

TABLES

Table 2.1 List of Generation Facilities

(As of 1994/E)

Region	Name of Power Station		Inst. Cap. (MW)	Avail. Cap. (MW)	Commissioning Year	
North (PC1)	Hydro	Thac Ba	3 x 36	108	#1 ('70), #2 ('71), #3 ('73)	
		Hoa Binh	8 x 240 (2,028)	1,920 (2,028)	#1 ('88), #2 ('89), #3 ('91), #4 ('91), #5 ('93), #6 ('93), #7 ('93), #8 ('94)	
	Thermal	Ninh Binh	4 x 25	100	#1 ('74), #2 ('75), #3 ('75), #4 ('76)	
		Uong Bi	1 x 50 1 x 55	100	'75 '77	
		Pha Lai	4 x 110 (645)	440 (640)	#1 ('83), #2 ('84), #3 ('85), #4 ('86)	
	GT	Thai Binh	2 x 14	12		
	Total	2,701	2,680			
South (PC2)	Hydro	Da Nhim	4 x 40	160	#1 ('63), #2 ('63), #3 ('64), #4 ('64)	
		Tri An	4 x 100	400	#1 ('88), #2 ('88), #3 ('89), #4 ('89)	
		Thac Mo	2 x 75	150	'94	
		Suoi Vang	3.1	3	'57	
			(713)	(713)		
	Thermal	Thu Duc	1 x 33 2 x 66	156	'66 '72	
		Tra Noc	1 x 33	32	'75	
		Old	1 x 7.2	3		
			(205)	(193)		
	GT	Thu Duc	GT1	23.4	15	'91
			GT2	12.5	7	'91
GT3			14.7	11	'91	
GT4/5			2 x 37.5	64	'92	
Ba Ria		GT1/2	2 x 23.4	30	'91	
		GT3/7	5 x 37.5	160	'92, '94	
Tra Noc	GT1/2	2 x 14 (388)	0 (287)	'68		
Diesel	Urban Province		126	41		
			75	37		
			(201)	(78)		
	Total	1,507	1,271			
Centre (PC3)	Hydro	Vinh Son	2 x 33	66	'94	
		Dray Linh	12.0	12.0		
		An Diem	5.4	5.4		
		Pha Minh	2.0	1.6		
			(85)	(85)		
Diesel		177.4	115			
	Total	262	200			
	Grand Total	4,470	4,151			

Source: IEV

Table 3.1 Historical Trends of Power Consumption and Generation in Viet Nam

Year	Year Demand (GWh)					Losses Generation (GWh)										Share (%)		
	Industry	Non-I.	Trans.	Agri.	House.	Total	Thermal	Hydro	Diesel	G.T.	Thermal	Hydro	Diesel	G.T.	Thermal	Hydro	Diesel	G.T.
1976	2,218.4	1,117.7	116.2	27.7	218.1	738.7	25.2	2,964.6	1,854.9	831.0	275.6	3.1	62.57	28.03	9.30	0.10		
1977	2,498.5	1,298.5	136.7	21.1	251.8	790.4	25.5	3,353.6	1,955.2	1,133.1	264.8	0.5	58.30	33.79	7.90	0.01		
1978	2,740.1	1,481.0	152.2	24.8	290.6	791.5	26.1	3,705.7	2,083.8	1,330.8	289.9	1.2	56.23	35.91	7.82	0.03		
1979	2,726.1	1,498.0	229.9	42.9	282.0	673.3	27.8	3,775.6	2,022.3	1,447.5	285.7	20.1	53.56	38.34	7.57	0.53		
1980	2,670.3	1,401.9	237.0	31.9	337.8	661.7	25.0	3,559.0	1,740.7	1,488.2	316.0	14.2	48.91	41.81	8.88	0.40		
1981	2,790.5	1,501.8	266.9	34.4	301.5	685.9	25.1	3,726.3	1,844.4	1,506.9	333.6	41.4	49.50	40.44	8.95	1.11		
1982	2,957.2	1,644.1	317.7	40.2	236.8	718.4	25.6	3,974.4	1,981.6	1,559.6	331.6	101.6	49.86	39.24	8.34	2.56		
1983	3,082.8	1,716.9	330.4	31.3	237.1	767.1	25.3	4,125.3	2,295.9	1,223.2	389.5	216.7	55.65	29.65	9.44	5.25		
1984	3,599.8	2,020.4	381.7	38.5	305.2	854.0	24.7	4,778.5	2,616.1	1,599.0	373.4	190.0	54.75	33.46	7.81	3.98		
1985	3,868.5	2,107.8	427.5	36.0	302.9	994.3	23.6	5,064.7	3,017.7	1,472.1	409.2	165.7	59.58	29.07	8.08	3.27		
1986	4,146.0	2,197.0	482.3	40.1	332.2	1,094.4	25.0	5,526.7	3,627.1	1,401.9	394.6	103.1	65.63	25.37	7.14	1.87		
1987	4,603.5	2,383.5	553.5	37.2	386.5	1,242.8	23.9	6,049.7	4,155.2	1,375.7	400.7	118.1	68.68	22.74	6.62	1.95		
1988	5,063.2	2,589.3	637.0	39.4	441.2	1,356.3	25.4	6,783.2	4,432.9	1,785.5	425.6	139.3	65.35	26.32	6.27	2.05		
1989	5,660.8	2,621.1	655.6	42.0	465.4	1,876.7	27.3	7,791.8	3,462.0	3,825.3	436.5	68.1	44.43	49.09	5.60	0.87		
1990	6,187.1	2,846.7	665.8	51.5	586.7	2,036.4	28.7	8,678.5	2,841.1	5,368.7	410.7	58.0	32.74	61.86	4.73	0.67		
1991	6,585.6	3,079.9	590.9	53.8	807.4	2,053.6	28.0	9,152.0	2,424.7	6,316.5	309.8	101.0	26.49	69.02	3.39	1.10		
1992	6,925.4	3,192.6	550.4	55.5	974.1	2,152.8	28.2	9,652.1	1,887.4	7,228.1	318.6	218.0	19.55	74.89	3.30	2.26		
*1993	8,006.8	3,644.7	632.4	63.8	429.5	3,236.4	25.4	10,728.9	1,776.3	7,965.0	360.7	626.9	16.56	74.24	3.36	5.84		

Average of Annual Growth Rate (%)

76-80	4.74	5.83	19.50	3.59	1.10	4.67
80-85	7.70	8.50	12.52	2.45	5.35	7.31
85-90	9.85	6.19	9.27	7.42	15.12	11.37
90-93	8.97	8.59	-1.70	7.40	11.80	7.55
80-93	8.81	7.63	7.84	5.48	10.51	8.86

Note : Losses (%) are calculated by Eq. (Generation - Demand) / Generation * 100.

: Annual Growth rates in Household include Agricultural Demand.

: Agricultural datum of 1993 is divided into columns of agriculture and household.

: Industry - Demand for Industry, Non-I - Demand for Non-Industrial Sector,

: Trans. - Demand for Transportation & Others, Agri. - Demand for Agriculture,

: House - Demand for Household

Source : Institute of Energy, PC1, PC2 and PC3

Table 3.2 Historical Trends of Power Consumption and Generation in the Southern Region (PC2)

Year	R. Demand								(Unit: GWh)	
		Industry	Non-I.	Trans.	Agri.	House.	Export to PC3	T. Sales	Losses (%)	Generation
1980	1,111.4	630.6	71.3	6.6	23.6	379.3	30.7	1,142.1	26.1	1,544.8
1981	1,141.8	650.3	81.4	6.9	32.5	370.7	31.4	1,173.2	25.5	1,575.5
1982	1,209.8	696.4	98.5	7.6	26.5	380.8	41.1	1,250.9	26.2	1,695.2
1983	1,230.3	693.9	100.6	9.8	26.5	399.5	67.3	1,297.6	25.1	1,732.9
1984	1,363.9	788.6	110.3	11.6	29.1	424.3	75.1	1,439.0	24.3	1,900.2
1985	1,444.4	841.8	110.0	11.1	32.6	448.9	78.1	1,522.5	22.6	1,966.4
1986	1,476.8	819.9	118.0	11.4	34.9	492.6	80.7	1,557.5	23.1	2,025.7
1987	1,656.8	894.9	169.6	10.6	41.7	540.0	91.6	1,748.4	21.7	2,233.9
1988	1,850.6	959.3	220.3	11.6	52.4	607.0	110.7	1,961.3	24.3	2,592.3
1989	2,270.6	1,054.8	267.1	11.0	69.0	868.7	120.1	2,390.7	22.1	3,068.7
1990	2,588.7	1,197.6	288.3	14.5	71.5	1,016.8	134.2	2,722.9	21.1	3,452.6
1991	2,824.4	1,448.1	286.2	18.9	79.2	992.0	141.2	2,965.6	21.8	3,793.1
1992	2,973.6	1,535.4	292.2	23.4	87.0	1,035.6	145.1	3,118.7	22.3	4,012.9
1993	3,490.5	1,739.9	359.8	31.8	95.6	1,263.4	161.1	3,651.6	21.8	4,667.9

Average of Annual Growth Rate (%)

80-85	5.38	5.95	9.06	10.96	6.67	3.43	5.92	4.94
85-90	12.38	7.31	21.25	5.49	17.01	17.77	12.33	11.92
90-93	10.48	13.26	7.66	29.92	10.17	7.51	10.28	10.58
80-93	9.20	8.12	13.26	12.86	11.36	9.70	9.35	8.88

Note : Losses (%) are calculated by Eq. (Generation - T. Sales) / Generation * 100.

: T. Sales (Total Sales Energy) = Regional Demand (R. Demand) + Export to PC3.

Source : Institute of Energy and PC2

Table 3.3 Historical Trends of Power Generation by Source in the Southern Region

Year	T. Generation (GWh)	Thermal (GWh)	Hydro. (GWh)	Diesel (GWh)	G.T (Oil) (GWh)	P. Load (MW)	L. Factor (%)
1980	1,544.8	320.0	1,110.2	114.2	0.4	259.7	67.9
1981	1,575.5	409.5	1,035.5	130.3	0.2	264.8	67.9
1982	1,695.2	459.1	1,096.1	138.6	1.4	284.9	67.9
1983	1,732.9	716.8	828.8	179.1	8.2	291.3	67.9
1984	1,900.2	600.1	1,157.4	140.9	1.8	329.5	65.8
1985	1,966.4	715.6	1,081.3	162.3	7.2	331.0	67.8
1986	2,025.7	971.1	916.9	131.6	6.1	343.0	67.4
1987	2,233.9	1,090.4	1,015.5	117.7	10.3	368.0	69.3
1988	2,592.3	994.2	1,489.4	98.7	10.0	406.0	72.9
1989	3,068.7	739.7	2,226.4	76.3	26.3	560.0	62.6
1990	3,452.6	840.6	2,484.0	75.9	52.1	665.0	59.3
1991	3,793.1	1,059.2	2,550.0	118.1	65.8	711.0	60.9
1992	4,012.9	1,036.0	2,618.6	145.8	212.5	789.0	58.1
1993	4,667.9	1,139.5	2,789.5	126.0	612.9	816.6	65.3

Note : T. Generation = Total Power Generation, G.T = Gas Turbine, P. Load = Peak Load

: L. Factor (Load Factor %) = (T. Generation / 8.76) / (P. Load) * 100

Source : Institute of Energy, Viet Nam

Table 3.4 Power Demand Forecast - Southern Region (Low Case)

Year	Regional Demand (GWh)				Total (GWh)	Losses (%)	Generation (GWh)	Load Factor (%)	Peak Load (MW)
	Industry	Agriculture	Others	Residence					
1993	1,739.90	95.60	391.60	1,263.40	3,490.50	22.6	4,506.80	63.0	816.60
1994	2,012.70	117.80	569.90	1,389.70	4,090.10	23.0	5,311.80	63.0	962.50
1995	2,322.40	135.10	605.20	1,541.20	4,603.80	23.0	5,979.00	62.0	1,100.90
1996	2,660.50	146.10	639.40	1,700.40	5,146.30	23.0	6,683.50	62.0	1,230.60
1997	3,053.10	155.60	673.60	1,885.30	5,767.50	22.0	7,394.30	62.0	1,361.40
1998	3,507.70	164.30	707.90	2,097.50	6,477.30	22.0	8,304.20	61.0	1,554.10
1999	4,033.10	172.70	742.10	2,338.80	7,286.70	21.0	9,223.70	60.0	1,754.90
2000	4,639.50	181.20	776.40	2,611.30	8,208.40	20.0	10,260.50	60.0	1,952.10
2001	5,258.90	189.10	807.00	2,895.00	9,150.00	20.0	11,437.50	60.0	2,176.10
2002	5,948.00	197.10	837.50	3,204.60	10,187.20	20.0	12,734.00	60.0	2,422.80
2003	6,717.60	205.40	867.90	3,541.60	11,332.50	20.0	14,165.60	60.0	2,695.10
2004	7,579.40	213.80	898.40	3,907.60	12,599.20	19.0	15,554.60	60.0	2,959.40
2005	8,546.30	222.60	928.80	4,304.10	14,001.80	19.0	17,286.20	60.0	3,288.80
2006	9,453.80	230.30	955.40	4,697.40	15,337.00	19.0	18,934.50	60.0	3,602.50
2007	10,440.60	238.10	982.00	5,114.10	16,774.90	18.0	20,457.20	60.0	3,892.20
2008	11,518.00	246.00	1,008.60	5,555.70	18,328.30	18.0	22,351.60	60.0	4,252.60
2009	12,697.50	254.10	1,035.10	6,023.50	20,010.30	17.0	24,108.70	60.0	4,586.90
2010	13,991.00	262.50	1,061.60	6,519.20	21,834.30	17.0	26,306.40	60.0	5,005.00
2011	15,432.10	271.20	1,089.90	7,075.90	23,869.10	17.0	28,757.90	60.0	5,471.40
2012	17,021.60	280.20	1,119.00	7,680.20	26,100.80	17.0	31,446.70	60.0	5,983.00
2013	18,774.80	289.50	1,148.90	8,336.10	28,549.30	17.0	34,396.70	60.0	6,544.30
2014	20,708.60	299.10	1,179.60	9,048.00	31,235.30	17.0	37,632.90	60.0	7,159.90
2015	22,841.60	309.10	1,211.10	9,820.70	34,182.50	17.0	41,183.70	60.0	7,835.50
AGR(%)	12.42	5.48	5.27	9.77	10.93		10.58		10.82

Table 3.5 Power Demand Forecast - Southern Region (Base Case)

	GDP Growth Rate (%)					Population Growth Rate (%)					Regional Demand (GWh)					Total (GWh)	Losses (%)	Generation (GWh)	Load Factor (%)	Peak Load (MW)
	1993-1995	1996-2000	2001-2005	2006-2010	2011-2015	Urban	Rural	Industry	Agriculture	Others	Residence	Industry	Agriculture	Others	Residence					
Industry	9.54	10.10	9.01	7.79	7.79	2.30	2.00	1.50	1.50	1.50	1.263.40	391.60	1,739.90	95.60	3,490.50	22.6	4,506.80	63.0	816.60	
Agriculture	13.36	13.50	11.00	9.00	9.00	3.50	2.90	2.40	2.40	2.40	1,404.80	584.30	2,061.40	118.50	4,173.00	23.0	5,419.50	63.0	982.00	
Others	5.51	5.00	5.00	5.00	5.00	1.80	1.60	1.00	1.00	1.00	1,579.80	623.30	2,431.30	136.40	4,770.80	23.0	6,195.80	62.0	1,140.80	
	10.50	11.00	9.50	8.00	8.00						1,767.30	664.30	2,842.20	147.80	5,421.60	23.0	7,041.10	62.0	1,296.40	
											1,987.30	705.30	3,324.20	158.00	6,174.80	22.0	7,916.40	62.0	1,457.60	
											2,242.30	746.40	3,889.30	167.50	7,045.40	22.0	9,032.60	61.0	1,690.40	
											2,535.00	787.60	4,551.30	176.90	8,050.80	21.0	10,190.90	60.0	1,938.90	
											2,868.90	828.90	5,326.70	186.40	9,210.90	20.0	11,513.60	60.0	2,190.60	
											3,220.00	864.80	6,120.60	196.30	10,401.80	20.0	13,002.30	60.0	2,473.80	
											3,605.60	900.70	7,012.00	206.60	11,724.80	20.0	14,656.10	60.0	2,788.40	
											4,027.60	936.50	8,017.20	217.30	13,198.60	20.0	16,498.50	60.0	3,138.90	
											4,488.10	972.40	9,154.60	228.50	14,843.50	19.0	18,325.30	60.0	3,486.60	
											4,989.30	1,008.20	10,444.20	240.20	16,681.90	19.0	20,595.00	60.0	3,918.40	
											5,494.70	1,038.50	11,691.30	252.50	18,477.00	19.0	22,811.10	60.0	4,340.00	
											6,032.60	1,068.70	13,064.40	265.40	20,431.10	18.0	24,915.90	60.0	4,740.50	
											6,604.60	1,098.90	14,581.70	278.90	22,564.20	18.0	27,517.30	60.0	5,235.40	
											7,212.70	1,129.10	16,262.60	293.20	24,897.60	17.0	29,997.10	60.0	5,707.20	
											7,858.90	1,159.20	18,127.90	308.20	27,454.20	17.0	33,077.50	60.0	6,293.30	
											8,594.50	1,191.40	20,227.10	323.90	30,336.90	17.0	36,550.50	60.0	6,954.00	
											9,398.90	1,224.50	22,569.40	340.40	33,533.20	17.0	40,401.40	60.0	7,686.70	
											10,278.60	1,258.60	25,182.90	357.80	37,077.90	17.0	44,672.10	60.0	8,499.30	
											11,240.70	1,293.60	28,099.10	376.00	41,009.40	17.0	49,408.90	60.0	9,400.50	
											12,292.90	1,329.50	31,353.00	395.20	45,370.60	17.0	54,663.40	60.0	10,400.20	
AGR(%)	14.05	6.66	5.72	10.89	12.36										12.36		12.01		12.26	

Table 3.6 Power Demand Forecast - Southern Region (High Case)

Year	Regional Demand (GWh)				Total (GWh)	Losses (%)	Generation (GWh)	Load Factor (%)	Peak Load (MW)
	Industry	Agriculture	Others	Residence					
1993	1,739.90	95.60	391.60	1,263.40	3,490.50	22.6	4,506.80	63.0	816.6
1994	2,086.00	118.50	605.30	1,423.20	4,232.90	23.0	5,497.30	63.0	996.1
1995	2,486.90	136.40	649.80	1,611.00	4,884.10	23.0	6,343.00	62.0	1,167.90
1996	2,935.50	147.80	692.70	1,812.60	5,588.60	23.0	7,257.90	62.0	1,336.30
1997	3,468.10	158.00	735.60	2,049.00	6,410.70	22.0	8,218.80	62.0	1,513.30
1998	4,099.90	167.50	778.50	2,323.20	7,369.00	22.0	9,447.50	61.0	1,768.00
1999	4,848.70	176.90	821.30	2,638.40	8,485.20	21.0	10,740.80	60.0	2,043.50
2000	5,735.70	186.40	864.20	2,998.10	9,784.40	20.0	12,230.50	60.0	2,327.00
2001	6,665.00	196.30	905.20	3,390.30	11,156.90	20.0	13,946.10	60.0	2,653.40
2002	7,721.70	206.60	946.30	3,824.20	12,698.90	20.0	15,873.60	60.0	3,020.10
2003	8,928.20	217.30	987.40	4,302.50	14,435.40	20.0	18,044.30	60.0	3,433.10
2004	10,309.60	228.50	1,028.60	4,827.90	16,394.50	19.0	20,240.10	60.0	3,850.90
2005	11,894.20	240.20	1,069.70	5,403.20	18,607.30	19.0	22,972.00	60.0	4,370.60
2006	13,467.50	252.50	1,103.50	5,985.00	20,808.60	19.0	25,689.60	60.0	4,887.70
2007	15,222.00	265.40	1,137.40	6,606.40	23,231.10	18.0	28,330.60	60.0	5,390.10
2008	17,184.80	278.90	1,171.20	7,269.30	25,904.20	18.0	31,590.50	60.0	6,010.40
2009	19,385.60	293.20	1,204.90	7,976.30	28,860.00	17.0	34,771.10	60.0	6,615.50
2010	21,857.00	308.20	1,238.60	8,729.60	32,133.40	17.0	38,714.90	60.0	7,365.80
2011	24,667.80	323.90	1,274.90	9,593.00	35,859.70	17.0	43,204.40	60.0	8,220.00
2012	27,840.10	342.50	1,312.20	10,541.70	40,036.50	17.0	48,236.70	60.0	9,177.40
2013	31,420.30	357.90	1,350.70	11,584.30	44,713.20	17.0	53,871.30	60.0	10,249.50
2014	35,460.90	376.20	1,390.30	12,730.00	49,957.40	17.0	60,189.60	60.0	11,451.60
2015	40,021.30	395.40	1,431.00	13,989.00	55,836.70	17.0	67,273.10	60.0	12,799.30
AGR (%)	15.32	6.67	6.08	11.55	13.43		13.07		13.32

