

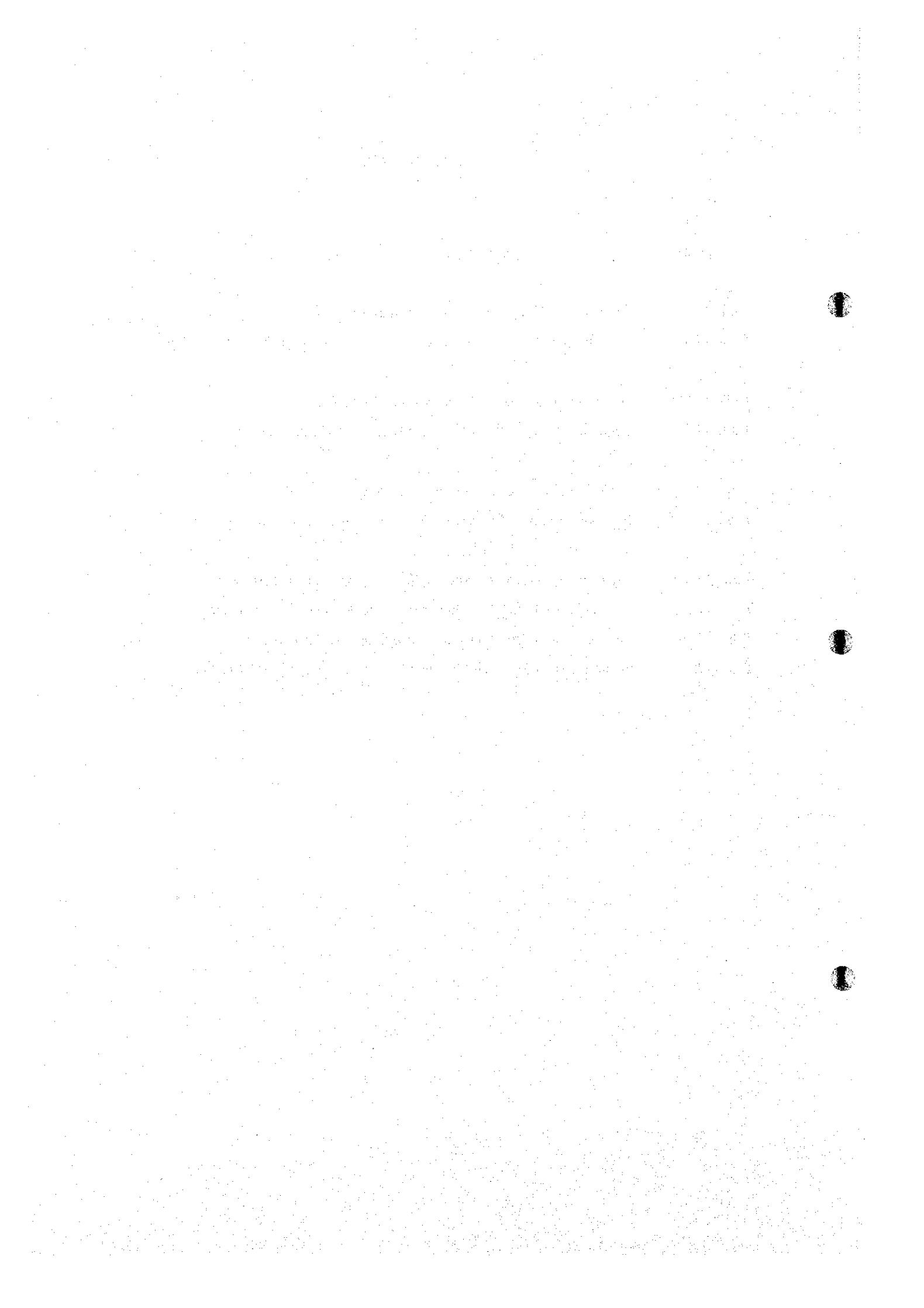
17. Economic Analysis

17. Economic Analysis

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17. Economic Analysis

17.1 Methodology of Economic Analysis and Conditions

17.1.1 Methodology

Economic analysis is to be carried out by using "with and without" method. "With" means the project and "Without" means an alternative power plant equipped with an equivalent kW and kWh at Sending-out (Powerhouse Exit) with those of the project. This methodology is derived from the concept that if the project does not exist, an alternative method will be proceeded to achieve the objective. The cost of the relevant project is represented by the term of "C(ost)" and the cost of an alternative is represented by the term of "B(enefit)".

A combined cycle power plant is selected as an alternative power plant to be compared with the relevant project in respect to evaluating the economic performance of the projects based on the discussion with MIH.

The basic technique is to discount "Cost" and "Benefit" occurring in different periods and express them all in a common value at any one point of time.

The economic preference of the project is to be valued by using the Economic Internal Rate of Return (EIRR). EIRR is calculated by the following formula.

$$\text{EIRR} = r (\%)$$

Where

$$\sum_{t=0}^n \frac{C_t}{(1+r)^t} = \sum_{t=0}^n \frac{B_t}{(1+r)^t}$$

C_t: Cost (Cost involved in the project)

B_t: Benefit (Cost involved in the alternative)

t : year

n: life time of the project

r: discount rate (%)

The EIRR calculated by the above formula is to compare with the ARI (Accounting Rate of Interest) of which rate is set 10% by IBRD in power sector for developing countries. If the EIRR exceeds the ARI, the project is said to be economically feasible, otherwise the project is not feasible.

Costs consist of following components;

- Project Cost (Construction Cost + Owner's Administration + Engineering Fee + Physical Contingency)
- Operation & Maintenance Cost (O/M cost)
- Fuel Cost.

Subsidies, and duty and tax are excluded in the Economic Analysis since the Economic Analysis is carried out from the view point of a country's economy. Price escalation (Price contingency) is also excluded because it is considered that the price escalation will affect "Cost" and "Benefit" simultaneously.

The price escalation for the fuel cost, however, is taken into consideration in the case of using different resources.

The prices applied to the Economic Analysis are used the shadow prices or the accounting prices basically. The project costs described in Chapter 16 are regarded as the shadow prices because of being estimated on a foreign exchange basis and are used in this Chapter without any treatment.

17.1.2 Common Conditions

Common conditions applied to the Economic Analysis are shown in Table 17.1-1. Economic and technical data are referred to EGAT (Energy Generation Authority of Thailand) internal data. If EGAT data are not available, PLN (Indonesian State-owned Power Electricity Company) internal data are referred.

The cost of transmission line involved in the project is taken into account in the economic analysis on the concept that the hydropower projects are located at the remote area while the combined cycles are adjoined to consumer's place usually.

Economic performance of alternative plans of transmission line up to the Thai border are also verified in sensitivity test for the Case 1 (allocated transmission line system) and the Case 2 (independent transmission line) because the transmission line in the basic condition is assumed to be constructed up to Ban Houaykong Substation (details are explained in Chapter 12).

Since the each commencement year of the commercial operation for the three (3) project sites (four plans) has not been established at present, the year zero (0) is defined as the

commercial operation commencement and the year minus ten (-10) is defined as the initial year for the project provisionally in the economic analysis.

Table 17.1-1 Common Conditions for Economic Analysis

Items	The Project	The Alternative	Remarks
Power Source	Hydro Power	Combined Cycle	according to the discussion with MIH.
Construction Cost	up to the projects	744.17 US\$/kW *	* as of 1994 Price Level
Construction Period	up to the projects	3 years * 25, 32.5, 42.5 %	* F/C : L/C = 75 : 25
Planned Maintenance Days	6 days/year	63 days/year	
Forced Outage Rate	1.0 %	9.0 %	
Plant Available Factor	97.4 %	75.3 %	$PA=(1-PO/365)(1-FO)$
Station Use	1.0 %	5.0 %	
T/D Loss	10 %	10 %	
O/M Cost	1.5 %	2.5 %	of the Const. Cost
Fuel Cost	0.0 \$/MWh	18.43 \$/MWh	LNG , 1 US\$ =26 Baht
Fuel Escalation	-	2.0 % per annum	assumed 3% increase in real term for crude oil
Life Time	50 years *	25 years	* according to the discussion with MIH

Table 17.1-2
**Plant Properties and Equivalent Capacity
of
Combined-cycle Power Plant**

	Planned Mainten. Days (days) ^a	Forced Outage Rate (Frac.)	Plant Available Factor (%)	Station Use (%)	T/D Loss (%)	Firm Capacity (8 Hrs) (MW)	Annual Generation Energy (MWh)	Available Output at Sending-out (MW)	Sending-out Energy (MWh)	Energy Generation Equivalent (MWh)	Equivalent Output (MW)
a	b	c	d	e	f	g	h	i	j	k	L
			$(1-a)/365$					$f \times c \times (1-d)$	$g \times (1-d)$	$i / (1-d)$	$h / (1-d)$
			$x(1-b)$								$\{c' \times (1-d')\}$
Sekong No.4	6	0.01	97.373	1.0	10.0	406	1,816,000	391.4	1,797,840	-	-
CC-500 Class	63	0.09	75.293	5.0	10.0	-	-	-	1,797,840	1,892,463	547.2
Xe Kaman No.1	6	0.01	97.373	1.0	10.0	245	1,137,000	236.2	1,125,630	-	-
CC-300	63	0.09	75.293	5.0	10.0	-	-	-	1,125,630	1,184,874	330.2
Xe Namnoy (Mid. + Down)	6	0.01	97.373	1.0	10.0	296	1,384,000	285.3	1,370,160	-	-
CC-400	63	0.09	75.293	5.0	10.0	-	-	-	1,370,160	1,442,274	398.9
Xe Namnoy (Mid.)	6	0.01	97.373	1.0	10.0	230	1,052,000	221.7	1,041,480	-	-
CC-300	63	0.09	75.293	5.0	10.0	-	-	-	1,041,480	1,096,295	309.9

Note: CC is the abbreviation for Combined Cycle Power Plant.

Fuel Cost Calculation

Type of Plant	Fuel Type	Fuel Price Btu/MMBtu	Exchange Rate * Bdt/MMBtu	Fuel Price \$/MMBtu	Heat Rate BTU/kWh	Fuel Cost \$/kWh
Combined C.	LNG	63.090	26.00	2,4265	7.595	0.01843

* Exchange Rate as of 1993 , EGAT Basic Criteria for Economic Analysis

17.2 Se Kong No.4 Project

17.2.1 Basic Conditions in Comparison with the Alternative

The project consists of the following characteristics.

- Installed Capacity	443	MW
- Firm Capacity	406	MW
- Sending-out Energy	1,797.8	GWh
- Project Cost	643.61	M.US\$

More detailed conditions in comparison with the alternative are shown in **Table 17.2-1**.

17.2.2 Result of Economic Analysis and Sensitivity Test

The EIRR for the basic conditions resulted in 10.81% as demonstrated in **Table 17.2-2**. Since the EIRR exceeds ARI (10%), the project is deemed to be economically feasible. The EIRR for the Sekong No.4, however, gives the lowest value among the three project sites (four plans).

Sensitivity test is carried out with respect to construction cost and annual generation energy from the view point of the risk management. The results of sensitivity test are shown in below. According to the below results, there is almost no allowance for the Sekong No.4 Project in respect to construction cost and generation energy respectively.

a) Construction Cost

Case	Construction Cost	EIRR (%)
Base Case	1,585 \$/kW	10.81
10 % up	1,744 \$/kW	9.76

b) Generation Energy

Case	Annual Generation Energy	EIRR (%)
Base Case	1,816.0 Gwh	10.81
20 % less	1,452.8 GWh	9.70

c) Transmission Line up to the Thai Border

Case	Construction Cost	EIRR (%)
Base Case	1,585 \$/kW (643.6 M.US\$)	10.81
Case 1 (Allocated)	1,704 \$/kW (691.6 M.US\$)	10.01
Case 2 (Independent)	1,700 \$/kW (690.3 M.US\$)	10.03

Table 17.2-1 Basic Conditions for Se Kong No.4 and the Alternative

Items	Se Kong No.4	Combined Cycle	Remarks
Installed Capacity	(443 MW)	547.2 MW	
Firm Capacity	406 MW *1	547.2 MW *2	*1 Peak 8 Hours *2 Equivalent capacity for the firm of the project.
Available Output at Sending-out	391.4 MW	391.4 MW	Firm Capacity x P.Available Factor x (1 - Station Use)
Generation Energy	1,816 GWh	1,892.4 GWh	Annual Average Energy
Sending-out Energy	1,797.8 GWh	1,797.8 GWh	Generation Energy x (1 - Station Use)
Construction Cost for Firm Capacity	643.61 M.US\$ * 1,585.25 \$/kW	407.2 M.US\$ 744.17 \$/kW	*Transmission Line up to Ban Houaykong is inclusive.
Construction Period	9 years * 8.0, 4.0, 10.0, 14.0, 11.0, 16.0, 17.0, 13.0, 7.0 %	3 years 25, 32.5, 42.5 %	* Including Preparatory Works

Table 17.2-2 Economic Analysis Cash Flow and Economic Internal Rate of Return

Dam Site:	Se Kong No.4	Project Cost	1585.25 \$/kW	Alternative:	Combined Cycle	Project Cost	744.17 \$/kW
Firm Capacity:	408 MWh	F/C	542.22 M.U.S\$	Eq.Install Capacity	547.2 MW	F/C	75.0% 305.41 M.U.S\$
Generation Energy	1816.0 GWh	L/C	101.39 M.U.S\$	Generation Energy	1892.4 GWh	L/C	25.0% 101.80 M.U.S\$
Sending-out Energy	1797.8 GWh	Total	643.61 M.U.S\$	Sending-out Energy	1797.8 GWh	Total	407.21 M.U.S\$
Plant Availability	97.37%	O/M Cost	1.50% of P.Cost	Plant Availability	75.29%	O/M Cost	2.50% of P.Cost
Planned Main.Days	6 days/year	Fuel Cost	0.00 \$/MWh	Planned Main.Days	63 days/year	Fuel Cost (LNG)	0.4792 Baht/kWh
Forced Outage R.	1.0%	Construction Period	9 years	Forced Outage R.	9.0%	Exchange Rate	26 Baht/U.S\$
Station Use	1.0%	Life Time	50 years	Station Use	5.0%	Fuel Cost (LNG)	18.43 \$/MWh
T/D Loss	10.0%			T/D Loss	10.0%	Fuel Escalation	2.0% /year
		Economic Internal Rate of Return (EIRR)				Construction Period	3 years
		EIRR	10.81%			Life Time	25 years

Year	COST (C)				BENEFIT (B)				Cash Flow B - C	Net Present Value						
	Const. Cost M.U.S\$	Gener. Energy GWh	O/M Cost M.U.S\$	Fuel Cost M.U.S\$	Total Cost M.U.S\$	Const. Cost M.U.S\$	Gener. Energy GWh	O/M Cost M.U.S\$		Fuel Price Index \$/MWh	Fuel Cost M.U.S\$	Fuel Cost M.U.S\$	Total Cost M.U.S\$	Discount Rate 10.81%	Cost M.U.S\$	Benefit M.U.S\$
-10					0.00				1.0000	18.43	0.00	0.00	0.00	2.7916	0.00	0.00
-9	51.49				51.49				1.0200	18.80	0.00	0.00	-51.49	2.5192	129.71	0.00
-8	25.74				25.74				1.0404	19.17	0.00	0.00	-25.74	2.2734	58.52	0.00
-7	64.36				64.36				1.0612	19.56	0.00	0.00	-64.36	2.0516	132.04	0.00
-6	90.11				90.11				1.0824	19.95	0.00	0.00	-90.11	1.8514	166.83	0.00
-5	70.80				70.80				1.1041	20.35	0.00	0.00	-70.80	1.6708	118.29	0.00
-4	102.98				102.98				1.1262	20.76	0.00	0.00	-102.98	1.5078	155.27	0.00
-3	109.41				109.41	101.80			1.1487	21.17	0.00	101.80	-7.61	1.3607	148.87	138.52
-2	83.67				83.67	132.34			1.1717	21.59	0.00	132.34	48.67	1.2279	102.74	182.50
-1	45.05				45.05	173.06			1.1951	22.03	0.00	173.06	128.01	1.1081	49.92	191.77
0	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	1.2190	22.47	42.52	52.70	43.05	1.0000	9.65	52.70	
1	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	1.2434	22.92	43.37	53.55	43.90	0.9024	8.71	48.32	
2	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	1.2682	23.37	44.23	54.41	44.76	0.8144	7.86	44.31	
3	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	1.2938	23.84	45.11	55.29	45.64	0.7349	7.09	40.63	
4	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	1.3195	24.32	46.02	56.20	46.55	0.6632	6.40	37.27	
5	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	1.3459	24.80	46.93	57.11	47.46	0.5985	5.78	34.18	
6	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	1.3728	25.30	47.88	58.06	48.41	0.5401	5.21	31.36	
7	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	1.4002	25.81	48.84	59.02	49.37	0.4874	4.70	28.77	
8	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	1.4282	26.32	49.81	59.99	50.34	0.4399	4.25	26.39	
9	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	1.4568	26.85	50.81	60.99	51.34	0.3970	3.83	24.21	
10	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	1.4858	27.39	51.83	62.01	52.36	0.3582	3.46	22.21	
11	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	1.5157	27.93	52.85	63.03	53.38	0.3233	3.12	20.38	
12	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	1.5460	28.49	53.91	64.09	54.44	0.2917	2.81	18.70	
13	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	1.5769	29.06	54.99	65.17	55.52	0.2633	2.54	17.16	
14	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	1.6084	29.64	56.09	66.27	56.62	0.2376	2.29	15.75	
15	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	1.6406	30.24	57.23	67.41	57.76	0.2144	2.07	14.45	
16	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	1.6734	30.84	58.36	68.54	58.89	0.1935	1.87	13.26	
17	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	1.7069	31.46	59.53	69.71	60.06	0.1748	1.68	12.17	
18	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	1.7410	32.09	60.73	70.91	61.26	0.1576	1.52	11.18	
19	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	1.7758	32.73	61.94	72.12	62.47	0.1422	1.37	10.26	
20	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	1.8114	33.38	63.17	73.35	63.70	0.1283	1.24	9.41	
21	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	1.8476	34.05	64.44	74.62	64.97	0.1158	1.12	8.84	
22	1816.0	9.65	0.00	9.65	101.80	1892.4	10.18	1.8845	34.73	65.72	77.70	66.05	0.1045	1.01	18.57	
23	1816.0	9.65	0.00	9.65	132.34	1892.4	10.18	1.9222	35.43	67.05	209.57	199.92	0.0943	0.91	19.76	
24	1816.0	9.65	0.00	9.65	173.06	1892.4	10.18	1.9607	36.14	68.39	251.83	241.98	0.0851	0.82	21.41	
25	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	1.9999	36.86	69.75	79.93	70.28	0.0768	0.74	6.14	
26	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	2.0399	37.60	71.15	81.33	71.66	0.0693	0.67	5.84	
27	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	2.0607	38.35	72.57	82.75	73.10	0.0625	0.60	5.17	
28	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	2.1223	39.11	74.01	84.19	74.54	0.0564	0.54	4.75	
29	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	2.1647	39.90	75.51	85.89	76.04	0.0509	0.49	4.36	
30	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	2.2080	40.69	77.00	87.18	77.53	0.0460	0.44	4.01	
31	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	2.2522	41.51	78.55	88.73	79.08	0.0415	0.40	3.68	
32	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	2.2972	42.34	80.12	90.30	80.86	0.0374	0.36	3.38	
33	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	2.3432	43.19	81.73	91.91	82.26	0.0338	0.33	3.11	
34	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	2.3901	44.05	83.36	93.54	83.89	0.0305	0.29	2.85	
35	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	2.4379	44.93	85.03	95.21	85.56	0.0275	0.27	2.62	
36	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	2.4866	45.83	86.73	96.91	87.26	0.0248	0.24	2.40	
37	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	2.5363	46.74	88.45	98.63	88.98	0.0224	0.22	2.21	
38	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	2.5871	47.68	90.23	100.41	90.76	0.0202	0.19	2.03	
39	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	2.6388	48.63	92.03	102.21	92.56	0.0182	0.18	1.86	
40	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	2.6916	49.61	93.88	104.06	94.41	0.0165	0.16	1.72	
41	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	2.7454	50.60	95.76	105.94	96.29	0.0149	0.14	1.58	
42	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	2.8003	51.61	97.67	107.85	98.20	0.0134	0.13	1.45	
43	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	2.8563	52.64	99.62	109.80	100.15	0.0121	0.12	1.33	
44	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	2.9135	53.70	101.62	111.80	102.15	0.0109	0.11	1.22	
45	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	2.9717	54.77	103.65	113.83	104.18	0.0099	0.10	1.13	
46	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	3.0312	55.87	105.73	115.91	106.26	0.0089	0.09	1.03	
47	1816.0	9.65	0.00	9.65	0.00	1892.4	10.18	3.0918	56.98	107.83	118.01	108.36	0.0080	0.08	0.94	
48	1816.0	9.65	0.0													

17.3 Xe Kaman No.1 Project

17.3.1 Basic Conditions in Comparison with the Alternative

The project consists of the following characteristics.

