Parameters o f a 6t/h coal fired boiler

Parameter	Value	Unit	Reference
Construction period	1	year	experienced rate
Lifetime	25	years	Expert's comments on economic lifetime
Boiler efficiency	85%		AM0058, Page25,the highest efficiency is used here
Capacity	6	t/h	Taking it as example for the caculation
Capital Expenditure	665,000	RMB	Impact and Operation Cost of minityle Gas-fired Boiler(Oil-fired Boiler) with Coal-fired boilers,[J] Arid Environmental Monitoring,
Coal Price	550	RMB/ tonne	http://news.stockstar.com/info/darticle.aspx?id=JL,20090707,00001411&columnid=2921, very conservative estimation
Coal used	7,387	tonne	caculated
Fuel Expenditure - (F)	4,062,993	RMB	caculated
Operational Hour	8,000	hours	Information obtained from the existing minitype coal-fired boilers
Assumed enthalthy of the rated Steam from the boiler	3,009	KJ/kg	using the same date from the biomass fired boiler in the proposed project
Total heat generation	144,427	GJ	caculated
Discount Rate -(r)	0.08		Benchmark used in power industry
Overhaul	*16,625*	*RMB*	experienced rate
Electrictiy expenditure	*144,000*	*RMB*	WU Xihuan. Inner Mongolia Oil and Chemistry, Investigation on retrofitting the coal-fired boiler to gas-fired boiler, 2008(10)
Desulferisation expenditure	*50,000*	*RMB*	WU Xihuan. Inner Mongolia Oil and Chemistry, Investigation on retrofitting the coal-fired boiler to gas-fired boiler, 2008(10)
Employee expenditure	*140,000*	*RMB*	WU Xihuan. Inner Mongolia Oil and Chemistry, Investigation on retrofitting the coal-fired boiler to gas-fired boiler, 2008(10)
Ash and sediments treatment fees	*72,000*	*RMB*	WU Xihuan. Inner Mongolia Oil and Chemistry, Investigation on retrofitting the coal-fired boiler to gas-fired boiler, 2008(10)
Total O&M expenditure	350,625	RMB	caculated

Year	Capital cost	O&M	Fuel	Total	$(1+r)^{-t}$	Numerator	Heat Generation	Denominator
0	665,000	0	0	665,000	1	665,000	0	0
1	0	350,625	4,062,993	4,413,618	1	4,086,683	144,427	133,729
2	0	350,625	4,062,993	4,413,618	1	3,783,966	144,427	123,823
3	0	350,625	4,062,993	4,413,618	1	3,503,672	144,427	114,651
4	0	350,625	4,062,993	4,413,618	1	3,244,141	144,427	106,158
5	0	350,625	4,062,993	4,413,618	1	3,003,834	144,427	98,295
6	0	350,625	4,062,993	4,413,618	1	2,781,328	144,427	91,014
7	0	350,625	4,062,993	4,413,618	1	2,575,304	144,427	84,272
8	0	350,625	4,062,993	4,413,618	1	2,384,540	144,427	78,030
9	0	350,625	4,062,993	4,413,618	1	2,207,908	144,427	72,250
10	0	350,625	4,062,993	4,413,618	0	2,044,359	144,427	66,898
11	0	350,625	4,062,993	4,413,618	0	1,892,925	144,427	61,942
12	0	350,625	4,062,993	4,413,618	0	1,752,708	144,427	57,354
13	0	350,625	4,062,993	4,413,618	0	1,622,878	144,427	53,106
14	0	350,625	4,062,993	4,413,618	0	1,502,665	144,427	49,172
15	0	350,625	4,062,993	4,413,618	0	1,391,356	144,427	45,529
16	0	350,625	4,062,993	4,413,618	0	1,288,293	144,427	42,157
17	0	350,625	4,062,993	4,413,618	0	1,192,864	144,427	39,034
18	0	350,625	4,062,993	4,413,618	0	1,104,504	144,427	36,143
19	0	350,625	4,062,993	4,413,618	0	1,022,688	144,427	33,466
20	0	350,625	4,062,993	4,413,618	0	946,934	144,427	30,987
21	0	350,625	4,062,993	4,413,618	0	876,791	144,427	28,691
22	0	350,625	4,062,993	4,413,618	0	811,843	144,427	26,566
23	0	350,625	4,062,993	4,413,618	0	751,707	144,427	24,598
24	0	350,625	4,062,993	4,413,618	0	696,025	144,427	22,776
25	0	350,625	4,062,993	4,413,618	0	644,467	144,427	21,089
						47,779,381		**1,541,728**

Levelized Cost of a new coal fired **31** **RMB/ GJ**

Year	Capital cost	O&M	Fuel	Total	(1+r)-t	Numerator	Heat Generation	Denominator
0	0	0	0	0	1	0	0	0
1	0	4,311,152	0	4,311,152	1	3,991,807	144,427	133,729
2	0	4,311,152	0	4,311,152	1	3,696,118	144,427	123,823
3	0	4,311,152	0	4,311,152	1	3,422,331	144,427	114,651
4	0	4,311,152	0	4,311,152	1	3,168,825	144,427	106,158
5	0	4,311,152	0	4,311,152	1	2,934,098	144,427	98,295
6	0	4,311,152	0	4,311,152	1	2,716,757	144,427	91,014
7	0	4,311,152	0	4,311,152	1	2,515,516	144,427	84,272
8	0	4,311,152	0	4,311,152	1	2,329,181	144,427	78,030
9	0	4,311,152	0	4,311,152	1	2,156,649	144,427	72,250
10	0	4,311,152	0	4,311,152	0	1,996,897	144,427	66,898
11	0	4,311,152	0	4,311,152	0	1,848,979	144,427	61,942
12	0	4,311,152	0	4,311,152	0	1,712,018	144,427	57,354
13	0	4,311,152	0	4,311,152	0	1,585,202	144,427	53,106
14	0	4,311,152	0	4,311,152	0	1,467,779	144,427	49,172
15	0	4,311,152	0	4,311,152	0	1,359,055	144,427	45,529
16	0	4,311,152	0	4,311,152	0	1,258,384	144,427	42,157
17	0	4,311,152	0	4,311,152	0	1,165,171	144,427	39,034
18	0	4,311,152	0	4,311,152	0	1,078,862	144,427	36,143
19	0	4,311,152	0	4,311,152	0	998,946	144,427	33,466
20	0	4,311,152	0	4,311,152	0	924,950	144,427	30,987
21	0	4,311,152	0	4,311,152	0	856,435	144,427	28,691
22	0	4,311,152	0	4,311,152	0	792,995	144,427	26,566
23	0	4,311,152	0	4,311,152	0	734,255	144,427	24,598
24	0	4,311,152	0	4,311,152	0	679,866	144,427	22,776
25	0	4,311,152	0	4,311,152	0	629,505	144,427	21,089
						46,020,582		**1,541,728**

Operating cost of an existing coal fired **30 RMB/ GJ**