Application No. 18-04-___
Exhibit PAC/1202
Witness: Robert M. Meredith

BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

PACIFICORP

REDACTED

Exhibit Accompanying Direct Testimony of

Robert M. Meredith

Marginal Cost of Service Study

April 2018

State of California

Marginal Cost of Service Study
Exhibit PAC/1202

Period Ending December 2019

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Period Ending December 2019

Summary Tables

PacifiCorp
California Marginal Cost Study - NCO Method
Summary of Marginal Costs
Demand & Energy in Mills/kWh
December 2019 Dollars

			(A)	(B)	(C)	(D)
			Energy		Demand & Energy	
Line	Description		1 Year	10 Year	1 Year	10 Year
1	Residential	(sec)	18.09	23.52	18.09	130.55
2						
3	General Service					
4	Sch A-25, 0-30 kW	(sec)	18.09	23.52	18.09	138.03
5	Sch. A-32, 0-100kW	(sec)	18.10	23.52	18.10	105.48
6	Sch. A-32, >100 kW	(sec)	18.09	23.52	18.09	105.48
7						
8	Schedule A-36					
9	Sch. A-36, 0-100kW	(sec)	18.08	23.52	18.08	77.59
10	Sch. A-36, >100kW	(sec)	18.09	23.52	18.09	76.30
11						
12	Schedule AT-48					
13	Sch AT-48, .5 - 4 MW	(sec)	18.09	23.52	18.09	62.12
14	Sch AT-48, .5 - 4 MW	(pri)	17.42	22.65	17.42	59.22
15						
16	Irrg - Schedule Sch PA-20	(sec)	18.09	23.52	18.09	87.00

Sources:
Columns : (A) & (C) Tab 1.10 (1 Year MC:) `1 Year Full Marginal Costs by Load Class - 1 year'
(B) & (D) Tab 1.4 (Table 4:) `10 Year Full Marginal Cost By Load Class December 2019 Dollars'
& Tab 1.3 (Table 3:) `10 Year Costing Inputs and Customer Data Marginal Unit Costs'

Energy costs include both generation and transmission energy-related costs.

Table 1

Table 2

PacifiCorp
California Marginal Cost Study - NCO Method
Summary of Marginal Costs
Commitment and Billing in $/Customer/Month
December 2019 Dollars

Line	Description		(A) 1 Year 1&3 Phase	(B) 10 Year 1&3 Phase
1	Residential	(sec)	$8.65	$13.23
2				
3	General Service			
4	Sch A-25, 0-30 kW	(sec)	9.36	15.48
5	Sch. A-32, 0-100kW	(sec)	12.22	37.46
6	Sch. A-32, >100 kW	(sec)	43.70	88.45
7				
8	Schedule A-36			
9	Sch. A-36, 0-100kW	(sec)	13.60	47.37
10	Sch. A-36, >100kW	(sec)	34.73	92.15
11				
12	Schedule AT-48			
13	Sch AT-48, .5 - 4 MW	(sec)	272.64	468.66
14	Sch AT-48, .5 - 4 MW	(pri)	8.12	8.12
15				
16	Irrg - Schedule Sch PA-20	(sec)	14.12	45.34

Short-run commitment and billing costs include the cost of metering, meter overhead and maintenance, service drops, service drop overhead and maintenance, customer accounting and informational expenses, and billing expenses.

Source:
Tab 1.7 (Table 7:) `Marginal Distribution & Billing Costs By Load Size'

Table 3

PacifiCorp
California Marginal Cost Study - NCO Method
10 Year Costing Inputs and Customer Data
Marginal Unit Costs
December 2019 Dollars

			(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
			Residential	**Schedule A-25**	**Schedule A-32**		**Schedule A-36**		**Schedule A-48**		**Irrigation**
				0 -20 kW	20 -100 kW	101 -500 kW	20 -100 kW	101 -500 kW	.5 - 4 MW	.5 - 4 MW	
Line	Description		(sec)	(sec)	(sec)	(sec)	(sec)	(sec)	(sec)	(pri)	(sec)
	Billing Units										
	Demand										
1	Peak Mw @ Meter	System Peak	54	7	8	2	5	6	7	3	22
2		Distribution Peak	78	10	10	2	5	8	8	3	3
3		Transformer Peak	254	18	27	6	9	10	14	-	51
4	Demand Loss Factor		1.1199	1.1199	1.1199	1.1199	1.1199	1.1199	1.1199	1.0825	1.1199
5	Peak Mw @ Generator	System Peak	61	8	9	2	5	7	8	4	25
6		Distribution Peak	87	11	11	2	6	9	9	4	3
7		Transformer Peak	285	20	30	6	10	12	15	N/A	57
8											
9											
10	Energy										
11	Energy - Annual Mwh	@ Meter	369,550	51,918	55,366	11,749	33,071	47,036	56,064	25,309	94,293
12	Energy Loss Factor		1.1143	1.1143	1.1143	1.1143	1.1143	1.1143	1.1143	1.0731	1.1143
13	Energy - Annual Mwh	@ Generator	411,800	57,854	61,696	13,092	36,852	52,414	62,474	27,159	105,073
14											
15											
16	Customer										
17	Annual Customers		35,861	7,131	1,040	85	129	62	17	2	2,019
18	Average Customers										975
19											
20	**Unit Costs**										
21											
22	Generation	$ / System Peak Kw	$145.28	$145.28	$145.28	$145.28	$145.28	$145.28	$145.28	$145.28	$145.28
23	Transmission	$ / System Peak Kw	$10.45	$10.45	$10.45	$10.45	$10.45	$10.45	$10.45	$10.45	$10.45
24	Poles, Cond., Subst.	$ / Dist. Peak Kw	$344.93	$407.21	$285.29	$285.29	$156.69	$156.69	$96.59	$96.59	$629.45
25	Transformers	$ / Xfmr Peak Kw	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
26											
27											
28	Energy - @ Generator	$ / Kwh	$0.02102	$0.02102	$0.02102	$0.02102	$0.02102	$0.02102	$0.02102	$0.02102	$0.02102
29	Marginal Cost of Energy-Related Transmission		$0.00008	$0.00008	$0.00008	$0.00008	$0.00008	$0.00008	$0.00008	$0.00008	$0.00008
30											
31	Commitment & Billing	$ / Cust / Year	158.81	185.73	449.46	1,061.35	568.44	1,105.83	5,623.91	97.43	544.07

Sources:

Line 1 - 3 Tab 16.4 (Cust Data 4:) `Customer Loads12 Months Ended June 2017 (Historical)'
Line 4 & 12 Tab 14.1 (Losses:) `Loss Factors'
Lines 11 & 17 Tab 16.2 (Cust Data 2:) `Customers and MWh's12 Months Ended December 2019'
Line 22 Tab 2.1 (Capacity:) `Marginal Capacity Costs Based on Avoided Capacity Costs'
Line 23 & 29 Tab 1.6 (Table 6:) `Marginal Cost of Transmission Investment and Associated Expenses'
Lines 24 - 25 Tab 1.7 (Table 7:) `Marginal Distribution & Billing Costs By Load Size'
Line 28 Tab 3.1 (Energy:) `Marginal Generation Energy Costs'
Line 31 Tab 1.7 (Table 7:) `Marginal Distribution & Billing Costs By Load Size'

PacifiCorp
California Marginal Cost Study - NCO Method
10 Year Full Marginal Cost By Load Class
December 2019 Dollars
(Dollars in 000's)

		(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)
			Residential	Schedule A-25	Schedule A-32		Schedule A-36		Schedule A-48		Sch PA-20 Irrigation	LS-51	LS-53	OL-15	OL-42	LS-58
				0 -20 kW	20 -100 kW	101 -500 kW	20 -100 kW	101 -500 kW	.5 - 4 MW	.5 - 4 MW						
Line	Description	Total	(sec)	(sec)	(sec)	(sec)	(sec)	(sec)	(sec)	(pri)	(sec)	(sec)	(sec)	(sec)	(sec)	(sec)
	Demand Related Marginal Cost															
1	Generation	$18,743	$8,854	$1,218	$1,257	$267	$771	$1,024	$1,200	$525	$3,627					
2	Transmission	$1,348	$637	$88	$90	$19	$55	$74	$86	$38	$261					
3																
4	Distribution															
5	Poles	$21,164	$14,684	$2,323	$1,507	$320	$366	$527	$239	$99	$1,099					
6	Conductor	$21,084	$14,157	$2,157	$1,527	$324	$510	$734	$511	$211	$952					
7	Substations	$2,006	$1,220	$160	$157	$33	$86	$124	$127	$53	$47					
8	Subtotal; Pole, Cond, Subs	$44,254	$30,062	$4,639	$3,191	$677	$962	$1,385	$878	$363	$2,098					
9	Transformers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0					
10	Distribution subtotal	$44,254	$30,062	$4,639	$3,191	$677	$962	$1,385	$878	$363	$2,098					
11																
12	Total Demand Related	$64,345	$39,553	$5,945	$4,538	$963	$1,788	$2,483	$2,164	$926	$5,986					
13	(Lines 1 + 2 + 8)															
14																
15																
16	**Energy Related Marginal Cost**															
17	Generation Energy Related	$17,486	$8,656	$1,216	$1,297	$275	$775	$1,102	$1,313	$571	$2,209	$20	$27	$21	$4	$1
18	Transmission Energy Related	$70	$35	$5	$5	$1	$3	$4	$5	$2	$9	$0	$0	$0	$0	$0
19	Total Energy	$17,556	$8,691	$1,221	$1,302	$276	$778	$1,106	$1,318	$573	$2,217	$20	$27	$21	$4	$1
20																
21	**Customer Related Marginal Cost**															
22	Poles	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0					
23	Conductor	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0					
24	Transformers	$3,747	$1,972	$524	$316	$45	$52	$42	$39	$0	$756					
25	Service Drops	$1,445	$978	$311	$66	$23	$10	$8	$49	$0	$0					
26	Meters	$1,408	$1,011	$246	$46	$19	$6	$15	$5	$0	$60					
27	Billing	$2,135	$1,734	$243	$40	$3	$5	$3	$2	$0	$105					
28	Commitment & Billing Rel.	$9,002	$5,695	$1,325	$468	$89	$73	$68	$95	$0	$922	$170	$15	$75	$5	$1
29																
30																
31	**Total Revenue @ Full MC**															
32	Generation	$36,229	$17,510	$2,434	$2,554	$542	$1,546	$2,126	$2,513	$1,096	$5,836	$20	$27	$21	$4	$1
33	Transmission	$1,418	$672	$93	$95	$20	$58	$78	$91	$40	$270	$0	$0	$0	$0	$0
34	Distribution	$53,256	$35,757	$5,964	$3,659	$766	$1,035	$1,453	$973	$363	$3,019	$170	$15	$75	$5	$1
35	Total	$90,903	$53,939	$8,491	$6,308	$1,329	$2,639	$3,657	$3,578	$1,499	$9,125	$190	$42	$97	$9	$2
36																
37	Percent of Total Marginal Cost	100.00%	59.34%	9.34%	6.94%	1.46%	2.90%	4.02%	3.94%	1.65%	10.04%	0.21%	0.05%	0.11%	0.01%	0.00%
38	Percent of Total Generation MC	100.00%	48.33%	6.72%	7.05%	1.50%	4.27%	5.87%	6.94%	3.02%	16.11%	0.05%	0.07%	0.06%	0.01%	0.00%
39	Percent of Total Transmission MC	100.00%	47.37%	6.55%	6.71%	1.42%	4.10%	5.53%	6.44%	2.84%	19.03%	0.01%	0.01%	0.01%	0.00%	0.00%
40	Percent of Total Distribution MC	100.00%	67.14%	11.20%	6.87%	1.44%	1.94%	2.73%	1.83%	0.68%	5.67%	0.32%	0.03%	0.14%	0.01%	0.00%
41	Percent of Total T & D	100.00%	66.63%	11.08%	6.87%	1.44%	2.00%	2.80%	1.95%	0.74%	6.02%	0.31%	0.03%	0.14%	0.01%	0.00%

Table 5

PacifiCorp
California Marginal Cost Study - NCO Method
Summary of Marginal Generation Costs
In Nominal Dollars

Year		(A) Resource Cost (Mills / kWh) (B) + (C)	(B) Energy Only (Mills / kWh)	(C) Capacity Only (Mills / kWh)	(D) Capacity Only ($ / kW)
2019		37.29	16.24	21.05	$132.96
2020		38.29	16.79	21.50	$135.81
2021		39.17	17.18	21.99	$138.87
2022		39.92	17.44	22.48	$142.01
2023		43.12	20.12	23.00	$145.26
2024		47.71	24.18	23.53	$148.63
2025		50.11	26.03	24.08	$152.07
2026		50.63	26.00	24.63	$155.54
2027		52.35	27.15	25.20	$159.16
2028		54.56	28.77	25.79	$162.87
2019 - 2023	**<u>5 year</u>**				
	Sum of PV Costs @ 7.93%	169.92	75.24	94.68	$597.97
	Annual Cost of R/E @ 23.16%	39.35	17.42		
	Annual Cost of Capacity @ 23.16%			21.93	$138.49
2019 - 2028	**<u>10 years</u>**				
	Sum of PV Costs @ 7.93%	319.69	152.64	167.05	$1,055.02
	Annual Cost of R/E @ 13.77%	44.02	21.02		
	Annual Cost of Capacity @ 13.77%			23	$145.28

Sources:
(B) Tab 3.1 (Energy:) `Marginal Generation Energy Costs'
(C) Tab 2.1 (Capacity:) `Marginal Capacity Costs Based on Avoided Capacity Costs'
(D) Tab 2.1 (Capacity:) `Marginal Capacity Costs Based on Avoided Capacity Costs'

PacifiCorp
California Marginal Cost Study - NCO Method
Marginal Cost of
Transmission Investment and Associated Expenses

Line	Item			
1	Growth Related Investments - (2016 to 2020 in $000's)		$217,455	
2				
3	Capacity Addition MW from 2016-2020		2,423	MW
4				
5	Marginal Investment	(1)/ (3)	$89.76	/kW
6				
7	Annualized Investment	(5) X 10.21%	$9.16	/kW
8	Admin. & General Factor	(5) x 0.71%	$0.64	/kW
9	Annual O&M Expenses	(5) x 1.388%	$1.25	/kW
10	Annualized Marginal Cost		$11.05	/kW
11				
12	Marginal Cost of Demand-Related Transmission		$10.45	/kW
13				
14	Marginal Cost of Energy-Related Transmission		$0.59	/kW
15	Marginal Cost of Energy-Related Transmission		$0.00008	/kWh
16	$0.59 / (8760 x 80.17% System LF))			

Sources:
Tab 4.2 (Transm2:) `2016-2020 Forecasted Transmission December 2019 Dollars'
Tab 13.1 (Charge 1:) `Calculation of Annual Charges' (for 10.92% factor)
Tab 4.1 (Transm1:) `Marginal Transmission Investment and O&M Expenses'

Table 7

PacifiCorp
California Marginal Cost Study - NCO Method
Marginal Distribution & Billing Costs By Load Size
December 2019 Dollars