- Installed Capacity 256 MW
- Firm Capacity 245 MW
- Sending-out Energy 1,125.6 GWh
- Project Cost 404.05 M.US\$

More detailed conditions in comparison with the alternative are shown in Table 17.3-1.

17.3.2 Result of Economic Analysis and Sensitivity Test

The EIRR for the basic conditions resulted in 11.78% as demonstrated in Table 17.3-2.

The results of sensitivity test are shown in below. The EIRR and the sensitivity test show a little better results of that of the Sekong No.4 Project. The Xe Kaman No.1 Project is deemed to be economically feasible.

a) Construction Cost

Condition	Construction Cost	EIRR (%)
Base Case	1,649 \$/kW	11.78
20 % up	1,979 \$/kW	9.46

b) Generation Energy

Condition	Construction Cost	EIRR (%)
Base Case	1,137.0 GWh	11.78
25 % less	852.8 GWh	10.11

c) Transmission Line up to the Thai Border

Case	Construction Cost	EIRR (%)
Base Case	1,649 \$/kW (404.16 M.US\$)	11.78
Case 1 (Allocated)	1,780 \$/kW (436.2 M.US\$)	10.74
Case 2 (Independent)	1,805 \$/kW (442.1 M.US\$)	10.57

Table 17.3-1 Basic Conditions for Xe Kaman No.1 and the Alternative

Items	Xe Kaman No.1	Combined Cycle	Remarks
Installed Capacity	(256 MW)	330.2 MW	
Firm Capacity	245 MW *1	330.2 MW *2	*1 Peak 8 Hours *2 Equivalent capacity for the firm of the project.
Available Output at Sending-out	236.2 MW	236.2 MW	Firm Capacity x P.Available Factor x (1 - Station Use)
Generation Energy	1,137 GWh	1,184.9 GWh	Annual Average Energy
Sending-out Energy	1,125.6 GWh	1,125.6 GWh	Generation Energy x (1- Station Use)
Construction Cost for Firm Capacity	404.05 M.US\$ * 1,649.18 \$/kW	245.72 M.US\$ 744.17 \$/kW	*Transmission Line up to Ban Houaykong is inclusive.
Construction Period	7 years * 8.0, 5.0, 18.0, 22.0, 23.0, 17.0, 7.0 %	3 years 25, 32.5, 42.5 %	* Including Preparatory Works

Table 17.3-2 Economic Analysis Cash Flow and Economic Internal Rate of Return

Dam Site:	Xe Kaman No.1	Project Cost	1649.18 \$/kW	Alternative:	Combined Cycle	Project Cost	744.17 \$/kW
Firm Capacity	245 MWh	F/C	342.44 M.USS	Eq Install Capacity	330.2 MW	F/C	75.0%
Generation Energy	1137.0 GWh	L/C	61.61 M.USS	Generation Energy	1184.9 GWh	L/C	25.0%
Sending-out Energy	1125.6 GWh	Total	404.05 M.USS	Sending-out Energy	1125.6 GWh	Total	245.72 M.USS
Plant Availability	97.37%	O/M Cost	1.50% of P.Cost	Plant Availability	75.29%	O/M Cost	2.50% of P.Cost
Planned Main.Days	6 days/year	Fuel Cost	0.00 \$/MWh	Planned Main.Days	63 days/year	Fuel Cost (LNG)	0.4792 Bah/USD
Forced Outage R.	1.0%	Construction Period	7 years	Forced Outage R.	9.0%	Exchange Rate	26 Bah/USD\$
Station Use	1.0%	Life Time	50 years	Station Use	5.0%	Fuel Cost (LNG)	18.43 \$/MWh
T/D Loss	10.0%	Economic Internal Rate of Return (EIRR)		T/D Loss	10.0%	Fuel Escalation	2.0% /year
		EIRR	11.78%			Construction Period	3 years
						Life Time	25 years

Year	Cost (C)				Benefit (B)								Cash Flow B-C	Net Present Value		
	Const. Cost	Gener. Energy	O/M Cost	Fuel Cost	Total Cost	Const. Cost	Gener. Energy	O/M Cost	Fuel Price Index	Fuel Cost	Fuel Cost	Total Cost		Discount Rate 11.78%	Cost	Benefit
	M.US\$	GWh	M.US\$	M.US\$	M.US\$	M.US\$	GWh	M.US\$	\$/MWh	M.US\$	M.US\$	M.US\$	M.US\$	M.US\$	M.US\$	M.US\$
-10					0.00				1.0000	18.43	0.00	0.00	0.00	3.0458	0.00	0.00
-9	0.00				0.00				1.0200	18.80	0.00	0.00	0.00	2.7248	0.00	0.00
-8	0.00				0.00				1.0404	19.17	0.00	0.00	0.00	2.4376	0.00	0.00
-7	32.32				32.32				1.0612	19.56	0.00	0.00	-32.32	2.1807	70.48	0.00
-6	20.20				20.20				1.0824	19.95	0.00	0.00	-20.20	1.9508	39.41	0.00
-5	72.73				72.73				1.1041	20.35	0.00	0.00	-72.73	1.7452	126.93	0.00
-4	88.89				88.89				1.1262	20.76	0.00	0.00	-88.89	1.5813	138.78	0.00
-3	92.93				92.93	61.43			1.1487	21.17	0.00	61.43	-31.50	1.3967	129.80	85.80
-2	68.69				68.69	79.86			1.1717	21.59	0.00	79.86	11.17	1.2495	85.83	99.79
-1	28.28				28.28	104.43			1.1951	22.03	0.00	104.43	76.15	1.1178	31.61	116.73
0	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	1.2190	22.47	26.62	32.76	26.70	1.0000	6.06	32.76	
1	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	1.2434	22.92	27.16	33.30	27.24	0.8946	5.42	29.79	
2	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	1.2682	23.37	27.69	33.83	27.77	0.8003	4.85	27.07	
3	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	1.2936	23.84	28.25	34.39	28.33	0.7180	4.34	24.62	
4	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	1.3195	24.32	28.82	34.96	28.90	0.6405	3.88	22.39	
5	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	1.3459	24.80	29.39	35.53	29.47	0.5730	3.47	20.36	
6	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	1.3728	25.30	29.98	36.12	30.06	0.5126	3.11	18.52	
7	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	1.4002	25.81	30.58	36.72	30.66	0.4586	2.78	16.84	
8	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	1.4282	26.32	31.19	37.33	31.27	0.4102	2.49	15.31	
9	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	1.4568	26.85	31.81	37.95	31.89	0.3670	2.22	13.93	
10	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	1.4859	27.39	32.45	38.59	32.53	0.3283	1.99	12.67	
11	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	1.5157	27.93	33.09	39.23	33.17	0.2937	1.78	11.52	
12	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	1.5460	28.49	33.76	39.90	33.84	0.2628	1.56	10.49	
13	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	1.5769	29.06	34.43	40.57	34.51	0.2351	1.42	9.54	
14	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	1.6084	29.64	35.12	41.26	35.20	0.2103	1.27	8.68	
15	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	1.6406	30.24	35.83	41.97	35.91	0.1881	1.14	7.89	
16	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	1.6734	30.84	36.54	42.68	36.62	0.1683	1.02	7.18	
17	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	1.7069	31.46	37.28	43.42	37.36	0.1506	0.91	6.54	
18	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	1.7410	32.09	38.02	44.16	38.10	0.1347	0.82	5.95	
19	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	1.7756	32.73	38.78	44.92	38.86	0.1205	0.73	5.41	
20	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	1.8114	33.38	39.55	45.89	39.63	0.1078	0.65	4.93	
21	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	1.8478	34.05	40.35	46.49	40.43	0.0964	0.58	4.48	
22	1137.0	6.06	0.00	6.06	61.43	1184.9	6.14	1.8845	34.73	41.15	108.72	102.66	0.0863	0.52	9.38	
23	1137.0	6.06	0.00	6.06	79.86	1184.9	6.14	1.9222	35.43	41.98	127.98	121.92	0.0772	0.47	9.88	
24	1137.0	6.06	0.00	6.06	104.43	1184.9	6.14	1.9607	36.14	42.82	153.39	147.33	0.0690	0.42	10.58	
25	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	1.9989	36.86	43.68	49.82	43.76	0.0618	0.37	3.08	
26	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	2.0399	37.60	44.55	50.89	44.63	0.0563	0.34	2.80	
27	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	2.0807	38.35	45.44	51.58	45.52	0.0494	0.30	2.55	
28	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	2.1223	39.11	46.34	52.48	46.42	0.0442	0.27	2.32	
29	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	2.1647	39.90	47.28	53.42	47.36	0.0396	0.24	2.12	
30	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	2.2080	40.69	48.21	54.35	48.29	0.0354	0.21	1.92	
31	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	2.2522	41.51	49.19	55.33	49.27	0.0317	0.18	1.75	
32	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	2.2972	42.34	50.17	56.31	50.25	0.0283	0.17	1.59	
33	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	2.3432	43.19	51.18	57.32	51.26	0.0253	0.15	1.45	
34	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	2.3901	44.05	52.19	58.33	52.27	0.0227	0.14	1.32	
35	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	2.4379	44.93	53.24	59.38	53.32	0.0203	0.12	1.21	
36	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	2.4866	45.83	54.30	60.44	54.38	0.0181	0.11	1.09	
37	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	2.5363	46.74	55.38	61.52	55.46	0.0162	0.10	1.00	
38	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	2.5871	47.68	56.50	62.64	56.58	0.0145	0.09	0.91	
39	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	2.6388	48.63	57.62	63.76	57.70	0.0130	0.08	0.83	
40	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	2.6916	49.61	58.78	64.92	58.86	0.0116	0.07	0.75	
41	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	2.7454	50.60	59.96	66.10	60.04	0.0104	0.06	0.69	
42	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	2.8003	51.61	61.15	67.29	61.23	0.0093	0.06	0.63	
43	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	2.8563	52.64	62.37	68.51	62.45	0.0083	0.05	0.57	
44	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	2.9135	53.70	63.63	69.77	63.71	0.0074	0.04	0.52	
45	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	2.9717	54.77	64.80	71.04	64.98	0.0067	0.04	0.48	
46	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	3.0312	55.87	66.20	72.34	66.28	0.0060	0.04	0.43	
47	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	3.0918	56.98	67.52	73.66	67.60	0.0053	0.03	0.39	
48	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	3.1536	58.12	68.87	75.01	68.95	0.0048	0.03	0.36	
49	1137.0	6.06	0.00	6.06	0.00	1184.9	6.14	3.2167	59.28	70.24	76.38	70.32	0.0043	0.03	0.33	

17.4 Xe Namnoy Project

17.4.1 Xe Namnoy (Midstream + Downstream)

(1) Basic Conditions in Comparison with the Alternative

The project consists of the following characteristics.

- Installed Capacity	305	MW
- Firm Capacity	296	MW
- Sending-out Energy	1,370.2	GWh
- Project Cost	433.22	M.US\$

More detailed conditions in comparison with the alternative are shown in Table 17.4-1.

(2) Result of Economic Analysis and Sensitivity Test

The EIRR for the basic conditions resulted in 16.67% as demonstrated in Table 17.4-2.

The results of sensitivity test are shown in below. The EIRR exceeds the ARI (10%) well.

The Xe Namnoy (Mid + Down) Project is expected to be good economic return and the project will be still economically feasible even though for the severer case (below table c)).

a) Construction Cost

Condition	Construction Cost	EIRR (%)
Base Case	1,464 \$/kW	16.67
20 % up	1,756 \$/kW	12.69

b) Generation Energy

Condition	Construction Cost	EIRR (%)
Base Case	1,384.0 GWh	16.67
25 % less	1,038.0 GWh	14.20

c) Construction Cost (20 % up) + Generation Energy (25 % less)

Condition	Construction Cost	EIRR (%)
20 % up	1,756 \$/kW	10.65
25 % less	1,038.0 GWh	

d) Transmission Line up to the Thailand Border

Case	Construction Cost	EIRR (%)
Base Case	1,464 \$/kW (433.2 M.US\$)	16.67
Case 1 (Allocated)	1,575 \$/kW (466.3 M.US\$)	14.89
Case 2 (Independent)	1,561 \$/kW (462.1 M.US\$)	15.10

17.4.2 Xe Namnoy (Midstream)

(1) Basic Conditions in Comparison with the Alternative

The project consists of the following characteristics.

- Installed Capacity 238 MW
- Firm Capacity 230 MW
- Sending-out Energy 1,041.5 GWh
- Project Cost 281.81 M.US\$

More detailed conditions in comparison with the alternative are shown in Table 17.4-3.

(2) Result of Economic Analysis and Sensitivity Test

The EIRR for the basic conditions resulted in 21.83% demonstrated in Table 17.4-4. The results of sensitivity test are shown in below. The EIRR gives the highest value among the three project sites (four plans). The project can be expected excellent return and the project will be worth materializing well even though for the severer case (below table c)).

a) **Construction Cost**

Condition	Construction Cost	EIRR (%)
Base Case	1,225 \$/kW	21.83
30 % up	1,593 \$/kW	14.38

b) **Generation Energy**

Condition	Construction Cost	EIRR (%)
Base Case	1,052.0 GWh	21.83
30 % less	736.4 GWh	18.36

c) **Construction Cost (30 % up) + Generation Energy (30 % less)**

Condition	Construction Cost	EIRR (%)
30 % up	1,593 \$/kW	11.71
30 % less	736.4 GWh	

d) **Transmission Line up to the Thai Border**

Case	Construction Cost	EIRR (%)
Base Case	1,225 \$/kW (281.8 M.US\$)	21.83
Case 1 (Allocated)	1,369 \$/kW (314.9 M.US\$)	18.18
Case 2 (Independent)	1,351 \$/kW (310.7 M.US\$)	18.58

Table 17.4-1 Basic Conditions for Xe Namnoy (Mid + Down) and the Alternative

Items	Xe Namnoy (Mid + Down)	Combined Cycle	Remarks
Installed Capacity	(305 MW)	398.9 MW	
Firm Capacity	296 MW *1	398.9 MW *2	*1 Peak 8 Hours *2 Equivalent capacity for the firm of the project.
Available Output at Sending-out	285.3 MW	285.3 MW	Firm Capacity x P.Available Factor x (1 - Station Use)
Generation Energy	1,384 GWh	1,442.3 GWh	Annual Average Energy
Sending-out Energy	1,370.2 GWh	1,370.2 GWh	Generation Energy x (1- Station Use)
Construction Cost for Firm Capacity	433.22 M.US\$ * 1,463.58 \$/kW	296.85 M.US\$ 744.17 \$/kW	*Transmission Line up to Ban Houaykong is inclusive.
Construction Period	5 years * 9.41, 15.61, 27.68, 30.43, 16.87 %	3 years 25, 32.5, 42.5 %	* Including Preparatory Works

Table 17.4-2 Economic Analysis - Cash Flow and Economic Internal Rate of Return

Dam Site:	Xe Nammoy (M+D)	Project Cost	1463.58 \$/kW	Alternative:	Combined Cycle	Project Cost	744.17 \$/kW
Firm Capacity	298 MWh	F/C	367.09 M.USS	Eq.Install Capacity	398.9 MW	F/C	222.64 M.USS
Generation Energy	1384.0 GWh	L/C	66.13 M.USS	Generation Energy	1442.3 GWh	L/C	74.21 M.USS
Sending-out Energy	1370.2 GWh	Total	433.22 M.USS	Sending-out Energy	1370.2 GWh	Total	296.85 M.USS
Plant Availability	97.37%	O/M Cost	1.50% of P.Cost	Plant Availability	75.29%	O/M Cost	2.50% of P.Cost
Planned Main.Days	6 days/year	Fuel Cost	0.00 \$/MWh	Planned Main.Days	63 days/year	Fuel Cost (LNG)	0.4792 Bah/kWh
Forced Outage R.	1.0%	Construction Period	7 years	Forced Outage R.	9.0%	Exchange Rate	26 Bah/US\$
Station Use	1.0%	Life Time	50 years	Station Use	5.0%	Fuel Cost (LNG)	18.43 \$/MWh
T/D Loss	10.0%	Economic Internal Rate of Return (ERR)		T/D Loss	10.0%	Fuel Escalation	2.0% /year
		EIRR	16.67%			Construction Period	3 years
						Life Time	25 years

