

Hells Canyon License Application
Additional Information Request: DR-1
Thermal Alternative Cost of Capital - Calculation Sequence

<u>Existing HCC nameplate capacity:</u>	1,167 MW
<u>Existing HCC peak capacity:</u>	1,398 MW
<u>Existing HCC peak capacity minus required 5% reserve:</u>	1,328 MW
<u>Equivalent thermal generating capacity required, including 7% reserve:</u>	1,421 MW
<u>Existing HCC average annual energy production, 01/01/81-12/31/01:</u>	6,053 GWh
(Note: HCC annual avg production from 01/01/81 through 12/31/03 is 5,904.75 GWh, however, the average through 2001 has been retained for this estimate to provide consistency with the balance of the license application.)	

Required equivalent thermal replacement capacity and energy: 1,421 MW capacity
6,053 GWh/year energy

Capacity needed to replace 6,053 GWh of energy annually:
6,053 GWh/8,766 hr/year 690.5 MW

Estimated cost of constructing 690,500 kW of CCCT generation:
 Estimated cost per kW: \$617/kW (see 2004 IPC IRP)
 Estimated total cost: \$617/kW x 690,500 kW = \$426,038,500

CCCT cost of capital, annual levelized equivalent:
 (Note: the rate used to discount the cost of capital streams for the alternative CCCT resource was 7.13% in the HCC license Application. The levelized cost of capital component of the CCCT resource is based on these new construction cost estimates, and a discount rate of 7.20%, as referenced in the 2004 IRP)

Period	Revenue Rqmt
1	\$ 63,576,236
2	\$ 60,523,069
3	\$ 58,362,069
4	\$ 56,281,292
5	\$ 54,274,720
6	\$ 52,336,789
7	\$ 50,462,351
8	\$ 48,646,643
9	\$ 46,780,701
10	\$ 44,902,781
11	\$ 43,024,861
12	\$ 41,146,941
13	\$ 39,269,021
14	\$ 37,391,101
15	\$ 35,513,182
16	\$ 33,635,262
17	\$ 31,757,342

18	\$	29,879,422
19	\$	28,001,502
20	\$	26,123,582
21	\$	25,082,136
22	\$	24,433,968
23	\$	23,342,602
24	\$	22,251,237
25	\$	21,159,872
26	\$	20,068,507
27	\$	18,977,142
28	\$	17,885,776
29	\$	16,794,411
30	\$	15,703,046

Sum	\$	1,087,587,565
PV	\$	560,717,129
Levelized	\$	44,523,279

Cost of simple cycle turbines to make up the balance of the capacity needed to replace the HCC:

Thermal capacity needed to match HCC peak capacity (see above):	1,421 MW
Capacity assumed to be provided by CCCT baseload units:	690.5 MW
Balance of capacity to be provided by SCCT's:	1,421 MW - 690.5 MW = 730.5 MW

Estimated cost per kW:	\$350/kW (see 2004 IPC IRP)	
Estimated total cost:	\$350/kW x 730,500 kW =	\$255,675,000

SCCT cost of capital, annual levelized equivalent:

(Note: the rate used to discount the revenue requirements for the alternative CCCT resource was 7.13% in the HCC license Application. The levelized cost of capital component of the CCCT resource is based on these new construction cost estimates, and a discount rate of 7.20%, as referenced in the 2004 IRP)

Period		Rev. Rqmt
1	\$	38,153,487
2	\$	36,321,214
3	\$	35,024,351
4	\$	33,775,631
5	\$	32,571,444
6	\$	31,408,449
7	\$	30,283,558
8	\$	29,193,912
9	\$	28,074,119
10	\$	26,947,139
11	\$	25,820,158
12	\$	24,693,177
13	\$	23,566,197
14	\$	22,439,216
15	\$	21,312,235
16	\$	20,185,254
17	\$	19,058,274
18	\$	17,931,293
19	\$	16,804,312
20	\$	15,677,332
21	\$	15,052,337

22	\$	14,663,357
23	\$	14,008,405
24	\$	13,353,453
25	\$	12,698,501
26	\$	12,043,549
27	\$	11,388,597
28	\$	10,733,645
29	\$	10,078,693
30	\$	9,423,740
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Sum	\$	652,685,029
PV	\$	336,498,584
Levelized	\$	26,719,391

Estimated annual fuel, operating, and maintenance costs:

Note: It is assumed that the 690.5 MW of highly efficient combined cycle turbines would be used to provide 85% of the generation now provided by the HCC, based on an expected availability factor of 85%. The remaining 15% is assumed to be provided by the simple cycle standby turbines.

