

Appendix H

Avoided Cost


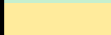

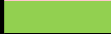
Draft 2018 WA IRP

Avoided Cost Workbook

Summary of tabs

Name	Description
FINAL CALCULATION	Aggregator of data from all other tabs. Currently costs past 20 years = 20th year cost
INCRM FIXED TRANSPORT	Fixed cost of contracts that will be used to solve pre-DSM identified shortfalls
VARIABLE TRANSPORT	Variable cost of Contracts. Once a shortfall is identified this should only use new contract costs
FUEL	Average fuel loss across all of Cascade's Contracts
INCRM FIXED STORAGE	Fixed cost of storage contracts that are selected as cost effective pre-DSM
VARIABLE STORAGE	Variable cost of storage contracts. Once a shortfall is identified this should only use new contract costs
COMMODITY COST	Price of gas based on CNGC price forecast. Can be modified for either Peak AC or annual. Need to input weights for each zone, which should be calculated by SENDOUT supply take by zone
CARBON TAX	Adder to the commodity cost based on the desired carbon scenario
ENVIRONMENTAL ADDER	Should stay 10% as per NWPC recommendation unless scenario analysis
DISTRIBUTION SYSTEM	Weighted average authorized margin, currently for Washington core cust.
RISK PREMIUM	Theoretical Cost to fully hedge natural gas portfolio
INFLATION	Estimated rate of inflation, modeled off the CPI.
Ballot Initiative	Results of a Carbon sensitivity using the I-1631 Ballot Initiative instead of SCC with 3% Discount rate. Still uses 10% Environmental Adder
SB 6203 - Inslee-Carlyle Tax	Results of a Carbon sensitivity using the SB 6203 - Inslee/Carlyle Carbon Tax proposal instead of SCC with 3% Discount rate. Still uses 10% Environmental Adder
Market Choice	Results of a Carbon sensitivity using the House of Representative's Market Choice Carbon Tax proposal instead of SCC with 3% Discount rate. Still uses 10% Environmental Adder
0% Environmental, SCC 3%	Results of a Carbon sensitivity using a 0% Environmental Adder instead of the NWPC recommended 10% adder. Still uses the SCC Carbon Forecast with a 3% discount rate
20% Environmental, SCC 3%	Results of a Carbon sensitivity using a 20% Environmental Adder instead of the NWPC recommended 10% adder. Still uses the SCC Carbon Forecast with a 3% discount rate
30% Environmental, SCC 3%	Results of a Carbon sensitivity using a 30% Environmental Adder instead of the NWPC recommended 10% adder. Still uses the SCC Carbon Forecast with a 3% discount rate

Avoided Cost Workbook

Color Code	
	You should change this box
	You probably don't need to change this box
	Don't change this box
	Result that will go into the final calculation

Current Avoided Cost Formula

$$AC_{nominal} = TC_f + TC_v + SC + (CC * C_{tax} * E_{adder}) + DSC + RP$$

Nominal Avoided Cost (By Zone) - \$/Therm

	Zone 1	Zone 2	Zone 3	Zone 4	Oregon	Washington	System
2019	0.316645	0.315169	0.315434	0.28791	0.28791	0.31653403	0.292795
2020	0.527794	0.52588	0.526223	0.50555	0.505548	0.52765021	0.509681
2021	0.53798	0.536045	0.536391	0.51767	0.517666	0.53783401	0.521526
2022	0.641692	0.637629	0.638357	0.61647	0.61647	0.64138646	0.62202
2023	0.656337	0.652354	0.653067	0.63381	0.633806	0.65603683	0.638925
2024	0.674909	0.6703	0.671125	0.65138	0.651377	0.6745623	0.656929
2025	0.671493	0.669792	0.670097	0.65534	0.65534	0.6713648	0.658483
2026	0.688032	0.686152	0.686489	0.67197	0.671975	0.68789004	0.675185
2027	0.676129	0.674155	0.674508	0.66015	0.660145	0.67598051	0.663388
2028	0.693811	0.691788	0.69215	0.67796	0.677956	0.69365827	0.681203
2029	0.706177	0.703757	0.704191	0.69042	0.690421	0.70599504	0.693834
2030	0.720546	0.718255	0.718665	0.70487	0.704873	0.72037392	0.708216
2031	0.73087	0.728992	0.729328	0.71518	0.715176	0.73072858	0.718333
2032	0.745755	0.74433	0.744585	0.73003	0.730035	0.74564766	0.732989
2033	0.761016	0.759829	0.760041	0.74532	0.745318	0.76092638	0.74816
2034	0.773553	0.772309	0.772532	0.75791	0.757914	0.77345907	0.760773
2035	0.784337	0.783065	0.783293	0.76876	0.768762	0.78424126	0.771625
2036	0.800463	0.798213	0.798616	0.78723	0.787233	0.80029363	0.790198
2037	0.807866	0.805617	0.806019	0.79464	0.794636	0.80769708	0.797602
2038	0.8214	0.81915	0.819553	0.80817	0.80817	0.82123029	0.811135
2039	0.837828	0.835533	0.835944	0.82433	0.824333	0.8376549	0.827358
2040	0.854584	0.852244	0.852663	0.84082	0.84082	0.854408	0.843905
2041	0.871676	0.869288	0.869716	0.85764	0.857636	0.87149616	0.860783
2042	0.889109	0.886674	0.88711	0.87479	0.874789	0.88892608	0.877999
2043	0.906892	0.904408	0.904852	0.89228	0.892285	0.9067046	0.895559
2044	0.925029	0.922496	0.922949	0.91013	0.91013	0.92483869	0.91347
2045	0.94353	0.940946	0.941408	0.92833	0.928333	0.94333547	0.931739
2046	0.962401	0.959765	0.960237	0.9469	0.9469	0.96220217	0.950374
2047	0.981649	0.97896	0.979441	0.96584	0.965838	0.98144622	0.969382
2048	1.001282	0.998539	0.99903	0.98515	0.985154	1.00107514	0.988769
2049	1.021307	1.01851	1.019011	1.00486	1.004857	1.02109665	1.008545
2050	1.041733	1.03888	1.039391	1.02495	1.024955	1.04151858	1.028715
2051	1.062568	1.059658	1.060179	1.04545	1.045454	1.06234895	1.04929
2052	1.083819	1.080851	1.081382	1.06636	1.066363	1.08359593	1.070276
2053	1.105496	1.102468	1.10301	1.08769	1.08769	1.10526785	1.091681
2054	1.127606	1.124517	1.12507	1.10944	1.109444	1.1273732	1.113515
2055	1.150158	1.147008	1.147572	1.13163	1.131633	1.14992067	1.135785
2056	1.173161	1.169948	1.170523	1.15427	1.154265	1.17291908	1.158501
2057	1.196624	1.193347	1.193934	1.17735	1.177351	1.19637746	1.181671
2058	1.220557	1.217214	1.217812	1.2009	1.200898	1.22030501	1.205304
2059	1.244968	1.241558	1.242168	1.22492	1.224916	1.24471111	1.22941
2060	1.269867	1.266389	1.267012	1.24941	1.249414	1.26960534	1.253998
2061	1.295265	1.291717	1.292352	1.2744	1.274402	1.29499744	1.279078
2062	1.32117	1.317551	1.318199	1.29989	1.29989	1.32089739	1.30466
2063	1.347593	1.343902	1.344563	1.32589	1.325888	1.34731534	1.330753
2064	1.374545	1.37078	1.371454	1.35241	1.352406	1.37426165	1.357368

Real 2019\$ Avoided Cost (By Zone)

	Zone 1	Zone 2	Zone 3	Zone 4	Oregon	Washington	System
2019	0.316645	0.315169	0.315434	0.28791	0.28791	0.316534	0.292795
2020	0.505405	0.503572	0.5039	0.484102	0.484102	0.505267	0.48806
2021	0.493305	0.491531	0.491848	0.474678	0.474678	0.493171	0.478217
2022	0.563444	0.559877	0.560516	0.541298	0.541298	0.563176	0.546171
2023	0.551856	0.548507	0.549107	0.532911	0.532911	0.551604	0.537216
2024	0.543399	0.539688	0.540353	0.524453	0.524453	0.54312	0.528923
2025	0.517714	0.516403	0.516637	0.50526	0.50526	0.517615	0.507684
2026	0.507962	0.506575	0.506823	0.496108	0.496108	0.507858	0.498478
2027	0.477999	0.476604	0.476854	0.466699	0.466699	0.477894	0.468992
2028	0.469692	0.468323	0.468568	0.458959	0.458959	0.469589	0.461157
2029	0.457784	0.456216	0.456496	0.44757	0.44757	0.457666	0.449783
2030	0.447285	0.445862	0.446117	0.437555	0.437555	0.447177	0.43963
2031	0.434447	0.433331	0.433531	0.425118	0.425118	0.434363	0.426995
2032	0.42449	0.423679	0.423824	0.415542	0.415542	0.424429	0.417224
2033	0.414801	0.414154	0.41427	0.406244	0.406244	0.414752	0.407794
2034	0.403748	0.403099	0.403216	0.395586	0.395586	0.403699	0.397078
2035	0.392011	0.391375	0.391489	0.384227	0.384227	0.391963	0.385657
2036	0.383099	0.382023	0.382216	0.376768	0.376768	0.383018	0.378187
2037	0.370241	0.36921	0.369395	0.364178	0.364178	0.370163	0.365537
2038	0.360474	0.359487	0.359664	0.354668	0.354668	0.3604	0.35597
2039	0.352086	0.351122	0.351295	0.346415	0.346415	0.352014	0.347686
2040	0.343894	0.342952	0.34312	0.338355	0.338355	0.343823	0.339596
2041	0.335891	0.334971	0.335136	0.330481	0.330481	0.335822	0.331694
2042	0.328076	0.327177	0.327338	0.322791	0.322791	0.328008	0.323976
2043	0.320441	0.319564	0.319721	0.31528	0.31528	0.320375	0.316437
2044	0.312985	0.312128	0.312281	0.307944	0.307944	0.312921	0.309074
2045	0.305702	0.304865	0.305015	0.300778	0.300778	0.305639	0.301882
2046	0.298589	0.297771	0.297917	0.293779	0.293779	0.298527	0.294857
2047	0.291641	0.290842	0.290985	0.286943	0.286943	0.291581	0.287996
2048	0.284855	0.284074	0.284214	0.280267	0.280267	0.284796	0.281295
2049	0.278226	0.277464	0.277601	0.273745	0.273745	0.278169	0.274749
2050	0.271752	0.271008	0.271141	0.267375	0.267375	0.271696	0.268356
2051	0.265429	0.264702	0.264832	0.261154	0.261154	0.265374	0.262112
2052	0.259252	0.258542	0.258669	0.255077	0.255077	0.259199	0.256013
2053	0.25322	0.252526	0.25265	0.249141	0.249141	0.253168	0.250055
2054	0.247328	0.24665	0.246771	0.243344	0.243344	0.247277	0.244237
2055	0.241572	0.240911	0.241029	0.237682	0.237682	0.241523	0.238554
2056	0.235951	0.235305	0.235421	0.232151	0.232151	0.235903	0.233003
2057	0.230461	0.22983	0.229943	0.226749	0.226749	0.230413	0.227581
2058	0.225098	0.224482	0.224592	0.221473	0.221473	0.225052	0.222285
2059	0.21986	0.219258	0.219366	0.216319	0.216319	0.219815	0.217113
2060	0.214744	0.214156	0.214262	0.211286	0.211286	0.2147	0.212061
2061	0.209748	0.209173	0.209276	0.206369	0.206369	0.209704	0.207126
2062	0.204867	0.204306	0.204406	0.201567	0.201567	0.204825	0.202307
2063	0.2001	0.199552	0.19965	0.196877	0.196877	0.200059	0.197599
2064	0.195444	0.194908	0.195004	0.192296	0.192296	0.195403	0.193001

