

10.4 Socioeconomic Influence Evaluation

- (1) In the case of Japan, during the stage of the postwar economy restoration, the investments of individual companies in the environment protection measures accounted for about 3% of their investments in the extension and improvement of the equipment and facilities.

During post World War II period in Japan, there were no systematized pollution control laws or regulations no government agency authorized to enforce the pollution control.

By around 1970 or near the peak of high growth period of Japanese economy the environmental pollution came to the fore as a nationwide problem. As a result, the laws relating to the prevention of the environmental pollution were enacted one after another. In 1971, the Environment Agency was founded to execute an integrated administrative measures for the pollution control and strengthen the measures for the protection of the environment.

The enactment and strengthening of the control laws relating to the environment protection applicable to the electric power companies were also advanced, and paralelly the introductions of the flue gas treatment technologies were promoted. The flue gas desulfurizing systems, which first installed in Takasago thermal power plant of Electric Power Development Co., have been installed in almost all the existing coal-fired thermal power plants and high-sulfur-content crude oil-fired thermal power plants, totaling 68 plants in number and 23,450kW in wattage.

- (2) The method for macroeconomically evaluating the socioeconomic effects of the execution of environment protection measures has not been established completely, but the results of various attempts in the past are as follows:
 - Yoichi Kaya, the then professor at Tokyo Univ. estimated that the damage caused by the sulfur oxides was about 6 trillion yen against the total annual expenditure for the control of the sulfur oxides in the amount of 480 billion yen, based on his bold assumptions, which was published at the 1982 Tokyo Conference of the Roma Club.
 - According to 1977 Environmental White Paper, the execution of the environment protection measures during the period from 1965 to 1975 produced a favorable effect such as the increase in the actual GNP of Japan by 0.9%, concluding that the execution of the environment protection measures had little influence in terms of macroeconomy.

- Similar tendencies are observed in the cases experienced in other countries. OECD stated that the effect of the investment in the environment protection measures on the gross national product is neutral or negligible.

(3) The macroeconomic effects of the introduction of the power generating facilities capable of required environmental quality standard into the existing power plants in Bulgaria, if analyzed by the above-described method, are estimated to be as follows:

- Favorable effect on economy such as the increase in employment opportunity resulting from the increase in investment.
- Effect on the electric power rate can be absorbed.
- Fostering industries relative to Environmental Protection Technologies

With regard to the technological level of the country, Bulgaria has already experienced the lignite firing, therefore it would not take long for the country to catch up with production and operation know-how of in-furnace desulfurization equipment.

In 1995 Bulgaria applied for joining EU. And a great demand of installation and spread for flue gas desulfurization equipment in new and existing coal-fired thermal power plants is expected to continue. Therefore, in anticipation of an expansion of the domestic market, it would be feasible to exploit their comparative costs of environmental protection equipment for boilers both power plants and general industries so that it becomes a solid base for fostering an industry where environmental protection related technologies are used such as flue gas desulfurization equipment.

**Table 10-1-1 Initial Investment Cost of ME-1 Replacing Thermal Power Plant
(Market Price Basis)**

(Unit: 10³ US\$)

Year		1	2	3	4	Total
Civil/Erection Island	FC	18,600	13,000	15,500	14,900	62,000
	LC	24,700	17,300	20,500	19,700	82,200
Boiler Island	FC	0	76,800	96,100	19,200	192,100
	LC	0	13,600	17,000	3,300	33,900
Turbine Island	FC	0	36,000	45,100	9,000	90,100
	LC	0	6,400	7,900	1,600	15,900
Coal/Limestone Handling Island	FC	0	18,900	41,700	15,100	75,700
	LC	0	3,300	7,400	2,700	13,400
General Expenses	FC	2,000	6,000	6,000	23,000	37,000
	LC	0	0	0	3,000	3,000
Total	FC	20,600	150,700	204,400	81,200	456,900
	LC	24,700	40,600	52,800	30,300	148,400
Total (FC + LC)		45,300	191,300	257,200	111,500	605,300

- (Note) 1. Interest on borrowing accrued during the term of construction work is not included in the above amounts.
2. General expenses include the indirect cost of contingency and engineering fee.

**Table 10-1-2 Initial Investment Cost of ME-1 Replacing Thermal Power Plant
(Economic Price Basis)**

(Unit: 10³ US\$)

Year		1	2	3	4	Total
Civil/Erection Island	FC	18,600	13,000	15,500	14,900	62,000
	LC	23,959	16,781	19,885	19,109	79,734
Boiler Island	FC	0	76,800	96,100	19,200	192,100
	LC	0	13,192	16,490	3,201	32,883
Turbine Island	FC	0	36,000	45,100	9,000	90,100
	LC	0	6,208	7,663	1,552	15,423
Coal/Limestone Handling Island	FC	0	18,900	41,700	15,100	75,700
	LC	0	3,201	7,178	2,619	12,998
General Expenses	FC	2,000	6,000	6,000	23,000	37,000
	LC	0	0	0	2,910	2,910
Total	FC	20,600	150,700	204,400	81,200	456,900
	LC	23,959	39,382	51,216	29,391	143,948
Total (FC + LC)		44,559	190,082	255,616	110,591	600,848

- (Note) 1. Interest on borrowing accrued during the term of construction work is not included in the above amounts.
2. General expenses include the indirect cost of contingency and engineering fee.

**Table 10-1-3 Initial Investment Cost of Alternative Thermal Power Plant
(Market Price Basis)**

(Unit: 10³ US\$)

Year		1	2	3	4	Total
Civil/Erection Island	FC	16,800	11,800	14,000	13,500	56,100
	LC	22,300	15,600	18,600	17,900	74,400
Boiler Island	FC	0	59,100	73,900	14,800	147,800
	LC	0	10,500	13,000	2,600	26,100
Turbine Island	FC	0	30,000	37,600	7,500	75,100
	LC	0	12,900	16,100	3,200	32,200
Coal/Limestone Handling Island	FC	0	13,700	30,100	10,900	54,700
	LC	0	5,800	12,900	4,700	23,400
General Expenses	FC	2,000	6,000	6,000	23,000	37,000
	LC	0	0	0	3,000	3,000
Total	FC	18,800	120,600	161,600	69,700	370,700
	LC	22,300	44,800	60,600	31,400	159,100
Total (FC + LC)		41,100	165,400	222,200	101,100	529,800

- (Note)
1. Interest on borrowing accrued during the term of construction work is not included in the above amounts.
 2. General expenses include the indirect cost of contingency and engineering fee.

