

APPENDIX 11
GEOHERMAL
ECONOMIC FEASIBILITY

Geothermal
Economic Feasibility
Parameters and Results

Line No.	<u>Col. 1</u> Description	<u>Col. 2</u>
FEASIBILITY PARAMETERS		
1.	Discount Rate	5.43%
2.	CCA Rate	50.00%
3.	Income Tax Rate	26.50%
4.	Customer Revenue Horizon (Years)	30
5.	Capital Investment (Dollars)	
6.	Geothermal Loops	237,148,543
7.	Total Capital Investment	237,148,543
8.	Working Capital (Days of Revenue)	30
FEASIBILITY RESULTS		
9.	Net Present Value (Dollars)	16,679,865
10.	Profitability Index	1.10

**Geothermal
Economic Feasibility - 40 year Horizon
DCF Analysis**

Line No.	Col.1 Description	Col.2 Year 1	Col.3 Year 2	Col.4 Year 3	Col.5 Year 4	Col.6 Year 5	Col.7 Year 6	Col.8 Year 7	Col.9 Year 8	Col.10 Year 9	Col.11 Year 10	Col.12 Year 11
	Discount factors to project outset	0.9739	0.9237	0.8762	0.8310	0.7882	0.7476	0.7091	0.6726	0.6379	0.6051	0.5739
	INCREMENTAL CAPITAL INVESTMENT											
1.	Geothermal Loops	(2,702,492)	(4,339,017)	(6,140,894)	(10,002,812)	(16,355,698)	(29,384,945)	(42,055,686)	(42,055,686)	(42,055,686)	(42,055,686)	-
2.	Contribution In Aid Of Construction											
3.	Net Investment Capital	(8,524)	(23,566)	(36,602)	(58,664)	(88,274)	(173,484)	(273,764)	(322,902)	(322,902)	(322,902)	(161,451)
4.	Working Capital	(2,711,016)	(4,362,582)	(6,177,436)	(10,061,476)	(16,453,973)	(29,558,429)	(42,329,451)	(42,378,588)	(42,378,588)	(42,378,588)	(161,451)
5.	Total Investment	(2,640,268)	(4,029,876)	(5,412,381)	(8,361,300)	(12,969,251)	(22,098,231)	(30,015,863)	(28,502,746)	(27,034,525)	(25,641,833)	(92,657)
6.	PV Of Total Investment At Project Outset	(2,640,268)	(6,670,144)	(12,082,525)	(20,443,825)	(33,413,076)	(55,511,308)	(85,527,170)	(114,029,916)	(141,064,441)	(166,706,374)	(166,789,031)
7.	ACCUMULATED PV OF TOTAL INVESTMENT											
	CCA TAX SHIELD											
8.	CCA Tax Shield	177,458	551,387	964,535	1,543,539	2,504,777	4,259,632	6,826,112	8,941,919	9,999,823	10,528,774	8,028,819
9.	PV Of CCA Tax Shield At Project Outset	172,827	509,336	845,061	1,282,714	1,974,301	3,184,551	4,840,404	6,014,104	6,379,176	6,370,626	4,607,740
10.	ACCUMULATED PV OF CCA TAX SHIELD											
	INCREMENTAL OPERATING CASHFLOWS (BEFORE TAXES)											
11.	Geothermal Revenues	102,286	385,075	824,302	1,528,267	2,707,560	4,789,373	8,074,546	11,949,365	15,824,184	19,699,003	21,636,413
12.	O&M Expenses	(1,537,880)	(1,270,689)	(1,370,840)	(1,822,089)	(2,169,696)	(2,887,015)	(3,640,951)	(3,832,665)	(4,019,479)	(4,206,293)	(1,430,529)
13.	Net Operating Cash (Before Taxes)	(1,435,595)	(885,614)	(546,539)	(293,822)	(537,864)	(1,902,558)	(4,433,595)	(8,116,700)	(11,804,705)	(15,492,710)	(20,205,884)
14.	PV of Net Operating Cash (Before Taxes) At Project Outset	(1,388,131)	(818,074)	(478,852)	(244,172)	(423,952)	(1,422,225)	(3,143,887)	(5,459,083)	(7,530,582)	(9,374,145)	(11,596,159)
15.	ACCUMULATED PV OF NET OPERATING CASH (BEFORE TAXES)											
	TAXES											
16.	Income Tax (Before Interest Tax Shield)	380,433	234,688	144,833	77,863	(142,534)	(604,125)	(1,174,903)	(2,150,925)	(3,126,247)	(4,105,568)	(5,354,559)
17.	Municipal Tax											
18.	Total Taxes	380,433	234,688	144,833	77,863	(142,534)	(604,125)	(1,174,903)	(2,150,925)	(3,126,247)	(4,105,568)	(5,354,559)
19.	PV of Total Taxes At Project Outset	370,505	216,790	126,896	64,706	(112,347)	(376,890)	(833,125)	(1,446,657)	(1,995,599)	(2,484,148)	(3,072,982)
20.	ACCUMULATED PV OF TOTAL TAXES											
	ACCUMULATED NPV AND PI											
21.	Net Present Value	(3,495,068)	(7,616,892)	(12,536,148)	(19,794,201)	(30,477,547)	(48,345,892)	(71,210,609)	(89,686,824)	(104,807,210)	(117,188,521)	(104,150,260)
22.	Profitability Index	(0.324)	(0.142)	(0.038)	0.032	0.088	0.129	0.167	0.213	0.257	0.297	0.376