GDP Growth Rate (%)

Industry

Agriculture

Others

Population Growth Rate (%)

Urban

Rural

1993-1995

1996-2000

2001-2005

2006-2010

2011-2015

2.30

3.50

1.80

2.00

2.90

1.60

1.50

2.40

1.00

10.15

10.68

10.87

8.71

12.00

14.50

5.00

5.00

11.00

9.00

10.00

5.00

9.00

1.50

2.40

1.00

8.71

10.00

5.00

9.00

1.50

2.40

1.00

10.00

5.00

9.00

Table 4.1 Principal Features of Hydropower Potential in the Main Stream

Name of Scheme	Province	Tributary	Catchment Area (km ²)	Estimated Runoff(m ³ /s)	Type of Dam	High Water Level (m)	Dam Height (m)	Estimated Capacity (MW)	Estimated Energy (GWh)
Dai Ninh	Lam Dong - Binh Thuan	Da Nhim/Da Queyon	1,158	30.84	Earthfill	880	54	300	1294
Dong Nai No.1	Lam Dong	Dong Nai	1,869*	45.09*	Rockfill	700/736	94/131	86/136	245/312
Dong Nai No.2	Lam Dong	Dong Nai	2,010*	49.34*	Rockfill	655/692	99/137	105/163	296/373
Dong Nai No.3	Lam Dong / Dac Lac	Dong Nai	2,428*	63.31*	Rockfill	565/599	84/118	113/179	317/409
Dong Nai No.4	Lam Dong / Dac Lac	Dong Nai	2,597*	69.47*	Rockfill	460/480	106/125	123/199	602/808
Dong Nai No.5	Lam Dong / Dac Lac	Dong Nai	4,263*	131.49*	Rockfill	290	85	61	355
Dong Nai No.6	Lam Dong / Song Be	Dong Nai	5,118*	163.17*	Rockfill	195/219	75/99	205/355	690/910
Dong Nai No.8	Dong Nai	Dong Nai	7,889*	271.97*	Rockfill	120	45	185	838
Can Don	Song Be	Song Be	3,440	160.92	Rockfill	110	37	69	251
Fu Mieng	Song Be	Song Be	4,110	206.8	Earthfill	68/77	41/50	**	**
Bao Loc	Lam Dong / Binh Thuan	La Nga	1,150	49.07	Rockfill	701/719	97/114	80/138	290/333
La Nga No.3	Binh Thuan	La Nga	2,000	82.39	Earthfill	151/157	41/49	**	**

Notes

*: Catchment area and Runoff of Dai Ninh Project are excluded.

** : Trans-basin project with possible power generation.

94/131: Figures indicate Low case / High case

Table 4.2 Principal Features of Hydropower Potential in the Tributaries

Name of Scheme	Province	Tributary	Catchment Area (km ²)	Estimated Runoff(m ³ /s)	Type of Dam	High Water Level (m)	Dam Height (m)	Head (H) (m)	Length (L) of Waterway (m)	L/H
Da M'Bri	Lam Dong	Da M'Bri / Da Te	211	7.6	Earthfill	605/615	70/80	450/460	6,600	14.3
Da R'Keh	Dac Lac	Da R'Keh	89	3.2	Earthfill	575/580	45/50			
Da Anh Kong	Dac Lac	Da Anh Kong	61	2.2	Earthfill	575/580	45/50	360/370	3,400	9.2
Da R'Tih	Dac Lc	Da Nong	718	25.8	Rockfill	610/620	75/85	190/200	3,000	15
Da R'Keh										
Da Anh Kong	same as above	same as above	868	31.2	Rock/Earthfill	575/580	same as above	360/370	3400	9.2
Da R'Tih (connected)									(Connecting tunnel of 12 km)	
Da Siat	Lam Dong	Da Siat	115	4.2	Earthfill	560/580	35/55	300/320	2,500	7.8

Table 5.1 Reservoir Area - Storage Capacity Curves (1/2)

Reservoir No	775.0				2,428.0 (excluding Da.Nhim)				7,889.0 (excluding Da.Nhim)			
	Elevation (El.m)	Area (km ²)	Volume (mil m ³)	Valley Width (m)	Elevation (El.m)	Area (km ²)	Volume (mil m ³)	Valley Width (m)	Elevation (El.m)	Area (km ²)	Volume (mil m ³)	Valley Width (m)
Da.Nhim	River Bed	1,000	0.00	0.00	80	0.00	0.00	80	River Bed	80	0.00	0.00
		1,010	0.00	0.00	500	1.74	8.70	7.48		90	7.48	37.40
		1,020	3.72	15.70	520	5.43	80.40	80.40		100	23.12	190.40
		1,030	6.79	67.97	540	16.55	300.20	300.20		110	42.95	520.75
		1,040	8.91	146.47	560	32.97	795.40	520		120	121.91	1,345.05
	1,050	10.79	244.97	580	47.88	1,603.90	620					
	1,060	13.10	364.42	600	70.04	2,783.10	750					
				610	77.60	3,521.50	800					
				2,597.0 (excluding Da.Nhim)				2,200.0				
Da.Nhim	River Bed	830	0.00	0.00	70	0.00	0.00	70	River Bed	180	0.00	0.00
		840	1.68	8.40	380	0.71	7.10	7.10		190	4.55	11.97
		860	6.88	68.04	400	1.69	31.10	31.10		195	13.55	55.19
		880	18.87	319.77	420	3.51	83.10	83.10		200	28.40	157.67
					440	5.83	176.70	300		205	48.18	346.91
				460	7.85	313.70	380		210	69.97	640.57	
				480	11.12	503.40	440		215	91.67	1,043.44	
									220	116.77	1,563.29	
				4,265.0 (excluding Da.Nhim)				3,440.0 (including Thac Mo)				
Dong Nai No.1	River Bed	610	0.00	0.00	190	0.00	0.00	190	River Bed	78	0.00	0.00
		620	1.06	5.30	220	1.18	11.80	11.80		80	0.41	0.41
		640	3.01	46.00	240	3.07	53.80	53.80		90	4.21	23.51
		660	6.56	141.70	260	5.09	135.00	360		100	8.01	84.61
		680	11.87	326.00	280	7.71	263.00	450		110	29.28	271.06
	700	23.28	677.50	300	11.58	455.90	560					
	720	34.64	1,256.70									
	740	47.55	2,078.60									
				5,118.0 (excluding Da.Nhim)				4,110.0 (including Thac Mo)				
Dong Nai No.2	River Bed	560	0.00	0.00	250	0.00	0.00	250	River Bed	33	0.00	0.00
		580	0.56	5.60	130	0.00	0.00	0.00		40	0.76	0.76
		600	2.31	34.30	140	16.73	83.60	83.60		50	4.48	26.96
		620	9.65	153.90	160	34.02	591.10	591.10		60	13.98	119.26
		640	17.74	427.80	180	48.37	1,414.90	710, 480, 280		70	40.73	392.81
	660	29.18	897.00	200	59.01	2,488.70	780, 580, 1000		80	83.69	1,014.91	
	680	37.98	1,568.60	220	77.27	3,851.50	1000, 710, 1110					
	700	52.85	2,476.90									
				770, 360								
Dong Nai No.3	River Bed	485	0.00	0.00	80	0.00	0.00	80	River Bed	485	0.00	0.00
		500	1.74	8.70	500	1.74	8.70	7.48		500	1.74	8.70
		520	5.43	80.40	520	5.43	80.40	80.40		520	5.43	80.40
		540	16.55	300.20	540	16.55	300.20	300.20		540	16.55	300.20
		560	32.97	795.40	560	32.97	795.40	520		560	32.97	795.40
	580	47.88	1,603.90	580	47.88	1,603.90	620		580	47.88	1,603.90	
	600	70.04	2,783.10	600	70.04	2,783.10	750		600	70.04	2,783.10	
	610	77.60	3,521.50	610	77.60	3,521.50	800		610	77.60	3,521.50	
				2,597.0 (excluding Da.Nhim)								
Dong Nai No.4	River Bed	360	0.00	0.00	70	0.00	0.00	70	River Bed	360	0.00	0.00
		380	0.71	7.10	380	0.71	7.10	7.10		380	0.71	7.10
		400	1.69	31.10	400	1.69	31.10	31.10		400	1.69	31.10
		420	3.51	83.10	420	3.51	83.10	83.10		420	3.51	83.10
		440	5.83	176.70	440	5.83	176.70	300		440	5.83	176.70
	460	7.85	313.70	460	7.85	313.70	380		460	7.85	313.70	
	480	11.12	503.40	480	11.12	503.40	440		480	11.12	503.40	
				4,265.0 (excluding Da.Nhim)								
Dong Nai No.5	River Bed	210	0.00	0.00	190	0.00	0.00	190	River Bed	210	0.00	0.00
		220	1.18	11.80	220	1.18	11.80	11.80		220	1.18	11.80
		240	3.07	53.80	240	3.07	53.80	53.80		240	3.07	53.80
		260	5.09	135.00	260	5.09	135.00	360		260	5.09	135.00
		280	7.71	263.00	280	7.71	263.00	450		280	7.71	263.00
	300	11.58	455.90	300	11.58	455.90	560		300	11.58	455.90	
				5,118.0 (excluding Da.Nhim)								
Dong Nai No.6	River Bed	125	0.00	0.00	250	0.00	0.00	250	River Bed	125	0.00	0.00
		130	0.00	0.00	130	0.00	0.00	0.00		130	0.00	0.00
		140	16.73	83.60	140	16.73	83.60	83.60		140	16.73	83.60
		160	34.02	591.10	160	34.02	591.10	591.10		160	34.02	591.10
		180	48.37	1,414.90	180	48.37	1,414.90	710, 480, 280		180	48.37	1,414.90
	200	59.01	2,488.70	200	59.01	2,488.70	780, 580, 1000		200	59.01	2,488.70	
	220	77.27	3,851.50	220	77.27	3,851.50	1000, 710, 1110		220	77.27	3,851.50	
				5,118.0 (excluding Da.Nhim)								
Dong Nai No.7	River Bed	830	0.00	0.00	70	0.00	0.00	70	River Bed	830	0.00	0.00
		840	1.68	8.40	380	0.71	7.10	7.10		840	1.68	8.40
		860	6.88	68.04	400	1.69	31.10	31.10		860	6.88	68.04
		880	18.87	319.77	420	3.51	83.10	83.10		880	18.87	319.77
					440	5.83	176.70	300				
				460	7.85	313.70	380					
				480	11.12	503.40	440					
				4,265.0 (excluding Da.Nhim)								
Dong Nai No.8	River Bed	180	0.00	0.00	100	0.00	0.00	100	River Bed	180	0.00	0.00
		190	4.55	11.97	190	4.55	11.97	11.97		190	4.55	11.97
		195	13.55	55.19	195	13.55	55.19	55.19		195	13.55	55.19
		200	28.40	157.67	200	28.40	157.67	157.67		200	28.40	157.67
		205	48.18	346.91	205	48.18	346.91	346.91		205	48.18	346.91
	210	69.97	640.57	210	69.97	640.57	640.57		210	69.97	640.57	
	215	91.67	1,043.44	215	91.67	1,043.44	1,043.44		215	91.67	1,043.44	
	220	116.77	1,563.29	220	116.77	1,563.29	1,563.29		220	116.77	1,563.29	
				3,440.0 (including Thac Mo)								
Fu Kien	River Bed	33	0.00	0.00	80, 275, 125	0.00	0.00	80, 275, 125	River Bed	33	0.00	0.00
		40	0.76	0.76	40	0.76	0.76	0.76		40	0.76	0.76
		50	4.48	26.96	50	4.48	26.96	26.96		50	4.48	26.96
		60	13.98	119.26	60	13.98	119.26	119.26		60	13.98	119.26
		70	40.73	392.81	70	40.73	392.81	392.81		70	40.73	392.81
	80	83.69	1,014.91	80	83.69	1,014.91	1,014.91		80	83.69	1,014.91	

Table 5.1 Reservoir Area - Storage Capacity Curves (2/2)

Reservoir Name	1,180.0				2,110.0				7,180.0				
	Elevation (El.m)	Area (km ²)	Volume (mil m ³)	Valley Width (m)	Elevation (El.m)	Area (km ²)	Volume (mil m ³)	Valley Width (m)	Elevation (El.m)	Area (km ²)	Volume (mil m ³)	Valley Width (m)	
Bao Lock	610	0.00	0.00	150	540	0.00	0.00	30	540	0.00	0.00	100.50	
	620	0.06	0.25		560	0.21	2.10	80	560	1.06	10.60		
	640	0.85	6.25		580	1.37	17.90	130	580	4.35	64.70		
	660	1.31	24.85	400	600	2.72	58.80	180	600	11.53	223.50	540.160	
	680	3.37	71.65	460	620	4.36	129.60	260	620	23.50	573.80	800.330.250	
700	24.57	351.05	540										
720	53.98	1,136.55	680										
Ham Thuan-Dam	1,363.0 (Ham plus Dam)												
	510	0.00	0.00		540	0.00	0.00	30	540	0.00	0.00	100	
	550	0.27	1.19		560	1.73	17.50	100	560	0.41	2.05	190	
	540	1.17	8.68		580	14.92	183.80	240	800	1.48	20.95	620	
	560	4.67	66.66						810	2.60	41.35	760	
580	12.05	227.54						820	7.92	93.95	890		
600	23.13	574.55											
620	23.13	1,137.18											
La Nga No.3	2,000.0 (including Ham-dam)												
	116	0.00	0.00	350.50	540	0.00	0.00	50	540	0.00	0.00	400	
	120	1.00	2.00		560	0.15	1.50	150	560	6.42	32.10	450	
	130	10.80	61.00		580	8.60	89.00	260.150	580	32.61	422.40	520	
	140	15.20	191.00						600	71.53	1,463.80	580	
150	19.00	362.00											
160	21.60	565.00											
Tri An	12,867.0 (excluding Da Nhim)												
	40	0.00	0.00		540	0.00	0.00	40	540	0.00	0.00	100	
	50	63.10	218.03		560	10.25	102.50	100	560	10.25	102.50	160	
	54	184.78	697.86		580	20.13	406.30		580	20.13	406.30		
	58	260.06	1,594.25										
60	293.80	2,147.78											
62	323.40	2,764.73											
Da Ma Bi	2,110.0												
	540	0.00	0.00	30	540	0.00	0.00	30	540	0.00	0.00	30	
	560	0.21	2.10	80	560	0.21	2.10	80	560	0.21	2.10	80	
	580	1.37	17.90	130	580	1.37	17.90	130	580	1.37	17.90	130	
	600	2.72	58.80	180	600	2.72	58.80	180	600	2.72	58.80	180	
620	4.36	129.60	260	620	4.36	129.60	260	620	4.36	129.60	260		
Da R Kih	89.0												
	540	0.00	0.00	30	540	0.00	0.00	30	540	0.00	0.00	30	
	560	1.73	17.50	100	560	1.73	17.50	100	560	1.73	17.50	100	
	580	14.92	183.80	240	580	14.92	183.80	240	580	14.92	183.80	240	
Da Anh Kong	61.0												
	540	0.00	0.00	50	540	0.00	0.00	50	540	0.00	0.00	50	
	560	0.15	1.50	150	560	0.15	1.50	150	560	0.15	1.50	150	
	580	8.60	89.00	260.150	580	8.60	89.00	260.150	580	8.60	89.00	260.150	
Da Sti	1,150.0												
	540	0.00	0.00	40	540	0.00	0.00	40	540	0.00	0.00	40	
	560	10.25	102.50	100	560	10.25	102.50	100	560	10.25	102.50	100	
	580	20.13	406.30	160	580	20.13	406.30	160	580	20.13	406.30	160	
Da R Kih	89.0												
	540	0.00	0.00	30	540	0.00	0.00	30	540	0.00	0.00	30	
	560	1.73	17.50	100	560	1.73	17.50	100	560	1.73	17.50	100	
	580	14.92	183.80	240	580	14.92	183.80	240	580	14.92	183.80	240	
Da Anh Kong	61.0												
	540	0.00	0.00	50	540	0.00	0.00	50	540	0.00	0.00	50	
	560	0.15	1.50	150	560	0.15	1.50	150	560	0.15	1.50	150	
	580	8.60	89.00	260.150	580	8.60	89.00	260.150	580	8.60	89.00	260.150	
Da Sti	1,150.0												
	540	0.00	0.00	40	540	0.00	0.00	40	540	0.00	0.00	40	
	560	10.25	102.50	100	560	10.25	102.50	100	560	10.25	102.50	100	
	580	20.13	406.30	160	580	20.13	406.30	160	580	20.13	406.30	160	
Da R Kih	89.0												
	540	0.00	0.00	30	540	0.00	0.00	30	540	0.00	0.00	30	
	560	1.73	17.50	100	560	1.73	17.50	100	560	1.73	17.50	100	
	580	14.92	183.80	240	580	14.92	183.80	240	580	14.92	183.80	240	
Da Anh Kong	61.0												
	540	0.00	0.00	50	540	0.00	0.00	50	540	0.00	0.00	50	
	560	0.15	1.50	150	560	0.15	1.50	150	560	0.15	1.50	150	
	580	8.60	89.00	260.150	580	8.60	89.00	260.150	580	8.60	89.00	260.150	
Da Sti	1,150.0												
	540	0.00	0.00	40	540	0.00	0.00	40	540	0.00	0.00	40	
	560	10.25	102.50	100	560	10.25	102.50	100	560	10.25	102.50	100	
	580	20.13	406.30	160	580	20.13	406.30	160	580	20.13	406.30	160	
Da R Kih	89.0												
	540	0.00	0.00	30	540	0.00	0.00	30	540	0.00	0.00	30	
	560	1.73	17.50	100	560	1.73	17.50	100	560	1.73	17.50	100	
	580	14.92	183.80	240	580	14.92	183.80	240	580	14.92	183.80	240	
Da Anh Kong	61.0												
	540	0.00	0.00	50	540	0.00	0.00	50	540	0.00	0.00	50	
	560	0.15	1.50	150	560	0.15	1.50	150	560	0.15	1.50	150	
	580	8.60	89.00	260.150	580	8.60	89.00	260.150	580	8.60	89.00	260.150	
Da Sti	1,150.0												
	540	0.00	0.00	40	540	0.00	0.00	40	540	0.00	0.00	40	
	560	10.25	102.50	100	560	10.25	102.50	100	560	10.25	102.50	100	
	580	20.13	406.30	160	580	20.13	406.30	160	580	20.13	406.30	160	
Da R Kih	89.0												
	540	0.00	0.00	30	540	0.00	0.00	30	540	0.00	0.00	30	
	560	1.73	17.50	100	560	1.73	17.50	100	560	1.73	17.50	100	
	580	14.92	183.80	240	580	14.92	183.80	240	580	14.92	183.80	240	
Da Anh Kong	61.0												
	540	0.00	0.00	50	540	0.00	0.00	50	540	0.00	0.00	50	
	560	0.15	1.50	150	560	0.15	1.50	150	560	0.15	1.50	150	
	580	8.60	89.00	260.150	580	8.60	89.00	260.150	580	8.60	89.00	260.150	
Da Sti	1,150.0												
	540	0.00	0.00	40	540	0.00	0.00	40	540	0.00	0.00	40	
	560	10.25	102.50	100	560	10.25	102.50	100	560	10.25	102.50	100	
	580	20.13	406.30	160	580	20.13	406.30	160	580	20.13	406.30	160	
Da R Kih	89.0												
	540	0.00	0.00	30	540	0.00	0.00	30	540	0.00	0.00	30	
	560	1.73	17.50	100	560	1.73	17.50	100	560	1.73	17.50	100	
	580	14.92	183.80	240	580	14.92	183.80	240	580	14.92	183.80	240	
Da Anh Kong	61.0												
	540	0.00	0.00	50	540	0.00	0.00	50	540	0.00	0.00	50	
	560	0.15	1.50	150	560	0.15	1.50	150	560	0.15	1.50	150	
	580	8.60	89.00	260.150	580	8.60	89.00	260.150	580	8.60	89.00	260.150	
Da Sti	1,150.0												
	540	0.00	0.00	40	540	0.00	0.00	40	540	0.00	0.00	40	
	560	10.25	102.50	100	560	10.25	102.50	100	560	10.25	102.50	100	
	580	20.13	406.30	160	580	20.13	406.30	160	580	20.13	40		

