Schedule 91 -- Cogeneration and Small Energy Production
Firm

Annual Energy Savings in kWh	Measure Life	Capacity Factor	Measure Type	Avoided Cost of Energy	Avoided Cost of Capacity	Total Avoided Cost	$/kWh	$/MWh		
	15	100.00%	Flat	$ 0.02927	$ 0.0103	$ 0.0395	$ 0.0395	$ 39.55		
								$ 38.36	3%	*"Contingency Reserves" per WECC 10/1/2014*

																		checksum	
Constant Nominal	$ 38.36	$ 38.36	$ 38.36	$ 38.36	$ 38.36	$ 38.36	$ 38.36	$ 38.36	$ 38.36	$ 38.36	$ 38.36	$ 38.36	$ 38.36	$ 38.36	$ 38.36	$ 38.36	$ 38.36	$336.51	$38.36

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	checksum	
Schedule 91 Rates for Purchase of Energy - Firm	$ 33.18	$ 34.01	$ 34.86	$ 35.73	$ 36.62	$ 37.54	$ 38.47	$ 39.44	$ 40.42	$ 41.43	$ 42.47	$ 43.53	$ 44.62	$ 45.73	$ 46.88	$48.05	$336.51	$38.36

Equivalent w/ 2.5% Increase

															checksum	
2.5 Percent Increase	100.00	102.50	105.06	107.69	110.38	113.14	115.97	118.87	121.84	124.89	128.01	131.21	134.49	137.85	141.30	1,014.32	115.62
2.5 Percent Index	0.86	0.89	0.91	0.93	0.95	0.98	1.00	1.03	1.05	1.08	1.11	1.13	1.16	1.19	1.22	8.77	1.00

Notes
1 This Schedule 91 energy rate model is based upon the cost effectiveness standard model that has been used for evaluating individual measures of PSE's Energy Efficiency Services program.
2 Power prices have been updated to be consistent with PSE's 2019 Integrated Resource Plan using the Mid C prices for the "Base + No CO2 price" scenario, and includes the 2019 power price forecast from Aurora.
3 This model accounts for both avoided energy costs and avoided capacity costs.
4 There are separate calculations for Baseload, Wind and Solar resources which have different capacity values as provided in the 2017 IRP and PSE's Schedule of Estimated Avoided Cost most recently filed in Docket No. 171141.
5 The value of a measure increases with its measure life. The power purchase agreement (PPA) length under Schedule 91 is fifteen years, analogous to a fifteen year measure life.
6 For each type of resource the final output of this calculation is a levelized price that does not vary from year to year (see cell L4).
7 Unlike a conservation project, a PPA requires spinning reserves which are deducted above at the rate of 3% (see cell M4).
8 PSE currently makes no deduction for balancing related costs as such costs could not be currently identified.
9 The final levelized price is adjusted to create a 15-year Fixed Price option that increases by 2.5% each year, which maintains the same value to PSE while increasing the value to the customer-generator over time.
10 The proposed 15-year strip is highlighted in yellow above.
11 A 16th year is added to the strip to accommodate projects that sign the PPA in 2019 but start operation in 2020, allowing for a 15-year PPA.

Schedule 91 -- Cogeneration and Small Energy Production
Wind

Annual Energy Savings in kWh	Measure Life	Capacity Factor	Measure Type	Avoided Cost of Energy	Avoided Cost of Capacity	Total Avoided Cost	$/kWh	$/MWh		
	15	16.00%	Flat	$ 0.02927	$ 0.0052	$ 0.0345	$ 0.0345	$ 34.52		
								$ 33.48	3%	*"Contingency Reserves" per WECC 10/1/2014*

																		checksum	
Constant Nominal	$ 33.48	$ 33.48	$ 33.48	$ 33.48	$ 33.48	$ 33.48	$ 33.48	$ 33.48	$ 33.48	$ 33.48	$ 33.48	$ 33.48	$ 33.48	$ 33.48	$ 33.48	$ 33.48	$ 33.48	$293.73	$33.48