The simplifications described above are considered to be reasonable, given the inherently speculative nature of this analysis. It is believed that the simplifying assumptions made do not materially affect the overall reasonableness of this estimate, the objective of which is to estimate as reasonably as possible the cost of replacing the HCC capacity and generation. The most relevant inaccuracy is likely to result from having to predict future fuel prices. Future fuel prices will be dependent on future regulations, hydrocarbon finding and production costs, and global energy demands, predictions of all of which are beyond the scope of this document.

Fuel demand to produce 6,053.13 GWh per year using new gas-fired turbine-generators:

85% of 6053.13 GWh per year using CCCT's with a heat rate of 6,880 Btu/kWh (see 2004 IPC IRP):
 $0.85 \times 6053.13 \text{ GWh} \times 6,880 \text{ Btu/kWh} = 5,145.16 \text{ GWh} \times 6,880 \text{ Btu/kWh} = 35,399,000 \text{ MMBtu}$

15% of 6053.13 GWh per year using SSCT's with a heat rate of 10,500 Btu/kWh (see 2004 IPC IRP):
 $0.15 \times 6053.13 \text{ GWh} \times 10,500 \text{ Btu/kWh} = 907.97 \text{ GWh} \times 10,500 \text{ Btu/kWh} = 9,534,000 \text{ MMBtu}$

Total estimated fuel use per year to generate 6053.13 GWh/year: 44,933,000 MMBtu

Cost of estimated annual fuel demand:
 $44,933,000 \text{ MMBtu} \times \text{current year cost of } \$4.55/\text{MMBtu} = \text{\$206,806,481 /year}$

Average annual escalated fuel cost over a 30-year period = \\$302,088,969 /year

Period	Gas	CCCT	SSCT	CCCT Fuel Cost	SSCT Fuel Cost	Total Fuel Cost
	Cost Per MMBTU	Annual Gen (MWh)	Annual Gen (MWh)			
1	4.55	5,141,463	959,877	160,948,358	45,858,124	206,806,481
2	4.80	5,141,463	959,877	169,791,674	48,377,801	218,169,475
3	4.89	5,141,463	959,877	172,975,268	49,284,885	222,260,153
4	4.86	5,141,463	959,877	171,914,070	48,982,523	220,896,593
5	4.92	5,141,463	959,877	174,036,466	49,587,246	223,623,712
6	5.01	5,141,463	959,877	177,220,060	50,494,330	227,714,389
7	5.14	5,141,463	959,877	181,818,584	51,804,562	233,623,146
8	5.35	5,141,463	959,877	189,246,970	53,921,090	243,168,061

9	5.57	5,141,463	959,877	197,029,089	56,138,406	253,167,495
10	5.78	5,141,463	959,877	204,457,474	58,254,935	262,712,409
11	6.05	5,141,463	959,877	214,008,256	60,976,186	274,984,442
12	6.30	5,141,463	959,877	222,851,572	63,495,864	286,347,436
13	6.05	5,141,463	959,877	214,008,256	60,976,186	274,984,442
14	6.20	5,141,463	959,877	219,314,246	62,487,993	281,802,238
15	6.40	5,141,463	959,877	226,388,899	64,503,734	290,892,633
16	6.56	5,141,463	959,877	232,048,621	66,116,328	298,164,949
17	6.79	5,141,463	959,877	240,184,472	68,434,431	308,618,903
18	6.80	5,141,463	959,877	240,538,205	68,535,218	309,073,423
19	6.96	5,141,463	959,877	246,197,927	70,147,811	316,345,739
20	7.18	5,141,463	959,877	253,980,046	72,365,127	326,345,173
21	7.54	5,141,463	959,877	266,714,421	75,993,462	342,707,884
22	7.69	5,141,463	959,877	272,020,411	77,505,268	349,525,680
23	7.87	5,141,463	959,877	278,387,599	79,319,436	357,707,035
24	8.05	5,141,463	959,877	284,754,787	81,133,603	365,888,390
25	8.23	5,141,463	959,877	291,121,975	82,947,771	374,069,746
26	8.41	5,141,463	959,877	297,489,162	84,761,938	382,251,101
27	8.59	5,141,463	959,877	303,856,350	86,576,106	390,432,456
28	8.77	5,141,463	959,877	310,223,538	88,390,274	398,613,811
29	8.95	5,141,463	959,877	316,590,726	90,204,441	406,795,167
30	9.13	5,141,463	959,877	322,957,913	92,018,609	414,976,522