Table S.2 Estimated Power and Energy (First Screening)

Dam Site	Mean Annual Runoff (cms)	HWL (m)	LWL (m)	TWL (m)	Active Storage (million m ³)	Q _{firm} (cms)	Q _{peak} (cms)	Head Loss (m)	Rated Head (m)	Inst'd Capacity (MW)	Mean Annual Firm Energy (GWh)	Mean Annual Secondary E (GWh)	Mean Annual Total E (GWh)
Dong Nai 1 (excl. Dai Ninh)													
Case 1	45.09	699	666	612	463.63	35.10	140.40	2.41	73.89	86.42	185.43	59.57	245.00
Case 2	45.09	716	669	612	927.27	40.00	160.00	2.41	86.06	114.70	245.10	35.68	280.78
Case 3	45.09	736	670	612	1,669.08	41.20	164.80	2.41	99.33	136.38	250.27	21.44	311.71
Dong Nai 2 (excl. Dai Ninh)													
Case 1	49.34	655	628	562	503.65	38.50	154.00	1.62	82.17	105.41	226.02	69.91	295.93
Case 2	49.34	672	631	562	1,007.31	43.70	174.80	1.62	94.77	137.99	294.98	42.37	337.35
Case 3	49.34	692	632	562	1,813.15	45.00	180.00	1.62	108.55	162.74	346.56	25.71	372.27
Dong Nai 3 (excl. Dai Ninh)													
Case 1	63.31	565	543	487	622.29	49.30	197.20	2.11	68.30	112.19	240.23	76.55	316.78
Case 2	63.31	581	545	487	1,244.58	56.10	224.40	2.11	80.22	149.96	320.39	47.73	368.12
Case 3	63.31	599	547	487	2,240.25	58.00	232.00	2.11	92.25	178.29	379.48	28.87	408.35
Dong Nai 4 (excl. Dai Ninh)													
Case 1	69.47	461	442	287	134.05	23.20	92.80	8.24	159.30	123.14	264.22	338.02	602.24
Case 2	69.47	480	445	287	294.91	34.20	136.80	8.24	173.43	197.63	423.58	385.12	808.70
Dong Nai 5 (excl. Dai Ninh)													
Case 1	131.49	290	285	215	45.72	25.70	102.80	1.89	71.63	61.34	132.21	222.46	354.67
Dong Nai 6 (excl. Dai Ninh)													
Case 1	163.17	195	172	127	1,108.62	106.00	424.00	2.21	57.98	204.79	439.16	250.51	689.67
Case 2	163.17	206	176	127	1,662.93	128.30	513.20	2.21	66.68	285.04	611.16	196.46	807.62
Case 3	163.17	219	178	127	2,438.97	140.40	561.60	2.21	75.79	354.57	757.71	152.56	910.27
Dong Nai 8 (excl. Dai Ninh)													
Case 1	271.97	120	110	62	824.30	113.50	454.00	5.67	49.00	185.30	397.07	441.18	838.25
Can Dang (from Thac Mo)													
Case 1	160.92	110	100	83	186.45	101.02	404.08	3.00	20.67	69.56	148.77	102.31	251.08
Fu Mieng (from Thac Mo)													
Case 1	206.8	69	60	40	236.96	109.5							
Case 2	206.8	73	60	40	473.92	124.9							
Case 3	206.8	77	60	40	710.88	139.3							
La Nga 3 (from Ham Dam)													
Case 1	82.39	152	145	118	119.53	58.50							
Case 2	82.39	157	145	118	217.96	64.50							
Case 3													
Bao Loc													
Case 1	49.07	702	687	612	246.61	29.10	116.40	2.01	83.02	80.50	172.90	117.62	290.52
Case 2	49.07	708	690	612	449.70	38.00	152.00	2.01	87.77	111.13	240.02	72.60	312.62
Case 3	49.07	719	691	612	870.39	43.30	173.20	2.01	95.55	137.86	297.29	35.85	333.14

Table S.3 Estimated Project Cost (First Screening)

Dam Site	H.W.L.	Dam Height	Prep. Work	Diversion	Main Dam	Aux. Dam	Spillway	Intake	Headrace	Surge Tank	Penstock	Powerhouse	Gr/S	Metal	Eng/Adm	Conu	Total Cost
Dong Nai 1																	
Case 1	699	94	18.08	12.69	82.38		68.98	3.05	6.17	1.47	0.62	5.48	43.52	13.82	30.75	43.05	390.07
Case 2	716	111	22.41	12.69	122.84		68.98	3.05	7.61	1.47	0.62	6.88	55.21	14.97	38.01	53.21	407.94
Case 3	736	131	35.07	12.69	247.73		68.98	3.05	8.30	1.47	0.62	7.88	62.65	15.64	55.69	77.96	597.73
Dong Nai 2																	
Case 1	655	100	18.78	8.95	111.38	4.34	45.68	3.50	4.37	1.45	1.13	6.04	47.55	12.87	32.05	44.86	343.96
Case 2	672	117	25.35	8.95	166.89	11.91	46.68	3.50	5.39	1.45	1.13	7.55	60.27	13.54	42.31	59.24	454.16
Case 3	692	137	35.28	8.95	248.59	28.04	46.68	3.50	5.88	1.45	1.13	8.59	67.88	13.91	56.38	78.94	605.20
Dong Nai 3																	
Case 1	565	85	14.63	10.45	66.30		45.05	5.50	7.65	3.15	2.10	6.13	51.43	15.46	27.34	38.28	293.46
Case 2	581	101	18.89	10.45	105.51		45.05	5.50	9.45	3.15	2.10	7.72	65.39	16.49	34.76	48.67	373.13
Case 3	599	119	22.04	10.45	155.02		45.05	5.50	10.30	3.15	2.10	8.82	73.99	17.07	40.02	56.03	429.54
Dong Nai 4																	
Case 1	461	106	18.61	9.85	75.31		51.86	7.25	29.27	4.16	2.78	5.61	34.94	19.05	31.04	43.46	333.17
Case 2	480	125	24.39	9.85	116.12		51.86	7.25	44.15	4.16	2.78	7.79	51.52	20.22	40.81	57.13	438.03
Dong Nai 5																	
Case 1	290	85	18.67	14.93	83.08		69.94	7.27	3.25	2.85	1.05	4.32	32.08	17.57	30.60	42.84	328.44
Dong Nai 6																	
Case 1	195	75	32.84	8.66	176.98	30.70	76.65	8.25	12.07	5.70	1.65	7.74	72.93	19.46	54.43	76.21	584.27
Case 2	206	86	38.05	8.66	208.21	47.23	76.65	8.25	14.63	5.70	1.65	9.52	90.52	20.38	63.56	88.98	682.17
Case 3	219	99	43.57	8.66	241.52	66.12	76.65	8.25	16.25	5.70	1.65	10.94	103.57	21.35	72.51	101.51	778.24
Dong Nai 8																	
Case 1	120	45	38.43	5.67	52.99	166.29	84.16	10.50	27.61		3.00	34.03	68.00	35.30	63.12	88.36	677.46
Can Dang																	
	110	37	9.49	4.93	17.03		44.12	7.25	14.59		0.65	6.35	33.00	12.32	17.97	25.15	192.85
Fu Mieng																	
Case 1	69	41	4.23	5.22	33.63	3.45									5.58	7.82	59.92
Case 2	73	45	5.50	5.22	42.36	7.38									7.25	10.16	77.86
Case 3	77	49	6.90	5.22	51.74	12.03									9.11	12.75	97.75
La Nga 3																	
Case 1	152	41	6.12	5.22	56.01										8.08	11.32	86.75
Case 2	157	46	7.66	5.22	71.42										10.12	14.16	108.59
Case 3	160	49	8.82	5.22	82.93										11.64	16.29	124.90
Bao Loc																	
Case 1	702	97	18.52	7.61	104.05		49.06	3.75	9.03	3.00	3.98	4.67	34.25	8.98	29.63	41.48	318.02
Case 2	708	103	20.72	7.61	122.52		49.06	3.75	11.55	3.00	3.98	5.73	43.60	9.56	33.73	47.22	362.05
Case 3	719	114	24.90	7.61	162.31		49.06	3.75	12.84	3.00	3.98	6.44	49.15	9.88	39.95	55.93	428.82

Table 5.4 Specific Cost for Capacity and Generation (First Screening)

Dam Site	HWL (m)	Inst'd Capacity (MW)	Mean Annual Firm Energy (GWh)	Mean Annual Secondary E (GWh)	Mean Annual Total E (GWh)	Total Project Cost (Million US\$)	Ann. Equiv. Econ. Cost (Million US\$)	Specific Capacity Cost (US\$/kW)	Specific Generation Cost (US Cent/kWh)
Dong Nai 1									
Case 1	699	86.42	185.43	59.57	245.00	330.07	30.58	3,819	13
Case 2	716	114.70	245.10	35.68	280.78	407.94	37.80	3,557	14
Case 3	736	136.38	290.27	21.44	311.71	597.73	55.38	4,383	18
Dong Nai 2									
Case 1	655	105.41	226.02	69.91	295.93	343.96	31.87	3,263	11
Case 2	672	137.99	294.98	42.37	337.35	454.16	42.08	3,291	13
Case 3	692	162.74	346.56	25.71	372.27	605.20	56.07	3,719	15
Dong Nai 3									
Case 1	565	112.19	240.23	76.55	316.78	293.46	27.19	2,616	9
Case 2	581	149.96	320.39	47.73	368.12	373.13	34.57	2,488	10
Case 3	599	178.29	379.48	28.87	408.35	429.54	39.80	2,409	10
Dong Nai 4									
Case 1	461	123.14	264.22	338.02	602.24	333.17	30.87	2,706	6
Case 2	480	197.63	423.58	385.12	808.70	435.03	40.58	2,216	6
Dong Nai 5									
Case 1	290	61.34	132.21	222.46	354.67	328.44	30.43	5,354	10
Dong Nai 6									
Case 1	195	204.79	439.16	250.51	689.67	584.27	54.13	2,853	8
Case 2	206	283.04	611.16	196.46	807.62	682.17	63.20	2,393	8
Case 3	219	354.57	757.71	152.56	910.27	778.24	72.10	2,195	8
Dong Nai 8									
Case 1	120	185.30	397.07	441.18	838.25	677.46	62.77	3,656	8
Can Dang	110	69.56	148.77	102.31	251.08	192.85	17.87	2,772	8
Hu Mieng									
Case 1	69		Trans - Basin Project			59.92	(Dam cost only)	-	-
Case 2	73					77.86		-	-
Case 3	77					97.75		-	-
Lu Nga 3									
Case 1	152		Trans - Basin Project			86.75	(Dam cost only)	-	-
Case 2	157					108.59		-	-
Case 3						124.90		-	-
Bao Loc									
Case 1	702	80.50	172.90	117.62	290.52	318.02	29.46	3,951	11
Case 2	708	111.13	240.02	72.60	312.62	362.05	33.54	3,258	11
Case 3	719	137.86	297.29	35.85	333.14	428.82	39.73	3,111	12

Table 6.1 Principal Features of Candidate Projects

Name of Scheme	Catchment Area (km ²)	Mean Annual Runoff (m ³ /s)	Design Flood (m ³ /s)	HWL (EL. m)	LWL (EL. m)	TWL (EL. m)	Active Storage (mil. m ³)	Crest Length Main & Saddle (m)	Dam Height (m)	Discharge (m ³ /s)	Installed Capacity (MW)	Annual Energy Output (GWh)
Dong Nai No.3	2428*	56.8*	9,400	580	545	487	1,179	660	104	197	130	345
Dong Nai No.4 (with Dong Nai No.3)	2597*	62.7*	9,600	480	445 (+75)**	287	292 (47)**	470	144	102 (209)**	147 (318)**	655 (811)**
Dong Nai No.6	5118*	150.0*	11,200	219	178	127	2,450	3,190	113	510	322	856
Dong Nai No.8 (with Dong Nai No.3)	7889*	245.6*	12,600	120	110 (110)**	62	824 (824)**	8,470	50	307 (480)**	134 (210)**	653 (858)**
Can Don	3440	145.8	5,600	110	100	80	186	1,750	48	385	80	276
Fu Mieng (diversion 60 m ³ /s (without diversion)	4110	168.8	6,200	77	69	40	462	2,800	55	220 460	60 126	229 407
La Nga No.3 (diversion 10 m ³ /s (without diversion)	2000	84.1	6,900	157	145	118	227	1,400	50	224 264	62 73	151 249

Notes

*: Catchment area (1933 km²) and Runoff (28.7 m³/s) of Dai Ninh Project is excluded.
 **: Modified figures according to the capacity increase due effect of Dong Nai No.3

Table 6.2 Estimated Total Project Cost

No.	Work Item	Dong Nai No.3 (1) Rockfill Type	Dong Nai No.3 (2) Concrete Type	Dong Nai No.4 (1) without D/N No.3	Dong Nai No.4 (2) with D/N No.3	Dong Nai No.6 (1) without D/N No.3	Dong Nai No.8 (1) without D/N No.3	Dong Nai No.8 (2) with D/N No.3	Pu Mieng (1) Diversion=60m/s	Pu Mieng (2) no Diversion	Can Dam with Thick-Mo	La Nga No.3 with Hm. Dam	La Nga No.3 (Qd+R) with Hm. Dam	Unit: US\$ 1,000
1	Preparatory Works	12,797	12,218	13,928	16,238	25,291	17,425	18,457	5,861	5,776	4,976	7,107	4,934	
2	Civil Works	182,346	164,066	216,160	258,863	677,131	458,448	478,995	116,763	103,997	77,062	137,619	114,756	
2-1	Reservoir	159,755	148,964	155,676	155,676	628,203	415,742	415,742	85,802	84,528	50,833	95,739	66,739	
2-1-1	Dam	122,170	112,360	124,706	124,706	530,440	321,180	321,180	72,991	72,991	26,230	69,388	69,388	
2-1-2	Spillway	22,068	22,068	15,818	15,818	30,736	55,427	55,427	4,535	3,525	19,482	17,037	17,037	
2-1-3	Miscellaneous Works	15,522	14,592	15,152	15,152	38,327	39,135	39,135	8,336	8,336	5,151	9,314	9,314	
2-2	Power Waterway and Power Plant	22,591	15,102	69,484	103,187	48,028	42,706	63,253	11,027	19,469	26,229	16,786	19,017	
2-2-1	Power Intake	8,759	7,213	7,464	6,101	20,064	9,305	13,787	5,222	9,900	11,021	6,758	7,711	
2-2-2	Penstock	1,306	414	2,159	4,319	3,976	2,516	3,652	408	717	5,411	1,526	1,720	
2-2-3	Tailrace	384	110	460	923	1,365	16,111	25,399	170	245	689	1,866	2,234	
2-2-5	Powerhouse incl Switchyard	2,948	2,248	10,060	21,394	10,131	4,580	7,192	1,372	2,790	2,654	1,899	2,259	
2-2-3	Miscellaneous Works	5,892	5,117	9,991	16,889	13,104	10,194	13,323	3,975	5,817	6,454	4,707	5,113	
2-3	Diversion Works	0	0	0	0	0	0	0	19,844	0	0	25,094	0	
2-3-1	Diversion Intake	0	0	0	0	0	0	0	2,157	0	0	629	0	
2-3-2	Diversion Canal	0	0	0	0	0	0	0	15,709	0	0	14,754	0	
2-3-3	Diversion Tunnel	0	0	0	0	0	0	0	0	0	0	7,404	0	
2-3-4	Miscellaneous Works	0	0	0	0	0	0	0	1,978	0	0	2,307	0	
3	Hydraulic Equipment	30,202	18,271	22,281	33,202	36,159	29,497	36,724	13,593	17,710	22,112	15,016	16,049	
3-1	Spillway Gate	11,000	11,000	11,000	11,000	13,090	14,740	14,740	5,850	5,850	5,850	6,710	6,710	
3-2	Power Intake Gate	3,465	3,465	1,782	3,172	9,110	4,983	7,904	3,497	7,491	6,294	3,643	4,312	
3-3	Outlet Gate	1,089	1,089	561	1,155	2,405	1,694	2,640	1,210	2,530	2,123	1,232	1,452	
3-4	Steepest Penstock	4,648	2,717	8,938	17,875	11,156	8,080	11,440	1,144	1,859	7,865	3,146	3,575	
3-5	Diversion Intake Gate	0	0	0	0	0	0	0	1,912	0	0	285	0	
4	Electro-mechanical Equipment	33,020	33,916	34,839	38,194	72,452	54,672	61,300	26,820	32,634	28,480	26,970	27,886	
[B] Indirect Cost		97,013	91,244	90,329	113,164	272,102	233,151	263,342	87,895	87,054	57,766	67,182	59,567	
5	Compensation Cost	22,160	22,160	6,620	6,620	33,600	79,860	79,860	35,600	35,600	17,016	11,660	10,820	
6	Administration Cost	4,967	4,969	5,744	7,300	16,221	11,910	11,910	3,261	3,261	2,653	3,724	3,272	
7	Engineering Fee	24,837	22,847	28,721	36,650	81,105	56,004	59,559	16,304	16,012	13,263	18,671	16,362	
8	Physical Contingency	45,049	41,707	49,244	62,564	141,278	106,066	112,022	32,730	32,240	24,834	33,117	29,112	
[C] Total Construction Cost		345,376	319,754	377,537	479,661	1,083,133	813,172	838,838	240,032	247,171	190,395	253,894	223,192	