Escalated Rate @ 2.5%

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	*checksum*	
Rates for Purchase of Energy - Wind	$ 28.96	$ 29.68	$ 30.42	$ 31.18	$ 31.96	$ 32.76	$ 33.58	$ 34.42	$ 35.28	$ 36.16	$ 37.07	$ 38.00	$ 38.95	$ 39.92	$ 40.92	$41.94	$293.73	$33.48

Equivalent w/ 2.5% Increase

																	checksum	
2.5 Percent Increase	100.00	102.50	105.06	107.69	110.38	113.14	115.97	118.87	121.84	124.89	128.01	131.21	134.49	137.85	141.30		1,014.32	115.62
2.5 Percent Index	0.86	0.89	0.91	0.93	0.95	0.98	1.00	1.03	1.05	1.08	1.11	1.13	1.16	1.19	1.22		8.77	1.00

Notes

1 This Schedule 91 energy rate model is based upon the cost effectiveness standard model that has been used for evaluating individual measures of PSE's Energy Efficiency Services program.
2 Power prices have been updated to be consistent with PSE's 2019 Integrated Resource Plan using the Mid C prices for the "Base + No CO2 price" scenario, and includes the 2019 power price forecast from Aurora.
3 This model accounts for both avoided energy costs and avoided capacity costs.
4 There are separate calculations for Baseload, Wind and Solar resources which have different capacity values as provided in the 2017 IRP and PSE's Schedule of Estimated Avoided Cost most recently filed in Docket No. 171141.
5 The value of a measure increases with its measure life. The power purchase agreement (PPA) length under Schedule 91 is fifteen years, analogous to a fifteen year measure life.
6 For each type of resource the final output of this calculation is a levelized price that does not vary from year to year (see cell L4).
7 Unlike a conservation project, a PPA requires spinning reserves which are deducted above at the rate of 3% (see cell M4).
8 PSE currently makes no deduction for balancing related costs as such costs could not be currently identified.
9 The final levelized price is adjusted to create a 15-year Fixed Price option that increases by 2.5% each year, which maintains the same value to PSE while increasing the value to the customer-generator over time.
10 The proposed 15-year strip is highlighted in yellow above.
11 A 16th year is added to the strip to accommodate projects that sign the PPA in 2019 but start operation in 2020, allowing for a 15-year PPA.

Schedule 91 -- Cogeneration and Small Energy Production
Solar

Annual Energy Savings in kWh	Measure Life	Capacity Factor	Measure Type	Avoided Cost of Energy	Avoided Cost of Capacity	Total Avoided Cost	$/kWh	$/MWh		
	15	2.00%	Flat	$ 0.02927	$ 0.0044	$ 0.0337	$ 0.0337	$ 33.68		
								$ 32.67	3%	*"Contingency Reserves" per WECC 10/1/2014*

																				checksum	
Constant Nominal	$ 32.67	$ 32.67	$ 32.67	$ 32.67	$ 32.67	$ 32.67	$ 32.67	$ 32.67	$ 32.67	$ 32.67	$ 32.67	$ 32.67	$ 32.67	$ 32.67	$ 32.67	$ 32.67	$ 32.67	$ 32.67	$ 32.67	$286.60	$32.67

Escalated Rate @ 2.5%

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	*checksum*	
Rates for Purchase of Energy - Solar	$ 28.26	$ 28.96	$ 29.69	$ 30.43	$ 31.19	$ 31.97	$ 32.77	$ 33.59	$ 34.43	$ 35.29	$ 36.17	$ 37.07	$ 38.00	$ 38.95	$ 39.92	$40.92	$286.60	$32.67

Equivalent w/ 2.5% Increase

																	checksum	
2.5 Percent Increase	100.00	102.50	105.06	107.69	110.38	113.14	115.97	118.87	121.84	124.89	128.01	131.21	134.49	137.85	141.30		1,014.32	115.62
2.5 Percent Index	0.86	0.89	0.91	0.93	0.95	0.98	1.00	1.03	1.05	1.08	1.11	1.13	1.16	1.19	1.22		8.77	1.00

