.66	25.71	28.25	69.07
2036	38.51	32.67	27.09	19.56	20.71	24.26	29.78	71.70	56.83	44.76	32.00	32.49	77.10

**Table 4**  
**Burnertip Natural Gas Price Forecast**  
**Utah 2018.Q3\_Solar - 80.0 MW and 30.9% 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	\$2.71	\$2.77	\$2.71
2018	\$2.33	\$2.31	\$2.32
2019	\$2.21	\$2.07	\$2.07
2020	\$2.11	\$1.98	\$2.01
2021	\$2.17	\$2.04	\$2.11
2022	\$2.70	\$2.54	\$2.63
2023	\$3.23	\$3.06	\$3.15
2024	\$3.70	\$3.61	\$3.62
2025	\$4.07	\$3.98	\$3.99
2026	\$4.28	\$4.19	\$4.19
2027	\$4.25	\$4.15	\$4.16
2028	\$4.19	\$4.09	\$4.11
2029	\$4.52	\$4.42	\$4.44
2030	\$5.10	\$4.99	\$5.01
2031	\$5.44	\$5.31	\$5.34
2032	\$5.79	\$5.62	\$5.69
2033	\$6.16	\$5.95	\$6.06
2034	\$6.52	\$6.27	\$6.42
2035	\$6.28	\$5.94	\$6.18
2036	\$6.38	\$5.99	\$6.27

Official Forward Price Curve Forecast dated Sep 28, 2018

Table 5

Utah 2018.Q3\_Solar - 80.0 MW and 30.9% CF  
January 2019 through December 2036

Nominal Avoided Costs Calculated Monthly

20 Year Starting 2019	\$ 46,289,536	\$ -	\$ 46,289,536	\$ 2,300,177	\$20.12
<b>Nominal NPV at 6.91% Discount Rate</b>					
15 Year Starting 2019	\$ 34,880,009	\$ -	\$ 34,880,009	\$ 1,989,409	\$17.53
15 Year Starting 2020	\$ 35,086,620	\$ -	\$ 35,086,620	\$ 1,979,594	\$17.72

Month	Energy	Capacity \$	Total	Total	AC Price
	Avoided \$	30.5% CF	Dollars	MWH	30.5% CF
Jan-19	283,123	-	283,123	10,481	27.01
Feb-19	167,240	-	167,240	11,731	14.26
Mar-19	215,928	-	215,928	18,156	11.89
Apr-19	231,664	-	231,664	21,103	10.98
May-19	314,632	-	314,632	24,430	12.88
Jun-19	428,121	-	428,121	25,954	16.50
Jul-19	1,437,550	-	1,437,550	23,490	61.20
Aug-19	594,040	-	594,040	23,527	25.25
Sep-19	390,095	-	390,095	20,738	18.81
Oct-19	225,541	-	225,541	16,813	13.41
Nov-19	181,650	-	181,650	11,324	16.04
Dec-19	143,001	-	143,001	8,692	16.45
Jan-20	170,862	-	170,862	10,429	16.38
Feb-20	154,262	-	154,262	12,374	12.47
Mar-20	205,412	-	205,412	18,065	11.37
Apr-20	242,710	-	242,710	20,998	11.56
May-20	290,899	-	290,899	24,308	11.97
Jun-20	374,478	-	374,478	25,824	14.50
Jul-20	826,099	-	826,099	23,373	35.34
Aug-20	505,081	-	505,081	23,410	21.58
Sep-20	355,712	-	355,712	20,635	17.24
Oct-20	164,467	-	164,467	16,729	9.83
Nov-20	190,601	-	190,601	11,267	16.92
Dec-20	142,575	-	142,575	8,648	16.49
Jan-35	306,383	-	306,383	9,673	31.67
Feb-35	309,703	-	309,703	10,827	28.61
Mar-35	282,364	-	282,364	16,757	16.85
Apr-35	359,253	-	359,253	19,477	18.44
May-35	478,959	-	478,959	22,547	21.24
Jun-35	676,319	-	676,319	23,953	28.23
Jul-35	1,466,221	-	1,466,221	21,680	67.63
Aug-35	1,131,720	-	1,131,720	21,714	52.12
Sep-35	510,359	-	510,359	19,140	26.66
Oct-35	398,975	-	398,975	15,517	25.71
Nov-35	295,220	-	295,220	10,451	28.25
Dec-35	554,079	-	554,079	8,022	69.07
Jan-36	314,492	-	314,492	9,625	32.67
Feb-36	309,413	-	309,413	11,421	27.09
Mar-36	326,054	-	326,054	16,673	19.56
Apr-36	401,373	-	401,373	19,380	20.71
May-36	544,290	-	544,290	22,434	24.26
Jun-36	709,820	-	709,820	23,834	29.78
Jul-36	1,546,682	-	1,546,682	21,572	71.70
Aug-36	1,227,861	-	1,227,861	21,606	56.83
Sep-36	852,449	-	852,449	19,044	44.76
Oct-36	494,066	-	494,066	15,440	32.00
Nov-36	337,831	-	337,831	10,399	32.49
Dec-36	615,414	-	615,414	7,982	77.10