Table 6.3 Energy Output for Combined Development

Cases of Development	Basic Case (Case 0)	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
	Tn An and Dai Naih DN No.3	Tn An and DN No.3	Tn An and DN No.4	Tn An and DN No.8	Tn An and DN No.3 and DN No.4	Tn An and DN No.3 and DN No.8	Tn An and DN No.3 and DN No.4 and DN No.8
1. Dong Nai No.3 (Reck/III Type)	Installed Capacity (MW) Ann. Firm Energy (GWh) Ann. Ave. Energy (GWh) Construction Cost (M.US\$)	130 275 322 345	Installed Capacity (MW) Ann. Firm Energy (GWh) Ann. Ave. Energy (GWh) Construction Cost (M.US\$)	130 275 322 345	Installed Capacity (MW) Ann. Firm Energy (GWh) Ann. Ave. Energy (GWh) Construction Cost (M.US\$)	130 275 322 345	Installed Capacity (MW) Ann. Firm Energy (GWh) Ann. Ave. Energy (GWh) Construction Cost (M.US\$)
2. Dong Nai No.4	Installed Capacity (MW) Ann. Firm Energy (GWh) Ann. Ave. Energy (GWh) Construction Cost (M.US\$)	147 320 654 377	Installed Capacity (MW) Ann. Firm Energy (GWh) Ann. Ave. Energy (GWh) Construction Cost (M.US\$)	147 320 654 377	Installed Capacity (MW) Ann. Firm Energy (GWh) Ann. Ave. Energy (GWh) Construction Cost (M.US\$)	147 320 654 377	Installed Capacity (MW) Ann. Firm Energy (GWh) Ann. Ave. Energy (GWh) Construction Cost (M.US\$)
3. Dong Nai No.8	Installed Capacity (MW) Ann. Firm Energy (GWh) Ann. Ave. Energy (GWh) Construction Cost (M.US\$)	134 292 658 813	Installed Capacity (MW) Ann. Firm Energy (GWh) Ann. Ave. Energy (GWh) Construction Cost (M.US\$)	134 292 658 813	Installed Capacity (MW) Ann. Firm Energy (GWh) Ann. Ave. Energy (GWh) Construction Cost (M.US\$)	134 292 658 813	Installed Capacity (MW) Ann. Firm Energy (GWh) Ann. Ave. Energy (GWh) Construction Cost (M.US\$)
4. Tin An	Installed Capacity (MW) Ann. Firm Energy (GWh) Ann. Ave. Energy (GWh) Firm Discharge (m ³ /s)	400 1,119 1,605 297	Installed Capacity (MW) Ann. Firm Energy (GWh) Ann. Ave. Energy (GWh) Firm Discharge (m ³ /s)	400 1,027 1,583 271	Installed Capacity (MW) Ann. Firm Energy (GWh) Ann. Ave. Energy (GWh) Firm Discharge (m ³ /s)	400 1,121 1,605 297	Installed Capacity (MW) Ann. Firm Energy (GWh) Ann. Ave. Energy (GWh) Firm Discharge (m ³ /s)
Total of Additional Capacities (MW)	0	130	147	134	448	340	661
Total of Additional Firm Energy (GWh)	0	423	376	427	1,107	1,001	1,701
Total of Additional 2nd. Energy (GWh)	0	-78	279	226	49	188	299
Total Project Cost (M. US\$)	0	345	377	813	825	1,203	1,685
Combined SCC (US\$/KW)	n.a	2,654	2,565	6,067	1,842	3,538	2,546
Combined SCC (US\$ Cent/KWh)	n.a	8.2	5.4	11.5	6.2	9.0	7.4

Table 6.4 Economic Comparison of Candidate Projects

Dam Site	HWL (m)	LWL (m)	TWL (m)	Active Storage (mil. m ³)	Max. Plant Disch. (m ³ /s)	Firm E (GWh)	Mean Annual Firm E (GWh)	Mean Annual Seed E (GWh)	Add. Firm E. at Th An (GWh)	Add. Seed E. at Th An (GWh)	Total Firm E. (GWh)	Total Seed E. (GWh)	Project Cost (Million US\$)	Ann. Econ. Cost (Million \$)	SOC (US\$/kW)	SOC (Cent/kWh)	Ann. Benefit (Million \$/Year)
A. Hydropower Only																	
Dong Nai 3	580	545	487	1,179	197	275	47	148	-125	-125	423	-78	345	29.59	2,654	8.21	4.69
Dong Nai 4	480	445	287	292	102	320	334	56	-55	-55	376	279	378	32.42	2,571	5.41	9.49
Dong Nai 6	219	178	127	2,450	510	670	151	345	-310	-310	1,015	-159	1,083	92.88	3,363	10.46	-9.03
Dong Nai 8	120	110	62	824	307	292	366	135	-140	-140	427	226	813	69.73	6,067	11.47	-32.53
Dong Nai No. VN No. 4	580/480	540/475	487/287	1,179/47	197/209	957	176	150	-127	-127	1,107	49	825	70.76	1,842	6.17	47.38
Dong Nai No. VN No. 8	580/120	580/110	487/62	1,179/824	197/480	731	449	270	-261	-261	1,001	188	1,204	103.26	3,541	8.97	-11.52
Can Don	110	100	80	186	385	178	98	n.a.	n.a.	n.a.	178	98	190	16.30	2,375	6.36	5.45
B. Trans Basin Project																	
Fu Mieng 60 m ³ /s Diversion no Diversion	77	69	40	462	220	131	98	n.a.	n.a.	n.a.	131	98	2.51+55/115	10.30	2,001	4.92	5.88
La Nga No. 3 10 m ³ /s Diversion no Diversion	157	145	118	227	264	155	47	2	-28	-28	132	19	254+56/66	18.48	3,476	12.56	-3.67
	157	145	118	227	264	155	50	39	5	5	194	55	223	19.13	3,065	8.04	-0.37

*** : Cost shared by firm discharge for Power Generation and Irrigation

Table 7.1 Transformed Load Duration Curve in the Year 2015

AS MODIFIED TO FIT USER-SPECIFIED PEAK LOAD AND/OR ENERGY		10400.0 MW	ENERGY	54663.0 GWH			
STATISTICS FOR LOAD NORMALIZED BY PEAK							
MAXIMUM		1.000000					
MINIMUM		.361797					
MEAN		.601655					
VARIANCE		.033466					
STANDARD DEVIATION		.182938					
LOAD DURATION CURVE							
	1.0000000000	1.0000000000	1.0000000000	1.0000000000			
	1.0000000000	1.0000000000	1.0000000000	1.0000000000			
	1.0000000000	1.0000000000	1.0000000000	1.0000000000			
	1.0000000000	1.0000000000	.8643817306	.8427721858			
	.8211626410	.7779435515	.7635371685	.7347244620			
	.6482862830	.6050671935	.5618481040	.5186290145			
	.3457526863	.3313463330	.3169399798	.3025335968			
	.2160954326	.1944858879	.1728763431	.1642325222			
	.1469448954	.1383010745	.1296572536	.0864381716			
	.0691505373	.0605067201	.0518629029	.0432190858			
STATISTICS FOR LOAD NORMALIZED BY PEAK							
SEGMENT	PEAK LOAD MW	ENERGY GWH	MAXIMUM	MINIMUM	MEAN	VARIANCE	STDD. DEVIATION
1	10400.0	13665.8	1.000000	.361797	.601655	.033466	.182938
2	10400.0	13665.8	1.000000	.361797	.601655	.033466	.182938
3	10400.0	13665.8	1.000000	.361797	.601655	.033466	.182938
4	10400.0	13665.8	1.000000	.361797	.601655	.033466	.182938

Table 7.2 Parameters of Planning Alternatives (1/4)

DATA SET REF. NO.	101	102	103	104	105
NAME	DANHIM HYD(160)	TRIAN HYD(400)	THACHMO HYD(150)	THU DUC OIL(165)	TRA NOC OIL(33)
TYPE	HYDR	HYDR	HYDR	THRM	THRM
LOADING STRATEGY	I	I	I	B	E
STATUS	E	E	E	E	OIL
CLASS					
SERVICE AREA					
POLITICAL SUBDIVISION					
PERCENT OWNERSHIP	100.0	100.0	100.0	100.0	100.0
NUMBER OF UNITS GROUPED	1	1	1	1	1
INSTALLATION YEAR	1963	1988	1994	1972	1975
RATED CAPACITY, MW	160.0	400.0	150.0	156.0	32.0
CAPACITY - RESERVE	1.0000	1.0000	1.0000	1.0000	1.0000
- OPERATING	1.0000	1.0000	1.0000	1.0000	1.0000
MULTIPLIERS - EMERGENCY	1.0000	1.0000	1.0000	1.0000	1.0000
- CHARGING	.0000	.0000	.0000	.0000	.0000
EQUIVALENT FORCED OUTAGE RATE	.0100	.0100	.0100	.1000	.1000
FULL LOAD HEAT RATE, BTU/KWH	0.	0.	0.	9800.	9800.
ANNUAL ENERGY LIMIT, GWH	1025.0	1662.0	596.0	0.	0.
STORAGE EFFICIENCY, PERCENT	.00	.00	.00	.00	.00
DESIGN CAPACITY FACTOR, PCT	100.00	100.00	100.00	100.00	100.00
INSTALLATION COST 1, \$/KW	.00	.00	.00	.00	.00
INSTALLATION COST 2, \$/KW	.00	.00	.00	.00	.00
LEVELIZED CARRYING CHARGE, PCT	.00	.00	.00	.00	.00
FIXED O&M COST, \$/KW-YR	.00	.00	.00	.00	.00
VARIABLE O&M COST, \$/MWH	.00	.00	.00	4.05	4.05
OPERATING LIFE, YEARS	50	50	50	25	25
BOOK LIFE, YEARS	50	50	50	25	25
YEARLY TRAJECTORIES					
COSTS-CAPITAL/FIX OM/VAR OM	0	0	0	0	0
FORCED OUTAGE RATE	0	0	0	0	0
CAPACITY-RESERVE/OPERATING	0	0	0	0	0
ENERGY LIMIT /CAP FACTOR	0	99	0	0	0
SEGMENT - CAPACITY	0	0	0	0	0
MULTIPLIERS - ENERGY	21	22	23	0	0
SUB-WEEK STORAGE ALLOCATION	0	0	0	0	0
MAINTENANCE DATA SET	52	52	52	51	51
FUEL DATA SET	0	0	0	71	71
LOADING BLOCK DATA SET	0	0	0	0	0
NON-DISPATCHABLE TECHNOLOGY NO.	0	0	0	0	0
ENVIRONMENTAL EMISSIONS	0	0	0	0	0
GENERIC SITE	0	0	0	0	0
MUST RUN / SPINNING RESERVE	0	0	0	0	0
OPER SCHED - MUST RUN / SPIN	.00	.00	.00	.00	.00
DISPATCH MODIFIER, \$/MWH	0	0	0	0	0
TRAJECTORY FOR DISPATCH MODIF	0	0	0	0	0

Table 7.2 Parameters of Planning Alternatives (2/4)

DATA SET REF. NO.	106	107	108	109	201
NAME	BA RIA GAS (234)	THU DUC GAS (125)	DIESEL	500KV LINE(500)	HAX-DAMI (472)
TYPE	THRM	THRM	THRM	HYDR	HYDR
LOADING STRATEGY	E	B	P	A	I
STATUS	E	E	E	E	C
CLASS	GAS	GAS	DISL		
SERVICE AREA					
POLITICAL SUBDIVISION					
PERCENT OWNERSHIP					
NUMBER OF UNITS GROUPED	1	1	1	1	1
INSTALLATION YEAR	1991	1991	1972	1994	2000
RATED CAPACITY, MW	100.0	100.0	100.0	100.0	100.0
CAPACITY - RESERVE	195.0	98.0	65.0	500.0	472.0
- OPERATING	1.0000	1.0000	1.0000	1.0000	1.0000
MULTIPLIERS - EMERGENCY	1.0000	1.0000	1.0000	1.0000	1.0000
- CHARGING	.0000	.0000	.0000	.0000	.0000
EQUIVALENT FORCED OUTAGE RATE	.1000	.1000	.1500	.0000	.0000
FULL LOAD HEAT RATE, BTU/KWH	7600.	7600.	13700.	0.	0.
ANNUAL ENERGY LIMIT, GWH	0	0	0	3640.0	1607.0
STORAGE EFFICIENCY, PERCENT	.00	.00	.00	.00	.00
DESIGN CAPACITY FACTOR, PCT	100.00	100.00	100.00	100.00	100.00
INSTALLATION COST 1, \$/KW	.00	.00	.00	.00	.00
INSTALLATION COST 2, \$/KW	.00	.00	.00	.00	.00
LEVELIZED CARRYING CHARGE, PCT	.00	.00	.00	.00	.00
FIXED O&M COST, \$/KW-YR	.00	.00	.00	.00	.00
VARIABLE O&M COST, \$/MWH	1.50	1.50	4.05	.00	.00
OPERATING LIFE, YEARS	25	25	25	50	50
BOOK LIFE, YEARS	25	25	25	50	50
YEARLY TRAJECTORIES					
COSTS-CAPITAL/FIX OM/VAR OM	0	0	0	0	0
FORCED OUTAGE RATE	0	0	0	0	0
CAPACITY-RESERVE/OPERATING	0	0	0	0	0
ENERGY LIMIT /CAP FACTOR	0	0	0	0	0
SEGMENT - CAPACITY	0	0	0	0	0
MULTIPLIERS - ENERGY	0	0	0	0	24
SUB-WEEK STORAGE ALLOCATION	0	0	0	0	0
MAINTENANCE DATA SET	53	53	54	0	52
FUEL DATA SET	72	72	73	0	0
LOADING BLOCK DATA SET	0	0	0	0	0
NON-DISPATCHABLE TECHNOLOGY NO.	0	0	0	0	0
ENVIRONMENTAL EMISSIONS	0	0	0	0	0
GENERIC SITE	0	0	0	0	0
MUST RUN / SPINNING RESERVE	0	0	0	0	0
OPER SCHED - MUST RUN / SPIN	.00	.00	.00	.00	.00
DISPATCH MODIFIER, \$/MWH	0	0	0	0	0
TRAJECTORY FOR DISPATCH MODIF	0	0	0	0	0

Table 7.2 Parameters of Planning Alternatives (3/4)

DATA SET REF. NO.	202	203	204	301	302
NAME	DAININ HYD(300)	PHU MY GAS(600)	BARIA C/C (58)	DONNAI NO3(130)	DONNAI NO4(147)
TYPE	HYDR	THRM	THRM	HYDR	HYDR
LOADING STRATEGY	I	B	B	I	I
STATUS	C	C	C	G	G
CLASS		GAS	GAS		
SERVICE AREA					
POLITICAL SUBDIVISION					
PERCENT OWNERSHIP	100.0	100.0	100.0	100.0	100.0
NUMBER OF UNITS GROUPED	1	1	1	1	1
INSTALLATION YEAR	2003	1998	1997	0	0
RATED CAPACITY, MW	300.0	600.0	58.0	130.0	147.0
CAPACITY - RESERVE	1.0000	1.0000	1.0000	1.0000	1.0000
- OPERATING	1.0000	1.0000	1.0000	1.0000	1.0000
MULTIPLIERS - EMERGENCY	1.0000	1.0000	1.0000	1.0000	1.0000
- CHARGING	.0000	.0000	.0000	.0000	.0000
EQUIVALENT FORCED OUTAGE RATE	.0000	.1000	.1000	.0000	.0000
FULL LOAD HEAT RATE, BTU/KWH	0.	7600.	7600.	0.	0.
ANNUAL ENERGY LIMIT, GWH	1209.0	0	0	345.0	655.0
STORAGE EFFICIENCY, PERCENT	.00	.00	.00	.00	.00
DESIGN CAPACITY FACTOR, PCT	100.00	100.00	100.00	100.00	100.00
INSTALLATION COST 1, \$/KW	.00	.00	.00	2656.00	2656.00
INSTALLATION COST 2, \$/KW	.00	.00	.00	2656.00	2656.00
LEVELIZED CARRYING CHARGE, PCT	.00	.00	.00	10.09	10.09
FIXED O&M COST, \$/KW-YR	.00	.00	.00	6.60	6.60
VARIABLE O&M COST, \$/MWH	.00	1.50	1.50	.00	.00
OPERATING LIFE, YEARS	50	25	25	50	50
BOOK LIFE, YEARS	50	25	25	50	50
YEARLY TRAJECTORIES					
COSTS-CAPITAL/FIX OM/VAR OM	0	0	0	31	81
FORCED OUTAGE RATE	0	0	0	0	0
CAPACITY-RESERVE/OPERATING	0	0	0	0	0
ENERGY LIMIT /CAP FACTOR	0	0	0	0	0
SEGMENT - CAPACITY	0	0	0	0	0
MULTIPLIERS - ENERGY	25	0	0	26	27
SUB-WEEK STORAGE ALLOCATION	0	0	0	0	0
MAINTENANCE DATA SET	52	51	51	52	52
FUEL DATA SET	0	72	72	0	0
LOADING BLOCK DATA SET	0	0	0	0	0
NON-DISPATCHABLE TECHNOLOGY NO.	0	0	0	0	0
ENVIRONMENTAL EMISSIONS	0	0	0	0	0
GENERIC SITE	0	0	0	0	0
MUST RUN / SPINNING RESERVE	0	0	0	0	0
OPER SCHED - MUST RUN / SPIN	.00	.00	.00	.00	.00
DISPATCH MODIFIER, \$/MWH	0	0	0	0	0
TRAJECTORY FOR DISPATCH MODIF	0	0	0	0	0

Table 7.2 Parameters of Planning Alternatives (4/4)

DATA SET REF. NO.	303	304	305	306	307
NAME	CANDON HYD(80)	FUMIENG (60)	DONNAI 3&4 (448)	COAL TRHY (300)	COMBINED C(300)
TYPE	HYDR	HYDR	HYDR	TRHY	TRHY
LOADING STRATEGY	I C	I C	I C	B C	B C GAS
STATUS CLASS					
SERVICE AREA					
POLITICAL SUBDIVISION					
PERCENT OWNERSHIP	100.0	100.0	100.0	100.0	100.0
NUMBER OF UNITS GROUPED	1	1	1	1	1
INSTALLATION YEAR	0	0	0	0	0
RATED CAPACITY, MW	80.0	126.0	448.0	300.0	300.0
CAPACITY - RESERVE	1.0000	1.0000	1.0000	1.0000	1.0000
- OPERATING	1.0000	1.0000	1.0000	1.0000	1.0000
MULTIPLIERS - EMERGENCY	1.0000	1.0000	1.0000	1.0000	1.0000
- CHARGING	.0000	.0000	.0000	.0000	.0000
EQUIVALENT FORCED OUTAGE RATE	.0000	.0000	.0000	.0000	.0800
FULL LOAD HEAT RATE, BTU/KWH	0.	0.	0.	10100.	8400.
ANNUAL ENERGY LIMIT, GWH	276.0	407.0	1156.0	.00	.00
STORAGE EFFICIENCY, PERCENT	.00	.00	.00	.00	.00
DESIGN CAPACITY FACTOR, PCT	100.00	100.00	100.00	100.00	100.00
INSTALLATION COST 1, \$/KW	2380.00	2001.00	1842.00	1250.00	800.00
INSTALLATION COST 2, \$/KW	2380.00	2001.00	1842.00	1250.00	800.00
LEVELIZED CARRYING CHARGE, PCT	10.09	10.09	10.09	11.02	11.02
FIXED O&M COST, \$/KW-YR	6.60	6.60	6.60	4.80	4.80
VARIABLE O&M COST, \$/MWH	.00	.00	.00	2.60	1.50
OPERATING LIFE, YEARS	50	50	50	25	25
BOOK LIFE, YEARS	50	50	50	25	25
YEARLY TRAJECTORIES					
COSTS-CAPITAL/FIX OM/VAR OM	81 81 0	81 81 0	81 81 0	81 81 81	81 81 81
FORCED OUTAGE RATE	0	0	0	0	0
CAPACITY-RESERVE/OPERATING	0	0	0	0	0
ENERGY LIMIT /CAP FACTOR	0	0	0	0	0
SEGMENT - CAPACITY	0	29	30	0	0
MULTIPLIERS - ENERGY	28	0	0	0	0
SUB-WEEK STORAGE ALLOCATION	0	0	0	0	0
MAINTENANCE DATA SET	52	52	52	51	51
FUEL DATA SET	0	0	0	74	72
LOADING BLOCK DATA SET	0	0	0	0	0
NON-DISPATCHABLE TECHNOLOGY NO.	0	0	0	0	0
ENVIRONMENTAL EMISSIONS	0	0	0	0	0
GENERIC SITE	0	0	0	0	0
MUST RUN / SPINNING RESERVE	0	0	0	0	0
OPER SCHED - MUST RUN / SPIN	.00	.00	.00	.00	.00
DISPATCH MODIFIER, \$/MWH	0	0	0	0	0
TRAJECTORY FOR DISPATCH MODIF.	0	0	0	0	0

