

Exh. RMM-15
Docket UE-19____
Witness: Robert M. Meredith

**BEFORE THE WASHINGTON
UTILITIES AND TRANSPORTATION COMMISSION**

WASHINGTON UTILITIES AND
TRANSPORTATION COMMISSION,

Complainant,

v.

PACIFICORP dba
PACIFIC POWER & LIGHT COMPANY

Respondent.

Docket UE-19____

**PACIFICORP
EXHIBIT OF ROBERT M. MEREDITH**

Street and Area Light Cost Study

December 2019

**PacifiCorp
Streetlighting Installation Costs**

Descriptions	Light Type	LED Street Lights					Decorative LED Street Lights	LED Area Lights		
		Level 1 (0-3,500 LED Equivalent Lumens)	Level 2 (3,501-5,500 LED Equivalent Lumens)	Level 3 (5,500-8,000 LED Equivalent Lumens)	Level 4 (8,001-12,000 LED Equivalent Lumens)	Level 5 (12,001-15,500 LED Equivalent Lumens)		Level 6 (15,501 and Greater LED Equivalent Lumens)	Level 1 (0-5,500 LED Equivalent Lumens)	Level 2 (5,501-12,000 LED Equivalent Lumens)
Installation Cost		\$969.94	\$1,035.60	\$1,040.07	\$1,049.54	\$1,107.58	\$1,347.79	\$846.30	\$841.52	\$1,092.52
Annualization @ 8.89%		\$86.23	\$92.06	\$92.46	\$93.30	\$98.46	\$119.82	\$75.24	\$83.70	\$97.12
Average Monthly Revenue Requirement		\$7.19	\$7.67	\$7.71	\$7.78	\$8.21	\$9.98	\$6.27	\$6.98	\$8.09