Notes

1 This Schedule 91 energy rate model is based upon the cost effectiveness standard model that has been used for evaluating individual measures of PSE's Energy Efficiency Services program.
2 Power prices have been updated to be consistent with PSE's 2019 Integrated Resource Plan using the Mid C prices for the "Base + No CO2 price" scenario, and includes the 2019 power price forecast from Aurora.
3 This model accounts for both avoided energy costs and avoided capacity costs.
4 There are separate calculations for Baseload, Wind and Solar resources which have different capacity values as provided in the 2017 IRP and PSE's Schedule of Estimated Avoided Cost most recently filed in Docket No. 171141.
5 The value of a measure increases with its measure life. The power purchase agreement (PPA) length under Schedule 91 is fifteen years, analogous to a fifteen year measure life.
6 For each type of resource the final output of this calculation is a levelized price that does not vary from year to year (see cell L4).
7 Unlike a conservation project, a PPA requires spinning reserves which are deducted above at the rate of 3% (see cell M4).
8 PSE currently makes no deduction for balancing related costs as such costs could not be currently identified.
9 The final levelized price is adjusted to create a 15-year Fixed Price option that increases by 2.5% each year, which maintains the same value to PSE while increasing the value to the customer-generator over time.
10 The proposed 15-year strip is highlighted in yellow above.
11 A 16th year is added to the strip to accommodate projects that sign the PPA in 2019 but start operation in 2020, allowing for a 15-year PPA.

Levelized Cost Effectiveness Standard-Energy

Including

T&D Line Loss Reduction [4]	2.70%
Nominal Discount Rate	7.60%

	$/MWh	$/kWh
Measure Life	**Flat**	**Flat**
1	$ 22.13	$ 0.02213
2	$ 22.31	$ 0.02231
3	$ 22.41	$ 0.02241
4	$ 22.55	$ 0.02255
5	$ 22.76	$ 0.02276
6	$ 23.21	$ 0.02321
7	$ 23.76	$ 0.02376
8	$ 24.40	$ 0.02440
9	$ 25.14	$ 0.02514
10	$ 25.86	$ 0.02586
11	$ 26.57	$ 0.02657
12	$ 27.23	$ 0.02723
13	$ 27.87	$ 0.02787
14	$ 28.54	$ 0.02854
15	$ 29.27	$ 0.02927
16	$ 30.02	$ 0.03002
17	$ 30.76	$ 0.03076
18	$ 31.53	$ 0.03153
19	$ 32.27	$ 0.03227

T&D Line Loss Reduction [4]	2.70%
Nominal Discount Rate	7.60%
GDP Inflation	2.50%

Year	Measure Life (years)	Annual Weighted Average of Hourly Price ($/MWh)	T&D Line Loss Reduction ($/MWh)	Planning Adjustment ($/MWh)	Avoided Renewable Benefits ($/MWh)	Conservation Credit ($/MWh)	Present Value- Energy ($/MWh)	Cumulative Present Value - Energy ($/MWh)	Levelized Cost Effectiveness Standard- Energy ($/MWh)
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
2019	1	21.55	0.58	0.00	0.00	0.00	20.57	20.57	22.13
2020	2	21.91	0.59	0.00	0.00	0.00	19.44	40.01	22.31
2021	3	22.02	0.59	0.00	0.00	0.00	18.15	58.16	22.41
2022	4	22.43	0.61	0.00	0.00	0.00	17.19	75.34	22.55
2023	5	23.18	0.63	0.00	0.00	0.00	16.51	91.85	22.76
2024	6	25.34	0.68	0.00	0.00	0.00	16.77	108.62	23.21
2025	7	27.34	0.74	0.00	0.00	0.00	16.81	125.43	23.76
2026	8	29.61	0.80	0.00	0.00	0.00	16.92	142.36	24.40
2027	9	32.69	0.88	0.00	0.00	0.00	17.37	159.72	25.14
2028	10	34.39	0.93	0.00	0.00	0.00	16.98	176.70	25.86
2029	11	36.47	0.98	0.00	0.00	0.00	16.73	193.43	26.57
2030	12	37.74	1.02	0.00	0.00	0.00	16.09	209.53	27.23
2031	13	39.63	1.07	0.00	0.00	0.00	15.70	225.23	27.87
2032	14	42.43	1.15	0.00	0.00	0.00	15.63	240.86	28.54
2033	15	46.57	1.26	0.00	0.00	0.00	15.94	256.80	29.27
2034	16	49.82	1.35	0.00	0.00	0.00	15.85	272.65	30.02
2035	17	52.73	1.42	0.00	0.00	0.00	15.59	288.23	30.76
2036	18	57.06	1.54	0.00	0.00	0.00	15.68	303.91	31.53
2037	19	59.25	1.60	0.00	0.00	0.00	15.13	319.04	32.27