Table 7.3 Seasonal Variation of Energy Output

DATA SET REF. NO.	TYPE OF MULTIPLIERS	SEGMENT MULTIPLIER	SEGMENT MULTIPLIER	SEGMENT MULTIPLIER	SEGMENT MULTIPLIER
21	- ENERGY Da Nam Hydro	1	.200000	2	.150000
				3	.400000
				4	.250000
22	- ENERGY Tri An Hydro	1	.150000	2	.130000
				3	.330000
				4	.390000
23	- ENERGY Thac Xo Hydro	1	.220000	2	.190000
				3	.250000
				4	.340000
24	- ENERGY Ham Dam Hydro	1	.200000	2	.150000
				3	.400000
				4	.250000
25	- ENERGY Dai Ninh Hydro	1	.220000	2	.220000
				3	.280000
				4	.280000
26	- ENERGY Dong Nai No.3	1	.220000	2	.190000
				3	.240000
				4	.350000
27	- ENERGY Dong Nai No.4	1	.120000	2	.120000
				3	.330000
				4	.430000
28	- ENERGY Can Dea Hydro	1	.250000	2	.200000
				3	.300000
				4	.250000
29	- ENERGY Fu Xieng Hydro	1	.190000	2	.160000
				3	.290000
				4	.360000
30	- ENERGY Dong Nai No.3/4	1	.220000	2	.190000
				3	.240000
				4	.350000

Table 7.4 Earliest Input Timing of Planning Alternatives

DATA SET REF. NO.	NAME	BASIC PLANT TYPE	GENERIC SITE	FIRST YEAR AVAILABLE	LAST YEAR AVAILABLE
1	DONG NAI NO.3	301	0	2005	2080
2	DONG NAI NO.4	302	0	2005	2080
3	CAN DONG	303	0	2005	2080
4	FU MIENG	304	0	2005	2080
5	DONG NAI NO.3&4	305	0	2005	2080
6	COAL THERMAL	306	0	1997	2080
7	COMBINED CYCLE	307	0	1997	2080

Table 7.5 Generation Expansion Plan for Low Demand Case (1/2)

EGEAS REPORT VER 03 LEV 02 EXPANSION PLAN SUMMARY

YEAR	NEW CAPACITY ADDED, MW						UNIT TYPES
	1	2	3	4	5	6	
1995	.0	.0	.0	.0	.0	.0	
1996	.0	.0	.0	.0	.0	.0	
1997	.0	.0	.0	.0	.0	300.0	
1998	.0	.0	.0	.0	.0	.0	
1999	.0	.0	.0	.0	.0	.0	
2000	.0	.0	.0	.0	.0	.0	
2001	.0	.0	.0	.0	.0	.0	
2002	.0	.0	.0	.0	.0	.0	
2003	.0	.0	.0	.0	.0	300.0	
2004	.0	.0	.0	.0	.0	300.0	
2005	.0	.0	.0	.0	.0	300.0	
2006	.0	.0	.0	.0	.0	300.0	
2007	.0	.0	.0	.0	.0	300.0	
2008	.0	.0	.0	.0	448.0	.0	
2009	.0	.0	.0	60.0	.0	300.0	
2010	.0	.0	.0	.0	.0	600.0	
2011	.0	.0	.0	.0	.0	600.0	
2012	.0	.0	.0	.0	.0	600.0	
2013	.0	.0	.0	.0	.0	900.0	
2014	.0	.0	.0	.0	.0	600.0	
2015	.0	.0	.0	.0	.0	900.0	
TOTAL	.0	.0	.0	60.0	448.0	6300.0	

UNIT TYPES
 1 PA 1 DONG NAI NO.3
 4 PA 4 FU MIENG
 130.0 MW 2 PA 2 DONG NAI NO.4
 60.0 MW 5 PA 5 DONG NAI NO.364
 147.0 MW 3 PA 3 CAN DONG
 448.0 MW 6 PA 6 COMBINED CYCLE
 80.0 MW
 300.0 MW

Table 7.5 Generation Expansion Plan for Low Demand Case (2/2)

EGEAS REPORT VER 03 LEV 02		EXPANSION PLAN SUMMARY									
YEAR	PEAK LOAD, MW	ENERGY GWR	INSTALLED	RATED CAPACITY, MW	TOTAL	RESERVE CAPACITY	RESERVE PERCENT	LOSS OF LOAD PROBABILITY	NEW UNITS CAPACITY, MW	NEW UNITS CAPITAL COST	
1995	1101	5979	0	0	1756	1756	59.49	.0000	0	0	
1996	1231	6684	0	0	1756	1756	42.65	.0002	0	0	
1997	1361	7394	358	221	1893	1893	39.09	.0004	300	255	
1998	1554	8304	600	0	2493	2493	60.42	.0004	0	0	
1999	1755	9224	0	0	2933	2933	42.05	.0021	0	0	
2000	1952	10261	472	32	2933	2933	50.26	.0003	0	0	
2001	2176	11438	0	0	2933	2933	34.79	.0015	0	0	
2002	2423	12734	0	0	2933	2933	21.05	.0060	0	0	
2003	2695	14166	600	0	3533	3533	31.09	.0010	300	304	
2004	2959	15535	300	0	3833	3833	29.54	.0010	300	313	
2005	3289	17286	300	0	4133	4133	25.66	.0016	300	323	
2006	3603	18935	300	0	4433	4433	23.04	.0025	300	332	
2007	3892	20457	300	0	4733	4733	21.61	.0030	300	342	
2008	4253	22352	448	0	5181	5181	21.82	.0019	448	1212	
2009	4587	24109	360	0	5541	5541	20.80	.0023	360	545	
2010	5005	26306	600	0	6141	6141	22.70	.0006	600	748	
2011	5471	28758	600	0	6741	6741	23.21	.0000	600	770	
2012	5983	31447	600	0	7341	7341	22.70	.0000	600	793	
2013	6544	34397	900	160	8081	8081	23.49	.0000	900	1226	
2014	7160	37633	600	0	8681	8681	21.24	.0000	600	842	
2015	7836	41184	900	0	9581	9581	22.27	.0000	900	1300	
EXT.											

YEAR	ALL UNITS		NEW UNITS ONLY		COST SUMMARY		
	PROD. COST	FIXED O & M	FIXED CHARGES	ANNUAL	CUM. ANNUAL	PRESENT WORTH	CUM. PRES. WORTH
1995	2.	0.	0.	2.	2.	2.	2.
1996	10.	0.	0.	10.	12.	9.	11.
1997	19.	2.	28.	49.	61.	40.	52.
1998	34.	2.	28.	64.	125.	48.	100.
1999	59.	2.	28.	88.	213.	60.	160.
2000	45.	2.	28.	75.	288.	47.	207.
2001	76.	2.	28.	106.	394.	60.	266.
2002	123.	2.	28.	153.	547.	79.	345.
2003	122.	4.	62.	187.	735.	87.	432.
2004	165.	6.	96.	267.	1002.	113.	546.
2005	225.	8.	132.	364.	1366.	140.	686.
2006	287.	10.	168.	466.	1831.	163.	849.
2007	351.	12.	206.	569.	2400.	181.	1030.
2008	378.	17.	328.	724.	3124.	210.	1240.
2009	447.	20.	387.	853.	3977.	225.	1465.
2010	534.	25.	469.	1028.	5005.	246.	1711.
2011	639.	31.	534.	1224.	6229.	266.	1977.
2012	765.	36.	641.	1443.	7672.	285.	2263.
2013	941.	45.	776.	1762.	9435.	317.	2580.
2014	1123.	51.	869.	2043.	11478.	334.	2914.
2015	1298.	61.	1012.	2371.	13848.	352.	3266.
EXT.							7141.

NOTES - ANNUAL COSTS ARE IN MILLIONS OF CURRENT DOLLARS.
 - PRESENT WORTH COSTS ARE IN MILLIONS OF DOLLARS DISCOUNTED TO THE BEGINNING OF 1995.

Table 7.6 Generation Expansion Plan for Basic Demand Case (1/2)

EGEAS REPORT VER 03 LEV 02 EXPANSION PLAN SUMMARY

PLAN 1

YEAR	NEW CAPACITY ADDED, MW						
	1	2	3	4	5	6	7
1995	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	300.0
1998	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	300.0
2002	0	0	0	0	0	0	300.0
2003	0	0	0	0	0	0	0
2004	0	0	0	60.0	0	0	600.0
2005	0	0	0	0	0	0	300.0
2006	0	0	0	0	448.0	0	0
2007	0	0	0	0	0	0	600.0
2008	0	0	0	0	0	0	600.0
2009	0	0	0	0	0	0	600.0
2010	0	0	0	0	0	0	600.0
2011	0	0	0	0	0	0	900.0
2012	0	0	0	0	0	0	900.0
2013	0	0	0	0	0	0	1200.0
2014	0	0	0	0	0	0	1200.0
2015	0	0	0	0	0	0	1200.0
TOTAL	0	0	0	60.0	448.0	0	9600.0

UNIT TYPES

1 PA 1	DONG NAI NO.3	130.0 MW	2 PA 2	DONG NAI NO.4	147.0 MW	3 PA 3	CAN DONG	80.0 MW
4 PA 4	FU MIENG	60.0 MW	5 PA 5	DONG NAI NO.3&4	448.0 MW	6 PA 6	COAL THERMAL	300.0 MW
7 PA 7	COMBINED CYCLE	300.0 MW						

Table 7.6 Generation Expansion Plan for Basic Demand Case (2/2)

EGEAS REPORT		VER 03		LEV 02		EXPANSION PLAN SUMMARY																
YEAR	PEAK LOAD, MW	ENERGY GWH	INSTALLED	RATED CAPACITY, MW	RETIRED	TOTAL	RESERVE CAPACITY	RESERVE PERCENT	LOSS OF LOAD PROBABILITY	NEW UNITS CAPACITY, MW	NEW UNITS CAPITAL COST	YEAR	PROD. COST	FIXED O & M	NEW UNITS ONLY, FIXED CHARGES	ANNUAL	CUM. ANNUAL	PRESENT WORTH	CUM. WORTH	PRES. WORTH	EXT.	
1995	1141	6196	0	0	0	1756	1756	53.90	.0001	0	0	1995	4	0	0	4	4	13	4	18	4	
1996	1296	7041	0	0	0	1756	1756	35.49	.0003	0	0	1996	14	0	0	14	19	47	13	64	18	
1997	1458	7916	358	221	1893	1893	1893	29.84	.0010	300	255	1997	27	28	28	57	75	61	47	125	64	
1998	1690	9033	600	0	2493	2493	2493	47.51	.0013	0	0	1998	51	28	28	81	156	81	61	207	125	
1999	1939	10191	0	0	2493	2493	2493	28.57	.0056	0	0	1999	89	28	28	106	276	66	81	272	207	
2000	2191	11514	472	32	2933	2933	2933	30.68	.0016	0	0	2000	76	60	60	180	561	101	66	374	272	
2001	2474	13002	300	0	3233	3233	3233	30.68	.0018	300	287	2001	116	92	92	292	825	136	101	509	374	
2002	2788	14656	300	0	3533	3533	3533	26.72	.0025	300	295	2002	167	92	92	381	1118	177	136	646	509	
2003	3139	16498	300	0	3833	3833	3833	22.11	.0032	0	0	2003	246	92	92	471	1535	212	177	822	646	
2004	3487	18325	600	0	4433	4433	4433	27.13	.0012	600	626	2004	325	161	161	550	2085	212	212	1035	822	
2005	3918	20595	360	0	4793	4793	4793	22.33	.0025	360	484	2005	366	161	161	711	2796	249	212	1284	1035	
2006	4340	22811	448	0	5241	5241	5241	20.76	.0023	448	1142	2006	441	161	161	866	3661	276	249	1560	1284	
2007	4741	24916	600	0	5841	5841	5841	23.20	.0009	600	684	2007	441	161	161	1051	4712	304	276	1864	1560	
2008	5235	27517	600	0	6441	6441	6441	23.04	.0000	600	705	2008	441	161	161	1238	5950	326	304	2190	1864	
2009	5707	29997	600	0	7041	7041	7041	23.37	.0000	600	726	2009	441	161	161	1429	7419	352	326	2542	2190	
2010	6293	33077	600	0	7641	7641	7641	21.42	.0000	600	748	2010	441	161	161	1624	9169	381	352	2923	2542	
2011	6954	36551	900	0	8541	8541	8541	22.82	.0000	900	1155	2011	441	161	161	1838	11237	409	381	3332	2923	
2012	7689	40401	900	0	9441	9441	9441	23.32	.0000	900	1190	2012	441	161	161	2087	13736	450	409	3781	3332	
2013	8499	44672	1200	160	10481	10481	10481	24.25	.0000	1200	1634	2013	441	161	161	2292	16658	478	450	4259	3781	
2014	9401	49409	1200	0	11681	11681	11681	23.86	.0000	1200	1683	2014	441	161	161	2539	20057	505	478	4764	4259	
2015	10400	54663	1200	0	12881	12881	12881	23.86	.0000	1200	1734	2015	441	161	161	3399	25663	563	505	5563	4764	
EXT.																						

NOTES - ANNUAL COSTS ARE IN MILLIONS OF CURRENT DOLLARS.
 - PRESENT WORTH COSTS ARE IN MILLIONS OF DOLLARS DISCOUNTED TO THE BEGINNING OF 1995.

Table 7.7 Generation Expansion Plan for High Demand Case (1/2)

 EGAS REPORT VER 03 LEV 02
 ***** EXPANSION PLAN SUMMARY *****

PLAN 1

YEAR	NEW CAPACITY ADDED, MW					
	1	2	3	4	5	6
1995	.0	.0	.0	.0	.0	.0
1996	.0	.0	.0	.0	.0	.0
1997	.0	.0	.0	.0	.0	300.0
1998	.0	.0	.0	.0	.0	.0
1999	.0	.0	.0	.0	.0	.0
2000	.0	.0	.0	.0	.0	.0
2001	.0	.0	.0	.0	.0	300.0
2002	.0	.0	.0	.0	.0	600.0
2003	.0	.0	.0	.0	.0	.0
2004	.0	.0	.0	50.0	.0	600.0
2005	.0	.0	.0	.0	.0	600.0
2006	.0	.0	.0	.0	.0	600.0
2007	.0	.0	.0	.0	.0	600.0
2008	.0	.0	.0	.0	448.0	300.0
2009	.0	.0	.0	.0	.0	600.0
2010	.0	.0	.0	.0	.0	900.0
2011	.0	.0	.0	.0	.0	1200.0
2012	.0	.0	.0	.0	.0	1200.0
2013	.0	.0	.0	.0	.0	1500.0
2014	.0	.0	.0	.0	.0	1500.0
2015	.0	.0	.0	.0	.0	1800.0
TOTAL	.0	.0	.0	60.0	448.0	12600.0

UNIT TYPES

1 PA 1	DONG NAI NO.3	130.0 MW	2 PA 2	DONG NAI NO.4	147.0 MW	3 PA 3	CAN DONG	80.0 MW
4 PA 4	FU MIENG	60.0 MW	5 PA 5	DONG NAI NO.3&4	448.0 MW	6 PA 6	COMBINED CYCLE	300.0 MW

Table 7.7 Generation Expansion Plan for High Demand Case (2/2)

EGEAS REPORT VER 03 LEV 02		EXPANSION PLAN SUMMARY									
YEAR	PEAK LOAD, MW	ENERGY GWH	INSTALLED	RATED CAPACITY, MW	TOTAL	RESERVE CAPACITY	RESERVE PERCENT	LOSS OF LOAD PROBABILITY	CAPACITY, MW	NEW UNITS CAPACITY, MW	CAPITAL COST
1995	1169	6343	0	0	1756	1756	50.21	.0001	0	0	0
1996	1336	7258	0	0	1756	1756	31.44	.0004	0	0	0
1997	1513	8219	358	221	1893	1893	25.12	.0018	300	300	255
1998	1768	9448	600	0	2493	2493	41.01	.0023	0	0	0
1999	2044	10741	0	0	2493	2493	21.97	.0095	0	0	0
2000	2327	12231	472	32	2933	2933	26.04	.0035	0	0	0
2001	2653	13946	300	0	3233	3233	21.86	.0050	300	300	287
2002	3020	15874	600	0	3833	3833	26.92	.0021	600	600	590
2003	3433	18044	600	0	4133	4133	20.39	.0041	0	0	0
2004	3851	20240	600	0	4733	4733	22.90	.0024	600	600	626
2005	4371	22972	660	0	5393	5393	23.38	.0019	660	660	806
2006	4888	25690	600	0	5993	5993	22.61	.0020	600	600	664
2007	5390	28331	600	0	6593	6593	22.32	.0020	600	600	684
2008	6010	31571	748	0	7341	7341	22.15	.0000	748	748	1564
2009	6616	34771	600	0	7941	7941	20.03	.0026	600	600	726
2010	7366	38715	900	0	8841	8841	20.02	.0016	900	900	1122
2011	8220	43204	1200	0	10041	10041	22.15	.0000	1200	1200	1541
2012	9177	48237	1200	0	11241	11241	22.49	.0000	1200	1200	1587
2013	10250	53871	1500	160	12581	12581	22.74	.0000	1500	1500	2043
2014	11452	60190	1500	0	14081	14081	22.96	.0000	1500	1500	2104
2015	12799	67273	1800	0	15881	15881	24.08	.0000	1800	1800	2601

YEAR	PROD. COST	FIXED O & M	NEW UNITS ONLY	FIXED CHARGES	ANNUAL	CUM. ANNUAL	PRESENT WORTH	CUM. PRES. WORTH
1995	6	0	0	0	6	6	6	6
1996	17	0	0	0	17	23	16	22
1997	33	2	0	28	63	86	52	73
1998	63	2	28	28	92	178	69	143
1999	112	2	28	28	142	320	97	239
2000	98	2	28	28	128	447	79	318
2001	150	3	60	60	213	660	120	439
2002	200	7	125	125	331	991	170	609
2003	243	7	125	125	375	1367	175	784
2004	311	11	194	194	516	1883	219	1003
2005	397	16	281	281	694	2576	267	1270
2006	499	20	354	354	874	3450	306	1576
2007	604	25	430	430	1059	4510	338	1914
2008	687	32	591	591	1311	5820	380	2394
2009	838	38	671	671	1546	7367	407	2701
2010	1012	46	794	794	1852	9219	443	3144
2011	1192	56	964	964	2212	11431	481	3626
2012	1421	67	1139	1139	2628	14059	520	4145
2013	1729	82	1364	1364	3175	17233	571	4716
2014	2039	97	1596	1596	3732	20965	610	5327
2015	2381	115	1883	1883	4379	25343	651	5977
EXT.							7166	13143

NOTES - ANNUAL COSTS ARE IN MILLIONS OF CURRENT DOLLARS.
 - PRESENT WORTH COSTS ARE IN MILLIONS OF DOLLARS DISCOUNTED TO THE BEGINNING OF 1995.