PacifiCorp
Company-Owned Lighting Maintenance Costs

Descriptions	Light Type	LED Street Lights				Decorative LED Street Lights				LED Area Lights			
		Level 1 (0-3,500 LED Equivalent Lumens)	Level 2 (3,500-5,500 LED Equivalent Lumens)	Level 3 (5,500-8,000 LED Equivalent Lumens)	Level 4 (8,000-12,000 LED Equivalent Lumens)	Level 5 (12,000-15,500 LED Equivalent Lumens)	Level 6 (15,500-20,000 LED Equivalent Lumens)	Level 7 (20,000-30,000 LED Equivalent Lumens)	Level 8 (30,000-40,000 LED Equivalent Lumens)	Level 1 (0-5,500 LED Equivalent Lumens)	Level 2 (5,501-12,000 LED Equivalent Lumens)	Level 3 (12,001-20,000 LED Equivalent Lumens)	Level 4 (20,001-30,000 LED Equivalent Lumens)
	Level	Hours	Rate										
Replace Pole (wood)			\$183.56										
Material Cost				30'	\$472.65	\$472.65	\$472.65	\$472.65	\$472.65	\$472.65	\$472.65	\$472.65	\$472.65
Labor		7.80	2 man		\$1,431.78	\$1,431.78	\$1,431.78	\$1,431.78	\$1,431.78	\$1,431.78	\$1,431.78	\$1,431.78	\$1,431.78
Total Cost					\$1,904.43	\$1,904.43	\$1,904.43	\$1,904.43	\$1,904.43	\$1,904.43	\$1,904.43	\$1,904.43	\$1,904.43
Annual Frequency					0.011	0.011	0.011	0.011	0.011	0.008	0.008	0.008	0.008
Annual Cost					\$21.33	\$21.33	\$21.33	\$21.33	\$21.33	\$15.24	\$15.24	\$15.24	\$15.24
Replace Pole and arm (metal)													
Material Cost				25'	\$652.07	\$652.07	\$652.07	\$652.07	\$652.07	\$652.07	\$652.07	\$652.07	\$652.07
Labor		6.90	2 man		\$1,266.57	\$1,266.57	\$1,266.57	\$1,266.57	\$1,266.57	\$1,266.57	\$1,266.57	\$1,266.57	\$1,266.57
Total Cost					\$1,918.64	\$1,918.64	\$1,918.64	\$1,918.64	\$1,918.64	\$1,918.64	\$1,918.64	\$1,918.64	\$1,918.64
Annual Frequency					0.005	0.005	0.005	0.005	0.005	0.004	0.004	0.004	0.004
Annual Cost					\$9.29	\$9.29	\$9.29	\$9.29	\$9.29	\$6.76	\$6.76	\$6.76	\$6.76
Replace Fiberglass Pole													
Material Cost				30'	\$788.32	\$788.32	\$788.32	\$788.32	\$788.32	\$788.32	\$788.32	\$788.32	\$788.32
Labor		6.20	2 man		\$1,138.08	\$1,138.08	\$1,138.08	\$1,138.08	\$1,138.08	\$1,138.08	\$1,138.08	\$1,138.08	\$1,138.08
Total Cost					\$1,926.40	\$1,926.40	\$1,926.40	\$1,926.40	\$1,926.40	\$1,926.40	\$1,926.40	\$1,926.40	\$1,926.40
Annual Frequency					0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Annual Cost					\$9.63	\$9.63	\$9.63	\$9.63	\$9.63	\$10.43	\$10.43	\$10.43	\$10.43
Replace Mast Arm													
Material Cost					\$217.13	\$217.13	\$217.13	\$217.13	\$217.13	\$217.13	\$217.13	\$217.13	\$217.13
Labor		2.20	2 man		\$403.83	\$403.83	\$403.83	\$403.83	\$403.83	\$403.83	\$403.83	\$403.83	\$403.83
Total Cost					\$620.96	\$620.96	\$620.96	\$620.96	\$620.96	\$620.96	\$620.96	\$620.96	\$620.96
Annual Frequency					0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
Annual Cost					\$8.07	\$8.07	\$8.07	\$8.07	\$8.07	\$8.07	\$8.07	\$8.07	\$8.07
Replace Photo Cell													
Material Cost					\$20.92	\$20.92	\$20.92	\$20.92	\$20.92	\$20.92	\$20.92	\$20.92	\$20.92
Labor		0.70	Single man		\$128.49	\$128.49	\$128.49	\$128.49	\$128.49	\$128.49	\$128.49	\$128.49	\$128.49
Total Cost					\$149.41	\$149.41	\$149.41	\$149.41	\$149.41	\$149.41	\$149.41	\$149.41	\$149.41
Annual Frequency					0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Annual Cost					\$7.47	\$7.47	\$7.47	\$7.47	\$7.47	\$7.47	\$7.47	\$7.47	\$7.47
Replace Luminaire													
Material Cost					\$286.14	\$286.14	\$286.14	\$286.14	\$286.14	\$286.14	\$286.14	\$286.14	\$286.14
Labor		1.20	Single man		\$220.27	\$220.27	\$220.27	\$220.27	\$220.27	\$220.27	\$220.27	\$220.27	\$220.27
Total Cost					\$440.75	\$440.75	\$440.75	\$440.75	\$440.75	\$440.75	\$440.75	\$440.75	\$440.75
Annual Frequency					0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Annual Cost					\$22.04	\$22.04	\$22.04	\$22.04	\$22.04	\$22.04	\$22.04	\$22.04	\$22.04
Total Annual Maintenance					\$77.83	\$81.12	\$81.34	\$81.81	\$83.81	\$83.81	\$100.76	\$100.76	\$100.76
Total Monthly Maintenance					\$6.49	\$6.76	\$6.78	\$6.82	\$6.98	\$6.98	\$8.40	\$8.40	\$8.40
										\$3.41	\$3.41	\$3.41	\$3.41
											\$4.99	\$4.99	\$4.99

Street and Area Light Energy Consumption by Level of Service

Light Level	Target Initial Lumens (in LED equivalent)*	LED Equivalent Range **	Annual Energy (kWh)
1	2700	<3500	100
2	4000	3501-5500	183
3	6200	5501-8000	296
4	9000	8001-12000	413
5	13000	12001-15500	525
6	16800	>15501	688

- Level 1 (0-3,500 LED Equivalent Lumens)
- Level 2 (3,501-5,500 LED Equivalent Lumens)
- Level 3 (5,500-8,000 LED Equivalent Lumens)
- Level 4 (8,001-12,000 LED Equivalent Lumens)
- Level 5 (12,001-15,500 LED Equivalent Lumens)
- Level 6 (15,501 and Greater LED Equivalent Lumens)

