

Combined Cycle Gas Turbine

Blue cells with borders indicate input data. Other cells are plain text or the results of formulas.

Initial Data

Variable	Value	Name or Formula
Capacity, kW	200,000	cap
Capital cost, \$/kW	590	costkw
Useful life, years	20	life
Capacity factor	65%	capfac
Maintenance cost, \$	3,500,000	maint
Heat rate, BTU/kWh	6,800	heatrate
Interest rate	15%	intrate
Electricity price, \$/kWh	0.07	price

Key Intermediate Calculations

Construction cost, \$	118,000,000	capcost = cap*costkw
Effective capacity, kW	130,000	effcap = cap*capfac
Hours per year	8,760	hours = 365*24
Generation, kWh per year	1,138,800,000	kwh = effcap*hours
Annual revenue, \$	79,716,000	rev = kwh*price
Fuel required, million BTU	7,743,840	fuel = kwh*heatrate/1000000

Fuel Cost Scenarios

	Low	Middle	High	
Price per mcf, \$	6.00	7.00	8.00	gasprice
Annual cost of fuel, \$	46,463,040	54,206,880	61,950,720	fuelcost = fuel*gasprice

Annual Operating Profit

Revenue, \$	79,716,000	79,716,000	79,716,000	= rev
Maintenance cost, \$	3,500,000	3,500,000	3,500,000	= maint
Fuel cost, \$	46,463,040	54,206,880	61,950,720	= fuelcost
Profit, \$	29,752,960	22,009,120	14,265,280	= rev - maint - fuelcost

Cash Flows Under Each Scenario

Year	Low	Middle	High	
0	-118,000,000	-118,000,000	-118,000,000	= capcost
1	29,752,960	22,009,120	14,265,280	= annual profit
2	29,752,960	22,009,120	14,265,280	
3	29,752,960	22,009,120	14,265,280	
4	29,752,960	22,009,120	14,265,280	
5	29,752,960	22,009,120	14,265,280	
6	29,752,960	22,009,120	14,265,280	
7	29,752,960	22,009,120	14,265,280	
8	29,752,960	22,009,120	14,265,280	
9	29,752,960	22,009,120	14,265,280	
10	29,752,960	22,009,120	14,265,280	
11	29,752,960	22,009,120	14,265,280	
12	29,752,960	22,009,120	14,265,280	
13	29,752,960	22,009,120	14,265,280	
14	29,752,960	22,009,120	14,265,280	
15	29,752,960	22,009,120	14,265,280	
16	29,752,960	22,009,120	14,265,280	
17	29,752,960	22,009,120	14,265,280	
18	29,752,960	22,009,120	14,265,280	
19	29,752,960	22,009,120	14,265,280	
20	29,752,960	22,009,120	14,265,280	

Present Values of Each Payment

Year	Low	Middle	High	
0	-118,000,000	-118,000,000	-118,000,000	= payment/(1+intrate)^year
1	25,872,139	19,138,365	12,404,591	
2	22,497,512	16,642,057	10,786,601	
3	19,563,054	14,471,354	9,379,653	
4	17,011,351	12,583,786	8,156,220	
5	14,792,480	10,942,422	7,092,365	
6	12,863,026	9,515,150	6,167,274	
7	11,185,240	8,274,043	5,362,847	
8	9,726,295	7,194,820	4,663,345	
9	8,457,648	6,256,366	4,055,083	
10	7,354,477	5,440,318	3,526,159	
11	6,395,197	4,730,711	3,066,225	
12	5,561,041	4,113,662	2,666,283	
13	4,835,688	3,577,097	2,318,507	
14	4,204,946	3,110,519	2,016,093	
15	3,656,475	2,704,799	1,753,124	
16	3,179,543	2,352,000	1,524,456	
17	2,764,820	2,045,217	1,325,614	
18	2,404,191	1,778,450	1,152,708	
19	2,090,601	1,546,478	1,002,354	
20	1,817,914	1,344,763	871,613	
NPV, \$	68,233,639	19,762,378	-28,708,884	= sum of above
Conclusion	profitable	profitable	unprofitable	