Line	Description		(A) Residential (sec)	(B) Schedule A-25 0 -30 kW (sec)	(C) Schedule A-32 0 -100 kW (sec)	(D) Schedule A-32 >100 kW (sec)	(E) Schedule A-36 0 -100 kW (sec)	(F) Schedule A-36 >100 kW (sec)	(G) Schedule A-48 .5 - 4 MW (sec)	(H) Schedule A-48 .5 - 4 MW (pri)	(I) Sch A-20 Irrigation (sec)
	Demand Related Costs ($/kW)										
1	Poles		$119.61	$144.75	$95.68	$95.68	$42.31	$42.31	$18.68	$18.68	$234.07
2	Conductors		$115.31	$134.38	$96.90	$96.90	58.98	58.98	39.95	39.95	$202.82
3	Substation		$9.94	$9.94	$9.94	$9.94	$9.94	$9.94	$9.94	$9.94	$9.94
4	Dist. O&M @	40.87%	100.07	118.14	82.77	82.77	45.46	45.46	28.02	28.02	182.62
5	of Total Investment										
6	Total $/ Distribution Peak kW		$344.93	$407.21	$285.29	$285.29	$156.69	$156.69	$96.59	$96.59	$629.45
7											
8	Transformers		$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	NA	$0.00
9	Dist. O&M @	40.87%	-	-	-	-	-	-	-	NA	-
10	of Total Investment										
11	Total $/ Transformer Peak kW		$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
12											
13											
14	**Commitment Related Costs ($/Customer)**										
15	Poles		$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
16	Conductors		$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
17	Line Transformers		$39.04	$52.12	$214.95	$381.13	$287.65	$489.15	$1,669.81	$0.00	$265.95
18	Dist. O&M @	40.87%	$15.96	$21.30	$87.85	$155.77	$117.56	$199.91	$682.45	$0.00	$108.69
19	of Total Investment										
20	Total Commitment Related		$55.00	$73.42	$302.80	$536.90	$405.21	$689.06	$2,352.26	$0.00	$374.64
21											
22	**Billing Related Costs ($/Customer/Yr)**										
23	Service Drop		$19.35	$31.00	$45.37	$189.96	$54.66	$94.29	$2,054.73	$0.00	$0.00
24	Service Drop O&M @	40.87%	$7.91	$12.67	$18.54	$77.64	$22.34	$38.54	$839.77	NA	$0.00
25	Meter		$15.74	$19.29	$24.48	$121.63	$25.20	$135.53	$156.09	$0.00	$34.48
26	Meter O&M @	79.21%	$12.47	$15.28	$19.39	$96.34	$19.96	$107.35	$123.64	$0.00	$27.31
27	Customer Acctg, Service & Information		$48.34	$34.07	$38.88	$38.88	$41.07	$41.07	$97.43	$97.43	$107.64
28	Total Billing-Related		$103.81	$112.31	$146.67	$524.45	$163.23	$416.78	$3,271.66	$97.43	$169.43
29											
30	Monthly Billing-Related		$8.65	$9.36	$12.22	$43.70	$13.60	$34.73	$272.64	$8.12	$14.12
31											
32	Total Distribution (Comm & Billing Costs)		$158.81	$185.73	$449.46	$1,061.35	$568.44	$1,105.83	$5,623.91	$97.43	$544.07
33											
34	Monthly Commitment & Bill		$13.23	$15.48	$37.46	$88.45	$47.37	$92.15	$468.66	$8.12	$45.34

Sources:

Line 1-2	Tab 7.1 (PC 1:) `Hypothetical Circuit Study Results'
Line 3	Tab 6.1 (Dist Sub 1:) `Distribution Substation Costs $/kW'
Line 4	Sum of lines 1-3 multiplied by 40.87% from Tab 5.1 (Dist OM:) `Distribution O&M Expense Loading Factor as a Percent of Dist. Plant
Line 8	Tab 8.2 (XFMR 2:) `Transformer Variable Costs'
Line 9	Line 8 multiplied by 40.87%
Line 15-16	Tab 7.1 (PC 1:) `Hypothetical Circuit Study Results'
Line 17	Tab 1.8 (Table 8:) `Calculation of NCO Unit Costs'
Line 18	Sum of lines 15-17 multiplied by 40.87%
Line 23	Tab 1.8 (Table 8:) `Calculation of NCO Unit Costs'
Line 25	Tab 1.8 (Table 8:) `Calculation of NCO Unit Costs'
Line 26	Tab 9.6 (Meters 6:) `Distribution Meters Expense Loading Factor' (for 79.21% Factor)
Line 27	Tab 11.1 (Cust Exp Sum:) `Summary of Customer Accounting Expense By Schedule'
Line 28	Sum of lines 23-27

Table 8

PacifiCorp
California Marginal Cost Study - NCO Method
Calculation of NCO Unit Costs
December 2019 Dollars

			(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)
			Residential	Schedule A-25	Schedule A-32		Schedule A-36		Schedule A-48		Irrigation	LS-51	LS-53	OL-15	OL-42	LS-58
				0 -30 kW	0 -100 kW	>100 kW	0 -100 kW	>100 kW	.5 - 4 MW	.5 - 4 MW						
Line No.	Description		(sec)	(sec)	(sec)	(sec)	(sec)	(sec)	(sec)	(pri)	(sec)	(sec)	(sec)	(sec)	(sec)	(sec)
1	Incremental Customers (2012-2016)		654	343	61	5	3	2	1	-	81	3	8	4	-	-
2	December 2019 Average Customers		35,861	7,131	1,040	85	129	62	17	2	2,019	78	105	760	36	20
3	Average Annual New Hookups		130.80	68.60	12.20	1.00	0.60	0.40	0.20	-	16.20	0.60	1.60	0.80	-	-
4																
5	Line Transformers Investment		$1,411	$1,481	$5,691	$8,522	$9,761	$11,966	$22,401	$0	$7,995	$180	$1,438	$1,438	$1,438	$1,438
6	PVRR - Transformer	@ 125.8%	$1,775	$1,864	$7,160	$10,723	$12,282	$15,057	$28,187	$0	$10,060	$226	$1,809	$1,809	$1,809	$1,809
7	Plant Replacement for Line Transformer	1.8%	652	130	19	2	2	1	0	0	37	1	2	14	1	0
8	PVRR of New & Replacement		$1,390,180	$369,051	$221,970	$32,168	$36,846	$30,113	$28,187	$0	$533,168	$453	$7,238	$27,141	$1,809	$0
9	PVRR Per Customer		$38.77	$51.75	$213.43	$378.44	$285.63	$485.70	$1,658.03	$0.00	$264.08	$5.80	$68.93	$35.71	$50.26	$0.00
10	A&G Transformer @ 0.71%	0.71%	$0.28	$0.37	$1.52	$2.69	$2.03	$3.45	$11.77	-	$1.87	$0.04	$0.49	$0.25	$0.36	$0.00
11	Cost Per Customer		$39.04	$52.12	$214.95	$381.13	$287.65	$489.15	$1,669.81	-	$265.95	$5.84	$69.42	$35.97	$50.62	$0.00
12																
13	Service Drop Investment		$716	$895	$1,201	$4,247	$1,855	$4,613	$27,565	$0	$0	$0	$0	$0	$0	$0
14	PVRR Service Drop	125.8%	$901	$1,126	$1,511	$5,344	$2,334	$5,805	$34,684	$0	$0	$0	$0	$0	$0	$0
15	Plant Replacement for Service Drops	1.8%	634	126	18	2	2	1	0	0	36	1	2	13	1	0
16	PVRR of New & Replacement		$688,999	$219,511	$46,854	$16,033	$7,001	$5,805	$34,684	$0	$0	$0	$0	$0	$0	$0
17	PVRR Per Customer		$19.21	$30.78	$45.05	$188.62	$54.27	$93.62	$2,040.24	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
18	A&G Service Drop @ 0.71%	0.71%	$0.14	$0.22	$0.32	$1.34	$0.39	$0.66	$14.49	-	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
19	Cost Per Customer		$19.35	$31.00	$45.37	$189.96	$54.66	$94.29	$2,054.73	-	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
20																
21	Meter Investment		$218	$241	$296	$1,537	$345	$1,562	$1,973	$11,949	$442	$0	$0	$0	$241	$0
22	PVRR - Meters	133.5%	$291	$321	$395	$2,053	$461	$2,086	$2,635	$15,958	$591	$0	$0	$0	$321	$0
23	Plant Replacement for Meters	5.0%	1,793	357	52	4	6	3	1	0	101	4	5	38	2	1
24	PVRR of New & Replacement		$560,383	$136,568	$25,279	$10,265	$3,228	$8,344	$2,635	$0	$69,132	$0	$0	$0	$643	$0
25	PVRR Per Customer		$15.63	$19.15	$24.31	$120.77	$25.02	$134.57	$154.99	$0.00	$34.24	$0.00	$0.00	$0.00	$17.85	$0.00
26	A&G Meters @ 0.71%	0.71%	$0.11	$0.14	$0.17	$0.86	$0.18	$0.96	$1.10	$0.00	$0.24	$0.00	$0.00	$0.00	$0.13	$0.00
27	Cost Per Customer		$15.74	$19.29	$24.48	$121.63	$25.20	$135.53	$156.09	$0.00	$34.48	$0.00	$0.00	$0.00	$17.98	$0.00

Sources:
Line 6, Col C - PVRR for California Dist. Assets prepared by Planning & Analysis Dept.

PacifiCorp
California Marginal Cost Study - NCO Method
Full Marginal Cost Percentage @ Meter
December 2019 Dollars

Line	Description	(A) Marginal Cost (000)s	(B) Mills / kWh	(C) % of Total
	Demand Related Marginal Cost -			
1	Generation	$18,743	25.08	20.6%
2	Transmission	1,348	1.80	1.5%
3	Dist. Poles, Cond., Subst.	44,254	59.21	48.7%
4	Dist. Transformers	0	0.00	0.0%
5				
6	Total Demand Related	$64,345	86.09	70.8%
7				
8	**Energy Related Marginal Cost -**			
9				
10	Generation	$17,486	23.40	19.2%
11	Transmission	70	0.09	0.1%
12				
13	Total Energy Related	$17,556	23.49	19.3%
14				
15	**Commitment & Billing -**			
16	Commitment	$4,013	5.37	4.4%
17	Billing	4,988	6.67	5.5%
18				
19	Total Commitment & Billing	$9,002	12.04	9.9%
20				
21				
22				
23	**TOTAL MARGINAL COST**	$90,903	121.62	100.0%

Total MWh = 747,460

PacifiCorp
California Marginal Cost Study - NCO Method
1 Year Full Marginal Costs by Load Class - 1 year
December 2019 Dollars
(Dollars in 000's)

Line		(A) Total	(B) Residential (sec)	(C) Schedule A-25 0 -20 kW (sec)	(D) Schedule A-32 20 -100 kW (sec)	(E) Schedule A-32 101 -500 kW (sec)	(F) Schedule A-36 20 -100 kW (sec)	(G) Schedule A-36 101 -500 kW (sec)	(H) Schedule A-48 .5 - 4 MW (sec)	(I) Schedule A-48 .5 - 4 MW (pri)	(J) Sch A-20 Irrigation (sec)
	Billing Units										
	Energy										
1	Energy - Annual Mwh @ Meter	744,355	369,550	51,918	55,366	11,749	33,071	47,036	56,064	25,309	94,293
2	Energy Loss Factor		1.1143	1.1143	1.1143	1.1143	1.1143	1.1143	1.1143	1.0731	1.1143
3	Energy - Annual Mwh @ Generator	828,414	411,800	57,854	61,696	13,092	36,852	52,414	62,474	27,159	105,073
4											
5	Customer										
6	Average Customers	46,346	35,861	7,131	1,040	85	129	62	17	2	2,019
7											975
8	**Unit Costs**										
9											
10	Energy @ Generator $ / Kwh		$0.01624	$0.01624	$0.01624	$0.01624	$0.01624	$0.01624	$0.01624	$0.01624	$0.01624
11											
12	Billing Related Costs		$103.81	$112.31	$146.67	$524.45	$163.23	$416.78	$3,271.66	$97.43	$169.43
13											
14											
15	**Marginal Costs $000**										
16											
17	Total Energy Related	$13,450	$6,686	$939	$1,002	$213	$598	$851	$1,014	$441	$1,706
18	(Line 3 x Line 5)										
19											
20											
21	Billing Related Costs	$5,055	$3,723	$801	$153	$45	$21	$26	$56	$0	$230
22	(Line 4 x Line 6)										
23											
24											
25	Total Revenue @ Full MC	$18,504	$10,409	$1,740	$1,155	$258	$619	$877	$1,070	$441	$1,936
	(Line 7 + Line 8)										

Sources:

Lines 1 & 6 Tab 16.2 (Cust Data 2:) `Customers and MWh's12 Months Ended December 2019'
Line 2 Tab 14.1 (Losses:) `Loss Factors'
Line 10 Tab 3.1 (Energy:) `Marginal Generation Energy Costs
Line 12 Tab 1.7 (Table 7:) `Marginal Distribution & Billing Costs By Load Size'

State of California

Marginal Cost of Service Study
Exhibit PAC/1202

Period Ending December 2019

Generation Capacity

PacifiCorp
California Marginal Cost Study - NCO Method
Marginal Capacity Costs
Based on Avoided Capacity Costs

		(A)	(B)	(C)	(D)	(E)
	Calendar Year 12 Months Ending December 2019	Projected Capacity $/kW	Present Value Factors	PV of Capacity $/kW	Capacity Mills / kWh	PV of Capacity Mills/kWh
			7.93%	(A) x (B)	(A) / 0.721 / 8,760	(B) * (D)
1	2019	$132.96	1.0000	132.96	21.05	21.05
2	2020	$135.81	0.9265	125.83	21.50	19.92
3	2021	$138.87	0.8584	119.21	21.99	18.88
4	2022	$142.01	0.7953	112.94	22.48	17.88
5	2023	$145.26	0.7368	107.03	23.00	16.95
6	2024	$148.63	0.6826	101.45	23.53	16.06
7	2025	$152.07	0.6324	96.17	24.08	15.23
8	2026	$155.54	0.5859	91.13	24.63	14.43
9	2027	$159.16	0.5428	86.39	25.20	13.68
10	2028	$162.87	0.5029	81.91	25.79	12.97
11						
12					$/kW	mills/kWh
13	2019 - 2023	5 Year -	Short Run -			
14			Sum of PV Costs	@ 7.93%	$597.97	94.68
15			Annual Cost of Capacity	@ 23.16%	138.49	21.93
16						
17	2019 - 2028	10 Years -	Medium Run -			
18			Sum of PV Costs	@ 7.93%	$1,055.02	167.05
19			Annual Cost of Capacity	@ 13.77%	145.28	23.00

Sources:
Column A - OR Commission Approved Sch 37 AC Study_2017 04 25 (Effective 2017 06 01) extended floor.xls
Column B - Tab 13.2 (Charge 2:) `Financial Inputs to the Economic Carrying Charge Calculatic (7.93% factor)
Line 15 Tab 13.1 (Charge 1:) `Calculation of Annual Charges (23.16% factor)
Line 19 Tab 13.1 (Charge 1:) `Calculation of Annual Charges (13.77% factor)

State of California

Marginal Cost of Service Study

Exhibit PAC/1202

Period Ending December 2019

Generation Energy

PacifiCorp
California Marginal Cost Study - NCO Methoc
Marginal Generation Energy Costs
Nominal Mills / kWh

[redacted]

State of California

Marginal Cost of Service Study
Exhibit PAC/1202

Period Ending December 2019

Transmission

PacifiCorp
California Marginal Cost Study - NCO Method
Marginal Transmission Investment and O&M Expenses
December 2019 Dollars

Line	Item		A Total (B) + (C)	B Demand Related	C Energy Related	
1	2016 Actual		21,188	21,188	0	
2	2017 Forecasted		74,179	74,179	0	
3	2018 Forecasted		85,395	73,755	11,640	
4	2019 Forecasted		36,693	36,693	0	
5	2020 Forecasted		0	0	0	
6						
7	Growth Related Investments - (2016 to 2020 in $000's)		$217,455	$205,815	$11,640	
8						
9	Capacity Additions mW's from 2016-2020		2,423	2,423	2,423	MW
10						
11	Marginal Investment	(7) / (9)	$89.76	$84.96	$4.80	/kW
12						
13	Annualized Investment	(11) x 10.21%	$9.16	$8.67	$0.49	/kW
14	Admin. & General Factor	(11) x 0.71%	$0.64	$0.60	$0.03	/kW
15	Annual O&M Expenses	(11) x 1.388%	$1.25	$1.18	$0.07	/kW
16						
17	Annualized Marginal Cost	Sum (13) to (15)	$11.05	$10.45	$0.59	/kW
18						
19	Marginal Cost of Energy-Related Transmission / kWh $0.59 / 8760 hours / 80.17% Load Factor))				$0.00008	/kWh

Footnote:

Lines 1-5	Tab 4.2 (Transm2:) `2016-2020 Forecasted Transmission December 2019 Dollars'	
Line 9	Peak Load Forecast Detail - Forecasting Dept.	
Line 13	Tab 13.1 (Charge 1:) `Calculation of Annual Charges'	(for 10.21% factor)
Line 14	Tab 13.1 (Charge 1:) `Calculation of Annual Charges'	(for 0.71% factor)
Line 15	Tab 4.3 (Tran_OM:) `Transmission O & M Expenses'	(for 1.388% factor)

PacifiCorp
California Marginal Cost Study - NCO Method
2016-2020 Forecasted Transmission
December 2019 Dollars

[redacted]

PacifiCorp
California Marginal Cost Study - NCO Method
Transmission O & M Expenses
(Dollars in 000's)