Table 7.8 Generation Expansion Plan (Capital of C/C increased 20 %) (1/2)

EGEAS REPORT VER 03 LEV 02		EXPANSION PLAN SUMMARY												
		NEW CAPACITY ADDED, MW												
YEAR	1	2	3	4	5									
+	1995	.00	.00	.00	.00	.00	.0	.0	.0	.0	.0	.0	.0	.0
+	1996	.00	.00	.00	.00	.00	.0	.0	.0	.0	.0	.0	.0	.0
+	1997	.00	.00	.00	.00	1.00	.0	.0	.0	.0	.0	.0	.0	300.0
+	1998	.00	.00	.00	.00	.00	.0	.0	.0	.0	.0	.0	.0	.0
+	1999	.00	.00	.00	.00	.00	.0	.0	.0	.0	.0	.0	.0	.0
+	2000	.00	.00	.00	.00	.00	.0	.0	.0	.0	.0	.0	.0	.0
+	2001	.00	.00	.00	.00	1.00	.0	.0	.0	.0	.0	.0	.0	300.0
+	2002	.00	.00	.00	.00	1.00	.0	.0	.0	.0	.0	.0	.0	300.0
+	2003	.00	.00	.00	.00	.00	.0	.0	.0	.0	.0	.0	.0	.0
+	2004	.00	.00	.00	.00	.00	2.00	.0	.0	.0	.0	.0	.0	600.0
+	2005	.00	.00	1.00	.00	.00	.00	.0	.0	448.0	.0	.0	.0	.0
+	2006	.00	1.00	.00	.00	1.00	.00	.0	60.0	.0	.0	.0	.0	300.0
+	2007	.00	.00	.00	.00	.00	2.00	.0	.0	.0	.0	.0	.0	600.0
+	2008	.00	.00	.00	.00	.00	2.00	.0	.0	.0	.0	.0	.0	600.0
+	2009	.00	.00	.00	.00	.00	2.00	.0	.0	.0	.0	.0	.0	600.0
+	2010	.00	.00	.00	.00	.00	2.00	.0	.0	.0	.0	.0	.0	600.0
+	2011	.00	.00	.00	.00	.00	3.00	.0	.0	.0	.0	.0	.0	900.0
+	2012	.00	.00	.00	.00	.00	3.00	.0	.0	.0	.0	.0	.0	900.0
+	2013	1.00	.00	.00	.00	.00	3.00	.0	.0	.0	.0	.0	.0	900.0
+	2014	.00	.00	.00	.00	.00	4.00	.0	.0	.0	.0	.0	.0	1200.0
+	2015	.00	.00	.00	.00	.00	4.00	.0	.0	.0	.0	.0	.0	1200.0
+	TOTAL	1.00	1.00	1.00	.00	.00	31.00	.0	60.0	448.0	.0	.0	.0	9300.0

UNIT TYPES
 1 PA 3 CAN DONG 80.0 MW 2 PA 4 FU MIENG 60.0 MW 3 PA 5 DONG NAI NO.364 448.0 MW
 4 PA 6 COAL THERMAL 300.0 MW 5 PA 7 COMBINED CYCLE 300.0 MW

Table 7.9 Generation Expansion Plan (Fuel Cost of C/C increased 20 %) (1/2)

YEAR	NUMBER OF NEW UNITS ADDED					NEW CAPACITY ADDED, MW				
	1	2	3	4	5	1	2	3	4	5
1995	.00	.00	.00	.00	.00	.0	.0	.0	.0	.0
1996	.00	.00	.00	.00	.00	.0	.0	.0	.0	.0
1997	.00	.00	.00	.00	1.00	.0	.0	.0	.0	300.0
1998	.00	.00	.00	.00	.00	.0	.0	.0	.0	.0
1999	.00	.00	.00	.00	.00	.0	.0	.0	.0	.0
2000	.00	.00	.00	.00	.00	.0	.0	.0	.0	.0
2001	.00	.00	.00	.00	1.00	.0	.0	.0	.0	.0
2002	.00	.00	.00	1.00	.00	.0	.0	.0	.0	300.0
2003	.00	.00	.00	.00	.00	.0	.0	.0	300.0	.0
2004	.00	.00	.00	2.00	.00	.0	.0	.0	.0	.0
2005	1.00	.00	.00	.00	.00	448.0	.0	.0	.0	.0
2006	.00	.00	1.00	1.00	.00	.0	.0	126.0	300.0	.0
2007	.00	.00	.00	1.00	1.00	.0	.0	.0	.0	.0
2008	.00	.00	.00	1.00	1.00	.0	.0	.0	.0	.0
2009	.00	.00	.00	1.00	1.00	.0	.0	.0	.0	.0
2010	.00	.00	.00	1.00	1.00	.0	.0	.0	.0	.0
2011	.00	.00	.00	2.00	1.00	.0	.0	.0	.0	.0
2012	.00	.00	.00	1.00	2.00	.0	.0	.0	.0	.0
2013	.00	.00	.00	2.00	2.00	.0	.0	.0	.0	.0
2014	.00	.00	.00	2.00	2.00	.0	.0	.0	.0	.0
2015	.00	.00	.00	2.00	2.00	.0	.0	.0	.0	.0
TOTAL	1.00	.00	1.00	17.00	15.00	448.0	.0	126.0	5100.0	4500.0

UNIT TYPES

1 PA 5 DONG NAI NO.364	448.0 MW	2 PA 3 CAN DONG	80.0 MW	3 PA 4 FU MIENG	126.0 MW
4 PA 6 COAL THERMAL	300.0 MW	5 PA 7 COMBINED CYCLE	300.0 MW		

Table 7.9 Generation Expansion Plan (Fuel Cost of C/C increased 20 %) (2/2)

YEAR	PEAK LOAD, MW	ENERGY GWH	RATED CAPACITY, MW		RESERVE CAPACITY	RESERVE PERCENT	LOSS OF LOAD PROBABILITY	NEW UNITS	
			INSTALLED	RETIRED				CAPACITY, MW	CAPITAL COST
1995	1141.	6196.	0.	1756.	1756.	53.90	0.001	0.	0.
1996	1296.	7041.	0.	1756.	1756.	35.49	0.003	0.	0.
1997	1458.	7916.	358.	1893.	1893.	29.84	0.010	300.	255.
1998	1690.	9033.	600.	2493.	2493.	47.51	0.013	0.	0.
1999	1939.	10191.	0.	2493.	2493.	28.57	0.056	0.	0.
2000	2191.	11514.	472.	2933.	2933.	33.87	0.016	0.	0.
2001	2474.	13002.	300.	3233.	3233.	30.68	0.018	300.	287.
2002	2788.	14656.	300.	3533.	3533.	26.72	0.026	300.	461.
2003	3139.	16498.	300.	3833.	3833.	22.11	0.034	0.	0.
2004	3487.	18325.	600.	4433.	4433.	27.13	0.024	600.	979.
2005	3918.	20595.	448.	4881.	4881.	24.58	0.013	448.	1108.
2006	4340.	22811.	426.	5307.	5307.	22.28	0.020	426.	862.
2007	4741.	24916.	600.	5907.	5907.	24.59	0.008	600.	877.
2008	5235.	27517.	600.	6507.	6507.	24.30	0.000	600.	903.
2009	5707.	29997.	600.	7107.	7107.	24.53	0.000	600.	930.
2010	6293.	33077.	600.	7707.	7707.	22.47	0.003	600.	958.
2011	6954.	36551.	900.	8607.	8607.	23.77	0.000	900.	1589.
2012	7687.	40401.	900.	9507.	9507.	23.68	0.000	900.	1413.
2013	8499.	44672.	1200.	10547.	10547.	24.10	0.000	1200.	2094.
2014	9401.	49409.	1200.	11747.	11747.	24.95	0.000	1200.	2157.
2015	10400.	54663.	1200.	12947.	12947.	24.49	0.000	1200.	2222.

YEAR	ALL UNITS		NEW UNITS ONLY		COST SUMMARY		
	PROD. COST	FIXED O & M	FIXED CHARGES	ANNUAL	CUM. ANNUAL	PRESENT WORTH	CUM. PRES. WORTH
1995	5.	0.	0.	5.	5.	5.	5.
1996	17.	0.	0.	17.	22.	15.	20.
1997	32.	28.	28.	61.	83.	51.	71.
1998	60.	28.	28.	90.	173.	68.	138.
1999	104.	28.	28.	133.	306.	91.	229.
2000	137.	60.	60.	119.	423.	74.	303.
2001	181.	110.	110.	200.	626.	113.	416.
2002	212.	110.	110.	296.	922.	152.	569.
2003	241.	218.	218.	328.	1250.	153.	721.
2004	283.	330.	330.	468.	1718.	199.	920.
2005	342.	422.	422.	627.	2345.	242.	1162.
2006	406.	519.	519.	781.	3126.	274.	1435.
2007	498.	618.	618.	946.	4072.	302.	1737.
2008	590.	721.	721.	1143.	5215.	331.	2068.
2009	724.	826.	826.	1343.	6558.	354.	2422.
2010	844.	1001.	1001.	1588.	8146.	380.	2802.
2011	1017.	1157.	1157.	1891.	10036.	411.	3213.
2012	1238.	1388.	1388.	2227.	12264.	441.	3654.
2013	1439.	1625.	1625.	2691.	14954.	484.	4138.
2014	1693.	1870.	1870.	3142.	18097.	514.	4652.
2015	1693.	1870.	1870.	3653.	21750.	543.	5195.
EXT.						5889.	11083.

NOTES - ANNUAL COSTS ARE IN MILLIONS OF CURRENT DOLLARS.
 - PRESENT WORTH COSTS ARE IN MILLIONS OF DOLLARS DISCOUNTED TO THE BEGINNING OF 1995.

Table 8.1 Alternative Study on Combination of Dong Nai No.3 and No.4

	Dong Nai No.3											Dong Nai No.4											Energy Increase at Tri An
	HWL (EL.)	LWL (EL.)	TWL (EL.)	Head (m)	Active Stor. (M.m ³)	Max. Disch. (m ³ /s)	Inst. Capa. (MW)	Firm Energy (GWh)	Second Energy (GWh)	Project Cost (M.US\$)	HWL (EL.)	LWL (EL.)	TWL (EL.)	Head (m)	Active Stor. (M.m ³)	Max. Disch. (m ³ /s)	Inst. Cap. (MW)	Firm Energy (GWh)	Second Energy (GWh)	Project Cost (M.US\$)	Firm Energy (GWh)	Second Energy (GWh)	
Case 1	580	545	487	79.2	1179	197	130	275	47	345	480	475	287	183	47	209	318	682	129	480	150	-127	
Case 2	570	540	487	70.9	899	190	112	236	52	295	480	475	287	183	47	202	308	655	152	473	148	-129	
Case 3	560	535	487	62.6	550	154	80	172	82	249	480	475	287	183	47	167	254	547	240	442	120	-111	
Case 4	580	545	440	121.2	1179	197	198	422	70	470	440	430	287	141.4	46.8	208	245	527	103	334	150	-127	
Case 5	570	540	440	112.9	899	190	178	377	80	412	440	430	287	141.4	46.8	201	236	506	121	327	147	-126	
Case 6	560	535	440	104.5	550	154	134	288	130	351	440	430	287	141.4	46.8	167	196	422	189	305	120	-111	

	Total Cost of D/N 3&4 (M. US\$)	Total Inst. Capacity of D/N 3 & 4 (MW)	Total Add. Firm Energy (GWh)		Total Add. Second Enc. (GWh)	Combined Specific Capacity Cost (\$/kW)		Combined Specific Generation Cost (Cent/kWh)	Annual Economic Net Benefit (M. US\$/Year)	
			Firm Energy (GWh)	Second Enc. (GWh)		Capacity Cost (\$/kW)	Generation Cost (Cent/kWh)		Specific Net Benefit	Annual Economic Net Benefit
Case 1	825	448	1107	49	1842	6.17	13.15			
Case 2	768	420	1039	75	1829	5.99	13.28			
Case 3	691	334	839	211	2069	5.88	5.83			
Case 4	804	443	1099	46	1815	6.07	14.11			
Case 5	739	414	1030	75	1785	5.81	14.84			
Case 6	656	330	830	208	1988	5.65	8.18			

- Note : 1. Combined cycle plant as the least cost alternative
 2. Capacity cost : US\$ 800 / kW
 3. Unit fuel cost : Cent 1.896
 4. Capacity adjustment factor : 1.2207
 5. Generation adjustment factor : 0.9846

Table 8.2 Principal Feature of Hydropower Master Plan Projects

Description	Unit	Dong Nai No.3	Dong Nai No.4	Combined Total	Fu Mieng (Multi-purpose)
1. Hydrology					
Catchment Area	km ²	2,428 *1)	2,597 *1)	-	4,110
Mean Inflow	m ³ /s	56.8 *1)	62.7 *1)	-	168.8
Maximum Flood	m ³ /s	9,400	9,550	-	6,200
*1) excluding catchment of Da Nhim and Dai Ninh Projects					
2. Reservoir					
Surface Area at HWL	km ²	40	6	46	70
HWL	m	570	440	-	77
LWL	m	540	430 *2)	-	69
Active Capacity	mil.m ³	899	47 *2)	946	462
Firm Discharge	m ³ /s	47.5	50.3 *2)	-	55.0
3. Major Structures					
3-1 Dam					
Type	-	Rockfill	Rockfill	-	Earthfill
Crest Length	m	690	290	-	2,820
Height	m	84	102	-	35
Volume	1000m ³	4,280	2,700	6,980	3,430
3-2 Waterway					
Number of Tunnel	-	2	2	-	-
Tunnel Length	m	5,030	5,650	10,680	-
3-3 Diversion Canal					
Canal Capacity	m ³ /s	-	-	-	60
Canal Length	m	-	-	-	7,200
3-4 Power Plant					
Tail Water Level	m	440	287	-	45
Plant Discharge	m ³ /s	190	201 *2)	-	220
Effective Head	m	112	141	254	28
Installed Capacity	MW	180	240 *2)	420	55
Number of Unit	-	2	2	-	2
4. Energy Generation					
Annual Firm Energy	GWh	377	506 *2)	883	111
Annual Secondary Energy	GWh	80	121 *2)	201	85
Annual Total Energy	GWh	457	627 *2)	1084	196
Add. Firm E at Tri An	GWh	-	-	147	0
Add. Secondary E at Tri An	GWh	-	-	-126	0
Total Firm Energy	GWh	-	-	1030	111
Total Secondary Energy	GWh	-	-	75	85
5. Project Cost					
Preparatory Works	mil.US\$	11	10 *2)	21	6
Civil Work	mil.US\$	308	238 *2)	546	151
Hydro-Mechanical Work	mil.US\$	24	28 *2)	52	15
Electro-Mechanical Work	mil.US\$	41	47 *2)	88	28
Indirect Cost including Contingency	mil.US\$	106	75 *2)	181	85
Total Project Cost	mil.US\$	490	398	888	285
*2) under the condition of "with Dong Nai No.3 Project"					

Table 8.3 Total Project Cost of Dong Nai No.3 (1/2)

Work Item	Unit	Unit Price	Dong Nai 3	
			Work Quantity	Amount (000 \$)
[A] Direct Cost				383,990
[A1] Preparatory Works				10,948
Access Road	km	100,000	15	1,500
Power supply	km	14,600	15	219
Others	ls	-	1	9,229
[A2] Civil Work				307,649
1 Reservoir				188,972
1-1 Care of River				2,235
1-2 Diversion Tunnel				59,723
Common excavation	m3	5.5	8,200	45
Rock excavation	m3	16.0	12,200	195
Tunnel excavation	m3	72.0	238,000	17,136
Lining concrete	m3	150.0	75,600	11,340
Plug concrete	m3	167.0	162,400	27,121
Reinforcement-bar	ton	690.0	1,510	1,042
Others	ls	-	1	2,844
1-3 Dam				74,513
Common excavation	m3	5.5	1,371,000	7,541
Rock excavation	m3	16.0	343,000	5,488
Embankment: core	m3	9.4	642,000	6,035
Embankment: filter	m3	29.5	214,000	6,313
Embankment: rock	m3	10.9	3,424,000	37,322
Wall Concrete	m3	100.0	20,300	2,030
Reinforcement-bar	ton	650.0	100	65
Grouting & others	ls	-	1	9,719
1-4 Spillway				40,751
Common excavation	m3	5.5	865,000	4,758
Rock excavation	m3	16.0	741,000	11,856
Structure concrete	m3	142.0	131,800	18,716
Reinforcement-bar	ton	650.0	2,640	1,716
Others	ls	-	1	3,705
1-5 Miscellaneous Works				11,750
ls			1	11,750
2 Power Waterway and Power Plant				118,677
2-1 Power Intake				13,614
Common excavation	m3	5.5	54,600	300
Rock excavation	m3	16.0	105,100	1,682
Shaft excavation	m3	53.0	3,700	196
Shaft lining concrete	m3	153.0	1,000	153
Structure concrete	m3	142.0	56,700	8,051
Canal lining concrete	m3	142.0	5,500	781
Reinforcement bar	ton	670.0	1,810	1,213
Others	ls	-	1	1,238
2-2 Headrace Tunnel				61,656
Tunnel excavation	m3	67.0	428,900	28,736
Inl. Lining concrete	m3	132.0	115,300	15,220
Reinforcement bar	ton	690.0	3,460	2,387
Work Adit	m	6,490.0	1,500	9,735
Grouting & others	ls	-	1	5,608
2-3 Surgetank				4,607
Common excavation	m3	5.5	28,000	154
Rock excavation	m3	16.0	19,000	304
Shaft excavation	m3	53.0	13,800	731
Open excavation	m3	142.0	13,000	1,846
Shaft lining concrete	m3	153.0	4,600	704
Reinforcement bar	ton	690.0	650	449
Others	ls	-	1	419

Table 8.3 Total Project Cost of Dong Nai No.3 (2/2)

Work Item	Unit	Unit Price	Dong Nai 3	
			Work Quantity	Amount (,000 \$)
2-4 Penstock				3,402
Tunnel excavation	m3	79.0	13,500	1,067
Shaft excavation	m3	99.0	4,500	446
Backfill concrete	m3	120.0	12,300	1,476
Reinforcement bar	ton	690.0	150	104
Others	ls	-	1	309
2-5 Power Outlet				223
Common excavation	m3	5.5	1,600	9
Rock excavation	m3	16.0	6,400	102
Lining concrete	m3	142.0	600	85
Reinforcement bar	ton	650.0	10	7
Others	ls	-	1	20
2-6 Powerhouse & Switchyard				24,356
Common excavation	m3	5.5	52,000	286
Rock excavation	m3	16.0	208,100	3,330
Powerhouse concrete	m3	156.0	15,900	2,480
Slope protection cone.	m3	142.0	109,200	15,506
Reinforcement bar	ton	650.0	830	540
Others	ls	-	1	2,214
2-7 Miscellaneous Works	ls	-	1	10,789
[A3] Hydraulic Equipment and Metal Work				24,503
1. Reservoir				11,330
Spillway Gate	ton	10,000.0	1,030	10,300
Others	ls	-	1	1,030
2. Power Waterway				13,173
Intake gate	ton	10,000.0	200	2,000
Trashrack / screen	ton	7,000.0	140	980
Penstock steel	ton	6,500.0	1,230	7,995
Draft gate	ton	10,000.0	100	1,000
Others	ls	-	1	1,198
[A4] Electro-mechanical Equipment and Transmission Line				40,890
1. Powerhouse and Switchyard				38,090
Turbine	ls	-	1	17,140
Generator	ls	-	1	15,240
Transformer	ls	-	1	1,900
Others	ls	-	1	3,810
2. Transmission Line	km	140,000	20	2,800
[B] Indirect Cost				106,235
[B1] Compensation Cost				23,270
Reservoir inundation	km2	400,000	55	22,160
Power Waterway / Plant	ls	-	1	1,110
[B2] Administration Cost	ls	-	1	7,680
[B3] Engineering Fee	ls	-	1	30,719
[B4] Physical Contingency	ls	-	1	44,566
[C] Total Construction Cost				490,225

Table 8.4 Total Project Cost of Dong Nai No.4 (1/2)