Area Lights

Light Level	Target Initial Lumens (in LED equivalent)*	LED Equivalent Range **	Annual Energy (kWh)
1	4000	0-5500	224
2	9000	5501-12000	413
3	16800	>12001	688

- Level 1 (0-5,500 LED Equivalent Lumens)
- Level 2 (5,501-12,000 LED Equivalent Lumens)
- Level 3 (12,001 and Greater LED Equivalent Lumens)

Pacific Power & Light
State of Washington
Summary of Present and Proposed Lighting Prices
Lighting Class Cost Analysis
12 Months Ended June 2019

Present Description	Present Sch No.	Co/Cust Owned?	Units	Present Quantity	Present Price	Present Revenue	Proposed Description	Proposed Sch No.	Proposed Price	Proposed Revenue
Outdoor Area Lighting										
Mercury Vapor - 7,000 Lumen	15	Co	Lamp Count	24,390	\$11.24	\$274,141	Level 1 (0-5,500 LED Equivalent Lumens)	15	\$8.15	\$198,865
Mercury Vapor - 21,000 Lumen	15	Co	Lamp Count	3,826	\$21.37	\$81,752	Level 2 (5,501-12,000 LED Equivalent Lumens)	15	\$9.17	\$35,088
Mercury Vapor - 55,000 Lumen	15	Co	Lamp Count	442	\$44.25	\$19,548	Level 3 (12,001 and Greater LED Equivalent Lumens)	15	\$10.77	\$4,759
High Pressure Sodium Vapor - 5,800 Lumen	15	Co	Lamp Count	2,265	\$12.77	\$28,927	Level 1 (0-5,500 LED Equivalent Lumens)	15	\$8.15	\$18,470
High Pressure Sodium Vapor - 22,000 Lumen	15	Co	Lamp Count	1,884	\$18.76	\$35,351	Level 2 (5,501-12,000 LED Equivalent Lumens)	15	\$9.17	\$17,384
High Pressure Sodium Vapor - 50,000 Lumen	15	Co	Lamp Count	571	\$30.28	\$17,284	Level 3 (12,001 and Greater LED Equivalent Lumens)	15	\$10.77	\$6,149
Pole Charge	15	Co	Lamp Count	497	\$1.00	\$497	Not Applicable	15	\$0	\$0.00
Street Lighting Service - Company-Owned System										
LED - 4,600 Lumen	51	Co	Lamp Count	42	\$7.95	\$335	Level 1 (0-3,500 LED Equivalent Lumens)	51	\$8.63	\$364
LED - 5,600 Lumen	51	Co	Lamp Count	1,941	\$9.86	\$19,134	Level 2 (3,501-5,500 LED Equivalent Lumens)	51	\$9.26	\$17,978
LED - 8,400 Lumen	51	Co	Lamp Count	386	\$12.43	\$4,802	Level 3 (5,501-8,000 LED Equivalent Lumens)	51	\$9.53	\$3,683
LED - 9,800 Lumen	51	Co	Lamp Count	31	\$12.87	\$395	Level 4 (8,001-12,000 LED Equivalent Lumens)	51	\$9.84	\$302
LED - 17,100 Lumen	51	Co	Lamp Count	1,920	\$20.67	\$39,694	Level 5 (12,001-15,500 LED Equivalent Lumens)	51	\$10.44	\$20,051
LED - 4,600 Lumen - Cust. Funded Conv.	51	Co	Lamp Count	711	\$26.09	\$18,546	Level 6 (15,501 and Greater LED Equivalent Lumens)	51	\$12.73	\$9,047
LED - 5,600 Lumen - Cust. Funded Conv.	51	Co	Lamp Count	1,225	\$6.90	\$8,538	Cust. Funded Conv. - Level 1 (0-3,500 LED Equivalent Lumens)	51	\$4.25	\$5,274
LED - 8,400 Lumen - Cust. Funded Conv.	51	Co	Lamp Count	21	\$7.97	\$168	Cust. Funded Conv. - Level 2 (3,501-5,500 LED Equivalent Lumens)	51	\$4.84	\$102
LED - 9,800 Lumen - Cust. Funded Conv.	51	Co	Lamp Count	1,848	\$8.13	\$15,022	Cust. Funded Conv. - Level 3 (5,501-8,000 LED Equivalent Lumens)	51	\$5.11	\$9,439
LED - 17,100 Lumen - Cust. Funded Conv.	51	Co	Lamp Count	164	\$10.56	\$1,734	Cust. Funded Conv. - Level 4 (8,001-12,000 LED Equivalent Lumens)	51	\$5.44	\$894
LED - 22,100 Lumen - Cust. Funded Conv.	51	Co	Lamp Count	648	\$12.09	\$7,838	Cust. Funded Conv. - Level 5 (12,001-15,500 LED Equivalent Lumens)	51	\$6.65	\$4,308