		(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)
								Merged			
Line	Description	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
1	Transmission O&M Exp.	154,195	174,010	172,875	195,628	204,716	206,484	198,670	211,984	215,664	203,261
2											
3	Wheeling	106,592	121,167	117,161	136,855	138,235	142,125	137,182	151,336	148,425	130,789
4											
5											
6	Net Transmission O&M	47,603	52,843	55,713	58,774	66,481	64,359	61,488	60,648	67,239	72,472
7	Line (1) - (3)										
8											
9											
10	Transmission Plant	2,874,659	3,054,529	3,342,914	4,339,114	4,500,418	4,724,914	5,231,106	5,387,871	5,910,756	6,051,720
11											
12											
13											
14	Tran. O&M Loading	1.656%	1.730%	1.667%	1.355%	1.477%	1.362%	1.175%	1.126%	1.138%	1.198%
15	Line (6) / (10)										

Source:
PacifiCorp FERC Form 1
Line 1 - page 321, line 100
Line 3 - page 321, line 88
Line 10 - page 206-07, line 58

State of California

Marginal Cost of Service Study

Exhibit PAC/1202

Period Ending December 2019

Distribution O&M

PacifiCorp
California Marginal Cost Study - NCO Method
Distribution O&M Expense
Loading Factor as a Percent of Dist. Plant
(Excluding Meters and St Ltg)
End of Year Dollars

		(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)
Line	Description	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
	Distribution O & M Expenses										
1	Total Distribution O & M Expense	12,208,097	11,498,707	11,269,412	9,827,757	10,476,894	10,229,330	10,379,979	10,834,883	10,555,835	9,374,201
2	Less:										
3	585 St Ltg & Signal Systems	9,383	8,050	7,423	7,410	8,151	7,864	6,990	8,382	7,890	8,420
4	586 Meter Expense	237,299	257,771	260,898	254,190	302,119	272,433	241,287	234,466	180,394	287,108
5	587 Customer Installation Expense	589,675	617,117	596,705	606,703	651,053	569,096	535,500	519,894	484,818	472,111
6	596 Main. of St Ltg & Signal Systems	106,367	118,716	133,899	129,901	115,656	101,682	102,307	85,738	63,649	78,304
7	597 Main. of Meters	110,276	96,406	101,540	101,302	104,660	107,640	102,593	109,669	42,644	(7,314)
8		1,053,000	1,098,060	1,100,465	1,099,506	1,181,639	1,058,714	988,678	958,149	779,395	838,629
9											
10	Total Adjusted Distribution O & M Expense	11,155,097	10,400,648	10,168,947	8,728,251	9,295,255	9,170,616	9,391,301	9,876,734	9,776,440	8,535,572
11	Line 1 - (Lines 3 through 7)										
12											
13	**Distribution Plant**										
14	Total Distribution Plant	194,381,535	205,722,384	212,113,223	215,696,032	220,808,087	225,699,124	233,600,089	245,354,774	250,636,680	255,609,602
15	Less:										
16	370 Meters	3,923,332	3,924,018	3,934,195	3,920,090	3,889,594	3,916,594	4,049,950	4,070,181	4,083,175	4,153,852
17	373 Street Lighting	672,066	660,294	660,717	662,112	670,934	675,382	701,460	702,381	700,865	712,626
18											
19	Adjusted Distribution Plant	189,786,136	201,138,072	207,518,311	211,113,830	216,247,560	221,107,148	228,848,679	240,582,213	245,852,640	250,743,124
20	Line 14 - (Lines 16 through 17)										
21											
22	**O & M Expense Loading Factor**										
23	Distribution O & M Loading	5.88%	5.17%	4.90%	4.13%	4.30%	4.15%	4.10%	4.11%	3.98%	3.40%
24	Line 10 / Line 19										
25											
26	Average Distribution O & M Loading	4.41%									
27	Average of Line 23										
28											
29	Distribution Annual Charge	10.79%									
30											
31	Annualized Distribution O & M Loading Factor	40.87%									
32	Line 26 / Line 29										

Sources:
Lines 1 - 7:Results of Operations (12 months ended December 2007-2016).
Lines 14 - 17: Results of Operations (12 months ended December 2007-2016).
Line 29: Tab 13.1 (Charge 1:) `Calculation of Annual Charges' (for 10.79% factor)

State of California

Marginal Cost of Service Study
Exhibit PAC/1202

Period Ending December 2019

Distribution Substations

PacifiCorp
California Marginal Cost Study - NCO Method
Distribution Substation Costs
$/kW
December 2019 Dollars

Line			
1	Incremental Substation Cost - $ / kVa	$	227.75
2	Power Factor		0.95
3	Substation Utilization Factor		38.43%
4	Incremental Substation Cost - $ / kW	$	92.12
5			
6	Annual Distribution Carrying Charge		10.79%
7			
8	Substation Marginal Cost - $ / kW		**$9.94 / kW**

PacifiCorp
Marginal Cost Study
Substation Investment

[redacted]

Tab: 6.2

Dist Sub 2

State of California

Marginal Cost of Service Study

Exhibit PAC/1202

Period Ending December 2019

Distribution Poles and Conductor

PacifiCorp
California Marginal Cost Study - NCO Method
Hypothetical Circuit Study Results
Annual Demand and Commitment Costs

			(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
			Demand				Commitment			
			Investment $/kW		Annual $/kW		Investment $/Customer		Annual $/Customer	
Line	Load Class		Poles	Conductor	Poles	Conductor	Poles	Conductor	Poles	Conductor
					(A) x 10.79%	(B) x 10.79%			(E) x 10.79%	(F) x 10.79%
1	Residential	(sec)	$1,108.50	$1,068.64	$119.61	$115.31	$0.00	$0.00	$0.00	$0.00
2										
3	General Service									
4	Sch A-25, 0-30 kW	(sec)	$1,341.51	$1,245.41	$144.75	$134.38	$0.00	$0.00	$0.00	$0.00
5	Sch. A-32, 0-100kW	(sec)	$886.78	$898.10	$95.68	$96.90	$0.00	$0.00	$0.00	$0.00
6	Sch. A-32, >100 kW	(sec)	$886.78	$898.10	$95.68	$96.90	$0.00	$0.00	$0.00	$0.00
7										
8	Large General Service									
9	Sch. A-36, 0-100kW	(sec)	$392.08	$546.66	$42.31	$58.98	$0.00	$0.00	$0.00	$0.00
10	Sch. A-36, >100kW	(sec)	$392.08	$546.66	$42.31	$58.98	$0.00	$0.00	$0.00	$0.00
11										
12	Schedule AT-48									
13	Sch AT-48, .5 - 4 MW	(sec)	$173.09	$370.26	$18.68	$39.95	$0.00	$0.00	$0.00	$0.00
14	Sch AT-48, .5 - 4 MW	(pri)	$173.09	$370.26	$18.68	$39.95	$0.00	$0.00	$0.00	$0.00
15										
16	Irrg - Schedule Sch PA-20	(sec)	$2,169.32	$1,879.67	$234.07	$202.82	$0.00	$0.00	$0.00	$0.00
17										

Sources:
Columns A, B, E & F - Tab 7.2 (PC 2:) `Calculation of Escalation Factors Poles and Conductor'
Columns C, D, G & H - Tab 13.1 (Charge 1:) `Calculation of Annual Charges' (for 10.79% factor)

Tab: 7.2

PacifiCorp
California Marginal Cost Study - NCO Method
Calculation of Escalation Factors
Poles and Conductor
3 Phase cost as Demand

[redacted]

PC 2

PacifiCorp
California Marginal Cost Study - NCO Method
Distribution Circuit Model
Inputs & Calculations

Line	Class	A 2017 Annual MWh	B Number of Customers	C Average MWh per Customer	D Distribution Peak MW	E Average kW per customer	F Percent Single Phase		
				(A) / (B)		(D)/(B) * 1,000			
1	Residential	374,160	35,575	10.52	77.82	2.19	100.00%		
2	GS Sch A-25, 0-30 kW	57,783	7,264	7.95	10.17	1.40	85.41%		
3	GS Sch. A-32, 0-100kW	62,729	907	69.15	9.99	11.01	46.21%		
4	GS Sch. A-32, >100 kW	13,311	74	179.50	2.12	28.58	6.73%		
5	Lrg GS Sch. A-36, 0-100kW	35,656	133	267.79	5.48	41.14	10.19%		
6	Lrg GS Sch. A-36, >100kW	50,712	64	787.79	7.89	122.57	1.55%		
7	Lrg Pwr Srv Sch AT-48, .5 - 4 MW (sec)	54,363	17	3,197.83	8.12	477.48	0.00%		
8	Lrg Pwr Srv Sch AT-48, .5 - 4 MW (pri)	24,541	2	12,270.60	3.48	1,738.13	0.00%		
9	Irrg - Schedule Sch PA-20	83,988	2,010	41.78	2.97	1.48	6.59%		
10	Total -	757,243	46,047		128.04				
11									
12	Customer Distance from Substation	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Total
13	Residential	0.42%	0.42%	0.42%	2.21%	2.21%	2.21%	92.11%	100.00%
14	GS Sch A-25, 0-30 kW	0.50%	0.50%	0.50%	2.91%	2.91%	2.91%	89.77%	100.00%
15	GS Sch. A-32, 0-100kW	0.36%	0.36%	0.36%	1.43%	1.43%	1.43%	94.65%	100.00%
16	GS Sch. A-32, >100 kW	0.36%	0.36%	0.36%	1.43%	1.43%	1.43%	94.65%	100.00%
17	Lrg GS Sch. A-36, 0-100kW	0.00%	0.00%	0.00%	1.19%	1.19%	1.19%	96.43%	100.00%
18	Lrg GS Sch. A-36, >100kW	0.00%	0.00%	0.00%	1.19%	1.19%	1.19%	96.43%	100.00%
19	Lrg Pwr Srv Sch AT-48, .5 - 4 MW (sec)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
20	Lrg Pwr Srv Sch AT-48, .5 - 4 MW (pri)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
21	Irrg - Schedule Sch PA-20	0.75%	0.75%	0.75%	5.71%	5.71%	5.71%	80.63%	100.00%
22									
23	System property records & engineering information								
24	Number of pole feet in California		12,320,770		12 kV circuit 12 miles long has approx. 3 miles of single phase.				
25	Number of pole miles in California		2,333		which is approx. 25 percent of circuit distance.				
26	Number of trench feet in California		3,300,415		9.25 = 25 percent of typical California circuit				
27	Number of trench miles in California		625						
28	Total miles in California		2,959		5	divide by outer branches			
29					1.849	distance of single phase on outer branch			
30	Number of circuits in California		80		35.00%	equals percentage of single phase outer branch Segmer			
31	Number of poles in California		55,401						
32	Branches per Circuit		7						
33									
34	Poles per mile (Total Poles/Pole Miles)		23.74	Poles					
35	Customers per mile (Total Customers/Total Miles)		15.56	Customers					
36	Distance per Circuit (Total miles/Circuits)		36.98	Miles					
37	Distance per Branch (Circuit miles / Branches)		5.28	Miles					

Columns A & B - Tab 16.1 (Cust Data 1:) `Customers and MWh's 12 Months Ended June 2017'
Columns D - Tab 16.4 (Cust Data 4:) `Customer Loads12 Months Ended June 2017 (Historical)'
Column H - Tab 16.3 (Cust Data 3:) `Customer Class Split between Three Phase / Single Phase'

State of California

Marginal Cost of Service Study
Exhibit PAC/1202

Period Ending December 2019

Distribution Transformers

PacifiCorp
California Marginal Cost Study - NCO Method
Transformer Fixed
Costs By Customer Load Class

Line	Customer Type	A Percent of Customers	B Dollars / Tran.	C Weighted $/Tran. (A)x(B)	D # Cust. /Tran.	E Transformer $/Cust. (C)/(D)	F Average Customers	G Total Fixed $'s (E)x(F)	H Total Variable $'s	I Total Fixed & Variable $'s (G)+(H)	J Transformer $/Customer (I)/(F)
1	Residential	100.0000%	$372.24	$372.24	2.62	$142.08	35,861	$5,095,143	$364,701	$5,459,844	$152.25
2											
3	General Service										
4	1 Phase	85.4126%	$372.24	317.94	2.86	$111.17					
5	3 Phase	14.5874%	$1,106.77	161.45	3.67	$43.99					
6	Sch A-25, 0-30 kW	100.0000%		$479.39	2.98	$155.16	7,131	$1,106,431	$33,331	$1,139,762	$159.83
7											
8	General Service										
9	1 Phase	46.2119%	$372.24	172.02	1.46	$117.82					
10	3 Phase	53.7881%	$1,106.77	595.31	1.33	$447.60					
11	Sch. A-32, 0-100kW	100.0000%		$767.33	1.39	$565.42	1,040	$588,040	$50,536	$638,576	$614.02
12											
13	General Service										
14	1 Phase	6.7312%	$372.24	25.06	1.46	$17.16					
15	3 Phase	93.2688%	$1,106.77	1032.27	1.33	776.14					
16	Sch. A-32, >100 kW	100.0000%		$1,057.33	1.34	$793.31	85	$67,431	$10,725	$78,156	$919.48
17											
18	Large General Service										
19	Sch. A-36, 0-100kW - 1 phase	10.1871%	$372.24	37.92	1.19	$31.87					
20	Sch. A-36, 0-100kW - 3 phase	89.8129%	$1,106.77	994.02	1.12	$887.52					
21		100.0000%		$1,031.94	1.13	$919.38	129	$118,600	$17,263	$135,863	$1,053.21
22											
23	Sch. A-36, >100kW (sec) - 1 phase	1.5535%	$372.24	5.78	1.19	$4.86					
24	Sch. A-36, >100kW (sec) - 3 phase	98.4465%	$1,106.77	1089.58	1.12	$972.84					
25		100.0000%		$ 1,095.36	1.12	$977.70	62	$60,617	$19,434	$80,051	$1,291.15
26											
27	Schedule AT-48										
28	Sch AT-48, .5 - 4 MW (sec)	100.0000%	$1,106.77	1106.77	1.20	$922.31					
29	Sch AT-48, .5 - 4 MW (pri)	100.0000%	-	0.00	0.00	N.A.					
30				$1,106.77		$922.31	17	$15,679	$25,411	$41,090	$2,417.07
31											
32	Irrg - Schedule Sch PA-20										
33	1 Phase	6.5932%	$372.24	24.54	1.21	$20.28					
34	3 Phase	93.4068%	$1,106.77	1033.8	1.30	$795.23					
35		100.0000%		$1,058.34	1.29	$815.51	2,019	$1,646,518	$95,177	$1,741,695	$862.65
36											

Column A - Tab 16.3 (Cust Data 3:) `Customer Class Split between Three Phase / Single Phase'
Column B - Tab 8.3 (XFMR 3:) `Regression weighted by number of transformer banks'
Column F - Tab 16.2 (Cust Data 2:) `Customers and MWh's12 Months Ended December 2019'
Column H - Tab 8.2 (XFMR 2:) `Transformer Variable Costs'

PacifiCorp
California Marginal Cost Study - NCO Method
Transformer Variable Costs

Line	Customer Type		A Weighted $/kW	B Transformer Peak kW's	C Tot. Trans. Variable $ (A)x(D)
1	Residential				
2	Schedule D, DL-6, DS-8, DM-9	(sec)	$1.28	284,923	$364,701
3					
4	General Service				
5	Sch A-25, 0-30 kW	(sec)	$1.66	20,079	$33,331
6					
7	Sch. A-32, 0-100kW	(sec)	$1.66	30,443	$50,536
8	Sch. A-32, >100 kW	(sec)	$1.66	6,461	$10,725
9					
10	Sch. A-36, 20-100kW	(sec)	$1.66	10,399	$17,263
11	Sch. A-36, 101-500kW	(sec)	$1.66	11,707	$19,434
12					
13	Schedule AT-48				
14	.5 - 4 MW (sec)	(sec)	$1.66	15,308	$25,411
15	.5 - 4 MW (pri)	(pri)	N.A.	N.A.	N.A.
16					
17	Irrg - Schedule Sch PA-20	(sec)	$1.66	57,335	$95,177
18					
19	Total			436,656	$616,578

Sources:

Column A - Tab 8.3 (XFMR 3:) `Regression weighted by number of transformer banks'
Column B - Tab 1.3 (Table 3:) `10 Year Costing Inputs and Customer Data Marginal Unit Costs'

Note: Residential $/kW is decreased by 23% (1/1.3) to account for higher transformer load capacities at the time of residential peak.

