

Appendix H

Avoided Cost Calculations

CASCADE NATURAL GAS CORPORATION
BASECASE - MEDIUM FORECAST - AVERAGE WEATHER
45 YEAR RESOURCE SUMMARY COSTS - MEDED COST PER THERM

	YEAR	IRP ANNUAL PORTFOLIO COST PER THERM (PV)*	NOMINAL COST PER THERM	RESOURCE PORTFOLIO COST - % CHANGE	PV OF RESOURCE PORTFOLIO COST/THERM	Non- Energy Benefits %	PORTFOLIO COSTS INCLUDING CONSERVATION CREDIT	COST- EFFECTIVENESS LIMIT
2010	1	\$ 0.58	\$ 0.62		\$ 0.58	5%	\$ 0.61	
2011	2	\$ 0.58	\$ 0.67	7.5%	\$ 1.16	5%	\$ 1.22	
2012	3	\$ 0.57	\$ 0.71	5.7%	\$ 1.73	5%	\$ 1.82	
2013	4	\$ 0.58	\$ 0.78	10.1%	\$ 2.32	5%	\$ 2.43	
2014	5	\$ 0.56	\$ 0.81	4.9%	\$ 2.89	7.5%	\$ 3.11	
2015	6	\$ 0.52	\$ 0.81	-0.1%	\$ 3.43	7.5%	\$ 3.68	
2016	7	\$ 0.48	\$ 0.81	-0.6%	\$ 3.92	7.5%	\$ 4.22	\$0.7072
2017	8	\$ 0.46	\$ 0.83	2.4%	\$ 4.40	7.5%	\$ 4.73	
2018	9	\$ 0.44	\$ 0.85	2.0%	\$ 4.85	7.5%	\$ 5.21	
2019	10	\$ 0.39	\$ 0.82	-2.8%	\$ 5.26	10.0%	\$ 5.78	\$0.7190
2020	11	\$ 0.37	\$ 0.82	-0.1%	\$ 5.64	10%	\$ 6.20	
2021	12	\$ 0.35	\$ 0.85	3.1%	\$ 6.00	10%	\$ 6.60	
2022	13	\$ 0.34	\$ 0.88	3.9%	\$ 6.36	10%	\$ 6.99	
2023	14	\$ 0.30	\$ 0.84	-4.6%	\$ 6.67	10%	\$ 7.34	
2024	15	\$ 0.27	\$ 0.81	-3.4%	\$ 6.96	12.5%	\$ 7.83	
2025	16	\$ 0.26	\$ 0.83	2.6%	\$ 7.23	12.5%	\$ 8.13	
2026	17	\$ 0.24	\$ 0.84	1.4%	\$ 7.49	12.5%	\$ 8.42	
2027	18	\$ 0.23	\$ 0.86	2.4%	\$ 7.73	12.5%	\$ 8.70	
2028	19	\$ 0.22	\$ 0.87	1.3%	\$ 7.96	12.5%	\$ 8.96	
2029	20	\$ 0.20	\$ 0.89	1.7%	\$ 8.18	12.5%	\$ 9.21	\$0.6877
2030	21	\$ 0.19	\$ 0.92	2.6%	\$ 8.40	15%	\$ 9.65	
2031	22	\$ 0.19	\$ 0.94	2.6%	\$ 8.60	15%	\$ 9.89	
2032	23	\$ 0.18	\$ 0.97	2.6%	\$ 8.79	15%	\$ 10.11	
2033	24	\$ 0.17	\$ 1.00	2.6%	\$ 8.97	15%	\$ 10.32	
2034	25	\$ 0.16	\$ 1.03	2.6%	\$ 9.15	15%	\$ 10.52	
2035	26	\$ 0.16	\$ 1.06	2.6%	\$ 9.32	17.5%	\$ 10.95	
2036	27	\$ 0.15	\$ 1.09	2.6%	\$ 9.48	17.5%	\$ 11.14	
2037	28	\$ 0.14	\$ 1.13	2.6%	\$ 9.64	17.5%	\$ 11.32	
2038	29	\$ 0.14	\$ 1.16	2.6%	\$ 9.78	17.5%	\$ 11.49	
2039	30	\$ 0.13	\$ 1.20	2.6%	\$ 9.92	17.5%	\$ 11.66	\$0.6884
2040	31	\$ 0.13	\$ 1.23	2.6%	\$ 10.06	20%	\$ 12.07	
2041	32	\$ 0.12	\$ 1.27	2.6%	\$ 10.19	20%	\$ 12.23	
2042	33	\$ 0.12	\$ 1.31	2.6%	\$ 10.31	20%	\$ 12.38	
2043	34	\$ 0.11	\$ 1.35	2.6%	\$ 10.43	20%	\$ 12.52	
2044	35	\$ 0.11	\$ 1.39	2.6%	\$ 10.55	20%	\$ 12.65	
2045	36	\$ 0.10	\$ 1.43	2.6%	\$ 10.65	20%	\$ 12.78	
2046	37	\$ 0.10	\$ 1.47	2.6%	\$ 10.76	20%	\$ 12.91	
2047	38	\$ 0.09	\$ 1.51	2.6%	\$ 10.86	20%	\$ 13.03	
2048	39	\$ 0.09	\$ 1.56	2.6%	\$ 10.95	20%	\$ 13.14	
2049	40	\$ 0.08	\$ 1.61	2.6%	\$ 11.04	20%	\$ 13.25	
2050	41	\$ 0.08	\$ 1.65	2.6%	\$ 11.13	20%	\$ 13.36	
2051	42	\$ 0.08	\$ 1.70	2.6%	\$ 11.21	20%	\$ 13.46	
2052	43	\$ 0.07	\$ 1.76	2.6%	\$ 11.29	20%	\$ 13.55	
2053	44	\$ 0.07	\$ 1.81	2.6%	\$ 11.37	20%	\$ 13.64	
2054	45	\$ 0.07	\$ 1.86	2.6%	\$ 11.44	20%	\$ 13.73	