High Pressure Sodium Vapor - 5,800 Lumen	51	Co	Lamp Count	11,400	\$8.93	\$101,802	Cust. Funded Conv. - Level 6 (15,501 and Greater LED Equivalent Lumens)	51	\$8.63	\$98,357
High Pressure Sodium Vapor - 9,500 Lumen	51	Co	Lamp Count	17,310	\$10.72	\$185,565	Level 1 (0-3,500 LED Equivalent Lumens)	51	\$9.26	\$160,367
High Pressure Sodium Vapor - 16,000 Lumen	51	Co	Lamp Count	1,066	\$13.69	\$14,588	Level 2 (3,501-5,500 LED Equivalent Lumens)	51	\$9.53	\$10,158
High Pressure Sodium Vapor - 22,000 Lumen	51	Co	Lamp Count	16,338	\$15.63	\$255,355	Level 3 (5,501-8,000 LED Equivalent Lumens)	51	\$9.84	\$160,825
High Pressure Sodium Vapor - 50,000 Lumen	51	Co	Lamp Count	1,995	\$19.80	\$39,507	Level 4 (8,001-12,000 LED Equivalent Lumens)	51	\$10.44	\$20,834
High Pressure Sodium Vapor - 9,500 Lumen - Decorative Series 1	51	Co	Lamp Count	2,707	\$70.813	\$191,133	Level 5 (12,001-15,500 LED Equivalent Lumens)	51	\$12.73	\$34,450
High Pressure Sodium Vapor - 9,500 Lumen - Decorative Series 2	51	Co	Lamp Count	-	\$34.03	\$0	Level 6 (15,501 and Greater LED Equivalent Lumens)	51	\$17.07	\$819
High Pressure Sodium Vapor - 16,000 Lumen - Decorative Series 1	51	Co	Lamp Count	-	\$26.46	\$0	CLOSED			
High Pressure Sodium Vapor - 16,000 Lumen - Decorative Series 2	51	Co	Lamp Count	48	\$35.25	\$1,692	Decorative Series - Level 3 (5,500-8,000 LED Equivalent Lumens)	51	\$17.07	\$819
Street Lighting Service - Company-Owned System										
Incanadescents - 2,500 Lumen + S1.3187 O&M	52	Co	Lamp Count	99	\$7.71	\$767	Level 1 (0-3,500 LED Equivalent Lumens)	51	\$8.63	\$858
Incanadescents - 4,000 Lumen + S1.37191 O&M	52	Co	Lamp Count	24	\$11.79	\$287	Level 1 (0-3,500 LED Equivalent Lumens)	51	\$8.63	\$210
Incanadescents - 6,000 Lumen + S1.41707 O&M	52	Co	Lamp Count	36	\$15.68	\$572	Level 1 (0-3,500 LED Equivalent Lumens)	51	\$8.63	\$315
High Pressure Sodium Vapor - 9,500 Lumen + S7.88516 O&M	52	Co	Lamp Count	1,010	\$11.74	\$11,859	Level 2 (3,501-5,500 LED Equivalent Lumens)	51	\$9.26	\$9,362
High Pressure Sodium Vapor - 9,500 Lumen + S8.43516 O&M	52	Co	Lamp Count	269	\$12.29	\$3,307	Level 2 (3,501-5,500 LED Equivalent Lumens)	51	\$9.26	\$2,494
High Pressure Sodium Vapor - 22,000 Lumen + S8.64565 O&M	52	Co	Lamp Count	24	\$16.08	\$386	Level 4 (8,001-12,000 LED Equivalent Lumens)	51	\$9.84	\$236
High Pressure Sodium Vapor - 22,000 Lumen + S9.29565 O&M	52	Co	Lamp Count	12	\$16.73	\$205	Level 4 (8,001-12,000 LED Equivalent Lumens)	51	\$9.84	\$121
High Pressure Sodium Vapor - 22,000 Lumen + S9.83565 O&M	52	Co	Lamp Count	733	\$17.27	\$12,658	Level 4 (8,001-12,000 LED Equivalent Lumens)	51	\$9.84	\$7,313
Mercury Vapor - 7,000 Lumen + S0.91108 O&M	52	Co	Lamp Count	12	\$12.61	\$152	Level 1 (0-3,500 LED Equivalent Lumens)	51	\$8.63	\$106
Mercury Vapor - 21,000 Lumen + S0.91108 O&M	52	Co	Lamp Count	12	\$15.96	\$192	Level 4 (8,001-12,000 LED Equivalent Lumens)	51	\$9.84	\$118
Street Lighting Service - Customer Owned System										
	53	Cust	KWh	3,695,897	\$0.07215	\$266,659	Street Lighting Service - Customer Owned System	53	\$0.04389	\$162,208