**Appendix B.3**  
**Avoided Cost Prices \$/MWh**  
**Utah 2018.Q3 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.Q2 Filing	Solar Tracking UT 2018.Q2 Filing	Wind UT 2018.Q2 Filing	Thermal Difference	Solar Tracking Difference	Wind Difference
2019	\$20.92	\$21.31	\$17.95	\$18.84	\$17.47	\$16.38	\$2.08	\$3.84	\$1.57
2020	\$18.54	\$16.77	\$16.47	\$16.60	\$14.31	\$15.52	\$1.94	\$2.46	\$0.96
2021	\$16.37	\$11.72	\$15.16	\$15.17	\$10.73	\$13.97	\$1.19	\$0.99	\$1.19
2022	\$17.24	\$11.71	\$14.28	\$14.08	\$8.35	\$13.51	\$3.16	\$3.36	\$0.77
2023	\$20.94	\$14.04	\$19.38	\$14.83	\$9.42	\$14.13	\$6.11	\$4.62	\$5.25
2024	\$23.43	\$14.65	\$21.44	\$16.50	\$10.25	\$15.02	\$6.93	\$4.40	\$6.42
2025	\$25.35	\$15.50	\$23.12	\$21.90	\$12.77	\$20.16	\$3.45	\$2.73	\$2.96
2026	\$25.63	\$14.79	\$23.17	\$23.57	\$11.91	\$22.52	\$2.06	\$2.88	\$0.65
2027	\$26.28	\$14.83	\$23.46	\$24.50	\$13.77	\$23.78	\$1.78	\$1.06	(\$0.31)
2028	\$28.35	\$17.29	\$26.90	\$27.98	\$16.72	\$27.17	\$0.37	\$0.57	(\$0.28)
2029	\$33.73	\$21.47	\$32.93	\$32.15	\$19.22	\$31.76	\$1.58	\$2.25	\$1.17
2030	\$40.79	\$23.97	\$49.61	\$39.32	\$25.01	\$37.72	\$1.47	(\$1.04)	\$11.89
2031	\$41.95	\$24.75	\$49.45	\$40.92	\$28.40	\$39.42	\$1.03	(\$3.65)	\$10.03
2032	\$43.65	\$26.17	\$50.82	\$44.51	\$28.01	\$40.45	(\$0.86)	(\$1.84)	\$10.38
2033	\$50.42	\$30.86	\$53.32	\$46.79	\$29.08	\$50.26	\$3.63	\$1.79	\$3.06

15-Year Levelized Prices (Nominal) @ 6.910% Discount Rate (1) (3)										
2019-2033	\$/MWh	\$26.25	\$17.53	\$25.76	\$23.69	\$15.46	\$22.56	\$2.56	\$2.07	\$3.20
							11%	13%	14%	

Footnotes:

- (2) Total Avoided Costs with Capacity, based on stated CF
- (3) 15-Years: 2019 - 2033, levelized monthly

