

Value of Lifetime GHG Emissions Reductions from the Proposed Geothermal Program

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Retrofit Customers											
Conversions (#)	80	120	160	200	320	440	520	520	520	520	-
Cumulative number of customers (#)	80	200	360	560	880	1,320	1,840	2,360	2,880	3,400	3,400
Cumulative number of customers (#) [50% effective]	40	140	280	460	720	1,100	1,580	2,100	2,620	3,140	3,400
Forecast annual NG savings (m ³) ⁽¹⁾	96,000	336,000	672,000	1,104,000	1,728,000	2,640,000	3,792,000	5,040,000	6,288,000	7,536,000	8,160,000
Forecast annual GHG reduction from NG (t CO ₂ e) ⁽²⁾	180	630	1,260	2,070	3,239	4,949	7,109	9,448	11,788	14,127	15,297
Forecast carbon price (\$/tonne) ^(3/4)	\$ 10.00	\$ 20.00	\$ 30.00	\$ 40.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00
Value of GHG reduction (\$, nominal)	\$ 1,800	\$ 12,597	\$ 37,792	\$ 82,784	\$ 161,968	\$ 247,451	\$ 355,429	\$ 472,406	\$ 589,383	\$ 706,359	\$ 764,848
Value of GHG reduction (\$, NPV)	\$ 7,565,173										
New Construction											
New Construction (#)	90	180	270	540	900	1,800	2,700	2,700	2,700	2,700	-
Cumulative number of customers (#)	90	270	540	1,080	1,980	3,780	6,480	9,180	11,880	14,580	14,580
Cumulative number of customers (#) [50% effective]	45	180	405	810	1,530	2,880	5,130	7,830	10,530	13,230	14,580
Forecast annual NG savings (m ³) ⁽¹⁾	99,000	396,000	891,000	1,782,000	3,366,000	6,336,000	11,286,000	17,226,000	23,166,000	29,106,000	32,076,000
Forecast annual GHG reduction from NG (t CO ₂ e) ⁽²⁾	186	742	1,670	3,341	6,310	11,878	21,157	32,292	43,428	54,563	60,131
Forecast carbon price (\$/tonne) ^(3/4)	\$ 10.00	\$ 20.00	\$ 30.00	\$ 40.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00
Value of GHG reduction (\$, nominal)	\$ 1,856	\$ 14,847	\$ 50,109	\$ 133,623	\$ 315,500	\$ 593,882	\$ 1,057,852	\$ 1,614,616	\$ 2,171,380	\$ 2,728,145	\$ 3,006,527
Value of GHG reduction (\$, NPV)	\$ 28,721,852										
Totals											
Forecast annual NG savings (m ³)	195,000	732,000	1,563,000	2,886,000	5,094,000	8,976,000	15,078,000	22,266,000	29,454,000	36,642,000	40,236,000
Forecast annual GHG reduction from NG (t CO ₂ e)	366	1,372	2,930	5,410	9,549	16,827	28,266	41,740	55,215	68,690	75,427
Value of GHG reduction (\$, nominal)	\$ 3,656	\$ 27,445	\$ 87,901	\$ 216,407	\$ 477,467	\$ 841,333	\$ 1,413,281	\$ 2,087,022	\$ 2,760,763	\$ 3,434,504	\$ 3,771,375
Value of GHG reduction (\$, NPV)	\$ 36,287,025										

1. Avoided natural gas volume for conversion of existing customers is 2,400 m³/yr and of new construction is 2,200 m³/yr.