Year	COST (C)					BENEFIT (B)					Cash Flow B-C M.USS	Net Present Value					
	Const. Cost M.USS	Gener. Energy GWh	O/M Cost M.USS	Fuel Cost M.USS	Total Cost M.USS	Const. Cost M.USS	Gener. Energy GWh	O/M Cost M.USS	Fuel Price Index \$/MWh	Fuel Cost M.USS	Fuel Cost M.USS	Discount Rate 16.67%	Cost M.USS	Benefit M.USS			
-10	0.00				0.00				1.0000	18.43	0.00	0.00	0.00	4.8731	0.00	0.00	
-9	0.00				0.00				1.0200	18.80	0.00	0.00	0.00	4.0054	0.00	0.00	
-8	0.00				0.00				1.0404	19.17	0.00	0.00	0.00	3.4331	0.00	0.00	
-7	0.00				0.00				1.0612	19.56	0.00	0.00	0.00	2.9425	0.00	0.00	
-6	0.00				0.00				1.0824	19.95	0.00	0.00	0.00	2.5221	0.00	0.00	
-5	40.77				40.77				1.1041	20.35	0.00	0.00	0.00	40.77	2.1617	88.13	0.00
-4	67.63				67.63				1.1262	20.76	0.00	0.00	0.00	67.63	1.8529	125.31	0.00
-3	119.92				119.92	74.21			1.1487	21.17	0.00	74.21		45.71	1.5881	180.44	117.85
-2	131.83				131.83	96.48			1.1717	21.59	0.00	96.48		35.35	1.3612	179.45	131.33
-1	73.08				73.08	126.16			1.1951	22.03	0.00	126.16		53.08	1.1887	85.26	147.19
0	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	1.2190	22.47	32.41	39.83	33.33	1.0000	6.50	39.83		
1	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	1.2434	22.92	33.06	40.48	33.98	0.8571	5.57	34.70		
2	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	1.2682	23.37	33.71	41.13	34.63	0.7346	4.77	30.21		
3	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	1.2936	23.84	34.38	41.80	35.30	0.6297	4.09	26.32		
4	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	1.3195	24.32	35.08	42.50	36.00	0.5397	3.51	22.94		
5	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	1.3459	24.80	35.77	43.19	36.69	0.4628	3.01	19.98		
6	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	1.3728	25.30	36.49	43.91	37.41	0.3965	2.58	17.41		
7	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	1.4002	25.81	37.23	44.65	38.16	0.3398	2.21	15.17		
8	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	1.4282	26.32	37.96	45.38	38.88	0.2913	1.89	13.22		
9	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	1.4568	26.85	38.73	46.15	39.65	0.2497	1.62	11.52		
10	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	1.4859	27.39	39.50	46.92	40.42	0.2140	1.39	10.04		
11	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	1.5157	27.93	40.28	47.70	41.20	0.1834	1.19	8.75		
12	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	1.5460	28.49	41.09	48.51	42.01	0.1572	1.02	7.63		
13	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	1.5769	29.06	41.91	49.33	42.83	0.1347	0.88	6.84		
14	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	1.6064	29.64	42.75	50.17	43.67	0.1155	0.75	5.79		
15	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	1.6406	30.24	43.62	51.04	44.54	0.0990	0.64	5.05		
16	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	1.6734	30.84	44.48	51.90	45.40	0.0848	0.55	4.40		
17	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	1.7089	31.46	45.37	52.79	46.29	0.0727	0.47	3.84		
18	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	1.7410	32.09	46.28	53.70	47.20	0.0623	0.40	3.35		
19	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	1.7758	32.73	47.21	54.63	48.13	0.0534	0.35	2.92		
20	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	1.8114	33.38	48.14	55.56	49.08	0.0458	0.30	2.54		
21	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	1.8476	34.05	49.11	56.53	50.03	0.0392	0.25	2.22		
22	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	1.8845	34.73	50.09	131.72	125.22	0.0336	0.22	4.43		
23	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	1.9222	35.43	51.10	155.00	148.50	0.0266	0.19	4.46		
24	1384.0	6.5	0.00	6.50	126.16	1442.3	7.42	1.9607	36.14	52.12	185.70	179.20	0.0247	0.16	4.59		
25	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	1.9999	36.86	53.16	60.58	54.08	0.0212	0.14	1.28		
26	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	2.0399	37.80	54.23	61.85	55.15	0.0182	0.12	1.12		
27	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	2.0807	38.35	55.31	62.73	56.23	0.0156	0.10	0.98		
28	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	2.1223	39.11	56.41	63.83	57.33	0.0133	0.09	0.85		
29	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	2.1647	39.90	57.56	64.97	58.47	0.0114	0.07	0.74		
30	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	2.2080	40.69	58.69	66.11	59.61	0.0098	0.06	0.65		
31	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	2.2522	41.51	58.87	67.29	60.79	0.0084	0.05	0.57		
32	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	2.2972	42.34	61.07	68.49	61.99	0.0072	0.05	0.49		
33	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	2.3432	43.19	62.29	69.71	63.21	0.0062	0.04	0.43		
34	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	2.3901	44.05	63.53	70.95	64.45	0.0053	0.03	0.38		
35	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	2.4379	44.93	64.80	72.22	65.72	0.0045	0.03	0.32		
36	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	2.4868	45.83	66.10	73.52	67.02	0.0039	0.03	0.29		
37	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	2.5363	46.74	67.41	74.83	68.33	0.0033	0.02	0.25		
38	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	2.5871	47.68	68.77	76.19	68.68	0.0029	0.02	0.22		
39	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	2.6388	48.63	70.14	77.58	71.06	0.0024	0.02	0.19		
40	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	2.6916	49.81	71.55	78.97	72.47	0.0021	0.01	0.17		
41	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	2.7454	50.60	72.98	80.40	73.90	0.0018	0.01	0.14		
42	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	2.8003	51.61	74.44	81.86	75.36	0.0015	0.01	0.12		
43	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	2.8563	52.64	75.92	83.34	76.84	0.0013	0.01	0.11		
44	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	2.9135	53.70	77.45	84.87	78.37	0.0011	0.01	0.09		
45	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	2.9717	54.77	78.99	86.41	79.91	0.0010	0.01	0.09		
46	1384.0	6.5	0.00	6.50	0.00	1442.3	7.42	3.0312	55.87	80.58	88.00	81.50	0.0008	0.01	0.07		

Table 17.4-3 Basic Conditions for Xe Namnoy (Mid) and the Alternative

Items	Xe Namnoy (Mid)	Combined Cycle	Remarks
Installed Capacity	(238 MW)	309.9 MW	
Firm Capacity	230 MW *1	309.9 MW *2	*1 Peak 8 Hours *2 Equivalent capacity for the firm of the project.
Available Output at Sending-out	221.7 MW	221.7 MW	Firm Capacity x P.Available Factor x (1 - Station Use)
Generation Energy	1,052 GWh	1,096.3 GWh	Annual Average Energy
Sending-out Energy	1,041.5 GWh	1,41.5 GWh	Generation Energy x (1- Station Use)
Construction Cost for Firm Capacity	281.81 M.US\$ * 1,225.26 \$/kW	230.62 M.US\$ 744.17 \$/kW	*Transmission Line up to Ban Houaykong is inclusive.
Construction Period	5 years * 10.20, 15.96, 26.81, 30.56, 16.47 %	3 years 25, 32.5, 42.5 %	* Including Preparatory Works

Table 17.4-4 Economic Analysis Cash Flow and Economic Internal Rate of Return

Dam Site:	Xe Namnoy (MID)	Project Cost	1225.26 \$/kW	Alternative:	Combined Cycle	Project Cost	744.17 \$/kW
Firm Capacity	230 MWh	F/C	237.58 M.U.S\$	Eq. Install Capacity	309.9 MW	F/C	75.0% 172.96 M.U.S\$
Generation Energy	1052.0 GWh	L/C	44.23 M.U.S\$	Generation Energy	1096.3 GWh	L/C	25.0% 57.65 M.U.S\$
Sending-out Energy	1041.5 GWh	Total	281.81 M.U.S\$	Sending-out Energy	1041.5 GWh	Total	230.61 M.U.S\$
Plant Availability	97.37%	O/M Cost	1.50% of P.Cost	Plant Availability	75.29%	O/M Cost	2.50% of P.Cost
Planned Main.Days	6 days/year	Fuel Cost	0.00 \$/MWh	Planned Main.Days	63 days/year	Fuel Cost (LNG)	0.4792 Baht/kWh
Forced Outage R.	1.0%	Construction Period	7 years	Forced Outage R.	9.0%	Exchange Rate	26 Baht/U.S\$
Station Use	1.0%	Life Time	50 years	Station Use	5.0%	Fuel Cost (LNG)	18.43 \$/MWh
T/D Loss	10.0%			T/D Loss	10.0%	Fuel Escalation	2.0% /year
		Economic Internal Rate of Return (EIRR)				Construction Period	3 years
		EIRR	21.83%			Life Time	25 years

Year	COST (C)					BENEFIT (B)					Cash Flow B - C M.U.S\$	Net Present Value				
	Const. Cost M.U.S\$	Gener. Energy GWh	O/M Cost M.U.S\$	Fuel Cost M.U.S\$	Total Cost M.U.S\$	Const. Cost M.U.S\$	Gener. Energy GWh	O/M Cost M.U.S\$	Fuel Price Index \$/MWh	Fuel Cost M.U.S\$	Fuel Cost M.U.S\$	Total Cost M.U.S\$	Discount Rate 21.83%	Cost M.U.S\$	Benefit M.U.S\$	
-10	0.00				0.00				1.0000	18.43	0.00	0.00	0.00	7.2026	0.00	0.00
-9	0.00				0.00				1.0200	18.80	0.00	0.00	0.00	5.9121	0.00	0.00
-8	0.00				0.00				1.0404	19.17	0.00	0.00	0.00	4.8528	0.00	0.00
-7	0.00				0.00				1.0612	19.56	0.00	0.00	0.00	3.9833	0.00	0.00
-6	0.00				28.74				1.0824	19.95	0.00	0.00	0.00	3.2996	0.00	0.00
-5	28.74				44.98				1.1041	20.35	0.00	0.00	-28.74	2.6838	77.13	0.00
-4	44.98				75.55	57.65			1.1262	20.78	0.00	0.00	-44.98	2.2029	99.09	0.00
-3	75.55				86.12	74.95			1.1487	21.17	0.00	57.85	-17.90	1.8082	136.61	104.24
-2	86.12				46.42	98.01			1.1717	21.59	0.00	74.95	-11.17	1.4842	127.82	111.24
-1	46.42								1.1951	22.03	0.00	98.01	51.59	1.2183	56.55	119.41
0	1052.0	4.23	0.00	4.23	1096.3	5.77	1.2190	22.47	24.63	30.40	26.17	1.0000	4.23	30.40		
1	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	1.2434	22.92	25.13	30.90	26.67	0.8208	3.47	25.36	
2	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	1.2682	23.37	25.62	31.39	27.16	0.6738	2.85	21.15	
3	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	1.2938	23.84	26.14	31.91	27.68	0.5530	2.34	17.65	
4	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	1.3195	24.32	26.66	32.43	28.20	0.4539	1.92	14.72	
5	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	1.3459	24.80	27.19	32.96	28.73	0.3726	1.58	12.28	
6	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	1.3728	25.30	27.74	33.51	29.28	0.3058	1.29	10.25	
7	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	1.4002	25.81	28.30	34.07	29.84	0.2510	1.08	8.55	
8	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	1.4282	26.32	28.85	34.62	30.39	0.2061	0.87	7.14	
9	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	1.4568	28.85	29.44	35.21	30.98	0.1691	0.72	5.95	
10	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	1.4859	27.39	30.03	35.80	31.57	0.1388	0.59	4.97	
11	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	1.5157	27.93	30.62	36.39	32.16	0.1140	0.48	4.15	
12	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	1.5460	28.49	31.23	37.00	32.77	0.0935	0.40	3.46	
13	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	1.5769	29.06	31.86	37.63	33.40	0.0768	0.32	2.89	
14	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	1.6084	29.64	32.49	38.26	34.03	0.0630	0.27	2.41	
15	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	1.6406	30.24	33.15	38.92	34.69	0.0517	0.22	2.01	
16	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	1.6734	30.84	33.81	39.58	35.35	0.0425	0.18	1.68	
17	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	1.7069	31.46	34.49	40.26	36.03	0.0349	0.15	1.41	
18	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	1.7410	32.09	35.18	40.95	36.72	0.0286	0.12	1.17	
19	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	1.7758	32.73	35.88	41.65	37.42	0.0235	0.10	0.98	
20	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	1.8114	33.38	36.59	42.36	38.13	0.0193	0.08	0.82	
21	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	1.8476	34.05	37.33	43.10	38.87	0.0158	0.07	0.68	
22	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	1.8845	34.73	38.07	43.10	39.726	0.0130	0.05	1.32	
23	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	1.9222	35.43	38.84	41.56	41.53	0.0107	0.05	1.28	
24	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	1.9607	36.14	39.82	43.40	43.917	0.0088	0.04	1.26	
25	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	1.9999	36.86	40.41	46.18	41.95	0.0072	0.03	0.33	
26	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	2.0396	37.60	41.22	46.99	42.78	0.0059	0.02	0.28	
27	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	2.0807	38.35	42.04	47.81	43.58	0.0048	0.02	0.23	
28	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	2.1223	39.11	42.88	48.65	44.42	0.0040	0.02	0.19	
29	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	2.1647	39.90	43.74	49.51	45.28	0.0033	0.01	0.16	
30	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	2.2080	40.68	44.61	50.38	46.15	0.0027	0.01	0.14	
31	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	2.2522	41.51	45.51	51.28	47.05	0.0022	0.01	0.11	
32	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	2.2972	42.34	46.42	52.19	47.96	0.0018	0.01	0.09	
33	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	2.3432	43.19	47.35	53.12	48.89	0.0015	0.01	0.08	
34	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	2.3901	44.05	48.29	54.06	49.83	0.0012	0.01	0.06	
35	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	2.4379	44.93	49.26	56.03	50.80	0.0010	0.00	0.06	
36	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	2.4866	45.83	50.24	56.01	51.78	0.0008	0.00	0.04	
37	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	2.5383	46.74	51.24	57.01	52.78	0.0007	0.00	0.04	
38	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	2.5871	47.68	52.27	58.04	53.81	0.0006	0.00	0.03	
39	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	2.6388	48.63	53.31	59.08	54.85	0.0005	0.00	0.03	
40	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	2.6918	49.61	54.39	60.16	55.93	0.0004	0.00	0.02	
41	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	2.7454	50.60	55.47	61.24	57.01	0.0003	0.00	0.02	
42	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	2.8003	51.61	56.58	62.35	58.12	0.0003	0.00	0.02	
43	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	2.8563	52.64	57.71	63.48	59.25	0.0002	0.00	0.01	
44	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	2.9135	53.70	58.87	64.64	60.41	0.0002	0.00	0.01	
45	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	2.9717	54.77	60.04	65.81	61.58	0.0001	0.00	0.01	
46	1052.0	4.23	0.00	4.23	0.00	1096.3	5.77	3.0312	55.87	61.25	67.02	62.79				

18. Financial Analysis

18. Financial Analysis

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18. Financial Analysis

18.1 Methodology of Financial Analysis and Conditions

18.1.1 Methodology

The most concern for the Bankers is whether the project will be run sound financially after the commencement of commercial operation because the debt service which the project owes will be repaid by the annual revenue only.

Therefore, financial analysis is to be carried out to appraise the project's feasibility from the view point of the financial management. There are many financial indices to explain the financial condition of the project, such as Debt Service Coverage Ratio, Current Ratio, Return on Total Asset, etc.. In this chapter, Debt Service Coverage Ratio (DSC) is used as an index for judging financial soundness of the project. Furthermore, Financial Internal Rate of Return (FIRR) is also calculated to evaluate the rate of profit return.

(1) Debt Service Coverage Ratio (DSC)

DSC is defined by following formula:

$$DSC = \frac{\text{Current Asset in Cash}}{(\text{Principal Repayment} + \text{Interest Payment})}$$

Where:

Current Asset in Cash = Net Operation Income + Depreciation

According to IBRD's guide line, more or equal to 1.5 is desirable as DSC value.

(2) Financial Internal Rate of Return (FIRR)

FIRR is calculated for the repayment period and the BOT period by the following formula.

$$FIRR = r (\%)$$

Where

$$\sum_{t=0}^n \frac{C_t}{(1+r)^t} = \sum_{t=0}^n \frac{B_t}{(1+r)^t}$$

Ct: Project Cost (Construction Cost + Royalty during Construction + Principal Repayment)

Bt: Net Income after Tax + Depreciation + Interest Payment

t : year

n : study period (years)

r : discount rate (%)

The financial feasible condition is defined as the following conditions;

- DSC exceeds or equals to 1.5 and
- FIRR for the repayment period exceeds or equals to financial cost (interest rate) or
- FIRR for the BOT period exceeds or equals to financial cost.

18.1.2 Conditions

(1) Accounting Structure

The following tables illustrate the accounting structure used in the financial analysis. The structure are referred to ADB report concerning to Nam Thuen 1-2 Hydropower Project.

	Sales Revenue
less	O/M Cost
less	Royalty
less	Depreciation
=	Net Operation Income
less	Interest Payment
=	Income before Tax
less	Tax
=	Net Income after Tax

=	Net Operation Income
plus	Depreciation
=	Current Asset in Cash

=	Net Income after Tax
plus	Depreciation
plus	Interest Payment
=	Net Profit

(2) Materializing Method of the Project

Two (2) materializing methods for the projects are assumed as follows.

(2.1) Materialized by the Lao Government (Case-A)

- a) The Lao Government (EDL) will materialize the project by their own finance and by official loan such as ADB's loan, IBRD's loan and OECF's loan.

(2.2) Materialized by BOT (Build-Operate-Transfer) (Case-B)

- a) The Lao Government will establish the subsidiary (Lao PDR)
- b) Private company will joint the project.
- c) Both parties will establish the new electricity company.
- d) The Government will borrow a part of required money from the official institutes.
- e) The Government will re-lend the borrowing money to the subsidiary as a part of equity of new company which the subsidiary shall prepare, and the Government will receive the dividend.
- f) The new company will borrow the required money up to 70 % of the construction cost by the external institutes.