Pacific Power & Light
State of Washington
Summary of Present and Proposed Lighting Prices
Lighting Class Cost Analysis
12 Months Ended June 2019

Present Description	Present Sch No.	Co/Cust Owned?	Present			Proposed Description	Proposed Sch No.	Proposed Price	Proposed Revenue
			Units	Quantity	Price				
Recreational Field Lighting									
Basic Charge - Single Phase	54	Cust	Bill Count	144	\$3.90	\$562	54	\$10.87	\$4,565
Basic Charge - Three Phase	54	Cust	Bill Count	180	\$7.00	\$1,260	54	\$19.50	\$5,310
Energy Charge	54	Cust	kWh	282,712	\$0.008582	\$24,262	54	\$0.04123	\$11,656
Mercury Vapor Street Lighting Service									
Prior to 1977 - OH - Wood Pole - Horizontal - 7,000 Lumen	57	Co	Lamp Count	11,338	\$10.29	\$116,663	51	\$8.63	\$97,817
Prior to 1977 - OH - Wood Pole - Horizontal - 21,000 Lumen	57	Co	Lamp Count	922	\$18.83	\$17,366	51	\$9.84	\$9,078
Prior to 1977 - OH - Wood Pole - Horizontal - 55,000 Lumen	57	Co	Lamp Count	-	\$38.08	\$0	51	\$12.73	\$0
Prior to 1977 - OH - Wood Pole - Horizontal - 7,000 Lumen	57	Co	Lamp Count	3,195	\$9.65	\$30,834	51	\$8.63	\$27,568
Prior to 1977 - OH - Wood Pole - Vertical - 7,000 Lumen	57	Co	Lamp Count	-	\$17.57	\$0	51	\$9.84	\$0
Prior to 1977 - OH - 26' Metal Pole - Horizontal - 7,000 Lumen	57	Co	Lamp Count	409	\$13.44	\$5,497	51	\$8.63	\$3,529
Prior to 1977 - OH - 26' Metal Pole - Horizontal - 7,000 Lumen	57	Co	Lamp Count	-	\$12.72	\$0	51	\$8.63	\$0
Prior to 1977 - OH - 30' Metal Pole - Horizontal - 21,000 Lumen	57	Co	Lamp Count	359	\$22.57	\$8,108	51	\$9.84	\$3,536
Prior to 1977 - OH - 30' Metal Pole - Vertical - 21,000 Lumen	57	Co	Lamp Count	-	\$21.34	\$0	51	\$9.84	\$0
Prior to 1977 - OH - 33' Metal Pole - Horizontal - 55,000 Lumen	57	Co	Lamp Count	-	\$41.85	\$0	51	\$12.73	\$0
Prior to 1977 - UG - 26' Metal Pole - Horizontal - 7,000 Lumen	57	Co	Lamp Count	-	\$13.43	\$0	51	\$8.63	\$0
Prior to 1977 - UG - 26' Metal Pole - Vertical - 7,000 Lumen	57	Co	Lamp Count	-	\$12.72	\$0	51	\$8.63	\$0
Prior to 1977 - UG - 30' Metal Pole - Horizontal - 21,000 Lumen	57	Co	Lamp Count	-	\$21.83	\$0	51	\$9.84	\$0
Prior to 1977 - UG - 30' Metal Pole - Vertical - 21,000 Lumen	57	Co	Lamp Count	-	\$20.60	\$0	51	\$9.84	\$0
Post to 1977 - OH - Wood Pole - Horizontal - 7,000 Lumen	57	Co	Lamp Count	180	\$41.13	\$7,403	51	\$12.73	\$2,292
Post to 1977 - OH - Wood Pole - Horizontal - 21,000 Lumen	57	Co	Lamp Count	582	\$18.82	\$10,944	51	\$8.63	\$5,054
Post to 1977 - OH - Wood Pole - Horizontal - 55,000 Lumen	57	Co	Lamp Count	-	\$40.20	\$0	51	\$9.84	\$5,725
Total						\$1,773,834			\$1,197,673