Discount Rate

4.43%

Source: <https://www.zillow.com/mortgage-rates/30-year-fixed/>

As of - 6/1/2018

Incremental Fixed Transportation

Total Cost - \$/dth	
2019	0
2020	0
2021	0
2022	0.7594052
2023	0.7594052
2024	0.7594052
2025	0.7594052
2026	0.7594052
2027	0.492824728
2028	0.492824728
2029	0.492824728
2030	0.492824728
2031	0.492824728
2032	0.492824728
2033	0.492824728
2034	0.492824728
2035	0.492824728
2036	0.492824728
2037	0.492824728
2038	0.492824728

	Allocated Cost	
	I-5 Exp	GTN
2019	0	0
2020	0	0
2021	0	0
2022	0.74	0
2023	0.74	0
2024	0.74	0
2025	0.74	0
2026	0.74	0
2027	0.37	0.1102315
2028	0.37	0.1102315
2029	0.37	0.1102315
2030	0.37	0.1102315
2031	0.37	0.1102315
2032	0.37	0.1102315
2033	0.37	0.1102315
2034	0.37	0.1102315
2035	0.37	0.1102315
2036	0.37	0.1102315
2037	0.37	0.1102315
2038	0.37	0.1102315

Contracts		
Name	I-5 Exp	GTN
Cost	0.74	0.220463
Year in Ser	2022	2027
Source	NWP Presentation April 8th, 2014	Blend of cost for milage based incrm. GTN capacity

Variable Transportation

Shortfalls Begin:	2022
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Total Cost \$/dth	
2019	0.02820827
2020	0.02820827
2021	0.02820827
2022	0.030786697
2023	0.030786697
2024	0.030786697
2025	0.030786697
2026	0.030786697
2027	0.018933819
2028	0.018933819
2029	0.018933819
2030	0.018933819
2031	0.018933819
2032	0.018933819
2033	0.018933819
2034	0.018933819
2035	0.018933819
2036	0.018933819
2037	0.018933819
2038	0.018933819

New Allocated Cost		
	I-5 Exp	GTN
2019	0	0
2020	0	0
2021	0	0
2022	0.03	0
2023	0.03	0
2024	0.03	0
2025	0.03	0
2026	0.03	0
2027	0.015	0.00345
2028	0.015	0.00345
2029	0.015	0.00345
2030	0.015	0.00345
2031	0.015	0.00345
2032	0.015	0.00345
2033	0.015	0.00345
2034	0.015	0.00345
2035	0.015	0.00345
2036	0.015	0.00345
2037	0.015	0.00345
2038	0.015	0.00345

New Contracts		
	I-5 Exp	GTN
Cost	0.03	0.0069
Year in Service	2022	2027

Existing Contracts	
Contract	Cost
GTN13687	0.004001515
GTN13688	0.00531888
GTN17019W	0.00173264
GTN17021	0.00434656
GTN17022	0.00452416
GTN17023	0.00656256
GTN17025	0.0068304
GTN17026	0.0070128
GTN17028	0.00727216
GTN17031	0.00750704
GTN17033	0.0077424
GTN17034	0.00801552
GTN17036	0.00831104
GTN17037	0.00979936
NWP100002N	0.03
NWP100064Z20	0.03
NWP100134N11	0.03
NWP100149S	0.03
NWP100150N	0.03
NWP132329Z3W	0.03
NWP135558SS	0.03
NWP139090Z26	0.03
NWP139382	0.03
NWP139383	0.03
NWP139384	0.03
NWP139630MEO	0.03
NWP139637Z3W	0.03
NWP140047DC	0.03
NWP140748Z26	0.03
RUBY6103600B	0.01
GTN18507	0.00979936
Average	0.02748746

Fuel

Total Cost - dth	
2019	0.00610122
2020	0.00610122
2021	0.00610122
2022	0.00610122
2023	0.00610122
2024	0.00610122
2025	0.00610122
2026	0.00610122
2027	0.00610122
2028	0.00610122
2029	0.00610122
2030	0.00610122
2031	0.00610122
2032	0.00610122
2033	0.00610122
2034	0.00610122
2035	0.00610122
2036	0.00610122
2037	0.00610122
2038	0.00610122

Existing Contracts	
Contract	Cost
GTN13687	0.005
GTN13688	0.005
GTN17019W	0.005
GTN17021	0.005
GTN17022	0.005
GTN17023	0.005
GTN17025	0.005
GTN17026	0.005
GTN17028	0.005
GTN17031	0.005
GTN17033	0.005
GTN17034	0.005
GTN17036	0.005
GTN17037	0.005
JPWD-100302	1.16
JPWD-100401	0.17
JPWD-135365	0.17
JPWD-139622	0.17
JPWD-139624	1.16
JPWD-139626	0.17
JPWD-139627	1.16
NWP100002S	1.16
NWP100064MEO	1.16
NWP100134S3S	1.16
NWP100149N	1.16
NWP100150S	1.16
NWP132329MEO	1.16
NWP135558P3W	1.16
NWP139090Z26	1.16
NWP139382	1.16
NWP139383	1.16
NWP139384	1.16
NWP139630MEO	1.16
NWP139637Z3W	1.16
NWP140047DC	1.16
NWP140748Z26	1.16
PLWD-100304	1.16
PLWD-100601	0.53
PLWD-140857	0.53
PLWD-141193	1.16
GTN18057	0.005
Average	0.610122

Fixed Storage

Total Cost \$/dth	
2019	0
2020	0
2021	0
2022	0
2023	0
2024	0
2025	0
2026	0
2027	0
2028	0
2029	0
2030	0
2031	0
2032	0
2033	0
2034	0
2035	0
2036	0
2037	0
2038	0

Allocated Cost	
2019	0
2020	0
2021	0
2022	0
2023	0
2024	0
2025	0
2026	0
2027	0
2028	0
2029	0
2030	0
2031	0
2032	0
2033	0
2034	0
2035	0
2036	0
2037	0
2038	0

Variable Storage

Total Cost \$/dth	
2019	0
2020	0
2021	0
2022	0
2023	0
2024	0
2025	0
2026	0
2027	0
2028	0
2029	0
2030	0
2031	0
2032	0
2033	0
2034	0
2035	0
2036	0
2037	0
2038	0

New Allocated Cost	
2019	0
2020	0
2021	0
2022	0
2023	0
2024	0
2025	0
2026	0
2027	0
2028	0
2029	0
2030	0
2031	0
2032	0
2033	0
2034	0
2035	0
2036	0
2037	0
2038	0

Commodity Cost							
\$/dth	Zone 1	Zone 2	Zone 3	Zone 4	Oregon	Washington	System
2019	2.774501	2.761085	2.763487	2.513275	2.513275	2.77349105	2.557679
2020	2.523356	2.505957	2.509072	2.321114	2.321114	2.52204623	2.358692
2021	2.61435	2.596762	2.599911	2.429683	2.429683	2.61302585	2.464771
2022	2.811202	2.774266	2.780879	2.581909	2.581909	2.80842151	2.632366
2023	2.891022	2.854818	2.8613	2.686194	2.686194	2.8882961	2.732731
2024	3.00652	2.964618	2.97212	2.792594	2.792594	3.00336562	2.843065
2025	2.922084	2.906623	2.909391	2.775242	2.775242	2.92091965	2.803816
2026	3.019023	3.001937	3.004996	2.87305	2.87305	3.01773669	2.902239
2027	3.110493	3.092545	3.095758	2.965184	2.965184	3.10914161	2.994669
2028	3.217749	3.199365	3.202657	3.073621	3.073621	3.21636471	3.103131
2029	3.328298	3.306299	3.310238	3.18506	3.18506	3.32664215	3.216089
2030	3.405369	3.384539	3.388269	3.262886	3.262886	3.40380115	3.293272
2031	3.445623	3.428551	3.431608	3.302953	3.302953	3.44433802	3.331651
2032	3.527306	3.514349	3.516669	3.384395	3.384395	3.5263307	3.411251
2033	3.612365	3.601575	3.603507	3.469654	3.469654	3.61155298	3.495492
2034	3.672622	3.661318	3.663342	3.530454	3.530454	3.67177076	3.556446
2035	3.716904	3.705343	3.707413	3.575311	3.575311	3.71603348	3.601336
2036	3.809705	3.789252	3.792914	3.689432	3.689432	3.80816473	3.716391
2037	3.823166	3.802714	3.806376	3.702894	3.702894	3.8216264	3.729852
2038	3.892309	3.871856	3.875518	3.772036	3.772036	3.89076915	3.798995

Basin Weights (From SENDOUT)			
	Aeco	Rockies	Sumas
Zone 1	0	0.409083	0.590917
Zone 2	0	0.502903	0.497097
Zone 3	0	0.486105	0.513895
Zone 4	0.222371	0.394663	0.382966
Oregon	0.222371	0.394663	0.382966
Washington	0	0.416146	0.583854
System	0.189784	0.353965	0.456252
Forecast Type?	Peak		

Commodity Cost							
Price Forecast (Annual)				Price Forecast (Peak)			
	Aeco	Rockies	Sumas		Aeco	Rockies	Sumas
2019	1.372315	2.010953	1.920402	2019	1.649	2.69	2.833
2020	1.449444	2.052139	2.049371	2020	1.677717	2.41377	2.599221
2021	1.612949	2.162179	2.125459	2021	1.84844	2.503572	2.69104
2022	1.718072	2.211603	2.206326	2022	1.915601	2.578559	2.972258
2023	1.868663	2.31376	2.392405	2023	2.102752	2.662995	3.048881
2024	1.947262	2.389797	2.463703	2024	2.198242	2.742599	3.189229
2025	2.057996	2.472059	2.477563	2025	2.318464	2.824709	2.989495
2026	2.155724	2.547368	2.563152	2026	2.425276	2.91141	3.093522
2027	2.250837	2.620728	2.648664	2027	2.522895	2.997448	3.188752
2028	2.347275	2.703139	2.737398	2028	2.637061	3.101961	3.297907
2029	2.472017	2.797846	2.843983	2029	2.764873	3.189739	3.424221
2030	2.547606	2.87165	2.915633	2030	2.841054	3.274173	3.496195
2031	2.57175	2.919012	2.94973	2031	2.866677	3.338093	3.520065
2032	2.625766	2.995285	3.011442	2032	2.932182	3.445693	3.583806
2033	2.697865	3.123408	3.098062	2033	3.010187	3.544406	3.659413
2034	2.761004	3.195198	3.167115	2034	3.074771	3.601425	3.72191
2035	2.808696	3.236762	3.218731	2035	3.12258	3.644091	3.767311
2036	3.014929	3.259346	3.279096	2036	3.343885	3.680885	3.898885
2037	3.027784	3.2722	3.29195	2037	3.357346	3.694346	3.912346
2038	3.093807	3.338224	3.357974	2038	3.426489	3.763489	3.981489