Cascade's Long Term Real Discount Rate: 4.170%
 IRP Discount Rate = 7.234%
 Years 21-45 Escalation = 2.60% (EIA Inflation Rate)

Conservation Credit % attempts to recognize non-quantifiable benefits associated with conservation, including benefits of price certainty & hedge against future carbon costs

CASCADE NATURAL GAS CORPORATION
BASECASE - MEDIUM FORECAST - AVERAGE WEATHER-With Carbon 1 Scenario
45 YEAR RESOURCE SUMMARY COSTS - MELED COST PER THERM

	YEAR	IRP ANNUAL PORTFOLIO COST PER THERM (PV)*	NOMINAL COST PER THERM	RESOURCE PORTFOLIO COST - % CHANGE	PV OF RESOURCE PORTFOLIO COST/THERM	Non- Energy Benefits %	PORTFOLIO COSTS INCLUDING CONSERVATION CREDIT	COST- EFFECTIVENESS LIMIT
2010	1	\$ 0.58	\$ 0.62		\$ 0.58	5%	\$ 0.61	
2011	2	\$ 0.58	\$ 0.67	7.5%	\$ 1.16	5%	\$ 1.22	
2012	3	\$ 0.57	\$ 0.71	5.7%	\$ 1.73	5%	\$ 1.82	
2013	4	\$ 0.58	\$ 0.78	10.1%	\$ 2.32	5%	\$ 2.43	
2014	5	\$ 0.56	\$ 0.81	4.9%	\$ 2.89	7.5%	\$ 3.11	
2015	6	\$ 0.52	\$ 0.81	-0.1%	\$ 3.43	7.5%	\$ 3.68	
2016	7	\$ 0.54	\$ 0.91	-0.6%	\$ 3.98	7.5%	\$ 4.28	\$0.7173
2017	8	\$ 0.51	\$ 0.93	2.4%	\$ 4.51	7.5%	\$ 4.85	
2018	9	\$ 0.49	\$ 0.96	2.0%	\$ 5.01	7.5%	\$ 5.39	
2019	10	\$ 0.45	\$ 0.94	-2.8%	\$ 5.48	10.0%	\$ 6.02	\$0.7491
2020	11	\$ 0.42	\$ 0.94	-0.1%	\$ 5.91	10%	\$ 6.50	
2021	12	\$ 0.40	\$ 0.98	3.1%	\$ 6.33	10%	\$ 6.96	
2022	13	\$ 0.39	\$ 1.02	3.9%	\$ 6.74	10%	\$ 7.41	
2023	14	\$ 0.35	\$ 0.99	-4.6%	\$ 7.10	10%	\$ 7.81	
2024	15	\$ 0.32	\$ 0.97	-3.4%	\$ 7.44	12.5%	\$ 8.37	
2025	16	\$ 0.30	\$ 1.00	2.6%	\$ 7.76	12.5%	\$ 8.73	
2026	17	\$ 0.29	\$ 1.02	1.4%	\$ 8.07	12.5%	\$ 9.08	
2027	18	\$ 0.28	\$ 1.05	2.4%	\$ 8.37	12.5%	\$ 9.41	
2028	19	\$ 0.26	\$ 1.08	1.3%	\$ 8.65	12.5%	\$ 9.73	
2029	20	\$ 0.25	\$ 1.10	1.7%	\$ 8.92	12.5%	\$ 10.03	\$0.7493