PacifiCorp
California Marginal Cost Study - NCO Method
Calculation of Escalation Factors for Transformers
Regression weighted by number of transformer banks

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State of California

Marginal Cost of Service Study
Exhibit PAC/1202

Period Ending December 2019

Customer Meters and O&M

PacifiCorp
California Marginal Cost Study - NCO Method
Weighted Average Installed Meter Costs

		A	B	C	D	E	F	G	H
			% of Customers				Weighted Metering Cost		
Line	Load Class	Customers	1 & 3 Phase	1 Phase	3 Phase	Metering Cost	1 & 3 Phase	1 Phase	3 Phase
			(A)/(A,Ttl)	(A)/1Ø	(A)/3Ø		(B)x(E)	(C)x(E)	(D)x(E)
1	**Residential**	35,575	100.00%	100.00%		$218	$218.10	$218.10	
2	Line 1 x 10.79%						$23.53	$23.53	
3									
4									
5	**General Service**								
6	**Sch A-25, 0-30 kW**								
7	1 Phase	6,204	85.41%	100.00%		$221	$188.37	$220.54	
8	3 Phase	1,060	14.59%		100.00%	$358	$52.25		$358.21
9	Sch A-25, 0-30 kW	7,264	100.00%	100.00%	100.00%		$240.62	$220.54	$358.21
10	Line 9 x 10.79%						$25.96	$23.80	$38.65
11									
12									
13	**Sch. A-32, 0-100kW**								
14	**0-50 KW**								
15	1 Phase	371	40.92%	88.55%		$221	$90.25	$195.29	
16	3 Phase	429	47.24%		87.82%	$358	$169.21		$314.59
17									
18	**51-100 kW**								
19	1 Phase	48	5.29%	11.45%		$243	$12.85	$27.80	
20	3 Phase	59	6.55%		12.18%	$358	$23.46		$43.61
21	Sch. A-32, 0-100kW	907	100.00%	100.00%	100.00%		$295.77	$223.09	$358.20
22	Line 21 x 10.79%						$31.91	$24.07	$38.65
23									
24									
25	**Sch. A-32, >100 kW**								
26	**101-300 kW**								
27	1 Phase	5	6.73%	100.00%		$1,095	$73.69	$1,094.83	
28	3 Phase	64	86.53%		92.77%	$1,569	$1,357.86		$1,455.85
29									
30	**301-1000 kW**								
31	3 Phase	5	6.74%		7.23%	$1,569	$105.81		$113.44
32	Sch. A-32, >100 kW	74	100.00%	100.00%	100.00%		$1,537.36	$1,094.83	$1,569.29
33	Line 32 x 10.79%						$165.88	$118.13	$169.33

Sources:
Column E - Tab 9.5 (Meters 5:) `Summary of Average Installed Costs Meters'
Line 2 - Tab 13.1 (Charge 1:) `Calculation of Annual Charges' (for 10.79% factor)

PacifiCorp
California Marginal Cost Study - NCO Method
Weighted Average Installed Meter Costs

		A	B	C	D	E	F	G	H
			% of Customers				Weighted Metering Cost		
Line	Load Class	Customers	1 & 3 Phase	1 Phase	3 Phase	Metering Cost	1 & 3 Phase	1 Phase	3 Phase
			(A)/(A,Ttl)	(A)/1Ø	(A)/3Ø		(B)x(E)	(C)x(E)	(D)x(E)
1	**Large General Service**								
2	**Sch. A-36, 0-100kW**								
3	**0-50 KW**								
4	1 Phase	7	5.30%	52.06%		$221	$11.70	$114.81	
5	3 Phase	26	19.55%		21.77%	$358	$70.05		$77.99
6									
7	**51-100 kW**								
8	1 Phase	7	4.88%	47.94%		$243	$11.86	$116.40	
9	3 Phase	94	70.26%		78.23%	$358	$251.67		$280.22
10	Sch. A-36, 0-100kW	133	100.00%	100.00%	100.00%		$345.28	$231.21	$358.21
11	Line 10 x 10.79%						$37.26	$24.95	$38.65
12									
13	**Sch. A-36, >100kW**								
14	**101-300 kW**								
15	1 Phase	1	1.55%	100.00%		$1,095	$17.01	$1,094.83	
16	3 Phase	54	83.70%		85.02%	$1,569	$1,313.53		$1,334.25
17									
18	**301-1000 kW**								
19	3 Phase	9	14.74%		14.98%	$1,569	$231.39		$235.04
20	Sch. A-36, >100kW	64	100.00%	100.00%	100.00%		$1,561.93	$1,094.83	$1,569.29
21	Line 20 x 10.79%						$168.53	$118.13	$169.33
22									
23	**Schedule AT-48**								
24	.5 - 4 MW (sec)	17	100.00%		100.00%	$1,973	$1,972.97		
25	.5 - 4 MW (pri)	2	100.00%		100.00%	$11,949	$11,949.31		
26	Schedule AT-48 Line 24 x 10.79%	19	100.00%		100.00%		$212.88		
27	Line 25 x 10.79%						$1,289.33		

Sources:
Column E - Tab 9.5 (Meters 5:) `Summary of Average Installed Costs Meters'
Line 7 - Tab 13.1 (Charge 1:) `Calculation of Annual Charges' (for 10.79% factor)

PacifiCorp
California Marginal Cost Study - Rental Method
Weighted Average Installed Meter Costs
Irrigation

		A	B	C	D	E	F	G	H
			% of Customers				Weighted Metering Cost		
Line No.	Load Class	Customers	1 & 3 Phase	1 Phase	3 Phase	Metering Cost	1 & 3 Phase	1 Phase	3 Phase
			(A)/(A,Ttl)	(A)/1Ø	(A)/3Ø		(B)x(E)	(C)x(E)	(D)x(E)
1	**Irrg - Schedule Sch PA-20**								
2	**0-50 KW**								
3	1 Phase	132	6.54%	99.25%		$221	$14.43	$218.87	
4	3 Phase	1,285	63.93%		68.44%	$358	$229.01		$245.17
5									
6	**51-100 kW**								
7	1 Phase	1	0.05%	0.75%		$243	$0.12	$1.83	
8	3 Phase	438	21.77%		23.31%	$358	$77.99		$83.49
9									
10	**101-300 kW**								
11	1 Phase	0	0.00%	0.00%		$1,095	$0.00	$0.00	
12	3 Phase	150	7.45%		7.98%	$1,569	$116.99		$125.24
13									
14	**301-1000 kW**								
15	3 Phase	5	0.25%		0.27%	$1,569	$3.91		$4.19
16	Total Irrigation	2,010	100.00%	100.00%	100.00%		$442.45	$220.70	$458.09
17	Line 16 x 10.79%						$ 47.74	$ 23.81	$ 49.43

Sources:
Column E - Tab 9.5 (Meters 5:) `Summary of Average Installed Costs Meters'
Line 14 - Tab 13.1 (Charge 1:) `Calculation of Annual Charges' (for 10.79% factor)

PacifiCorp
California Marginal Cost Study - NCO Method
Incremental Three Phase
Meter and Services Costs

		A	B	C	D	E	F	G	H
		Meters				Service Drops			
Line	Load Class	Single Phase	Three Phase	Difference	Annualized Difference	Single Phase	Three Phase	Difference	Annualized Difference
				(B) - (A)	(C) x 10.79%			(F) - (E)	(G) x 10.79%
1	Residential	$218.10	$358.21	$140.11	$15.12	$715.79	$1,092.57	$376.79	$40.66
2									
3	0 - 50 kW	$220.54	$358.21	$137.67	$14.85	$842.14	$1,092.57	$250.43	$27.02
4									
5	51 - 100 kW	$242.80	$358.21	$115.40	$12.45	$1,671.84	$2,145.11	$473.27	$51.07
6									
7	101-300 kW	$1,094.83	$1,569.30	$474.47	$51.20	$3,788.10	$3,970.18	$182.08	$19.65
8									
9	301 - 1000 kW	N.A.	$1,569.30	N.A.	N.A.	N.A.	$8,263.26	N.A.	N.A.
10									
11	Over 1000 KW	N.A.	$1,972.97	N.A.	N.A.	N.A.	$27,564.96	N.A.	N.A.

Sources:
Columns A & B - Tab 9.5 (Meters 5:) `Summary of Average Installed Costs Meters'
Columns D & H - Tab 13.1 (Charge 1:) `Calculation of Annual Charges' (for 10.79% factor)
Columns E & F - Tab 10.4 (Services 3:) `Summary of Average Installed Costs Service Drops'

PacifiCorp
California Marginal Cost Study - NCO Method
Summary of Average Installed Costs
Meters

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PacifiCorp
California Marginal Cost Study - NCO Method
Distribution Meters Expense
Loading Factor

Line	Description	A 2007	B 2008	C 2009	D 2010	E 2011	F 2012	G 2013	H 2014	I 2015	J 2016
	Distribution Meters Expenses										
1	586 Meter Expense	$237,299	$257,771	$260,898	$254,190	$302,119	$272,433	$241,287	$234,466	$180,394	$287,108
2	597 Main. of Meters	$110,276	$96,406	$101,540	$101,302	$104,660	$107,640	$102,593	$109,669	$42,644	-$7,314
3											
4	Total Adjusted Distribution Meters Expense	$347,575	$354,177	$362,438	$355,492	$406,779	$380,073	$343,880	$344,135	$223,038	$279,793
5	Line 1 + Line 2										
6											
7											
8											
9	Distribution Meters										
10	370 Meters	$3,923,332	$3,924,018	$3,934,195	$3,920,090	$3,889,594	$3,916,594	$4,049,950	$4,070,181	$4,083,175	$4,153,852
11											
12											
13											
14	Meters Expense Loading Factor										
15	Meter O&M Loading	8.86%	9.03%	9.21%	9.07%	10.46%	9.70%	8.49%	8.46%	5.46%	6.74%
16	Line 4 / Line 15										
17											
18	Average Meter O&M Loading	8.55%									
19	Average of Line 15										
20											
21	Distribution Annual Charge	10.79%									
22											
23	Annualized Meter O&M Loading Factor	79.21%									
24	Line 18 / Line 21										

Sources:
Lines 1 & 2 - FERC Form 1 Pages 321 and 322 & Results of Operations (12 months ended December 2000-2008)
Lines 10 - FERC Form 1 Pages 206 and 207 & Results of Operations (12 months ended December 2000-2008)
Line 21 - Tab 13.1 (Charge 1:) `Calculation of Annual Charges' (for 10.79% factor)

State of California

Marginal Cost of Service Study

Exhibit PAC/1202

Period Ending December 2019

Customer Service Drops

PacifiCorp
California Marginal Cost Study - NCO Method
Weighted Average Installed Service Drop Costs
Residential, Schedule A-25 and A-32

		A	B	C	D	E	F	G	H
			% of Customers			Service	Weighted Service Drop Cost		
Line	Load Class	Customers	1 & 3 Phase	1 Phase	3 Phase	Drop Cost	1 & 3 Phase	1 Phase	3 Phase
			(A)/(A,Ttl)	(A)/1Ø	(A)/3Ø		(B)x(E)	(C)x(E)	(D)x(E)
1	**Residential**	35,575	100.00%	100.00%		$716	$715.79	$715.79	
2	Line 1 x 10.79%						$77.23	$77.23	
3									
4									
5	**General Service**								
6	**Sch A-25, 0-30 kW**								
7	1 Phase	6,204	85.41%	100.00%		$860	$734.51	$859.95	
8	3 Phase	1,060	14.59%		100.00%	$1,098	$160.13		$1,097.71
9	Sch A-25, 0-30 kW	7,264	100.00%				$894.64	$859.95	$1,097.71
10	Line 9 x 10.79%						$96.53	$92.79	$118.44
11									
12									
13	**Sch. A-32, 0-100kW**								
14	**0-30 KW**								
15	1 Phase	234	23.76%	100.00%		$842	$200.12	$842.14	
16	3 Phase	230	23.36%		100.00%	$1,093	$255.19		$1,092.57
17									
18	**31-50 kW**								
19	1 Phase	138	13.97%	100.00%		$930	$129.93	$930.05	
20	3 Phase	199	20.22%		100.00%	$1,178	$238.21		$1,177.86
21									
22	**51-100 kW**								
23	1 Phase	48	4.87%	100.00%		$1,672	$81.49	$1,671.84	
24	3 Phase	136	13.81%		100.00%	$2,145	$296.26		$2,145.11
25	Sch. A-32, 0-100kW	985	100.00%				$1,201.20	$3,444.03	$4,415.54
26	Line 25 x 10.79%						$129.61	$371.61	$476.44
27									
28									
29	**Sch. A-32, >100 kW**								
30	**101-300 kW**								
31	1 Phase	5	6.73%	100.00%		$3,788	$254.98	$3,788.10	
32	3 Phase	64	86.53%		100.00%	$3,970	$3,435.25		$3,970.18
33									
34	**301-1000 kW**								
35	1 Phase	0	0.00%	0.00%		$0	$0.00	$0.00	
36	3 Phase	5	6.74%	100.00%	100.00%	$8,263	$557.14		$8,263.26
37									
38	Sch. A-32, >100 kW	74	100.00%				$4,247.37	$3,788.10	$12,233.44
39	Line 38 x 10.79%						$458.29	$408.74	$1,319.99
40									
41									

Sources:
Column A - Tab 9.1 (Meters 1:) `Weighted Average Installed Meter Costs'
Column E - Tab 10.4 (Services 3:) `Summary of Average Installed Costs Service Drops'
Line 2 - Tab 13.1 (Charge 1:) `Calculation of Annual Charges' (for 10.79% factor)

PacifiCorp
California Marginal Cost Study - NCO Method
Weighted Average Installed Service Drop Costs

		A	B	C	D	E	F	G	H
			% of Customers			Service	Weighted Service Drop Cost		
Line	Load Class	Customers	1 & 3 Phase	1 Phase	3 Phase	Drop Cost	1 & 3 Phase	1 Phase	Annualized 3 Phase
			(A)/(A,Ttl)	(A)/1Ø	(A)/3Ø		(B)x(E)	(C)x(E)	
	Large General Service								
	Sch. A-36, 0-100kW								
1	**0-30 KW**								
2	1 Phase	1	0.75%	100.00%		$824	$6.18	$824.16	
3	3 Phase	0	0.00%		0.00%	$1,087	$0.00		$0.00
4									
5	**31-50 kW**								
6	1 Phase	6	4.50%	100.00%		$902	$40.59	$902.06	
7	3 Phase	26	19.34%		100.00%	$1,169	$226.19		$1,169.25
8									
9	**51-100 kW**								
10	1 Phase	7	5.25%	100.00%		$1,617	$84.87	$1,616.70	
11	3 Phase	94	70.16%		100.00%	$2,134	$1,496.84		$2,133.59
12	Sch. A-36, 0-100kW	133	100.00%				$1,854.67	$3,342.92	$3,302.84
13	Line 12 x 10.79%						$200.12	$360.70	$356.38
14									
15									
16	**Sch. A-36, >100kW**								
17	**101-300 kW**								
18	1 Phase	1	1.55%	100.00%		$3,935	$61.13	$3,934.86	
19	3 Phase	54	83.70%		100.00%	$4,002	$3,349.91		$4,002.21
20									
21	**301-1000 kW**								
22	1 Phase	0	0.00%	0.00%		$0	$0.00	$0.00	
23	3 Phase	9	14.74%		100.00%	$8,153	$1,202.10		$8,152.57
24									
25	Sch. A-36, >100kW	64	100.00%				$4,613.14	$3,934.86	$12,154.78
26	Line 25 x 10.79%						$497.76	$424.57	$1,311.50
27	**Schedule AT-48**								
28	.5 - 4 MW (sec)	17	100.00%		100.00%	$27,565	$27,564.96		$27,564.96
29	.5 - 4 MW (pri)	2	100.00%		100.00%	$0	$0.00		$0.00
30	Schedule AT-48	19	100.00%		100.00%		$27,564.96		$27,564.96
31	Line 30 x 10.79%						$2,974.26	$0.00	$2,974.26

Sources:
Column A - Tab 9.2 (Meters 2:) `Weighted Average Installed Meter Costs' and COS Breakouts
Column E - Tab 10.4 (Services 3:) `Summary of Average Installed Costs Service Drops'
Line 5 - Tab 13.1 (Charge 1:) `Calculation of Annual Charges' (for 10.79% factor)