(3) Financial Common Conditions

Financial common conditions applied to the financial analysis for Case-A and Case-B are shown in **Table 18.1-1** and **Table 18.1-2**.

(4) Treatment of Transmission Line

The construction cost of transmission line up to the Ban Houaykong substation is included in the basic condition of each project site. Other additional two (2) cases concerning the transmission line up to the Thai border are also incorporated in this chapter. Case 1 and Case 2 are called "allocated transmission line system" and "independent transmission line" respectively (details are explained in Chapter 12).

Table 18.1-1 Common Conditions for Financial Analysis
 (Case-A: Materialized by the Lao Government)

Items	Value and Conditions
Financing Proportion a/	Own Finance 10 % Official Loan 80 % Bilateral Loan 10 %
Loan Conditions a/	6.0 % for interest rate and 25 years repayment period
Graced Period	During Construction
Project Life Time	50 years
Initial Fixed Asset a/	Construction Cost after escalation + IDC
Depreciation Method	Constant Value Method
Income Tax	20 %
Export/Domestic a/	100/0 (All salable energy will be allocate for export provisionally.)
Export Tariff in year 0 b/	52.41 US\$/MWh ($39.00 \times (1+0.03)^{10} = 52.41$)
Export Tariff Escalation	1.0 % per year
Domestic Tariff in Year 0 c/	34.33 US\$/MWh ($28.17 \times (1+0.02)^{10} = 34.33$)
Domestic Tariff Escalation a/	1.0 % per year
Increase of Domestic Consumption a/	0.0 % per year
Price Escalation	F/C: 2.8 % (IBRD's projection as of 1990) L/C: 4.5 % (Thailand 1990-1993 average)

Note: a/ JICA's assumption or estimate

b/ According to Nam Thuen1-2, tariff escalation up to 3 %/year is accepted by EGAT.

c/ JICA's estimate 20 kip/kWh at 1994 (1 US\$ = 710 kip) equals to 28.17 US\$/MWh.

Table 18.1-2 Common Conditions for Financial Analysis
(Case-B: Materialized by BOT)

Items	Value and Conditions
Share of Equity	Lao PDR : Private = 25:75
Debt/Equity	70/30
Royalty	10 % of Sales Revenue Payment will be made from the first year of the commercial operation.
Interest Rate	10 % for IDC and onwards
Graced Period	During Construction
Repayment Period	10 years
Project Life Time	50 years
Initial Fixed Asset a/	Construction Cost after escalation + IDC
Depreciation Method	Constant Value Method
Income Tax	20 %
Export/Domestic a/	100/0 (All salable energy will be allocate for export provisionally.)
Export Tariff in year 0 b/	52.41 US\$/MWh ($39.00 \times (1+0.03)^{10} = 52.41$)
Export Tariff Escalation	1.0 % per year
Domestic Tariff in Year 0 c/	34.33 US\$/MWh ($28.17 \times (1+0.02)^{10} = 34.33$)
Domestic Tariff Escalation a/	1.0 % per year
Increase of Domestic Consumption a/	0.0 % per year
Price Escalation	F/C: 2.8 % (IBRD's projection as of 1990) L/C: 4.5 % (Thailand 1990-1993 average)

Note: a/ JICA's assumption or estimate

b/ According to Nam Thuen 1-2, tariff escalation up to 3 %/year is accepted by EGAT.

c/ JICA's estimate 20 kip/kWh at 1994 (1 US\$ = 710 kip) equals to 28.17 US\$/MWh.

18.2 Se Kong No.4 Project

18.2.1 Basic Conditions of Se Kong No.4

The project consists of following characteristics.

- Installed Capacity 443 MW
- Firm Capacity 406 MW
- Salable Energy 1,616.2 GWh
- Construction Cost 643.61 M.US\$

More detailed conditions are shown in Table 18.2-1.

18.2.2 Results of Financial Analysis and Sensitivity Test

(1) Case-A

The results are shown in below and more detailed information are shown in Table 18.2-2, Table 18.2-4 and Table 18.2-5.

Case	DSC	FIRR	Levelized Financial Generation Cost *
Base	1.61	24.55%	56.93 \$/MWh
Case 1	1.46	22.75%	61.33 \$/MWh
Case 2	1.47	22.86%	61.04 \$/MWh

* with 10 % discount rate for the project life time (50 years)

DSC and FIRR almost satisfy the feasible conditions, say 1.5 point for DSC and 6.0% for FIRR. The project is expected good return.

(2) Case-B

The results are shown in below and more detailed information are shown in **Table 18.2-3, Table 18.2-6 and Table 18.2-7.**

Case	DSC	FIRR	Levelized Financial Generation Cost *	FIRR for BOT Period (25 years)
Base	0.85	- 9.85%	78.15 \$/MWh	8.03%
Case 1	0.78	- 19.25%	83.79 \$/MWh	6.88%
Case 2	0.78	-18.26%	83.42 \$/MWh	6.96%

* with 10 % discount rate for the project life time (50 years)

DSC and FIRR indicate that the project to be proceeded by BOT method cannot expect financially sound and good return over the repayment period.

Some reasons why the project cannot expect financially sound are deemed as follows;

- a) Export power tariff to Thailand at the year 0, 52.41 US\$/MWh based on Nam Ngum's export price, seems to be too cheap. Levelized financial generation cost with 10 % discount rate over the project life time is estimated at 78.15 US\$/MWh as shown in above table.
- b) One (1) percent escalation for the export power tariff after commercial operation also seems to be too low. The domestic inflation rate set as four point and half (4.5) % in US\$ term referred to Thailand Consumer Price Index (CPI) exceeds the export power tariff escalation.

The following table shows the feasible condition with varying some parameters independently for the base case. All values described in the below table seems to be unrealistic. Therefore, it is deemed that there is still enough room for the discussion on the BOT method, based on the proposed conditions by MIH.

Parameters	Values	DSC	FIRR	Generation Cost	FIRR (BOT)
Construction Cost	386.16 M.US\$ (20 % less)	1.54	11.43%	48.95 \$/MWh	16.4 %
Exporting Power Tariff Escalation	1.0% to 12.0%	1.56	8.78%	107.38 \$/MWh	19.05%
Interest Rate	not reach feasible	-	-	-	-

Table 18.2-1 Basic Conditions for Se Kong No.4

Items	Value and Conditions	Remarks
Installed Capacity	443 MW	
Firm Capacity	406 MW	Peak 8 Hours
Generation Energy	1,816 GWh	Annual Average Energy
Plant Available Factor	97.373 %	
Sending-end Energy (Salable Energy)	1,616.2 GWh	G.Energy x {1- (St.Use + T/D Loss)}
Construction Cost including Associated T/L	643.61 M.US\$ F/C: 542.22 M.US\$ L/C: 101.39 M.US\$ 1,452.84 \$/kW	subject to price escalation F/C: 2.8 % L/C: 4.5 %
Construction Period	9 years *	including Preparatory Works

* F/C: 7.42, 3.44, 10.41, 13.04, 11.59, 16.36, 16.98, 13.88, 6.88 (%)

L/C: 11.00, 5.27, 11.87, 14.35, 11.57, 14.46, 14.50, 12.36, 4.62 (%)

Table 18.2-2 Financial Analysis (1/4) Summary of Financial Analysis

Site Name	Se Kong No.4	
Case: - A (Base)		
Construction Cost	1,452.84 US\$/kW	
Equity Share	Lao PDR	Private S.
	100.0%	0.0%
Debt / Equity	Debt	Equity
	90.0%	10.0%
Installed Capacity	443.0	MW
Generation Energy	1,816.0	GWh
Sending-end Energy	1,616.2	GWh
Construction Cost		
Before Price Escalation	643.61	M.US\$
After Price Escalation	758.66	M.US\$
Financial Budget	941.57	M.US\$
Financial Items	Lao PDR	Private S.
Own Finance	75.87	0.00
Loan Amount	682.79	0.00
IDC	182.91	0.00
Royalty		0.00
Total	941.57	0.00
Export/Domestic Ratio for Salable Energy		
Export	100.0%	
Domestic	0.0%	
Initial Power Tariff at year 0		
Export	52.41	US\$/MWh
Domestic	34.33	US\$/MWh
Power Tariff Escalation		
Export	1.00%	
Domestic	1.00%	
Increase of Domestic Demand	2.00%	
Royalty for Construction Period	0.00%	
Royalty from Operation onwards	0.00%	
Financial Indeices		
Averaged Debt Service Coverage	1.61	
Financial Internal Rate of Return	24.55%	
FIRR Calculation Period	25 years	
BOT Period		-- Years
FIRR for the BOT Period		-
General Inflation		
Foreign	2.80%	
Domestic	4.50%	
Financial Conditions		
Interest Rate for IDC	6.00%	
Interest after Operation	6.00%	
Repayment Period	25 yr	
Grace Period	9 yr	
Government Own finance	10.00%	
Income Statement		M.US\$
Sales Revenue	5,460.36	
Operating Expense	4,219.32	
Financial Expense	491.64	
Net Income before Tax	749.40	
Income Tax	(177.96)	
Net Income	571.44	
To the Government		M.US\$
Royalty	0	
Income Tax	177.964	
Interest Payment to Equity		
Net Income	177.964	
Financial Generation Cost in Year 0 for the project life time		56.93
10.0% Discount Rate	\$/MWh	

Table 18.2-2 Financial Analysis (2/4) Construction Disbursement and Loan Amount

Case: - A (Base)									Total Construction Cost (M.USS\$)				
Dam Site:	Se Kong No.4			Equity Proportions			Price Escalation per annum			Finance Condition		Finance Items	
Installed	443.00	MW	Lao PDR	100.0%	F/C Portion	2.8%	IDC	6.00 %	Own Finance	75.87	0.00	75.87	
Generation Energy	1,816.0	GWh	Private	0.0%	L/C Portion	4.5%	Interest Rate	6.00 %	Principal Loan	682.79	0.00	682.79	
Salable Energy	1,616.2	GWh	Debt/Equity Ratio	90.0%	Repayment Period	25 years	Grace Period	9 years	IDC	182.91	0.00	182.91	
Project Cost	1452.84	\$/kW	Debt	90.0%	Graced Period	9 years	LAO Own Finance	10.00 %	Total	941.57	0.00	941.57	
FIC	542.22	M. U.S\$	Equity	10.0%	Exporting Ratio	100.0%	Exp. Price (\$/MWh)	52.410	Equity / Royalty Fee	0.00	0.00	-	
LIC	101.39	M. U.S\$	Royalty for Construction	0.0%	Dom. Price (\$/MWh)	34.330							
Total	643.61	M. U.S\$	Royalty from Operation	0.0%									

Year	Disbursement before Escalation			Disbursement after Escalation			Total Disbursement			Finance Proportion			Own Finance Portion by Loan			Royalty Fee	
	for F/C			for L/C			for F/C			for L/C			Inc. Equity financed by Loan				
	M.USS	M.USS	M.USS	M.USS	M.USS	M.USS	M.USS	M.USS	M.USS	Lao PDR	PRV.SCT	Lao PDR	PRV.SCT	Lao PDR	PRV.SCT		
-10	0.00	0.00	1.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
-9	40.23	11.15	1.0280	1.0450	41.36	11.65	53.01	0.00	5.30	0.00	0.00	47.71	0.00	0.00	2.86	0.00	
-8	18.65	5.34	1.0568	1.0920	19.71	5.83	25.54	0.00	2.55	0.00	0.00	22.99	0.00	70.70	0.00	4.24	0.00
-7	56.45	12.03	1.0864	1.1412	61.33	13.73	75.06	0.00	7.51	0.00	0.00	67.55	0.00	138.25	0.00	8.30	0.00
-6	70.71	14.55	1.1168	1.1925	78.97	17.35	96.32	0.00	9.63	0.00	0.00	86.69	0.00	224.94	0.00	13.50	0.00
-5	62.84	11.73	1.1481	1.2462	72.15	14.62	86.77	0.00	8.68	0.00	0.00	78.09	0.00	303.03	0.00	18.18	0.00
-4	88.71	14.66	1.1802	1.3023	104.70	19.09	123.79	0.00	12.38	0.00	0.00	111.41	0.00	414.44	0.00	24.87	0.00
-3	92.07	14.70	1.2133	1.3609	111.71	20.01	131.72	0.00	13.17	0.00	0.00	118.55	0.00	532.99	0.00	31.98	0.00
-2	75.26	12.53	1.2472	1.4221	93.86	17.82	111.68	0.00	11.17	0.00	0.00	100.51	0.00	633.50	0.00	38.01	0.00
-1	37.30	4.68	1.2821	1.4861	47.82	6.95	54.77	0.00	5.48	0.00	0.00	49.29	0.00	682.79	0.00	40.97	0.00
0	0.00	0.00	1.3180	1.5530	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sum	542.22	101.37			631.61	127.05	758.66	0.00	75.87	0.00	0.00	682.79	0.00	182.91	0.00		

Table 18.2-2 Financial Analysis (3/4) Income Statement

Case - A (Base)	Se Kong No. 4	Exporting Ratio	100.0%	Exp. Price (\$/MWh)	\$2.41	O/I cost	1.5% of T. Disp.	Income Tax	20.0%	Initial F.A. (M.U.S\$)	941.57
Dam Site:	443 MW	Domestic Use	0.0%	Dom. Price (\$/MWh)	\$4.33	Fuel Cost	0.0%	\$/MWh	0.0%	Life Time (Years)	50
Installed Capacity		Increase of D. Use	2.0%	Exp. Escalation	1.00%				100.0%	Initial Dep. (M.U.S\$)	18.83
Generation Energy	1818.0 GWh	Financial Condition		Dom. Escalation	1.00%	P Repay.	27.31	MUSS/p.a	0.0%	FC Escalation	2.8%
Sustainable Energy	1818.2 GWh	Interest Rate (%)	6						2.5%	L/C Escalation	4.5%
Construction Cost	643.61 M.U.S\$	Repayment P. Yr	25						(not considered)	Equity Escalation	3.1%

Note: Net Operation Income = Sales Revenue - Cost of Goods Sold

Income before Tax = Net Operation Income - Interest Payments

Current Asset in Cash = Net Operation Income + Depreciation

The year 25 onwards are not printed in the above table intentionally.

Table 18.2-2 Financial Analysis (4/4) Financial Internal Rate of Return

Case: - A (Base)

Dam Site:	Se Kong No.4	Equity Proportions	Total construction Cost (M.US\$)				Discount Rate	10.0%
			Finance Items	LAO PDR	PRV SGT	Total		
Install Capacity	443 MW	Lao PDR	100.0%	Own Finance	75.87	0	75.87	B(benefit)
Generation Energy	1816 GWh	Private	0.0%	Principal Loan	682.79	0.00	682.79	C(cost)
		Royalty from Operation	0.0%	IDC	182.91	0	182.91	B/C
Construction Cost	643.61 M.US\$	Lao PDR	100.0%	Total	941.57	0.00	941.57	FIRR for the Year
		Private	0.0%	Equity / Royalty Fee	0	0	-	FIRR
								24.55%

(Unit.M.US\$)