2030	21	\$ 0.24	\$ 1.14	2.6%	\$ 9.18	15%	\$ 10.55	
2031	22	\$ 0.23	\$ 1.19	2.6%	\$ 9.43	15%	\$ 10.84	
2032	23	\$ 0.22	\$ 1.23	2.6%	\$ 9.67	15%	\$ 11.12	
2033	24	\$ 0.21	\$ 1.27	2.6%	\$ 9.90	15%	\$ 11.38	
2034	25	\$ 0.21	\$ 1.32	2.6%	\$ 10.12	15%	\$ 11.64	
2035	26	\$ 0.20	\$ 1.37	2.6%	\$ 10.34	17.5%	\$ 12.15	
2036	27	\$ 0.19	\$ 1.41	2.6%	\$ 10.55	17.5%	\$ 12.39	
2037	28	\$ 0.18	\$ 1.46	2.6%	\$ 10.74	17.5%	\$ 12.62	
2038	29	\$ 0.18	\$ 1.50	2.6%	\$ 10.93	17.5%	\$ 12.85	
2039	30	\$ 0.17	\$ 1.55	2.6%	\$ 11.12	17.5%	\$ 13.06	\$0.7710
2040	31	\$ 0.16	\$ 1.60	2.6%	\$ 11.29	20%	\$ 13.55	
2041	32	\$ 0.15	\$ 1.65	2.6%	\$ 11.46	20%	\$ 13.75	
2042	33	\$ 0.15	\$ 1.70	2.6%	\$ 11.62	20%	\$ 13.94	
2043	34	\$ 0.14	\$ 1.75	2.6%	\$ 11.77	20%	\$ 14.13	
2044	35	\$ 0.14	\$ 1.81	2.6%	\$ 11.92	20%	\$ 14.30	
2045	36	\$ 0.13	\$ 1.86	2.6%	\$ 12.06	20%	\$ 14.47	
2046	37	\$ 0.12	\$ 1.92	2.6%	\$ 12.20	20%	\$ 14.63	
2047	38	\$ 0.12	\$ 1.98	2.6%	\$ 12.33	20%	\$ 14.79	
2048	39	\$ 0.11	\$ 2.04	2.6%	\$ 12.45	20%	\$ 14.94	
2049	40	\$ 0.11	\$ 2.11	2.6%	\$ 12.57	20%	\$ 15.08	
2050	41	\$ 0.10	\$ 2.17	2.6%	\$ 12.68	20%	\$ 15.22	
2051	42	\$ 0.10	\$ 2.24	2.6%	\$ 12.79	20%	\$ 15.35	
2052	43	\$ 0.10	\$ 2.31	2.6%	\$ 12.90	20%	\$ 15.48	
2053	44	\$ 0.09	\$ 2.38	2.6%	\$ 13.00	20%	\$ 15.60	
2054	45	\$ 0.07	\$ 2.45	2.6%	\$ 11.44	20%	\$ 13.73	

0.6129836

Cascade's Long Term Real Discount Rate: 4.170%
 IRP Discount Rate = 7.234%
 Years 21-45 Escalation = 2.60% (EIA Inflation Rate)

Conservation Credit % attempts to recognize non-quantifiable benefits associated with conservation, including benefits of price certainty & hedge against future carbon costs
 Carbon estimated \$15/ton, applies to Natural Gas 2016