**Table 10-1-4 Initial Investment Cost of Alternative Thermal Power Plant
(Economic Price Basis)**

(Unit: 10³ US\$)

Year		1	2	3	4	Total
Civil/Erection Island	FC	16,800	11,800	14,000	13,500	56,100
	LC	21,631	15,132	18,042	17,363	72,168
Boiler Island	FC	0	59,100	73,900	14,800	147,800
	LC	0	10,185	12,610	2,522	25,317
Turbine Island	FC	0	30,000	37,600	7,500	75,100
	LC	0	12,513	15,617	3,104	31,234
Coal/Limestone Handling Island	FC	0	13,700	30,100	10,900	54,700
	LC	0	5,626	12,513	4,559	22,698
General Expenses	FC	2,000	6,000	6,000	23,000	37,000
	LC	0	0	0	2,910	2,910
Total	FC	18,800	120,600	161,600	69,700	370,700
	LC	21,631	43,456	58,782	30,458	154,327
Total (FC + LC)		40,431	164,056	220,382	100,158	525,027

- (Note) 1. Interest on borrowing accrued during the term of construction work is not included in the above amounts.
2. General expenses include the indirect cost of contingency and engineering fee.

Table 10-1-5 Basic Condition for Economic Evaluation

1. The 1 US\$ = 67Lv is the exchange rate of average 1995, which is adopted in the economic and financial evaluation to convert into the unit price.
2. Basic price point for evaluation is assumed to be the prices as of January, 1996.
3. Other Parameter and Data

Item	Assumed Data and Conditions
1) Method of Analysis	Alternative Plant Approach (Imported coal-fired plant)
2) Study Period	30 year plus construction period
3) Discount Rate	10%
4) Opportunity Cost of Capital	10%
5) Selection of Benefit	Cost of Imported coal-fired TPP
6) Standard Conversion Factor (SCF)	0.97

Table 10-1-6 Basic Factors for Economic Evaluation

Item	Maritsa East No.1 Replacing Plant	Alternative Plant
1. Capacity	230 MW x 2 Units	230 MW x 2 Units
Heat supply	25 Gcal/H	25 Gcal/H
2. Site	Maritsa East-1 site	Maritsa East 1 site
3. Annual Utilization	70 %	70 %
4. Plant efficiency	28.5 %	38.3 %
Boiler	68.3 %	93.8 %
Turbine	45.0 %	45.0 %
In-house ratio	7.0 %	9.0 %
Plant loss	0.3 %	0.3 %
5. Annual production (GWh)	2,821	2,821
6. Net annual production [at sending end] (GWh)	2,623	2,567
7. Fuel calorific value [LHV]	1,686 kcal/kg 7,058 kJ/kg	5,898 kcal/kg 24,689 kJ/kg
8. Fuel consumption (t/year)	5,052 x 10 ³	994 x 10 ³
9. Fuel cost (unit cost)		
- Economic cost	6.6 \$/T	60.0 \$/T
- Financial cost	6.0 \$/T	60.0 \$/T
10. Annual OM cost (US\$/year)	22,030 x 10 ³	18,960 x 10 ³
11. Plant life	30 years	30 years

Table 10-1-7 Net Present Values and Benefit-Cost Ratio

(Unit: 10³ US\$)

	ME-1 Thermal Power Plant		Alternative Thermal		Difference		
	Total Cost	Present Value (C)	Total Cost	Present Value (B)	Total	(B-C)	(B/C)
	2,183,334	804,823	2,896,367	915,270	713,034	110,447	1.14

No.	YEAR	Maritsa East No.1 Replacing PROJECT				A Iternative Thermal Power P R O J E C T (Imported Coal-fired)			(B) TOTAL COST	(B) - (C)	
		Construct. Cost	O & M Cost	Fuel Cost	TOTAL COST	Const. Cost	O & M Cost	Fuel Cost			
1	1998	44,559			44,559	40,431		40,431	-4,128		
2	1999	190,082			190,082	164,056		164,056	-26,026		
3	2000	255,616			255,616	220,382		220,382	-35,234		
4	2001	110,591			110,591	100,158		100,158	-10,433		
5	2002		22,438	30,312	52,750		19,405	59,640	26,295		
6	2003		22,438	30,312	52,750		19,405	59,640	26,295		
7	2004		22,438	30,312	52,750		19,405	59,640	26,295		
8	2005		22,438	30,312	52,750		19,405	59,640	26,295		
9	2006		22,438	30,312	52,750		19,405	59,640	26,295		
10	2007		22,438	30,312	52,750		19,405	59,640	26,295		
11	2008		22,438	30,312	52,750		19,405	59,640	26,295		
12	2009		22,438	30,312	52,750		19,405	59,640	26,295		
13	2010		22,438	30,312	52,750		19,405	59,640	26,295		
14	2011		22,438	30,312	52,750		19,405	59,640	26,295		
15	2012		22,438	30,312	52,750		19,405	59,640	26,295		
16	2013		22,438	30,312	52,750		19,405	59,640	26,295		
17	2014		22,438	30,312	52,750		19,405	59,640	26,295		
18	2015		22,438	30,312	52,750		19,405	59,640	26,295		
19	2016		22,438	30,312	52,750		19,405	59,640	26,295		
20	2017		22,438	30,312	52,750		19,405	59,640	26,295		
21	2018		22,438	30,312	52,750		19,405	59,640	26,295		
22	2019		22,438	30,312	52,750		19,405	59,640	26,295		
23	2020		22,438	30,312	52,750		19,405	59,640	26,295		
24	2021		22,438	30,312	52,750		19,405	59,640	26,295		
25	2022		22,438	30,312	52,750		19,405	59,640	26,295		
26	2023		22,438	30,312	52,750		19,405	59,640	26,295		
27	2024		22,438	30,312	52,750		19,405	59,640	26,295		
28	2025		22,438	30,312	52,750		19,405	59,640	26,295		
29	2026		22,438	30,312	52,750		19,405	59,640	26,295		
30	2027		22,438	30,312	52,750		19,405	59,640	26,295		
31	2028		22,438	30,312	52,750		19,405	59,640	26,295		
32	2029		22,438	30,312	52,750		19,405	59,640	26,295		
33	2030		22,438	30,312	52,750		19,405	59,640	26,295		
34	2031		22,438	30,312	52,750		19,405	59,640	26,295		
TOTAL		600,848	673,126	909,360	2,183,334	523,027	582,140	1,789,200	2,896,367	713,034	
Present Value					804,823				915,270	110,447	
I = 10%										25.3%	1.14
										N.P.V.	
										E.I.R.R.	
										B/C	