Year	Own Finance	IDC	Principal Repay.	Interest Payment	Royalty	Total Cost	Net Income after Tax	Depreciation + Interest	Total Income	NPV Convert Index	Net Present Value		NPV Cumulative		Balance	
											Cost	Benefit	Cost (C)	Benefit (B)		
-10	0.00	0.00			0.00	0.00		0.00	2.5937	0.00	0.00	0.00	0.00	0.00	0.00	
-9	5.30	2.86			0.00	5.30		0.00	2.3579	12.50	0.00	12.50	0.00	-5.30		
-8	2.55	4.24			0.00	2.55		0.00	2.1436	5.47	0.00	17.97	0.00	-2.55		
-7	7.51	8.30			0.00	7.51		0.00	1.9487	14.63	0.00	32.60	0.00	-7.51		
-6	9.63	13.50			0.00	9.63		0.00	1.7716	17.06	0.00	49.66	0.00	-9.63		
-5	8.68	18.18			0.00	8.68		0.00	1.6105	13.96	0.00	63.64	0.00	-8.68		
-4	12.38	24.87			0.00	12.38		0.00	1.4641	18.13	0.00	81.77	0.00	-12.38		
-3	13.17	31.98			0.00	13.17		0.00	1.3310	17.53	0.00	99.30	0.00	-13.17		
-2	11.17	38.01			0.00	11.17		0.00	1.2100	13.52	0.00	112.82	0.00	-11.17		
-1	5.48	40.97			0.00	5.48		0.00	1.1000	6.03	0.00	118.85	0.00	-5.48		
0			27.31	39.33		27.31	15.17	58.16	73.33	1.0000	27.31	73.33	146.16	73.33	46.02	
1			27.31	37.69		27.31	16.55	57.11	73.66	0.9091	24.83	66.96	170.99	140.29	46.35	
2			27.31	36.05		27.31	17.90	56.07	73.97	0.8264	22.57	61.13	193.56	201.42	46.66	
3			27.31	34.41		27.31	19.23	55.05	74.28	0.7513	20.52	55.81	214.08	257.23	46.97	
4			27.31	32.77		27.31	20.53	54.05	74.58	0.6830	18.65	50.94	232.73	308.17	47.27	
5			27.31	31.14		27.31	17.41	53.08	70.49	0.6209	16.96	43.77	249.69	351.94	43.18	
6			27.31	29.50		27.31	18.38	52.12	70.50	0.5645	15.42	39.80	265.11	391.74	43.19	
7			27.31	27.86		27.31	19.31	51.18	70.49	0.5132	14.02	36.18	279.13	427.92	43.18	
8			27.31	26.22		27.31	20.22	50.26	70.48	0.4665	12.74	32.88	291.87	460.80	43.17	
9			27.31	24.58		27.31	21.09	49.37	70.46	0.4241	11.58	29.88	303.45	490.68	43.15	
10			27.31	22.94		27.31	21.92	48.49	70.41	0.3855	10.53	27.14	313.98	517.82	43.10	
11			27.31	21.30		27.31	22.70	47.65	70.35	0.3505	9.57	24.66	323.55	542.48	43.04	
12			27.31	19.67		27.31	23.46	46.83	70.29	0.3186	8.70	22.39	332.25	564.87	42.98	
13			27.31	18.03		27.31	24.17	46.03	70.20	0.2897	7.91	20.34	340.16	585.21	42.89	
14			27.31	16.39		27.31	24.84	45.26	70.10	0.2633	7.19	18.46	347.35	603.67	42.79	
15			27.31	14.75		27.31	25.45	44.52	69.97	0.2394	6.54	16.75	353.89	620.42	42.66	
16			27.31	13.11		27.31	26.02	43.80	69.82	0.2176	5.94	15.19	359.83	635.61	42.51	
17			27.31	11.47		27.31	26.53	43.11	69.64	0.1978	5.40	13.77	365.23	649.38	42.33	
18			27.31	9.83		27.31	26.99	42.45	69.44	0.1799	4.91	12.49	370.14	661.87	42.13	
19			27.31	8.20		27.31	27.39	41.84	69.23	0.1635	4.47	11.32	374.61	673.19	41.92	
20			27.31	6.56		27.31	27.74	41.24	68.98	0.1486	4.06	10.25	378.67	683.44	41.67	
21			27.31	4.92		27.31	28.03	40.67	68.70	0.1351	3.69	9.28	382.36	692.72	41.39	
22			27.31	3.28		27.31	28.25	40.14	68.39	0.1228	3.35	8.40	385.71	701.12	41.08	
23			27.31	1.64		27.31	28.42	39.64	68.06	0.1117	3.05	7.60	388.76	708.72	40.75	
24			27.31	0.00		27.31	28.50	39.18	67.68	0.1015	2.77	6.87	391.53	715.59	40.37	
25						0.00	27.22	40.40	67.62	0.0923	0.00	6.24	391.53	721.83	67.62	
26						0.00	25.86	41.65	67.51	0.0839	0.00	5.66	391.53	727.49	67.51	
27						0.00	24.42	42.94	67.36	0.0763	0.00	5.14	391.53	732.63	67.36	
28						0.00	22.90	44.27	67.17	0.0693	0.00	4.65	391.53	737.28	67.17	
29						0.00	21.29	45.64	66.93	0.0630	0.00	4.22	391.53	741.50	66.93	
30						0.00	19.58	47.06	66.65	0.0573	0.00	3.82	391.53	745.32	66.65	
31						0.00	17.81	48.52	66.33	0.0521	0.00	3.46	391.53	748.78	66.33	
32						0.00	15.92	50.02	65.94	0.0474	0.00	3.13	391.53	751.91	65.94	
33						0.00	13.94	51.57	65.51	0.0431	0.00	2.82	391.53	754.73	65.51	
34						0.00	11.85	53.17	65.02	0.0391	0.00	2.54	391.53	757.27	65.02	
35						0.00	9.65	54.82	64.47	0.0356	0.00	2.30	391.53	759.57	64.47	
36						0.00	7.34	56.52	63.86	0.0323	0.00	2.06	391.53	761.63	63.86	
37						0.00	4.91	58.27	63.18	0.0294	0.00	1.86	391.53	763.49	63.18	
38						0.00	2.34	60.06	62.42	0.0267	0.00	1.67	391.53	765.16	62.42	
39						0.00	-0.41	61.94	61.53	0.0243	0.00	1.50	391.53	766.66	61.53	
40						0.00	-3.94	63.86	59.92	0.0221	0.00	1.32	391.53	767.98	59.92	
41						0.00	-7.64	65.84	58.20	0.0201	0.00	1.17	391.53	769.15	58.20	
42						0.00	-11.51	67.88	56.37	0.0183	0.00	1.03	391.53	770.18	56.37	
43						0.00	-15.58	69.99	54.41	0.0166	0.00	0.90	391.53	771.08	54.41	
44						0.00	-19.85	72.16	52.31	0.0151	0.00	0.79	391.53	771.87	52.31	
45						0.00	-24.33	74.39	50.06	0.0137	0.00	0.69	391.53	772.56	50.06	
46						0.00	-29.03	76.70	47.67	0.0125	0.00	0.60	391.53	773.16	47.67	
47						0.00	-33.94	79.07	45.13	0.0113	0.00	0.51	391.53	773.67	45.13	
48						0.00	-39.09	81.53	42.44	0.0103	0.00	0.44	391.53	774.11	42.44	
49						0.00	-44.46	84.05	39.57	0.0094	0.00	0.37	391.53	774.48	39.57	
Sum	75.87	182.91	682.75	491.64	0.00	758.62	571.44	2679.64	3251.06	391.53	774.48		2492.46			

Note: Financial Generation Cost (FGC) is calculated as below.

$$FGC = NPV(\text{Own Finance} + IDC + \text{Royalty} + O/M Cost + \text{Prc Repayment} + \text{Interest Payment})$$

Financial Generation Cost in Year 0 at
10.0% discount rate

\$/MWh

Total Cost does not include IDC and Interest Payment for the purpose of FIRR calculation.

Table 18.2-3 Financial Analysis (1/4) Summary of Financial Analysis

Site Name	Se Kong No.4	
Case: - B (Base)		
Construction Cost	1,452.84 US\$/kW	
Equity Share	Lao PDR	Private S.
	25.0%	75.0%
Debt / Equity	Debt	Equity
	70.0%	30.0%
Installed Capacity	443.0 MW	
Generation Energy	1,816.0 GWh	
Sending-end Energy	1,616.2 GWh	
Construction Cost		
Before Price Escalation	643.61 M.US\$	
After Price Escalation	758.66 M.US\$	
Financial Budget	995.74 M.US\$	
Financial Items	Lao PDR	Private S.
Own Finance	56.92	170.70
Loan Amount	132.75	398.29
IDC	59.27	177.81
Royalty	-	0.00
Total	248.94	746.80
Export/Domestic Ratio for Salable Energy		
Export	100.0%	
Domestic	0.0%	
Initial Power Tariff at year 0		
Export	52.41 US\$/MWh	
Domestic	34.33 US\$/MWh	
Power Tariff Escalation		
Export	1.00%	
Domestic	1.00%	
Increase of Domestic Demand	2.00%	
Royalty for Construction Period	0.00%	
Royalty from Operation onwards	10.00%	
Financial Indeices		
Averaged Debt Service Coverage		0.85
Financial Internal Rate of Return		-9.85%
FIRR Calculation Period		10 years
BOT Period		
BOT Period		25 Years
FIRR for the BOT Period		8.03%
General Inflation		
Foreign		2.80%
Domestic		4.50%
Financial Conditions		
Interest Rate for IDC		10.00%
Interest after Operation		10.00%
Repayment Period		10 yr
Grace Period		9 yr
Government Own finance		0.00%
Income Statement M.US\$		
Sales Revenue		5,460.36
Operating Expense		4,891.20
Financial Expense		238.95
Net Income before Tax		330.21
Income Tax		(149.45)
Net Income		180.76
To the Government M.US\$		
Royalty		546.03
Income Tax		149.446
Interest Payment to Equity		-
Net Income		695.476
Financial Generation Cost in \$/MWh		
Year 0 for the project life time		78.15
10.0% Discount Rate		

Table 18.2.3 Financial Analysis (2/4) Construction Disbursement and Loan Amount

Case: - B (Base)									
Dam Site:	Se Kong No.4	Equity Proportions		Price Escalation per annum		Finance Condition		Total Construction Cost (M.USS)	
Installed	443.00 MW	Lao PDR	25.0%	F/C Portion	2.8%	IDC	10.00 %	Finance Items	LAO PDR PRV SCT Total
Generation Energy	1,816.0 GWh	Private	75.0%	L/C Portion	4.5%	Interest Rate	10.00 %	Own Finance	56.92 170.70 227.62
Saleable Energy	1,616.2 GWh	Debt/Equity Ratio				Repayment Period	10 years	Principal Loan	132.75 398.29 531.04
Project Cost	1452.84 \$/Kw	Debt	70.0%			Grace Period	9 years	IDC	59.27 177.81 237.08
F/C	542.22 M.USS	Equity	30.0%	Exporting Ratio	100.0%	LAO Own Finance	0.00 %	Total	248.94 746.80 995.74
L/C	101.39 M.USS	Rent/Royalty for Construction	0.0%	Exp. Price (\$/MWh)	52.410			Equity / Royalty Fee	56.92 0.00 -
Total	643.61 M.USS	Royalty Item Operation	10.0%	Dom. Price (\$/MWh)	34.330				

Year	Disbursement before Escalation		Price Index		Disbursement after Escalation		Total Disburse		Finance Proportion		Own Finance Portion		Loan Portion		Loan Cumulative		IDC		Royalty Fee	
	for F/C	M.USS	for L/C	M.USS	for F/C	M.USS	for L/C	M.USS	Lao PDR	PRV.SCT	Lao PDR	PRV.SCT	Lao PDR	PRV.SCT	Lao PDR	PRV.SCT	Lao PDR	PRV.SCT	Lao PDR	PRV.SCT
-10	0.00	0.00	1,0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-9	40.23	11.15	1,0280	1,0450	41.36	11.65	53.01	13.25	39.76	0.00	3.98	11.93	9.27	27.83	0.93	2.78	0.00	0.00	0.00	0.00
-8	18.65	5.34	1,0568	1,0920	19.71	5.83	25.54	6.39	19.15	0.00	1.92	5.75	4.47	13.40	13.74	41.23	1.37	4.12	0.00	0.00
-7	56.45	12.03	1,0864	1,1412	61.33	13.73	75.06	18.77	56.29	0.00	5.63	16.89	13.14	39.40	26.88	80.63	2.69	8.06	0.00	0.00
-6	70.71	14.55	1,1168	1,1925	78.97	17.35	96.32	24.08	72.24	0.00	7.22	21.67	16.86	50.57	43.74	131.20	4.37	13.12	0.00	0.00
-5	62.84	11.73	1,1481	1,2462	72.15	14.62	86.77	21.68	65.08	0.00	6.51	19.52	15.18	45.56	58.92	176.76	5.89	17.68	0.00	0.00
-4	88.71	14.56	1,1802	1,3023	104.70	19.09	123.79	30.95	92.84	0.00	9.29	27.85	21.66	64.99	80.58	241.75	8.06	24.18	0.00	0.00
-3	92.07	14.70	1,2133	1,3609	111.71	20.01	131.72	32.93	98.79	0.00	9.88	29.64	23.05	69.15	103.63	310.90	10.36	31.09	0.00	0.00
-2	75.26	12.53	1,2472	1,4221	93.86	17.82	111.68	27.92	83.76	0.00	8.38	25.13	19.54	58.63	123.17	369.53	12.32	36.95	0.00	0.00
-1	37.30	4.68	1,2821	1,4861	47.82	6.95	54.77	13.68	41.08	0.00	4.11	12.32	9.58	28.76	132.75	398.29	13.28	39.83	0.00	0.00
0	0.00	0.00	1,3180	1,5530	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sum	542.22	101.37		631.61	127.05	758.66	189.67	568.99	0.00	56.92	170.70	132.75	398.29	59.27	177.81	0.00				

Table 18.2-3 Financial Analysis (3/4) Income Statement

Case: - B (Base)		Sa Kong No. 4		Sa Kong No. 5		Sa Kong No. 6	
Dam Site	443 MW	Exporting Ratio	100.0%	Exp. Price (\$/MWh)	52.41	OM cost	1.5% of T. Dmb
Metal Capacity	1816.0 GWh	Domestic Use	0.0%	Dom. Price (\$/MWh)	34.33	Fuel Cost	Income Tax
Generation Energy	1616.2 GWh	Increase of D Use	2.0%	Exp. Escalation	1.00%	\$/MWh	from Operation
Sustainable Energy		Financial Condition		Dom. Escalation	1.00%	P Repay.	Lao PDR
Concentration Cost	643.61 MUSS	Interest Rate (%)	10				Private
		Requirement P. (Y)	10				Dividend
							(not considered)
							Equity Escalation

Note: Net Operation Income = Sales Revenue - O/M Cost - Royalty - Depreciation

Income before Tax = Net Operation Income - Interest Payment

Current Asset in Cash = Net Operation Income + Depreciation - Debt

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Table 18.2-3 Financial Analysis (4/4) Financial Internal Rate of Return

Case: - B (Base)

Dam Site:	Se Kong No.4	Equity Proportions	Total construction Cost (M.US\$)				Discount Rate	10.0%
			Finance Items	LAO PDR	PRV SCT	Total		
Install Capacity	443 MW	Lao PDR	25.0%	56.92	170.7	227.62	B(enefit)	669.39
Generation Energy	1816 GWh	Private	75.0%	132.75	398.29	531.04	C(cost)	715.42
Construction Cost	643.61 M.US\$	Royalty from Operation	10.0%	IDC	59.27	177.81	B/I/C	0.94
		Lao PDR	25.0%	Total	248.94	746.8	FIRR for the Year	9
		Private	75.0%	Equity / Royalty Fee	56.92	0	FIRR	9.85%

Year	Own Finance	IDC	Principal Repay.	Interest Payment	Royalty	Total Cost	Net Income after Tax	Depreciation + Interest	Total Income	NPV Convert Index	(Unit M.US\$)			Balance
											Net Present Value	NPV Cumulative	Cost (C)	Benefit (B)
-10	0.00	0.00			0.00	0.00		0.00	2.5937	0.00	0.00	0.00	0.00	0.00
-9	15.91	3.71			0.00	15.91		0.00	2.3579	37.51	0.00	37.51	0.00	-15.91
-8	7.67	5.49			0.00	7.67		0.00	2.1436	16.44	0.00	53.95	0.00	-7.67
-7	22.52	10.75			0.00	22.52		0.00	1.9487	43.88	0.00	97.83	0.00	-22.52
-6	28.89	17.49			0.00	28.89		0.00	1.7716	51.18	0.00	149.01	0.00	-28.89
-5	26.03	23.57			0.00	26.03		0.00	1.6105	41.92	0.00	190.93	0.00	-26.03
-4	37.14	32.24			0.00	37.14		0.00	1.4641	54.38	0.00	245.31	0.00	-37.14
-3	39.52	41.45			0.00	39.52		0.00	1.3310	52.60	0.00	297.91	0.00	-39.52
-2	33.51	49.27			0.00	33.51		0.00	1.2100	40.55	0.00	338.46	0.00	-33.51
-1	16.43	53.11			0.00	16.43		0.00	1.1000	18.07	0.00	356.53	0.00	-16.43
0		53.10	47.79		53.10	-2.84	67.70	64.86	1.0000	53.10	64.86	409.63	64.86	11.76
1		53.10	42.48		53.10	2.09	63.01	65.10	0.9091	48.27	59.18	457.90	124.04	12.00
2		53.10	37.17		53.10	6.99	58.34	65.33	0.8264	43.88	53.99	501.78	178.03	12.23
3		53.10	31.86		53.10	11.87	53.68	65.65	0.7513	39.89	49.25	541.67	227.28	12.45
4		53.10	26.55		53.10	16.71	49.05	65.76	0.6830	36.27	44.91	577.94	272.19	12.66
5		53.10	21.24		53.10	17.20	44.44	61.64	0.6209	32.97	38.27	610.91	310.46	8.54
6		53.10	15.93		53.10	21.00	39.85	60.85	0.5645	29.97	34.35	640.88	344.81	7.75
7		53.10	10.62		53.10	24.77	35.28	60.05	0.5132	27.25	30.82	668.13	375.63	6.95
8		53.10	5.31		53.10	28.51	30.73	59.24	0.4665	24.77	27.64	692.90	403.27	6.14
9		53.10	0.00		53.10	32.21	26.21	58.42	0.4241	22.52	24.78	715.42	428.05	5.32
10		0.00	0.00		0.00	31.61	27.02	58.63	0.3855	20.00	22.60	715.42	450.65	58.63
11		0.00	0.00		0.00	30.98	27.86	58.84	0.3505	19.00	20.62	715.42	471.27	58.84
12		0.00	0.00		0.00	30.30	28.73	59.03	0.3186	18.00	18.81	715.42	490.08	59.03
13		0.00	0.00		0.00	29.58	29.62	59.20	0.2897	17.00	17.15	715.42	507.23	59.20
14		0.00	0.00		0.00	28.83	30.53	59.36	0.2633	16.00	15.63	715.42	522.86	59.36
15		0.00	0.00		0.00	28.01	31.48	59.49	0.2394	15.00	14.24	715.42	537.10	59.49
16		0.00	0.00		0.00	27.14	32.46	59.60	0.2176	14.00	12.97	715.42	550.07	59.60
17		0.00	0.00		0.00	26.22	33.46	59.68	0.1978	13.00	11.80	715.42	561.87	59.68
18		0.00	0.00		0.00	25.25	34.50	59.75	0.1799	12.00	10.75	715.42	572.62	59.75
19		0.00	0.00		0.00	24.22	35.57	59.79	0.1635	11.00	9.78	715.42	582.40	59.79
20		0.00	0.00		0.00	23.13	36.67	59.80	0.1486	10.00	8.89	715.42	591.29	59.80
21		0.00	0.00		0.00	21.97	37.81	59.78	0.1351	9.00	8.08	715.42	599.37	59.78
22		0.00	0.00		0.00	20.74	38.98	59.72	0.1228	8.00	7.33	715.42	606.70	59.72
23		0.00	0.00		0.00	19.46	40.19	59.65	0.1117	7.00	6.66	715.42	613.36	59.65
24		0.00	0.00		0.00	18.10	41.44	59.54	0.1015	6.00	6.04	715.42	619.40	59.54
25		0.00	0.00		0.00	16.67	42.72	59.39	0.0923	5.00	5.48	715.42	624.88	59.39
26		0.00	0.00		0.00	15.17	44.05	59.22	0.0839	4.00	4.97	715.42	629.85	59.22
27		0.00	0.00		0.00	13.58	45.41	58.99	0.0763	3.00	4.50	715.42	634.35	58.99
28		0.00	0.00		0.00	11.90	46.82	58.72	0.0693	2.00	4.07	715.42	638.42	58.72
29		0.00	0.00		0.00	10.14	48.27	58.41	0.0630	1.00	3.68	715.42	642.10	58.41
30		0.00	0.00		0.00	8.29	49.77	58.06	0.0573	0.00	3.33	715.42	645.43	58.06
31		0.00	0.00		0.00	6.35	51.31	57.66	0.0521	0.00	3.00	715.42	648.43	57.66
32		0.00	0.00		0.00	4.30	52.80	57.20	0.0474	0.00	2.71	715.42	651.14	57.20
33		0.00	0.00		0.00	2.15	54.54	56.69	0.0431	0.00	2.44	715.42	653.58	56.69
34		0.00	0.00		0.00	-0.13	56.23	56.10	0.0391	0.00	2.19	715.42	655.77	56.10
35		0.00	0.00		0.00	3.09	57.97	54.88	0.0356	0.00	1.95	715.42	657.72	54.88
36		0.00	0.00		0.00	-6.19	59.77	53.58	0.0323	0.00	1.73	715.42	659.45	53.58
37		0.00	0.00		0.00	-9.45	61.62	52.17	0.0294	0.00	1.53	715.42	660.98	52.17
38		0.00	0.00		0.00	-12.88	63.53	50.65	0.0267	0.00	1.35	715.42	662.33	50.65
39		0.00	0.00		0.00	-16.46	65.50	49.04	0.0243	0.00	1.19	715.42	663.52	49.04
40		0.00	0.00		0.00	-20.22	67.53	47.31	0.0221	0.00	1.05	715.42	664.57	47.31
41		0.00	0.00		0.00	-24.17	69.63	45.46	0.0201	0.00	0.91	715.42	665.48	45.46
42		0.00	0.00		0.00	-28.29	71.79	43.50	0.0183	0.00	0.80	715.42	666.28	43.50
43		0.00	0.00		0.00	-32.59	74.01	41.42	0.0166	0.00	0.69	715.42	666.97	41.42
44		0.00	0.00		0.00	-37.12	76.31	39.19	0.0151	0.00	0.59	715.42	667.56	39.19
45		0.00	0.00		0.00	-41.86	78.67	36.81	0.0137	0.00	0.50	715.42	668.06	36.81
46		0.00	0.00		0.00	-46.83	81.11	34.28	0.0125	0.00	0.43	715.42	668.49	34.28
47		0.00	0.00		0.00	-52.02	83.63	31.61	0.0113	0.00	0.36	715.42	668.85	31.61
48		0.00	0.00		0.00	-57.44	86.22	28.78	0.0103	0.00	0.30	715.42	669.15	28.78
49		0.00	0.00		0.00	-63.10	88.88	25.78	0.0094	0.00	0.24	715.42	669.39	25.78

Note: Financial Generation Cost (FGC) is calculated as below.

$$\text{FGC} = \text{NPV}(\text{Own Finance} + \text{IDC} + \text{Royalty} + \text{O/M Cost} + \text{Prc Repayment} + \text{Interest Payment}) / \text{NPV}(\text{Generation Energy})$$

Total Cost does not include IDC and Interest Payment for the purpose of FIRR calculation.