Carbon Tax			
Scenario?	SCC 3%	SCC 3%	
\$/dth	Washington	Oregon	System
2019	0	0	0
2020	2.16911392	2.169114	2.169114
2021	2.16911392	2.169114	2.169114
2022	2.22075949	2.220759	2.220759
2023	2.27240506	2.272405	2.272405
2024	2.32405063	2.324051	2.324051
2025	2.3756962	2.375696	2.375696
2026	2.42734177	2.427342	2.427342
2027	2.47898734	2.478987	2.478987
2028	2.53063291	2.530633	2.530633
2029	2.53063291	2.530633	2.530633
2030	2.58227848	2.582278	2.582278
2031	2.63392405	2.633924	2.633924
2032	2.68556962	2.68557	2.68557
2033	2.73721519	2.737215	2.737215
2034	2.78886076	2.788861	2.788861
2035	2.84050633	2.840506	2.840506
2036	2.8921519	2.892152	2.892152
2037	2.94379747	2.943797	2.943797
2038	2.99544304	2.995443	2.995443

EPA 40 CFR Part 98 Subpart NN default higher heating value is 1.026 mmbtu/Mscf

EPA 40 CFR Part 98 Subpart NN Methodology 2 default CO2 emissions factor - 0.0544 metric tons CO2/Mscf

CNGC WA heating values - from EPA Subpart NN reporting

2012	1.032 mmbtu/Mscf
2013	1.035 mmbtu/Mscf
2014	1.043 mmbtu/Mscf
2015	1.062 mmbtu/Mscf
2016	1.073 mmbtu/Mscf
2017	1.075 mmbtu/Mscf
average	1.05333333 mmbtu/Mscf

Carbon Forecasts

Inslee Tax			PSU Study			I-1631		
Year	\$/ton	\$/dth	Year	\$/ton	\$/dth	Year	\$/ton	\$/dth
2019	0	0	2019	10	0.516456	2019	0	0
2020	12	0.619747	2020	20	1.032911	2020	15	0.774684
2021	13.8	0.712709	2021	30	1.549367	2021	17.318	0.894398
2022	15.6	0.805671	2022	40	2.065823	2022	19.68514	1.01665
2023	17.4	0.898633	2023	50	2.582278	2023	22.10247	1.141494
2024	19.2	0.991595	2024	60	3.098734	2024	24.57104	1.268985
2025	21	1.084557	2025	60	3.098734	2025	27.09194	1.399179
2026	22.8	1.177519	2026	60	3.098734	2026	29.66629	1.532133
2027	24.6	1.270481	2027	60	3.098734	2027	32.29522	1.667905
2028	26.4	1.363443	2028	60	3.098734	2028	34.97988	1.806556
2029	28.2	1.456405	2029	60	3.098734	2029	37.72145	1.948146
2030	30	1.549367	2030	60	3.098734	2030	40.52115	2.092738
2031	30	1.549367	2031	60	3.098734	2031	43.38019	2.240395
2032	30	1.549367	2032	60	3.098734	2032	46.29985	2.391182
2033	30	1.549367	2033	60	3.098734	2033	49.28141	2.545167
2034	30	1.549367	2034	60	3.098734	2034	52.32618	2.702415
2035	30	1.549367	2035	60	3.098734	2035	55.43549	2.862998
2036	30	1.549367	2036	60	3.098734	2036	58.61073	3.026984
2037	30	1.549367	2037	60	3.098734	2037	61.85327	3.194447
2038	30	1.549367	2038	60	3.098734	2038	65.16456	3.365461

EPA 40 CFR Part 98 Subpart NN default higher heating value is 1.026 mmbtu/Mscf

EPA 40 CFR Part 98 Subpart NN Methodology 2 default CO2 emissions factor - 0.0544 metric tons CO2/Mscf

CNGC WA heating values - from EPA Subpart NN reporting

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2013	1.035	mmbtu/Mscf
2014	1.043	mmbtu/Mscf
2015	1.062	mmbtu/Mscf
2016	1.073	mmbtu/Mscf
2017	1.075	mmbtu/Mscf
average	1.053333	

Carbon Forecasts

CEC Mid			SCC 3%			Market Choice		
Year	\$/ton	\$/dth	Year	\$/ton	\$/dth	Year	\$/ton	\$/dth
2019	0	0	2019	0	0	2019	0	0
2020	0	0	2020	42	2.169114	2020	24	1.239493671
2021	19.22995	0.993142	2021	42	2.169114	2021	24.48	1.264283544
2022	21.53828	1.112357	2022	43	2.220759	2022	24.9696	1.289569215
2023	24.11584	1.245476	2023	44	2.272405	2023	25.46899	1.315360599
2024	26.99627	1.394238	2024	45	2.324051	2024	25.97837	1.341667811
2025	30.22917	1.561203	2025	46	2.375696	2025	26.49794	1.368501168
2026	33.84673	1.748034	2026	47	2.427342	2026	27.0279	1.395871191
2027	37.88973	1.956836	2027	48	2.478987	2027	27.56846	1.423788615
2028	42.41258	2.190422	2028	49	2.530633	2028	28.11983	1.452264387
2029	47.4747	2.451858	2029	49	2.530633	2029	28.68222	1.481309675
2030	53.15717	2.745332	2030	50	2.582278	2030	29.25587	1.510935868
2031	58.83965	3.038807	2031	51	2.633924	2031	29.84098	1.541154586
2032	64.52212	3.332282	2032	52	2.68557	2032	30.4378	1.571977678
2033	70.20459	3.625756	2033	53	2.737215	2033	31.04656	1.603417231
2034	75.88707	3.919231	2034	54	2.788861	2034	31.66749	1.635485576
2035	81.56954	4.212706	2035	55	2.840506	2035	32.30084	1.668195287
2036	87.25202	4.50618	2036	56	2.892152	2036	32.94686	1.701559193
2037	92.93449	4.799655	2037	57	2.943797	2037	33.60579	1.735590377
2038	98.61697	5.093129	2038	58	2.995443	2038	34.27791	1.770302184

EPA 40 CFR Part 98 Subpart NN default higher heating value is 1.026 mmbtu/Mscf

EPA 40 CFR Part 98 Subpart NN Methodology 2 default CO2 emissions factor - 0.0544 metric tons CO2/Mscf

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2014	1.043	mmbtu/Mscf
2015	1.062	mmbtu/Mscf
2016	1.073	mmbtu/Mscf
2017	1.075	mmbtu/Mscf
average	1.053333	

Environmental Adder		
	System	Adder 10%
2019	110%	
2020	110%	
2021	110%	
2022	110%	
2023	110%	
2024	110%	
2025	110%	
2026	110%	
2027	110%	
2028	110%	
2029	110%	
2030	110%	
2031	110%	
2032	110%	
2033	110%	
2034	110%	
2035	110%	
2036	110%	
2037	110%	
2038	110%	

Distribution System Costs

\$/dth	Zone 1	Zone 2	Zone 3	Zone 4	Oregon	Washington	System
2019	0.08629187	0.08629187	0.08629187	0.08629187	0.08629187	0.08629187	0.08629187
2020	0.088017707	0.088017707	0.088017707	0.08801771	0.08801771	0.088017707	0.088017707
2021	0.089778061	0.089778061	0.089778061	0.08977806	0.08977806	0.089778061	0.089778061
2022	0.091573622	0.091573622	0.091573622	0.09157362	0.09157362	0.091573622	0.091573622
2023	0.093405094	0.093405094	0.093405094	0.09340509	0.09340509	0.093405094	0.093405094
2024	0.095273196	0.095273196	0.095273196	0.0952732	0.0952732	0.095273196	0.095273196
2025	0.09717866	0.09717866	0.09717866	0.09717866	0.09717866	0.09717866	0.09717866
2026	0.099122233	0.099122233	0.099122233	0.09912223	0.09912223	0.099122233	0.099122233
2027	0.101104678	0.101104678	0.101104678	0.10110468	0.10110468	0.101104678	0.101104678
2028	0.103126772	0.103126772	0.103126772	0.10312677	0.10312677	0.103126772	0.103126772
2029	0.105189307	0.105189307	0.105189307	0.10518931	0.10518931	0.105189307	0.105189307
2030	0.107293093	0.107293093	0.107293093	0.10729309	0.10729309	0.107293093	0.107293093
2031	0.109438955	0.109438955	0.109438955	0.10943896	0.10943896	0.109438955	0.109438955
2032	0.111627734	0.111627734	0.111627734	0.11162773	0.11162773	0.111627734	0.111627734
2033	0.113860289	0.113860289	0.113860289	0.11386029	0.11386029	0.113860289	0.113860289
2034	0.116137495	0.116137495	0.116137495	0.11613749	0.11613749	0.116137495	0.116137495
2035	0.118460245	0.118460245	0.118460245	0.11846024	0.11846024	0.118460245	0.118460245
2036	0.120829449	0.120829449	0.120829449	0.12082945	0.12082945	0.120829449	0.120829449
2037	0.123246038	0.123246038	0.123246038	0.12324604	0.12324604	0.123246038	0.123246038
2038	0.125710959	0.125710959	0.125710959	0.12571096	0.12571096	0.125710959	0.125710959

Margin

Rate Class	Margin/Therm	Therms	Weighted Margin/Therm
502	0.09183	293249	0.00012315
503	0.29484	116691233.6	0.15733574
504	0.24608	80863981.62	0.09099849
505x1	0.18843	1465676	0.00126296
505x2	0.15175	4948445	0.00343400
505x3	0.1462	4991516	0.00333720
511x1	0.14834	7308369	0.00495771
511x2	0.11295	1838907	0.00094984
511x3	0.02541	226113	0.00002627
512	0.21479	46552	0.00004573
System Weighted Margin/Therm			0.00862919

Risk Premium

System		Average Annual Portfolio Cost		Cost To Fully Hedge	
Year	Risk Premium	Year	Cost	Year	Cost
2019	0	2019	0	2019	0
2020	0	2020	0	2020	0
2021	0	2021	0	2021	0
2022	0	2022	0	2022	0
2023	0	2023	0	2023	0
2024	0	2024	0	2024	0
2025	0	2025	0	2025	0
2026	0	2026	0	2026	0
2027	0	2027	0	2027	0
2028	0	2028	0	2028	0
2029	0	2029	0	2029	0
2030	0	2030	0	2030	0
2031	0	2031	0	2031	0
2032	0	2032	0	2032	0
2033	0	2033	0	2033	0
2034	0	2034	0	2034	0
2035	0	2035	0	2035	0
2036	0	2036	0	2036	0
2037	0	2037	0	2037	0
2038	0	2038	0	2038	0

Inflation

Year	System Inflation Factor
2019	2.00%
2020	2.00%
2021	2.00%
2022	2.00%
2023	2.00%
2024	2.00%
2025	2.00%
2026	2.00%
2027	2.00%
2028	2.00%
2029	2.00%
2030	2.00%
2031	2.00%
2032	2.00%
2033	2.00%
2034	2.00%
2035	2.00%
2036	2.00%
2037	2.00%
2038	2.00%
2039	2.00%
2040	2.00%
2041	2.00%
2042	2.00%
2043	2.00%
2044	2.00%
2045	2.00%
2046	2.00%
2047	2.00%
2048	2.00%
2049	2.00%
2050	2.00%
2051	2.00%
2052	2.00%
2053	2.00%
2054	2.00%
2055	2.00%
2056	2.00%
2057	2.00%
2058	2.00%
2059	2.00%
2060	2.00%
2061	2.00%
2062	2.00%
2063	2.00%
2064	2.00%

