Appendix H

Avoided Cost

2020 OR IRP

Appendix H – Introduction

The purpose of this document is to present the inputs into Cascade's avoided cost calculation, as well as the sources for these inputs. The format of this appendix has been modified for the 2020 OR IRP to align with the OPUC UM 1893 filing template.

The elements of the Company's avoided cost calculation comply with UM 1893. The data itself is sourced from a number of processes integral to the 2020 IRP, specifically the resource integration and distribution system planning sections.

Once calculated, these figures are sent to the Energy Trust of Oregon (ETO), where they are used to generate Cascade's Conservation Potential Assessment (CPA). The Company appreciates its partnership with ETO, as the CPA is a vital element to forecasting energy efficiency savings over the 20-year planning horizon. Additionally, if acknowledged, this data will be used complete Cascade's 2020 filing for the UM 1893 docket.

Global Assumptions Inputs			SOURCING				
			Provide as much detail as possible with sourcing including a link. Ensure that dollar years listed here are the same as the source.				
Avoided Cost Element	Units	Value	Source	Source Page #	Table # (if applicable)	Source Link or File Name	Source Notes
Discount Rate (Company's Real after-tax weighted average cost of capital (WACC)	Percent	7.33%	CNGC Spring Earnings Review	13	Interest Coordination Adjustment	https://edocs.puc.state.or.us/efdocs/HAQ/rg36haq91248.pdf	
Inflation Rate - 2020	Percent	2.48%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2021	Percent	2.66%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2022	Percent	2.86%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2023	Percent	3.01%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2024	Percent	3.18%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2025	Percent	3.32%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2026	Percent	3.45%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2027	Percent	3.56%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2028	Percent	3.65%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2029	Percent	3.73%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2030	Percent	3.79%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2031	Percent	3.83%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2032	Percent	3.85%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2033	Percent	3.86%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2034	Percent	3.88%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2035	Percent	3.89%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2036	Percent	3.90%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2037	Percent	3.91%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2038	Percent	3.92%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2039	Percent	3.92%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2040	Percent	3.93%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2041	Percent	3.93%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2042	Percent	3.94%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2043	Percent	3.94%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2044	Percent	3.94%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2045	Percent	3.94%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2046	Percent	3.94%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2047	Percent	3.94%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2048	Percent	3.95%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2049	Percent	3.94%	Woods & Poole 2019 Projections	36	4		
Inflation Rate - 2050	Percent	3.95%	Woods & Poole 2019 Projections	36	4		
Regional Act Credit	Percent	10.00%	N/A	1980 Northwest Power Act:			
Forecast Period Calendar Start Year	Year	2020	N/A				
Real Dollar Base Year	Year	2019					
System Peak Definition	Calendar Month/Day/Hour	Day					
System Peak Coincident Day Factor	Peak Day/Annual Load Ratio	0.0513	2020 CNGC OR IRP, Appendix B				
System Peak Coincident Hour Factor	Peak Hour/Annual Load Ratio	0.0005					

CNGC Appendix H - Avoided Cost

Definitions

1) Global Inputs

<> Standard economic assumptions of the avoided costs are input into this tab, including inflation and discount rates, as well as real dollar year and forecast start year. <> In addition to the standard economic assumptions, CNGC provides the system peak definition of the utility (calendar Month/Day/Hour) and the peak-day/annual load and peak-hour/Annual Load Ratios for the utility system.

2) Commodity and Transport

<> Commidity and Transport price forecast by month
<> Forecast is in real dollars

3) Environmental Compliance

<> $/Metric Ton of CO_2 is the most likely carbon forecast for each year of the avoided cost calculation
<> Metric ton of CO_2/dekatherm is constant for each year of the forecast
<> Column 'F' is a calculated field, which multiplies the $/metric ton of CO_2 by the CO_2/dekatherm
<> Alternative carbon inputs provided in 3a) and 3b)

4) Infrastructure Capacity

<> Supply Infrastructure Capacity Cost provided in a $/Dth/Day format for each year available of the forecast period
<> Distribution Infrastructure Capacity Cost provided in a $/Dth/Day and $/Dth/Hour format for each year available of the forecast period

5) Risk Reduction

<> Risk Reduction value provided in a $/Dth format if available for each year available of the forecast period
<> The box in cell C7 calculates the levelized net present value of all years of the forecast period. This is used when negative values occur in any year of the forecast period. If the levelized risk reduction value is negative, zero will be assigned as the final value. This is due to the premise that the risk reduction value is meant to be a benefit.

6) Monthly Load Shape

<> Monthly share of annual load for Cascade's system.

UM 1893 Appendix H - Draft 2) Commodity & Transport - IRP

Commodity Price Inputs

Real or Nominal?	Real
Source:	CNGC Price forecast as of 9-30-2019

Gas Commodity and Transportation/Storage Costs (Real 2019$/Dth)