PacifiCorp
California Marginal Cost Study - NCO Method
Summary of Average Installed Costs
Service Drops

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State of California

Marginal Cost of Service Study

Exhibit PAC/1202

Period Ending December 2019

Customer Accounting, Service & Information

PacifiCorp
California Marginal Cost Study - NCO Method
Summary of Customer Accounting Expense
By Schedule
12 Months Ended December 2019

Line	FERC Account	Description	(A) Residential	(B) General Service Schedule A-25	(D) General Service Schedule A-32	(E) Large General Service Schedule A-36	(F) Large Power Service Schedule A-48	(G) Irrigation	(G) Total
1		Average Number of Customers	35,861	7,131	1,125	191	19	975	45,301
2									
3		Write-offs By Schedule	416,016	547	570	518	195	64,611	482,457
4									
5									
6	901								
7	Supervision	Account 902 + 903 + 904	$1,403,335	$181,143	$33,777	$6,130	$1,641	$93,785	$1,719,811
8		% of Total 902 + 903 +904	81.60%	10.53%	1.96%	0.36%	0.10%	5.45%	100.00%
9		Total 901 $	$53,144	$6,860	$1,279	$232	$62	$3,552	$65,129
10		Dollars Per Customer	$1.48	$0.96	$1.14	$1.22	$3.27	$3.64	$1.44
11	902								
12	Meter Reading Expense	902 Weighting Factor	0.00	0.00	0.00	0.00	0.00	0.00	
13		Weighted Customers	0	0	0	0	0	0	0
14		% of Total $	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
15		Total 902 $	$0	$0	$0	$0	$0	$0	$0
16		Dollars Per Customer	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
17	903								
18	Cust. Receipts & Collect.	903 Weighting Factor	1.00	0.90	1.05	1.05	2.73	1.18	
19		Weighted Customers	35,861	6,429	1,183	201	52	1,150	44,875
20		% of Total $	79.91%	14.33%	2.64%	0.45%	0.12%	2.56%	100.00%
21		Total 903 $	$1,007,585	$180,623	$33,235	$5,637	$1,455	$32,321	$1,260,856
22		Dollars Per Customer	$28.10	$25.33	$29.55	$29.55	$76.58	$33.15	$27.83
23	904								
24	Uncollectibles	Total 904 $	$395,750	$520	$542	$493	$186	$61,463	$458,955
25		% of Write-offs	86.23%	0.11%	0.12%	0.11%	0.04%	13.39%	100.00%
26		Dollars Per Customer	$11.04	$0.07	$0.48	$2.59	$9.78	$63.04	$10.13
27	905								
28	Misc Cust Acct Expense	Account 902 + 903 + 904	$1,403,335	$181,143	$33,777	$6,130	$1,641	$93,785	$1,719,811
29		% of Total 902 + 903 +904	81.60%	10.53%	1.96%	0.36%	0.10%	5.45%	100.00%
30		Total 905 $	$1,968	$254	$47	$9	$2	$132	$2,412
31		Dollars Per Customer	$0.05	$0.04	$0.04	$0.05	$0.12	$0.13	$0.05
32	907-910								
33	Supervision, Cust. Assist.	Average Number of customers	35,861	7,131	1,125	191	19	975	45,301
34	Info & Instructional Exp.,	% of Total	79.16%	15.74%	2.48%	0.42%	0.04%	2.15%	100.00%
35	Misc Cust Svc & Info Exp.	Total 907-910 $	$275,130	$54,709	$8,629	$1,463	$146	$7,480	$347,557
36		Dollars Per Customer	$7.67	$7.67	$7.67	$7.67	$7.67	$7.67	$7.67
37									
38	Total 901 - 910	Total 901 - 910 $	$1,733,577	$242,966	$43,732	$7,834	$1,851	$104,948	$2,134,909
39									
40		**Dollars Per Customer**	**$48.34**	**$34.07**	**$38.88**	**$41.07**	**$97.43**	**$107.64**	**$47.13**

PacifiCorp
California Marginal Cost Study - NCO Method
Summary of Customer and Metering Expenses
End of Year Dollars

Line	Description	(A) Actual 2012 Dollars	(B) Actual 2013 Dollars	(C) Actual 2014 Dollars	(D) Actual 2015 Dollars	(E) Actual 2016 Dollars	(F) Adjusted December 2019 Dollars
							[(A) x 0.9780+ (B) x 0.9564+ (C) x 0.9354+ (D) x 0.9148+ (E) x 0.8946] / 5
	Customer Accounting						
1	901 Supervision	$71,110	$59,653	$63,838	$97,647	$55,897	$65,129
2	902 Meter Reading Expense	$959,254	$911,969	$1,016,945	$896,856	$851,027	$868,676
3	903 Cust Records & Collection	$1,424,073	$1,368,221	$1,390,498	$1,315,866	$1,227,970	$1,260,856
4	904 Uncollectible Accounts	$600,117	$590,866	$364,257	$429,865	$456,951	$458,955
5	905 Misc Cust Acct Expense	$4,274	$2,833	$3,825	$787	$977	$2,412
6	Total	$3,058,828	$2,933,543	$2,839,363	$2,741,021	$2,592,822	$2,656,028
7							
8	Customer Service & Info Expense						
9	907 Supervision	$7,299	$8,096	$3,660	$9,952	$6,669	$6,675
10	908 Cust Assistance Expense	$556,608	$122,993	$174,520	$98,109	$152,461	$210,276
11	909 Info & Instructional Expense	$174,618	$134,062	$184,867	$110,754	$78,543	$128,700
12	910 Misc Cust Svc & Info Expense	$3,071	$2,861	$2,414	$391	$1,314	$1,906
13	Total	$ 741,596	$ 268,012	$ 365,460	$ 219,206	$ 238,987	$347,557
14							
15							
16	Inflation Adjustment -	0.9780	0.9564	0.9354	0.9148	0.8946	

Sources:
Account Inputs - Results of Operations (12 months ended Dec 2012-2016), State of California
Inflation Adj - Tab 13.2 (Charge 2:) `Financial Inputs to the Economic Carrying Charge Calculation' (2.25% factor)

State of California

Marginal Cost of Service Study
Exhibit PAC/1202

Period Ending December 2019

A&G Loading Factor

PacifiCorp
California Marginal Cost Study - NCO Method
Administrative & General Expense
Loading Factor

Year	(A) Administrative and General Expenses (000)	(B) Electric Plant in Service (000)	(C) Admin. & General to Electric Plant In Service Loading Factor Col (A) / Col (B)
2007	$180,356	$16,417,338	1.10%
2008	$170,044	$18,224,943	0.93%
2009	$162,620	$19,645,569	0.83%
2010	$146,076	$21,775,587	0.67%
2011	$152,657	$22,769,524	0.67%
2012	$188,240	$23,734,237	0.79%
2013	$175,800	$24,578,893	0.72%
2014	$103,887	$25,826,088	0.40%
2015	$134,217	$26,518,617	0.51%
2016	$129,633	$27,064,435	0.48%
		10 Year Average A&G to EPIS Loading Factor =	0.71%

Sources:
PacifiCorp FERC Form 1
Column A - FERC Form 1, page 323, line 197
Column B - FERC Form 1, page 207, line 104

State of California

Marginal Cost of Service Study
Exhibit PAC/1202

Period Ending December 2019

Annual Charges

PacifiCorp
California Marginal Cost Study - NCO Method
Calculation of Annual Charges

Line	Description	A 20 years - Generation	B 10 years - Generation	C 5 years - Generation	D System Transmission	E Distribution
1	Levelized Income Taxes *	NA	NA	NA	1.90%	1.75%
2	Levelized Property Tax *	NA	NA	NA	0.67%	0.56%
3	Total	NA	NA	NA	2.57%	2.31%
4						
5	Levelized Income & Property Taxes	NA	NA	NA	$25.70	$23.10
6	(per $1,000 of Investment)					
7						
8	Expected Life	20	10	5	62	54
9						
10	Nominal Interest Rate *	7.93%	7.93%	7.93%	7.93%	7.93%
11						
12	Present Value: Income **	NA	NA	NA	$321.15	$286.61
13	Taxes & Property Taxes per				(PV of $25.70 at 7.93%	(PV of $23.10
14	$1,000 of Investment				for 62 years)	for 54 years)
15						
16	Removal Cost Per $1,000 Investment				$166.48	$547.28
17						
18	Present Value: Removal Cost				$1.42	$8.53
19	at End of Useful Life				(PV of $166.48 in	(PV of $547.28 in
20					62 years at 7.93%)	54 years at 7.93%)
21						
22	Investment and Taxes	$1,000.00	$1,000.00	$1,000.00	$1,322.57	$1,295.14
23	w/o PVCD (Line 12 + Line 18 + 1000)					
24						
25	PVCD Factor	NA	NA	NA	0.040982	0.042008
26						
27	PVCD $ (Line 22 x Line 25)	NA	NA	NA	$54.20	$54.41
28						
29	Total (Line 22 + Line 27)	$1,000.00	$1,000.00	$1,000.00	$1,376.77	$1,349.55
30						
31	EOY Annual Charge *** (nominal value)	$93.90	$137.66	$231.64	$102.08	$100.78
32						
33	Annual Economic Carrying	9.39%	13.77%	23.16%	10.21%	10.08%
34	Adm & Gen Expense Loading Factor	0.00%	0.00%	0.00%	0.71%	0.71%
35						
36	Annual Econ Carrying + A&G Loading	9.39%	13.77%	23.16%	10.92%	10.79%

Notes:

* From Financial Analysis

** PV = Ln(4) x [1/r - (1/r)/(1+r)^a] 25.70*(1/0.0793-(1/0.0793)/(1+0.0793)^62)
23.10*(1/0.0793-(1/0.0793)/(1+0.0793)^54)

Where: r = Nominal Interest Rate
a = Expected Investment Life

*** The Annual Charge Formula: AC% = Ln(11) x r x {1/[1 - 1/(1+r)^a]}/(1+r)

Where: k = real interest rate = (1 + r)/(1 + i) - 1
i = inflation rate = 2.25%
a = expected investment life = Ln(5)
r = nominal interest rate = Ln(6)

PacifiCorp
California Marginal Cost Study - NCO Method
Financial Inputs to the Economic Carrying Charge Calculation

Financial Inputs		Levelized	
		Income Taxes	
Weighted Cost of Capital	7.93%	Transmission	1.90%
Borrowing Rate	7.93%	Distribution	1.75%
Average Rate of Inflation	2.25%	Property Taxes	
		Transmission	0.67%
Real Cost of Cap.		Distribution	0.56%
(1+0.0793)/(1+0.0225)-1	5.56%		

Source:
- Inflation Rate 2019-2028, Ore Commission Approved - AC Study (2017 04 25).xls (Table 9, page 3)
- Cost of Capital/Borrowing Rate: Revenue Requirement (CA Jurisdictional Allocation Model)
- Income & Property Taxes: Financial Analysis, Use of Facilities Charges 12/31/16 Basis (prepared 05/2017)

PacifiCorp
California Marginal Cost Study - NCO Method
Present Value of Cost of Dispersion Factor
Iowa Curve R2.0 & 62 Year Average Life
Page 1 of 2

Real Cost of Capital =	5.56%

	A	B	C	D	E	F	G	H	I	J
YEAR	PVCD	% RENEWED	NUM1	DEM1	NUM1/DEM1	NUM2	DEM2	NUM2/DEM2	INSTANCE	Iowa R3.0
	((A) {yr-1} +(I)) / 100	((J)-(J,{yr+1})) * 100	(B)	1.0556 ^Year	(C) / (D)	(B)	1.0556 ^62	(F) / (G)	(E) - (H)	(Given)
										100.000000
1	0.000748	8.19%	0.0819	1.055575	0.077622	0.0819	28.596576	0.002865	0.074756	99.918065
2	0.002161	16.39%	0.1639	1.114238	0.147070	0.1639	28.596576	0.005730	0.141340	99.754194
3	0.003497	16.39%	0.1639	1.176161	0.139327	0.1639	28.596576	0.005730	0.133597	99.590323
4	0.004849	17.55%	0.1755	1.241526	0.141345	0.1755	28.596576	0.006137	0.135209	99.414839
5	0.006254	19.29%	0.1929	1.310523	0.147196	0.1929	28.596576	0.006746	0.140450	99.221935
6	0.007581	19.29%	0.1929	1.383355	0.139446	0.1929	28.596576	0.006746	0.132700	99.029032
7	0.008900	20.30%	0.2030	1.460234	0.138997	0.2030	28.596576	0.007098	0.131899	98.826065
8	0.010289	22.65%	0.2265	1.541386	0.146914	0.2265	28.596576	0.007919	0.138995	98.599613
9	0.011602	22.65%	0.2265	1.627048	0.139179	0.2265	28.596576	0.007919	0.131261	98.373161
10	0.012882	23.39%	0.2339	1.717471	0.136209	0.2339	28.596576	0.008181	0.128029	98.139226
11	0.014246	26.39%	0.2639	1.812919	0.145550	0.2639	28.596576	0.009227	0.136323	97.875355
12	0.015532	26.39%	0.2639	1.913671	0.137887	0.2639	28.596576	0.009227	0.128660	97.611484
13	0.016766	26.81%	0.2681	2.020022	0.132720	0.2681	28.596576	0.009375	0.123345	97.343387
14	0.018094	30.61%	0.3061	2.132284	0.143569	0.3061	28.596576	0.010705	0.132863	97.037258
15	0.019347	30.61%	0.3061	2.250785	0.136010	0.3061	28.596576	0.010705	0.125305	96.731129
16	0.020529	30.61%	0.3061	2.375872	0.128849	0.3061	28.596576	0.010705	0.118144	96.425000
17	0.021815	35.35%	0.3535	2.507910	0.140973	0.3535	28.596576	0.012363	0.128610	96.071452
18	0.023027	35.35%	0.3535	2.647286	0.133551	0.3535	28.596576	0.012363	0.121188	95.717903
19	0.024168	35.35%	0.3535	2.794408	0.126520	0.3535	28.596576	0.012363	0.114157	95.364355
20	0.025386	40.06%	0.4006	2.949706	0.135804	0.4006	28.596576	0.014008	0.121796	94.963774
21	0.026548	40.58%	0.4058	3.113635	0.130332	0.4058	28.596576	0.014191	0.116141	94.557968
22	0.027640	40.58%	0.4058	3.286674	0.123470	0.4058	28.596576	0.014191	0.109280	94.152161
23	0.028787	45.28%	0.4528	3.469329	0.130508	0.4528	28.596576	0.015833	0.114675	93.699387
24	0.029893	46.45%	0.4645	3.662136	0.126843	0.4645	28.596576	0.016244	0.110599	93.234871
25	0.030932	46.45%	0.4645	3.865658	0.120165	0.4645	28.596576	0.016244	0.103921	92.770355
26	0.032004	50.99%	0.5099	4.080490	0.124961	0.5099	28.596576	0.017831	0.107130	92.260452
27	0.033048	52.94%	0.5294	4.307262	0.122898	0.5294	28.596576	0.018511	0.104387	91.731097
28	0.034027	52.94%	0.5294	4.546636	0.116428	0.5294	28.596576	0.018511	0.097917	91.201742
29	0.035019	57.23%	0.5723	4.799314	0.119251	0.5723	28.596576	0.020014	0.099237	90.629419
30	0.035995	60.10%	0.6010	5.066034	0.118627	0.6010	28.596576	0.021015	0.097611	90.028452
31	0.036909	60.10%	0.6010	5.347577	0.112381	0.6010	28.596576	0.021015	0.091366	89.427484
32	0.037819	64.03%	0.6403	5.644766	0.113437	0.6403	28.596576	0.022392	0.091045	88.787161
33	0.038722	67.97%	0.6797	5.958472	0.114069	0.6797	28.596576	0.023768	0.090301	88.107484
34	0.039565	67.97%	0.6797	6.289612	0.108063	0.6797	28.596576	0.023768	0.084296	87.427806
35	0.040391	71.40%	0.7140	6.639154	0.107544	0.7140	28.596576	0.024968	0.082576	86.713806
36	0.041216	76.55%	0.7655	7.008123	0.109228	0.7655	28.596576	0.026768	0.082460	85.948323
37	0.041983	76.55%	0.7655	7.397596	0.103477	0.7655	28.596576	0.026768	0.076709	85.182839
38	0.042721	79.35%	0.7935	7.808715	0.101611	0.7935	28.596576	0.027746	0.073865	84.389387
39	0.043463	85.87%	0.8587	8.242681	0.104178	0.8587	28.596576	0.030028	0.074150	83.530677
40	0.044150	85.87%	0.8587	8.700765	0.098694	0.8587	28.596576	0.030028	0.068665	82.671968
41	0.044799	87.88%	0.8788	9.184307	0.095689	0.8788	28.596576	0.030732	0.064957	81.793129
42	0.045453	95.94%	0.9594	9.694721	0.098956	0.9594	28.596576	0.033548	0.065409	80.833774
43	0.046055	95.94%	0.9594	10.233501	0.093746	0.9594	28.596576	0.033548	0.060199	79.874419
44	0.046614	97.00%	0.9700	10.802224	0.089796	0.9700	28.596576	0.033920	0.055876	78.904419
45	0.047176	106.58%	1.0658	11.402554	0.093471	1.0658	28.596576	0.037270	0.056200	77.838613
46	0.047689	106.58%	1.0658	12.036246	0.088550	1.0658	28.596576	0.037270	0.051279	76.772806
47	0.048155	106.58%	1.0658	12.705156	0.083888	1.0658	28.596576	0.037270	0.046617	75.707000
48	0.048621	117.74%	1.1774	13.411240	0.087793	1.1774	28.596576	0.041173	0.046620	74.529581
49	0.049041	117.74%	1.1774	14.156564	0.083171	1.1774	28.596576	0.041173	0.041998	73.352161
50	0.049417	117.74%	1.1774	14.943310	0.078792	1.1774	28.596576	0.041173	0.037619	72.174742