**Table 1**  
**Avoided Cost Prices**  
**Utah 2018.Q3\_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	\$17.95	\$17.95
2020	\$0.00	\$16.47	\$16.47
2021	\$0.00	\$15.16	\$15.16
2022	\$0.00	\$14.28	\$14.28
2023	\$0.00	\$19.38	\$19.38
2024	\$0.00	\$21.44	\$21.44
2025	\$0.00	\$23.12	\$23.12
2026	\$0.00	\$23.17	\$23.17
2027	\$0.00	\$23.46	\$23.46
2028	\$0.00	\$26.90	\$26.90
2029	\$0.00	\$32.93	\$32.93
2030	\$120.49	\$5.24	\$49.61
2031	\$122.92	\$4.19	\$49.45
2032	\$125.38	\$4.80	\$50.82
2033	\$157.99	(\$4.85)	\$53.32
2034	\$161.15	(\$5.64)	\$53.69
2035	\$164.37	(\$7.01)	\$53.51
2036	\$167.65	(\$6.42)	\$55.13
2037	\$171.17	(\$6.49)	\$56.49
2038	\$174.76	(\$6.63)	\$57.68

15 Year Starting 2019

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

\$/kW \$23.26

\$/MWh \$17.20 \$25.76

20 Year Starting 2019

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

\$/kW \$43.68

\$/MWh \$13.85 \$29.93

15 Year Starting 2020

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

\$/kW \$31.34

\$/MWh \$16.20 \$27.74

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.Q3\_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	17.95	20.96	18.60	14.79	13.03	13.36	13.94	35.15	20.69	17.23	13.77	14.12	16.30
2020	16.47	18.53	17.10	13.86	14.13	13.44	13.04	24.46	19.74	17.49	13.36	15.50	14.79
2021	15.16	16.15	15.86	13.74	13.56	12.85	11.49	17.55	16.99	16.79	12.50	15.51	17.36
2022	14.28	16.57	16.94	13.45	14.28	13.42	13.35	14.47	12.20	12.60	14.45	12.35	18.36
2023	19.38	21.63	20.84	20.71	20.31	18.01	18.19	17.73	19.07	18.53	18.11	20.83	19.53
2024	21.44	25.43	24.12	21.85	21.58	19.61	18.44	22.51	21.53	16.52	19.32	23.55	23.78
2025	23.12	26.21	25.37	24.09	24.69	20.97	18.88	24.34	22.58	21.76	21.87	23.66	23.95
2026	23.17	27.28	27.21	23.98	24.81	21.24	19.02	25.20	22.01	22.65	19.79	23.88	22.61
2027	23.46	31.29	23.90	18.20	25.83	20.77	21.07	25.79	25.07	22.22	20.63	22.08	24.95
2028	26.90	27.22	28.88	26.11	25.92	24.60	23.11	31.35	32.28	28.78	22.23	25.81	25.05
2029	32.93	30.47	34.41	28.05	40.27	28.91	26.31	40.37	41.61	38.38	26.63	27.75	30.32
2030	5.24	1.24	(9.28)	1.15	2.59	5.41	14.45	17.08	23.25	17.04	(1.75)	(8.26)	(7.88)
2031	4.19	(6.69)	(15.69)	0.30	(2.59)	5.24	14.03	18.65	23.34	18.26	(1.44)	(6.85)	(8.07)
2032	4.80	(7.36)	(13.49)	(0.45)	3.55	5.35	12.62	18.79	24.74	20.21	(1.20)	(5.94)	(9.40)
2033	(4.85)	(17.33)	(29.85)	(9.95)	(11.26)	(3.79)	6.22	11.54	17.30	12.67	(9.07)	(17.27)	(21.58)
2034	(5.64)	(18.09)	(30.94)	(10.40)	(12.67)	(2.07)	6.05	2.65	19.36	13.67	(8.79)	(17.99)	(22.07)
2035	(7.01)	(25.37)	(42.63)	(17.69)	(13.45)	(3.07)	6.37	10.79	20.43	7.71	(8.93)	(16.28)	(20.60)
2036	(6.42)	(17.83)	(32.60)	(12.43)	(12.09)	(4.52)	6.92	11.24	20.12	11.82	(12.39)	(20.49)	(28.13)