Year #	Calendar Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	2020	$2.99	$2.65	$2.09	$1.86	$1.46	$1.48	$2.05	$2.35	$2.56	$2.16	$2.18	$2.51
2	2021	$2.66	$2.47	$2.05	$1.71	$1.57	$1.57	$1.86	$1.90	$1.92	$1.91	$2.12	$2.41
3	2022	$2.53	$2.44	$2.05	$1.77	$1.66	$1.68	$1.93	$1.96	$1.97	$2.02	$2.21	$2.47
4	2023	$2.54	$2.48	$2.11	$1.86	$1.74	$1.71	$2.02	$2.06	$2.08	$2.13	$2.28	$2.50
5	2024	$2.57	$2.48	$2.17	$1.93	$1.79	$1.89	$2.10	$2.14	$2.13	$2.27	$2.43	$2.76
6	2025	$2.76	$2.68	$2.37	$2.17	$2.08	$2.12	$2.41	$2.49	$2.45	$2.41	$2.59	$2.95
7	2026	$2.92	$2.85	$2.51	$2.30	$2.19	$2.22	$2.52	$2.60	$2.58	$2.53	$2.69	$3.07
8	2027	$3.00	$2.92	$2.57	$2.36	$2.26	$2.28	$2.58	$2.67	$2.65	$2.58	$2.73	$3.09
9	2028	$3.01	$2.92	$2.62	$2.40	$2.29	$2.31	$2.61	$2.73	$2.69	$2.60	$2.77	$3.13
10	2029	$3.07	$3.00	$2.71	$2.46	$2.37	$2.41	$2.76	$2.88	$2.82	$2.75	$2.95	$3.28
11	2030	$3.28	$3.19	$2.89	$2.60	$2.50	$2.60	$2.90	$3.02	$2.96	$2.89	$3.13	$3.39
12	2031	$3.47	$3.31	$2.98	$2.70	$2.61	$2.68	$2.97	$3.08	$3.03	$2.95	$3.17	$3.42
13	2032	$3.50	$3.31	$2.99	$2.71	$2.62	$2.70	$3.00	$3.10	$3.05	$2.97	$3.21	$3.46
14	2033	$3.54	$3.38	$3.05	$2.75	$2.67	$2.76	$3.06	$3.16	$3.10	$3.03	$3.28	$3.55
15	2034	$3.61	$3.44	$3.09	$2.80	$2.71	$2.79	$3.11	$3.21	$3.15	$3.07	$3.34	$3.62
16	2035	$3.65	$3.48	$3.13	$2.84	$2.75	$2.84	$3.14	$3.25	$3.19	$3.11	$3.38	$3.65
17	2036	$3.70	$3.52	$3.15	$2.87	$2.78	$2.87	$3.18	$3.28	$3.23	$3.14	$3.43	$3.70
18	2037	$3.77	$3.59	$3.23	$2.95	$2.83	$2.91	$3.27	$3.36	$3.30	$3.26	$3.55	$3.84
19	2038	$4.18	$3.88	$3.44	$3.03	$3.03	$3.14	$3.68	$3.80	$3.70	$3.50	$3.87	$4.31
20	2039	$4.27	$3.96	$3.50	$3.15	$3.18	$3.24	$3.75	$3.86	$3.80	$3.59	$3.96	$4.35
21	2040	$4.34	$4.01	$3.55	$3.50	$3.26	$3.27	$3.95	$4.21	$4.44	$3.92	$3.89	$4.26
22	2041	$4.38	$4.05	$3.58	$3.53	$3.29	$3.30	$3.99	$4.25	$4.48	$3.96	$3.93	$4.31
23	2042	$4.42	$4.09	$3.62	$3.57	$3.33	$3.33	$4.03	$4.29	$4.53	$4.00	$3.97	$4.35
24	2043	$4.47	$4.13	$3.66	$3.60	$3.36	$3.37	$4.07	$4.34	$4.57	$4.04	$4.01	$4.39
25	2044	$4.51	$4.18	$3.69	$3.64	$3.39	$3.40	$4.11	$4.38	$4.62	$4.08	$4.05	$4.44
26	2045	$4.56	$4.22	$3.73	$3.68	$3.43	$3.43	$4.15	$4.42	$4.66	$4.12	$4.09	$4.48
27	2046	$4.60	$4.26	$3.77	$3.71	$3.46	$3.47	$4.19	$4.47	$4.71	$4.16	$4.13	$4.53
28	2047	$4.65	$4.30	$3.81	$3.75	$3.50	$3.50	$4.23	$4.51	$4.76	$4.20	$4.17	$4.57
29	2048	$4.70	$4.35	$3.84	$3.79	$3.53	$3.54	$4.27	$4.56	$4.80	$4.24	$4.21	$4.62
30	2049	$4.74	$4.39	$3.88	$3.83	$3.57	$3.57	$4.32	$4.60	$4.85	$4.29	$4.26	$4.66
31	2050	$4.79	$4.43	$3.92	$3.86	$3.60	$3.61	$4.36	$4.65	$4.90	$4.33	$4.30	$4.71
32	2051	$4.84	$4.48	$3.96	$3.90	$3.64	$3.64	$4.40	$4.69	$4.95	$4.37	$4.34	$4.76
33	2052	$4.89	$4.52	$4.00	$3.94	$3.68	$3.68	$4.45	$4.74	$5.00	$4.42	$4.38	$4.81
34	2053	$4.94	$4.57	$4.04	$3.98	$3.71	$3.72	$4.49	$4.79	$5.05	$4.46	$4.43	$4.85
35	2054	$4.98	$4.61	$4.08	$4.02	$3.75	$3.75	$4.54	$4.84	$5.10	$4.50	$4.47	$4.90
36	2055	$5.03	$4.66	$4.12	$4.06	$3.79	$3.79	$4.58	$4.89	$5.15	$4.55	$4.52	$4.95
37	2056	$5.08	$4.71	$4.16	$4.10	$3.82	$3.83	$4.63	$4.93	$5.20	$4.59	$4.56	$5.00
38	2057	$5.14	$4.75	$4.20	$4.14	$3.86	$3.87	$4.68	$4.98	$5.25	$4.64	$4.61	$5.05
39	2058	$5.19	$4.80	$4.25	$4.18	$3.90	$3.91	$4.72	$5.03	$5.31	$4.69	$4.65	$5.10
40	2059	$5.24	$4.85	$4.29	$4.23	$3.94	$3.95	$4.77	$5.08	$5.36	$4.73	$4.70	$5.15
41	2060	$5.29	$4.90	$4.33	$4.27	$3.98	$3.99	$4.82	$5.13	$5.41	$4.78	$4.75	$5.20
42	2061	$5.34	$4.95	$4.37	$4.31	$4.02	$4.03	$4.87	$5.19	$5.47	$4.83	$4.80	$5.26
43	2062	$5.40	$5.00	$4.42	$4.35	$4.06	$4.07	$4.91	$5.24	$5.52	$4.88	$4.84	$5.31
44	2063	$5.45	$5.05	$4.46	$4.40	$4.10	$4.11	$4.96	$5.29	$5.58	$4.93	$4.89	$5.36
45	2064	$5.51	$5.10	$4.51	$4.44	$4.14	$4.15	$5.01	$5.34	$5.63	$4.98	$4.94	$5.41