2. Assumes a conversion rate of 1.875 kg of CO₂e per cubic meter of gas.

3. For 2018 - 2022, assumes the Federal Carbon Pricing Backstop.

4. For 2023 and beyond, assumes the carbon price is constant.

Value of Lifetime GHG Emissions Reductions from the Proposed Geothermal Program

	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22
Retrofit Customers											
Conversions (#)	-	-	-	-	-	-	-	-	-	-	-
Cumulative number of customers (#)	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400
Cumulative number of customers (#) [50% effective]	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400
Forecast annual NG savings (m ³) ⁽¹⁾	8,160,000	8,160,000	8,160,000	8,160,000	8,160,000	8,160,000	8,160,000	8,160,000	8,160,000	8,160,000	8,160,000
Forecast annual GHG reduction from NG (t CO ₂ e) ⁽²⁾	15,297	15,297	15,297	15,297	15,297	15,297	15,297	15,297	15,297	15,297	15,297
Forecast carbon price (\$/tonne) ⁽³⁾⁽⁴⁾	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00
Value of GHG reduction (\$, nominal)	\$ 764,848	\$ 764,848	\$ 764,848	\$ 764,848	\$ 764,848	\$ 764,848	\$ 764,848	\$ 764,848	\$ 764,848	\$ 764,848	\$ 764,848
Value of GHG reduction (\$, NPV)											
New Construction											
New Construction (#)	-	-	-	-	-	-	-	-	-	-	-
Cumulative number of customers (#)	14,580	14,580	14,580	14,580	14,580	14,580	14,580	14,580	14,580	14,580	14,580
Cumulative number of customers (#) [50% effective]	14,580	14,580	14,580	14,580	14,580	14,580	14,580	14,580	14,580	14,580	14,580
Forecast annual NG savings (m ³) ⁽¹⁾	32,076,000	32,076,000	32,076,000	32,076,000	32,076,000	32,076,000	32,076,000	32,076,000	32,076,000	32,076,000	32,076,000
Forecast annual GHG reduction from NG (t CO ₂ e) ⁽²⁾	60,131	60,131	60,131	60,131	60,131	60,131	60,131	60,131	60,131	60,131	60,131
Forecast carbon price (\$/tonne) ⁽³⁾⁽⁴⁾	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00
Value of GHG reduction (\$, nominal)	\$ 3,006,527	\$ 3,006,527	\$ 3,006,527	\$ 3,006,527	\$ 3,006,527	\$ 3,006,527	\$ 3,006,527	\$ 3,006,527	\$ 3,006,527	\$ 3,006,527	\$ 3,006,527
Value of GHG reduction (\$, NPV)											
Totals											
Forecast annual NG savings (m ³)	40,236,000	40,236,000	40,236,000	40,236,000	40,236,000	40,236,000	40,236,000	40,236,000	40,236,000	40,236,000	40,236,000
Forecast annual GHG reduction from NG (t CO ₂ e)	75,427	75,427	75,427	75,427	75,427	75,427	75,427	75,427	75,427	75,427	75,427
Value of GHG reduction (\$, nominal)	\$ 3,771,375	\$ 3,771,375	\$ 3,771,375	\$ 3,771,375	\$ 3,771,375	\$ 3,771,375	\$ 3,771,375	\$ 3,771,375	\$ 3,771,375	\$ 3,771,375	\$ 3,771,375
Value of GHG reduction (\$, NPV)											

1. Avoided natural gas volume for conversion of existing cus
2. Assumes a conversion rate of 1.875 kg of CO₂e per cubic
3. For 2018 - 2022, assumes the Federal Carbon Pricing Bar
4. For 2023 and beyond, assumes the carbon price is const

Value of Lifetime GHG Emissions Reductions from the Proposed Geothermal Program

	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30	Year 31	Year 32	Year 33
Retrofit Customers											
Conversions (#)	-	-	-	-	-	-	-	-	-	-	-
Cumulative number of customers (#)	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,320	3,200	3,040
Cumulative number of customers (#) [50% effective]	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,360	3,260	3,120
Forecast annual NG savings (m ³) ⁽¹⁾	8,160,000	8,160,000	8,160,000	8,160,000	8,160,000	8,160,000	8,160,000	8,160,000	8,064,000	7,824,000	7,488,000
Forecast annual GHG reduction from NG (t CO ₂ e) ⁽²⁾	15,297	15,297	15,297	15,297	15,297	15,297	15,297	15,297	15,117	14,667	14,037
Forecast carbon price (\$/tonne) ^(3/4)	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00
Value of GHG reduction (\$, nominal)	\$ 764,848	\$ 764,848	\$ 764,848	\$ 764,848	\$ 764,848	\$ 764,848	\$ 764,848	\$ 764,848	\$ 755,850	\$ 733,354	\$ 701,860
Value of GHG reduction (\$, NPV)											
New Construction											
New Construction (#)	-	-	-	-	-	-	-	-	-	-	-
Cumulative number of customers (#)	14,580	14,580	14,580	14,580	14,580	14,580	14,580	14,580	14,490	14,310	14,040
Cumulative number of customers (#) [50% effective]	14,580	14,580	14,580	14,580	14,580	14,580	14,580	14,580	14,535	14,400	14,175
Forecast annual NG savings (m ³) ⁽¹⁾	32,076,000	32,076,000	32,076,000	32,076,000	32,076,000	32,076,000	32,076,000	32,076,000	31,977,000	31,680,000	31,185,000
Forecast annual GHG reduction from NG (t CO ₂ e) ⁽²⁾	60,131	60,131	60,131	60,131	60,131	60,131	60,131	60,131	59,945	59,388	58,460
Forecast carbon price (\$/tonne) ^(3/4)	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00
Value of GHG reduction (\$, nominal)	\$ 3,006,527	\$ 3,006,527	\$ 3,006,527	\$ 3,006,527	\$ 3,006,527	\$ 3,006,527	\$ 3,006,527	\$ 3,006,527	\$ 2,997,247	\$ 2,969,409	\$ 2,923,012
Value of GHG reduction (\$, NPV)											
Totals											
Forecast annual NG savings (m ³)	40,236,000	40,236,000	40,236,000	40,236,000	40,236,000	40,236,000	40,236,000	40,236,000	40,041,000	39,504,000	38,673,000
Forecast annual GHG reduction from NG (t CO ₂ e)	75,427	75,427	75,427	75,427	75,427	75,427	75,427	75,427	75,062	74,055	72,497
Value of GHG reduction (\$, nominal)	\$ 3,771,375	\$ 3,771,375	\$ 3,771,375	\$ 3,771,375	\$ 3,771,375	\$ 3,771,375	\$ 3,771,375	\$ 3,771,375	\$ 3,753,097	\$ 3,702,763	\$ 3,624,872
Value of GHG reduction (\$, NPV)											