**Table 4**  
**Burnertip Natural Gas Price Forecast**  
**Utah 2018.Q3\_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	\$2.71	\$2.77	\$2.71
2018	\$2.33	\$2.31	\$2.32
2019	\$2.21	\$2.07	\$2.07
2020	\$2.11	\$1.98	\$2.01
2021	\$2.17	\$2.04	\$2.11
2022	\$2.70	\$2.54	\$2.63
2023	\$3.23	\$3.06	\$3.15
2024	\$3.70	\$3.61	\$3.62
2025	\$4.07	\$3.98	\$3.99
2026	\$4.28	\$4.19	\$4.19
2027	\$4.25	\$4.15	\$4.16
2028	\$4.19	\$4.09	\$4.11
2029	\$4.52	\$4.42	\$4.44
2030	\$5.10	\$4.99	\$5.01
2031	\$5.44	\$5.31	\$5.34
2032	\$5.79	\$5.62	\$5.69
2033	\$6.16	\$5.95	\$6.06
2034	\$6.52	\$6.27	\$6.42
2035	\$6.28	\$5.94	\$6.18
2036	\$6.38	\$5.99	\$6.27

Official Forward Price Curve Forecast dated Sep 28, 2018

**Table 5**  
**Utah 2018.Q3\_Wind - 80.0 MW and 31.0% CF**  
**January 2019 through December 2036**  
**Nominal Avoided Costs Calculated Monthly**

**20 Year Starting 2019**                   \$ 33,062,651   \$ 38,388,057   \$ 71,450,709   \$ 2,387,098           \$29.93  
**Nominal NPV at 6.91% Discount Rate**  
**15 Year Starting 2019**               \$ 35,245,304   \$ 17,556,571   \$ 52,801,875   \$ 2,049,534           \$25.76  
**15 Year Starting 2020**               \$ 33,197,667   \$ 23,649,775   \$ 56,847,442   \$ 2,049,648           \$27.74

Month	Energy	Capacity \$	Total	Total	AC Price
	Avoided \$	31.0% CF	Dollars	MWH	31.0% CF
Jan-19	346,013	-	346,013	16,505	20.96
Feb-19	256,656	-	256,656	13,802	18.60
Mar-19	249,352	-	249,352	16,862	14.79
Apr-19	188,763	-	188,763	14,482	13.03
May-19	190,994	-	190,994	14,297	13.36
Jun-19	249,982	-	249,982	17,930	13.94
Jul-19	725,567	-	725,567	20,642	35.15
Aug-19	444,474	-	444,474	21,488	20.69
Sep-19	362,935	-	362,935	21,070	17.23
Oct-19	278,033	-	278,033	20,190	13.77
Nov-19	284,740	-	284,740	20,169	14.12
Dec-19	323,358	-	323,358	19,837	16.30
Jan-20	305,905	-	305,905	16,505	18.53
Feb-20	246,926	-	246,926	14,442	17.10
Mar-20	233,670	-	233,670	16,862	13.86
Apr-20	204,585	-	204,585	14,482	14.13
May-20	192,086	-	192,086	14,297	13.44
Jun-20	233,716	-	233,716	17,930	13.04
Jul-20	504,826	-	504,826	20,642	24.46
Aug-20	424,169	-	424,169	21,488	19.74
Sep-20	368,439	-	368,439	21,070	17.49
Oct-20	269,672	-	269,672	20,190	13.36
Nov-20	312,706	-	312,706	20,169	15.50
Dec-20	293,388	-	293,388	19,837	14.79
Jan-35	(418,757)	1,095,812	677,055	16,505	41.02
Feb-35	(588,361)	1,095,812	507,451	13,802	36.77
Mar-35	(298,211)	1,095,812	797,601	16,862	47.30
Apr-35	(194,720)	1,095,812	901,092	14,482	62.22
May-35	(43,857)	1,095,812	1,051,955	14,297	73.58
Jun-35	114,126	1,095,812	1,209,938	17,930	67.48
Jul-35	222,654	1,095,812	1,318,466	20,642	63.87
Aug-35	439,064	1,095,812	1,534,876	21,488	71.43
Sep-35	162,475	1,095,812	1,258,287	21,070	59.72
Oct-35	(180,278)	1,095,812	915,534	20,190	45.35
Nov-35	(328,315)	1,095,812	767,497	20,169	38.05
Dec-35	(408,707)	1,095,812	687,105	19,837	34.64
Jan-36	(294,239)	1,117,695	823,456	16,505	49.89
Feb-36	(470,884)	1,117,695	646,811	14,442	44.79
Mar-36	(209,639)	1,117,695	908,056	16,862	53.85
Apr-36	(175,051)	1,117,695	942,644	14,482	65.09
May-36	(64,592)	1,117,695	1,053,103	14,297	73.66
Jun-36	124,030	1,117,695	1,241,725	17,930	69.26
Jul-36	232,103	1,117,695	1,349,798	20,642	65.39
Aug-36	432,367	1,117,695	1,550,062	21,488	72.14
Sep-36	249,007	1,117,695	1,366,702	21,070	64.86
Oct-36	(250,162)	1,117,695	867,533	20,190	42.97
Nov-36	(413,347)	1,117,695	704,348	20,169	34.92
Dec-36	(557,948)	1,117,695	559,747	19,837	28.22