Table 10-1-9 Sensitivity Analysis

		B-C (10 ³ US\$)	B/C	EIRR (%)
Case - 1	Construction cost (20% up)	17,411	1.02	11.2
Case - 2	Discount rate (8%)	142,607	1.15	22.6
	Discount rate (12%)	78,468	1.11	25.3
Case - 3	Fuel cost (5% up)	100,867	1.12	24.2

Table 10-2-1 Basic Conditions for Financial Evaluation

Item	Assumed Data and Conditions
1) Revenue for Financial Evaluation	4.5 cent/kWh (Electricity) 31.4 US\$/Gcal (Heat) These are estimated average tariff as of 2001 for NEK
2) Study Period	30 years plus construction period
3) Method of Repayment	Principal & Interest in equal installment
5) Escalation	Not considered
6) Depreciation	Straight line method/zero residual value

Table 10-2-2 Revenue from Sales of Electricity and Heat

	Electricity	Heat
Annual net energy	2,624 GWh/year	100,000 Gcal/year
Electricity price (cent / kWh)	4.5	-
Annual electricity revenue (10 ³ US\$)	118,059	-
Heat price (US\$ / Gcal)	-	31.4
Annual heat revenue (10 ³ US\$)	-	3,140

(I) Basic assumption for Salable Annual Electricity and Heat Supply

1) Electricity

R₁ unit: [230MW x 12 months]

230MW x 24 h x 365 day x 0.7 x (1 - 0.07)

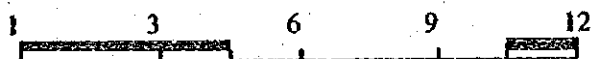
R₂ unit: [230MW x 6 months; 200MW x 6 months (During Heat Supply)]

230MW x 24 h x (365 day/2) x 0.7 x (1 - 0.07)

200MW x 24 h x (365 day/2) x 0.7 x (1 - 0.07)

2) Heat

a) The period of supply: 6 (months)



b) Average annual operating period: 4,000 (hours)

c) Total supply heat: 100,000 (Gcal/year)

Table 10-2-3 Financial Evaluation of ME-1 Thermal Power Plant

(Unit : 1,000 US \$)

No.	YEAR	Marista East No.1 PROJECT				(B) REVENUE		(B) - (C)
		Construct. Cost	O & M Cost	FUEL	(C) TOTAL COST	POWER SALES	HEAT SALES	
1	1998	45,300			45,300			-45,300
2	1999	191,300			191,300			-191,300
3	2000	257,200			257,200			-257,200
4	2001	111,500			111,500			-111,500
5	1 2002		22,612	30,312	52,924	114,198	3,135	64,409
6	2 2003		22,612	30,312	52,924	114,198	3,135	64,409
7	3 2004		22,612	30,312	52,924	114,198	3,135	64,409
8	4 2005		22,612	30,312	52,924	114,198	3,135	64,409
9	5 2006		22,612	30,312	52,924	114,198	3,135	64,409
10	6 2007		22,612	30,312	52,924	114,198	3,135	64,409
11	7 2008		22,612	30,312	52,924	114,198	3,135	64,409
12	8 2009		22,612	30,312	52,924	114,198	3,135	64,409
13	9 2010		22,612	30,312	52,924	114,198	3,135	64,409
14	10 2011		22,612	30,312	52,924	114,198	3,135	64,409
15	11 2012		22,612	30,312	52,924	114,198	3,135	64,409
16	12 2013		22,612	30,312	52,924	114,198	3,135	64,409
17	13 2014		22,612	30,312	52,924	114,198	3,135	64,409
18	14 2015		22,612	30,312	52,924	114,198	3,135	64,409
19	15 2016		22,612	30,312	52,924	114,198	3,135	64,409
20	16 2017		22,612	30,312	52,924	114,198	3,135	64,409
21	17 2018		22,612	30,312	52,924	114,198	3,135	64,409
22	18 2019		22,612	30,312	52,924	114,198	3,135	64,409
23	19 2020		22,612	30,312	52,924	114,198	3,135	64,409
24	20 2021		22,612	30,312	52,924	114,198	3,135	64,409
25	21 2022		22,612	30,312	52,924	114,198	3,135	64,409
26	22 2023		22,612	30,312	52,924	114,198	3,135	64,409
27	23 2024		22,612	30,312	52,924	114,198	3,135	64,409
28	24 2025		22,612	30,312	52,924	114,198	3,135	64,409
29	25 2026		22,612	30,312	52,924	114,198	3,135	64,409
30	26 2027		22,612	30,312	52,924	114,198	3,135	64,409
31	27 2028		22,612	30,312	52,924	114,198	3,135	64,409
32	28 2029		22,612	30,312	52,924	114,198	3,135	64,409
33	29 2030		22,612	30,312	52,924	114,198	3,135	64,409
34	30 2031		22,612	30,312	52,924	114,198	3,135	64,409
TOTAL		605,300	678,360	909,360	2,193,020	3,425,933	94,050	1,326,963

Base case: 4.5 cent/kWh

F.I.R.R.

