

Appendix A
PacifiCorp
Avoided Cost (Partial Displacement Differential Revenue
Requirement)
Model Updates through August 2016
Docket No. 03-035-14
Docket No. 16-035-29

Assumptions that have changed since the 2016.Q1 compliance filing are in bold.

GRID Scenario Study Period

January 1, **2018** through December 31, **2032** - 15-year study
Avoided cost prices starting in January **2018**

Official Forward Price Curve (Gas and Electric Market Prices)

Updated to PacifiCorp's June 2016 Official Forward Price Curve (1606 OFPC)
OFPC reflecting the changes in forecasted prices inclusive of the impact of the
Environmental Protection Agency's Clean Power Plan final rule

Fuel Prices (Coal)

Average and incremental coal costs based on forecast dated August 2015
Coal burn expense reflects incremental coal costs and coal take or pay minimum burn
levels

Integrated Resource Plan (IRP) Resources

2015 IRP Update filed with the Commission on March 31, 2016
Resource additions, including generating resources, and front office transactions (FOT),
consistent with 2015 IRP Update Table 5.3
Existing plant retirement consistent with 2015 IRP Update Table 5.3
No transmission additions consistent with 2015 IRP Update

Hydro Resources

2015 hydro forecast prepared December 2015
2015 hydro levels extended thereafter with known and measurable changes
Adjust Klamath dispatch to reflect current operating patterns
Update Mid-Columbia generation forecast

Discount Rate

6.66% discount rate - 2015 IRP Update page 39 (unchanged from 2015 IRP)
Discount rate is consistent with the Commission's order in Docket No. 11-035-T06

Inflation Rates

Company's inflation rate forecast dated **June 2016**

Levelized Prices (Nominal) @ 6.66% Discount Rate

15 years **2018** through **2032**
Calculated annually
Levelized prices are for illustrative purposes only

Load Forecast (Retail)

20-Year load forecast dated **July 2016**

Long-Term Contracts

Long-term contracts which have prices that are indexed to market are consistent with the **1606 OFPC**

Contracts are modeled based on 48 months ended **December 2015**

QF contracts are assumed to terminate and not renew at the end of their contracts

Three QFs were added as signed contracts:

Orchard Wind Farm, a 40 MW wind QF in Oregon (4 QFs at 10 MW each)

Chevron Wind, a 16.50 MW wind QF in Wyoming

Surprise Valley Geothermal, a 3.7 MW geothermal QF in Oregon

Market Capacity

Capacity set at 48 month average of all STF sales ended December 2015

Mid-Columbia and Palo Verde 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 **July 2016**

Potential Environmental Costs

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

Regulating Margin

Consistent with the 2014 Wind Integration Study

Regulation reserves starting at 432 aMW and increasing as necessary to provide wind integration
Increasing at 7.0 MW of regulation reserve per 100 MW of incremental east side wind
Reserve modeling reflects reliability Standard BAL-003-1 related to frequency response

Contingency Reserve Calculation

Reserve modeling reflects reliability standard BAL-002-WECC-2 – contingency reserves set to 3% of retail load plus 3% of generating resources
Hourly retail load reserve calculation through 2019
Typical week retail load reserve calculation thereafter

Short-Term Firm (STF) Transactions

Executed STF contracts as of **July 2016**

Size of the Avoided Cost Resource

The avoided cost thermal resource is a 100 MW and 85% capacity factor thermal resource 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 December 2015

Wind and Solar Resources

Existing wind generation profiles modeled using 2015 actual generation shape

New wind and solar generation modeled using 12x24 profiles

Integration cost methodology pursuant to Commission orders in Docket No. 12-035-100 (issued August 16, 2013, and October 4, 2013)

Wind integration costs set at **\$2.23/MWh (2017-2036)** on a 20-year nominal levelized basis

Solar integration costs set at \$2.83 per megawatt hour for fixed solar resources and \$2.18 per megawatt hour for tracking solar resources

Capacity contribution applied to renewable resources consistent with June 26, 2015, Commission order in Docket No. 14-035-140 (see table below)

Renewable Type	Capacity Contribution Percent of Nameplate	
	East	West
Wind	14.5%	25.4%
Solar – Fixed Mount	34.1%	32.2%
Solar –Tracking	39.1%	36.7%

Transmission

Short term transmission modeled based on 48 months ended December 2015

Energy Gateway transmission rights - 2015 IRP Scenario EG 1

Wyoming Central -> Wyoming Northeast transmission link included

IRP Partial Displacements (This Filing)

Thermal partial displacement is 722.23 MW in the base case and 822.23 MW in the avoided cost case. Listed below are the QFs that have executed a power purchase agreement or are actively negotiating for a power purchase agreement. Signed resources are new and were not included in the 2015 IRP Update.