**Table 3**  
**2017 IRP Update Wyoming DJ Wind Resource**  
**41% Capacity Factor**

Year	Estimated Capital Cost	Fixed Capital Cost at Real Levelized	Fixed O&M	Fixed Costs	Variable O&M	Tax Credit	Total Resource Cost	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)	(i)

**2017 IRP Update Wyoming DJ Wind Resource - 41% Capacity Factor**

2016									
2017			\$37.57	\$10.38	\$0.65	\$0.00	\$11.03	\$39.92	\$0.59
2018			\$38.43	\$10.62	\$0.66	\$0.00	\$11.28	\$40.82	\$0.60
2019			\$39.28	\$10.86	\$0.67	\$0.00	\$11.53	\$41.70	\$0.61
2020			\$40.26	\$11.13	\$0.69	\$0.00	\$11.82	\$42.76	\$0.63
2021			\$41.23	\$11.40	\$0.71	\$0.00	\$12.11	\$43.80	\$0.65
2022			\$42.22	\$11.67	\$0.73	\$0.00	\$12.40	\$44.86	\$0.67
2023			\$43.23	\$11.95	\$0.75	\$0.00	\$12.70	\$45.94	\$0.69
2024			\$44.22	\$12.22	\$0.77	\$0.00	\$12.99	\$47.01	\$0.71
2025			\$45.24	\$12.50	\$0.79	\$0.00	\$13.29	\$48.10	\$0.73
2026			\$46.24	\$12.78	\$0.81	\$0.00	\$13.59	\$49.17	\$0.75
2027			\$47.26	\$13.06	\$0.83	\$0.00	\$13.89	\$50.26	\$0.77
2028			\$48.30	\$13.35	\$0.85	\$0.00	\$14.20	\$51.38	\$0.79
2029			\$49.31	\$13.63	\$0.87	\$0.00	\$14.50	\$52.46	\$0.81
2030	\$1,353	\$96.16	\$50.30	\$40.48	\$0.89	\$0.00	\$41.37	\$149.68	\$0.83
2031		\$98.09	\$51.31	\$41.29	\$0.91	\$0.00	\$42.20	\$152.69	\$0.85
2032		\$100.05	\$52.34	\$42.12	\$0.93	\$0.00	\$43.05	\$155.75	\$0.87
2033		\$102.05	\$53.39	\$42.96	\$0.95	\$0.00	\$43.91	\$158.88	\$0.89
2034		\$104.09	\$54.46	\$43.82	\$0.97	\$0.00	\$44.79	\$162.06	\$0.91
2035		\$106.17	\$55.55	\$44.70	\$0.99	\$0.00	\$45.69	\$165.30	\$0.93
2036		\$108.29	\$56.66	\$45.59	\$1.01	\$0.00	\$46.60	\$168.60	\$0.95
2037		\$110.56	\$57.85	\$46.55	\$1.03	\$0.00	\$47.58	\$172.14	\$0.97
2038		\$112.88	\$59.06	\$47.53	\$1.05	\$0.00	\$48.58	\$175.74	\$0.99
2039		\$115.25	\$60.30	\$48.52	\$1.07	\$0.00	\$49.59	\$179.42	\$1.01
2040		\$117.67	\$61.57	\$49.54	\$1.09	\$0.00	\$50.63	\$183.18	\$1.03
2041		\$120.26	\$62.92	\$50.63	\$1.11	\$0.00	\$51.74	\$187.20	\$1.05
2042		\$122.91	\$64.30	\$51.75	\$1.13	\$0.00	\$52.88	\$191.30	\$1.07