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**Geothermal
Economic Feasibility - 40 year Horizon
DCF Analysis**

Line No.	Col. 1 Description	Col. 13 Year 12	Col. 14 Year 13	Col. 15 Year 14	Col. 16 Year 15	Col. 17 Year 16	Col. 18 Year 17	Col. 19 Year 18	Col. 20 Year 19	Col. 21 Year 20	Col. 22 Year 21
	Discount factors to project outset	0.5443	0.5163	0.4897	0.4645	0.4406	0.4179	0.3963	0.3759	0.3566	0.3382
	INCREMENTAL CAPITAL INVESTMENT										
1.	Geothermal Loops	-	-	-	-	-	-	-	-	-	-
2.	Contribution In Aid Of Construction	-	-	-	-	-	-	-	-	-	-
3.	Net Investment Capital	-	-	-	-	-	-	-	-	-	-
4.	Working Capital	-	-	-	-	-	-	-	-	-	-
5.	Total Investment	-	-	-	-	-	-	-	-	-	-
6.	PV Of Total Investment At Project Outset	-	-	-	-	-	-	-	-	-	-
7.	ACCUMULATED PV OF TOTAL INVESTMENT	(166,799,031)	(166,799,031)	(166,799,031)	(166,799,031)	(166,799,031)	(166,799,031)	(166,799,031)	(166,799,031)	(166,799,031)	(166,799,031)
	CCA TAX SHIELD										
8.	CCA Tax Shield	4,014,409	2,007,205	1,003,602	501,801	250,901	125,450	62,725	31,363	15,681	7,841
9.	PV Of CCA Tax Shield At Project Outset	2,185,194	1,036,316	491,467	233,075	110,535	52,420	24,860	11,790	5,591	2,652
10.	ACCUMULATED PV OF CCA TAX SHIELD	38,366,052	39,402,368	39,893,834	40,126,910	40,237,444	40,289,865	40,314,725	40,326,514	40,332,106	40,334,757
	INCREMENTAL OPERATING CASHFLOWS (BEFORE TAXES)										
11.	Geothermal Revenues	21,636,413	21,636,413	21,636,413	21,636,413	21,636,413	21,636,413	21,636,413	21,636,413	21,636,413	21,636,413
12.	O&M Expenses	(1,414,429)	(1,414,429)	(1,414,429)	(1,414,429)	(1,522,611)	(1,522,611)	(1,522,611)	(1,522,611)	(1,522,611)	(1,522,611)
13.	Net Operating Cash (Before Taxes)	20,221,984	20,221,984	20,221,984	20,221,984	20,113,802	20,113,802	20,113,802	20,113,802	20,113,802	20,113,802
14.	PV Of Net Operating Cash (Before Taxes) At Project Outset	11,007,586	10,440,568	9,902,758	9,392,651	8,861,161	8,404,709	7,971,769	7,561,130	7,171,644	6,802,222
15.	ACCUMULATED PV OF NET OPERATING CASH (BEFORE TAXES)	47,018,352	57,458,920	67,361,678	76,754,329	85,615,480	94,020,198	101,991,967	109,553,097	116,724,742	123,526,963
	TAXES										
16.	Income Tax (Before Interest Tax Shield)	(5,358,826)	(5,358,826)	(5,358,826)	(5,358,826)	(5,330,157)	(5,330,157)	(5,330,157)	(5,330,157)	(5,330,157)	(5,330,157)
17.	Municipal Tax	-	-	-	-	-	-	-	-	-	-
18.	Total Taxes	(5,358,826)	(5,358,826)	(5,358,826)	(5,358,826)	(5,330,157)	(5,330,157)	(5,330,157)	(5,330,157)	(5,330,157)	(5,330,157)
19.	PV of Total Taxes At Project Outset	(2,917,010)	(2,766,751)	(2,624,231)	(2,489,053)	(2,348,208)	(2,227,248)	(2,112,519)	(2,003,700)	(1,900,486)	(1,802,589)
20.	ACCUMULATED PV OF TOTAL TAXES	(12,459,863)	(15,226,614)	(17,850,845)	(20,339,897)	(22,688,105)	(24,915,353)	(27,027,871)	(29,031,571)	(30,932,057)	(32,734,645)
	ACCUMULATED NPV AND PI										
21.	Net Present Value	(93,874,490)	(85,164,357)	(77,394,363)	(70,257,690)	(63,634,202)	(57,404,320)	(51,520,210)	(45,950,990)	(40,674,240)	(35,671,956)
22.	Profitability Index	0.437	0.489	0.536	0.579	0.618	0.656	0.691	0.725	0.756	0.786