Pacific Power & Light
 State of Washington
 Summary of Consolidated Proposed Lighting Prices
 Lighting Class Cost Analysis
 12 Months Ended June 2019

Proposed Description	Proposed Sch No.	Units	Quantity	Proposed Price	Proposed Revenue
Outdoor Area Lighting					
Level 1 (0-5,500 LED Equivalent Lumens)	15	Lamp Count	26,655	\$8.15	\$217,335.26
Level 2 (5,501-12,000 LED Equivalent Lumens)	15	Lamp Count	5,710	\$9.17	\$52,371.88
Level 3 (12,001 and Greater LED Equivalent Lumens)	15	Lamp Count	1,013	\$10.77	\$10,907.35
Level 1 (0-3,500 LED Equivalent Lumens)					
Level 1 (0-3,500 LED Equivalent Lumens)	51	Lamp Count	26,737	\$8.63	\$230,677.56
Level 2 (3,501-5,500 LED Equivalent Lumens)	51	Lamp Count	20,530	\$9.26	\$190,200.99
Level 3 (5,500-8,000 LED Equivalent Lumens)	51	Lamp Count	1,452	\$9.53	\$13,840.30
Level 4 (8,001-12,000 LED Equivalent Lumens)	51	Lamp Count	19,012	\$9.84	\$187,154.33
Level 5 (12,001-15,500 LED Equivalent Lumens)	51	Lamp Count	3,916	\$10.44	\$40,884.78
Level 6 (15,501 and Greater LED Equivalent Lumens)	51	Lamp Count	3,418	\$12.73	\$43,496.90
Cust. Funded Conv. - Level 1 (0-3,500 LED Equivalent Lumens)	51	Lamp Count	2,512	\$4.25	\$10,678.12
Cust. Funded Conv. - Level 2 (3,501-5,500 LED Equivalent Lumens)	51	Lamp Count	1,225	\$4.59	\$5,624.36
Cust. Funded Conv. - Level 3 (5,500-8,000 LED Equivalent Lumens)	51	Lamp Count	21	\$4.84	\$101.86
Cust. Funded Conv. - Level 4 (8,001-12,000 LED Equivalent Lumens)	51	Lamp Count	1,848	\$5.11	\$9,438.83
Cust. Funded Conv. - Level 5 (12,001-15,500 LED Equivalent Lumens)	51	Lamp Count	164	\$5.44	\$893.69
Cust. Funded Conv. - Level 6 (15,501 and Greater LED Equivalent Lumens)	51	Lamp Count	648	\$6.65	\$4,308.44
Decorative Series - Level 3 (5,500-8,000 LED Equivalent Lumens)	51	Lamp Count	48	\$17.07	\$819.20
Street Lighting Service - Customer Owned System					
	53	kWh	3,695,897	\$0.04389	\$162,207.83
Recreational Field Lighting					
Basic Charge - Single Phase	54	Bill Count	144	\$10.87	\$1,564.66
Basic Charge - Three Phase	54	Bill Count	180	\$19.50	\$3,510.45
Energy Charge	54	kWh	282,712	\$0.04123	\$11,656.03
Total					\$1,197,672.81
Unique Price Count				20	