**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 41.3%)
	(g)	= (d) + (f)
	(i)	Plant Costs - 2017 IRP Update - Table 5.4 & 5.5

2017 IRP Update Wyoming DJ Wind Resource - 41% Capacity Factor	
Wind	Cost and Input Assumptions

2030 \$	\$1,353	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 \$	\$0.65	Variable O&M	\$/MWH
2017 \$		Tax Credit \$/MWh	\$/MWH

7.106%	Payment Factor		
41%	Capacity Factor	41%	Supply Side tables

Company Official Inflation Forecast Dated September 28, 2018					
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2017	2.0%	2026	2.2%	2035	2.0%
2018	2.3%	2027	2.2%	2036	2.0%
2019	2.2%	2028	2.2%	2037	2.1%
2020	2.5%	2029	2.1%	2038	2.1%
2021	2.4%	2030	2.0%	2039	2.1%
2022	2.4%	2031	2.0%	2040	2.1%
2023	2.4%	2032	2.0%	2041	2.2%
2024	2.3%	2033	2.0%	2042	2.2%
2025	2.3%	2034	2.0%	2043	2.2%

**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			\$40.26	\$12.09	\$0.00	\$0.00	\$12.09	\$40.26	\$0.63
2021			\$41.23	\$12.39	\$0.00	\$0.00	\$12.39	\$41.23	\$0.65
2022			\$42.22	\$12.68	\$0.00	\$0.00	\$12.68	\$42.22	\$0.67
2023			\$43.23	\$12.99	\$0.00	\$0.00	\$12.99	\$43.23	\$0.69
2024			\$44.22	\$13.28	\$0.00	\$0.00	\$13.28	\$44.22	\$0.71
2025			\$45.24	\$13.59	\$0.00	\$0.00	\$13.59	\$45.24	\$0.73
2026			\$46.24	\$13.89	\$0.00	\$0.00	\$13.89	\$46.24	\$0.75
2027			\$47.26	\$14.20	\$0.00	\$0.00	\$14.20	\$47.26	\$0.77
2028			\$48.30	\$14.51	\$0.00	\$0.00	\$14.51	\$48.30	\$0.79
2029			\$49.31	\$14.81	\$0.00	\$0.00	\$14.81	\$49.31	\$0.81
2030			\$50.30	\$15.11	\$0.00	\$0.00	\$15.11	\$50.30	\$0.83
2031			\$51.31	\$15.41	\$0.00	\$0.00	\$15.41	\$51.31	\$0.85
2032			\$52.34	\$15.72	\$0.00	\$0.00	\$15.72	\$52.34	\$0.87
2033	\$1,420	\$100.91	\$53.39	\$46.35	\$0.00	\$0.00	\$46.35	\$154.30	\$0.89
2034		\$102.93	\$54.46	\$47.28	\$0.00	\$0.00	\$47.28	\$157.39	\$0.91
2035		\$104.99	\$55.55	\$48.23	\$0.00	\$0.00	\$48.23	\$160.54	\$0.93
2036		\$107.09	\$56.66	\$49.19	\$0.00	\$0.00	\$49.19	\$163.75	\$0.95
2037		\$109.34	\$57.85	\$50.23	\$0.00	\$0.00	\$50.23	\$167.19	\$0.97
2038		\$111.64	\$59.06	\$51.28	\$0.00	\$0.00	\$51.28	\$170.70	\$0.99
2039		\$113.98	\$60.30	\$52.36	\$0.00	\$0.00	\$52.36	\$174.28	\$1.01
2040		\$116.37	\$61.57	\$53.45	\$0.00	\$0.00	\$53.45	\$177.94	\$1.03
2041		\$118.93	\$62.92	\$54.63	\$0.00	\$0.00	\$54.63	\$181.85	\$1.05
2042		\$121.55	\$64.30	\$55.83	\$0.00	\$0.00	\$55.83	\$185.85	\$1.07