PacifiCorp
California Marginal Cost Study - NCO Method
Present Value of Cost of Dispersion Factor
Iowa Curve R2.0 & 62 Year Average Life
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	A	B	C	D	E	F	G	H	I	J
YEAR	PVCD	% RENEWED	NUM1	DEM1	NUM1/DEM1	NUM2	DEM2	NUM2/DEM2	INSTANCE	Iowa R3.0
	((A) {yr-1} +(I)) / 100	((J)-(J,{yr+1})) * 100	(B)	1.0556 ^Year	(C) / (D)	(B)	1.0556 ^62	(F) / (G)	(E) - (H)	(Given)
51	0.049781	127.99%	1.2799	15.773779	0.081141	1.2799	28.596576	0.044757	0.036384	70.894839
52	0.050105	129.13%	1.2913	16.650400	0.077553	1.2913	28.596576	0.045155	0.032398	69.603548
53	0.050388	129.13%	1.2913	17.575740	0.073470	1.2913	28.596576	0.045155	0.028315	68.312258
54	0.050650	138.19%	1.3819	18.552505	0.074484	1.3819	28.596576	0.048323	0.026161	66.930387
55	0.050876	140.45%	1.4045	19.583553	0.071719	1.4045	28.596576	0.049115	0.022604	65.525871
56	0.051064	140.45%	1.4045	20.671901	0.067943	1.4045	28.596576	0.049115	0.018828	64.121355
57	0.051225	147.99%	1.4799	21.820734	0.067822	1.4799	28.596576	0.051752	0.016070	62.641419
58	0.051353	151.23%	1.5123	23.033413	0.065655	1.5123	28.596576	0.052882	0.012772	61.129161
59	0.051446	151.23%	1.5123	24.313486	0.062198	1.5123	28.596576	0.052882	0.009316	59.616903
60	0.051509	157.01%	1.5701	25.664698	0.061179	1.5701	28.596576	0.054906	0.006272	58.046774
61	0.051540	160.87%	1.6087	27.091004	0.059382	1.6087	28.596576	0.056255	0.003126	56.438065
62	0.051540	160.87%	1.6087	28.596576	0.056255	1.6087	28.596576	0.056255	0.000000	54.829355
63	0.051509	164.81%	1.6481	30.185820	0.054597	1.6481	28.596576	0.057632	-0.003034	53.181290
64	0.051449	168.74%	1.6874	31.863385	0.052958	1.6874	28.596576	0.059008	-0.006050	51.493871
65	0.051361	168.74%	1.6874	33.634180	0.050170	1.6874	28.596576	0.059008	-0.008838	49.806452
66	0.051244	170.90%	1.7090	35.503387	0.048135	1.7090	28.596576	0.059761	-0.011626	48.097484
67	0.051100	174.13%	1.7413	37.476474	0.046464	1.7413	28.596576	0.060892	-0.014428	46.356194
68	0.050931	174.13%	1.7413	39.559214	0.044017	1.7413	28.596576	0.060892	-0.016874	44.614903
69	0.050739	174.79%	1.7479	41.757702	0.041857	1.7479	28.596576	0.061122	-0.019264	42.867032
70	0.050522	176.32%	1.7632	44.078370	0.040002	1.7632	28.596576	0.061659	-0.021657	41.103806
71	0.050284	176.32%	1.7632	46.528008	0.037896	1.7632	28.596576	0.061659	-0.023763	39.340581
72	0.050027	176.02%	1.7602	49.113784	0.035839	1.7602	28.596576	0.061553	-0.025714	37.580387
73	0.049753	174.81%	1.7481	51.843264	0.033718	1.7481	28.596576	0.061128	-0.027410	35.832323
74	0.049461	174.81%	1.7481	54.724433	0.031943	1.7481	28.596576	0.061128	-0.029185	34.084258
75	0.049154	174.25%	1.7425	57.765722	0.030164	1.7425	28.596576	0.060932	-0.030768	32.341806
76	0.048839	169.19%	1.6919	60.976030	0.027748	1.6919	28.596576	0.059166	-0.031418	30.649871
77	0.048511	169.19%	1.6919	64.364749	0.026287	1.6919	28.596576	0.059166	-0.032879	28.957935
78	0.048168	169.19%	1.6919	67.941795	0.024903	1.6919	28.596576	0.059166	-0.034263	27.266000
79	0.047833	159.58%	1.5958	71.717634	0.022251	1.5958	28.596576	0.055804	-0.033553	25.670194
80	0.047485	159.58%	1.5958	75.703313	0.021080	1.5958	28.596576	0.055804	-0.034724	24.074387
81	0.047127	159.58%	1.5958	79.910496	0.019970	1.5958	28.596576	0.055804	-0.035834	22.478581
82	0.046786	147.68%	1.4768	84.351490	0.017507	1.4768	28.596576	0.051642	-0.034134	21.001806
83	0.046438	146.35%	1.4635	89.039292	0.016437	1.4635	28.596576	0.051179	-0.034742	19.538258
84	0.046082	146.35%	1.4635	93.987616	0.015572	1.4635	28.596576	0.051179	-0.035607	18.074710
85	0.045750	133.53%	1.3353	99.210941	0.013459	1.3353	28.596576	0.046694	-0.033235	16.739419
86	0.045418	130.32%	1.3032	104.724550	0.012444	1.3032	28.596576	0.045573	-0.033128	15.436194
87	0.045081	130.32%	1.3032	110.544577	0.011789	1.3032	28.596576	0.045573	-0.033784	14.132968
88	0.044769	117.90%	1.1790	116.688049	0.010104	1.1790	28.596576	0.041230	-0.031126	12.953935
89	0.044467	112.58%	1.1258	123.172941	0.009140	1.1258	28.596576	0.039369	-0.030229	11.828129
90	0.044160	112.58%	1.1258	130.018230	0.008659	1.1258	28.596576	0.039369	-0.030710	10.702323
91	0.043879	101.61%	1.0161	137.243942	0.007403	1.0161	28.596576	0.035531	-0.028128	9.686258
92	0.043614	94.29%	0.9429	144.871221	0.006509	0.9429	28.596576	0.032973	-0.026464	8.743355
93	0.043346	94.29%	0.9429	152.922383	0.006166	0.9429	28.596576	0.032973	-0.026807	7.800452
94	0.043100	85.34%	0.8534	161.420985	0.005287	0.8534	28.596576	0.029842	-0.024556	6.947065
95	0.042878	76.39%	0.7639	170.391894	0.004483	0.7639	28.596576	0.026712	-0.022229	6.183194
96	0.042654	76.39%	0.7639	179.861357	0.004247	0.7639	28.596576	0.026712	-0.022465	5.419323
97	0.042447	69.66%	0.6966	189.857082	0.003669	0.6966	28.596576	0.024361	-0.020692	4.722677
98	0.042268	59.58%	0.5958	200.408316	0.002973	0.5958	28.596576	0.020835	-0.017862	4.126871
99	0.042088	59.58%	0.5958	211.545930	0.002816	0.5958	28.596576	0.020835	-0.018018	3.531065
100	0.041920	54.92%	0.5492	223.302513	0.002459	0.5492	28.596576	0.019204	-0.016744	2.981903
101	0.041785	44.03%	0.4403	235.712463	0.001868	0.4403	28.596576	0.015398	-0.013530	2.541581
102	0.041649	44.03%	0.4403	248.812092	0.001770	0.4403	28.596576	0.015398	-0.013628	2.101258
103	0.041520	41.21%	0.4121	262.639727	0.001569	0.4121	28.596576	0.014410	-0.012841	1.689194
104	0.041427	29.90%	0.2990	277.235828	0.001079	0.2990	28.596576	0.010457	-0.009378	1.390161
105	0.041332	29.90%	0.2990	292.643101	0.001022	0.2990	28.596576	0.010457	-0.009435	1.091129
106	0.041241	28.66%	0.2866	308.906628	0.000928	0.2866	28.596576	0.010023	-0.009095	0.804516
107	0.041186	17.48%	0.1748	326.073994	0.000536	0.1748	28.596576	0.006114	-0.005578	0.629677
108	0.041129	17.48%	0.1748	344.195429	0.000508	0.1748	28.596576	0.006114	-0.005606	0.454839
109	0.041073	17.48%	0.1748	363.323956	0.000481	0.1748	28.596576	0.006114	-0.005633	0.280000
110	0.041049	7.55%	0.0755	383.515544	0.000197	0.0755	28.596576	0.002640	-0.002443	0.204516
111	0.041024	7.55%	0.0755	404.829272	0.000186	0.0755	28.596576	0.002640	-0.002453	0.129032
112	0.041000	7.55%	0.0755	427.327501	0.000177	0.0755	28.596576	0.002640	-0.002463	0.053548
113	0.040993	2.09%	0.0209	451.076061	0.000046	0.0209	28.596576	0.000731	-0.000685	0.032645
114	0.040988	1.48%	0.0148	476.144438	0.000031	0.0148	28.596576	0.000519	-0.000488	0.017806
115	0.040983	1.48%	0.0148	502.605980	0.000030	0.0148	28.596576	0.000519	-0.000489	0.002968
116	0.040982	0.30%	0.0030	530.538112	0.000006	0.0030	28.596576	0.000104	-0.000098	0.000000

Charge 5

PacifiCorp
California Marginal Cost Study - NCO Method
Present Value of Cost of Dispersion Factor
Iowa Curve R2.0 & 54 Year Average Life
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Real Cost of Capital	5.56%

	A	B	C	D	E	F	G	H	I	J
YEAR	PVCD	% RENEWED	NUM1	DEM1	NUM1/DEM1	NUM2	DEM2	NUM2/DEM2	INSTANCE	Iowa R2.0
	((A){yr-1} +(I)) / 100	((J)-(J,{yr+1})) * 100	(B)	1.0556 ^Year	(C) / (D)	(B)	1.0556 ^54	(F) / (G)	(E) - (H)	(Given)
										100.0000
1	0.000841	9.41%	0.0941	1.055575	0.089121	0.0941	18.552505	0.005071	0.084051	99.9059
2	0.002428	18.81%	0.1881	1.114238	0.168858	0.1881	18.552505	0.010141	0.158717	99.7178
3	0.003926	18.81%	0.1881	1.176161	0.159968	0.1881	18.552505	0.010141	0.149827	99.5296
4	0.005540	21.48%	0.2148	1.241526	0.173025	0.2148	18.552505	0.011579	0.161446	99.3148
5	0.007111	22.15%	0.2215	1.310523	0.169002	0.2215	18.552505	0.011938	0.157064	99.0933
6	0.008618	22.53%	0.2253	1.383355	0.162889	0.2253	18.552505	0.012146	0.150743	98.8680
7	0.010259	26.00%	0.2600	1.460234	0.178054	0.2600	18.552505	0.014014	0.164039	98.6080
8	0.011806	26.00%	0.2600	1.541386	0.168679	0.2600	18.552505	0.014014	0.154665	98.3480
9	0.013360	27.72%	0.2772	1.627048	0.170361	0.2772	18.552505	0.014941	0.155420	98.0708
10	0.014960	30.30%	0.3030	1.717471	0.176401	0.3030	18.552505	0.016330	0.160071	97.7679
11	0.016468	30.30%	0.3030	1.812919	0.167113	0.3030	18.552505	0.016330	0.150783	97.4649
12	0.018047	33.69%	0.3369	1.913671	0.176063	0.3369	18.552505	0.018161	0.157902	97.1280
13	0.019598	35.15%	0.3515	2.020022	0.173999	0.3515	18.552505	0.018945	0.155054	96.7765
14	0.021057	35.15%	0.3515	2.132284	0.164838	0.3515	18.552505	0.018945	0.145893	96.4250
15	0.022641	40.59%	0.4059	2.250785	0.180349	0.4059	18.552505	0.021880	0.158469	96.0191
16	0.024131	40.59%	0.4059	2.375872	0.170853	0.4059	18.552505	0.021880	0.148974	95.6131
17	0.025593	42.39%	0.4239	2.507910	0.169036	0.4239	18.552505	0.022850	0.146185	95.1892
18	0.027102	46.59%	0.4659	2.647286	0.176001	0.4659	18.552505	0.025114	0.150887	94.7233
19	0.028518	46.59%	0.4659	2.794408	0.166735	0.4659	18.552505	0.025114	0.141621	94.2574
20	0.029962	50.64%	0.5064	2.949706	0.171668	0.5064	18.552505	0.027294	0.144374	93.7510
21	0.031387	53.33%	0.5333	3.113635	0.171290	0.5333	18.552505	0.028747	0.142542	93.2177
22	0.032723	53.33%	0.5333	3.286674	0.162271	0.5333	18.552505	0.028747	0.133524	92.6843
23	0.034129	60.03%	0.6003	3.469329	0.173040	0.6003	18.552505	0.032359	0.140682	92.0840
24	0.035461	60.78%	0.6078	3.662136	0.165963	0.6078	18.552505	0.032760	0.133203	91.4762
25	0.036740	62.42%	0.6242	3.865658	0.161479	0.6242	18.552505	0.033646	0.127833	90.8520
26	0.038059	69.00%	0.6900	4.080490	0.169097	0.6900	18.552505	0.037192	0.131906	90.1620
27	0.039289	69.00%	0.6900	4.307262	0.160195	0.6900	18.552505	0.037192	0.123003	89.4720
28	0.040509	73.52%	0.7352	4.546636	0.161699	0.7352	18.552505	0.039627	0.122071	88.7368
29	0.041715	78.04%	0.7804	4.799314	0.162600	0.7804	18.552505	0.042063	0.120538	87.9564
30	0.042835	78.04%	0.7804	5.066034	0.154040	0.7804	18.552505	0.042063	0.111977	87.1761
31	0.043978	85.92%	0.8592	5.347577	0.160668	0.8592	18.552505	0.046311	0.114357	86.3169
32	0.045061	87.89%	0.8789	5.644766	0.155700	0.8789	18.552505	0.047373	0.108327	85.4380
33	0.046075	88.96%	0.8896	5.958472	0.149299	0.8896	18.552505	0.047950	0.101349	84.5484
34	0.047111	98.59%	0.9859	6.289612	0.156755	0.9859	18.552505	0.053142	0.103612	83.5625
35	0.048065	98.59%	0.9859	6.639154	0.148502	0.9859	18.552505	0.053142	0.095359	82.5766
36	0.048981	103.21%	1.0321	7.008123	0.147279	1.0321	18.552505	0.055634	0.091645	81.5444
37	0.049876	110.15%	1.1015	7.397596	0.148897	1.1015	18.552505	0.059371	0.089526	80.4429
38	0.050693	110.15%	1.1015	7.808715	0.141058	1.1015	18.552505	0.059371	0.081687	79.3414
39	0.051494	118.70%	1.1870	8.242681	0.144011	1.1870	18.552505	0.063983	0.080028	78.1544
40	0.052240	122.37%	1.2237	8.700765	0.140643	1.2237	18.552505	0.065959	0.074684	76.9307
41	0.052913	122.37%	1.2237	9.184307	0.133239	1.2237	18.552505	0.065959	0.067280	75.7070
42	0.053579	135.19%	1.3519	9.694721	0.139442	1.3519	18.552505	0.072866	0.066576	74.3551
43	0.054171	135.19%	1.3519	10.233501	0.132101	1.3519	18.552505	0.072866	0.059234	73.0033
44	0.054709	139.11%	1.3911	10.802224	0.128777	1.3911	18.552505	0.074980	0.053796	71.6122
45	0.055210	148.26%	1.4826	11.402554	0.130023	1.4826	18.552505	0.079913	0.050110	70.1296
46	0.055643	148.26%	1.4826	12.036246	0.123177	1.4826	18.552505	0.079913	0.043264	68.6470
47	0.056030	156.06%	1.5606	12.705156	0.122831	1.5606	18.552505	0.084118	0.038714	67.0864
48	0.056363	161.26%	1.6126	13.411240	0.120242	1.6126	18.552505	0.086920	0.033321	65.4739
49	0.056633	161.26%	1.6126	14.156564	0.113911	1.6126	18.552505	0.086920	0.026991	63.8613
50	0.056858	172.39%	1.7239	14.943310	0.115364	1.7239	18.552505	0.092921	0.022443	62.1373