Ballot Initiative

Nominal Avoided Cost (By Zone) - \$/Therm

	Zone 1	Zone 2	Zone 3	Zone 4	Oregon	Washington	System
2019	0.315674	0.314198	0.314463	0.28694	0.286939	0.31556297	0.291824
2020	0.373436	0.371522	0.371865	0.35119	0.351189	0.37329182	0.355323
2021	0.39679	0.394855	0.395202	0.37648	0.376476	0.3966442	0.380336
2022	0.50924	0.505177	0.505905	0.48402	0.484018	0.50893446	0.489568
2023	0.531936	0.527954	0.528667	0.50941	0.509405	0.53163666	0.514525
2024	0.558852	0.554243	0.555068	0.53532	0.53532	0.55850511	0.540872
2025	0.564076	0.562375	0.56268	0.54792	0.547923	0.5639479	0.551066
2026	0.589559	0.587679	0.588016	0.5735	0.573502	0.58941704	0.576712
2027	0.58691	0.584936	0.585289	0.57093	0.570926	0.58676145	0.574169
2028	0.614162	0.61214	0.612502	0.59831	0.598308	0.61400978	0.601554
2029	0.642104	0.639684	0.640117	0.62635	0.626347	0.64192147	0.629761
2030	0.666697	0.664406	0.664816	0.65102	0.651024	0.66652444	0.654366
2031	0.687582	0.685704	0.68604	0.67189	0.671888	0.68744037	0.675045
2032	0.713372	0.711947	0.712202	0.69765	0.697652	0.71326507	0.700606
2033	0.73989	0.738704	0.738916	0.72419	0.724192	0.73980104	0.727034
2034	0.764044	0.7628	0.763023	0.74841	0.748405	0.76395007	0.751264
2035	0.786811	0.785539	0.785767	0.77124	0.771236	0.7867153	0.774099
2036	0.815295	0.813045	0.813448	0.80206	0.802065	0.81512519	0.80503
2037	0.835438	0.833188	0.833591	0.82221	0.822208	0.83526859	0.825173
2038	0.862102	0.859852	0.860255	0.84887	0.848872	0.86193226	0.851837
2039	0.879344	0.877049	0.87746	0.86585	0.865849	0.8791709	0.868874
2040	0.896931	0.89459	0.895009	0.88317	0.883166	0.89675432	0.886251
2041	0.914869	0.912482	0.912909	0.90083	0.900829	0.91468941	0.903976
2042	0.933167	0.930731	0.931167	0.91885	0.918846	0.9329832	0.922056
2043	0.95183	0.949346	0.949791	0.93722	0.937223	0.95164286	0.940497
2044	0.970866	0.968333	0.968786	0.95597	0.955967	0.97067572	0.959307
2045	0.990284	0.987699	0.988162	0.97509	0.975087	0.99008923	0.978493
2046	1.010089	1.007453	1.007925	0.99459	0.994588	1.00989102	0.998063
2047	1.030291	1.027603	1.028084	1.01448	1.01448	1.03008884	1.018024
2048	1.050897	1.048155	1.048646	1.03477	1.03477	1.05069061	1.038385
2049	1.071915	1.069118	1.069619	1.05547	1.055465	1.07170443	1.059152
2050	1.093353	1.0905	1.091011	1.07657	1.076575	1.09313851	1.080335
2051	1.11522	1.11231	1.112831	1.09811	1.098106	1.11500128	1.101942
2052	1.137525	1.134556	1.135088	1.12007	1.120068	1.13730131	1.123981
2053	1.160275	1.157247	1.15779	1.14247	1.142469	1.16004734	1.146461
2054	1.183481	1.180392	1.180945	1.16532	1.165319	1.18324828	1.16939
2055	1.20715	1.204	1.204564	1.18863	1.188625	1.20691325	1.192778
2056	1.231293	1.22808	1.228655	1.2124	1.212398	1.23105151	1.216633
2057	1.255919	1.252642	1.253229	1.23665	1.236646	1.25567254	1.240966
2058	1.281038	1.277695	1.278293	1.26138	1.261379	1.28078599	1.265785
2059	1.306658	1.303249	1.303859	1.28661	1.286606	1.30640171	1.291101
2060	1.332792	1.329313	1.329936	1.31234	1.312338	1.33252975	1.316923
2061	1.359447	1.3559	1.356535	1.33859	1.338585	1.35918034	1.343261
2062	1.386636	1.383018	1.383666	1.36536	1.365357	1.38636395	1.370127
2063	1.414369	1.410678	1.411339	1.39266	1.392664	1.41409123	1.397529
2064	1.442657	1.438892	1.439566	1.42052	1.420517	1.44237305	1.42548

Ballot Initiative

Real 2019\$ Avoided Cost (By Zone)

	Zone 1	Zone 2	Zone 3	Zone 4	Oregon	Washington	System
2019	0.315674	0.314198	0.314463	0.286939	0.286939	0.315563	0.291824
2020	0.357594	0.355762	0.35609	0.336292	0.336292	0.357456	0.34025
2021	0.36384	0.362066	0.362383	0.345213	0.345213	0.363706	0.348752
2022	0.447144	0.443576	0.444215	0.424997	0.424997	0.446875	0.42987
2023	0.447259	0.44391	0.44451	0.428314	0.428314	0.447006	0.432618
2024	0.449956	0.446245	0.44691	0.43101	0.43101	0.449677	0.43548
2025	0.434896	0.433585	0.43382	0.422443	0.422443	0.434798	0.424866
2026	0.435261	0.433874	0.434122	0.423407	0.423407	0.435157	0.425777
2027	0.414925	0.413529	0.413779	0.403625	0.403625	0.41482	0.405918
2028	0.415772	0.414403	0.414648	0.405039	0.405039	0.415669	0.407237
2029	0.416248	0.414679	0.41496	0.406034	0.406034	0.41613	0.408247
2030	0.413857	0.412435	0.412689	0.404128	0.404128	0.41375	0.406203
2031	0.408715	0.407599	0.407799	0.399387	0.399387	0.408631	0.401263
2032	0.406058	0.405246	0.405392	0.39711	0.39711	0.405997	0.398791
2033	0.403286	0.402639	0.402755	0.39473	0.39473	0.403238	0.396279
2034	0.398785	0.398136	0.398252	0.390623	0.390623	0.398736	0.392115
2035	0.393248	0.392612	0.392726	0.385463	0.385463	0.3932	0.386894
2036	0.390198	0.389121	0.389314	0.383866	0.383866	0.390117	0.385285
2037	0.382877	0.381846	0.38203	0.376814	0.376814	0.382799	0.378173
2038	0.378336	0.377349	0.377526	0.37253	0.37253	0.378262	0.373832
2039	0.369533	0.368569	0.368741	0.363862	0.363862	0.36946	0.365133
2040	0.360934	0.359992	0.360161	0.355395	0.355395	0.360863	0.356637
2041	0.352536	0.351616	0.35178	0.347125	0.347125	0.352466	0.348338
2042	0.344332	0.343434	0.343595	0.339048	0.339048	0.344265	0.340233
2043	0.33632	0.335442	0.335599	0.331159	0.331159	0.336254	0.332316
2044	0.328494	0.327637	0.32779	0.323453	0.323453	0.32843	0.324583
2045	0.32085	0.320013	0.320163	0.315926	0.315926	0.320787	0.31703
2046	0.313384	0.312567	0.312713	0.308575	0.308575	0.313323	0.309653
2047	0.306092	0.305293	0.305436	0.301395	0.301395	0.306032	0.302448
2048	0.29897	0.298189	0.298329	0.294382	0.294382	0.298911	0.29541
2049	0.292013	0.291251	0.291387	0.287532	0.287532	0.291956	0.288536
2050	0.285218	0.284474	0.284607	0.280841	0.280841	0.285162	0.281822
2051	0.278581	0.277854	0.277984	0.274306	0.274306	0.278526	0.275264
2052	0.272099	0.271389	0.271516	0.267923	0.267923	0.272045	0.268859
2053	0.265767	0.265074	0.265198	0.261689	0.261689	0.265715	0.262603
2054	0.259583	0.258906	0.259027	0.2556	0.2556	0.259532	0.256492
2055	0.253543	0.252881	0.253	0.249652	0.249652	0.253493	0.250524
2056	0.247643	0.246997	0.247113	0.243843	0.243843	0.247594	0.244695
2057	0.241881	0.241249	0.241362	0.238169	0.238169	0.241833	0.239001
2058	0.236252	0.235636	0.235746	0.232627	0.232627	0.236206	0.233439
2059	0.230755	0.230153	0.230261	0.227214	0.227214	0.23071	0.228007
2060	0.225385	0.224797	0.224903	0.221927	0.221927	0.225341	0.222702
2061	0.220141	0.219566	0.219669	0.216763	0.216763	0.220098	0.21752
2062	0.215018	0.214457	0.214558	0.211719	0.211719	0.214976	0.212458
2063	0.210015	0.209467	0.209565	0.206792	0.206792	0.209974	0.207515
2064	0.205128	0.204593	0.204689	0.20198	0.20198	0.205088	0.202686

<p>Discount Rate</p> <p>4.43%</p>
<p>Source: https://www.zillow.com/mortgage-rates/30-year-fixed/</p> <p>As of - 6/1/2018</p>