CASCADE NATURAL GAS CORPORATION
BASECASE - MEDIUM FORECAST - AVERAGE WEATHER- With Carbon 2 scenario
45 YEAR RESOURCE SUMMARY COSTS - MELED COST PER THERM

	YEAR	IRP ANNUAL PORTFOLIO COST PER THERM (PV)*	NOMINAL COST PER THERM	RESOURCE PORTFOLIO COST - % CHANGE	PV OF RESOURCE PORTFOLIO COST/THERM	Non- Energy Benefits %	PORTFOLIO COSTS INCLUDING CONSERVATION CREDIT	COST- EFFECTIVENESS LIMIT
2010	1	\$ 0.58	\$ 0.62		\$ 0.58	5%	\$ 0.61	
2011	2	\$ 0.58	\$ 0.67	7.5%	\$ 1.16	5%	\$ 1.22	
2012	3	\$ 0.57	\$ 0.71	5.7%	\$ 1.73	5%	\$ 1.82	
2013	4	\$ 0.58	\$ 0.78	10.1%	\$ 2.32	5%	\$ 2.43	
2014	5	\$ 0.56	\$ 0.81	4.9%	\$ 2.89	7.5%	\$ 3.11	
2015	6	\$ 0.52	\$ 0.81	-0.1%	\$ 3.43	7.5%	\$ 3.68	
2016	7	\$ 0.55	\$ 0.81	-0.6%	\$ 4.00	7.5%	\$ 4.30	\$0.7203
2017	8	\$ 0.53	\$ 0.83	2.4%	\$ 4.54	7.5%	\$ 4.88	
2018	9	\$ 0.50	\$ 0.85	2.0%	\$ 5.06	7.5%	\$ 5.44	
2019	10	\$ 0.46	\$ 0.82	-2.8%	\$ 5.54	10.0%	\$ 6.10	\$0.7581
2020	11	\$ 0.43	\$ 0.82	-0.1%	\$ 5.99	10%	\$ 6.59	
2021	12	\$ 0.42	\$ 0.85	3.1%	\$ 6.43	10%	\$ 7.07	
2022	13	\$ 0.40	\$ 0.88	3.9%	\$ 6.85	10%	\$ 7.54	
2023	14	\$ 0.36	\$ 0.84	-4.6%	\$ 7.23	10%	\$ 7.96	
2024	15	\$ 0.33	\$ 0.81	-3.4%	\$ 7.59	12.5%	\$ 8.53	
2025	16	\$ 0.32	\$ 0.83	2.6%	\$ 7.92	12.5%	\$ 8.92	
2026	17	\$ 0.30	\$ 0.84	1.4%	\$ 8.25	12.5%	\$ 9.28	
2027	18	\$ 0.29	\$ 0.86	2.4%	\$ 8.56	12.5%	\$ 9.63	
2028	19	\$ 0.28	\$ 0.87	1.3%	\$ 8.86	12.5%	\$ 9.96	
2029	20	\$ 0.26	\$ 0.89	1.7%	\$ 9.14	12.5%	\$ 10.28	\$0.7681
2030	21	\$ 0.25	\$ 0.92	2.6%	\$ 9.41	15%	\$ 10.83	
2031	22	\$ 0.25	\$ 0.94	2.6%	\$ 9.68	15%	\$ 11.13	
2032	23	\$ 0.24	\$ 0.97	2.6%	\$ 9.94	15%	\$ 11.43	
2033	24	\$ 0.23	\$ 1.00	2.6%	\$ 10.18	15%	\$ 11.71	
2034	25	\$ 0.22	\$ 1.03	2.6%	\$ 10.42	15%	\$ 11.98	
2035	26	\$ 0.21	\$ 1.06	2.6%	\$ 10.65	17.5%	\$ 12.51	
2036	27	\$ 0.20	\$ 1.09	2.6%	\$ 10.87	17.5%	\$ 12.77	
2037	28	\$ 0.20	\$ 1.13	2.6%	\$ 11.08	17.5%	\$ 13.02	
2038	29	\$ 0.19	\$ 1.16	2.6%	\$ 11.29	17.5%	\$ 13.26	
2039	30	\$ 0.18	\$ 1.20	2.6%	\$ 11.48	17.5%	\$ 13.49	\$0.7963
2040	31	\$ 0.17	\$ 1.23	2.6%	\$ 11.67	20%	\$ 14.00	
2041	32	\$ 0.16	\$ 1.27	2.6%	\$ 11.85	20%	\$ 14.22	
2042	33	\$ 0.16	\$ 1.31	2.6%	\$ 12.02	20%	\$ 14.42	
2043	34	\$ 0.15	\$ 1.35	2.6%	\$ 12.18	20%	\$ 14.62	
2044	35	\$ 0.14	\$ 1.39	2.6%	\$ 12.34	20%	\$ 14.81	
2045	36	\$ 0.14	\$ 1.43	2.6%	\$ 12.49	20%	\$ 14.99	
2046	37	\$ 0.13	\$ 1.47	2.6%	\$ 12.64	20%	\$ 15.17	
2047	38	\$ 0.13	\$ 1.51	2.6%	\$ 12.78	20%	\$ 15.33	
2048	39	\$ 0.12	\$ 1.56	2.6%	\$ 12.91	20%	\$ 15.49	
2049	40	\$ 0.12	\$ 1.61	2.6%	\$ 13.04	20%	\$ 15.65	
2050	41	\$ 0.11	\$ 1.65	2.6%	\$ 13.16	20%	\$ 15.80	
2051	42	\$ 0.11	\$ 1.70	2.6%	\$ 13.28	20%	\$ 15.94	
2052	43	\$ 0.10	\$ 1.76	2.6%	\$ 13.39	20%	\$ 16.07	
2053	44	\$ 0.10	\$ 1.81	2.6%	\$ 13.50	20%	\$ 16.20	
2054	45	\$ 0.07	\$ 1.86	2.6%	\$ 11.44	20%	\$ 13.73	