[4] Transmission losses updated as per section 15.7 Real Power Losses, PSE Current Effective OATT 8.7.18.
http://www.oatioasis.com/webSmartOASIS/HomePage?ProviderName=PSEI&Homepage=1

[5] The planning adjustment is the cost difference between the IRP portfolio with no demand side resources (DSR) and the IRP portfolio with optimal DSR, which is relevant to EES but not for a PPA.

[6] EES leads to lower overall load and hence lower RPS requirement to meet. A PPA does not lower overall load.

[7] The 10% conservation credit adder per Northwest Power Act of 1980 is now reflected in the REC market which is additional to the PPA.

Levelized Cost Effectiveness Standard-Capacity

Flat Load	1 / 8760	0.000114155	*year / hour*

	$/kw-yr	$ / MWh	$ / kWh	$/kw-yr	$ / MWh
Measure Life	**Levelized Cost Effectiveness Standard-Capacity**	**Base**	**Base**	**Levelized Cost Effectiveness Standard-Capacity**	**Wind**
1	$ 32.59	$ 3.72	$ 0.0037	$ 32.50	$ 3.71
2	$ 32.98	$ 3.76	$ 0.0038	$ 32.89	$ 3.76
3	$ 33.37	$ 3.81	$ 0.0038	$ 33.28	$ 3.80
4	$ 34.46	$ 3.93	$ 0.0039	$ 33.78	$ 3.86
5	$ 50.68	$ 5.79	$ 0.0058	$ 36.69	$ 4.19
6	$ 61.57	$ 7.03	$ 0.0070	$ 38.75	$ 4.42
7	$ 67.93	$ 7.75	$ 0.0078	$ 40.08	$ 4.58
8	$ 72.77	$ 8.31	$ 0.0083	$ 41.16	$ 4.70
9	$ 76.62	$ 8.75	$ 0.0087	$ 42.08	$ 4.80
10	$ 79.74	$ 9.10	$ 0.0091	$ 42.88	$ 4.90
11	$ 82.34	$ 9.40	$ 0.0094	$ 43.59	$ 4.98
12	$ 84.54	$ 9.65	$ 0.0097	$ 44.23	$ 5.05
13	$ 86.61	$ 9.89	$ 0.0099	$ 44.85	$ 5.12
14	$ 88.41	$ 10.09	$ 0.0101	$ 45.42	$ 5.19
15	$ 89.99	$ 10.27	$ 0.0103	$ 45.95	$ 5.25
16	$ 91.54	$ 10.45	$ 0.0104	$ 46.47	$ 5.30
17	$ 92.92	$ 10.61	$ 0.0106	$ 46.96	$ 5.36
18	$ 94.24	$ 10.76	$ 0.0108	$ 47.43	$ 5.41
19	$ 95.44	$ 10.89	$ 0.0109	$ 47.88	$ 5.47
20	$ 96.52	$ 11.02	$ 0.0110	$ 48.30	$ 5.51

Deferred T&D Cost Credit ($/kw-yr) (4):	$ 27.33
NW Power Act Regional Credit (5):	0.00%
Nominal Discount Rate (*):	7.60%
GDP Inflation (**):	2.50%