8.8%

Table 10-2-4 Fund Requirement and Repayment

(Unit : 1,000 US \$)

No.	FUND REQUIREMENT			REPAYMENT SCHEDULE																	
	Foreign	Local	Total	FOREIGN FOR FOREIGN CONSTRUCTION			FOREIGN FOR LOCAL														
				Interest	Principal	Total	Balance	Interest	Principal	Total	Balance										
1	20,600	24,700	45,300	()																	
2	150,700	40,600	191,300	(824)																	
3	204,400	52,800	257,200	(7,676)																	
4	81,200	30,300	111,500	(21,880)																	
5				(33,304)				522,752													178,990
6				41,820	11,423	53,243	511,329	17,899	5,633	23,532											173,357
7				40,906	12,337	53,243	498,992	17,336	6,197	23,532											167,160
8				39,919	13,324	53,243	485,667	16,716	6,817	23,532											160,343
9				38,853	14,390	53,243	471,277	16,034	7,498	23,532											152,845
10				37,702	15,541	53,243	455,736	15,284	8,248	23,532											144,597
11				36,459	16,785	53,243	438,952	14,460	9,073	23,532											135,524
12				35,116	18,127	53,243	420,824	13,552	9,980	23,532											125,544
13				33,666	19,578	53,243	401,247	12,554	10,978	23,532											114,566
14				32,100	21,144	53,243	380,103	11,457	12,076	23,532											102,490
15				30,408	22,835	53,243	357,268	10,249	13,283	23,532											89,207
16				28,581	24,662	53,243	332,606	8,921	14,612	23,532											74,595
17				26,608	26,635	53,243	305,971	7,459	16,073	23,532											58,522
18				24,478	28,766	53,243	277,205	5,852	17,680	23,532											40,842
19				22,176	31,067	53,243	246,138	4,084	19,448	23,532											21,393
20				19,691	33,552	53,243	212,586	2,139	21,393	23,532											0
21				17,007	36,237	53,243	176,349														
22				14,108	39,136	53,243	137,214														
23				10,977	42,266	53,243	94,947														
24				7,596	45,648	53,243	49,299														
20				3,944	49,299	53,243	0														
Total	456,900	148,400	605,300	542,117	522,752	1,064,869		173,997	178,990	352,987											

Note: Figures in parentheses are I.D. C.

Funds to be required do not include the amount of interest

Remarks: Repayment condition

Foreign currency : 8.00% (20 Year)
 Local currency : 10.00% (15 Year)
 Grace Period : 4 years (construction period including preparation)

Table 10-2-5 Profit and Loss Statement

No.	Operating Revenue (A)		Operating Expenses		Total (B)	Operating Income (C)=A-B	Financial Expenses*		Total* (D)	Net Income (E)=C-D
	O & M	Depreciation	F.C.	L.C.						
							(Unit : 1,000 US \$)			
1	117,338	22,612	16,921	39,533	77,805	(0)	(0)	(0)	18,086	
2	117,338	22,612	16,921	39,533	77,805	(824)	(1,235)	(2,059)	19,563	
3	117,338	22,612	16,921	39,533	77,805	(7,676)	(4,500)	(12,176)	21,170	
4	117,338	22,612	16,921	39,533	77,805	(21,880)	(9,170)	(31,050)	22,917	
5	117,338	22,612	16,921	39,533	77,805	(33,304)	(13,325)	(46,629)	24,818	
6	117,338	22,612	16,921	39,533	77,805	41,820	17,899	59,719	26,887	
7	117,338	22,612	16,921	39,533	77,805	40,906	17,336	58,242	29,137	
8	117,338	22,612	16,921	39,533	77,805	39,919	16,716	56,635	31,585	
9	117,338	22,612	16,921	39,533	77,805	38,853	16,034	54,888	34,249	
10	117,338	22,612	16,921	39,533	77,805	37,702	15,284	52,987	37,148	
11	117,338	22,612	16,921	39,533	77,805	36,459	14,460	50,919	40,303	
12	117,338	22,612	16,921	39,533	77,805	35,116	13,552	48,669	43,737	
13	117,338	22,612	16,921	39,533	77,805	33,666	12,554	46,220	47,475	
14	117,338	22,612	16,921	39,533	77,805	32,100	11,457	43,556	51,545	
15	117,338	22,612	16,921	39,533	77,805	30,408	10,249	40,657	55,975	
16	117,338	22,612	16,921	39,533	77,805	28,581	8,921	37,502	60,798	
17	117,338	22,612	16,921	39,533	77,805	26,608	7,459	34,068	63,697	
18	117,338	22,612	16,921	39,533	77,805	24,478	5,852	30,330	66,828	
19	117,338	22,612	16,921	39,533	77,805	22,176	4,084	26,261	70,209	
20	117,338	22,612	16,921	39,533	77,805	19,691	2,139	21,850	73,861	
21	117,338	22,612	16,921	39,533	77,805	17,007	0	17,007	839,988	
22	117,338	22,612	16,921	39,533	77,805	14,108	0	14,108		
23	117,338	22,612	16,921	39,533	77,805	10,977	0	10,977		
24	117,338	22,612	16,921	39,533	77,805	7,596	0	7,596		
25	117,338	22,612	16,921	39,533	77,805	3,944	0	3,944		
Total	2,346,755	452,240	338,413	790,653	1,556,102	542,117	173,997	716,114		

*Note: Figures in parentheses are I.D.C.

Remarks: Operating revenue :

Electricity :	2,537.73 GWh /Year x	0.045	USS/kWh=	114,198	Thousand	USS/year
Heat :	100,000 Gcal /Year x	31.40	USS/Gcal=	3,140.0	Thousand	USS/year
				117,338	Thousand	USS/year

Table 10-2-6 Cash Flow Sheet

(Unit : 1000 U.S.)