**Geothermal
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DCF Analysis**

Line No.	Col. 1 Description	Col. 23 Year 22	Col. 24 Year 23	Col. 25 Year 24	Col. 26 Year 25	Col. 27 Year 26	Col. 28 Year 27	Col. 29 Year 28	Col. 30 Year 29	Col. 31 Year 30	Col. 32 Year 31
	Discount factors to project outset	0.3208	0.3042	0.2886	0.2737	0.2596	0.2462	0.2336	0.2215	0.2101	0.1983
	INCREMENTAL CAPITAL INVESTMENT										
1.	Geothermal Loops	-	-	-	-	-	-	-	-	-	-
2.	Contribution In Aid Of Construction	-	-	-	-	-	-	-	-	-	-
3.	Net Investment Capital	-	-	-	-	-	-	-	-	-	-
4.	Working Capital	-	-	-	-	-	-	-	-	-	8,524
5.	Total Investment	-	-	-	-	-	-	-	-	-	8,524
6.	PV Of Total Investment At Project Outset	-	-	-	-	-	-	-	-	-	1,699
7.	ACCUMULATED PV OF TOTAL INVESTMENT	(166,799,031)	(166,799,031)	(166,799,031)	(166,799,031)	(166,799,031)	(166,799,031)	(166,799,031)	(166,799,031)	(166,799,031)	(166,797,332)
	CCA TAX SHIELD										
8.	CCA Tax Shield	3,920	1,960	980	490	245	123	61	31	15	8
9.	PV Of CCA Tax Shield At Project Outset	1,288	596	283	134	64	30	14	7	3	2
10.	ACCUMULATED PV OF CCA TAX SHIELD	40,336,015	40,336,611	40,336,894	40,337,028	40,337,092	40,337,122	40,337,136	40,337,143	40,337,146	40,337,148
	INCREMENTAL OPERATING CASHFLOWS (BEFORE TAXES)										
11.	Geothermal Revenues	21,636,413	21,636,413	21,636,413	21,636,413	21,636,413	21,636,413	21,636,413	21,636,413	21,636,413	21,534,127
12.	O&M Expenses	(1,522,611)	(1,522,611)	(1,522,611)	(1,522,611)	(1,522,611)	(1,522,611)	(1,522,611)	(1,522,611)	(1,522,611)	(1,517,168)
13.	Net Operating Cash (Before Taxes)	20,113,802	20,113,802	20,113,802	20,113,802	20,113,802	20,113,802	20,113,802	20,113,802	20,113,802	20,016,959
14.	PV of Net Operating Cash (Before Taxes) At Project Outset	6,451,828	6,119,484	5,804,260	5,505,273	5,221,688	4,952,711	4,697,589	4,455,608	4,226,083	3,989,101
15.	ACCUMULATED PV OF NET OPERATING CASH (BEFORE TAXES)	129,978,792	136,096,276	141,902,536	147,407,810	152,629,488	157,562,209	162,279,797	166,735,406	170,961,499	174,950,600
	TAXES										
16.	Income Tax (Before Interest Tax Shield)	(5,330,157)	(5,330,157)	(5,330,157)	(5,330,157)	(5,330,157)	(5,330,157)	(5,330,157)	(5,330,157)	(5,330,157)	(5,304,494)
17.	Municipal Tax	-	-	-	-	-	-	-	-	-	-
18.	Total Taxes	(5,330,157)	(5,330,157)	(5,330,157)	(5,330,157)	(5,330,157)	(5,330,157)	(5,330,157)	(5,330,157)	(5,330,157)	(5,304,494)
19.	PV of Total Taxes At Project Outset	(1,709,735)	(1,621,663)	(1,538,129)	(1,458,897)	(1,383,747)	(1,312,468)	(1,244,861)	(1,180,736)	(1,119,915)	(1,057,112)
20.	ACCUMULATED PV OF TOTAL TAXES	(84,444,380)	(86,066,043)	(87,604,172)	(89,063,070)	(90,446,817)	(91,759,285)	(93,004,146)	(94,184,883)	(95,304,797)	(96,361,909)
	ACCUMULATED NPV AND PI										
21.	Net Present Value	(30,928,604)	(26,430,187)	(22,163,773)	(18,117,263)	(14,279,268)	(10,638,986)	(7,186,244)	(3,911,365)	(805,183)	2,128,506
22.	Profitability Index	0.815	0.842	0.867	0.891	0.914	0.936	0.957	0.977	0.995	1.013