Deferred T&D Cost Credit ($/kw-yr) (4):	Note 2
2012	$ 27.33
2019	$ 32.49

Calcula

Year	Measure Life (years)	Total Annual Capital & Fixed Costs of Capacity ($/kw-yr)	Deferred T&D ($/kw-yr)	Conservation Credit ($/kw-yr)	NPV - Capacity ($/kw-yr)	Cumulative Present Value CES-Capacity ($/kw-yr)	Levelized Cost Effectiveness Standard-Capacity ($/kw-yr)
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
2019	1	$ 0.10	$ 32.49	$ -	$ 30.29	$ 30.29	$ 32.59
2020	2	$ 0.10	$ 33.30	$ -	$ 28.85	$ 59.14	$ 32.98
2021	3	$ 0.10	$ 34.13	$ -	$ 27.48	$ 86.62	$ 33.37
2022	4	$ 3.26	$ 34.98	$ -	$ 28.53	$ 115.15	$ 34.46
2023	5	$ 93.00	$ 35.86	$ -	$ 89.34	$ 204.49	$ 50.68
2024	6	$ 93.00	$ 36.76	$ -	$ 83.61	$ 288.10	$ 61.57
2025	7	$ 80.00	$ 37.67	$ -	$ 70.47	$ 358.57	$ 67.93
2026	8	$ 80.00	$ 38.62	$ -	$ 66.02	$ 424.58	$ 72.77
2027	9	$ 80.48	$ 39.58	$ -	$ 62.10	$ 486.68	$ 76.62
2028	10	$ 80.48	$ 40.57	$ -	$ 58.19	$ 544.87	$ 79.74
2029	11	$ 80.48	$ 41.59	$ -	$ 54.53	$ 599.40	$ 82.34
2030	12	$ 80.48	$ 42.63	$ -	$ 51.11	$ 650.52	$ 84.54
2031	13	$ 84.16	$ 43.69	$ -	$ 49.33	$ 699.85	$ 86.61
2032	14	$ 84.16	$ 44.78	$ -	$ 46.24	$ 746.09	$ 88.41
2033	15	$ 84.16	$ 45.90	$ -	$ 43.35	$ 789.44	$ 89.99
2034	16	$ 88.31	$ 47.05	$ -	$ 41.93	$ 831.36	$ 91.54
2035	17	$ 88.31	$ 48.23	$ -	$ 39.30	$ 870.67	$ 92.92
2036	18	$ 91.09	$ 49.43	$ -	$ 37.59	$ 908.26	$ 94.24
2037	19	$ 91.09	$ 50.67	$ -	$ 35.25	$ 943.51	$ 95.44
2038	20	$ 91.09	$ 51.93	$ -	$ 33.05	$ 976.56	$ 96.52

Note 1: The avoided capacity costs are consistent with the 2017 IRP for the Firm Resource.

Note 2: The 7th Northwest Power Plan used monetary values of avoided transmission and distribution capacity which were recommended by the Regional Technical Forum. The values of transmission and distribution in the 7th Northwest Power Plan are in 2012 prices. To obtain a current year value, the price in 2012 was inflated using 2.5% per year, consistent with EES methodology.

Deferred T&D Cost Credit ($/kw-yr) (4):	$ 27.33
NW Power Act Regional Credit (5):	0.00%
Nominal Discount Rate (*):	7.60%
GDP Inflation (**):	2.50%