Cascade's Long Term Real Discount Rate: 4.170%
 IRP Discount Rate = 7.234%
 Years 21-45 Escalation = 2.60% (EIA Inflation Rate)

Conservation Credit % attempts to recognize non-quantifiable benefits associated with conservation, including benefits of price certainty & hedge against future carbon costs
 Carbon estimated \$20/ton, applies to Natural Gas 2016

CASCADE NATURAL GAS CORPORATION
BASECASE - MEDIUM FORECAST - AVERAGE WEATHER-With Carbon 3 Scenario
45 YEAR RESOURCE SUMMARY COSTS - MEDED COST PER THERM

	YEAR	IRP ANNUAL PORTFOLIO COST PER THERM (PV)*	NOMINAL COST PER THERM	RESOURCE PORTFOLIO COST - % CHANGE	PV OF RESOURCE PORTFOLIO COST/THERM	Non- Energy Benefits %	PORTFOLIO COSTS INCLUDING CONSERVATION CREDIT	COST- EFFECTIVENESS LIMIT
2010	1	\$ 0.58	\$ 0.62		\$ 0.58	5%	\$ 0.61	
2011	2	\$ 0.58	\$ 0.67	7.5%	\$ 1.16	5%	\$ 1.22	
2012	3	\$ 0.57	\$ 0.71	5.7%	\$ 1.73	5%	\$ 1.82	
2013	4	\$ 0.58	\$ 0.78	10.1%	\$ 2.32	5%	\$ 2.43	
2014	5	\$ 0.56	\$ 0.81	4.9%	\$ 2.89	7.5%	\$ 3.11	
2015	6	\$ 0.52	\$ 0.81	-0.1%	\$ 3.43	7.5%	\$ 3.68	
2016	7	\$ 0.59	\$ 0.99	-0.6%	\$ 4.03	7.5%	\$ 4.33	\$0.7263
2017	8	\$ 0.56	\$ 1.02	2.4%	\$ 4.61	7.5%	\$ 4.95	
2018	9	\$ 0.54	\$ 1.05	2.0%	\$ 5.16	7.5%	\$ 5.55	
2019	10	\$ 0.49	\$ 1.04	-2.8%	\$ 5.67	10.0%	\$ 6.24	\$0.7761
2020	11	\$ 0.46	\$ 1.06	-0.1%	\$ 6.16	10%	\$ 6.77	
2021	12	\$ 0.45	\$ 1.10	3.1%	\$ 6.62	10%	\$ 7.29	
2022	13	\$ 0.43	\$ 1.15	3.9%	\$ 7.08	10%	\$ 7.79	
2023	14	\$ 0.39	\$ 1.12	-4.6%	\$ 7.49	10%	\$ 8.24	
2024	15	\$ 0.36	\$ 1.11	-3.4%	\$ 7.88	12.5%	\$ 8.86	
2025	16	\$ 0.35	\$ 1.15	2.6%	\$ 8.25	12.5%	\$ 9.28	
2026	17	\$ 0.33	\$ 1.18	1.4%	\$ 8.60	12.5%	\$ 9.68	
2027	18	\$ 0.32	\$ 1.23	2.4%	\$ 8.94	12.5%	\$ 10.06	
2028	19	\$ 0.31	\$ 1.26	1.3%	\$ 9.27	12.5%	\$ 10.43	