Financial Generation Cost in Year 0 at 10.0% discount rate

\$MM

Table 18.2-4 Financial Analysis

Summary of Financial Analysis

Site Name	Se Kong No.4		Financial Indeces	
Case: - A (Case 1: Allocated T/L system)				
Construction Cost	1,565.58 US\$/kW		Averaged Debt Service Coverage	
Equity Share		Lao PDR	Private S.	1.46
		100.0%	0.0%	
Debt / Equity		Debt	Equity	Financial Internal Rate of Return
		90.0%	10.0%	22.75%
Installed Capacity		443.0	MW	FIRR Calculation Period
Generation Energy		1,816.0	GWh	25 years
Sending-end Energy		1,616.2	GWh	
Construction Cost				BOT Period
Before Price Escalation		693.55	M.US\$	-- Years
After Price Escalation		817.38	M.US\$	
Financial Budget		1,014.38	M..US\$	FIRR for the BOT Period
Financial Items		Lao PDR	Private S.	General Inflation
Own Finance		81.74	0.00	Foreign
Loan Amount		735.64	0.00	Domestic
IDC		197.00	0.00	Financial Conditions
Royalty		-	0.00	Interest Rate for IDC
Total		1014.38	0.00	Interest after Operation
				Repayment Period
				25 yr
				Graced Period
				9 yr
				Government Own finance
				10.00%
				Income Statement
Sales Revenue				M.US\$
Operating Expense				5,460.36
Financial Expense				4,545.82
				529.33
				Net Income before Tax
				385.21
Income Tax				(138.16)
Net Income				247.05
Export/Domestic Ratio for Salable Energy				To the Government
Export		100.0%		M.US\$
Domestic		0.0%		Royalty
Initial Power Tariff at year 0				0
Export		52.41	US\$/MWh	Income Tax
Domestic		34.33	US\$/MWh	Interest Payment to Equity
Power Tariff Escalation				-
Export		1.00%		Net Income
Domestic		1.00%		138.16
Increase of Domestic Demand		2.00%		
Royalty for Construction Period		0.00%		
Royalty from Operation onwards		0.00%		
				Financial Generation Cost in
				Year 0 for the project life time
				10.0% Discount Rate
				\$/MWh

Table 18.2-5 Financial Analysis

Summary of Financial Analysis

Site Name	Se Kong No.4	
Case: - A (Case 2: Independent T/L)		
Construction Cost	1,558.17 US\$/kW	
Equity Share	Lao PDR	Private S.
	100.0%	0.0%
Debt / Equity	Debt	Equity
	90.0%	10.0%
Installed Capacity	443.0 MW	
Generation Energy	1,816.0 GWh	
Sending-end Energy	1,616.2 GWh	
Construction Cost		
Before Price Escalation	690.27 M.US\$	
After Price Escalation	813.49 M.US\$	
Financial Budget	1,009.57 M.US\$	
Financial Items	Lao PDR	Private S.
Own Finance	81.36	0.00
Loan Amount	732.13	0.00
IDC	196.08	0.00
Royalty		0.00
Total	1009.57	
Export/Domestic Ratio for Salable Energy		
Export	100.0%	
Domestic	0.0%	
Initial Power Tariff at year 0		
Export	52.41 US\$/MWh	
Domestic	34.33 US\$/MWh	
Power Tariff Escalation		
Export	1.00%	
Domestic	1.00%	
Increase of Domestic Demand	2.00%	
Royalty for Construction Period	0.00%	
Royalty from Operation onwards	0.00%	
Financial Indeices		
Averaged Debt Service Coverage	1.47	
Financial Internal Rate of Return	22.86%	
FIRR Calculation Period	25 years	
BOT Period	-- Years	
FIRR for the BOT Period	-	
General Inflation		
Foreign	2.80%	
Domestic	4.50%	
Financial Conditions		
Interest Rate for IDC	6.00%	
Interest after Operation	6.00%	
Repayment Period	25 yr	
Grace Period	9 yr	
Government Own finance	10.00%	
Income Statement		
Sales Revenue	5,460.36	
Operating Expense	4,524.17	
Financial Expense	526.79	
Net Income before Tax	409.40	
Income Tax	(140.69)	
Net Income	268.71	
To the Government		
Royalty	0	
Income Tax	140.686	
Interest Payment to Equity	-	
Net Income	140.686	
Financial Generation Cost in Year 0 for the project life time		
10.0% Discount Rate	\$/MWh	
	61.04	

Table 18.2-6 Financial Analysis

Summary of Financial Analysis

Site Name Se Kong No.4			Financial Indeces																																					
Case: - B (Case 1: Allocated T/L system)			Averaged Debt Service Coverage 0.78																																					
Construction Cost 1,565.58 US\$/kW			Financial Internal Rate of Return -19.25%																																					
<table border="1"> <tr> <td>Equity Share</td> <td>Lao PDR</td> <td>Private S.</td> </tr> <tr> <td></td> <td>25.0%</td> <td>75.0%</td> </tr> <tr> <td>Debt / Equity</td> <td>Debt</td> <td>Equity</td> </tr> <tr> <td></td> <td>70.0%</td> <td>30.0%</td> </tr> </table>			Equity Share	Lao PDR	Private S.		25.0%	75.0%	Debt / Equity	Debt	Equity		70.0%	30.0%	FIRR Calculation Period 10 years																									
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Debt / Equity	Debt	Equity																																						
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Export/ Domestic Ratio for Saleable Energy <table border="1"> <tr> <td>Export</td> <td>100.0%</td> </tr> <tr> <td>Domestic</td> <td>0.0%</td> </tr> </table>			Export	100.0%	Domestic	0.0%	<table border="1"> <tr> <td>Income Statement</td> <td>M.US\$</td> </tr> <tr> <td>Sales Revenue</td> <td>5,460.36</td> </tr> <tr> <td>Operating Expense</td> <td>5,227.47</td> </tr> <tr> <td>Financial Expense</td> <td>257.04</td> </tr> <tr> <td>Net Income before Tax</td> <td>(24.15)</td> </tr> <tr> <td>Income Tax</td> <td>(121.09)</td> </tr> <tr> <td>Net Income</td> <td>(145.24)</td> </tr> </table>		Income Statement	M.US\$	Sales Revenue	5,460.36	Operating Expense	5,227.47	Financial Expense	257.04	Net Income before Tax	(24.15)	Income Tax	(121.09)	Net Income	(145.24)																		
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Initial Power Tariff at year 0 <table border="1"> <tr> <td>Export</td> <td>52.41 US\$/MWh</td> </tr> <tr> <td>Domestic</td> <td>34.33 US\$/MWh</td> </tr> </table>			Export	52.41 US\$/MWh	Domestic	34.33 US\$/MWh	<table border="1"> <tr> <td>To the Government</td> <td>M.US\$</td> </tr> <tr> <td>Royalty</td> <td>546.03</td> </tr> <tr> <td>Income Tax</td> <td>121.094</td> </tr> <tr> <td>Interest Payment to Equity</td> <td>-</td> </tr> <tr> <td>Net Income</td> <td>667.124</td> </tr> </table>		To the Government	M.US\$	Royalty	546.03	Income Tax	121.094	Interest Payment to Equity	-	Net Income	667.124																						
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Export	1.00%																																							
Domestic	1.00%																																							
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10.0% Discount Rate	\$/MWh																																							
Increase of Domestic Demand 2.00%																																								
Royalty for Construction Period 0.00%																																								
Royalty from Operation onwards 10.00%																																								

Table 18.2-7 Financial Analysis

Summary of Financial Analysis

Site Name	Se Kong No.4	
Case: - B (Case 2: Independent T/L)		
Construction Cost	1,558.17 US\$/kW	
Equity Share	Lao PDR	Private S.
	25.0%	75.0%
Debt / Equity	Debt	Equity
	70.0%	30.0%
Installed Capacity	443.0 MW	
Generation Energy	1,816.0 GWh	
Sending-end Energy	1,616.2 GWh	
Construction Cost		
Before Price Escalation	690.27 M.US\$	
After Price Escalation	813.49 M.US\$	
Financial Budget	1,067.67 M.US\$	
Financial Items	Lao PDR	Private S.
Own Finance	61.02	183.04
Loan Amount	142.36	427.07
IDC	63.55	190.63
Royalty		0.00
Total	266.93	800.74
Export/Domestic Ratio for Saleable Energy		
Export	100.0%	
Domestic	0.0%	
Initial Power Tariff at year 0		
Export	52.41 US\$/MWh	
Domestic	34.33 US\$/MWh	
Power Tariff Escalation		
Export	1.00%	
Domestic	1.00%	
Increase of Domestic Demand	2.00%	
Royalty for Construction Period	0.00%	
Royalty from Operation onwards	10.00%	
Financial Indeces		
Averaged Debt Service Coverage	0.78	
Financial Internal Rate of Return	-18.28%	
FIRR Calculation Period	10 years	
BOT Period	25 Years	
FIRR for the BOT Period	6.98%	
General Inflation		
Foreign	2.80%	
Domestic	4.50%	
Financial Conditions		
Interest Rate for IDC	10.00%	
Interest after Operation	10.00%	
Repayment Period	10 yr	
Grace Period	9 yr	
Government Own finance	0.00%	
Income Statement M.US\$		
Sales Revenue	5,460.36	
Operating Expense	5,205.20	
Financial Expense	256.27	
Net Income before Tax	(1.11)	
Income Tax	(122.82)	
Net Income	(123.93)	
To the Government M.US\$		
Royalty	546.03	
Income Tax	122.82	
Interest Payment to Equity		
Net Income	668.85	
Financial Generation Cost in Year 0 for the project life time \$/MWh		
10.0% Discount Rate	83.42	

18.3 Xe Kaman No.1 Project

18.3.1 Basic Conditions of Xe Kaman No.1

The project consists of following characteristics.

- Installed Capacity	256	MW
- Firm Capacity	245	MW
- Salable Energy	1,011.9	GWh
- Construction Cost	404.05	M.US\$

More detailed conditions are shown in Table 18.3-1.

18.3.2 Results of Financial Analysis and Sensitivity Test

(1) Case-A

The results are shown in below and more detailed information are shown in Table 18.3-2, Table 18.3-4 and Table 18.3-5.

Case	DSC	FIRR	Levelized Financial Generation Cost *
Base	1.55	27.49%	54.95 \$/MWh
Case 1	1.42	25.37%	58.85 \$/MWh
Case 2	1.38	24.73%	60.10 \$/MWh

* with 10 % discount rate for the project life time (50 years)

Even though FIRR becomes better than that of Se Kong No. 4, DSC becomes slightly lower than that of Se Kong No.4. This phenomenon is perhaps caused by less salable energy in comparison with Se Kong No.4. The project can be expected good return for the base case.

(2) Case-B

The results are shown in below and more detailed information are shown in Table 18.3-3, Table 18.3-6 and Table 18.3-7.

Case	DSC	FIRR	Levelized Financial Generation Cost *	FIRR for BOT Period (25 years)
Base	0.83	-13.68%	74.67 \$/MWh	7.97%
Case 1	0.76	-31.25%	79.61 \$/MWh	6.83%
Case 2	0.74	N/A	81.19 \$/MWh	6.48%

* with 10 % discount rate for the project life time (50 years)

DSC and FIRR shows the same tendency with the Case-A in respect to comparison with Se Kong No.4.

The following table shows the feasible condition with varying some parameters independently for the base case. It is deemed that there is still enough room for the discussion on the BOT method as well as Se Kong No.4 based on the proposed conditions by MIH.

Parameters	Values	DSC	FIRR	Generation Cost	FIRR (BOT)
Construction Cost	242.43 M.US\$ (40% less)	1.50	12.07%	46.87 \$/MWh	17.57%
Exporting Power Tariff Escalation	1.0% to 12.0%	1.51	8.88%	103.90 \$/MWh	20.06%
Interest Rate	not reach feasible	-	-	-	-

Table 18.3-1 Basic Conditions for Xe Kaman No.1

Items	Value and Conditions	Remarks
Installed Capacity	256 MW	
Firm Capacity	245 MW	Peak 8 Hours
Generation Energy	1,137 GWh	Annual Average Energy
Plant Available Factor	97.373 %	
Sending-end Energy (Salable Energy)	1,011.9 GWh	G.Energy x {1- (St.Use + T/D Loss)}
Construction Cost including Associated T/L	404.05 M.US\$ F/C: 342.44 M.US\$ L/C: 61.61 M.US\$ 1,578.32 \$/kW	subject to price escalation F/C: 2.8 % L/C: 4.5 %
Construction Period	7 years *	including Preparatory Works

* F/C: 7.49, 4.73, 17.69, 22.03, 23.28, 16.95, 7.83 (%)

L/C: 12.33, 6.39, 18.32, 21.25, 21.02, 15.24, 5.45 (%)

Table 18.3-2 Financial Analysis (1/4) Summary of Financial Analysis

Site Name	Xe Kaman No.1	
Case: - A (Base)		
Construction Cost		1,578.32 US\$/kW
Equity Share	Lao PDR	Private S.
	100.0%	0.0%
Debt / Equity	Debt	Equity
	90.0%	10.0%
Installed Capacity	256.0	MW
Generation Energy	1,137.0	GWh
Sending-end Energy	1,011.9	GWh
Construction Cost		
Before Price Escalation	404.05	M.US\$
After Price Escalation	488.46	M.US\$
Financial Budget	585.05	M.US\$
Financial Items	Lao PDR	Private S.
Own Finance	48.84	0.00
Loan Amount	439.62	-0.00
IDC	96.59	0.00
Royalty	-	0.00
Total	585.05	-0.00
Export/Domestic Ratio for Salable Energy		
Export	100.0%	
Domestic	0.0%	
Initial Power Tariff at year 0		
Export	52.41	US\$/MWh
Domestic	34.33	US\$/MWh
Power Tariff Escalation		
Export	1.00%	
Domestic	1.00%	
Increase of Domestic Demand	2.00%	
Royalty for Construction Period	0.00%	
Royalty from Operation onwards	0.00%	
Financial Indeices		
Averaged Debt Service Coverage		1.55
Financial Internal Rate of Return		27.49%
FIRR Calculation Period		25 years
BOT Period		Years
FIRR for the BOT Period		-
General Inflation		
Foreign		2.80%
Domestic		4.50%
Financial Conditions		
Interest Rate for IDC		6.00%
Interest after Operation		6.00%
Repayment Period		25 yr
Grace Period		7 yr
Government Own finance		10.00%
Income Statement		M.US\$
Sales Revenue		3,418.75
Operating Expense		2,667.40
Financial Expense		316.55
Net Income before Tax		434.80
Income Tax		(107.65)
Net Income		327.15
To the Government		M.US\$
Royalty		0
Income Tax		107.654
Interest Payment to Equity		-
Net Income		107.654
Financial Generation Cost in Year 0 for the project life time		54.95
10.0% Discount Rate		\$/MWh

Table 18.3-2 Financial Analysis (2/4) Construction Disbursement and Loan Amount

Case: - A (Base)									Total Construction Cost (M.USS\$)					
Dam Site:	Xe Kaman No.1	Equity Proportions		Price Escalation per annum		Finance Condition		Finance Items		LAO PDR		PRV SCT		Total
Installed	256.00 MW	Lao PDR	100.0%	FIC Portion	2.8%	IDC	6.00 %	Own Finance	48.84	0.00	48.84	0.00	-0.00	48.84
Generation Energy	1,137.0 GWh	Private	0.0%	L/C Portion	4.5%	Interest Rate	6.00 %	Principal Loan	439.62	-0.00	439.62	-0.00	-0.00	439.62
Salable Energy	1,011.9 GWh	Debt/Equity Ratio	90.0%	Repayment Period	25 years	Graced Period	7 years	IDC	96.59	0.00	96.59	0.00	-0.00	96.59
Project Cost	1578.32 \$/kW	Debt	90.0%	LAO Own. Finance	10.00 %	Total	585.05	Equity / Royalty Fee	0.00	-0.00	585.05	-0.00	-0.00	585.05
F/C	342.44 M.USS\$	Equity	10.0%	Exp. Price (\$/MWh)	52.410									-
L/C	61.61 M.USS\$	Royalty for Construction	0.0%	Dom. Price (\$/MWh)	34.330									
Total	404.05 M.USS\$	Royalty from Operation	0.0%											