QF Queue						
No.	QF	Partial Displacement	Name plate	CF	Capacity Contribution	Start Date
1	Pavant Solar III	7.82	20.00	29.5%	39.1%	2016 12 31
2	Sweetwater Solar	31.28	80.00	26.6%	39.1%	2018 11 01
3	Orchard Wind Farm	10.16	40.00	36.0%	25.4%	2020 10 01
4	Chevron Wind	2.39	16.50	29.5%	14.5%	2016 07 01
5	Surprise Valley Geothermal	3.70	3.70	85.0%	100.0%	2016 09 01
Total Signed MW		55.35	160.20			
1	QF - 245 - WY - Wind	11.60	80.00	44.9%	14.5%	2018 11 01
2	QF - 246 - WY - Wind	11.60	80.00	42.0%	14.5%	2018 11 01
3	QF - 247 - WY - Wind	11.60	80.00	37.4%	14.5%	2018 11 01
4	QF - 249 - OR - Solar	14.68	40.00	29.1%	36.7%	2017 12 31
5	QF - 254 - OR - Solar	20.19	55.00	24.6%	36.7%	2017 12 31
6	QF - 256 - UT - Solar	26.59	68.00	32.3%	39.1%	2019 07 01
7	QF - 257 - UT - Solar	10.56	68.00	32.3%	15.5%	2019 07 01
8	QF - 259 - UT - Solar	31.28	80.00	31.5%	39.1%	2018 12 01
9	QF - 260 - UT - Solar	31.28	80.00	31.5%	39.1%	2018 12 01
10	QF - 261 - UT - Solar	31.28	80.00	31.5%	39.1%	2018 12 01
11	QF - 262 - UT - Solar	31.28	80.00	31.5%	39.1%	2018 12 01
12	QF - 263 - UT - Solar	31.28	80.00	31.5%	39.1%	2019 10 01
13	QF - 264 - UT - Solar	31.28	80.00	31.5%	39.1%	2019 10 01
14	QF - 265 - UT - Solar	31.28	80.00	31.5%	39.1%	2019 10 01
15	QF - 266 - UT - Solar	31.28	80.00	32.1%	39.1%	2018 12 01
16	QF - 267 - UT - Solar	31.28	80.00	32.3%	39.1%	2018 12 01
17	QF - 268 - UT - Solar	31.28	80.00	32.3%	39.1%	2018 12 01
18	QF - 269 - UT - Solar	31.28	80.00	32.3%	39.1%	2019 10 01
19	QF - 270 - UT - Solar	31.28	80.00	32.3%	39.1%	2019 10 01
20	QF - 271 - UT - Solar	15.64	40.00	30.7%	39.1%	2018 12 01
21	QF - 277 - WY - Solar	7.82	20.00	28.2%	39.1%	2019 10 01
22	QF - 278 - WY - Solar	7.82	20.00	28.2%	39.1%	2019 10 01
23	QF - 279 - OR - Solar	14.68	40.00	31.0%	36.7%	2017 12 30
24	QF - 280 - OR - Solar	14.68	40.00	27.9%	36.7%	2018 12 01
25	QF - 281 - OR - Solar	14.68	40.00	24.5%	36.7%	2018 12 01
26	QF - 282 - WY - Solar	29.29	74.90	30.6%	39.1%	2018 03 01
27	QF - 283 - UT - Solar	29.29	74.90	31.4%	39.1%	2017 12 01
28	QF - 284 - OR - Solar	4.40	12.00	26.0%	36.7%	2018 01 01
29	QF - 285 - WY - Wind	11.60	80.00	40.7%	14.5%	2018 12 31
30	QF - 286 - WY - Wind	11.60	80.00	40.7%	14.5%	2018 12 31
31	QF - 287 - WY - Wind	11.60	80.00	40.7%	14.5%	2018 12 31
32	QF - 288 - WY - Wind	11.60	80.00	40.7%	14.5%	2018 12 31
Total Potential MW		666.88	2112.80			
Total Partial Displacement		722.23	2273.00			

Pavant Solar III is a Utah non-QF solar resource added for the Utah Subscriber Solar Program.