Work Item	Unit	Unit Price	Dong Nai 4	
			Work Quantity	Amount (000 \$)
[A] Direct Cost				322,686
[A1] Preparatory Works				9,998
Access Road	km	100,000	25	2,500
Power supply	km	14,600	25	365
Others	ls	-	1	7,133
[A2] Civil Work				237,767
1 Reservoir				114,820
1-1 Care of River				1,364
1-2 Diversion Tunnel				33,995
Common excavation	m ³	5.5	8,300	46
Rock excavation	m ³	16.0	12,500	200
Tunnel excavation	m ³	72.0	135,000	9,720
Lining concrete	m ³	150.0	42,500	6,375
Plug concrete	m ³	167.0	92,500	15,448
Reinforcement-bar	ton	690.0	850	587
Others	ls	-	1	1,619
1-3 Dam				45,473
Common excavation	m ³	5.5	864,000	4,752
Rock excavation	m ³	16.0	216,000	3,456
Embankment core	m ³	9.4	405,000	3,807
Embankment filter	m ³	29.5	135,000	3,983
Embankment rock	m ³	10.9	2,160,000	23,544
Grouting & others	ls	-	1	5,931
1-4 Spillway				26,640
Common excavation	m ³	5.5	440,000	2,420
Rock excavation	m ³	16.0	660,000	10,560
Structure concrete	m ³	142.0	72,500	10,295
Reinforcement-bar	ton	650.0	1,450	943
Others	ls	-	1	2,422
1-5 Miscellaneous Works	ls	-	1	7,348
2 Power Waterway and Power Plant				122,947
2-1 Power Intake				7,762
Common excavation	m ³	5.5	35,800	197
Rock excavation	m ³	16.0	103,000	1,648
Structure concrete	m ³	142.0	26,500	3,763
Canal lining concrete	m ³	142.0	5,900	838
Reinforcement bar	ton	670.0	910	610
Others	ls	-	1	706
2-2 Headrace Tunnel				72,157
Tunnel excavation	m ³	67.0	508,500	34,070
Tnl. Lining concrete	m ³	132.0	133,500	17,622
Reinforcement bar	ton	690.0	1,340	925
Work Adit	m	6,490.0	2,000	12,980
Grouting & others	ls	-	1	6,560
2-3 Surgetank				4,251
Common excavation	m ³	154.0	34,000	187
Rock excavation	m ³	304.0	23,000	368
Shaft excavation	m ³	731.0	9,700	514
Open concrete	m ³	1,846.0	15,900	2,258
Shaft lining concrete	m ³	704.0	3,200	490
Reinforcement bar	ton	449.0	800	552
Others	ls	419.0	1	437

Table 8.4 Total Project Cost of Dong Nai No.4 (2/2)

Work Item	Unit	Unit Price	Dong Nai 4	
			Work Quantity	Amount (,000 \$)
2-4 Penstock				4,110
Tunnel excavation	m3	79.0	55,600	1,232
Shaft excavation	m3	99.0	6,100	604
Backfill concrete	m3	120.0	14,800	1,776
Reinforcement bar	ton	690.0	180	124
Others	ls	-	1	374
2-5 Power Outlet				677
Common excavation	m3	5.5	4800	26
Rock excavation	m3	16	19200	307
Lining concrete	m3	142	1800	256
Reinforcement bar	ton	650.0	40	26
Others	ls	-	1	62
2-6 Powerhouse & Switchyard				22,813
Common excavation	m3	5.5	48,100	265
Rock excavation	m3	16.0	192,400	3,078
Powerhouse concrete	m3	156.0	19,700	3,073
Slope protection conc.	m3	142.0	96,200	13,660
Reinforcement bar	ton	650.0	1,020	663
Others	ls	-	1	2,074
2-7 Miscellaneous Works	ls	-	1	11,177
[A3] Hydraulic Equipment and Metal Work				27,511
1. Reservoir				11,660
Spillway Gate	ton	10,000.0	1,060	10,600
Others	ls	-	1	1,060
2. Power Waterway				15,851
Intake gate	ton	10,000.0	190	1,900
Trashrack / screen	ton	7,000.0	140	980
Penstock steel	ton	6,500.0	1,620	10,530
Draft gate	ton	10,000.0	100	1,000
Others	ls	-	1	1,441
[A4] Electro-mechanical Equipment and Transmission Line				47,410
1. Powerhouse and Switchyard				45,310
Turbine	ls	-	1	20,390
Generator	ls	-	1	18,120
Transformer	ls	-	1	2,270
Others	ls	-	1	4,530
2. Transmission Line	km	140,000.0	15	2,100
[B] Indirect Cost				75,409
[B1] Compensation Cost				6,950
Reservoir inundation	km2	400,000.0	17	6,620
Power Waterway / Plant	ls	-	1	330
[B2] Administration Cost	ls	-	1	6,454
[B3] Engineering Fee	ls	-	1	25,815
[B4] Physical Contingency	ls	-	1	36,190
[C] Total Construction Cost				398,095

Table 8.5 Cash Flow Analysis for Dong Nai No.3 and No.4

Unit US \$ 1,000

Year	Cash Flow of Cost			Cash Flow of Benefit			Balance B-C
	Capital Cost		O & M Cost	Capital Cost Combined Cycle	O&M Cost	Fuel Cost	
	Dong Nai No.3	Dong Nai No.4					
-5	41,669	33,838					-75,507
-4	83,338	67,676		87,890			-63,124
-3	83,338	67,676		131,836			-19,179
-2	125,007	101,514		131,836			-94,686
-1	83,338	67,676		87,890			-63,124
0			3,003		21,973	20,348	39,317
1			3,003		21,973	20,348	39,317
2			3,003		21,973	20,348	39,317
3			3,003		21,973	20,348	39,317
4			3,003		21,973	20,348	39,317
5			3,003		21,973	20,348	39,317
6			3,003		21,973	20,348	39,317
7			3,003		21,973	20,348	39,317
8			3,003		21,973	20,348	39,317
9			3,003		21,973	20,348	39,317
10			3,003		21,973	20,348	39,317
11			3,003		21,973	20,348	39,317
12			3,003		21,973	20,348	39,317
13			3,003		21,973	20,348	39,317
14			3,003		21,973	20,348	39,317
15			3,003		21,973	20,348	39,317
16			3,003		21,973	20,348	39,317
17			3,003	79,101	21,973	20,348	118,419
18			3,003	118,652	21,973	20,348	157,969
19			3,003	138,427	21,973	20,348	177,745
20			3,003	59,326	21,973	20,348	98,643
21			3,003		21,973	20,348	39,317
22			3,003		21,973	20,348	39,317
23			3,003		21,973	20,348	39,317
24			3,003		21,973	20,348	39,317
25			3,003		21,973	20,348	39,317
26			3,003		21,973	20,348	39,317
27			3,003		21,973	20,348	39,317
28			3,003		21,973	20,348	39,317
29			3,003		21,973	20,348	39,317
30			3,003		21,973	20,348	39,317
31			3,003		21,973	20,348	39,317
32			3,003		21,973	20,348	39,317
33			3,003		21,973	20,348	39,317
34			3,003		21,973	20,348	39,317
35			3,003		21,973	20,348	39,317
36			3,003		21,973	20,348	39,317
37			3,003	79,101	21,973	20,348	118,419
38	11,267	13,108	3,003	118,652	21,973	20,348	133,595
39	16,900	19,662	3,003	138,427	21,973	20,348	141,183
40	16,900	19,662	3,003	59,326	21,973	20,348	62,082
41			3,003		21,973	20,348	39,317
42			3,003		21,973	20,348	39,317
43			3,003		21,973	20,348	39,317
44			3,003		21,973	20,348	39,317
45			3,003		21,973	20,348	39,317
46			3,003		21,973	20,348	39,317
47			3,003		21,973	20,348	39,317
48			3,003		21,973	20,348	39,317
49			3,003		21,973	20,348	39,317
50			3,003		21,973	20,348	39,317

Total Benefit at DR=10% 1,100,893
 Total Cost at DR=10% 1,019,042
 Net Benefit at DR=10% 81,852
 EIRR= 0.1141

Table 8.6 Total Project Cost of Fu Mieng Multi-purpose Project (1/2)

Work Item	Unit	Unit Price	Fu Mieng	
			Work Quantity	Amount (,000 \$)
(A) Direct Cost				199,511
[A1] Preparatory Works				5,672
Access Road	km	100,000	10	1,000
Power supply	km	14,600	10	146
Others	ls	-	1	4,526
[A2] Civil Work				150,873
1 Reservoir				71,841
1-1 Care of River				1,957
1-2 Dam				48,921
Common excavation	m3	5.5	309,200	1,701
Rock excavation	m3	16.0	35,200	563
Embankment core	m3	9.4	2,890,000	27,166
Embankment filter	m3	29.5	170,000	5,015
Embankment rock	m3	10.9	340,000	3,706
Wall Concrete	m3	100.0	67,200	6,720
Reinforcement bar	ton	690.0	340	235
Grouting & others	ls	-	1	3,815
1-3 Spillway				14,432
Common excavation	m3	5.5	390,000	2,145
Rock excavation	m3	16.0	132,000	2,112
Structure concrete	m3	142.0	57,200	8,122
Reinforcement bar	ton	650.0	1,140	741
Others	ls	-	1	1,312
1-4 Miscellaneous Works	ls	-	1	6,531
2 Power Waterway and Power Plant				20,986
2-1 Power Intake				9,617
Common excavation	m3	5.5	136,800	752
Rock excavation	m3	16.0	34,200	547
Structure concrete	m3	142.0	23,600	3,351
Canal lining concrete	m3	142.0	23,300	3,309
Reinforcement bar	ton	670.0	1,170	784
Others	ls	-	1	874
2-2 Penstock				375
Common excavation	m3	5.5	10,600	58
Rock excavation	m3	16.0	2,600	42
Base / block concrete	m3	156.0	1,500	234
Reinforcement bar	ton	690.0	10	7
Others	ls	-	1	34
2-3 Power Outlet				6,873
Common excavation	m3	5.5	148,500	817
Rock excavation	m3	16.0	99,000	1,584
Lining concrete	m3	142.0	24,800	3,522
Reinforcement bar	ton	650.0	500	325
Others	ls	-	1	625
2-4 Powerhouse				1,931
Common excavation	m3	5.5	6,000	33
Rock excavation	m3	16.0	23,900	382
Powerhouse concrete	m3	156.0	7,300	1,139
Reinforcement bar	ton	650.0	380	247
Others	ls	-	1	180
2-5 Switchyard				232
Base concrete	m3	122.0	1,350	165
Reinforcement bar	ton	650.0	70	46
Others	ls	-	1	21
2-6 Miscellaneous Works	ls	-	1	1,908

Table 8.6 Total Project Cost of Fu Mieng Multi-purpose Project (2/2)

Work Item	Unit	Unit Price	Fu Mieng	
			Work Quantity	Amount (,000 \$)
3	Diversion Works			58,046
3-1	Diversion Intake			2576
	Common excavation	m3	5.5	22200
	Rock excavation	m3	16	7200
	Structure concrete	m3	129	10500
	Intake wire concrete	m3	129	4200
	Reinforcement-bar	ton	650.0	320
	Others	ls	-	1
				234
3-2	Diversion Canal			50,193
	Common excavation	m3	5.5	1,560,000
	Rock excavation	m3	16.0	1,560,000
	Lining concrete	m3	142.0	78,000
	Reinforcement bar	ton	650.0	1,560
	Others	ls	-	1
				4,563
3-3	Miscellaneous Works	ls	-	1
				5,277
[A3]	Hydraulic Equipment and Metal Work			14,806
1.	Reservoir			7,480
	Spillway Gate	ton	10,000.0	680
	Others	ls	-	1
				680
2.	Power Waterway			5,390
	Intake gate	ton	10,000.0	210
	Trashrack / screen	ton	7,000.0	150
	Penstock steel	ton	6,500.0	100
	Draft gate	ton	10,000.0	110
	Others	ls	-	1
				490
3.	Diversion Work			1,936
	Intake gate	ton	10,000.0	120
	Screen	ton	7,000.0	80
	Others	ls	-	1
				176
[A4]	Electro-mechanical Equipment and Transmission Line			28,160
1.	Powerhouse and Switchyard			26,060
	Turbine	ls	-	1
	Generator	ls	-	1
	Transformer	ls	-	1
	Others	ls	-	1
				2,610
2.	Transmission Line	km	140,000.0	15
				2,100
[B]	Indirect Cost			86,095
[B1]	Compensation Cost			40,180
	Reservoir inundation	km2	400,000	89
	Power Waterway / Plant	ls	-	1
	Diversion Work	km2	-	7
				2,800
[B2]	Administration Cost	ls	-	1
				3,990
[B3]	Engineering Fee	ls	-	1
				15,961
[B4]	Physical Contingency	ls	-	1
				25,964
[C]	Total Construction Cost			285,607

Table 8.7. Cash Flow Analysis (Fu Mieng Multi and Phuoc Hoa Pumping)

Year	Initial Costs		Cash Flow of Cost				Cash Flow of Benefit				Lang An In.	Lang An Br.	RLC		
	Dist. A. Cost	Dist. B. Cost	Phase I Inv. In.	Dist. Tota. In.	IC/MC In.	Lang An In.	Phase I Inv. In.	Dist. Tota. In.	IC/MC In.	Lang An Br.					
0			10,000	16,200	0	0	0	0	0	0	0	0	0	0	0
1	34,277	46,533	13,300	3,200	0	0	16,783	4,196	2,887	2,887	3,410	358	358	358	358
2	46,533	46,533	10,000	3,200	0	0	23,177	4,196	2,887	2,887	3,410	358	358	358	358
3			1,800	49,200	0	0	23,177	4,196	2,887	2,887	3,410	358	358	358	358
4			1,800	31,790	6,297	7,960	16,783	4,196	2,887	2,887	3,410	358	358	358	358
5			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
6			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
7			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
8			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
9			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
10			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
11			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
12			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
13			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
14			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
15			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
16			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
17			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
18			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
19			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
20			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
21			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
22			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
23			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
24			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
25			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
26			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
27			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
28			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
29			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
30			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
31			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
32			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
33			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
34			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
35			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
36			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
37			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
38			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
39			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
40			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
41			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
42			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
43			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
44			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
45			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
46			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
47			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
48			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
49			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358
50			1,800	1,800	6,297	8,117	16,783	4,196	2,887	2,887	3,410	358	358	358	358

Total Cost at DR=10%
 Total Benefit at DR=10%
 Net Benefit at DR=10%

440,195
 954,979
 114,484
 0.1138

Table 8.8 Cash Flow Analysis (Fu Mieng Single and Phuc Hoa Dam and Canal)

Year	Fu Mieng		Cash Flow of Dam				Cash Flow of Canal				Cash Flow of Benefit				Unit (US \$, 1,000)
	Dam & Canal	Canal Dam	Power (Million kWh)	Flow (Million m ³ /day)	10 ⁴ m ³ /day	10 ⁴ m ³ /day	10 ⁴ m ³ /day	10 ⁴ m ³ /day	10 ⁴ m ³ /day	10 ⁴ m ³ /day	10 ⁴ m ³ /day	10 ⁴ m ³ /day	10 ⁴ m ³ /day	10 ⁴ m ³ /day	
0	21,348		16,200	0	0	0	0	0	0	0	0	0	0	0	0
1	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
2	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
3	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
4	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
5	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
6	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
7	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
8	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
9	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
10	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
11	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
12	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
13	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
14	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
15	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
16	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
17	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
18	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
19	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
20	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
21	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
22	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
23	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
24	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
25	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
26	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
27	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
28	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
29	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
30	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
31	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
32	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
33	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
34	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
35	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
36	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
37	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
38	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
39	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
40	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
41	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
42	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
43	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
44	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
45	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
46	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
47	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
48	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
49	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0
50	42,776		32,400	0	0	0	0	0	0	0	0	0	0	0	0

Total Cost at DR=10%
Total Benefit at DR=10%
Net Benefit at DR=10%

-969,554
1,047,302
77,748

0.1085

Table 8.9 Cash Flow Analysis (Phuoc Hoa Dam and Canal Only)

Year	In Meters		Cash Flow of Cost		Year Totals		IPMC/yr	Long. An. Int.	Cash Flow of Benefit			IPMC/yr	Long. An. Int.	B/C
	Dam & Canal	Canal Only	Dam & Canal	Canal Only	Dam & Canal	Canal Only			Hydro-Benefit	Fixed Cost	Phase			
0	0	0	16,200	0	0	0	0	0	0	0	0	0	0	12,860
1	0	0	32,400	0	0	0	0	0	0	0	0	0	0	25,720
2	0	0	48,600	0	0	0	0	0	0	0	0	0	0	38,580
3	0	0	64,800	0	0	0	0	0	0	0	0	0	0	51,440
4	0	0	81,000	0	0	0	0	0	0	0	0	0	0	64,300
5	0	0	97,200	0	0	0	0	0	0	0	0	0	0	77,160
6	0	0	113,400	0	0	0	0	0	0	0	0	0	0	90,020
7	0	0	129,600	0	0	0	0	0	0	0	0	0	0	102,880
8	0	0	145,800	0	0	0	0	0	0	0	0	0	0	115,740
9	0	0	162,000	0	0	0	0	0	0	0	0	0	0	128,600
10	0	0	178,200	0	0	0	0	0	0	0	0	0	0	141,460
11	0	0	194,400	0	0	0	0	0	0	0	0	0	0	154,320
12	0	0	210,600	0	0	0	0	0	0	0	0	0	0	167,180
13	0	0	226,800	0	0	0	0	0	0	0	0	0	0	180,040
14	0	0	243,000	0	0	0	0	0	0	0	0	0	0	192,900
15	0	0	259,200	0	0	0	0	0	0	0	0	0	0	205,760
16	0	0	275,400	0	0	0	0	0	0	0	0	0	0	218,620
17	0	0	291,600	0	0	0	0	0	0	0	0	0	0	231,480
18	0	0	307,800	0	0	0	0	0	0	0	0	0	0	244,340
19	0	0	324,000	0	0	0	0	0	0	0	0	0	0	257,200
20	0	0	340,200	0	0	0	0	0	0	0	0	0	0	270,060
21	0	0	356,400	0	0	0	0	0	0	0	0	0	0	282,920
22	0	0	372,600	0	0	0	0	0	0	0	0	0	0	295,780
23	0	0	388,800	0	0	0	0	0	0	0	0	0	0	308,640
24	0	0	405,000	0	0	0	0	0	0	0	0	0	0	321,500
25	0	0	421,200	0	0	0	0	0	0	0	0	0	0	334,360
26	0	0	437,400	0	0	0	0	0	0	0	0	0	0	347,220
27	0	0	453,600	0	0	0	0	0	0	0	0	0	0	360,080
28	0	0	469,800	0	0	0	0	0	0	0	0	0	0	372,940
29	0	0	486,000	0	0	0	0	0	0	0	0	0	0	385,800
30	0	0	502,200	0	0	0	0	0	0	0	0	0	0	398,660
31	0	0	518,400	0	0	0	0	0	0	0	0	0	0	411,520
32	0	0	534,600	0	0	0	0	0	0	0	0	0	0	424,380
33	0	0	550,800	0	0	0	0	0	0	0	0	0	0	437,240
34	0	0	567,000	0	0	0	0	0	0	0	0	0	0	450,100
35	0	0	583,200	0	0	0	0	0	0	0	0	0	0	462,960
36	0	0	599,400	0	0	0	0	0	0	0	0	0	0	475,820
37	0	0	615,600	0	0	0	0	0	0	0	0	0	0	488,680
38	0	0	631,800	0	0	0	0	0	0	0	0	0	0	501,540
39	0	0	648,000	0	0	0	0	0	0	0	0	0	0	514,400
40	0	0	664,200	0	0	0	0	0	0	0	0	0	0	527,260
41	0	0	680,400	0	0	0	0	0	0	0	0	0	0	540,120
42	0	0	696,600	0	0	0	0	0	0	0	0	0	0	552,980
43	0	0	712,800	0	0	0	0	0	0	0	0	0	0	565,840
44	0	0	729,000	0	0	0	0	0	0	0	0	0	0	578,700
45	0	0	745,200	0	0	0	0	0	0	0	0	0	0	591,560
46	0	0	761,400	0	0	0	0	0	0	0	0	0	0	604,420
47	0	0	777,600	0	0	0	0	0	0	0	0	0	0	617,280
48	0	0	793,800	0	0	0	0	0	0	0	0	0	0	630,140
49	0	0	810,000	0	0	0	0	0	0	0	0	0	0	643,000
50	0	0	826,200	0	0	0	0	0	0	0	0	0	0	655,860