Year	Disbursement before Escalation for F/C M.USS\$	Price Index for F/C for L/C M.USS\$	Disbursement after Escalation for F/C for L/C M.USS\$	Total Disbursements M.USS\$	Finance Proportion Lao PDR PRV.SCT M.USS\$	Own Finance Portion Inc. Equity financed by Loan Lao PDR Lao Equity M.USS\$	Loan Portion PRV.SCT M.USS\$	Loan Cumulative			IDC M.USS\$	Royalty Fee M.USS\$
								Lao PDR PRV.SCT M.USS\$		PRV.SCT M.USS\$		
								PRV.SCT M.USS\$	Lao PDR PRV.SCT M.USS\$	PRV.SCT M.USS\$		
-10	0.00	1.0000	1.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-9	0.00	1.0280	1.0450	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-8	0.00	1.0568	1.0920	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-7	25.65	7.60	1.0864	1.1412	27.87	8.67	36.54	36.54	0.00	32.89	0.00	1.97
-6	16.20	3.94	1.1168	1.1925	18.09	4.70	22.79	22.79	0.00	20.51	0.00	3.20
-5	60.58	11.29	1.1481	1.2462	69.55	14.07	83.62	83.62	0.00	76.26	0.00	7.72
-4	75.44	13.09	1.1802	1.3023	89.03	17.05	106.08	106.08	0.00	95.47	0.00	13.45
-3	79.72	12.95	1.2133	1.3609	96.72	17.62	114.34	114.34	0.00	102.91	0.00	19.62
-2	58.04	9.39	1.2472	1.4221	72.39	13.35	85.74	85.74	0.00	77.17	0.00	24.25
-1	26.81	3.35	1.2821	1.4861	34.37	4.98	39.35	39.35	-0.00	35.41	-0.00	26.38
0	0.00	0.00	1.3180	1.5530	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sum	342.44	61.61			408.02	80.44	488.46	488.46	-0.00	48.84	0.00	96.59
									439.62	-0.00		0.00

Table 18.3-2 Financial Analysis (3/4) Income Statement

Case A (Base)		Initial F.A. (M.USS\$)	585.05
Dam Site:	Xe Kaman No. 1	Life Time (Years)	50
Initial Capacity	258 MW	Initial Dep. (M.USS\$)	11.70
Generation Energy	1137.0 GWh	FIC Escalation	2.8%
Sustainable Energy	1011.9 GWh	L/C Escalation	4.5%
Construction Cost	404.05 M.USS\$	Equity Escalation	3.1%
		(not considered)	
Exporting Ratio	100.0% Exp. Price (\$/MWh)	Initial Tax	20.0%
Domestic Use	0.0% Dom. Price (\$/MWh)	Royalty from Operation	0.0%
Increase of D.Use	2.0% Exp. Escalation	Lao PDR	100.0%
Financial Condition	Dom. Escalation	Private	
Interest Rate (%)	6	Dividend	
Repayment P. YN	25		

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Income Before Tax = Net Operation Income - Interest Payment

Current Asset in Cash = Net Operation Income + Depreciation - Debit:

The year 25 onwards are not printed in the above table intentionally.

Table 18.3-2 Financial Analysis (4/4) Financial Internal Rate of Return

Case: - A (Base)											
Dam Site:	Xe Kamen No.1	Equity Proportions		Total construction Cost (M.USS\$)				Discount Rate		10.0%	
Install Capacity	256 MW	Lao PDR	100.0%	Finance Items	LAO PDR	PRV SGT	Total	Discounted to Year	0		
Generation Energy	1137 GWh	Private	0.0%	Own Finance	48.84	0	48.84	B(enefit)	481.9		
Construction Cost	404.05 M.USS\$	Royalty from Operatio	0.0%	Principal Loan	439.62	-0	439.62	C(cost)	245.62		
		Lao PDR	100.0%	IDC	96.59	0	96.59	B/C	1.96		
		Private	0.0%	Total	585.05	-0	585.05	FIRR for the Year	24		
				Equity / Royalty Fee	0	0	0	FIRR	27.49%		

Year	Own Finance	IDC	Principal Repay.	Interest Payment	Royalty	Total Cost	Net Income after Tax	Depreciation + Interest	Total Income	NPV Current Index	(Unit M.USS\$)		NPV Cumulative	Balance B - C before Discount
											Cost	Benefit		
-10	0.00	0.00			0.00	0.00			0.00	2,5937	0.00	0.00	0.00	0.00
-9	0.00	0.00			0.00	0.00			0.00	2,3579	0.00	0.00	0.00	0.00
-8	0.00	0.00			0.00	0.00			0.00	2,1436	0.00	0.00	0.00	-3.65
-7	3.65	1.97			0.00	3.65			0.00	1,9487	7.11	0.00	7.11	0.00
-6	2.28	3.20			0.00	2.28			0.00	1,7716	4.04	0.00	11.15	0.00
-5	8.36	7.72			0.00	8.36			0.00	1,6105	13.46	0.00	24.61	0.00
-4	10.61	13.45			0.00	10.61			0.00	1,4641	15.53	0.00	40.14	0.00
-3	11.43	19.62			0.00	11.43			0.00	1,3310	15.21	0.00	55.35	0.00
-2	8.57	24.25			0.00	8.57			0.00	1,2100	10.37	0.00	65.72	0.00
-1	3.94	26.38			0.00	3.94			0.00	1,1000	4.33	0.00	70.05	0.00
0			17.59	25.32		17.59	8.68	37.02	45.70	1,0000	17.59	45.70	87.64	45.70
1			17.59	24.27		17.59	9.57	36.33	45.90	0.9091	15.99	41.73	103.63	87.43
2			17.59	23.21		17.59	10.45	35.65	46.10	0.8264	14.53	38.10	118.16	125.53
3			17.59	22.16		17.59	11.30	34.98	46.28	0.7513	13.21	34.77	131.37	143.38
4			17.59	21.10		17.59	12.13	34.32	46.45	0.6830	12.01	31.73	143.38	192.03
5			17.59	20.05		17.59	10.34	33.68	44.02	0.6209	10.92	27.33	154.30	219.36
6			17.59	18.99		17.59	10.97	33.04	44.01	0.5645	9.93	24.84	164.23	244.20
7			17.59	17.94		17.59	11.57	32.43	44.00	0.5132	9.02	22.58	173.25	266.78
8			17.59	16.88		17.59	12.15	31.82	43.97	0.4665	8.20	20.51	181.45	287.29
9			17.59	15.83		17.59	12.70	31.23	43.93	0.4241	7.46	18.63	188.91	305.92
10			17.59	14.77		17.59	13.24	30.65	43.89	0.3855	6.78	16.92	195.69	322.84
11			17.59	13.72		17.59	13.75	30.09	43.84	0.3505	6.16	15.37	201.85	338.21
12			17.59	12.66		17.59	14.23	29.54	43.77	0.3186	5.60	13.95	207.45	352.16
13			17.59	11.61		17.59	14.70	29.01	43.71	0.2897	5.09	12.66	212.54	364.82
14			17.59	10.55		17.59	15.13	28.49	43.62	0.2633	4.63	11.49	217.17	376.31
15			17.59	9.50		17.59	15.51	28.00	43.51	0.2394	4.21	10.42	221.38	386.73
16			17.59	8.44		17.59	15.89	27.51	43.40	0.2176	3.83	9.44	225.21	396.17
17			17.59	7.39		17.59	16.22	27.05	43.27	0.1978	3.48	8.56	228.69	404.73
18			17.59	6.33		17.59	16.53	26.60	43.13	0.1799	3.16	7.76	231.85	412.49
19			17.59	5.28		17.59	16.78	26.18	42.96	0.1635	2.88	7.02	234.73	419.51
20			17.59	4.22		17.59	17.02	25.77	42.79	0.1486	2.61	6.36	237.34	425.87
21			17.59	3.17		17.59	17.20	25.39	42.59	0.1351	2.38	5.75	239.72	431.82
22			17.59	2.11		17.59	17.36	25.01	42.37	0.1228	2.16	5.20	241.88	436.82
23			17.59	1.05		17.59	17.47	24.66	42.13	0.1117	1.96	4.71	243.84	441.53
24			17.59	0.00		17.59	17.53	24.35	41.88	0.1019	1.78	4.25	245.62	445.78
25						0.00	16.71	25.10	41.81	0.0923	0.00	3.86	245.62	449.84
26						0.00	15.85	25.88	41.73	0.0839	0.00	3.50	245.62	453.14
27						0.00	14.92	26.68	41.60	0.0763	0.00	3.17	245.62	456.31
28						0.00	13.94	27.51	41.45	0.0693	0.00	2.87	245.62	459.18
29						0.00	12.92	28.36	41.28	0.0630	0.00	2.60	245.62	461.78
30						0.00	11.84	29.24	41.08	0.0573	0.00	2.35	245.62	464.13
31						0.00	10.70	30.15	40.85	0.0521	0.00	2.13	245.62	466.26
32						0.00	9.50	31.08	40.58	0.0474	0.00	1.92	245.62	468.18
33						0.00	8.23	32.04	40.27	0.0431	0.00	1.74	245.62	469.92
34						0.00	6.90	33.04	39.94	0.0391	0.00	1.56	245.62	471.48
35						0.00	5.49	34.06	39.55	0.0356	0.00	1.41	245.62	472.89
36						0.00	4.02	35.12	39.14	0.0323	0.00	1.26	245.62	474.15
37						0.00	2.47	36.21	38.68	0.0294	0.00	1.14	245.62	475.29
38						0.00	0.84	37.33	38.17	0.0267	0.00	1.02	245.62	476.31
39						0.00	-1.09	38.49	37.40	0.0243	0.00	0.91	245.62	477.22
40						0.00	-3.34	39.68	36.34	0.0221	0.00	0.80	245.62	478.02
41						0.00	-5.69	40.91	35.22	0.0201	0.00	0.71	245.62	478.73
42						0.00	-8.17	42.18	34.01	0.0183	0.00	0.62	245.62	479.35
43						0.00	-10.75	43.48	32.73	0.0166	0.00	0.54	245.62	479.88
44						0.00	-13.48	44.83	31.35	0.0151	0.00	0.47	245.62	480.36
45						0.00	-16.34	46.22	29.88	0.0137	0.00	0.41	245.62	480.77
46						0.00	-19.34	47.66	28.32	0.0125	0.00	0.35	245.62	481.12
47						0.00	-22.46	49.13	26.67	0.0113	0.00	0.30	245.62	481.42
48						0.00	-25.75	50.66	24.91	0.0103	0.00	0.26	245.62	481.68
49						0.00	-29.19	52.22	23.03	0.0094	0.00	0.22	245.62	481.90
Sum	48.84	96.59	439.63	316.55	0.00	488.47	327.15	1676.06	2003.21	245.62	481.90		1514.75	

Note: Financial Generation Cost (FGC) is calculated as below.

$$FGC = NPV(\text{Own Finance} + IDC + Royalty + O/M Cost + Prc Repayment + Interest Payment) / NPV(\text{Generation Energy})$$

 Total Cost does not include IDC and Interest Payment for the purpose of FIRR calculation.

Financial Generation Cost in Year 0 at
10.0% discount rate
\$/MWh

Table 18.3-3 Financial Analysis (1/4) Summary of Financial Analysis

Site Name			Xe Kaman No1		Financial Indexes	
Case: - B (Base)						
Construction Cost			1,578.32	US\$/kW	Averaged Debt Service Coverage	
Equity Share	Lao PDR	Private S.			0.83	
	25.0%	75.0%			Financial Internal Rate of Return	
Debt / Equity	Debt	Equity	FIRR Calculation Period		-13.68%	
	70.0%	30.0%	BOT Period		10 years	
Installed Capacity			BOT Period		25 Years	
Generation Energy			FIRR for the BOT Period		7.97%	
Sending-end Energy						
Construction Cost			General Inflation			
Before Price Escalation			Foreign		2.80%	
After Price Escalation			Domestic		4.50%	
Financial Budget			Financial Conditions			
			Interest Rate for IDC		10.00%	
			Interest after Operation		10.00%	
			Repayment Period		10 yr	
			Grace Period		7 yr	
			Government Own finance		0.00%	
Financial Items			Income Statement		M.US\$	
Own Finance			Sales Revenue		3,418.75	
Loan Amount			Operating Expense		3,075.93	
IDC			Financial Expense		153.87	
Royalty			Net Income before Tax		188.95	
Total			Income Tax		(92.56)	
Export/ Domestic Ratio for Saleable Energy			Net Income		96.39	
Export			To the Government		M.US\$	
Domestic			Royalty		341.93	
Initial Power Tariff at year 0			Income Tax		92.558	
Export			Interest Payment to Equity		-	
Domestic			Net Income		434.488	
Power Tariff Escalation			Financial Generation Cost in Year 0 for the project life time		74.67	
Export			10.0% Discount Rate		\$/MWh	
Domestic						
Increase of Domestic Demand						
Royalty for Construction Period						
Royalty from Operation onwards						

Table 18.3-3 Financial Analysis (2/4) Construction Disbursement and Loan Amount

Case: - B (Base)									
Dam Site:	Xe Kaman No1		Equity Proportions		Price Escalation per annum		Finance Condition		Total Construction Cost (M.USS\$)
Installed:	256.00 MW	Lao PDR	25.0%	F/C Portion	2.8%	IDC	10.00 %	Finance Items	LAO PDR PRV SCT Total
Generation Energy	1.137.0 GWh	Private	75.0%	L/C Portion	4.5%	Interest Rate	10.00 %	Own Finance	36.64 109.90 146.54
Saleable Energy	1.011.9 GWh	Debt/Equity Ratio				Repayment Period	10 years	Principal Loan	85.50 256.42 341.92
Project Cost	1578.32 \$/kW	Debt	70.0%			Graced Period	7 years	IDC	31.31 93.90 125.21
FIC	342.44 M.USS	Equity	30.0%	Exporting Ratio	100.0%	LAO Own Finance	0.00 %	Total	153.45 460.22 613.67
L/C	61.61 M.USS	Royalty for Construction	0.0%	Exp. Price (\$/MWh)	52.410			Equity / Royalty Fee	36.64 0.00 -
Total	404.05 M.USS	Royalty from Operation	10.0%	Dom. Price (\$/MWh)	34.330				

Year	Disbursement before Escalation			Disbursement after Escalation			Total Disburse			Own Finance Proportion Inc. Equity Financed by Loan			Loan Portion			Loan Cumulative			IDC			Royalty Fee		
	for F/C			for L/C			for F/C			for L/C			Lao PDR PRV SCT Lao PDR PRV SCT Lao PDR PRV SCT			Lao PDR PRV SCT Lao PDR PRV SCT Lao PDR PRV SCT			Lao PDR PRV SCT Lao PDR PRV SCT Lao PDR PRV SCT			Lao PDR PRV SCT Lao PDR PRV SCT Lao PDR PRV SCT		
	M.USS	M.USS	M.USS	M.USS	M.USS	M.USS	M.USS	M.USS	M.USS	M.USS	M.USS	M.USS	M.USS	M.USS	M.USS	M.USS	M.USS	M.USS	M.USS	M.USS	M.USS	M.USS	M.USS	
-10	0.00	0.00	1.00000	1.00000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
-9	0.00	0.00	1.02800	1.04500	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
-8	0.00	0.00	1.05688	1.09200	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
-7	25.65	7.60	1.0864	1.1412	27.87	8.67	36.54	9.14	27.40	0.00	2.74	8.22	6.40	19.18	6.40	19.18	6.40	19.18	6.40	19.18	6.40	19.18		
-6	16.20	3.94	1.11168	1.1925	18.09	4.70	22.79	5.70	17.09	0.00	1.71	5.13	3.99	11.96	10.39	11.96	10.39	11.96	10.39	11.96	10.39	11.96		
-5	60.58	11.29	1.14481	1.2462	69.55	14.07	63.62	20.91	62.71	0.00	6.27	18.81	14.64	43.90	25.03	43.90	25.03	43.90	25.03	43.90	25.03	43.90		
-4	75.44	13.09	1.1802	1.3023	89.03	17.05	106.08	26.52	79.56	0.00	7.96	23.87	18.56	55.69	43.59	55.69	43.59	55.69	43.59	55.69	43.59	55.69		
-3	79.72	12.95	1.2133	1.3609	96.72	17.62	114.34	28.59	85.75	0.00	8.58	25.73	20.01	60.02	63.60	60.02	63.60	60.02	63.60	60.02	63.60	60.02		
-2	58.04	9.39	1.2472	1.4221	72.39	13.35	85.74	21.44	64.30	0.00	6.43	19.29	15.01	45.01	45.01	45.01	45.01	45.01	45.01	45.01	45.01	45.01		
-1	26.81	3.35	1.2821	1.49861	34.37	4.98	39.35	9.84	29.51	0.00	2.95	8.85	6.89	20.66	85.50	20.66	85.50	20.66	85.50	20.66	85.50	20.66		
0	0.00	0.00	1.3180	1.55330	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Sum	32.44	61.61			408.02	80.44	488.46	122.14	366.32	0.00	36.64	109.90	85.50	256.42	31.31	256.42	31.31	256.42	31.31	256.42	31.31	256.42		

Table 18.3-3 Financial Analysis (3/4) Income Statement

Cases - B (Base)		Xe Kamman No1		Exporting Ratio		100.0% Exp. Price (\$/MWh)		52.41 O/H cost		1.5% of T. Diesel Income Tax		20.0% Initial F.A. (M.USS)		613.67	
Dam Site:	256 MW	Domestic Use	0.0%	Dom.Price (\$/MWh)	34.33 Fuel Cost	\$/MWh	0.00	Royalty from Operation	Lao PDR	10.0% Life Time (Years)	50	Initial Dep. (M.USS)	56	12.27	
Install. Capacity	1137.0 GWh	Increase of D.Use	2.0%	Exp. Escalation	1.00%					FIC Escalation	25.0%				
Generation Energy	1011.9 GWh	Financial Condition		Dom. Escalation	1.00%	P Repay.	34.19 MUSS.p.a	Private Dividend	75.0%						
Sustainable Energy		Interest Rate (%)	10					(not considered)	2.5%	L/C Escalation					
Construction Cost	404.05 M.USS	Repayment P. (yr)	10							Escalation					

Note: Net Operations Income = Sales Revenue - COGS - Royalty - Depreciation

income before Tax = Net Corporation Income - Interest Payment

Segment Margin in Czech = Net Contribution Income + Direct Expenses

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The year 23 orwards are not printed in the above table if they have not been issued.