1. Avoided natural gas volume for conversion of existing cus
2. Assumes a conversion rate of 1.875 kg of CO₂e per cubic
3. For 2018 - 2022, assumes the Federal Carbon Pricing Bar
4. For 2023 and beyond, assumes the carbon price is const

Value of Lifetime GHG Emissions Reductions from the Proposed Geothermal Program

	Year 34	Year 35	Year 36	Year 37	Year 38	Year 39	Year 40	TOTAL
Retrofit Customers								
Conversions (#)	-	-	-	-	-	-	-	-
Cumulative number of customers (#)	2,840	2,520	2,080	1,560	1,040	520	-	-
Cumulative number of customers (#) [50% effective]	2,940	2,680	2,300	1,820	1,300	780	260	260
Forecast annual NG savings (m ³) ⁽¹⁾	7,056,000	6,432,000	5,520,000	4,368,000	3,120,000	1,872,000	624,000	244,800,000
Forecast annual GHG reduction from NG (t CO ₂ e) ⁽²⁾	13,227	12,058	10,348	8,188	5,849	3,509	1,170	458,909
Forecast carbon price (\$/tonne) ⁽³⁾⁽⁴⁾	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	-
Value of GHG reduction (\$, nominal)	\$ 661,368	\$ 602,880	\$ 517,397	\$ 409,419	\$ 292,442	\$ 175,465	\$ 58,488	\$ 22,873,449
Value of GHG reduction (\$, NPV)								
New Construction								
New Construction (#)	-	-	-	-	-	-	-	-
Cumulative number of customers (#)	13,500	12,600	10,800	8,100	5,400	2,700	-	-
Cumulative number of customers (#) [50% effective]	13,770	13,050	11,700	9,450	6,750	4,050	1,350	1,350
Forecast annual NG savings (m ³) ⁽¹⁾	30,294,000	28,710,000	25,740,000	20,790,000	14,850,000	8,910,000	2,970,000	962,280,000
Forecast annual GHG reduction from NG (t CO ₂ e) ⁽²⁾	56,790	53,821	48,253	38,973	27,838	16,703	5,568	1,803,916
Forecast carbon price (\$/tonne) ⁽³⁾⁽⁴⁾	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	-
Value of GHG reduction (\$, nominal)	\$ 2,839,498	\$ 2,691,027	\$ 2,412,645	\$ 1,948,675	\$ 1,391,911	\$ 835,146	\$ 278,382	\$ 90,099,298
Value of GHG reduction (\$, NPV)								
Totals								
Forecast annual NG savings (m ³)	37,350,000	35,142,000	31,260,000	25,158,000	17,970,000	10,782,000	3,594,000	1,207,080,000
Forecast annual GHG reduction from NG (t CO ₂ e)	70,017	65,878	58,601	47,162	33,687	20,212	6,737	2,262,825
Value of GHG reduction (\$, nominal)	\$ 3,500,866	\$ 3,293,907	\$ 2,930,042	\$ 2,358,093	\$ 1,684,352	\$ 1,010,611	\$ 336,870	\$ 112,972,746
Value of GHG reduction (\$, NPV)								

1. Avoided natural gas volume for conversion of existing cus
2. Assumes a conversion rate of 1.875 kg of CO₂e per cubic
3. For 2018 - 2022, assumes the Federal Carbon Pricing Bar
4. For 2023 and beyond, assumes the carbon price is const