2029	20	\$ 0.29	\$ 1.30	1.7%	\$ 9.59	12.5%	\$ 10.78	\$0.8055
2030	21	\$ 0.28	\$ 1.35	2.6%	\$ 9.89	15%	\$ 11.37	
2031	22	\$ 0.27	\$ 1.41	2.6%	\$ 10.19	15%	\$ 11.71	
2032	23	\$ 0.26	\$ 1.47	2.6%	\$ 10.47	15%	\$ 12.04	
2033	24	\$ 0.26	\$ 1.53	2.6%	\$ 10.75	15%	\$ 12.36	
2034	25	\$ 0.25	\$ 1.59	2.6%	\$ 11.02	15%	\$ 12.67	
2035	26	\$ 0.24	\$ 1.66	2.6%	\$ 11.27	17.5%	\$ 13.25	
2036	27	\$ 0.23	\$ 1.71	2.6%	\$ 11.52	17.5%	\$ 13.54	
2037	28	\$ 0.22	\$ 1.77	2.6%	\$ 11.76	17.5%	\$ 13.82	
2038	29	\$ 0.21	\$ 1.82	2.6%	\$ 11.99	17.5%	\$ 14.09	
2039	30	\$ 0.20	\$ 1.88	2.6%	\$ 12.21	17.5%	\$ 14.35	\$0.8470
2040	31	\$ 0.19	\$ 1.94	2.6%	\$ 12.42	20%	\$ 14.91	
2041	32	\$ 0.19	\$ 2.00	2.6%	\$ 12.63	20%	\$ 15.15	
2042	33	\$ 0.18	\$ 2.07	2.6%	\$ 12.82	20%	\$ 15.38	
2043	34	\$ 0.17	\$ 2.13	2.6%	\$ 13.01	20%	\$ 15.61	
2044	35	\$ 0.16	\$ 2.20	2.6%	\$ 13.19	20%	\$ 15.82	
2045	36	\$ 0.16	\$ 2.27	2.6%	\$ 13.36	20%	\$ 16.03	
2046	37	\$ 0.15	\$ 2.34	2.6%	\$ 13.52	20%	\$ 16.23	
2047	38	\$ 0.14	\$ 2.42	2.6%	\$ 13.68	20%	\$ 16.42	
2048	39	\$ 0.14	\$ 2.49	2.6%	\$ 13.83	20%	\$ 16.60	
2049	40	\$ 0.13	\$ 2.57	2.6%	\$ 13.98	20%	\$ 16.78	
2050	41	\$ 0.13	\$ 2.65	2.6%	\$ 14.12	20%	\$ 16.95	
2051	42	\$ 0.12	\$ 2.74	2.6%	\$ 14.26	20%	\$ 17.11	
2052	43	\$ 0.12	\$ 2.83	2.6%	\$ 14.38	20%	\$ 17.26	
2053	44	\$ 0.07	\$ 1.81	2.6%	\$ 11.37	20%	\$ 13.64	
2054	45	\$ 0.07	\$ 1.86	2.6%	\$ 11.44	20%	\$ 13.73	

Cascade's Long Term Real Discount Rate: 4.170%
 IRP Discount Rate = 7.234%
 Years 21-45 Escalation = 2.60% (EIA Inflation Rate)

Conservation Credit % attempts to recognize non-quantifiable benefits associated with conservation, including benefits of price certainty & hedge against future carbon costs
 Carbon estimated \$30/ton, applies to Natural Gas 2016