Table 18.3-3 Financial Analysis (4/4) Financial Internal Rate of Return

Case: - B (Base)

Dam Site:	Xe Kaman No1	Equity Proportions	Total construction Cost (M.US\$)				Discount Rate	10.0%
			Finance Items	LAO PDR	PRV SCT	Total		
Install Capacity	256 MW	Lao PDR	25.0%	Own Finance	36.64	109.9	146.54	B(enefit)
Generation Energy	1137 GWh	Private	75.0%	Principal Loan	85.5	256.42	341.92	C(cost)
		Royalty from Operatio	10.0%	IDC	31.31	93.9	125.21	B/C
Construction Cost	404.05 M.US\$	Lao PDR	25.0%	Total	153.45	460.22	613.87	FIRR for the Year
		Private	75.0%	Equity / Royalty Fee	36.64	0	-	FIRR

(Unit M.US\$)

Year	Own Finance	IDC	Principal Repay.	Interest Payment	Royalty	Total Cost	Net Income after Tax	Depreciation + Interest	Total Income	NPV Convert. Index	Net Present Value		NPV Cumulative		Balance B - C before Discount
											Cost	Benefit	Cost (C)	Benefit (B)	
-10	0.00	0.00			0.00	0.00			0.00	2.5937	0.00	0.00	0.00	0.00	0.00
-9	0.00	0.00			0.00	0.00			0.00	2.3579	0.00	0.00	0.00	0.00	0.00
-8	0.00	0.00			0.00	0.00			0.00	2.1436	0.00	0.00	0.00	0.00	0.00
-7	10.96	2.56			0.00	10.96			0.00	1.9487	21.36	0.00	21.36	0.00	-10.96
-6	6.84	4.15			0.00	6.84			0.00	1.7716	12.12	0.00	33.48	0.00	-6.84
-5	25.08	10.00			0.00	25.08			0.00	1.6105	40.39	0.00	73.87	0.00	-25.08
-4	31.83	17.43			0.00	31.83			0.00	1.4641	46.60	0.00	120.47	0.00	-31.83
-3	34.31	25.44			0.00	34.31			0.00	1.3310	45.67	0.00	166.14	0.00	-34.31
-2	25.72	31.44			0.00	25.72			0.00	1.2100	31.12	0.00	197.26	0.00	-25.72
-1	11.80	34.19			0.00	11.80			0.00	1.1000	12.98	0.00	210.24	0.00	-11.80
0			34.19	30.77		34.19	-2.64	43.04	40.40	1.0000	34.19	40.40	244.43	40.40	6.21
1			34.19	27.35		34.19	0.54	40.00	40.54	0.9091	31.08	36.85	275.51	77.25	6.35
2			34.19	23.93		34.19	3.71	36.98	40.69	0.8264	28.26	33.63	303.77	110.88	6.50
3			34.19	20.52		34.19	6.85	33.97	40.82	0.7513	25.69	30.67	329.46	141.55	6.63
4			34.19	17.10		34.19	9.96	30.97	40.93	0.6830	23.35	27.96	352.81	169.51	6.74
5			34.19	13.68		34.19	10.45	27.98	38.43	0.6209	21.23	23.86	374.04	193.37	4.24
6			34.19	10.26		34.19	12.90	25.00	37.90	0.5645	19.30	21.39	393.34	214.76	3.71
7			34.19	6.84		34.19	15.33	22.04	37.37	0.5132	17.55	19.18	410.89	233.94	3.18
8			34.19	3.42		34.19	17.74	19.09	36.83	0.4665	15.95	17.18	426.84	251.12	2.64
9			34.19	0.00		34.19	20.13	16.15	36.28	0.4241	14.50	15.39	441.34	266.51	2.09
10			0.00	0.00		0.00	19.74	16.66	36.40	0.3855	0.00	14.03	441.34	280.54	36.40
11			0.00	0.00		0.00	19.35	17.17	36.52	0.3505	0.00	12.80	441.34	293.34	36.52
12			0.00	0.00		0.00	18.92	17.70	36.62	0.3186	0.00	11.67	441.34	305.01	36.62
13			0.00	0.00		0.00	18.47	18.25	36.72	0.2897	0.00	10.64	441.34	315.65	36.72
14			0.00	0.00		0.00	17.98	18.82	36.80	0.2633	0.00	9.69	441.34	325.34	36.80
15			0.00	0.00		0.00	17.46	19.40	36.86	0.2394	0.00	8.82	441.34	334.16	36.86
16			0.00	0.00		0.00	16.92	20.00	36.92	0.2176	0.00	8.03	441.34	342.19	36.92
17			0.00	0.00		0.00	16.34	20.62	36.96	0.1978	0.00	7.31	441.34	349.50	36.96
18			0.00	0.00		0.00	15.73	21.26	36.99	0.1799	0.00	6.65	441.34	356.15	36.99
19			0.00	0.00		0.00	15.06	21.92	36.98	0.1635	0.00	6.05	441.34	362.20	36.98
20			0.00	0.00		0.00	14.38	22.60	36.98	0.1486	0.00	5.50	441.34	367.70	36.98
21			0.00	0.00		0.00	13.64	23.30	36.94	0.1351	0.00	4.99	441.34	372.69	36.94
22			0.00	0.00		0.00	12.86	24.03	36.89	0.1228	0.00	4.53	441.34	377.22	36.89
23			0.00	0.00		0.00	12.05	24.77	36.82	0.1117	0.00	4.11	441.34	381.33	36.82
24			0.00	0.00		0.00	11.19	25.54	36.73	0.1015	0.00	3.73	441.34	385.06	36.73
25			0.00	0.00		0.00	10.29	26.33	36.62	0.0923	0.00	3.38	441.34	388.44	36.62
26			0.00	0.00		0.00	9.34	27.15	36.49	0.0839	0.00	3.06	441.34	391.50	36.49
27			0.00	0.00		0.00	8.32	27.99	36.31	0.0763	0.00	2.77	441.34	394.27	36.31
28			0.00	0.00		0.00	7.26	28.86	36.12	0.0693	0.00	2.50	441.34	396.77	36.12
29			0.00	0.00		0.00	6.14	29.75	35.89	0.0630	0.00	2.26	441.34	399.03	35.89
30			0.00	0.00		0.00	4.98	30.67	35.65	0.0573	0.00	2.04	441.34	401.07	35.65
31			0.00	0.00		0.00	3.74	31.62	35.36	0.0521	0.00	1.84	441.34	402.91	35.36
32			0.00	0.00		0.00	2.44	32.61	35.05	0.0474	0.00	1.66	441.34	404.57	35.05
33			0.00	0.00		0.00	1.07	33.62	34.69	0.0431	0.00	1.50	441.34	406.07	34.69
34			0.00	0.00		0.00	-0.44	34.66	34.22	0.0391	0.00	1.34	441.34	407.41	34.22
35			0.00	0.00		0.00	-2.32	35.73	33.41	0.0356	0.00	1.19	441.34	408.60	33.41
36			0.00	0.00		0.00	-4.29	36.04	32.55	0.0323	0.00	1.05	441.34	409.65	32.56
37			0.00	0.00		0.00	-6.34	37.98	31.64	0.0294	0.00	0.93	441.34	410.58	31.64
38			0.00	0.00		0.00	-8.52	39.16	30.64	0.0267	0.00	0.82	441.34	411.40	30.64
39			0.00	0.00		0.00	-10.79	40.37	29.58	0.0243	0.00	0.72	441.34	412.12	29.58
40			0.00	0.00		0.00	-13.19	41.63	28.44	0.0221	0.00	0.63	441.34	412.75	28.44
41			0.00	0.00		0.00	-15.67	42.91	27.24	0.0201	0.00	0.55	441.34	413.30	27.24
42			0.00	0.00		0.00	-18.30	44.25	25.95	0.0183	0.00	0.47	441.34	413.77	26.95
43			0.00	0.00		0.00	-21.03	45.62	24.59	0.0166	0.00	0.41	441.34	414.18	24.59
44			0.00	0.00		0.00	-23.90	47.03	23.13	0.0151	0.00	0.35	441.34	414.53	23.13
45			0.00	0.00		0.00	-26.91	48.49	21.58	0.0137	0.00	0.30	441.34	414.83	21.58
46			0.00	0.00		0.00	-30.05	49.99	19.94	0.0125	0.00	0.25	441.34	415.08	19.94
47			0.00	0.00		0.00	-33.34	51.54	18.20	0.0113	0.00	0.21	441.34	415.29	18.20
48			0.00	0.00		0.00	-36.78	53.14	16.36	0.0103	0.00	0.17	441.34	415.46	16.36
49			0.00	0.00		0.00	-40.39	54.78	14.39	0.0094	0.00	0.14	441.34	415.60	14.39
Sum	146.54	125.21	341.92	153.87	0.00	488.46	96.38	1579.98	1676.36		441.34	415.60		1187.90	

Note: Financial Generation Cost (FGC) is calculated as below.

FGC=NPV(Own Finance + IDC + Royalty + O/M Cost + Prc Repayment + Interest Payment)

/ NPV(Generation Energy)

Total Cost does not include IDC and Interest Payment for the purpose of FIRR calculation.

Financial Generation Cost in Year 0 at
10.0% discount rate

\$/MWh

Table 18.3-4 Financial Analysis

Summary of Financial Analysis

Site Name	Xe Kaman No.1	
Case: - A (Case 1: Allocated T/L system)		
Construction Cost	1,691.13 US\$/kW	
Equity Share	Lao PDR	Private S.
	100.0%	0.0%
Debt / Equity	Debt	Equity
	90.0%	10.0%
Installed Capacity	256.0 MW	
Generation Energy	1,137.0 GWh	
Sending-end Energy	1,011.9 GWh	
Construction Cost		
Before Price Escalation	432.93 M.US\$	
After Price Escalation	523.26 M.US\$	
Financial Budget	626.72 M.US\$	
Financial Items	Lao PDR	Private S.
Own Finance	52.34	0.00
Loan Amount	470.92	-0.00
IDC	103.46	0.00
Royalty		0.00
Total	626.72	-0.00
Export/Domestic Ratio for Salable Energy		
Export	100.0%	
Domestic	0.0%	
Initial Power Tariff at year 0		
Export	52.41 US\$/MWh	
Domestic	34.33 US\$/MWh	
Power Tariff Escalation		
Export	1.00%	
Domestic	1.00%	
Increase of Domestic Demand	2.00%	
Royalty for Construction Period	0.00%	
Royalty from Operation onwards	0.00%	
Financial Indeces		
Averaged Debt Service Coverage		1.42
Financial Internal Rate of Return		25.37%
FIRR Calculation Period		25 years
BOT Period		
-- Years		
FIRR for the BOT Period		
General Inflation		
Foreign		2.80%
Domestic		4.50%
Financial Conditions		
Interest Rate for IDC		6.00%
Interest after Operation		6.00%
Repayment Period		25 yr
Graced Period		7 yr
Government Own finance		10.00%
Income Statement		
M.US\$		
Sales Revenue		3,418.75
Operating Expense		2,857.44
Financial Expense		339.00
Net Income before Tax		222.31
Income Tax		(84.68)
Net Income		137.63
To the Government		
M.US\$		
Royalty		0
Income Tax		84.682
Interest Payment to Equity		-
Net Income		84.682
Financial Generation Cost in Year 0 for the project life time		
58.85		
10.0% Discount Rate		
\$/MWh		

Table 18.3-5 Financial Analysis

Summary of Financial Analysis

Site Name	Xe Kaman No.1	
Case: - A (Case 2: Independent T/L))		
Construction Cost	1,726.95 US\$/kW	
Equity Share	Lao PDR	Private S.
	100.0%	0.0%
Debt / Equity	Debt	Equity
	90.0%	10.0%
Installed Capacity	256.0	MW
Generation Energy	1,137.0	GWh
Sending-end Energy	1,011.9	GWh
Construction Cost		
Before Price Escalation	442.10	M.US\$
After Price Escalation	534.32	M.US\$
Financial Budget	639.95 M.US\$	
Financial Items	Lao PDR	Private S.
Own Finance	53.44	0.00
Loan Amount	480.88	-0.00
IDC	105.63	0.00
Royalty	-	0.00
Total	639.95	-0.00
Export/Domestic Ratio for Salable Energy		
Export	100.0%	
Domestic	0.0%	
Initial Power Tariff at year 0		
Export	52.41	US\$/MWh
Domestic	34.33	US\$/MWh
Power Tariff Escalation		
Export	1.00%	
Domestic	1.00%	
Increase of Domestic Demand	2.00%	
Royalty for Construction Period	0.00%	
Royalty from Operation onwards	0.00%	
Financial Indeces		
Averaged Debt Service Coverage		1.38
Financial Internal Rate of Return		24.73%
FIRR Calculation Period		25 years
BOT Period	-- Years	
FIRR for the BOT Period	-	
General Inflation		
Foreign		2.80%
Domestic		4.50%
Financial Conditions		
Interest Rate for IDC		6.00%
Interest after Operation		6.00%
Repayment Period		25 yr
Graced Period		7 yr
Government Own finance		10.00%
Income Statement		
Sales Revenue		3,418.75
Operating Expense		2,917.79
Financial Expense		346.23
Net Income before Tax		154.73
Income Tax		(77.95)
Net Income		76.78
To the Government		
Royalty		0
Income Tax		77.952
Interest Payment to Equity		-
Net Income		77.952
Financial Generation Cost in Year 0 for the project life time		
10.0% Discount Rate		\$/MWh
		60.1

Table 18.3-6 Financial Analysis

Summary of Financial Analysis

Site Name	Xe Kaman No1	
Case: - B (Case 1: Allocated T/L system)		
Construction Cost	1,691.13 US\$/kW	
Equity Share	Lao PDR	Private S.
	25.0%	75.0%
Debt / Equity	Debt	Equity
	70.0%	30.0%
Installed Capacity	256.0	MW
Generation Energy	1,137.0	GWh
Sending-end Energy	1,011.9	GWh
Construction Cost		
Before Price Escalation	432.93	M.US\$
After Price Escalation	523.26	M.US\$
Financial Budget	657.36	M.US\$
Financial Items	Lao PDR	Private S.
Own Finance	39.25	117.73
Loan Amount	91.57	274.71
IDC	33.53	100.57
Royalty		0.00
Total	164.35	493.01
Export/Domestic Ratio for Salable Energy		
Export	100.0%	
Domestic	0.0%	
Initial Power Tariff at year 0		
Export	52.41 US\$/MWh	
Domestic	34.33 US\$/MWh	
Power Tariff Escalation		
Export	1.00%	
Domestic	1.00%	
Increase of Domestic Demand	2.00%	
Royalty for Construction Period	0.00%	
Royalty from Operation onwards	10.00%	
Financial Indeces		
Averaged Debt Service Coverage	0.76	
Financial Internal Rate of Return	-31.25%	
FIRR Calculation Period	10 years	
BOT Period	25 Years	
FIRR for the BOT Period	6.83%	
General Inflation		
Foreign	2.80%	
Domestic	4.50%	
Financial Conditions		
Interest Rate for IDC	10.00%	
Interest after Operation	10.00%	
Repayment Period	10 yr	
Grace Period	7 yr	
Government Own finance	0.00%	
Income Statement M.US\$		
Sales Revenue	3,418.75	
Operating Expense	3,270.55	
Financial Expense	164.83	
Net Income before Tax	(16.63)	
Income Tax	(76.20)	
Net Income	(92.83)	
To the Government M.US\$		
Royalty	341.93	
Income Tax	76.196	
Interest Payment to Equity	-	
Net Income	418.126	
Financial Generation Cost in Year 0 for the project life time \$/MWh		
10.0% Discount Rate	79.61	

Table 18.3-7 Financial Analysis

Summary of Financial Analysis

Site Name	Xe Kaman No1	
Case: - B (Case 2: Independent T/L)		
Construction Cost 1,726.95 US\$/kW		
Equity Share	Lao PDR	Private S.
	25.0%	75.0%
Debt / Equity	Debt	Equity
	70.0%	30.0%
Installed Capacity	256.0	MW
Generation Energy	1,137.0	GWh
Sending-end Energy	1,011.9	GWh
Construction Cost		
Before Price Escalation	442.10	M.US\$
After Price Escalation	534.32	M.US\$
Financial Budget	671.27	M.US\$
Financial Items	Lao PDR	Private S.
Own Finance	40.07	120.23
Loan Amount	93.52	280.50
IDC	34.26	102.69
Royalty		0.00
Total	167.85	503.42
Export/ Domestic Ratio for Salable Energy		
Export	100.0%	
Domestic	0.0%	
Initial Power Tariff at year 0		
Export	52.41 US\$/MWh	
Domestic	34.33 US\$/MWh	
Power Tariff Escalation		
Export	1.00%	
Domestic	1.00%	
Increase of Domestic Demand	2.00%	
Royalty for Construction Period	0.00%	
Royalty from Operation onwards	10.00%	
Financial Indeces		
Averaged Debt Service Coverage		0.74
Financial Internal Rate of Return		NA
FIRR Calculation Period		10 years
BOT Period		
25 Years		
FIRR for the BOT Period		
6.48%		
General Inflation		
Foreign		2.80%
Domestic		4.50%
Financial Conditions		
Interest Rate for IDC		10.00%
Interest after Operation		10.00%
Repayment Period		10 yr
Graced Period		7 yr
Government Own finance		0.00%
Income Statement		
Sales Revenue		3,418.75
Operating Expense		3,332.51
Financial Expense		168.30
Net Income before Tax		(82.06)
Income Tax		(71.46)
Net Income		(153.52)
To the Government		
Royalty		341.93
Income Tax		71.462
Interest Payment to Equity		-
Net Income		413.392
Financial Generation Cost in Year 0 for the project life time		
10.0% Discount Rate		\$/MWh
81.19		

18.4 Xe Namnoy Project

18.4.1 Xe Namnoy (Midstream + Downstream)

(1) Basic Conditions of Xe Namnoy (Midstream + Downstream)

The project consists of following characteristics.

- Installed Capacity 305 MW
- Firm Capacity 296 MW
- Salable Energy 1,231.8 GWh
- Construction Cost 433.22 M.US\$

More detailed conditions are shown in Table 18.4-1.

(2) Results of Financial Analysis and Sensitivity Test

a) Case-A

The results are shown in below and more detailed information are shown in Table 18.4-2, Table 18.4-4 and Table 18.4-5.

Case	DSC	FIRR	Levelized Financial Generation Cost *
Basic	1.75	37.28%	46.51 \$/MWh
Case 1	1.59	34.12%	50.19 \$/MWh
Case 2	1.61	34.62%	49.60 \$/MWh

* with 10 % discount rate for the project life time (50 years)

DSC and FIRR indicate that the project will be run financially sound well.