Deferred T&D Cost Credit ($/kw-yr) (4):	Note 2
2012	$ 27.33
2019	$ 32.49

Calcula

Year	Measure Life (years)	Total Annual Capital & Fixed Costs of Capacity ($/kw-yr)	Deferred T&D ($/kw-yr)	Conservation Credit ($/kw-yr)	NPV - Capacity ($/kw-yr)	Cumulative Present Value CES-Capacity ($/kw-yr)	Levelized Cost Effectiveness Standard-Capacity ($/kw-yr)
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
2019	1	$ 0.02	$ 32.49	$ -	$ 30.21	$ 30.21	$ 32.50
2020	2	$ 0.02	$ 33.30	$ -	$ 28.78	$ 58.98	$ 32.89
2021	3	$ 0.02	$ 34.13	$ -	$ 27.41	$ 86.39	$ 33.28
2022	4	$ 0.52	$ 34.98	$ -	$ 26.49	$ 112.88	$ 33.78
2023	5	$ 14.88	$ 35.86	$ -	$ 35.18	$ 148.06	$ 36.69
2024	6	$ 14.88	$ 36.76	$ -	$ 33.27	$ 181.33	$ 38.75
2025	7	$ 12.80	$ 37.67	$ -	$ 30.23	$ 211.56	$ 40.08
2026	8	$ 12.80	$ 38.62	$ -	$ 28.62	$ 240.18	$ 41.16
2027	9	$ 12.88	$ 39.58	$ -	$ 27.13	$ 267.31	$ 42.08
2028	10	$ 12.88	$ 40.57	$ -	$ 25.69	$ 293.00	$ 42.88
2029	11	$ 12.88	$ 41.59	$ -	$ 24.33	$ 317.33	$ 43.59
2030	12	$ 12.88	$ 42.63	$ -	$ 23.04	$ 340.38	$ 44.23
2031	13	$ 13.47	$ 43.69	$ -	$ 22.05	$ 362.43	$ 44.85
2032	14	$ 13.47	$ 44.78	$ -	$ 20.89	$ 383.32	$ 45.42
2033	15	$ 13.47	$ 45.90	$ -	$ 19.79	$ 403.11	$ 45.95
2034	16	$ 14.13	$ 47.05	$ -	$ 18.95	$ 422.06	$ 46.47
2035	17	$ 14.13	$ 48.23	$ -	$ 17.95	$ 440.01	$ 46.96
2036	18	$ 14.57	$ 49.43	$ -	$ 17.12	$ 457.13	$ 47.43
2037	19	$ 14.57	$ 50.67	$ -	$ 16.22	$ 473.35	$ 47.88
2038	20	$ 14.57	$ 51.93	$ -	$ 15.37	$ 488.72	$ 48.30

Note 1: The avoided capacity costs are consistent with the 2017 IRP for the Wind Resource.

Note 2: The 7th Northwest Power Plan used monetary values of avoided transmission and distribution capacity which were recommended by the Regional Technical Forum. The values of transmission and distribution in the 7th Northwest Power Plan are in 2012 prices. To obtain a current year value, the price in 2012 was inflated using 2.5% per year, consistent with EES methodology.

Deferred T&D Cost Credit ($/kw-yr) (4):	$ 27.33
NW Power Act Regional Credit (5):	0.00%
Nominal Discount Rate (*):	7.60%
GDP Inflation (**):	2.50%

Deferred T&D Cost Credit ($/kw-yr) (4):	Note 2
2012	$ 27.33
2019	$ 32.49

Calcula

Year	Measure Life (years)	Total Annual Capital & Fixed Costs of Capacity ($/kw-yr.)	Deferred T&D ($/kw-yr)	Conservation Credit ($/kw-yr)	NPV - Capacity ($/kw-yr)	Cumulative Present Value CES-Capacity ($/kw-yr)	Levelized Cost Effectiveness Standard-Capacity ($/kw-yr)
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
2019	1	$ 0.00	$ 32.49	$ -	$ 30.19	$ 30.19	$ 32.49
2020	2	$ 0.00	$ 33.30	$ -	$ 28.76	$ 58.96	$ 32.88
2021	3	$ 0.00	$ 34.13	$ -	$ 27.40	$ 86.36	$ 33.27
2022	4	$ 0.07	$ 34.98	$ -	$ 26.15	$ 112.50	$ 33.67
2023	5	$ 1.86	$ 35.86	$ -	$ 26.15	$ 138.66	$ 34.36
2024	6	$ 1.86	$ 36.76	$ -	$ 24.88	$ 163.54	$ 34.95
2025	7	$ 1.60	$ 37.67	$ -	$ 23.52	$ 187.06	$ 35.44
2026	8	$ 1.60	$ 38.62	$ -	$ 22.38	$ 209.44	$ 35.89
2027	9	$ 1.61	$ 39.58	$ -	$ 21.31	$ 230.75	$ 36.33
2028	10	$ 1.61	$ 40.57	$ -	$ 20.28	$ 251.02	$ 36.74
2029	11	$ 1.61	$ 41.59	$ -	$ 19.30	$ 270.32	$ 37.13
2030	12	$ 1.61	$ 42.63	$ -	$ 18.37	$ 288.69	$ 37.52
2031	13	$ 1.68	$ 43.69	$ -	$ 17.51	$ 306.20	$ 37.89
2032	14	$ 1.68	$ 44.78	$ -	$ 16.66	$ 322.86	$ 38.26
2033	15	$ 1.68	$ 45.90	$ -	$ 15.86	$ 338.72	$ 38.61
2034	16	$ 1.77	$ 47.05	$ -	$ 15.12	$ 353.84	$ 38.96
2035	17	$ 1.77	$ 48.23	$ -	$ 14.39	$ 368.23	$ 39.30
2036	18	$ 1.82	$ 49.43	$ -	$ 13.71	$ 381.94	$ 39.63
2037	19	$ 1.82	$ 50.67	$ -	$ 13.05	$ 394.99	$ 39.95
2038	20	$ 1.82	$ 51.93	$ -	$ 12.42	$ 407.42	$ 40.27