SB 6203 - Inslee-Carlyle Tax

Nominal Avoided Cost (By Zone) - \$/Therm

	Zone 1	Zone 2	Zone 3	Zone 4	Oregon	Washington	System
2019	0.315674	0.314198	0.314463	0.286939	0.286939	0.31556297	0.291824
2020	0.356393	0.354479	0.354822	0.334146	0.334146	0.35624878	0.33828
2021	0.376804	0.374869	0.375216	0.356491	0.356491	0.3766584	0.36035
2022	0.486033	0.48197	0.482697	0.46081	0.46081	0.48572672	0.466361
2023	0.505222	0.501239	0.501952	0.482691	0.482691	0.50492189	0.48781
2024	0.528339	0.52373	0.524555	0.504807	0.504807	0.52799217	0.510359
2025	0.529468	0.527767	0.528071	0.513315	0.513315	0.52933948	0.516458
2026	0.550551	0.548672	0.549008	0.534494	0.534494	0.55040954	0.537705
2027	0.543193	0.541219	0.541573	0.527209	0.527209	0.54304481	0.530453
2028	0.56542	0.563397	0.563759	0.549566	0.549566	0.56526738	0.552812
2029	0.588012	0.585592	0.586026	0.572256	0.572256	0.58782998	0.575669
2030	0.606926	0.604635	0.605045	0.591253	0.591253	0.60675367	0.594595
2031	0.611569	0.609691	0.610027	0.595875	0.595875	0.61142731	0.599032
2032	0.620773	0.619347	0.619603	0.605052	0.605052	0.62066538	0.608007
2033	0.630352	0.629166	0.629378	0.614654	0.614654	0.63026309	0.617496
2034	0.637208	0.635965	0.636188	0.62157	0.62157	0.63711477	0.624429
2035	0.642312	0.64104	0.641268	0.626736	0.626736	0.64221594	0.629599
2036	0.652757	0.650507	0.65091	0.639527	0.639527	0.6525873	0.642492
2037	0.654479	0.652229	0.652632	0.641249	0.641249	0.65430974	0.644215
2038	0.662331	0.660082	0.660484	0.649101	0.649101	0.66216194	0.652067
2039	0.675578	0.673283	0.673694	0.662083	0.662083	0.67540518	0.665108
2040	0.68909	0.686749	0.687168	0.675325	0.675325	0.68891328	0.67841
2041	0.702871	0.700484	0.700911	0.688832	0.688832	0.70269154	0.691978
2042	0.716929	0.714493	0.714929	0.702608	0.702608	0.71674538	0.705818
2043	0.731267	0.728783	0.729228	0.71666	0.71666	0.73108028	0.719934
2044	0.745893	0.743359	0.743813	0.730994	0.730994	0.74570189	0.734333
2045	0.76081	0.758226	0.758689	0.745613	0.745613	0.76061593	0.74902
2046	0.776027	0.773391	0.773863	0.760526	0.760526	0.77582825	0.764
2047	0.791547	0.788859	0.78934	0.775736	0.775736	0.79134481	0.77928
2048	0.807378	0.804636	0.805127	0.791251	0.791251	0.80717171	0.794866
2049	0.823526	0.820728	0.821229	0.807076	0.807076	0.82331514	0.810763
2050	0.839996	0.837143	0.837654	0.823217	0.823217	0.83978144	0.826978
2051	0.856796	0.853886	0.854407	0.839682	0.839682	0.85657707	0.843518
2052	0.873932	0.870964	0.871495	0.856475	0.856475	0.87370861	0.860388
2053	0.891411	0.888383	0.888925	0.873605	0.873605	0.89118279	0.877596
2054	0.909239	0.90615	0.906703	0.891077	0.891077	0.90900644	0.895148
2055	0.927424	0.924273	0.924838	0.908899	0.908899	0.92718657	0.913051
2056	0.945972	0.942759	0.943334	0.927077	0.927077	0.9457303	0.931312
2057	0.964892	0.961614	0.962201	0.945618	0.945618	0.96464491	0.949938
2058	0.98419	0.980846	0.981445	0.96453	0.96453	0.98393781	0.968937
2059	1.003873	1.000463	1.001074	0.983821	0.983821	1.00361656	0.988316
2060	1.023951	1.020473	1.021095	1.003497	1.003497	1.02368889	1.008082
2061	1.04443	1.040882	1.041517	1.023567	1.023567	1.04416267	1.028244
2062	1.065318	1.0617	1.062348	1.044039	1.044039	1.06504592	1.048808
2063	1.086625	1.082934	1.083595	1.06492	1.06492	1.08634684	1.069785
2064	1.108357	1.104592	1.105266	1.086218	1.086218	1.10807378	1.09118

SB 6203 - Inslee-Carlyle Tax

Real 2019\$ Avoided Cost (By Zone)

	Zone 1	Zone 2	Zone 3	Zone 4	Oregon	Washington	System
2019	0.315674	0.314198	0.314463	0.286939	0.286939	0.315563	0.291824
2020	0.341274	0.339442	0.33977	0.319972	0.319972	0.341136	0.32393
2021	0.345513	0.343739	0.344057	0.326887	0.326887	0.34538	0.330426
2022	0.426766	0.423198	0.423837	0.404619	0.404619	0.426497	0.409493
2023	0.424796	0.421448	0.422048	0.405852	0.405852	0.424544	0.410156
2024	0.425389	0.421678	0.422342	0.406443	0.406443	0.42511	0.410913
2025	0.408214	0.406903	0.407137	0.39576	0.39576	0.408115	0.398184
2026	0.406463	0.405075	0.405324	0.394608	0.394608	0.406358	0.396978
2027	0.384019	0.382623	0.382873	0.372719	0.372719	0.383914	0.375011
2028	0.382775	0.381406	0.381651	0.372042	0.372042	0.382672	0.37424
2029	0.381183	0.379614	0.379895	0.370969	0.370969	0.381065	0.373182
2030	0.376754	0.375332	0.375586	0.367025	0.367025	0.376647	0.3691
2031	0.363531	0.362415	0.362615	0.354203	0.354203	0.363447	0.356079
2032	0.353349	0.352538	0.352683	0.344401	0.344401	0.353288	0.346083
2033	0.343581	0.342934	0.34305	0.335025	0.335025	0.343533	0.336574
2034	0.332585	0.331936	0.332052	0.324422	0.324422	0.332536	0.325915
2035	0.321027	0.320391	0.320505	0.313242	0.313242	0.320979	0.314673
2036	0.312408	0.311331	0.311524	0.306076	0.306076	0.312327	0.307495
2037	0.299944	0.298913	0.299098	0.293881	0.293881	0.299867	0.29524
2038	0.290667	0.289679	0.289856	0.28486	0.28486	0.290592	0.286162
2039	0.283903	0.282939	0.283111	0.278232	0.278232	0.28383	0.279503
2040	0.277297	0.276355	0.276523	0.271758	0.271758	0.277226	0.272999
2041	0.270844	0.269924	0.270089	0.265434	0.265434	0.270775	0.266647
2042	0.264542	0.263643	0.263804	0.259258	0.259258	0.264474	0.260442
2043	0.258386	0.257509	0.257666	0.253225	0.253225	0.25832	0.254382
2044	0.252374	0.251517	0.25167	0.247333	0.247333	0.252309	0.248463
2045	0.246501	0.245664	0.245814	0.241577	0.241577	0.246438	0.242681
2046	0.240765	0.239948	0.240094	0.235956	0.235956	0.240704	0.237034
2047	0.235163	0.234364	0.234507	0.230466	0.230466	0.235103	0.231519
2048	0.229691	0.228911	0.22905	0.225103	0.225103	0.229632	0.226131
2049	0.224346	0.223584	0.223721	0.219865	0.219865	0.224289	0.220869
2050	0.219126	0.218382	0.218515	0.214749	0.214749	0.21907	0.21573
2051	0.214027	0.2133	0.21343	0.209752	0.209752	0.213972	0.21071
2052	0.209047	0.208337	0.208464	0.204871	0.204871	0.208993	0.205807
2053	0.204182	0.203489	0.203613	0.200104	0.200104	0.20413	0.201018
2054	0.199431	0.198754	0.198875	0.195448	0.195448	0.19938	0.196341
2055	0.194791	0.194129	0.194247	0.1909	0.1909	0.194741	0.191772
2056	0.190258	0.189612	0.189728	0.186458	0.186458	0.190209	0.18731
2057	0.185831	0.1852	0.185313	0.182119	0.182119	0.185783	0.182951
2058	0.181507	0.18089	0.181001	0.177881	0.177881	0.18146	0.178694
2059	0.177283	0.176681	0.176789	0.173742	0.173742	0.177238	0.174536
2060	0.173158	0.17257	0.172675	0.169699	0.169699	0.173114	0.170475
2061	0.169129	0.168554	0.168657	0.16575	0.16575	0.169086	0.166508
2062	0.165193	0.164632	0.164733	0.161894	0.161894	0.165151	0.162633
2063	0.161349	0.160801	0.160899	0.158126	0.158126	0.161308	0.158849
2064	0.157595	0.15706	0.157155	0.154447	0.154447	0.157555	0.155153

<p>Discount Rate</p> <p>4.43%</p>
<p>Source: https://www.zillow.com/mortgage-rates/30-year-fixed/</p> <p>As of - 6/1/2018</p>

House of Representatives Market Choice Bill

Nominal Avoided Cost (By Zone) - \$/Therm

	Zone 1	Zone 2	Zone 3	Zone 4	Oregon	Washington	System
2019	0.315674	0.314198	0.314463	0.286939	0.286939	0.31556297	0.291824
2020	0.424565	0.422651	0.422994	0.402318	0.402318	0.42442093	0.406452
2021	0.437477	0.435543	0.435889	0.417164	0.417164	0.43733161	0.421024
2022	0.539261	0.535198	0.535926	0.514039	0.514039	0.53895553	0.519589
2023	0.551062	0.547079	0.547792	0.528531	0.528531	0.55076194	0.53365
2024	0.566847	0.562238	0.563063	0.543315	0.543315	0.56650019	0.548867
2025	0.560701	0.559001	0.559305	0.544549	0.544549	0.56057335	0.547692
2026	0.57457	0.57269	0.573027	0.558513	0.558513	0.57442828	0.561724
2027	0.560057	0.558083	0.558436	0.544073	0.544073	0.55990865	0.547317
2028	0.57519	0.573168	0.57353	0.559336	0.559336	0.57503773	0.562582
2029	0.590752	0.588332	0.588765	0.574995	0.574995	0.59056949	0.578409
2030	0.602699	0.600407	0.600818	0.587026	0.587026	0.60252624	0.590368
2031	0.610665	0.608787	0.609124	0.594972	0.594972	0.61052394	0.598128
2032	0.62326	0.621835	0.62209	0.60754	0.60754	0.62315255	0.610494
2033	0.636298	0.635111	0.635324	0.6206	0.6206	0.63620861	0.623442
2034	0.646681	0.645438	0.645661	0.631043	0.631043	0.6465878	0.633902
2035	0.655383	0.654111	0.654339	0.639808	0.639808	0.65528704	0.64267
2036	0.669498	0.667248	0.667651	0.656268	0.656268	0.66932843	0.659233
2037	0.674964	0.672714	0.673117	0.661734	0.661734	0.6747943	0.664699
2038	0.686634	0.684384	0.684787	0.673404	0.673404	0.6864648	0.67637
2039	0.700367	0.698072	0.698483	0.686872	0.686872	0.70019409	0.689897
2040	0.714374	0.712034	0.712453	0.70061	0.70061	0.71419798	0.703695
2041	0.728662	0.726274	0.726702	0.714622	0.714622	0.72848193	0.717769
2042	0.743235	0.7408	0.741236	0.728914	0.728914	0.74305157	0.732124
2043	0.7581	0.755616	0.75606	0.743493	0.743493	0.7579126	0.746767
2044	0.773262	0.770728	0.771182	0.758363	0.758363	0.77307086	0.761702
2045	0.788727	0.786143	0.786605	0.77353	0.77353	0.78853227	0.776936
2046	0.804501	0.801865	0.802337	0.789	0.789	0.80430292	0.792475
2047	0.820591	0.817903	0.818384	0.80478	0.80478	0.82038898	0.808324
2048	0.837003	0.834261	0.834752	0.820876	0.820876	0.83679676	0.824491
2049	0.853743	0.850946	0.851447	0.837293	0.837293	0.85353269	0.840981
2050	0.870818	0.867965	0.868476	0.854039	0.854039	0.87060335	0.8578
2051	0.888235	0.885324	0.885845	0.87112	0.87112	0.88801541	0.874956
2052	0.905999	0.903031	0.903562	0.888543	0.888543	0.90577572	0.892455
2053	0.924119	0.921091	0.921633	0.906313	0.906313	0.92389124	0.910304
2054	0.942602	0.939513	0.940066	0.92444	0.92444	0.94236906	0.928511
2055	0.961454	0.958303	0.958867	0.942928	0.942928	0.96121644	0.947081
2056	0.980683	0.977469	0.978045	0.961787	0.961787	0.98044077	0.966022
2057	1.000296	0.997019	0.997606	0.981023	0.981023	1.00004959	0.985343
2058	1.020302	1.016959	1.017558	1.000643	1.000643	1.02005058	1.00505
2059	1.040708	1.037298	1.037909	1.020656	1.020656	1.04045159	1.025151
2060	1.061522	1.058044	1.058667	1.041069	1.041069	1.06126062	1.045654
2061	1.082753	1.079205	1.07984	1.061891	1.061891	1.08248583	1.066567
2062	1.104408	1.100789	1.101437	1.083128	1.083128	1.10413555	1.087898
2063	1.126496	1.122805	1.123466	1.104791	1.104791	1.12621826	1.109656
2064	1.149026	1.145261	1.145935	1.126887	1.126887	1.14874263	1.131849