**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 September 28, 2018					
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2017	2.0%	2026	2.2%	2035	2.0%
2018	2.3%	2027	2.2%	2036	2.0%
2019	2.2%	2028	2.2%	2037	2.1%
2020	2.5%	2029	2.1%	2038	2.1%
2021	2.4%	2030	2.0%	2039	2.1%
2022	2.4%	2031	2.0%	2040	2.1%
2023	2.4%	2032	2.0%	2041	2.2%
2024	2.3%	2033	2.0%	2042	2.2%
2025	2.3%	2034	2.0%	2043	2.2%

**ROCKY MOUNTAIN POWER**

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

**2018.Q3 – DECEMBER 2018**

**Nominal Levelized Payment at 6.910% Discount Rate**

	<b>2019 - 2033</b>		<b>2020 - 2034</b>		<b>2021 - 2035</b>	
2018.Q2 As Filed	\$23.71		\$25.14		\$27.04	
OFPC	\$2.41		\$2.62		\$2.80	
Generic	-\$0.64		-\$0.67		-\$0.68	
Queue	\$0.79		\$0.84		\$0.80	
2018.Q3 As Filed	\$26.27	\$2.56	\$27.92	\$2.78	\$29.96	\$2.92

## Appendix C

### Utah Quarterly Compliance Filing Step Study between 2018.Q3 and 2018.Q2 Compliance Filing Avoided Cost Impact of Changing Assumptions \$/MWH (1)

Year	OFPC (2)	Generic	Queue	Total Impact
2019	\$ 1.90	\$ (0.36)	\$ 0.54	\$ 2.08
2020	\$ 1.56	\$ (0.47)	\$ 0.85	\$ 1.94
2021	\$ 1.47	\$ (0.67)	\$ 0.40	\$ 1.20
2022	\$ 3.01	\$ (0.26)	\$ 0.41	\$ 3.16
2023	\$ 5.52	\$ (1.61)	\$ 2.20	\$ 6.11
2024	\$ 6.71	\$ (0.33)	\$ 0.55	\$ 6.93
2025	\$ 2.17	\$ 0.46	\$ 0.83	\$ 3.45
2026	\$ 1.84	\$ (0.65)	\$ 0.87	\$ 2.06
2027	\$ 1.40	\$ (0.84)	\$ 1.22	\$ 1.78
2028	\$ (0.18)	\$ (0.44)	\$ 0.99	\$ 0.37
2029	\$ 0.31	\$ (2.18)	\$ 3.45	\$ 1.58
2030	\$ 0.62	\$ (0.54)	\$ 1.39	\$ 1.47
2031	\$ 2.60	\$ (0.04)	\$ (1.53)	\$ 1.03
2032	\$ 2.61	\$ (1.23)	\$ (2.25)	\$ (0.86)
2033	\$ 3.58	\$ (1.16)	\$ 1.21	\$ 3.63
2034	\$ 6.24	\$ (0.73)	\$ 1.27	\$ 6.78
2035	\$ 4.40	\$ (0.28)	\$ (0.05)	\$ 4.08
2036	\$ 5.51	\$ (0.22)	\$ (0.08)	\$ 5.21

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

2019 - 2033	\$ 2.41	\$ (0.64)	\$ 0.79	\$ 2.56
2020 - 2034	\$ 2.62	\$ (0.67)	\$ 0.84	\$ 2.78
2021 - 2035	\$ 2.80	\$ (0.68)	\$ 0.80	\$ 2.92

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

## Appendix C

### Utah Quarterly Compliance Filing Step Study between 2018.Q3 and 2018.Q2 Compliance Filing Total Avoided Cost Prices \$/MWH (1) (4)