PacifiCorp
California Marginal Cost Study - NCO Method
Present Value of Cost of Dispersion Factor
Iowa Curve R2.0 & 54 Year Average Life
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Real Cost of Capital	5.56%

	A	B	C	D	E	F	G	H	I	J
YEAR	PVCD	% RENEWED	NUM1	DEM1	NUM1/DEM1	NUM2	DEM2	NUM2/DEM2	INSTANCE	Iowa R2.0
	((A){yr-1} +(I)) / 100	((J)-(J,{yr+1})) * 100	(B)	1.0556 ^Year	(C) / (D)	(B)	1.0556 ^54	(F) / (G)	(E) - (H)	(Given)
51	0.057023	173.63%	1.7363	15.773779	0.110075	1.7363	18.552505	0.093588	0.016487	60.401037
52	0.057131	175.84%	1.7584	16.650400	0.105610	1.7584	18.552505	0.094782	0.010828	58.642593
53	0.057186	184.70%	1.8470	17.575740	0.105090	1.8470	18.552505	0.099557	0.005533	56.795556
54	0.057186	184.70%	1.8470	18.552505	0.099557	1.8470	18.552505	0.099557	0.000000	54.948519
55	0.057132	189.22%	1.8922	19.583553	0.096623	1.8922	18.552505	0.101993	-0.005370	53.056296
56	0.057025	193.74%	1.9374	20.671901	0.093722	1.9374	18.552505	0.104428	-0.010707	51.118889
57	0.056869	193.74%	1.9374	21.820734	0.088787	1.9374	18.552505	0.104428	-0.015641	49.181481
58	0.056661	198.69%	1.9869	23.033413	0.086261	1.9869	18.552505	0.107095	-0.020834	47.194593
59	0.056405	199.93%	1.9993	24.313486	0.082228	1.9993	18.552505	0.107762	-0.025534	45.195333
60	0.056106	200.18%	2.0018	25.664698	0.077997	2.0018	18.552505	0.107898	-0.029901	43.193556
61	0.055762	202.44%	2.0244	27.091004	0.074728	2.0244	18.552505	0.109120	-0.034392	41.169111
62	0.055379	202.44%	2.0244	28.596576	0.070793	2.0244	18.552505	0.109120	-0.038326	39.144667
63	0.054960	201.75%	2.0175	30.185820	0.066835	2.0175	18.552505	0.108744	-0.041909	37.127185
64	0.054508	200.70%	2.0070	31.863385	0.062989	2.0070	18.552505	0.108181	-0.045193	35.120148
65	0.054023	200.70%	2.0070	33.634180	0.059673	2.0070	18.552505	0.108181	-0.048509	33.113111
66	0.053518	196.19%	1.9619	35.503387	0.055260	1.9619	18.552505	0.105750	-0.050490	31.151185
67	0.052989	194.26%	1.9426	37.476474	0.051835	1.9426	18.552505	0.104708	-0.052873	29.208593
68	0.052433	194.26%	1.9426	39.559214	0.049106	1.9426	18.552505	0.104708	-0.055602	27.266000
69	0.051885	183.22%	1.8322	41.757702	0.043877	1.8322	18.552505	0.098759	-0.054881	25.433778
70	0.051313	183.22%	1.8322	44.078370	0.041567	1.8322	18.552505	0.098759	-0.057191	23.601556
71	0.050734	178.67%	1.7867	46.528008	0.038400	1.7867	18.552505	0.096303	-0.057903	21.814889
72	0.050170	168.04%	1.6804	49.113784	0.034214	1.6804	18.552505	0.090574	-0.056360	20.134519
73	0.049588	168.04%	1.6804	51.843264	0.032413	1.6804	18.552505	0.090574	-0.058161	18.454148
74	0.049029	156.99%	1.5699	54.724433	0.028688	1.5699	18.552505	0.084621	-0.055933	16.884222
75	0.048482	149.63%	1.4963	57.765722	0.025903	1.4963	18.552505	0.080652	-0.054749	15.387926
76	0.047920	149.63%	1.4963	60.976030	0.024539	1.4963	18.552505	0.080652	-0.056113	13.891630
77	0.047417	131.30%	1.3130	64.364749	0.020399	1.3130	18.552505	0.070770	-0.050371	12.578667
78	0.046910	129.26%	1.2926	67.941795	0.019025	1.2926	18.552505	0.069672	-0.050647	11.286074
79	0.046411	125.06%	1.2506	71.717634	0.017438	1.2506	18.552505	0.067408	-0.049971	10.035481
80	0.045970	108.26%	1.0826	75.703313	0.014300	1.0826	18.552505	0.058353	-0.044052	8.952889
81	0.045522	108.26%	1.0826	79.910496	0.013548	1.0826	18.552505	0.058353	-0.044805	7.870296
82	0.045110	97.98%	0.9798	84.351490	0.011616	0.9798	18.552505	0.052813	-0.041197	6.890481
83	0.044736	87.70%	0.8770	89.039292	0.009850	0.8770	18.552505	0.047273	-0.037423	6.013444
84	0.044356	87.70%	0.8770	93.987616	0.009331	0.8770	18.552505	0.047273	-0.037942	5.136407
85	0.044040	72.27%	0.7227	99.210941	0.007284	0.7227	18.552505	0.038953	-0.031668	4.413741
86	0.043736	68.41%	0.6841	104.724550	0.006532	0.6841	18.552505	0.036872	-0.030340	3.729667
87	0.043437	66.62%	0.6662	110.544577	0.006027	0.6662	18.552505	0.035910	-0.029883	3.063444
88	0.043208	50.56%	0.5056	116.688049	0.004333	0.5056	18.552505	0.027250	-0.022917	2.557889
89	0.042977	50.56%	0.5056	123.172941	0.004104	0.5056	18.552505	0.027250	-0.023146	2.052333
90	0.042773	44.07%	0.4407	130.018230	0.003389	0.4407	18.552505	0.023752	-0.020363	1.611667
91	0.042613	34.33%	0.3433	137.243942	0.002502	0.3433	18.552505	0.018506	-0.016004	1.268333
92	0.042452	34.33%	0.3433	144.871221	0.002370	0.3433	18.552505	0.018506	-0.016136	0.925000
93	0.042336	24.35%	0.2435	152.922383	0.001592	0.2435	18.552505	0.013126	-0.011533	0.681481
94	0.042241	20.07%	0.2007	161.420985	0.001244	0.2007	18.552505	0.010820	-0.009577	0.480741
95	0.042144	20.07%	0.2007	170.391894	0.001178	0.2007	18.552505	0.010820	-0.009642	0.280000
96	0.042102	8.67%	0.0867	179.861357	0.000482	0.0867	18.552505	0.004671	-0.004190	0.193333
97	0.042060	8.67%	0.0867	189.857082	0.000456	0.0867	18.552505	0.004671	-0.004215	0.106667
98	0.042028	6.58%	0.0658	200.408316	0.000328	0.0658	18.552505	0.003545	-0.003217	0.040889
99	0.042020	1.70%	0.0170	211.545930	0.000081	0.0170	18.552505	0.000918	-0.000838	0.023852
100	0.042011	1.70%	0.0170	223.302513	0.000076	0.0170	18.552505	0.000918	-0.000842	0.006815
101	0.042008	0.68%	0.0068	235.712463	0.000029	0.0068	18.552505	0.000367	-0.000338	0.000000
102	0.042008	0.00%	0.0000	248.812092	0.000000	0.0000	18.552505	0.000000	0.000000	0.000000
103	0.042008	0.00%	0.0000	262.639727	0.000000	0.0000	18.552505	0.000000	0.000000	0.000000
104	0.042008	0.00%	0.0000	277.235828	0.000000	0.0000	18.552505	0.000000	0.000000	0.000000
105	0.042008	0.00%	0.0000	292.643101	0.000000	0.0000	18.552505	0.000000	0.000000	0.000000
106	0.042008	0.00%	0.0000	308.906628	0.000000	0.0000	18.552505	0.000000	0.000000	0.000000
107	0.042008	0.00%	0.0000	326.073994	0.000000	0.0000	18.552505	0.000000	0.000000	0.000000
108	0.042008	0.00%	0.0000	344.195429	0.000000	0.0000	18.552505	0.000000	0.000000	0.000000
109	0.042008	0.00%	0.0000	363.323956	0.000000	0.0000	18.552505	0.000000	0.000000	0.000000
110	0.042008	0.00%	0.0000	383.515544	0.000000	0.0000	18.552505	0.000000	0.000000	0.000000
111	0.042008	0.00%	0.0000	404.829272	0.000000	0.0000	18.552505	0.000000	0.000000	0.000000
112	0.042008	0.00%	0.0000	427.327501	0.000000	0.0000	18.552505	0.000000	0.000000	0.000000
113	0.042008	0.00%	0.0000	451.076061	0.000000	0.0000	18.552505	0.000000	0.000000	0.000000
114	0.042008	0.00%	0.0000	476.144438	0.000000	0.0000	18.552505	0.000000	0.000000	0.000000

State of California

Marginal Cost of Service Study

Exhibit PAC/1202

Period Ending December 2019

Losses

PacifiCorp
California Marginal Cost Study - NCO Method
12 Months Ended December 2019
Loss Factors

Line	Voltage Level	Energy Loss Factor	Loss Percent	Demand Loss Factor	Loss Percent
1	Transmission Line (>= 69 kV)	1.04527	4.53%	1.04259	4.26%
2	Primary Line (2.4 kV thru 34.5 kV)	1.07311	7.31%	1.08248	8.25%
3	Secondary Distribution (<= 600 Volts)	1.11433	11.43%	1.11990	11.99%

State of California

Marginal Cost of Service Study

Exhibit PAC/1202

Period Ending December 2019

Street Lighting

PacifiCorp
California Marginal Cost Study - NCO Method
Street & Outdoor Lighting
Full Marginal Cost by Schedule

			(A)	(B)	(C)	(D)	(F)
Line No.	Description	Units	LS-51	LS-53	OL-15	OL-42	LS-58
1	Energy $/kWh @ Generator	$/kWh	0.02102	0.02102	0.02102	0.02102	0.02102
2	Transmission Energy	$/kWh	0.00008	0.00008	0.00008	0.00008	0.00008
3	Transmission Energy $/kWh @ Meter	$/kWh	0.00009	0.00009	0.00009	0.00009	0.00009
4	Energy $/kWh @ Meter	$/kWh	0.02342	0.02342	0.02342	0.02342	0.02342
5	(1) x 1.1143 (Losses)						
6							
7	Energy @ Meter	kWh	845,623	1,138,821	913,538	154,197	52,440
8							
9	Generation Energy Related Marginal Costs		$19,807	$26,675	$21,398	$3,612	$1,228
10	Transmission Energy Related Marginal Costs		$79	$107	$86	$14	$5
11	Total Energy		$19,886	$26,781	$21,484	$3,626	$1,233
12							
13	Average Number of Customers	#	78	105	760	36	20
14	Commitment & Billing	$/Customer	$2,176.71	$145.86	$98.74	$144.71	$48.07
15	Commitment & Billing Related		$169,783	$15,316	$75,041	$5,209	$961
16							
17	Full Marginal Cost	$	$189,670	$42,097	$96,525	$8,836	$2,195

Source:
Pricing - Dec 2019 Forecasted Customer Data

PacifiCorp
California Marginal Cost Study - NCO Method
Street & Outdoor Lighting
Commitment Cost

Line No.	Description	(A) LS-51	(B) LS-53	(C) OL-15	(D) OL-42	(F) Based On LS-53 LS-58
1	Light Installation Cost (less transformer)	$2,120.40	N.A.	N.A.	N.A.	N.A.
2						
3	Distribution Costs					
4	Poles	$0.00	$0.00	$0.00	$0.00	$0.00
5	Conductors	$0.00	$0.00	$0.00	$0.00	$0.00
6	Transformers	$5.84	$69.42	$35.97	$50.62	$0.00
7	Meters	$0.00	$0.00	$0.00	$17.98	$0.00
8	Substations	$9.94	$9.94	$9.94	$9.94	$9.94
9	Dist O&M at 40.87% of Total Investment	$6.45	$32.43	$18.76	$32.10	$4.06
10						
11	Total Commitment Related	$22.23	$111.79	$64.67	$110.63	$14.00
12	sum of Lines 2 to 6					
13						
14	Billing Costs per Customer	$34.07	$34.07	$34.07	$34.07	$34.07
15						
16	Total Marginal Cost per Customer	$2,176.71	$145.86	$98.74	$144.71	$48.07
17	Sum of Lines 1,7, and 8.					

PacifiCorp
California Marginal Cost Study - NCO Method
Distribution Cost Development
For Street Lighting Service
Fully-Loaded Overheads
Schedule 51

[redacted]

PacifiCorp
California Marginal Cost Study - NCO Method
Cost of Streetlighting Transformer

Transformer Cost Per Light - 100 Watt H.P.S.V.

Assume Average use of 25 KVA Distribution Transformer
Assume Installed Cost 25 KVA Transformer is **$ 3,273.00**

Lamp Line Watts	=	117	watts
+ Ballast (Encasement) Loss	3.0%	3.51	
+ Circuit Loss	5.00%	5.85	
		126.36	

Transformer Cost = Total Watts/25,000 X Installed Cost

126.36 / 25000 X $3273 = **$ 16.54**

Transformer Cost Per Light - 150 Watt H.P.S.V.

Assume Average use of 25 KVA Distribution Transformer
Assume Installed Cost 25 KVA Transformer is **$ 3,273.00**

Lamp Line Watts	=	171	watts
+ Ballast (Encasement) Loss	3.0%	5.13	
+ Circuit Loss	5.00%	8.55	
		184.68	

Transformer Cost = Total Watts/25,000 X Installed Cost

184.68 / 25000 X $3273 = **$ 24.18**

Transformer Cost Per Light - 250 Watt H.P.S.V.

Assume Average use of 25 KVA Distribution Transformer
Assume Installed Cost 25 KVA Transformer is **$ 3,273.00**

Lamp Line Watts	=	305	watts
+ Ballast (Encasement) Loss	3.0%	9.15	
+ Circuit Loss	5.00%	15.25	
		329.4	

Transformer Cost = Total Watts/25,000 X Installed Cost

329.4 / 25000 X $3273 = **$ 43.13**

Transformer Cost Per Light - 400 Watt H.P.S.V.