No.	CASH INFLOW					CASH OUTFLOW					BALANCE	
	Fund Re-quirement	Net Income	Depreci-ation	Total (A)	Construc-tion Cost	Principal Repayment			I.D.C.	Total (B)	Yearly (A)-(B)	Accumulation
						F.C.	L.C.	Subtotal				
1	0	0	0	0	0	0	0	0	0	0	0	0
2	45,300	0	0	45,300	45,300	0	0	0	2,059	47,359	-2,059	-2,059
3	191,300	0	0	191,300	191,300	0	0	0	12,176	203,476	-12,176	-14,235
4	257,200	0	0	257,200	257,200	0	0	0	31,050	288,250	-31,050	-45,285
5	111,500	0	0	111,500	111,500	0	0	0	46,629	158,129	-46,629	-91,914
6	0	18,086	16,921	35,007	0	11,425	5,633	17,057	0	17,057	17,950	-73,964
7	0	19,563	16,921	36,484	0	12,337	6,197	18,534	0	18,534	17,950	-56,014
8	0	21,170	16,921	38,090	0	13,324	6,817	20,141	0	20,141	17,950	-38,065
9	0	22,917	16,921	39,838	0	14,390	7,498	21,888	0	21,888	17,950	-20,115
10	0	24,818	16,921	41,739	0	15,541	8,248	23,789	0	23,789	17,950	-2,165
11	0	26,887	16,921	43,807	0	16,785	9,073	25,857	0	25,857	17,950	15,785
12	0	29,137	16,921	46,057	0	18,127	9,980	28,107	0	28,107	17,950	33,735
13	0	31,585	16,921	48,505	0	19,578	10,978	30,556	0	30,556	17,950	51,685
14	0	34,249	16,921	51,169	0	21,144	12,076	33,220	0	33,220	17,950	69,634
15	0	37,148	16,921	54,069	0	22,835	13,283	36,119	0	36,119	17,950	87,584
16	0	40,303	16,921	57,224	0	24,662	14,612	39,274	0	39,274	17,950	105,534
17	0	43,737	16,921	60,658	0	26,635	16,073	42,708	0	42,708	17,950	123,484
18	0	47,475	16,921	64,396	0	28,766	17,680	46,446	0	46,446	17,950	141,434
19	0	51,545	16,921	68,465	0	31,067	19,448	50,515	0	50,515	17,950	159,384
20	0	55,975	16,921	72,895	0	33,552	21,393	54,946	0	54,946	17,950	177,333
21	0	60,798	16,921	77,719	0	36,237	0	36,237	0	36,237	41,482	218,816
22	0	63,697	16,921	80,618	0	39,136	0	39,136	0	39,136	41,482	260,298
23	0	66,828	16,921	83,749	0	42,266	0	42,266	0	42,266	41,482	301,780
24	0	70,209	16,921	87,130	0	45,648	0	45,648	0	45,648	41,482	343,263
24	0	73,861	16,921	90,782	0	49,299	0	49,299	0	49,299	41,482	384,745
Total	605,300	859,988	338,413	1,783,701	605,300	522,752	178,990	701,742	91,914	1,598,956	384,745	

Table 10-3-1 Trend of Electricity and Heat Price

Year (Month)	Electricity (Lv/kWh)			Heating (Lv/GCal)	
	Households		Industry	Households	Buildings
	Day time	Night time			
February 1991	0.167	0.088	0.314	50	202
June 1991	0.284	0.150	0.534	85	343
April 1992	0.383	0.202	0.721	115	463
December 1992	0.440	0.233	0.793	149	509
May 1993	0.660	0.350	0.837	238	610
April 1994	0.850	0.450	1.138	450	705
March 1995	1.250	0.660	1.461	810	n.a.
September 1995	1.560	0.830	2.016	810	n.a.

Source: NEK

Table 10-3-2(1) Financial Evaluation of ME-1 Thermal Power Plant (Case 1)

(Unit : 1,000 US \$)

No.	YEAR	Marista East No. 1 PROJECT				(B) REVENUE		(B) - (C)
		Construct. Cost	O & M Cost	FUEL	(C) TOTAL COST	POWER SALES	HEAT SALES	
1	1998	45,300			45,300			-45,300
2	1999	191,300			191,300			-191,300
3	2000	257,200			257,200			-257,200
4	2001	111,500			111,500			-111,500
5	1 2002		22,612	30,312	52,924	96,434	3,135	46,645
6	2 2003		22,612	30,312	52,924	96,434	3,135	46,645
7	3 2004		22,612	30,312	52,924	96,434	3,135	46,645
8	4 2005		22,612	30,312	52,924	96,434	3,135	46,645
9	5 2006		22,612	30,312	52,924	96,434	3,135	46,645
10	6 2007		22,612	30,312	52,924	96,434	3,135	46,645
11	7 2008		22,612	30,312	52,924	96,434	3,135	46,645
12	8 2009		22,612	30,312	52,924	96,434	3,135	46,645
13	9 2010		22,612	30,312	52,924	96,434	3,135	46,645
14	10 2011		22,612	30,312	52,924	96,434	3,135	46,645
15	11 2012		22,612	30,312	52,924	96,434	3,135	46,645
16	12 2013		22,612	30,312	52,924	96,434	3,135	46,645
17	13 2014		22,612	30,312	52,924	96,434	3,135	46,645
18	14 2015		22,612	30,312	52,924	96,434	3,135	46,645
19	15 2016		22,612	30,312	52,924	96,434	3,135	46,645
20	16 2017		22,612	30,312	52,924	96,434	3,135	46,645
21	17 2018		22,612	30,312	52,924	96,434	3,135	46,645
22	18 2019		22,612	30,312	52,924	96,434	3,135	46,645
23	19 2020		22,612	30,312	52,924	96,434	3,135	46,645
24	20 2021		22,612	30,312	52,924	96,434	3,135	46,645
25	21 2022		22,612	30,312	52,924	96,434	3,135	46,645
26	22 2023		22,612	30,312	52,924	96,434	3,135	46,645
27	23 2024		22,612	30,312	52,924	96,434	3,135	46,645
28	24 2025		22,612	30,312	52,924	96,434	3,135	46,645
29	25 2026		22,612	30,312	52,924	96,434	3,135	46,645
30	26 2027		22,612	30,312	52,924	96,434	3,135	46,645
31	27 2028		22,612	30,312	52,924	96,434	3,135	46,645
32	28 2029		22,612	30,312	52,924	96,434	3,135	46,645
33	29 2030		22,612	30,312	52,924	96,434	3,135	46,645
34	30 2031		22,612	30,312	52,924	96,434	3,135	46,645
TOTAL		605,300	678,360	909,360	2,193,020	2,893,010	94,050	794,040