Sum				7,053,075,396	2,009,593,688	9,062,669,084
Ave Annual Fuel				235,102,513	66,986,456	302,088,969

Fixed annual op & maint cost for CCCT's: \$5,006,125 /year
 Current year cost: \$7.25/kW (see 2004 IRP) x 690,500 kW

Average annual escalated fixed CCCT O&M cost over a 30-year period: \$7,349,474 /year
 (2.52% Escalation)

Fixed annual op & maint cost for SCCT's: \$4,653,285 /year
 Current year cost: \$6.37/kW (see 2004 IRP) x 730,500 kW

Average annual escalated fixed SCCT O&M cost over a 30-year period: \$6,831,471 /year
 (2.52% Escalation)

Variable annual O&M cost of CCCT's: \$14,406,000 /year
 Current year cost \$2.80/MWh (see 2004 IRP) x 5,145,160 MWh/yr =

Average annual escalated variable CCCT O&M cost over a 30-year period: \$21,149,396 /year
 (2.52% Escalation)

Variable annual O&M cost of SCCT's: \$3,759,000 /year
 Current year cost: \$4.14/MWh (see 2004 IRP) x 907,970 MWh/yr =

Average annual escalated variable SCCT O&M cost over a 30-year period: \$5,518,574 /year
 (2.52% Escalation)

Total estimated annual direct replacement costs, gas-fired turbines: \$414,180,554 /year

Total cost of replacement turbines (30 years, assuming escalation)	\$12,028,409,104
<i>Components:</i>	
Total cost of capital	\$1,740,272,593
Total fuel	\$9,062,669,084
Total fixed O&M	\$425,428,331
Total variable O&M	\$800,039,095
Total cost of replacement turbines (30 years, assuming no escalation)	\$8,489,417,036
<i>Components:</i>	
Total cost of capital	\$1,740,272,593
Total fuel	\$6,204,194,443
Total fixed O&M	\$289,782,300
Total variable O&M	\$544,950,000

Notes:

1. All unit item prices, such as construction costs for new CCCT's, have been updated based on the 2004 Idaho Power Company (IPC) Integrated Resource Plan (IRP).
2. The amount of equivalent CCCT capacity in this estimate is roughly 9% lower than the estimate in the initial license application. When recalculating the replacement costs in accord with FERC's additional information request, it was decided that applying the industry-standard CCCT availability factor of 91% to the amount of CCCT capacity was not appropriate, in recognition that additional CCCT capacity would not be procured in addition to the estimated 662 MW of SCCT standby capacity that would normally be available under this estimate.
This resulted in the following changes from what was shown in the initial license application:
the total amount of thermal capacity needed to replace the HCC remained unchanged at 1421.1 MW;
the amount of equivalent CCCT capacity needed was reduced from 758.8 MW to 690.5 MW;
the amount of equivalent SCCT capacity needed was increased from 662 MW to 730.5 MW;
the amount of baseload energy to be generated with the CCCT's was decreased by 15% to account for the 85% availability factor shown in the 2004 IRP for CCCT's;
15% of the baseload energy was assigned to be generated with the SCCT's.
These changes reduced the expected capital costs and slightly increased the expected fuel and O&M costs.
The changes were made to make the overall estimate more realistic.
3. Market prices for natural gas have increased significantly since the initial license was drafted. Estimated gas prices for this update are from IPC's 2004 Integrated Resource Plan. In the initial application, the long term "current" cost was estimated at \$3.00/MMBtu.