Projects “QF - 256 - UT - Solar” and “QF - 257 - UT - Solar” are located in an area that PacifiCorp Energy Supply Management (ESM), in its merchant capacity, is aware has significant transmission constraints. The existing transmission constraint conditions could lead to curtailment of these potential projects under certain circumstances, in accordance with the amended Network Operating Agreement between PacifiCorp ESM and PacifiCorp Transmission approved by the Federal Energy Regulatory Commission on May 21, 2015.¹ As a result of the transmission constraint conditions, PacifiCorp provided these potential projects indicative avoided cost pricing that reflected certain transmission constraint-related adjustments. For example, the pricing reflected only projected delivered output from the potential projects, as well as a preliminary projected level of potential curtailment of that output, subject to further analysis. The projects’ capacity deferral was also restricted based on the constraint conditions.

¹ *PacifiCorp*, 151 FERC ¶ 61,170 (2015).

Partial displacement, adjusted for solar degradation, is shown below.

**Partial Displacement Adjusted for Solar Degradation
MW Capacity (July)**

Year	a	b	c	d	e	f	g	h	i	j	k
	Signed & Potential QFs			Cumulative		Base Case		Avoided Cost Case			
	Adjusted For Solar Degradation			2015 IRP		Displacement		Nameplate		Displacement	
	Signed	Potential	Total	CCCT MW	FOT	CCCT	FOT	New QF	Total	CCCT	FOT
	a + b			MIN(c,d)		MIN(e,c-f)		c + h		MIN(e,i-j)	
2016	2.4	-	2.4	-	902.8	-	2.4	-	2.4	-	2.4
2017	13.9	-	13.9	-	747.7	-	13.9	-	13.9	-	13.9
2018	11.5	108.1	119.6	-	1,093.9	-	119.6	100.0	219.6	-	219.6
2019	42.7	494.2	537.0	-	1,245.7	-	537.0	100.0	637.0	-	637.0
2020	42.4	664.2	706.6	-	1,203.0	-	706.6	100.0	806.6	-	806.6
2021	52.3	661.2	713.6	-	970.2	-	713.6	100.0	813.6	-	813.6
2022	48.3	658.3	706.6	-	1,060.0	-	706.6	100.0	806.6	-	806.6
2023	48.0	655.4	703.4	-	965.3	-	703.4	100.0	803.4	-	803.4
2024	47.8	652.5	700.2	-	993.0	-	700.2	100.0	800.2	-	800.2
2025	47.5	649.6	697.1	-	1,440.3	-	697.1	100.0	797.1	-	797.1
2026	47.2	646.7	693.9	-	1,440.1	-	693.9	100.0	793.9	-	793.9
2027	46.9	643.8	690.8	-	1,442.9	-	690.8	100.0	790.8	-	790.8
2028	46.6	641.0	687.6	1,112.0	1,177.3	687.6	-	100.0	787.6	787.6	-
2029	46.4	638.1	684.5	1,112.0	1,222.8	687.6	-	100.0	784.5	787.6	-
2030	46.1	635.3	681.4	1,747.0	1,442.9	687.6	-	100.0	781.4	787.6	-
2031	45.8	632.5	678.3	2,201.0	1,106.6	687.6	-	100.0	778.3	787.6	-
2032	45.6	629.7	675.3	2,201.0	1,174.0	687.6	-	100.0	775.3	787.6	-
2033	45.3	572.5	617.8	2,624.0	1,442.9	687.6	-	100.0	717.8	787.6	-
2034	45.0	290.8	335.8	2,624.0	1,442.9	687.6	-	100.0	435.8	787.6	-
2035	44.8	144.6	189.4	2,624.0	1,442.9	687.6	-	100.0	289.4	787.6	-
2036	44.5	144.2	188.8	2,624.0	1,442.9	687.6	-	100.0	288.8	787.6	-
2037	37.2	143.9	181.1	2,624.0	1,442.9	687.6	-	100.0	281.1	787.6	-
2038	37.0	99.1	136.2	2,624.0	1,442.9	687.6	-	100.0	236.2	787.6	-
2039	10.2	13.9	24.0	2,624.0	1,442.9	687.6	-	100.0	124.0	787.6	-
2040	10.2	-	10.2	2,624.0	1,442.9	687.6	-	100.0	110.2	787.6	-
2041	-	-	-	2,624.0	1,442.9	687.6	-	100.0	100.0	787.6	-

CCCT Partial Displacement in 2028	Base Case	AC Case
Before Solar Degradation	722.23	822.23
After Solar Degradation	687.62	787.62

IRP Partial Displacements (Previous Filing)

Thermal partial displacement is 314.09 MW in the base case and 414.09 MW in the avoided cost case. Listed below are the QFs that have executed a power purchase agreement or are actively negotiating for a power purchase agreement. Signed resources are new and were not included in the 2015 IRP Update.