Case 1: 3.8 cent/kWh

F.I.R.R.

5.9%

Table 10-3-2(2) : Financial Analysis of ME-1 Thermal Power Plant (Case I)

(Unit : 1000 US\$)

No.	CASH INFLOW				CASH OUTFLOW				BALANCE		
	Fund Re- quirement	Net Income	Depreci- ation	Total (A)	Construc- tion Cost	Principal Repayment		I.D.C.	Total (B)	Yearly (A)-(B)	Accumulation
						F.C.	L.C.				
1	0	0	0	0	0	0	0	0	0	0	0
2	45,300	0	0	45,300	45,300	0	0	2,059	47,359	-2,059	-2,059
3	191,300	0	0	191,300	191,300	0	0	12,176	203,476	-12,176	-14,235
4	257,200	0	0	257,200	257,200	0	0	31,050	288,250	-31,050	-45,285
5	111,500	0	0	111,500	111,500	0	0	46,629	158,129	-46,629	-91,914
6	0	322	16,921	17,243	0	11,423	5,633	0	17,057	186	-91,728
7	0	1,799	16,921	18,720	0	12,337	6,197	0	18,534	186	-91,543
8	0	3,406	16,921	20,326	0	13,324	6,817	0	20,141	186	-91,357
9	0	5,153	16,921	22,074	0	14,390	7,498	0	21,888	186	-91,171
10	0	7,054	16,921	23,975	0	15,541	8,248	0	23,789	186	-90,985
11	0	9,122	16,921	26,043	0	16,785	9,075	0	25,857	186	-90,800
12	0	11,572	16,921	28,293	0	18,127	9,980	0	28,107	186	-90,614
13	0	13,821	16,921	30,741	0	19,578	10,978	0	30,556	186	-90,428
14	0	16,485	16,921	33,405	0	21,144	12,076	0	33,220	186	-90,242
15	0	19,384	16,921	36,304	0	22,835	13,285	0	36,119	186	-90,057
16	0	22,559	16,921	39,460	0	24,662	14,612	0	39,274	186	-89,871
17	0	25,973	16,921	42,894	0	26,635	16,073	0	42,708	186	-89,685
18	0	29,711	16,921	46,632	0	28,766	17,680	0	46,446	186	-89,499
19	0	33,780	16,921	50,701	0	31,067	19,448	0	50,515	186	-89,314
20	0	38,211	16,921	55,131	0	33,552	21,395	0	54,946	186	-89,128
21	0	43,034	16,921	59,955	0	36,237	0	0	36,237	23,718	-65,410
22	0	45,953	16,921	62,854	0	39,136	0	0	39,136	23,718	-41,692
23	0	49,064	16,921	65,985	0	42,266	0	0	42,266	23,718	-17,973
24	0	52,445	16,921	69,366	0	45,648	0	0	45,648	23,718	5,745
24	0	56,097	16,921	73,018	0	49,299	0	0	49,299	23,718	29,463
Total	605,300	484,706	338,413	1,428,419	605,300	522,752	178,990	91,914	1,398,956	29,463	

Table 10-3-3(1) Financial Evaluation of ME-1 Thermal Power Plant (Case 2)

(Unit : 1,000 US \$)

No.	YEAR	Marista East No.1 PROJECT				(B) REVENUE		(B) - (C)
		Construct. Cost	O & M Cost	FUEL	(C) TOTAL COST	POWER SALES	HEAT SALES	
1	1998	45,300			45,300			-45,300
2	1999	191,300			191,300			-191,300
3	2000	257,200			257,200			-257,200
4	2001	111,500			111,500			-111,500
5	1 2002		22,612	30,312	52,924	126,886	3,135	77,097
6	2 2003		22,612	30,312	52,924	126,886	3,135	77,097
7	3 2004		22,612	30,312	52,924	126,886	3,135	77,097
8	4 2005		22,612	30,312	52,924	126,886	3,135	77,097
9	5 2006		22,612	30,312	52,924	126,886	3,135	77,097
10	6 2007		22,612	30,312	52,924	126,886	3,135	77,097
11	7 2008		22,612	30,312	52,924	126,886	3,135	77,097
12	8 2009		22,612	30,312	52,924	126,886	3,135	77,097
13	9 2010		22,612	30,312	52,924	126,886	3,135	77,097
14	10 2011		22,612	30,312	52,924	126,886	3,135	77,097
15	11 2012		22,612	30,312	52,924	126,886	3,135	77,097
16	12 2013		22,612	30,312	52,924	126,886	3,135	77,097
17	13 2014		22,612	30,312	52,924	126,886	3,135	77,097
18	14 2015		22,612	30,312	52,924	126,886	3,135	77,097
19	15 2016		22,612	30,312	52,924	126,886	3,135	77,097
20	16 2017		22,612	30,312	52,924	126,886	3,135	77,097
21	17 2018		22,612	30,312	52,924	126,886	3,135	77,097
22	18 2019		22,612	30,312	52,924	126,886	3,135	77,097
23	19 2020		22,612	30,312	52,924	126,886	3,135	77,097
24	20 2021		22,612	30,312	52,924	126,886	3,135	77,097
25	21 2022		22,612	30,312	52,924	126,886	3,135	77,097
26	22 2023		22,612	30,312	52,924	126,886	3,135	77,097
27	23 2024		22,612	30,312	52,924	126,886	3,135	77,097
28	24 2025		22,612	30,312	52,924	126,886	3,135	77,097
29	25 2026		22,612	30,312	52,924	126,886	3,135	77,097
30	26 2027		22,612	30,312	52,924	126,886	3,135	77,097
31	27 2028		22,612	30,312	52,924	126,886	3,135	77,097
32	28 2029		22,612	30,312	52,924	126,886	3,135	77,097
33	29 2030		22,612	30,312	52,924	126,886	3,135	77,097
34	30 2031		22,612	30,312	52,924	126,886	3,135	77,097
TOTAL		605,300	678,360	909,360	2,193,020	3,806,592	94,050	1,707,622