Environmental Compliance Cost Inputs

Real or Nominal?	Real
Source	2019 CEC Carbon Pricing - Carbon Price Mid Price

Environmental Compliance Cost

Year #	Calendar Year	Environmental Compliance Cost (Real 2019$/MTCO2e)	Carbon Intesity (MTCO2e/Dth)	Environmental Compliance Cost (Real 2019$/Dth)
1	2020	$0.00	0.0583	$0.000
2	2021	$21.13	0.0583	$1.233
3	2022	$26.16	0.0583	$1.526
4	2023	$26.77	0.0583	$1.562
5	2024	$30.14	0.0583	$1.758
6	2025	$33.95	0.0583	$1.980
7	2026	$38.24	0.0583	$2.230
8	2027	$43.06	0.0583	$2.512
9	2028	$48.50	0.0583	$2.829
10	2029	$54.61	0.0583	$3.185
11	2030	$61.50	0.0583	$3.587
12	2031	$61.50	0.0583	$3.587
13	2032	$61.50	0.0583	$3.587
14	2033	$61.50	0.0583	$3.587
15	2034	$61.50	0.0583	$3.587
16	2035	$61.50	0.0583	$3.587
17	2036	$61.50	0.0583	$3.587
18	2037	$61.50	0.0583	$3.587
19	2038	$61.50	0.0583	$3.587
20	2039	$61.50	0.0583	$3.587
21	2040	$61.50	0.0583	$3.587
22	2041	$61.50	0.0583	$3.587
23	2042	$61.50	0.0583	$3.587
24	2043	$61.50	0.0583	$3.587
25	2044	$61.50	0.0583	$3.587
26	2045	$61.50	0.0583	$3.587
27	2046	$61.50	0.0583	$3.587
28	2047	$61.50	0.0583	$3.587
29	2048	$61.50	0.0583	$3.587
30	2049	$61.50	0.0583	$3.587
31	2050	$61.50	0.0583	$3.587
32	2051	$61.50	0.0583	$3.587
33	2052	$61.50	0.0583	$3.587
34	2053	$61.50	0.0583	$3.587
35	2054	$61.50	0.0583	$3.587
36	2055	$61.50	0.0583	$3.587
37	2056	$61.50	0.0583	$3.587
38	2057	$61.50	0.0583	$3.587
39	2058	$61.50	0.0583	$3.587
40	2059	$61.50	0.0583	$3.587
41	2060	$61.50	0.0583	$3.587
42	2061	$61.50	0.0583	$3.587
43	2062	$61.50	0.0583	$3.587
44	2063	$61.50	0.0583	$3.587
45	2064	$61.50	0.0583	$3.587

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Alternative Environmental Compliance Cost Inputs - SCC

Real or Nominal?	Real
Source	Interagency Working Group on Social Cost of Greenhouse Gases

Environmental Compliance Cost

Year #	Calendar Year	Environmental Compliance Cost (Real 2019$/MTCO2e)	Carbon Intesity (MTCO2e/Dth)	Environmental Compliance Cost (Real 2019$/Dth)
1	2020	$0.00	0.0583	$0.000
2	2021	$52.47	0.0583	$3.060
3	2022	$53.69	0.0583	$3.131
4	2023	$54.91	0.0583	$3.202
5	2024	$56.13	0.0583	$3.274
6	2025	$57.35	0.0583	$3.345
7	2026	$58.57	0.0583	$3.416
8	2027	$59.79	0.0583	$3.487
9	2028	$59.79	0.0583	$3.487
10	2029	$61.01	0.0583	$3.558
11	2030	$62.23	0.0583	$3.629
12	2031	$63.45	0.0583	$3.701
13	2032	$64.67	0.0583	$3.772
14	2033	$65.89	0.0583	$3.843
15	2034	$67.11	0.0583	$3.914
16	2035	$68.33	0.0583	$3.985
17	2036	$69.55	0.0583	$4.056
18	2037	$70.77	0.0583	$4.128
19	2038	$71.99	0.0583	$4.199
20	2039	$73.21	0.0583	$4.270
21	2040	$74.43	0.0583	$4.341
22	2041	$74.43	0.0583	$4.341
23	2042	$75.65	0.0583	$4.412
24	2043	$76.87	0.0583	$4.483
25	2044	$78.09	0.0583	$4.555
26	2045	$79.31	0.0583	$4.626
27	2046	$80.53	0.0583	$4.697
28	2047	$81.75	0.0583	$4.768
29	2048	$82.97	0.0583	$4.839
30	2049	$84.19	0.0583	$4.910
31	2050	$85.41	0.0583	$4.982
32	2051	$86.63	0.0583	$5.053
33	2052	$87.85	0.0583	$5.124
34	2053	$89.07	0.0583	$5.195
35	2054	$90.29	0.0583	$5.266
36	2055	$91.51	0.0583	$5.337
37	2056	$92.73	0.0583	$5.409
38	2057	$93.96	0.0583	$5.480
39	2058	$95.18	0.0583	$5.551
40	2059	$96.40	0.0583	$5.622
41	2060	$97.62	0.0583	$5.693
42	2061	$98.84	0.0583	$5.764
43	2062	$100.06	0.0583	$5.836
44	2063	$101.28	0.0583	$5.907
45	2064	$102.51	0.0583	$5.979

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Alternative Environmental Compliance Cost Inputs - Market Choice

Real or Nominal?	Real
Source	2018 House bill - Modernizing America with Rebuilding to Kickstart the Economy of the Twenty-First Century with a Historic Infrastructure-Centered Expansion Act

Environmental Compliance Cost

Year #	Calendar Year	Environmental Compliance Cost (Real 2019$/MTCO2e)	Carbon Intesity (MTCO2e/Dth)	Environmental Compliance Cost (Real 2019$/Dth)
1	2020	$0.00	0.0583	$0.000
2	2021	$24.48	0.0583	$1.428
3	2022	$24.97	0.0583	$1.456
4	2023	$25.47	0.0583	$1.485
5	2024	$25.98	0.0583	$1.515
6	2025	$26.50	0.0583	$1.545
7	2026	$27.03	0.0583	$1.576
8	2027	$27.57	0.0583	$1.608
9	2028	$28.12	0.0583	$1.640
10	2029	$28.68	0.0583	$1.673
11	2030	$29.26	0.0583	$1.706
12	2031	$29.84	0.0583	$1.740
13	2032	$30.44	0.0583	$1.775
14	2033	$31.05	0.0583	$1.811
15	2034	$31.67	0.0583	$1.847
16	2035	$32.30	0.0583	$1.884
17	2036	$32.95	0.0583	$1.922
18	2037	$33.61	0.0583	$1.960
19	2038	$34.28	0.0583	$1.999
20	2039	$34.96	0.0583	$2.039
21	2040	$35.66	0.0583	$2.080
22	2041	$36.38	0.0583	$2.122
23	2042	$37.10	0.0583	$2.164
24	2043	$37.85	0.0583	$2.207
25	2044	$38.60	0.0583	$2.251
26	2045	$39.37	0.0583	$2.296
27	2046	$40.16	0.0583	$2.342
28	2047	$40.97	0.0583	$2.389
29	2048	$41.78	0.0583	$2.437
30	2049	$42.62	0.0583	$2.486
31	2050	$43.47	0.0583	$2.535
32	2051	$44.34	0.0583	$2.586
33	2052	$45.23	0.0583	$2.638
34	2053	$46.13	0.0583	$2.691
35	2054	$47.06	0.0583	$2.744
36	2055	$48.00	0.0583	$2.799
37	2056	$48.96	0.0583	$2.855
38	2057	$49.94	0.0583	$2.912
39	2058	$50.94	0.0583	$2.971
40	2059	$51.95	0.0583	$3.030
41	2060	$52.99	0.0583	$3.091
42	2061	$54.05	0.0583	$3.153
43	2062	$55.13	0.0583	$3.216
44	2063	$56.24	0.0583	$3.280
45	2064	$57.36	0.0583	$3.345