House of Representatives Market Choice Bill

Real 2019\$ Avoided Cost (By Zone)

	Zone 1	Zone 2	Zone 3	Zone 4	Oregon	Washington	System	Discount Rate 4.43%
2019	0.315674	0.314198	0.314463	0.286939	0.286939	0.315563	0.291824	
2020	0.406555	0.404722	0.40505	0.385252	0.385252	0.406417	0.38921	
2021	0.401148	0.399374	0.399692	0.382522	0.382522	0.401015	0.386061	
2022	0.473504	0.469936	0.470575	0.451357	0.451357	0.473235	0.456231	
2023	0.463339	0.459991	0.46059	0.444395	0.444395	0.463087	0.448699	
2024	0.456394	0.452683	0.453347	0.437447	0.437447	0.456114	0.441917	
2025	0.432295	0.430984	0.431218	0.419841	0.419841	0.432196	0.422265	
2026	0.424195	0.422808	0.423056	0.412341	0.412341	0.424091	0.414711	
2027	0.395941	0.394545	0.394795	0.384641	0.384641	0.395836	0.386934	
2028	0.389389	0.38802	0.388265	0.378656	0.378656	0.389286	0.380854	
2029	0.382959	0.38139	0.381671	0.372745	0.372745	0.382841	0.374957	
2030	0.37413	0.372707	0.372962	0.364401	0.364401	0.374023	0.366475	
2031	0.362994	0.361878	0.362078	0.353666	0.353666	0.36291	0.355542	
2032	0.354765	0.353953	0.354099	0.345817	0.345817	0.354704	0.347498	
2033	0.346822	0.346175	0.346291	0.338266	0.338266	0.346773	0.339815	
2034	0.337529	0.33688	0.336996	0.329367	0.329367	0.33748	0.330859	
2035	0.32756	0.326924	0.327038	0.319775	0.319775	0.327512	0.321206	
2036	0.32042	0.319343	0.319536	0.314088	0.314088	0.320339	0.315507	
2037	0.309332	0.308301	0.308486	0.303269	0.303269	0.309255	0.304628	
2038	0.301332	0.300345	0.300521	0.295526	0.295526	0.301258	0.296827	
2039	0.29432	0.293356	0.293528	0.288649	0.288649	0.294248	0.28992	
2040	0.287472	0.28653	0.286698	0.281933	0.281933	0.287401	0.283174	
2041	0.280782	0.279862	0.280027	0.275372	0.275372	0.280713	0.276585	
2042	0.274249	0.27335	0.273511	0.268965	0.268965	0.274181	0.270149	
2043	0.267867	0.26699	0.267147	0.262706	0.262706	0.267801	0.263863	
2044	0.261634	0.260777	0.26093	0.256593	0.256593	0.26157	0.257723	
2045	0.255546	0.254709	0.254859	0.250622	0.250622	0.255483	0.251726	
2046	0.2496	0.248782	0.248928	0.244791	0.244791	0.249538	0.245869	
2047	0.243792	0.242993	0.243136	0.239094	0.239094	0.243732	0.240147	
2048	0.238119	0.237339	0.237478	0.233531	0.233531	0.23806	0.234559	
2049	0.232578	0.231816	0.231953	0.228097	0.228097	0.232521	0.229101	
2050	0.227166	0.226422	0.226555	0.222789	0.222789	0.22711	0.22377	
2051	0.22188	0.221153	0.221283	0.217605	0.217605	0.221826	0.218563	
2052	0.216717	0.216007	0.216134	0.212542	0.212542	0.216664	0.213478	
2053	0.211675	0.210981	0.211105	0.207596	0.207596	0.211622	0.20851	
2054	0.206749	0.206072	0.206193	0.202765	0.202765	0.206698	0.203658	
2055	0.201938	0.201276	0.201395	0.198047	0.198047	0.201888	0.198919	
2056	0.197239	0.196593	0.196709	0.193439	0.193439	0.197191	0.194291	
2057	0.19265	0.192018	0.192131	0.188938	0.188938	0.192602	0.18977	
2058	0.188167	0.18755	0.187661	0.184541	0.184541	0.18812	0.185354	
2059	0.183788	0.183186	0.183294	0.180247	0.180247	0.183743	0.181041	
2060	0.179512	0.178924	0.179029	0.176053	0.176053	0.179467	0.176828	
2061	0.175335	0.17476	0.174863	0.171956	0.171956	0.175291	0.172714	
2062	0.171255	0.170694	0.170794	0.167955	0.167955	0.171212	0.168695	
2063	0.16727	0.166722	0.16682	0.164047	0.164047	0.167229	0.164769	
2064	0.163378	0.162842	0.162938	0.16023	0.16023	0.163337	0.160935	

Source: <https://www.zillow.com/mortgage-rates/30-year-fixed/>
As of - 6/1/2018

0% Environmental Adder, SCC w/ 3% Discount Rate

Nominal Avoided Cost (By Zone) - \$/Therm

	Zone 1	Zone 2	Zone 3	Zone 4	Oregon	Washington	System
2019	0.287929	0.286587	0.286828	0.261807	0.261807	0.28782806	0.266247
2020	0.479899	0.478159	0.47847	0.459674	0.459674	0.47976756	0.463432
2021	0.489174	0.487415	0.48773	0.470707	0.470707	0.48904156	0.474216
2022	0.591373	0.587679	0.58834	0.568443	0.568443	0.59109465	0.573489
2023	0.604702	0.601082	0.60173	0.58422	0.58422	0.60442982	0.588873
2024	0.621604	0.617413	0.618164	0.600211	0.600211	0.62128813	0.605258
2025	0.618515	0.616969	0.617246	0.603831	0.603831	0.61839864	0.606688
2026	0.633568	0.631859	0.632165	0.618971	0.618971	0.63343926	0.621889
2027	0.620234	0.61844	0.618761	0.605703	0.605703	0.62009922	0.608652
2028	0.636327	0.634488	0.634817	0.621914	0.621914	0.63618829	0.624865
2029	0.647588	0.645388	0.645782	0.633264	0.633264	0.64742229	0.636367
2030	0.66067	0.658587	0.65896	0.646422	0.646422	0.66051313	0.64946
2031	0.670074	0.668367	0.668673	0.655807	0.655807	0.66994596	0.658677
2032	0.683626	0.68233	0.682562	0.669335	0.669335	0.68352866	0.672021
2033	0.69752	0.696441	0.696634	0.683249	0.683249	0.6974387	0.685833
2034	0.708938	0.707807	0.70801	0.694721	0.694721	0.70885276	0.69732
2035	0.718763	0.717607	0.717814	0.704604	0.704604	0.71867586	0.707206
2036	0.733444	0.731399	0.731765	0.721417	0.721417	0.73329046	0.724113
2037	0.740197	0.738152	0.738518	0.72817	0.72817	0.74004285	0.730865
2038	0.752522	0.750477	0.750843	0.740495	0.740495	0.75236817	0.743191
2039	0.767573	0.765486	0.76586	0.755305	0.755305	0.76741553	0.758055
2040	0.782924	0.780796	0.781177	0.770411	0.770411	0.78276384	0.773216
2041	0.798583	0.796412	0.796801	0.785819	0.785819	0.79841912	0.78868
2042	0.814554	0.81234	0.812737	0.801535	0.801535	0.8143875	0.804454
2043	0.830845	0.828587	0.828991	0.817566	0.817566	0.83067525	0.820543
2044	0.847462	0.845159	0.845571	0.833918	0.833918	0.84728876	0.836953
2045	0.864411	0.862062	0.862483	0.850596	0.850596	0.86423453	0.853693
2046	0.8817	0.879303	0.879732	0.867608	0.867608	0.88151922	0.870766
2047	0.899334	0.896889	0.897327	0.88496	0.88496	0.89914961	0.888182
2048	0.91732	0.914827	0.915274	0.902659	0.902659	0.9171326	0.905945
2049	0.935667	0.933124	0.933579	0.920712	0.920712	0.93547525	0.924064
2050	0.95438	0.951786	0.952251	0.939127	0.939127	0.95418476	0.942546
2051	0.973468	0.970822	0.971296	0.957909	0.957909	0.97326845	0.961396
2052	0.992937	0.990238	0.990721	0.977067	0.977067	0.99273382	0.980624
2053	1.012796	1.010043	1.010536	0.996609	0.996609	1.0125885	1.000237
2054	1.033052	1.030244	1.030747	1.016541	1.016541	1.03284027	1.020242
2055	1.053713	1.050849	1.051362	1.036872	1.036872	1.05349707	1.040646
2056	1.074787	1.071866	1.072389	1.057609	1.057609	1.07456701	1.061459
2057	1.096283	1.093303	1.093837	1.078761	1.078761	1.09605836	1.082689
2058	1.118208	1.115169	1.115713	1.100336	1.100336	1.11797952	1.104342
2059	1.140573	1.137473	1.138028	1.122343	1.122343	1.14033911	1.126429
2060	1.163384	1.160222	1.160788	1.14479	1.14479	1.16314589	1.148958
2061	1.186652	1.183426	1.184004	1.167686	1.167686	1.18640881	1.171937
2062	1.210385	1.207095	1.207684	1.19104	1.19104	1.21013699	1.195376
2063	1.234592	1.231237	1.231838	1.21486	1.21486	1.23433973	1.219283
2064	1.259284	1.255862	1.256474	1.239158	1.239158	1.25902652	1.243669

0% Environmental Adder, SCC w/ 3% Discount Rate

Real 2019\$ Avoided Cost (By Zone)