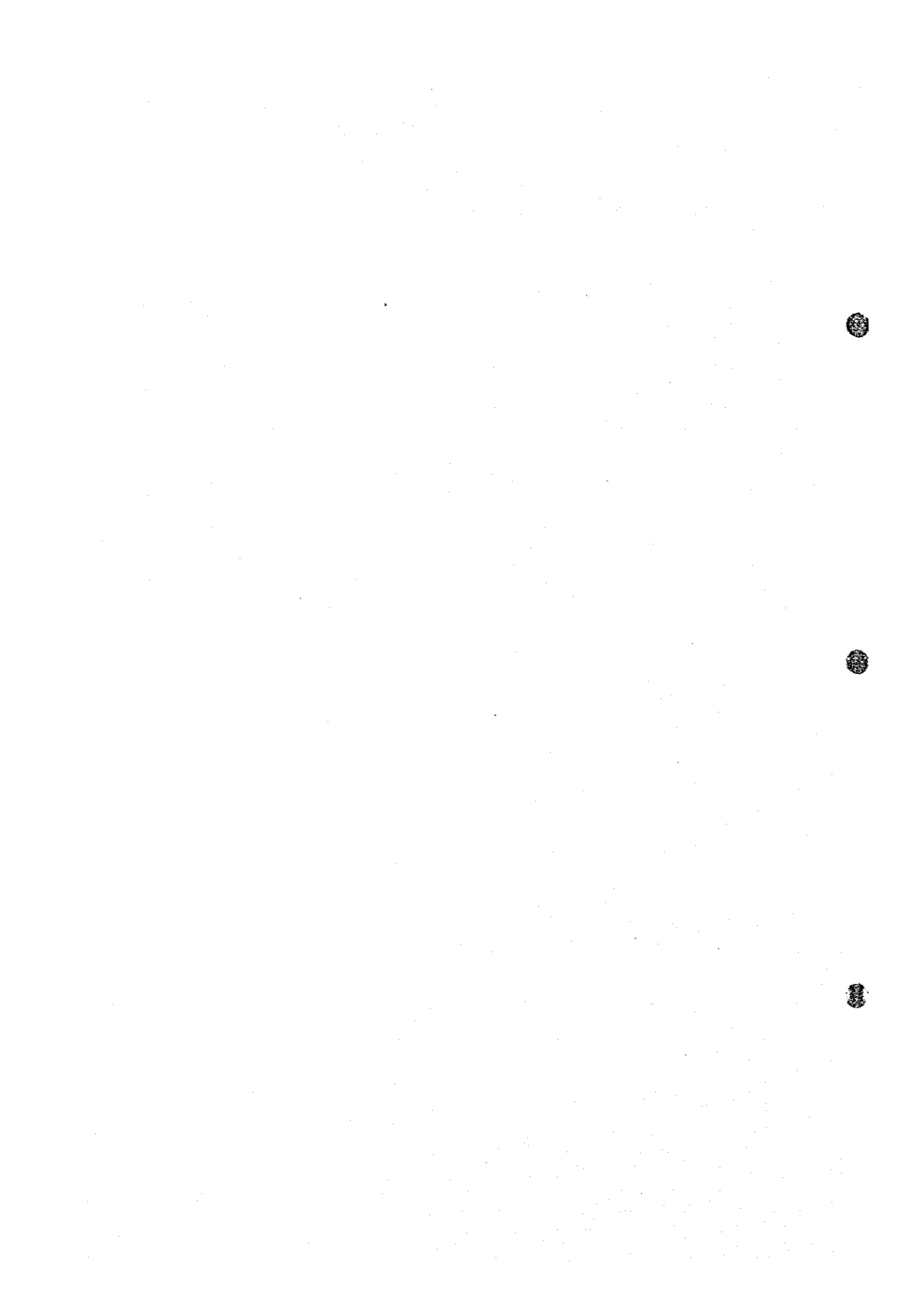
Case 2: 5.0 cent / kWh

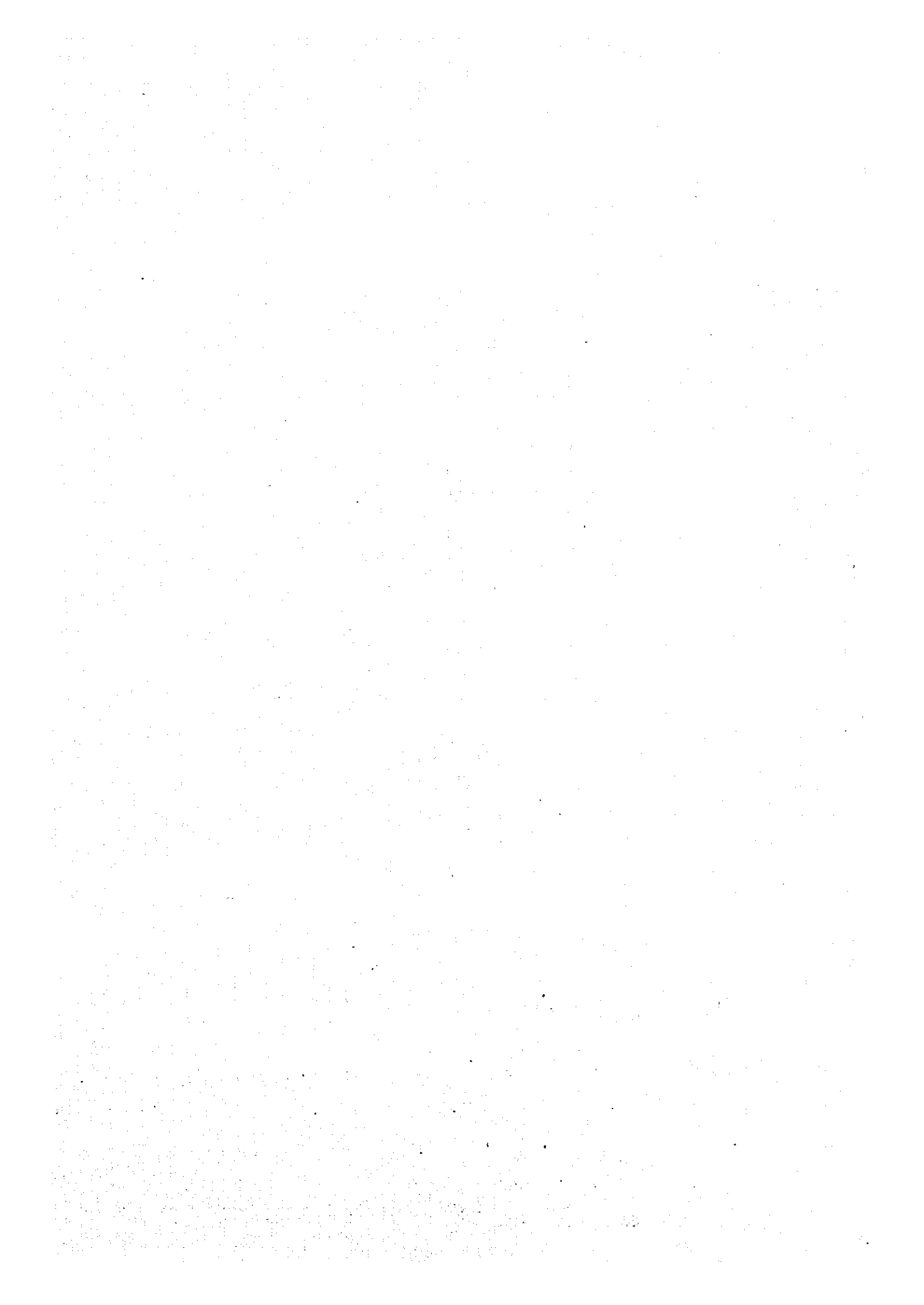
F.I.R.R.

10.6%

Table 10-3-3(2) Financial Analysis of ME-1 Thermal Power Plant (Case 2)

No.	CASH INFLOW							CASH OUTFLOW				BALANCE	
	Fund Re-quirement	Net Income	Depreciation	Total (A)	Construc-tion Cost	Principal Repayment		I.D.C.	Total (B)	Yearly (A)-(B)	Accumulation		
						F.C.	L.C.					(A)-(B)	
1	0	0	0	0	0	0	0	0	0	0	0		
2	45,300	0	0	45,300	45,300	0	0	2,059	47,359	-2,059	-2,059		
3	191,300	0	0	191,300	191,300	0	0	12,176	203,476	-12,176	-14,235		
4	257,200	0	0	257,200	257,200	0	0	31,050	288,250	-31,050	-45,285		
5	111,500	0	0	111,500	111,500	0	0	46,629	158,129	-46,629	-91,914		
6	0	30,775	16,921	47,695	0	11,423	5,633	17,057	17,057	30,638	-61,276		
7	0	32,252	16,921	49,172	0	12,337	6,197	18,534	18,534	30,638	-30,637		
8	0	33,858	16,921	50,779	0	13,324	6,817	20,141	20,141	30,638	1		
9	0	35,606	16,921	52,527	0	14,390	7,498	21,888	21,888	30,638	30,640		
10	0	37,507	16,921	54,428	0	15,541	8,248	23,789	23,789	30,638	61,278		
11	0	39,575	16,921	56,496	0	16,785	9,073	25,857	25,857	30,638	91,917		