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Infrastructure Capacity Cost Inputs

Real or Nominal?	Real
Source	Peak Day costs are calculated by pulling CNGC Margin numbers from Tariffs 101, 104, 105, 111, 170, 502, 503, 504, 505, 511, 570, 577, then calculating what % of total load each rate class accounts for on peak day. This number is then multiplied by the % of projects related to growth specifically, and then multiplied by the ratio of peak day demand to average daily demand. Peak hour demand is calculated by looking at a recent historical cold week on Cascade's system (1/10/17-1/16-17) and pulling actual hourly demand data, indentifying the highest demand hour on the system from a representative sample of citygates, and calculating what % of the day's demand that hour accounted for. This hourly impact is then multiplied by the Peak Day figure.

Infrastructure Capacity Costs

Year #	Calendar Year	Infrastructure Capacity Costs		
		Supply (Real 2019$/Dth/Day)	Distribution Peak DAY (Real 2019$/Dth/Day)	Distribution Peak HOUR (Real 2019$/Dth/Hour)
1	2020	$0.00	$0.119	$0.006
2	2021	$0.00	$0.127	$0.007
3	2022	$0.00	$0.130	$0.007
4	2023	$0.00	$0.121	$0.006
5	2024	$0.00	$0.141	$0.007
6	2025	$0.00	$0.126	$0.006
7	2026	$0.00	$0.126	$0.006
8	2027	$0.00	$0.128	$0.007
9	2028	$0.00	$0.128	$0.007
10	2029	$0.00	$0.129	$0.007
11	2030	$0.00	$0.129	$0.007
12	2031	$0.00	$0.128	$0.007
13	2032	$0.23	$0.128	$0.007
14	2033	$0.23	$0.130	$0.007
15	2034	$0.23	$0.130	$0.007
16	2035	$0.23	$0.131	$0.007
17	2036	$0.23	$0.131	$0.007
18	2037	$0.23	$0.129	$0.007
19	2038	$0.23	$0.131	$0.007
20	2039	$0.23	$0.132	$0.007
21	2040	$0.23	$0.131	$0.007
22	2041	$0.23	$0.000	$0.000
23	2042	$0.23	$0.000	$0.000
24	2043	$0.23	$0.000	$0.000
25	2044	$0.23	$0.000	$0.000
26	2045	$0.23	$0.000	$0.000
27	2046	$0.23	$0.000	$0.000
28	2047	$0.23	$0.000	$0.000
29	2048	$0.23	$0.000	$0.000
30	2049	$0.23	$0.000	$0.000
31	2050	$0.23	$0.000	$0.000
32	2051	$0.23	$0.000	$0.000
33	2052	$0.23	$0.000	$0.000
34	2053	$0.23	$0.000	$0.000
35	2054	$0.23	$0.000	$0.000
36	2055	$0.23	$0.000	$0.000
37	2056	$0.23	$0.000	$0.000
38	2057	$0.23	$0.000	$0.000
39	2058	$0.23	$0.000	$0.000
40	2059	$0.23	$0.000	$0.000
41	2060	$0.23	$0.000	$0.000
42	2061	$0.23	$0.000	$0.000
43	2062	$0.23	$0.000	$0.000
44	2063	$0.23	$0.000	$0.000
45	2064	$0.23	$0.000	$0.000

Risk Reduction Value Inputs

Real or Nominal?	Real
Source	CNGC Price forecast as of 9-30-2019

| | -$0.13 | = Levelized Risk Reduction Value (for use when negative values occur in any years of the forecast period). If this value is negative, then zero will be assigned as the final value. |

Risk Reduction Value

Year #	Calendar Year	Risk Reduction Value (Real 2019$/Dth)
1	2020	-$0.159
2	2021	-$0.139
3	2022	-$0.108
4	2023	-$0.067
5	2024	-$0.104
6	2025	-$0.245
7	2026	-$0.301
8	2027	-$0.221
9	2028	-$0.109
10	2029	-$0.078
11	2030	-$0.105
12	2031	-$0.069
13	2032	$0.000
14	2033	-$0.001
15	2034	-$0.016
16	2035	-$0.030
17	2036	-$0.057
18	2037	-$0.141
19	2038	-$0.459
20	2039	-$0.304

Monthly Load Shape

Source:	CNGC Load Forecast

End Use Load Profiles		Monthly Share of Normal Weather Annual Load											
End Use		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
All		0.154178	0.126423	0.107155	0.072351	0.04992	0.035601	0.030266	0.031202	0.041425	0.070827	0.119081	0.16157

TOTAL AVOIDED COSTS - Base Case Carbon Scenario (2019 CEC Projections)