Year	2018.Q2 As Filed	OFPC (2)	Generic	Queue
2019	\$18.84	\$20.74	\$20.38	\$20.92
2020	\$16.60	\$18.15	\$17.69	\$18.54
2021	\$15.17	\$16.64	\$15.97	\$16.37
2022	\$14.08	\$17.09	\$16.83	\$17.24
2023	\$14.83	\$20.35	\$18.74	\$20.94
2024	\$16.50	\$23.21	\$22.88	\$23.43
2025	\$21.90	\$24.06	\$24.52	\$25.35
2026	\$23.57	\$25.41	\$24.76	\$25.63
2027	\$24.50	\$25.90	\$25.06	\$26.28
2028	\$27.98	\$27.80	\$27.36	\$28.35
2029	\$32.15	\$32.46	\$30.28	\$33.73
2030	\$39.32	\$39.94	\$39.40	\$40.79
2031	\$40.92	\$43.52	\$43.48	\$41.95
2032	\$44.51	\$47.12	\$45.89	\$43.65
2033	\$46.79	\$50.37	\$49.21	\$50.42
2034	\$46.24	\$52.48	\$51.75	\$53.02
2035	\$49.18	\$53.59	\$53.31	\$53.26
2036	\$50.74	\$56.25	\$56.03	\$55.95

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

2019 - 2033	\$23.71	\$26.12	\$25.48	\$26.27
2020 - 2034	\$25.14	\$27.76	\$27.09	\$27.92
2021 - 2035	\$27.04	\$29.84	\$29.16	\$29.96

- (1) Studies are sequential. The order of the studies would affect the price impact.
- (2) Official Forward Price Curve Dated September 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.Q3 and 2018.Q2 Compliance Filing GRID Calculated Energy Avoided Cost Prices \$/MWH (1)

Year	2018.Q2 As Filed	OFPC	Generic	Queue
<b>2019</b>	\$18.84	\$20.74	\$20.38	\$20.92
<b>2020</b>	\$16.60	\$18.15	\$17.69	\$18.54
<b>2021</b>	\$15.17	\$16.64	\$15.97	\$16.37
<b>2022</b>	\$14.08	\$17.09	\$16.83	\$17.24
<b>2023</b>	\$14.83	\$20.35	\$18.74	\$20.94
<b>2024</b>	\$16.50	\$23.21	\$22.88	\$23.43
<b>2025</b>	\$21.90	\$24.06	\$24.52	\$25.35
<b>2026</b>	\$23.57	\$25.41	\$24.76	\$25.63
<b>2027</b>	\$24.50	\$25.90	\$25.06	\$26.28
<b>2028</b>	\$27.98	\$27.80	\$27.36	\$28.35
<b>2029</b>	\$32.15	\$32.46	\$30.28	\$33.73
<b>2030</b>	\$39.32	\$39.94	\$39.40	\$40.79
<b>2031</b>	\$40.92	\$43.52	\$43.48	\$41.95
<b>2032</b>	\$44.51	\$47.12	\$45.89	\$43.65
<b>2033</b>	\$46.79	\$50.37	\$49.21	\$50.42
<b>2034</b>	\$46.24	\$52.48	\$51.75	\$53.02
<b>2035</b>	\$49.18	\$53.59	\$53.31	\$53.26
<b>2036</b>	\$50.74	\$56.25	\$56.03	\$55.95

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

2019 - 2033	\$23.71	\$26.12	\$25.48	\$26.27
2020 - 2034	\$25.14	\$27.76	\$27.09	\$27.92
2021 - 2035	\$27.04	\$29.84	\$29.16	\$29.96

- (1) Studies are sequential. The order of the studies would affect the price impact.
- (2) Official Forward Price Curve Dated September 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.Q3 and 2018.Q2 Compliance Filing**  
**Capacity Avoided Cost Prices**

Year	\$/kW-Year		\$/MWH (1)	
	2018.Q2 (3)	2018.Q3 (3)	2018.Q2 (3)	2018.Q3 (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

## 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 December 24, 2018.

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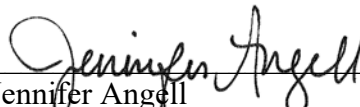
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