QF Queue						
No.	QF	Partial Displacement	Name plate	CF	Capacity Contribution	Start Date
1	Pavant Solar III	7.82	20.00	29.5%	39.1%	2016 12 31
2	Sweetwater Solar	31.28	80.00	26.6%	39.1%	2018 11 01
Total Signed MW		39.10	100.00			
1	QF - 101 - OR - Geoth	3.50	3.50	85.0%	100.0%	2016 01 01
2	QF - 182 - OR - Solar	16.22	44.20	24.0%	36.7%	2017 01 01
3	QF - 183 - OR - Solar	16.52	45.00	27.5%	36.7%	2016 12 31
4	QF - 224 - OR - Solar	3.67	10.00	27.2%	36.7%	2016 12 31
5	QF - 177 - WY - Wind	11.60	80.00	40.7%	14.5%	2016 12 31
6	QF - 180 - WY - Wind	11.60	80.00	40.7%	14.5%	2016 12 31
7	QF - 194 - WY - Wind	11.60	80.00	40.7%	14.5%	2016 12 31
8	QF - 195 - WY - Wind	11.60	80.00	40.7%	14.5%	2016 12 31
9	QF - 241 - OR - Solar	20.19	55.00	23.5%	36.7%	2016 12 01
10	QF - 242 - OR - Solar	16.74	52.00	23.8%	32.2%	2016 12 31
11	QF - 243 - WY - Wind	2.39	16.50	29.5%	14.5%	2016 07 01
12	QF - 245 - WY - Wind	11.60	80.00	44.9%	14.5%	2018 11 01
13	QF - 246 - WY - Wind	11.60	80.00	42.0%	14.5%	2018 11 01
14	QF - 247 - WY - Wind	11.60	80.00	37.4%	14.5%	2018 11 01
15	QF - 248 - UT - Solar	31.28	80.00	31.6%	39.1%	2017 12 01
16	QF - 249 - OR - Solar	14.68	40.00	29.1%	36.7%	2017 12 01
17	QF - 250 - OR - Wind	10.16	40.00	36.0%	25.4%	2019 07 01
18	QF - 251 - UT - Solar	31.28	80.00	32.1%	39.1%	2019 07 01
19	QF - 252 - UT - Solar	5.87	80.00	32.1%	7.3%	2019 07 01
20	QF - 253 - UT - Solar	0.00	80.00	32.1%	0.0%	2019 07 01
21	QF - 254 - OR - Solar	21.29	58.00	24.6%	36.7%	2017 12 31
Total Potential MW		274.99	1244.20			
Total Partial Displacement		314.09	1344.20			

Pavant Solar III is a Utah non-QF solar resource added for the Utah Subscriber Solar Program.

Projects “QF - 251 - UT - Solar”, “QF - 252 - UT - Solar”, and “QF - 253 - UT - Solar” are located in an area that PacifiCorp Energy Supply Management (ESM), in its merchant capacity, is aware has significant transmission constraints. The existing transmission constraint conditions could lead to curtailment of these potential projects under certain circumstances, in accordance with the amended Network Operating Agreement between PacifiCorp ESM and PacifiCorp Transmission approved by the Federal Energy Regulatory Commission on May 21, 2015.² As a result of the transmission constraint conditions, PacifiCorp provided these potential projects indicative avoided cost pricing that reflected certain transmission constraint-related adjustments. For example, the pricing reflected only projected delivered output from the potential projects, as well as a preliminary projected level of potential curtailment of that output, subject to further analysis. The projects’ capacity deferral was also restricted based on the constraint conditions.

Partial displacement, adjusted for solar degradation, is shown below.