12	0	41,825	16,921	58,746	0	18,127	9,980	28,107	28,107	30,638	122,555		
13	0	44,273	16,921	61,194	0	19,578	10,978	30,556	30,556	30,638	153,194		
14	0	46,937	16,921	63,858	0	21,144	12,076	33,220	33,220	30,638	183,832		
15	0	49,836	16,921	66,757	0	22,835	13,283	36,119	36,119	30,638	214,471		
16	0	52,992	16,921	69,912	0	24,662	14,612	39,274	39,274	30,638	245,109		
17	0	56,426	16,921	73,346	0	26,635	16,073	42,708	42,708	30,638	275,748		
18	0	60,164	16,921	77,085	0	28,766	17,680	46,446	46,446	30,638	306,386		
19	0	64,233	16,921	81,154	0	31,067	19,448	50,515	50,515	30,638	337,025		
20	0	68,663	16,921	85,584	0	33,552	21,393	54,946	54,946	30,638	367,663		
21	0	73,487	16,921	90,408	0	36,237	0	36,237	36,237	54,171	421,834		
22	0	76,386	16,921	93,306	0	39,136	0	39,136	39,136	54,171	476,005		
23	0	79,517	16,921	96,437	0	42,266	0	42,266	42,266	54,171	530,176		
24	0	82,898	16,921	99,819	0	45,648	0	45,648	45,648	54,171	584,347		
24	0	86,550	16,921	103,470	0	49,299	0	49,299	49,299	54,171	638,518		
Total	605,300	1,093,761	338,413	2,037,474	605,300	522,732	178,990	701,742	1,398,956	638,518	638,518		





JICA