Assume Average use of 25 KVA Distribution Transformer
Assume Installed Cost 25 KVA Transformer is **$ 3,273.00**

Lamp Line Watts	=	468	watts
+ Ballast (Encasement) Loss	3.0%	14.04	
+ Circuit Loss	5.00%	23.4	
		505.44	

Transformer Cost = Total Watts/25,000 X Installed Cost

505.44 / 25000 X $3273 = **$ 66.17**

Source:
2017 LED Streetlight Analysis

State of California

Marginal Cost of Service Study

Exhibit PAC/1202

Period Ending December 2019

Customer Data

PacifiCorp
California Marginal Cost Study - NCO Method
Customers and MWh's
12 Months Ended June 2017

		A	B	C	D	E	F	G
Line	Description	Del. Volt	Average Customers	% Total Class	Annual MWh's	% Total Class	Average Billing kW	% Total Class
	Residential							
1	Schedule D, DL-6, DS-8, DM-9	(sec)	35,575	100.0%	374,160	100.0%	363,455	100.0%
2								
3	General Service							
4	Sch A-25, 0-30 kW	(sec)	7,264	100.0%	57,783	100.0%	25,613	100.0%
5								
6	General Service							
7	Sch. A-32, 0-100kW	(sec)	907	92.4%	62,729	82.5%	27,184	82.5%
8	Sch. A-32, >100 kW	(sec)	74	7.6%	13,311	17.5%	5,769	17.5%
9	Total Sch. A-32		981	100.0%	76,040	100.0%	32,953	100.0%
10								
11	Large General Service							
12	Sch. A-36, 0-100kW	(sec)	133	67.4%	35,656	41.3%	9,286	47.0%
13	Sch. A-36, >100kW	(sec)	64	32.6%	50,712	58.7%	10,454	53.0%
14	Schedule A-36		198	100.0%	86,368	100.0%	19,740	100.0%
15								
16	Large Power Service -							
17	Sch AT-48, .5 - 4 MW	(sec)	17	89.5%	54,363	68.9%	13,669	75.0%
18	Sch AT-48, .5 - 4 MW	(pri)	2	10.5%	24,541	31.1%	4,562	25.0%
19	Schedule AT-48		19	100.0%	78,904	100.0%	18,231	100.0%
20								
21	Irrg - Schedule Sch PA-20	(sec)	2,010	100.0%	83,988	100.0%	51,197	100.0%
22								
23	TOTAL		46,047		757,243		511,189	

Source:
Pricing - June 2017 Customer data

PacifiCorp
California Marginal Cost Study - NCO Method
Customers and MWh's
12 Months Ended December 2019

		A	B	C	D	E	F	G
Line	Description	Del. Volt	Average Customers	% Total Class	Annual MWh's	% Total Class	Average Billing kW	% Total Class
	Residential							
1	Total Schedule D, DS-8, DM-9	(sec)	35,861	100.0%	369,550	100.0%	363,455	100.0%
2								
3	General Service							
4	Sch A-25, 0-30 kW	(sec)	7,131	100.0%	51,918	100.0%	25,613	100.0%
5								
6	General Service							
7	Sch. A-32, 0-100kW	(sec)	1,040	92.4%	55,366	82.5%	27,184	82.5%
8	Sch. A-32, >100 kW	(sec)	85	7.6%	11,749	17.5%	5,769	17.5%
9	Total Sch. A-32		1,125	100.0%	67,115	100.0%	32,953	100.0%
10								
11	Large General Service							
12	Sch. A-36, 0-100kW	(sec)	129	67.4%	33,071	41.3%	9,286	47.0%
13	Sch. A-36, >100kW	(sec)	62	32.6%	47,036	58.7%	10,454	53.0%
14	Schedule A-36		191	100.0%	80,107	100.0%	19,740	100.0%
15								
16	Large Power Service -							
17	Sch AT-48, .5 - 4 MW	(sec)	17	89.5%	56,064	68.9%	13,669	75.0%
18	Sch AT-48, .5 - 4 MW	(pri)	2	10.5%	25,309	31.1%	4,562	25.0%
19	Schedule AT-48		19	100.0%	81,373	100.0%	18,231	100.0%
20								
21	Irrg - Schedule Sch PA-20	(sec)	2,019	100.0%	94,293	100.0%	51,197	100.0%
22								
23	TOTAL		46,345		744,355		511,189	

Source:
Pricing - Dec 2019 Forecasted Customer Data

PacifiCorp
California Marginal Cost Study - NCO Method
Customer Class Split between
Three Phase / Single Phase
12 Months Ended December 2019

Line	Customer Class	A Voltage Level	B Three Phase	C Average Customers	D Three Phase % of Customers	E Single Phase % of Customers
					(A) / (B)	100% - (C)
1	Residential					
2	Schedule D, DL-6, DS-8, DM-9	(sec)	-	35,575	0.0000%	100.0000%
3						
4	General Service					
5	Sch A-25, 0-30 kW	(sec)	1,060	7,264	14.5874%	85.4126%
6						
7	General Service					
8	Sch. A-32, 0-100kW	(sec)	488	907	53.7881%	46.2119%
9	Sch. A-32, >100 kW	(sec)	69	74	93.2688%	6.7312%
10	Total Sch. A-32		557	981	56.7718%	43.2282%
11						
12	Large General Service					
13	Sch. A-36, 0-100kW	(sec)	120	133	89.8129%	10.1871%
14	Sch. A-36, >100kW	(sec)	63	64	98.4465%	1.5535%
15	Schedule A-36		183	198	92.6266%	7.3734%
16						
17	Large Power Service -					
18	Sch AT-48, .5 - 4 MW	(sec)	17	17	100.0000%	0.0000%
19	Sch AT-48, .5 - 4 MW	(pri)	2	2	100.0000%	0.0000%
20	Schedule AT-48		19	19	100.0000%	0.0000%
21						
22	Irrg - Schedule Sch PA-20	(sec)	1,878	2,010	93.4068%	6.5932%
23						
24	TOTAL		3,696	46,047	8.0275%	91.9725%

Sources:
Column C - Tab 16.1 (Cust Data 1:) `Customers and MWh's 12 Months Ended June 2017'

PacifiCorp
California Marginal Cost Study - NCO Method
Customer Loads
12 Months Ended June 2017 (Historical)

		A	B	C	D	E	F	G	H	I	J
Line	Description	Del. Volt	System Peak	Customer loads weighted by Loss of Load probability	Weighting factor	Weighted System Peak	Weighted Distribution Peak	Transformer Peak	Non-Coincident Peak	Customers Per Transformer	Coincidence Factor
1	Residential										
2	Schedule D, DL-6, DS-8, DM-9	(sec)	61	48	50%	54	78	254	363	3.00	0.70
3											
4	General Service										
5	Sch A-25, 0-30 kW	(sec)	8	7	50%	7	10	18	26	3.00	0.70
6	Sch. A-32, 0-100kW	(sec)	8	7	50%	8	10	27	27	1.00	1.00
7	Sch. A-32, >100 kW	(sec)	2	2	50%	2	2	6	6	1.00	1.00
8											
9	Large General Service										
10	Sch. A-36, 0-100kW	(sec)	5	5	50%	5	5	9	9	1.00	1.00
11	Sch. A-36, >100kW	(sec)	7	6	50%	6	8	10	10	1.00	1.00
12											
13	Large Power Service -										
14	Sch AT-48, .5 - 4 MW	(sec)	8	7	50%	7	8	14	14	1.00	1.00
15	Sch AT-48, .5 - 4 MW	(pri)	4	3	50%	3	3	0	5	0.00	0.00
16											
17	Irrg - Schedule Sch PA-20	(sec)	12	32	50%	22	3	51	51	1.00	1.00

Sources:
Columns B and H - Prepared by Load Research
Column F Distribution peaks weighted by substation peaks
Column J - Coincidence Factor from Distribution Construction Standard, DA411 (30 June 2016)

Cust Data 5

PacifiCorp
California Marginal Cost Study- NCO Method
Distribution Substations Monthly Peaks
12 months ended June 2017

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
													Peak	Peak
Substation	**Jul-16**	**Aug-16**	**Sep-16**	**Oct-16**	**Nov-16**	**Dec-16**	**Jan-17**	**Feb-17**	**Mar-17**	**Apr-17**	**May-17**	**Jun-17**	**Month**	**Load**
Alturas	16,247	9,962	9,513	7,592	8,052	11,895	16,962	17,771	10,076	8,492	7,634	9,745	Feb-17	17,771
Castella	438	405	386	359	435	489	476	383	382	378	356	402	Dec-16	489
Del Norte	26,551	30,001	28,921	30,342	39,011	43,925	48,399	44,637	43,280	36,491	33,076	27,095	Jan-17	48,399
Dorris	6,095	6,259	5,105	3,230	3,142	3,668	3,801	3,346	3,608	2,810	5,601	5,178	Aug-16	6,259
Greenhorn	10,030	9,783	7,302	7,516	9,130	10,660	13,491	10,439	9,953	8,221	7,581	9,025	Jan-17	13,491
Macdoel	13,432	13,560	11,278	4,540	1,507	1,731	1,578	1,760	1,726	3,596	13,839	11,785	May-17	13,839
Mount Shasta	6,496	6,197	4,648	5,509	6,686	8,201	8,930	7,586	7,181	6,712	5,108	7,823	Jan-17	8,930
North Dunsmuir	2,389	2,442	1,916	2,115	2,843	3,171	3,269	2,740	2,825	2,397	1,990	2,409	Jan-17	3,269
Weed	11,924	12,258	11,273	11,180	12,319	13,136	14,736	12,651	12,807	12,181	11,237	11,619	Jan-17	14,736
Yreka	8,860	8,682	8,342	10,097	11,859	13,917	16,876	14,099	12,992	10,695	9,989	10,257	Jan-17	16,876
													Total	
Substation peaks	-	6,259	-	-	-	489	105,701	17,771	-	-	13,839	-	144,059	
Weighting Factor	0.00%	4.34%	0.00%	0.00%	0.00%	0.34%	73.37%	12.34%	0.00%	0.00%	9.61%	0.00%	100%	

PacifiCorp
California Marginal Cost Study- NCO Method
Weighted Distribution Peaks
12 months ended June 2017

A	B	C	D	E	F	G	H	I	J	K	L	M	N
	Jul-16	**Aug-16**	**Sep-16**	**Oct-16**	**Nov-16**	**Dec-16**	**Jan-17**	**Feb-17**	**Mar-17**	**Apr-17**	**May-17**	**Jun-17**	**Sum of**
	28	**19**	**8**	**31**	**18**	**7**	**6**	**1**	**6**	**3**	**23**	**24**	**12 Wgt**
	17:00	**17:00**	**19:00**	**08:00**	**09:00**	**08:00**	**10:00**	**08:00**	**08:00**	**08:00**	**17:00**	**19:00**	**Dist peaks**
Residential													
Schedule D, DL-6, DS-8, DM-9	0	2,867	0	0	0	266	59,264	9,273	0	0	6,153	0	77,823
General Service													
Sch A-25, 0-30 kW	0	411	0	0	0	30	7,843	1,028	0	0	860	0	10,172
Sch. A-32, 0-100kW	0	383	0	0	0	30	7,624	1,101	0	0	852	0	9,990
Sch. A-32, >100 kW	0	81	0	0	0	6	1,618	234	0	0	181	0	2,120
Large General Service													
Sch. A-36, 0-100kW	0	236	0	0	0	18	4,083	618	0	0	522	0	5,478
Sch. A-36, >100kW	0	291	0	0	0	29	6,014	931	0	0	626	0	7,890
Large Power Service -													
Sch AT-48, .5 - 4 MW sec	0	339	0	0	0	30	5,952	1,041	0	0	756	0	8,117
Sch AT-48, .5 - 4 MW pri	0	137	0	0	0	13	2,536	475	0	0	316	0	3,476
Irrg - Schedule Sch PA-20	0	1,121	0	0	0	1	154	3	0	0	1,696	0	2,974

PacifiCorp
California Marginal Cost Study- NCO Method
Distribution Peaks @ Sales
12 months ended June 2017

A	B	C	D	E	F	G	H	I	J	K	L	M	N
	Jul-16	**Aug-16**	**Sep-16**	**Oct-16**	**Nov-16**	**Dec-16**	**Jan-17**	**Feb-17**	**Mar-17**	**Apr-17**	**May-17**	**Jun-17**	**Sum of**
	28	**19**	**8**	**31**	**18**	**7**	**6**	**1**	**6**	**3**	**23**	**24**	**12 Wgt**
	17:00	**17:00**	**19:00**	**08:00**	**09:00**	**08:00**	**10:00**	**08:00**	**08:00**	**08:00**	**17:00**	**19:00**	**Dist peaks**
Residential													
Schedule D, DL-6, DS-8, DM-9	75,098	65,996	52,673	49,834	67,885	78,219	80,770	75,173	80,560	66,896	64,053	75,524	832,681
General Service													
Sch A-25, 0-30 kW	10,025	9,461	6,513	7,807	8,644	8,722	10,689	8,331	8,214	7,001	8,956	6,772	101,135
Sch. A-32, 0-100kW	9,347	8,806	6,646	7,837	8,797	8,869	10,391	8,927	8,112	7,526	8,865	7,012	101,135
Sch. A-32, >100 kW	1,984	1,869	1,410	1,663	1,867	1,882	2,205	1,894	1,721	1,597	1,881	1,488	21,461
Large General Service													
Sch. A-36, 0-100kW	5,863	5,424	4,110	4,771	5,210	5,345	5,565	5,012	4,620	4,576	5,439	4,481	60,416
Sch. A-36, >100kW	7,154	6,702	5,468	6,578	7,458	8,441	8,196	7,543	6,965	6,852	6,518	5,397	83,272
Large Power Service -													
Sch AT-48, .5 - 4 MW sec	8,865	7,795	7,905	9,307	8,795	8,721	8,112	8,440	6,689	5,631	7,866	5,248	93,374
Sch AT-48, .5 - 4 MW pri	3,219	3,151	3,178	3,826	3,781	3,791	3,456	3,847	4,297	4,193	3,291	2,397	42,427
Irrg - Schedule Sch PA-20	30,602	25,790	22,762	5,698	819	296	210	22	108	7,175	17,656	35,861	146,999

PacifiCorp
California Marginal Cost Study - NCO Method
Allocation of Uncollectible Expenses between Schedules
12 Months Ended December 2019

	(A)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
		Revenues 2019		Percent of Total Revenues		Allocated Net Uncollectible		
Line	Description	Commercial	Industrial	Commercial	Industrial	Commercial	Industrial	Total
1	**Residential**	0	0	0.00%	0.00%	$0	$0	$416,016
2								
3	**GS - Schedule 25**	8,791,831	111,434	29.87%	1.89%	$547	$0	$547
4	**GS - Schedule 32**	9,165,285	371,501	31.14%	6.29%	$570	$0	$570
5	**LGS - Schedule 36**	8,332,460	938,774	28.31%	15.89%	$518	$0	$518
6	**LPS - Schedule 48**	3,140,980	4,486,293	10.67%	75.94%	$195	$0	$195
7		29,430,556	5,908,002	100.00%	100.00%	$1,831	$0	$1,831
8								
9	**Irrigation - Schedule 20**	$0	$12,643,546	0.00%	100.00%	$0	$64,611	$64,611
10								
11	**Total**	$29,430,556	$18,551,548			$1,831	$64,611	$482,457

Source:
Columns C & D - Pricing Dept.
Writeoffs - Corporate Accounting

12 Months Ended June 2017 Total Write-offs	
Residential	416,016
Commercial	1,831
Industrial	0
Irrigation	64,611

PacifiCorp
California Marginal Cost Study - NCO Method
New Customer Connections
12 Months Ended June 2017

Line	Description	A Del. Volt	B New Customer Connections 2012-2016	C % Total Class
	Residential			
1	Total Schedule D, DS-8, DM-9, DL-6	(sec)	654	100.0%
2				
3	General Service			
4	Sch A-25, 0-30 kW	(sec)	343	100.0%
5				
6	General Service			
7	Sch. A-32, 0-100kW	(sec)	61	92.4%
8	Sch. A-32, >100 kW	(sec)	5	7.6%
9	Total Sch. A-32		66	100.0%
10				
11	Large General Service			
12	Sch. A-36, 0-100kW	(sec)	3	67.4%
13	Sch. A-36, >100kW	(sec)	2	32.6%
14	Schedule A-36		5	100.0%
15				
16	Large Power Service -			
17	Sch AT-48, .5 - 4 MW	(sec)	1	89.5%
18	Sch AT-48, .5 - 4 MW	(pri)	0	10.5%
19	Schedule AT-48		1	100.0%
20				
21	Irrg - Schedule Sch PA-20	(sec)	81	100.0%
22				
23	Streetlighting			
24	Schedule LS-51		3	
25				
26	Schedule LS-53		8	
27				
28	Schedule OL-15		4	
29				
30	Schedule OL-42		0	
31				
32	Schedule LS-58		0	
	TOTAL		1,165	