Note 1: The avoided capacity costs are consistent with the 2017 IRP for the Wind Resource.

Note 2: The 7th Northwest Power Plan used monetary values of avoided transmission and distribution capacity which were recommended by the Regional Technical Forum. The values of transmission and distribution in the 7th Northwest Power Plan are in 2012 prices. To obtain a current year value, the price in 2012 was inflated using 2.5% per year, consistent with EES methodology.

2019 IRP: Forecast Mid-C Power Prices for Base + No CO2 Scenario (Nominal $/MWh)

	1	2	3	4	5	6	7	8	9	10	11	12	Ave	
	MONTHS													
2019	24.48	24.62	21.02	18.25	14.08	15.99	20.62	23.25	24.50	23.77	23.48	24.55	21.55	
2020	23.55	24.10	21.53	18.95	14.95	16.22	21.27	23.84	24.73	24.49	23.75	25.52	21.91	1.66%
2021	24.08	23.97	20.59	18.35	13.97	16.19	21.56	24.12	25.33	26.09	24.50	25.53	22.02	0.50%
2022	24.63	24.34	21.00	18.52	14.28	16.40	22.42	24.79	25.98	26.00	24.67	26.12	22.43	1.86%
2023	25.12	24.83	21.37	20.16	15.81	17.29	22.91	24.98	26.65	26.48	25.61	26.90	23.18	3.34%
2024	26.66	27.23	23.38	22.19	15.98	19.29	24.77	28.07	30.08	28.98	28.23	29.17	25.34	9.32%
2025	28.23	29.31	25.55	23.75	17.20	21.17	26.69	30.70	32.66	31.36	30.25	31.15	27.34	7.89%
2026	30.03	31.63	27.03	26.31	20.62	23.02	28.80	32.99	34.91	34.33	32.80	32.82	29.61	8.30%
2027	33.59	35.11	29.86	27.98	21.17	24.76	32.27	36.13	38.77	38.88	36.95	36.86	32.69	10.40%
2028	35.63	37.11	30.29	29.09	21.73	26.29	34.17	37.56	41.55	40.62	39.08	39.58	34.39	5.20%
2029	37.73	39.71	31.99	31.43	23.60	27.60	35.43	40.48	44.88	42.14	40.55	42.05	36.47	6.05%
2030	39.48	41.51	32.88	30.75	22.13	27.92	36.72	42.83	46.65	44.40	43.66	43.95	37.74	3.48%
2031	41.72	42.99	34.99	32.16	24.04	29.34	38.83	45.10	48.52	46.19	45.04	46.57	39.63	5.01%
2032	43.79	44.94	36.63	34.79	29.08	31.68	42.03	47.51	50.95	49.15	48.77	49.81	42.43	7.07%
2033	47.78	49.55	40.21	38.12	29.97	35.65	46.60	51.95	56.19	55.06	53.78	54.01	46.57	9.76%
2034	51.02	53.37	43.29	40.85	32.37	38.71	50.46	55.30	60.39	57.74	56.59	57.83	49.82	6.98%
2035	54.29	57.21	45.72	45.29	35.49	40.24	51.78	59.35	65.21	59.58	58.00	60.55	52.73	5.84%
2036	58.49	60.54	49.36	46.48	36.31	44.79	57.77	66.63	69.28	65.18	64.47	65.40	57.06	8.21%
2037	61.93	63.53	52.04	47.33	39.19	45.35	59.59	68.56	71.01	67.65	66.45	68.43	59.25	3.84%
2038	64.76	66.98	54.15	50.87	44.06	46.77	62.50	71.78	74.16	70.96	70.28	72.17	62.45	5.40%
2039	67.90	69.75	54.73	51.47	42.78	47.83	65.46	73.95	77.98	76.75	75.77	76.17	65.04	