TOTAL AVOIDED COSTS - *Annual Values*

Lifetime	DHW	FLAT	Res Heating	Com Heating	Clotheswasher
2020	$0.26	$0.26	$0.28	$0.28	$0.26
2021	$0.39	$0.39	$0.40	$0.41	$0.39
2022	$0.43	$0.43	$0.45	$0.45	$0.43
2023	$0.45	$0.45	$0.46	$0.47	$0.45
2024	$0.50	$0.50	$0.52	$0.52	$0.50
2025	$0.54	$0.54	$0.56	$0.56	$0.54
2026	$0.58	$0.57	$0.60	$0.60	$0.57
2027	$0.61	$0.61	$0.63	$0.64	$0.61
2028	$0.67	$0.66	$0.68	$0.69	$0.66
2029	$0.73	$0.72	$0.75	$0.75	$0.72
2030	$0.78	$0.78	$0.80	$0.81	$0.78
2031	$0.79	$0.78	$0.81	$0.81	$0.78
2032	$0.83	$0.82	$1.02	$1.00	$0.81
2033	$0.83	$0.83	$1.02	$1.00	$0.81
2034	$0.84	$0.83	$1.03	$1.01	$0.82
2035	$0.84	$0.84	$1.03	$1.01	$0.82
2036	$0.85	$0.85	$1.04	$1.02	$0.83
2037	$0.89	$0.88	$1.08	$1.06	$0.87
2038	$0.90	$0.89	$1.09	$1.07	$0.88
2039	$0.92	$0.91	$1.11	$1.09	$0.90
2040	$0.92	$0.91	$1.11	$1.09	$0.90
2041	$0.92	$0.91	$1.11	$1.09	$0.90
2042	$0.92	$0.91	$1.11	$1.09	$0.90
2043	$0.92	$0.91	$1.11	$1.09	$0.90
2044	$0.92	$0.91	$1.11	$1.09	$0.90
2045	$0.92	$0.91	$1.11	$1.09	$0.90
2046	$0.92	$0.91	$1.11	$1.09	$0.90
2047	$0.92	$0.91	$1.11	$1.09	$0.90
2048	$0.92	$0.91	$1.11	$1.09	$0.90
2049	$0.92	$0.91	$1.11	$1.09	$0.90
2050	$0.92	$0.91	$1.11	$1.09	$0.90
2051	$0.92	$0.91	$1.11	$1.09	$0.90
2052	$0.92	$0.91	$1.11	$1.09	$0.90
2053	$0.92	$0.91	$1.11	$1.09	$0.90
2054	$0.92	$0.91	$1.11	$1.09	$0.90
2055	$0.92	$0.91	$1.11	$1.09	$0.90
2056	$0.92	$0.91	$1.11	$1.09	$0.90
2057	$0.92	$0.91	$1.11	$1.09	$0.90
2058	$0.92	$0.91	$1.11	$1.09	$0.90
2059	$0.92	$0.91	$1.11	$1.09	$0.90
2060	$0.92	$0.91	$1.11	$1.09	$0.90
2061	$0.92	$0.91	$1.11	$1.09	$0.90
2062	$0.92	$0.91	$1.11	$1.09	$0.90
2063	$0.92	$0.91	$1.11	$1.09	$0.90
2064	$0.92	$0.91	$1.11	$1.09	$0.90
2065	$0.92	$0.91	$1.11	$1.09	$0.90
2066	$0.92	$0.91	$1.11	$1.09	$0.90
2067	$0.92	$0.91	$1.11	$1.09	$0.90
2068	$0.92	$0.91	$1.11	$1.09	$0.90
2069	$0.92	$0.91	$1.11	$1.09	$0.90

TOTAL AVOIDED COSTS - Base Case Carbon Scenario (2019 CEC Projections)					
TOTAL AVOIDED COSTS - *Net Present Value*					
Lifetime	DHW	FLAT	Res Heating	Com Heating	Clotheswasher
2020	$0.25	$0.25	$0.26	$0.27	$0.25
2021	$0.61	$0.60	$0.63	$0.64	$0.60
2022	$0.99	$0.98	$1.03	$1.03	$0.98
2023	$1.36	$1.36	$1.42	$1.42	$1.35
2024	$1.76	$1.76	$1.83	$1.84	$1.75
2025	$2.18	$2.17	$2.26	$2.27	$2.16
2026	$2.60	$2.59	$2.70	$2.71	$2.58
2027	$3.03	$3.02	$3.14	$3.16	$3.01
2028	$3.48	$3.47	$3.60	$3.62	$3.46
2029	$3.95	$3.93	$4.08	$4.10	$3.92
2030	$4.43	$4.42	$4.58	$4.60	$4.40
2031	$4.90	$4.88	$5.06	$5.07	$4.86
2032	$5.36	$5.34	$5.63	$5.64	$5.32
2033	$5.81	$5.79	$6.18	$6.18	$5.76
2034	$6.25	$6.22	$6.71	$6.70	$6.18
2035	$6.66	$6.63	$7.22	$7.20	$6.59
2036	$7.07	$7.03	$7.71	$7.68	$6.98
2037	$7.47	$7.43	$8.20	$8.17	$7.37
2038	$7.86	$7.81	$8.68	$8.63	$7.75
2039	$8.24	$8.19	$9.14	$9.08	$8.13
21	$8.61	$8.55	$9.58	$9.52	$8.48
22	$8.96	$8.90	$10.00	$9.93	$8.82
23	$9.29	$9.23	$10.40	$10.33	$9.15
24	$9.61	$9.55	$10.79	$10.71	$9.46
25	$9.92	$9.85	$11.16	$11.08	$9.76
26	$10.21	$10.14	$11.51	$11.42	$10.05
27	$10.49	$10.42	$11.85	$11.76	$10.32
28	$10.76	$10.68	$12.18	$12.08	$10.58
29	$11.01	$10.94	$12.49	$12.38	$10.83
30	$11.26	$11.18	$12.78	$12.67	$11.07
31	$11.50	$11.42	$13.07	$12.95	$11.30
32	$11.72	$11.64	$13.34	$13.22	$11.52
33	$11.94	$11.85	$13.60	$13.48	$11.73
34	$12.14	$12.06	$13.85	$13.72	$11.93
35	$12.34	$12.25	$14.09	$13.96	$12.13
36	$12.53	$12.44	$14.32	$14.18	$12.31
37	$12.71	$12.62	$14.53	$14.39	$12.49
38	$12.88	$12.79	$14.74	$14.60	$12.66
39	$13.05	$12.95	$14.94	$14.80	$12.82
40	$13.20	$13.11	$15.13	$14.98	$12.97
41	$13.35	$13.26	$15.32	$15.16	$13.12
42	$13.50	$13.40	$15.49	$15.34	$13.26
43	$13.64	$13.54	$15.66	$15.50	$13.40
44	$13.77	$13.67	$15.82	$15.66	$13.52
45	$13.90	$13.80	$15.97	$15.81	$13.65
46	$14.02	$13.92	$16.12	$15.95	$13.77
47	$14.14	$14.03	$16.26	$16.09	$13.88
48	$14.25	$14.14	$16.40	$16.23	$13.99
49	$14.35	$14.25	$16.52	$16.35	$14.09
50	$14.45	$14.35	$16.65	$16.47	$14.19

TOTAL AVOIDED COSTS - Social Cost of Carbon Scenario (SCC 3% discount)