**Geothermal
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DCF Analysis**

Line No.	Col. 1	Col. 33	Col. 34	Col. 35	Col. 36	Col. 37	Col. 38	Col. 39	Col. 40	Col. 41
	Description	Year 32	Year 33	Year 34	Year 35	Year 36	Year 37	Year 38	Year 39	Year 40
	Discount factors to project outset	0.1890	0.1793	0.1700	0.1613	0.1530	0.1451	0.1376	0.1305	0.1255
	INCREMENTAL CAPITAL INVESTMENT									
1.	Geothermal Loops	-	-	-	-	-	-	-	-	-
2.	Contribution In Aid Of Construction	-	-	-	-	-	-	-	-	-
3.	Net Investment Capital	-	-	-	-	-	-	-	-	-
4.	Working Capital	23,566	36,602	58,664	98,274	173,484	273,764	322,902	322,902	322,902
5.	Total Investment	23,566	36,602	58,664	98,274	173,484	273,764	322,902	322,902	322,902
6.	PV Of Total Investment At Project Outset	4,454	6,562	9,976	15,851	26,540	39,723	44,440	42,151	40,511
7.	ACCUMULATED PV OF TOTAL INVESTMENT	(166,792,878)	(166,786,316)	(166,776,340)	(166,760,489)	(166,733,950)	(166,694,226)	(166,649,787)	(166,607,636)	(166,567,125)
	CCA TAX SHIELD									
8.	CCA Tax Shield	4	2	1	0	0	0	0	0	0
9.	PV Of CCA Tax Shield At Project Outset	1	0	0	0	0	0	0	0	0
10.	ACCUMULATED PV OF CCA TAX SHIELD	40,337,148	40,337,149	40,337,149	40,337,149	40,337,149	40,337,149	40,337,149	40,337,149	40,337,149
	INCREMENTAL OPERATING CASHFLOWS (BEFORE TAXES)									
11.	Geothermal Revenues	21,251,338	20,812,111	20,108,146	18,928,853	16,847,040	13,561,867	9,687,048	5,812,229	1,937,410
12.	O&M Expenses	(1,502,120)	(1,478,748)	(1,441,288)	(1,378,535)	(1,267,757)	(1,092,946)	(886,757)	(680,569)	(286,738)
13.	Net Operating Cash (Before Taxes)	19,749,217	19,333,363	18,666,857	17,550,317	15,579,283	12,468,922	8,800,291	5,131,660	1,648,672
14.	PV Of Net Operating Cash (Before Taxes) At Project Outset	3,733,007	3,466,158	3,174,273	2,830,675	2,383,332	1,809,248	1,211,151	669,871	206,843
15.	ACCUMULATED PV OF NET OPERATING CASH (BEFORE TAXES)	178,663,607	182,149,765	185,324,038	188,154,713	190,536,045	192,347,292	193,556,443	194,228,313	194,435,157
	TAXES									
16.	Income Tax (Before Interest Tax Shield)	(5,233,543)	(5,123,341)	(4,946,717)	(4,650,834)	(4,128,510)	(3,304,264)	(2,332,077)	(1,359,890)	(436,898)
17.	Municipal Tax	-	-	-	-	-	-	-	-	-
18.	Total Taxes	(5,233,543)	(5,123,341)	(4,946,717)	(4,650,834)	(4,128,510)	(3,304,264)	(2,332,077)	(1,359,890)	(436,898)
19.	PV of Total Taxes At Project Outset	(989,247)	(918,532)	(841,182)	(750,129)	(631,583)	(479,451)	(320,955)	(177,516)	(54,813)
20.	ACCUMULATED PV OF TOTAL TAXES	(47,351,156)	(48,269,688)	(49,110,870)	(49,860,999)	(50,482,582)	(50,972,032)	(51,282,987)	(51,470,503)	(51,525,317)
	ACCUMULATED NPV AND PI									
21.	Net Present Value	4,876,722	7,430,910	9,773,977	11,870,373	13,648,662	15,018,182	15,952,818	16,487,323	16,679,865
22.	Profitability Index	1.029	1.045	1.059	1.071	1.082	1.090	1.096	1.099	1.100