**Partial Displacement Adjusted for Solar Degradation
MW Capacity (July)**

Year	a		b	c		d		e	f		g	h		i	j		k
	Signed & Potential QFs			Cumulative			Base Case		Avoided Cost Case								
	Adjusted For Solar Degradation			2015 IRP			Displacement		Nameplate		Displacement						
	Signed	Potential	Total	CCCT MW	FOT	CCCT	FOT	New QF	Total	CCCT	FOT						
	a + b				MIN(c,d)		MIN(e,c-f)			c + h		MIN(d,i)		MIN(e,i-j)			
2016	-	5.9	5.9	-	902.8	-	5.9	-	5.9	-	5.9	-	5.9	-	5.9	-	5.9
2017	7.8	122.0	129.8	-	747.7	-	129.8	100.0	229.8	-	229.8	-	229.8	-	229.8	-	229.8
2018	7.8	192.4	200.2	-	1,093.9	-	200.2	100.0	300.2	-	300.2	-	300.2	-	300.2	-	300.2
2019	39.0	273.7	312.7	-	1,245.7	-	312.7	100.0	412.7	-	412.7	-	412.7	-	412.7	-	412.7
2020	38.7	272.7	311.4	-	1,203.0	-	311.4	100.0	411.4	-	411.4	-	411.4	-	411.4	-	411.4
2021	38.4	269.3	307.7	-	970.2	-	307.7	100.0	407.7	-	407.7	-	407.7	-	407.7	-	407.7
2022	38.2	268.3	306.5	-	1,060.0	-	306.5	100.0	406.5	-	406.5	-	406.5	-	406.5	-	406.5
2023	37.9	267.3	305.2	-	965.3	-	305.2	100.0	405.2	-	405.2	-	405.2	-	405.2	-	405.2
2024	37.6	266.3	303.9	-	993.0	-	303.9	100.0	403.9	-	403.9	-	403.9	-	403.9	-	403.9
2025	37.3	265.4	302.7	-	1,440.3	-	302.7	100.0	402.7	-	402.7	-	402.7	-	402.7	-	402.7
2026	37.0	264.4	301.4	-	1,440.1	-	301.4	100.0	401.4	-	401.4	-	401.4	-	401.4	-	401.4
2027	36.8	263.4	300.2	-	1,442.9	-	300.2	100.0	400.2	-	400.2	-	400.2	-	400.2	-	400.2
2028	36.5	262.4	298.9	1,112.0	1,177.3	298.9	-	100.0	398.9	398.9	-	398.9	-	398.9	-	398.9	-
2029	36.2	261.5	297.7	1,112.0	1,222.8	298.9	-	100.0	397.7	398.9	-	397.7	398.9	-	397.7	-	397.7
2030	35.9	260.5	296.5	1,747.0	1,442.9	298.9	-	100.0	396.5	398.9	-	396.5	398.9	-	396.5	-	396.5
2031	35.7	259.6	295.2	2,201.0	1,106.6	298.9	-	100.0	395.2	398.9	-	395.2	398.9	-	395.2	-	395.2
2032	35.4	258.6	294.0	2,201.0	1,174.0	298.9	-	100.0	394.0	398.9	-	394.0	398.9	-	394.0	-	394.0
2033	35.1	215.1	250.2	2,624.0	1,442.9	298.9	-	100.0	350.2	398.9	-	350.2	398.9	-	350.2	-	350.2
2034	34.9	179.9	214.8	2,624.0	1,442.9	298.9	-	100.0	314.8	398.9	-	314.8	398.9	-	314.8	-	314.8
2035	34.6	179.4	214.0	2,624.0	1,442.9	298.9	-	100.0	314.0	398.9	-	314.0	398.9	-	314.0	-	314.0
2036	34.4	175.3	209.7	2,624.0	1,442.9	298.9	-	100.0	309.7	398.9	-	309.7	398.9	-	309.7	-	309.7
2037	27.1	67.3	94.4	2,624.0	1,442.9	298.9	-	100.0	194.4	398.9	-	194.4	398.9	-	194.4	-	194.4
2038	26.9	45.0	71.8	2,624.0	1,442.9	298.9	-	100.0	171.8	398.9	-	171.8	398.9	-	171.8	-	171.8
2039	-	-	-	2,624.0	1,442.9	298.9	-	100.0	100.0	398.9	-	100.0	398.9	-	100.0	-	100.0
2040	-	-	-	2,624.0	1,442.9	298.9	-	100.0	100.0	398.9	-	100.0	398.9	-	100.0	-	100.0
2041	-	-	-	2,624.0	1,442.9	298.9	-	100.0	100.0	398.9	-	100.0	398.9	-	100.0	-	100.0

CCCT Partial Displacement in 2030	Base Case	AC Case
Before Solar Degradation	314.09	414.09
After Solar Degradation	298.93	398.93

² PacifiCorp, 151 FERC ¶ 61,170 (2015).