TOTAL AVOIDED COSTS - *Annual Values*

Lifetime	DHW	FLAT	Res Heating	Com Heating	Clotheswasher
1	$0.26	$0.26	$0.28	$0.28	$0.26
2	$0.61	$0.60	$0.62	$0.62	$0.60
3	$0.62	$0.62	$0.64	$0.64	$0.62
4	$0.64	$0.64	$0.66	$0.66	$0.64
5	$0.68	$0.68	$0.70	$0.70	$0.67
6	$0.70	$0.70	$0.72	$0.72	$0.70
7	$0.72	$0.71	$0.74	$0.74	$0.71
8	$0.73	$0.73	$0.75	$0.75	$0.73
9	$0.74	$0.74	$0.76	$0.76	$0.74
10	$0.77	$0.77	$0.79	$0.79	$0.77
11	$0.79	$0.79	$0.81	$0.81	$0.78
12	$0.80	$0.80	$0.82	$0.82	$0.80
13	$0.85	$0.84	$1.04	$1.02	$0.83
14	$0.86	$0.86	$1.05	$1.03	$0.84
15	$0.88	$0.87	$1.06	$1.05	$0.86
16	$0.89	$0.88	$1.08	$1.06	$0.87
17	$0.91	$0.90	$1.10	$1.08	$0.89
18	$0.95	$0.95	$1.14	$1.13	$0.93
19	$0.97	$0.96	$1.16	$1.15	$0.95
20	$1.00	$0.99	$1.19	$1.17	$0.98
21	$1.01	$1.00	$1.20	$1.18	$0.99
22	$1.01	$1.00	$1.20	$1.18	$0.99
23	$1.02	$1.01	$1.21	$1.19	$1.00
24	$1.03	$1.02	$1.22	$1.20	$1.00
25	$1.03	$1.03	$1.23	$1.21	$1.01
26	$1.04	$1.03	$1.23	$1.22	$1.02
27	$1.05	$1.04	$1.24	$1.23	$1.03
28	$1.06	$1.05	$1.25	$1.23	$1.04
29	$1.07	$1.06	$1.26	$1.24	$1.05
30	$1.08	$1.07	$1.27	$1.25	$1.05
31	$1.08	$1.08	$1.28	$1.26	$1.06
32	$1.09	$1.08	$1.29	$1.27	$1.07
33	$1.10	$1.09	$1.29	$1.28	$1.08
34	$1.11	$1.10	$1.30	$1.28	$1.09
35	$1.12	$1.11	$1.31	$1.29	$1.10
36	$1.13	$1.12	$1.32	$1.30	$1.10
37	$1.13	$1.13	$1.33	$1.31	$1.11
38	$1.14	$1.13	$1.34	$1.32	$1.12
39	$1.15	$1.14	$1.34	$1.33	$1.13
40	$1.16	$1.15	$1.35	$1.33	$1.14
41	$1.17	$1.16	$1.36	$1.34	$1.15
42	$1.18	$1.17	$1.37	$1.35	$1.16
43	$1.19	$1.18	$1.38	$1.36	$1.16
44	$1.19	$1.19	$1.39	$1.37	$1.17
45	$1.20	$1.19	$1.39	$1.38	$1.18
46	$1.20	$1.19	$1.39	$1.38	$1.18
47	$1.20	$1.19	$1.39	$1.38	$1.18
48	$1.20	$1.19	$1.39	$1.38	$1.18
49	$1.20	$1.19	$1.39	$1.38	$1.18
50	$1.20	$1.19	$1.39	$1.38	$1.18

TOTAL AVOIDED COSTS - Social Cost of Carbon Scenario (SCC 3% discount)

TOTAL AVOIDED COSTS - *Net Present Value*

Lifetime	DHW	FLAT	Res Heating	Com Heating	Clotheswasher
1	$0.25	$0.25	$0.26	$0.27	$0.25
2	$0.80	$0.80	$0.83	$0.84	$0.80
3	$1.35	$1.35	$1.39	$1.40	$1.34
4	$1.89	$1.88	$1.94	$1.95	$1.88
5	$2.43	$2.43	$2.50	$2.51	$2.42
6	$2.97	$2.96	$3.05	$3.06	$2.95
7	$3.50	$3.49	$3.59	$3.61	$3.48
8	$4.01	$4.00	$4.12	$4.13	$3.99
9	$4.51	$4.50	$4.63	$4.65	$4.49
10	$5.01	$4.99	$5.14	$5.16	$4.98
11	$5.49	$5.48	$5.64	$5.66	$5.46
12	$5.97	$5.95	$6.12	$6.14	$5.93
13	$6.44	$6.42	$6.71	$6.72	$6.40
14	$6.91	$6.88	$7.28	$7.28	$6.85
15	$7.36	$7.33	$7.83	$7.82	$7.30
16	$7.81	$7.77	$8.36	$8.34	$7.73
17	$8.23	$8.20	$8.88	$8.85	$8.15
18	$8.67	$8.62	$9.40	$9.36	$8.57
19	$9.09	$9.04	$9.90	$9.86	$8.98
20	$9.50	$9.45	$10.40	$10.34	$9.39
21	$9.90	$9.85	$10.87	$10.81	$9.78
22	$10.29	$10.23	$11.33	$11.26	$10.15
23	$10.66	$10.60	$11.77	$11.70	$10.52
24	$11.01	$10.95	$12.19	$12.11	$10.86
25	$11.36	$11.29	$12.60	$12.52	$11.20
26	$11.69	$11.62	$12.99	$12.90	$11.53
27	$12.01	$11.94	$13.37	$13.28	$11.84
28	$12.32	$12.24	$13.74	$13.64	$12.14
29	$12.62	$12.54	$14.09	$13.98	$12.43
30	$12.90	$12.83	$14.43	$14.32	$12.72
31	$13.18	$13.10	$14.75	$14.64	$12.99
32	$13.45	$13.37	$15.07	$14.95	$13.25
33	$13.70	$13.62	$15.37	$15.25	$13.50
34	$13.95	$13.87	$15.66	$15.53	$13.75
35	$14.19	$14.10	$15.94	$15.81	$13.98
36	$14.42	$14.33	$16.21	$16.08	$14.21
37	$14.65	$14.56	$16.47	$16.33	$14.43
38	$14.86	$14.77	$16.72	$16.58	$14.64
39	$15.07	$14.97	$16.97	$16.82	$14.84
40	$15.27	$15.17	$17.20	$17.05	$15.03
41	$15.46	$15.36	$17.42	$17.27	$15.22
42	$15.64	$15.55	$17.64	$17.48	$15.41
43	$15.82	$15.72	$17.85	$17.69	$15.58
44	$16.00	$15.89	$18.04	$17.88	$15.75
45	$16.16	$16.06	$18.24	$18.07	$15.91
46	$16.32	$16.22	$18.42	$18.26	$16.07
47	$16.47	$16.37	$18.60	$18.43	$16.22
48	$16.62	$16.51	$18.77	$18.60	$16.36
49	$16.76	$16.65	$18.93	$18.76	$16.50
50	$16.89	$16.78	$19.08	$18.91	$16.63