	Zone 1	Zone 2	Zone 3	Zone 4	Oregon	Washington	System	Discount Rate 4.43%
2019	0.287929	0.286587	0.286828	0.261807	0.261807	0.287828	0.266247	
2020	0.459541	0.457875	0.458173	0.440175	0.440175	0.459415	0.443773	
2021	0.448552	0.446939	0.447228	0.431619	0.431619	0.448431	0.434836	
2022	0.519261	0.516017	0.516598	0.499127	0.499127	0.519017	0.503558	
2023	0.508441	0.505397	0.505942	0.491219	0.491219	0.508212	0.495132	
2024	0.50048	0.497107	0.497711	0.483256	0.483256	0.500226	0.48732	
2025	0.476868	0.475676	0.47589	0.465547	0.465547	0.476779	0.46775	
2026	0.467753	0.466491	0.466717	0.456976	0.456976	0.467658	0.459131	
2027	0.438484	0.437215	0.437442	0.428211	0.428211	0.438388	0.430295	
2028	0.430777	0.429533	0.429755	0.42102	0.42102	0.430683	0.423018	
2029	0.419803	0.418377	0.418633	0.410518	0.410518	0.419696	0.412529	
2030	0.410116	0.408823	0.409054	0.401271	0.401271	0.410018	0.403157	
2031	0.398309	0.397294	0.397476	0.389828	0.389828	0.398232	0.391534	
2032	0.389126	0.388388	0.38852	0.380991	0.380991	0.38907	0.38252	
2033	0.380192	0.379604	0.379709	0.372413	0.372413	0.380148	0.373821	
2034	0.370023	0.369433	0.369539	0.362603	0.362603	0.369979	0.36396	
2035	0.359237	0.358659	0.358763	0.35216	0.35216	0.359194	0.353461	
2036	0.351025	0.350046	0.350221	0.345268	0.345268	0.350951	0.346559	
2037	0.339228	0.338291	0.338459	0.333716	0.333716	0.339158	0.334952	
2038	0.330247	0.32935	0.32951	0.324969	0.324969	0.33018	0.326152	
2039	0.322563	0.321686	0.321843	0.317407	0.317407	0.322497	0.318563	
2040	0.315057	0.3142	0.314354	0.310021	0.310021	0.314992	0.31115	
2041	0.307726	0.306889	0.307039	0.302807	0.302807	0.307663	0.30391	
2042	0.300565	0.299748	0.299894	0.295761	0.295761	0.300504	0.296838	
2043	0.293571	0.292773	0.292916	0.288879	0.288879	0.293511	0.289931	
2044	0.28674	0.285961	0.2861	0.282157	0.282157	0.286681	0.283184	
2045	0.280068	0.279307	0.279443	0.275592	0.275592	0.280011	0.276595	
2046	0.273551	0.272807	0.272941	0.269179	0.269179	0.273495	0.270159	
2047	0.267186	0.266459	0.266589	0.262915	0.262915	0.267131	0.263872	
2048	0.260968	0.260259	0.260386	0.256797	0.256797	0.260915	0.257732	
2049	0.254896	0.254203	0.254327	0.250822	0.250822	0.254844	0.251735	
2050	0.248965	0.248288	0.248409	0.244986	0.244986	0.248914	0.245877	
2051	0.243171	0.242511	0.242629	0.239285	0.239285	0.243122	0.240156	
2052	0.237513	0.236868	0.236983	0.233717	0.233717	0.237464	0.234568	
2053	0.231986	0.231356	0.231469	0.228279	0.228279	0.231939	0.22911	
2054	0.226588	0.225972	0.226083	0.222967	0.222967	0.226542	0.223778	
2055	0.221316	0.220714	0.220822	0.217778	0.217778	0.22127	0.218571	
2056	0.216166	0.215578	0.215684	0.212711	0.212711	0.216122	0.213485	
2057	0.211136	0.210562	0.210665	0.207761	0.207761	0.211093	0.208518	
2058	0.206223	0.205662	0.205763	0.202927	0.202927	0.206181	0.203666	
2059	0.201424	0.200877	0.200975	0.198205	0.198205	0.201383	0.198927	
2060	0.196737	0.196203	0.196298	0.193593	0.193593	0.196697	0.194298	
2061	0.192159	0.191637	0.191731	0.189088	0.189088	0.19212	0.189777	
2062	0.187688	0.187178	0.187269	0.184688	0.184688	0.18765	0.185361	
2063	0.183321	0.182822	0.182912	0.180391	0.180391	0.183283	0.181047	
2064	0.179055	0.178568	0.178655	0.176193	0.176193	0.179018	0.176835	

Source: <https://www.zillow.com/mortgage-rates/30-year-fixed/>
As of - 6/1/2018

20% Environmental Adder, SCC w/ 3% Discount Rate

Nominal Avoided Cost (By Zone) - \$/Therm

	Zone 1	Zone 2	Zone 3	Zone 4	Oregon	Washington	System
2019	0.343419	0.341809	0.342097	0.312072	0.312072	0.34329789	0.3174
2020	0.573748	0.571666	0.572034	0.549479	0.549479	0.57359076	0.553988
2021	0.584843	0.582733	0.583111	0.562683	0.562683	0.58468435	0.566894
2022	0.692012	0.68758	0.688373	0.664497	0.664497	0.69167827	0.670552
2023	0.707971	0.703626	0.704404	0.683392	0.683392	0.70764384	0.688976
2024	0.728215	0.723187	0.724087	0.702544	0.702544	0.72783646	0.7086
2025	0.724471	0.722615	0.722948	0.70685	0.70685	0.72433096	0.710278
2026	0.742495	0.740445	0.740812	0.724978	0.724978	0.74234083	0.728481
2027	0.732024	0.72987	0.730256	0.714587	0.714587	0.7318618	0.718125
2028	0.751294	0.749088	0.749483	0.733999	0.733999	0.75112825	0.73754
2029	0.764767	0.762127	0.762599	0.747578	0.747578	0.76456779	0.751301
2030	0.780423	0.777923	0.778371	0.763325	0.763325	0.78023472	0.766971
2031	0.791665	0.789617	0.789984	0.774545	0.774545	0.7915112	0.777989
2032	0.807884	0.806329	0.806607	0.790734	0.790734	0.80776667	0.793957
2033	0.824512	0.823217	0.823449	0.807386	0.807386	0.82441406	0.810487
2034	0.838168	0.836811	0.837054	0.821107	0.821107	0.83806539	0.824226
2035	0.849911	0.848524	0.848772	0.83292	0.83292	0.84980666	0.836043
2036	0.867482	0.865027	0.865467	0.853049	0.853049	0.8672968	0.856284
2037	0.875536	0.873082	0.873521	0.861103	0.861103	0.87535132	0.864338
2038	0.890277	0.887823	0.888262	0.875844	0.875844	0.89009241	0.87908
2039	0.908083	0.905579	0.906028	0.893361	0.893361	0.90789426	0.896661
2040	0.926244	0.923691	0.924148	0.911229	0.911229	0.92605215	0.914594
2041	0.944769	0.942165	0.942631	0.929453	0.929453	0.94457319	0.932886
2042	0.963665	0.961008	0.961484	0.948042	0.948042	0.96346465	0.951544
2043	0.982938	0.980228	0.980713	0.967003	0.967003	0.98273395	0.970575
2044	1.002597	0.999833	1.000328	0.986343	0.986343	1.00238863	0.989986
2045	1.022649	1.019829	1.020334	1.00607	1.00607	1.0224364	1.009786
2046	1.043102	1.040226	1.040741	1.026191	1.026191	1.04288513	1.029982
2047	1.063964	1.061031	1.061556	1.046715	1.046715	1.06374283	1.050581
2048	1.085243	1.082251	1.082787	1.06765	1.06765	1.08501769	1.071593
2049	1.106948	1.103896	1.104443	1.089003	1.089003	1.10671804	1.093025
2050	1.129087	1.125974	1.126531	1.110783	1.110783	1.1288524	1.114885
2051	1.151668	1.148494	1.149062	1.132998	1.132998	1.15142945	1.137183
2052	1.174702	1.171463	1.172043	1.155658	1.155658	1.17445804	1.159927
2053	1.198196	1.194893	1.195484	1.178771	1.178771	1.1979472	1.183125
2054	1.22216	1.218791	1.219394	1.202347	1.202347	1.22190614	1.206788
2055	1.246603	1.243166	1.243782	1.226394	1.226394	1.24634426	1.230924
2056	1.271535	1.26803	1.268657	1.250922	1.250922	1.27127115	1.255542
2057	1.296966	1.29339	1.29403	1.27594	1.27594	1.29669657	1.280653
2058	1.322905	1.319258	1.319911	1.301459	1.301459	1.3226305	1.306266
2059	1.349363	1.345643	1.346309	1.327488	1.327488	1.34908311	1.332391
2060	1.37635	1.372556	1.373235	1.354038	1.354038	1.37606478	1.359039
2061	1.403877	1.400007	1.4007	1.381119	1.381119	1.40358607	1.38622
2062	1.431955	1.428007	1.428714	1.408741	1.408741	1.43165779	1.413944
2063	1.460594	1.456568	1.457288	1.436916	1.436916	1.46029095	1.442223
2064	1.489806	1.485699	1.486434	1.465654	1.465654	1.48949677	1.471068

20% Environmental Adder, SCC w/ 3% Discount Rate

Real 2019\$ Avoided Cost (By Zone)

	Zone 1	Zone 2	Zone 3	Zone 4	Oregon	Washington	System	Discount Rate 4.43%
2019	0.343419	0.341809	0.342097	0.312072	0.312072	0.343298	0.3174	
2020	0.549409	0.54741	0.547768	0.52617	0.52617	0.549259	0.530488	
2021	0.536277	0.534341	0.534688	0.515957	0.515957	0.536131	0.519818	
2022	0.607628	0.603736	0.604433	0.583468	0.583468	0.607335	0.588785	
2023	0.59527	0.591618	0.592272	0.574604	0.574604	0.594995	0.579299	
2024	0.586318	0.58227	0.582994	0.565649	0.565649	0.586013	0.570525	
2025	0.558559	0.557129	0.557385	0.544973	0.544973	0.558451	0.547617	
2026	0.548172	0.546658	0.546929	0.53524	0.53524	0.548058	0.537825	
2027	0.517515	0.515993	0.516265	0.505188	0.505188	0.517401	0.507689	
2028	0.508607	0.507114	0.507381	0.496899	0.496899	0.508495	0.499296	
2029	0.495765	0.494054	0.49436	0.484623	0.484623	0.495636	0.487036	
2030	0.484453	0.482902	0.48318	0.47384	0.47384	0.484337	0.476103	
2031	0.470585	0.469367	0.469586	0.460408	0.460408	0.470494	0.462456	
2032	0.459854	0.458969	0.459128	0.450093	0.450093	0.459788	0.451927	
2033	0.44941	0.448704	0.448831	0.440076	0.440076	0.449357	0.441766	
2034	0.437473	0.436765	0.436892	0.428569	0.428569	0.43742	0.430197	
2035	0.424785	0.424092	0.424216	0.416293	0.416293	0.424733	0.417854	
2036	0.415174	0.414	0.41421	0.408267	0.408267	0.415086	0.409815	
2037	0.401254	0.400129	0.40033	0.394639	0.394639	0.401169	0.396122	
2038	0.390701	0.389624	0.389817	0.384368	0.384368	0.39062	0.385787	
2039	0.38161	0.380558	0.380746	0.375424	0.375424	0.381531	0.37681	
2040	0.37273	0.371703	0.371887	0.366688	0.366688	0.372653	0.368042	
2041	0.364057	0.363054	0.363233	0.358155	0.358155	0.363982	0.359478	
2042	0.355586	0.354606	0.354781	0.349821	0.349821	0.355512	0.351113	
2043	0.347312	0.346354	0.346526	0.341681	0.341681	0.34724	0.342943	
2044	0.33923	0.338295	0.338462	0.333731	0.333731	0.33916	0.334963	
2045	0.331336	0.330423	0.330587	0.325965	0.325965	0.331268	0.327169	
2046	0.323627	0.322734	0.322894	0.31838	0.31838	0.323559	0.319556	
2047	0.316096	0.315225	0.315381	0.310972	0.310972	0.31603	0.31212	
2048	0.308741	0.30789	0.308042	0.303736	0.303736	0.308677	0.304857	
2049	0.301557	0.300725	0.300874	0.296668	0.296668	0.301494	0.297764	
2050	0.29454	0.293728	0.293873	0.289765	0.289765	0.294478	0.290835	
2051	0.287686	0.286893	0.287035	0.283022	0.283022	0.287626	0.284067	
2052	0.280992	0.280217	0.280356	0.276436	0.276436	0.280933	0.277457	
2053	0.274453	0.273697	0.273832	0.270004	0.270004	0.274396	0.271001	
2054	0.268067	0.267328	0.26746	0.263721	0.263721	0.268011	0.264695	
2055	0.261829	0.261107	0.261237	0.257585	0.257585	0.261775	0.258536	
2056	0.255737	0.255032	0.255158	0.251591	0.251591	0.255684	0.25252	
2057	0.249786	0.249097	0.249221	0.245737	0.245737	0.249734	0.246644	
2058	0.243974	0.243301	0.243421	0.240018	0.240018	0.243923	0.240905	
2059	0.238297	0.23764	0.237757	0.234433	0.234433	0.238247	0.235299	
2060	0.232752	0.23211	0.232225	0.228978	0.228978	0.232703	0.229824	
2061	0.227336	0.226709	0.226821	0.22365	0.22365	0.227288	0.224476	
2062	0.222046	0.221434	0.221543	0.218446	0.218446	0.222	0.219253	
2063	0.216879	0.216281	0.216388	0.213363	0.213363	0.216834	0.214151	
2064	0.211832	0.211248	0.211353	0.208398	0.208398	0.211788	0.209168	