20-year levelized	$33.51
15-year levelized	$ 28.50

Indicative Avoided Capacity Costs for Resources Delivered to PSE's System

					Delivered to PSE Capacity Value		
		Capacity Resource Addition	Levelized Net $/kW-yr Delivered To PSE	Avoided Energy Supply Capacity Cost $/kW-Yr Delivered to Mid-C	(c)=(a)*100% Firm Resource ELCC=100%	(d)=(a)*0.16 Wind Resource ELCC=16%	(e)=(a)*0.02 Solar Resource ELCC=2%
					100%	16%	2%
1	2019	Supply Capacity Cost	$ 0.10	$ 0.10	$ 0.1024	$ 0.0164	$ 0.0020
2	2020		$ 0.10	$ 0.10	$ 0.1024	$ 0.0164	$ 0.0020
3	2021		$ 0.10	$ 0.10	$ 0.1024	$ 0.0164	$ 0.0020
4	2022	Transmission Redirect	$ 3.26	$ 0.10	$ 3.2600	$ 0.5216	$ 0.0652
5	2023	Flow Battery-4 hr	$ 93.00	$ 0.10	$ 93.0000	$ 14.8800	$ 1.8600
6	2024	Flow Battery-4 hr	$ 93.00	$ 0.10	$ 93.0000	$ 14.8800	$ 1.8600
7	2025	Frame Peaker	$ 80.00	$ 0.10	$ 80.0000	$ 12.8000	$ 1.6000
8	2026	Frame Peaker	$ 80.00	$ 0.10	$ 80.0000	$ 12.8000	$ 1.6000
9	2027	Frame Peaker	$ 80.48	$ 0.10	$ 80.4779	$ 12.8765	$ 1.6096
10	2028		$ 80.48	$ 0.10	$ 80.4779	$ 12.8765	$ 1.6096
11	2029		$ 80.48	$ 0.10	$ 80.4779	$ 12.8765	$ 1.6096
12	2030		$ 80.48	$ 0.10	$ 80.4779	$ 12.8765	$ 1.6096
13	2031	Frame Peaker	$ 84.16	$ 0.10	$ 84.1571	$ 13.4651	$ 1.6831
14	2032		$ 84.16	$ 0.10	$ 84.1571	$ 13.4651	$ 1.6831
15	2033		$ 84.16	$ 0.10	$ 84.1571	$ 13.4651	$ 1.6831
16	2034	Frame Peaker	$ 88.31	$ 0.10	$ 88.3068	$ 14.1291	$ 1.7661
17	2035		$ 88.31	$ 0.10	$ 88.3068	$ 14.1291	$ 1.7661
18	2036	Frame Peaker	$ 91.09	$ 0.10	$ 91.0895	$ 14.5743	$ 1.8218
19	2037		$ 91.09	$ 0.10	$ 91.0895	$ 14.5743	$ 1.8218
20	2038		$ 91.09	$ 0.10	$ 91.0895	$ 14.5743	$ 1.8218

Docket No. UE-180282

Adjustment 18.02

PUGET SOUND ENERGY-ELECTRIC

PRO FORMA COST OF CAPITAL

FOR THE TWELVE MONTHS ENDED SEPTEMBER 30, 2016

2017 GENERAL RATE INCREASE - UE-180282

Tax Reform Filing

LINE NO.	DESCRIPTION	PRO FORMA CAPITAL %	COST %	COST OF CAPITAL
1	SHORT & LONG TERM DEBT	51.50%	5.81%	2.99%
2	EQUITY	48.50%	9.50%	4.61%
3	TOTAL COST OF CAPITAL	100.00%		7.60%
4				
5	AFTER TAX DEBT	51.50%	5.81%	2.36%
6	EQUITY	48.50%	9.50%	4.61%
7	TOTAL AFTER TAX COST OF CAPITAL	100.00%		6.97%