TOTAL AVOIDED COSTS - Social Cost of Carbon Scenario (SCC 3% discount)

% Difference from Base Case

Lifetime	DHW	FLAT	Res Heating	Com Heating	Clotheswasher
1	0%	0%	0%	0%	0%
2	55%	56%	53%	53%	56%
3	44%	44%	42%	42%	44%
4	43%	43%	42%	42%	44%
5	36%	36%	35%	34%	36%
6	30%	30%	29%	29%	30%
7	24%	24%	24%	23%	24%
8	19%	19%	18%	18%	19%
9	12%	12%	11%	11%	12%
10	6%	6%	6%	6%	6%
11	1%	1%	1%	1%	1%
12	2%	2%	2%	2%	2%
13	3%	3%	2%	2%	3%
14	4%	4%	3%	3%	4%
15	5%	5%	4%	4%	5%
16	6%	6%	5%	5%	6%
17	6%	7%	5%	5%	7%
18	7%	7%	6%	6%	7%
19	8%	8%	7%	7%	8%
20	9%	9%	7%	7%	9%
21	10%	10%	8%	8%	10%
22	10%	10%	8%	8%	10%
23	11%	11%	9%	9%	11%
24	12%	12%	10%	10%	12%
25	12%	13%	10%	10%	13%
26	13%	13%	11%	11%	14%
27	14%	14%	12%	12%	15%
28	15%	15%	13%	13%	16%
29	16%	16%	13%	14%	16%
30	17%	17%	14%	14%	17%
31	18%	18%	15%	15%	18%
32	19%	19%	16%	16%	19%
33	20%	20%	16%	17%	20%
34	21%	21%	17%	17%	21%
35	22%	22%	18%	18%	22%
36	22%	23%	19%	19%	23%
37	23%	24%	19%	20%	24%
38	24%	25%	20%	20%	25%
39	25%	25%	21%	21%	26%
40	26%	26%	22%	22%	27%
41	27%	27%	22%	23%	28%
42	28%	28%	23%	23%	29%
43	29%	29%	24%	24%	30%
44	30%	30%	25%	25%	30%
45	31%	31%	25%	26%	31%
46	31%	31%	25%	26%	31%
47	31%	31%	25%	26%	31%
48	31%	31%	25%	26%	31%
49	31%	31%	25%	26%	31%
50	31%	31%	25%	26%	31%

TOTAL AVOIDED COSTS - National Market Choice Proposal Carbon Scenario

TOTAL AVOIDED COSTS - *Annual Values*

Lifetime	DHW	FLAT	Res Heating	Com Heating	Clotheswasher
1	$0.26	$0.26	$0.28	$0.28	$0.26
2	$0.41	$0.41	$0.43	$0.43	$0.41
3	$0.42	$0.42	$0.44	$0.44	$0.42
4	$0.44	$0.44	$0.46	$0.46	$0.44
5	$0.47	$0.47	$0.49	$0.49	$0.47
6	$0.49	$0.49	$0.51	$0.51	$0.49
7	$0.50	$0.50	$0.52	$0.52	$0.50
8	$0.51	$0.51	$0.53	$0.53	$0.50
9	$0.52	$0.52	$0.54	$0.55	$0.52
10	$0.55	$0.55	$0.57	$0.57	$0.54
11	$0.56	$0.56	$0.58	$0.58	$0.56
12	$0.57	$0.57	$0.59	$0.59	$0.56
13	$0.61	$0.61	$0.80	$0.78	$0.59
14	$0.62	$0.62	$0.81	$0.79	$0.60
15	$0.63	$0.63	$0.82	$0.80	$0.61
16	$0.64	$0.63	$0.83	$0.81	$0.62
17	$0.66	$0.65	$0.84	$0.83	$0.64
18	$0.70	$0.69	$0.89	$0.87	$0.68
19	$0.71	$0.70	$0.90	$0.89	$0.69
20	$0.74	$0.73	$0.93	$0.91	$0.72
21	$0.74	$0.73	$0.93	$0.92	$0.72
22	$0.75	$0.74	$0.94	$0.92	$0.73
23	$0.75	$0.74	$0.94	$0.93	$0.73
24	$0.76	$0.75	$0.95	$0.93	$0.74
25	$0.76	$0.75	$0.95	$0.94	$0.74
26	$0.77	$0.76	$0.96	$0.94	$0.75
27	$0.77	$0.76	$0.97	$0.95	$0.75
28	$0.78	$0.77	$0.97	$0.95	$0.76
29	$0.78	$0.78	$0.98	$0.96	$0.76
30	$0.79	$0.78	$0.98	$0.96	$0.77
31	$0.80	$0.79	$0.99	$0.97	$0.77
32	$0.80	$0.79	$0.99	$0.98	$0.78
33	$0.81	$0.80	$1.00	$0.98	$0.79
34	$0.81	$0.81	$1.01	$0.99	$0.79
35	$0.82	$0.81	$1.01	$0.99	$0.80
36	$0.83	$0.82	$1.02	$1.00	$0.81
37	$0.83	$0.82	$1.03	$1.01	$0.81
38	$0.84	$0.83	$1.03	$1.01	$0.82
39	$0.85	$0.84	$1.04	$1.02	$0.83
40	$0.85	$0.85	$1.05	$1.03	$0.83
41	$0.86	$0.85	$1.05	$1.04	$0.84
42	$0.87	$0.86	$1.06	$1.04	$0.85
43	$0.88	$0.87	$1.07	$1.05	$0.85
44	$0.88	$0.88	$1.08	$1.06	$0.86
45	$0.89	$0.88	$1.08	$1.07	$0.87
46	$0.89	$0.88	$1.08	$1.07	$0.87
47	$0.89	$0.88	$1.08	$1.07	$0.87
48	$0.89	$0.88	$1.08	$1.07	$0.87
49	$0.89	$0.88	$1.08	$1.07	$0.87
50	$0.89	$0.88	$1.08	$1.07	$0.87