Source: <https://www.zillow.com/mortgage-rates/30-year-fixed/>
As of - 6/1/2018

30% Environmental Adder, SCC w/ 3% Discount Rate

Nominal Avoided Cost (By Zone) - \$/Therm

	Zone 1	Zone 2	Zone 3	Zone 4	Oregon	Washington	System
2019	0.371164	0.36942	0.369732	0.337205	0.337205	0.3710328	0.342977
2020	0.620673	0.618411	0.618816	0.594381	0.594381	0.62050236	0.599266
2021	0.632678	0.630391	0.630801	0.608671	0.608671	0.63250575	0.613233
2022	0.742332	0.73753	0.73839	0.712523	0.712523	0.74197008	0.719083
2023	0.759605	0.754899	0.755741	0.732978	0.732978	0.75925085	0.739027
2024	0.781521	0.776073	0.777049	0.75371	0.75371	0.78111062	0.760272
2025	0.777448	0.775439	0.775798	0.758359	0.758359	0.77729712	0.762074
2026	0.796959	0.794738	0.795135	0.777982	0.777982	0.79679161	0.781777
2027	0.787919	0.785586	0.786003	0.769029	0.769029	0.78774309	0.772862
2028	0.808778	0.806388	0.806816	0.790042	0.790042	0.80859822	0.793878
2029	0.823356	0.820496	0.821008	0.804735	0.804735	0.82314054	0.808769
2030	0.840299	0.837591	0.838076	0.821777	0.821777	0.84009552	0.825727
2031	0.852461	0.850241	0.850639	0.833914	0.833914	0.85229382	0.837645
2032	0.870012	0.868328	0.86863	0.851434	0.851434	0.86988567	0.854925
2033	0.888007	0.886605	0.886856	0.869455	0.869455	0.88790175	0.872814
2034	0.902782	0.901313	0.901576	0.884301	0.884301	0.9026717	0.88768
2035	0.915485	0.913982	0.914251	0.897078	0.897078	0.91537205	0.900461
2036	0.9345	0.931841	0.932317	0.918865	0.918865	0.93429996	0.922369
2037	0.943206	0.940547	0.941023	0.92757	0.92757	0.94300556	0.931075
2038	0.959155	0.956496	0.956972	0.943519	0.943519	0.95895454	0.947024
2039	0.978338	0.975626	0.976111	0.96239	0.96239	0.97813363	0.965964
2040	0.997905	0.995138	0.995634	0.981637	0.981637	0.9976963	0.985284
2041	1.017863	1.015041	1.015546	1.00127	1.00127	1.01765022	1.004989
2042	1.03822	1.035342	1.035857	1.021296	1.021296	1.03800323	1.025089
2043	1.058984	1.056049	1.056574	1.041722	1.041722	1.05876329	1.045591
2044	1.080164	1.07717	1.077706	1.062556	1.062556	1.07993856	1.066503
2045	1.101767	1.098713	1.09926	1.083807	1.083807	1.10153733	1.087833
2046	1.123803	1.120687	1.121245	1.105483	1.105483	1.12356808	1.109589
2047	1.146279	1.143101	1.14367	1.127593	1.127593	1.14603944	1.131781
2048	1.169204	1.165963	1.166543	1.150145	1.150145	1.16896023	1.154417
2049	1.192588	1.189282	1.189874	1.173148	1.173148	1.19233943	1.177505
2050	1.21644	1.213068	1.213672	1.196611	1.196611	1.21618622	1.201055
2051	1.240769	1.237329	1.237945	1.220543	1.220543	1.24050994	1.225076
2052	1.265584	1.262076	1.262704	1.244954	1.244954	1.26532014	1.249578
2053	1.290896	1.287318	1.287958	1.269853	1.269853	1.29062655	1.274569
2054	1.316714	1.313064	1.313717	1.29525	1.29525	1.31643908	1.300061
2055	1.343048	1.339325	1.339992	1.321155	1.321155	1.34276786	1.326062
2056	1.369909	1.366112	1.366792	1.347578	1.347578	1.36962322	1.352583
2057	1.397307	1.393434	1.394127	1.374529	1.374529	1.39701568	1.379635
2058	1.425253	1.421303	1.42201	1.40202	1.40202	1.42495599	1.407228
2059	1.453759	1.449729	1.45045	1.43006	1.43006	1.45345511	1.435372
2060	1.482834	1.478723	1.479459	1.458662	1.458662	1.48252422	1.46408
2061	1.51249	1.508298	1.509048	1.487835	1.487835	1.5121747	1.493361
2062	1.54274	1.538464	1.539229	1.517592	1.517592	1.54241819	1.523228
2063	1.573595	1.569233	1.570014	1.547943	1.547943	1.57326656	1.553693
2064	1.605067	1.600618	1.601414	1.578902	1.578902	1.60473189	1.584767

30% Environmental Adder, SCC w/ 3% Discount Rate

Real 2019\$ Avoided Cost (By Zone)

	Zone 1	Zone 2	Zone 3	Zone 4	Oregon	Washington	System	Discount Rate 4.43%
2019	0.371164	0.36942	0.369732	0.337205	0.337205	0.371033	0.342977	
2020	0.594343	0.592177	0.592565	0.569167	0.569167	0.59418	0.573845	
2021	0.580139	0.578042	0.578418	0.558126	0.558126	0.579981	0.562309	
2022	0.651812	0.647595	0.64835	0.625638	0.625638	0.651494	0.631398	
2023	0.638685	0.634728	0.635436	0.616296	0.616296	0.638387	0.621383	
2024	0.629237	0.624851	0.625636	0.606845	0.606845	0.628907	0.612128	
2025	0.599404	0.597855	0.598132	0.584687	0.584687	0.599288	0.587551	
2026	0.588381	0.586742	0.587035	0.574371	0.574371	0.588258	0.577173	
2027	0.557031	0.555381	0.555677	0.543676	0.543676	0.556907	0.546386	
2028	0.547522	0.545905	0.546194	0.534838	0.534838	0.547401	0.537435	
2029	0.533746	0.531892	0.532224	0.521675	0.521675	0.533607	0.52429	
2030	0.521622	0.519941	0.520242	0.510124	0.510124	0.521496	0.512576	
2031	0.506724	0.505404	0.505641	0.495699	0.495699	0.506624	0.497916	
2032	0.495219	0.49426	0.494431	0.484644	0.484644	0.495146	0.486631	
2033	0.484019	0.483255	0.483392	0.473907	0.473907	0.483962	0.475738	
2034	0.471198	0.470431	0.470569	0.461552	0.461552	0.471141	0.463316	
2035	0.457559	0.456808	0.456942	0.448359	0.448359	0.457502	0.45005	
2036	0.447249	0.445977	0.446205	0.439766	0.439766	0.447153	0.441443	
2037	0.432266	0.431048	0.431266	0.425101	0.425101	0.432175	0.426707	
2038	0.420929	0.419762	0.419971	0.414067	0.414067	0.420841	0.415605	
2039	0.411134	0.409994	0.410198	0.404432	0.404432	0.411048	0.405934	
2040	0.401567	0.400454	0.400653	0.395021	0.395021	0.401483	0.396488	
2041	0.392223	0.391136	0.39133	0.385829	0.385829	0.392141	0.387262	
2042	0.383096	0.382034	0.382224	0.376851	0.376851	0.383016	0.378251	
2043	0.374182	0.373145	0.37333	0.368082	0.368082	0.374104	0.36945	
2044	0.365475	0.364462	0.364643	0.359517	0.359517	0.365399	0.360853	
2045	0.356971	0.355981	0.356158	0.351152	0.351152	0.356896	0.352456	
2046	0.348664	0.347698	0.347871	0.342981	0.342981	0.348592	0.344255	
2047	0.340551	0.339607	0.339776	0.335	0.335	0.34048	0.336244	
2048	0.332627	0.331705	0.33187	0.327205	0.327205	0.332557	0.32842	
2049	0.324887	0.323986	0.324148	0.319591	0.319591	0.324819	0.320778	
2050	0.317327	0.316447	0.316605	0.312154	0.312154	0.317261	0.313314	
2051	0.309943	0.309084	0.309238	0.304891	0.304891	0.309878	0.306023	
2052	0.302731	0.301892	0.302042	0.297796	0.297796	0.302668	0.298902	
2053	0.295687	0.294867	0.295014	0.290867	0.290867	0.295625	0.291947	
2054	0.288806	0.288006	0.288149	0.284098	0.284098	0.288746	0.285154	
2055	0.282086	0.281304	0.281444	0.277488	0.277488	0.282027	0.278518	
2056	0.275522	0.274758	0.274895	0.271031	0.271031	0.275465	0.272037	
2057	0.269111	0.268365	0.268499	0.264724	0.264724	0.269055	0.265707	
2058	0.262849	0.26212	0.262251	0.258564	0.258564	0.262794	0.259525	
2059	0.256733	0.256021	0.256148	0.252548	0.252548	0.256679	0.253486	
2060	0.250759	0.250064	0.250188	0.246671	0.246671	0.250706	0.247587	
2061	0.244924	0.244245	0.244366	0.240931	0.240931	0.244873	0.241826	
2062	0.239225	0.238561	0.23868	0.235325	0.235325	0.239175	0.236199	
2063	0.233658	0.23301	0.233126	0.229849	0.229849	0.233609	0.230703	
2064	0.228221	0.227588	0.227702	0.224501	0.224501	0.228173	0.225335	

Source: <https://www.zillow.com/mortgage-rates/30-year-fixed/>
As of - 6/1/2018