TOTAL AVOIDED COSTS - National Market Choice Proposal Carbon Scenario

TOTAL AVOIDED COSTS - *Net Present Value*

Lifetime	DHW	FLAT	Res Heating	Com Heating	Clotheswasher
1	$0.25	$0.25	$0.26	$0.27	$0.25
2	$0.63	$0.62	$0.66	$0.66	$0.62
3	$1.00	$1.00	$1.04	$1.05	$0.99
4	$1.37	$1.36	$1.42	$1.43	$1.36
5	$1.75	$1.74	$1.81	$1.82	$1.73
6	$2.12	$2.11	$2.20	$2.21	$2.10
7	$2.49	$2.48	$2.58	$2.60	$2.47
8	$2.85	$2.83	$2.95	$2.97	$2.82
9	$3.20	$3.19	$3.32	$3.34	$3.17
10	$3.55	$3.54	$3.69	$3.70	$3.52
11	$3.90	$3.88	$4.05	$4.06	$3.87
12	$4.23	$4.22	$4.39	$4.41	$4.20
13	$4.58	$4.56	$4.85	$4.85	$4.53
14	$4.92	$4.89	$5.28	$5.28	$4.86
15	$5.24	$5.21	$5.71	$5.70	$5.18
16	$5.56	$5.53	$6.12	$6.10	$5.48
17	$5.87	$5.83	$6.52	$6.49	$5.79
18	$6.19	$6.15	$6.92	$6.88	$6.09
19	$6.50	$6.45	$7.31	$7.27	$6.39
20	$6.80	$6.75	$7.70	$7.64	$6.69
21	$7.10	$7.04	$8.07	$8.01	$6.97
22	$7.38	$7.32	$8.42	$8.36	$7.25
23	$7.65	$7.59	$8.77	$8.69	$7.51
24	$7.92	$7.85	$9.10	$9.02	$7.77
25	$8.17	$8.11	$9.42	$9.33	$8.02
26	$8.42	$8.35	$9.72	$9.63	$8.25
27	$8.65	$8.58	$10.01	$9.92	$8.48
28	$8.88	$8.80	$10.30	$10.20	$8.70
29	$9.10	$9.02	$10.57	$10.46	$8.92
30	$9.31	$9.23	$10.83	$10.72	$9.12
31	$9.51	$9.43	$11.08	$10.97	$9.32
32	$9.71	$9.62	$11.33	$11.21	$9.51
33	$9.90	$9.81	$11.56	$11.44	$9.69
34	$10.08	$9.99	$11.79	$11.66	$9.87
35	$10.25	$10.17	$12.00	$11.87	$10.04
36	$10.42	$10.33	$12.21	$12.08	$10.21
37	$10.59	$10.50	$12.41	$12.27	$10.37
38	$10.74	$10.65	$12.61	$12.46	$10.52
39	$10.90	$10.80	$12.79	$12.65	$10.67
40	$11.04	$10.95	$12.97	$12.82	$10.81
41	$11.19	$11.09	$13.15	$13.00	$10.95
42	$11.32	$11.22	$13.31	$13.16	$11.08
43	$11.45	$11.35	$13.48	$13.32	$11.21
44	$11.58	$11.48	$13.63	$13.47	$11.34
45	$11.70	$11.60	$13.78	$13.62	$11.46
46	$11.82	$11.72	$13.92	$13.76	$11.57
47	$11.93	$11.83	$14.06	$13.89	$11.68
48	$12.04	$11.94	$14.19	$14.02	$11.79
49	$12.15	$12.04	$14.32	$14.14	$11.89
50	$12.24	$12.14	$14.44	$14.26	$11.98

TOTAL AVOIDED COSTS - National Market Choice Proposal Carbon Scenario

% Difference from Base Case

Lifetime	DHW	FLAT	Res Heating	Com Heating	Clotheswasher
1	0%	0%	0%	0%	0%
2	6%	6%	6%	6%	6%
3	-2%	-2%	-2%	-2%	-2%
4	-2%	-2%	-2%	-2%	-2%
5	-6%	-6%	-6%	-6%	-6%
6	-9%	-10%	-9%	-9%	-10%
7	-13%	-13%	-13%	-13%	-13%
8	-17%	-17%	-17%	-17%	-17%
9	-21%	-21%	-20%	-20%	-21%
10	-25%	-25%	-24%	-24%	-25%
11	-28%	-28%	-28%	-28%	-29%
12	-28%	-28%	-27%	-27%	-28%
13	-26%	-26%	-21%	-21%	-26%
14	-25%	-25%	-21%	-21%	-26%
15	-24%	-25%	-20%	-20%	-25%
16	-24%	-24%	-20%	-20%	-24%
17	-23%	-23%	-19%	-19%	-24%
18	-22%	-22%	-18%	-18%	-22%
19	-21%	-21%	-17%	-17%	-21%
20	-20%	-20%	-16%	-17%	-20%
21	-19%	-20%	-16%	-16%	-20%
22	-19%	-19%	-16%	-16%	-19%
23	-18%	-18%	-15%	-15%	-19%
24	-18%	-18%	-15%	-15%	-18%
25	-17%	-17%	-14%	-14%	-18%
26	-17%	-17%	-14%	-14%	-17%
27	-16%	-16%	-13%	-13%	-16%
28	-15%	-16%	-13%	-13%	-16%
29	-15%	-15%	-12%	-12%	-15%
30	-14%	-14%	-12%	-12%	-14%
31	-13%	-14%	-11%	-11%	-14%
32	-13%	-13%	-11%	-11%	-13%
33	-12%	-12%	-10%	-10%	-12%
34	-12%	-12%	-10%	-10%	-12%
35	-11%	-11%	-9%	-9%	-11%
36	-10%	-10%	-8%	-9%	-10%
37	-9%	-9%	-8%	-8%	-10%
38	-9%	-9%	-7%	-7%	-9%
39	-8%	-8%	-7%	-7%	-8%
40	-7%	-7%	-6%	-6%	-7%
41	-6%	-6%	-5%	-5%	-7%
42	-6%	-6%	-5%	-5%	-6%
43	-5%	-5%	-4%	-4%	-5%
44	-4%	-4%	-3%	-3%	-4%
45	-3%	-3%	-3%	-3%	-3%
46	-3%	-3%	-3%	-3%	-3%
47	-3%	-3%	-3%	-3%	-3%
48	-3%	-3%	-3%	-3%	-3%
49	-3%	-3%	-3%	-3%	-3%
50	-3%	-3%	-3%	-3%	-3%