Total Cost at DR=10%
 Total Benefit at DR=10%
 Net Benefit at DR=10%

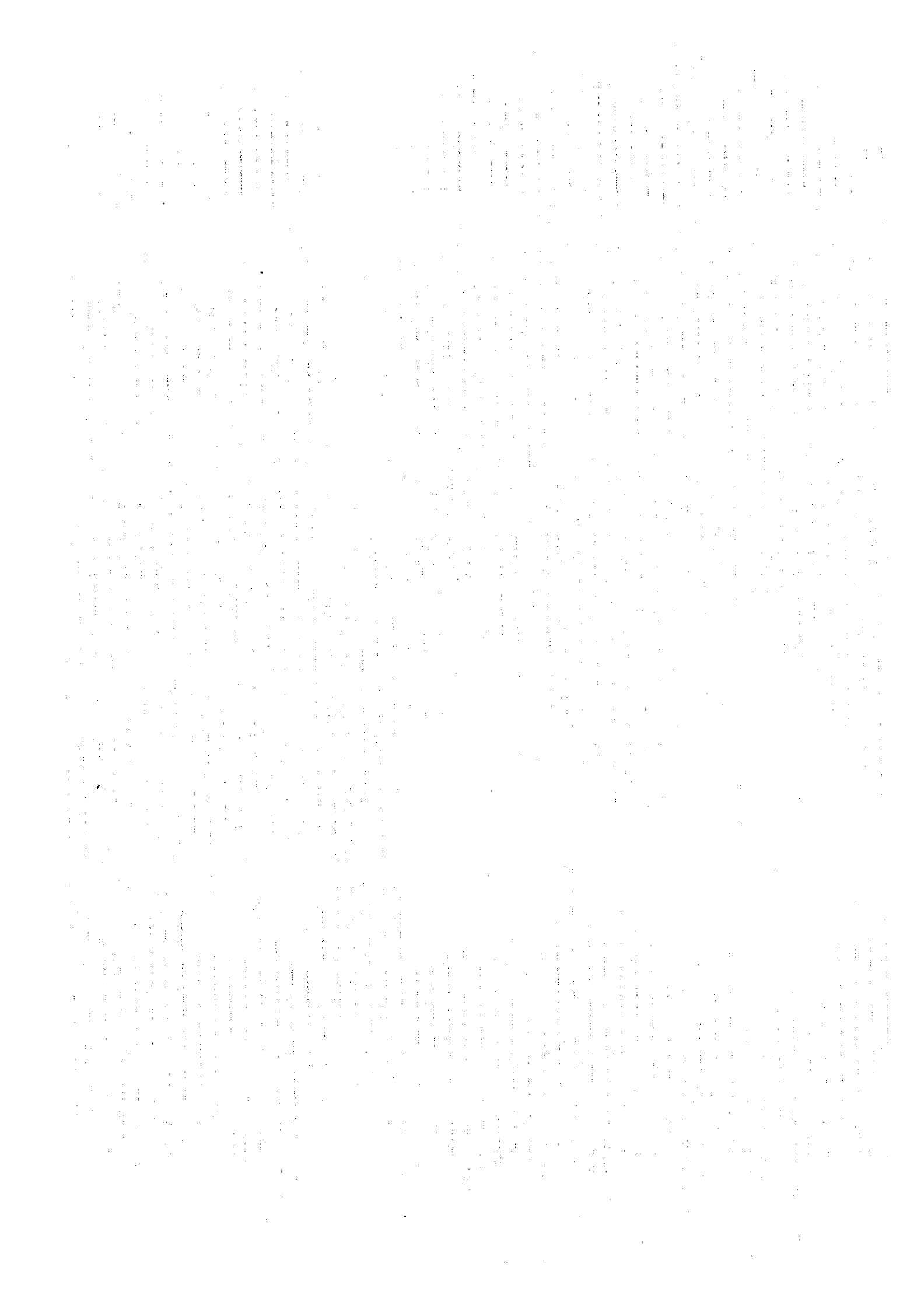
-447,378
 604,449
 21,121
 0,1027

Table 8.10 : Cash Flow Analysis for Fu Mlang Multipurpose Project

Year	Unit US \$ 1,000										Balance		
	Fu Mlang		Dau Ten In.	HCMC In.	Long An In.	Capital Cost	Hydro Benefit		Dau Ten In.	HCMC In.		Long An In.	B-C
	Dam & Canal	O&M Cost					Coal Thermal	O&M Cost					
-5	24,277		0	0	0				0	0	0	-24,277	
-4	48,553		0	0	0	16,785			0	0	0	-31,768	
-3	48,553		0	0	0	25,177			0	0	0	-23,376	
-2	72,830		0	0	0	25,177			0	0	0	-47,653	
-1	48,553		6,291	2900	6,365	16,785			0	0	0	-52,284	
0		895	6,571	8117	6,510		4,196	2,887	708	320	285	-13,626	
1		895	6,851	8274	6,635		4,196	2,887	2,124	991	856	-11,650	
2		895	7,131	8432	6,800		4,196	2,887	4,249	1,923	1,711	-8,292	
3		895	7,411	8589	6,945		4,196	2,887	7,082	3,205	2,852	-3,619	
4		895	7,691	8746	7,090		4,196	2,887	10,622	4,807	4,278	2,368	
5		895	7,971	8903	7,235		4,196	2,887	14,163	6,409	5,703	8,355	
6		895	8,251	9060	7,380		4,196	2,887	17,704	8,011	7,129	14,342	
7		895	8,431	9217	7,525		4,196	2,887	21,245	9,614	8,355	20,429	
8		895	8,541	9375	7,670		4,196	2,887	24,786	11,216	9,981	26,515	
9		895	2,370	1572	1,450		4,196	2,887	28,326	12,818	11,407	33,147	
10		895	2,370	1572	1,450		4,196	2,887	31,159	14,100	12,547	38,802	
11		895	2,370	1572	1,450		4,196	2,887	33,203	15,001	13,403	42,544	
12		895	2,370	1572	1,450		4,196	2,887	34,700	15,702	13,973	45,171	
13		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	46,485	
14		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	46,485	
15		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	46,485	
16		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	46,485	
17		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	46,485	
18		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	46,485	
19		895	8,670	9532	7,810		4,196	2,887	35,408	16,023	14,258	45,865	
20		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	46,485	
21		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	46,485	
22		895	2,370	1572	1,450	15,106	4,196	2,887	35,408	16,023	14,258	41,591	
23		895	2,370	1572	1,450	22,659	4,196	2,887	35,408	16,023	14,258	32,144	
24		895	2,370	1572	1,450	22,659	4,196	2,887	35,408	16,023	14,258	23,114	
25		895	2,370	1572	1,450	15,106	4,196	2,887	35,408	16,023	14,258	14,591	
26		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	6,485	
27		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	6,485	
28		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	6,485	
29		895	8,670	9532	7,810		4,196	2,887	35,408	16,023	14,258	45,865	
30		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	46,485	
31		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	46,485	
32		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	46,485	
33		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	46,485	
34		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	46,485	
35		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	46,485	
36		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	46,485	
37		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	46,485	
38	11,056	895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	53,439	
39	14,715	895	8,670	9532	7,810		4,196	2,887	35,408	16,023	14,258	31,150	
40	11,056	895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	55,449	
41		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	66,485	
42		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	66,485	
43		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	66,485	
44		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	66,485	
45		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	66,485	
46		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	66,485	
47		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	66,485	
48		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	66,485	
49		895	8,670	9532	7,810		4,196	2,887	35,408	16,023	14,258	45,865	
50		895	2,370	1572	1,450		4,196	2,887	35,408	16,023	14,258	46,485	

Total Cost at DR=10% 526,269
 Total Benefit at DR=10% 594,112
 Net Benefit at DR=10% 67,823
 0.1132

FIGURES



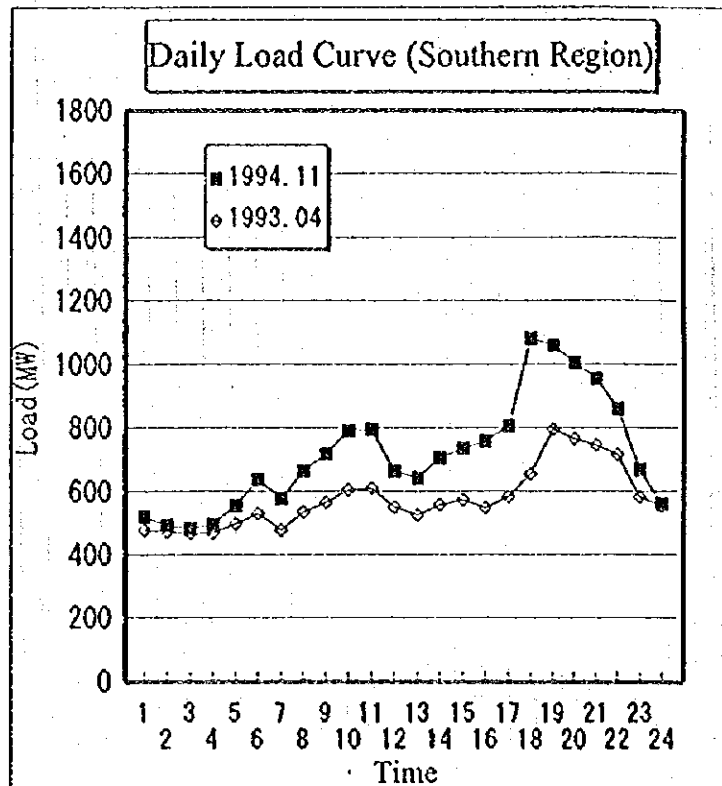
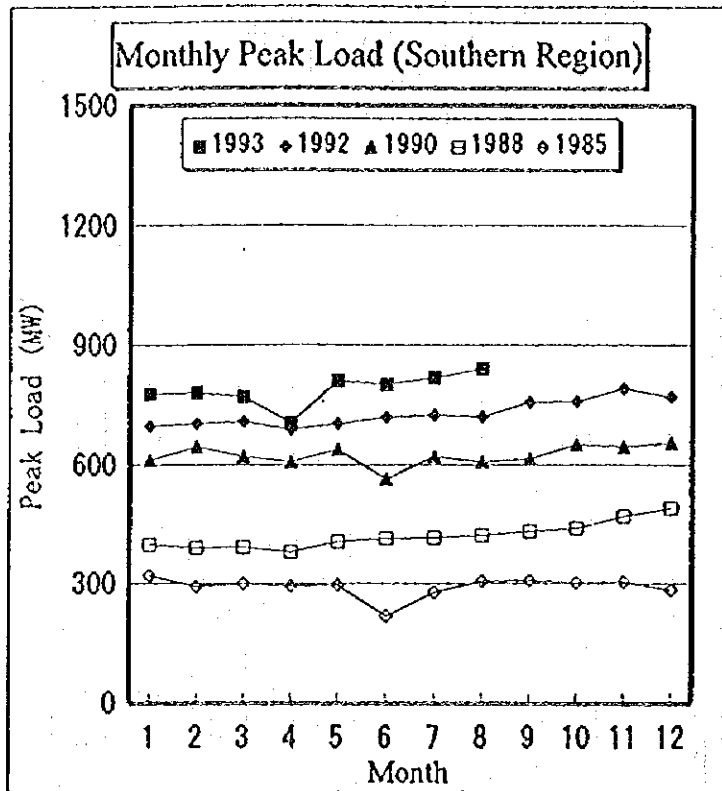
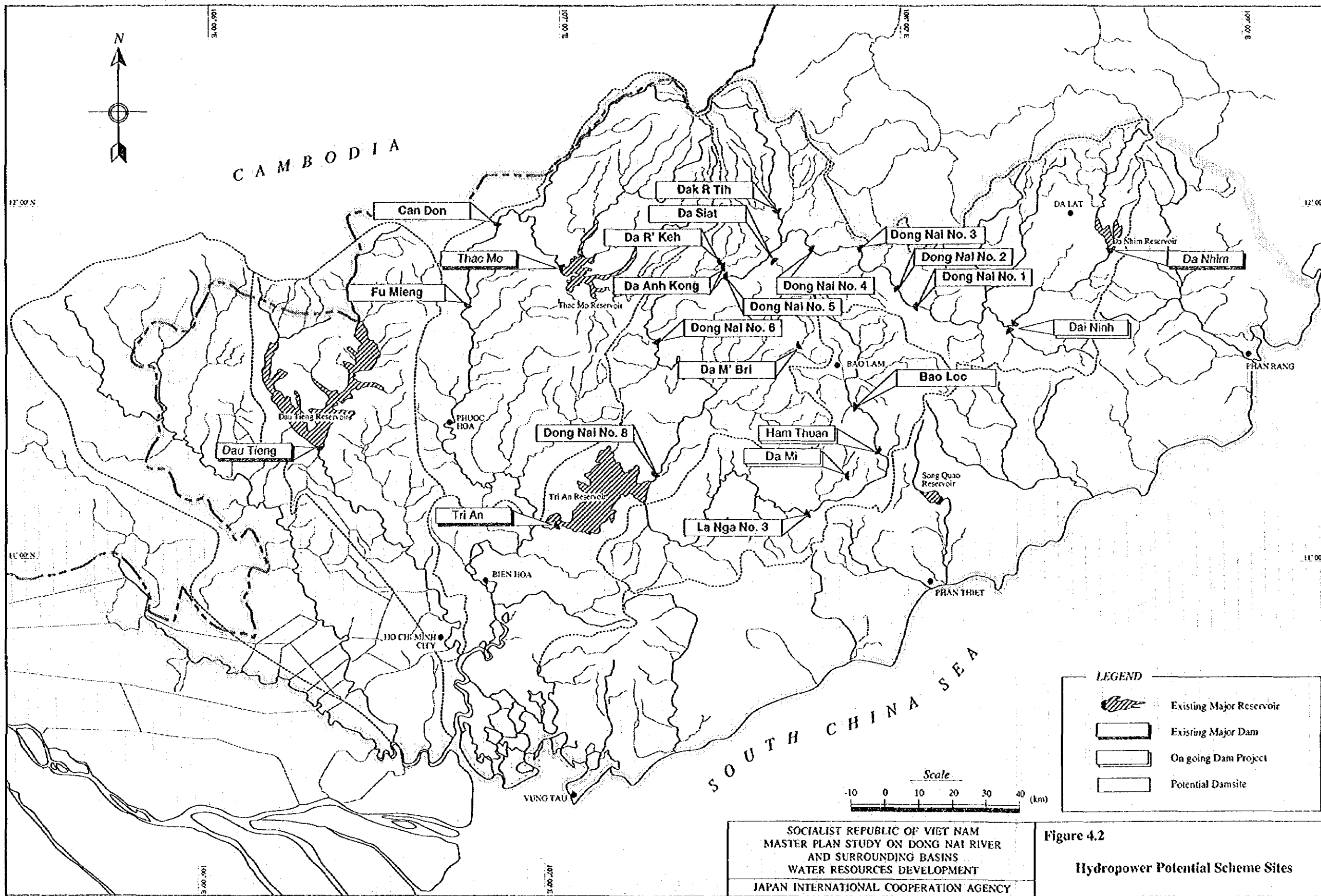

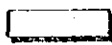
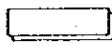
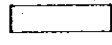


Figure 3.1
Monthly Peak and Daily Load Curve

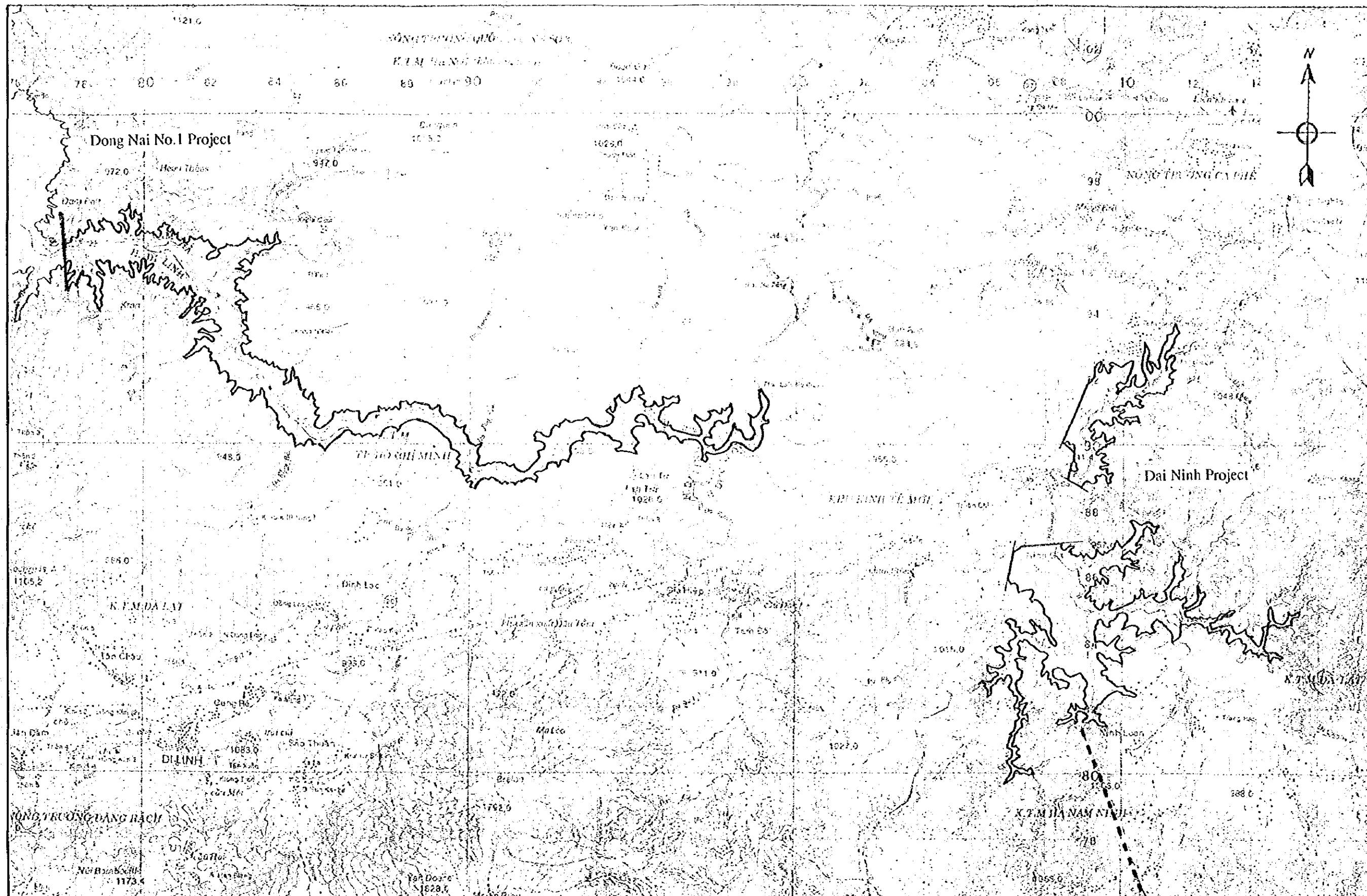


LEGEND

-  Existing Major Reservoir
-  Existing Major Dam
-  On going Dam Project
-  Potential Damsite

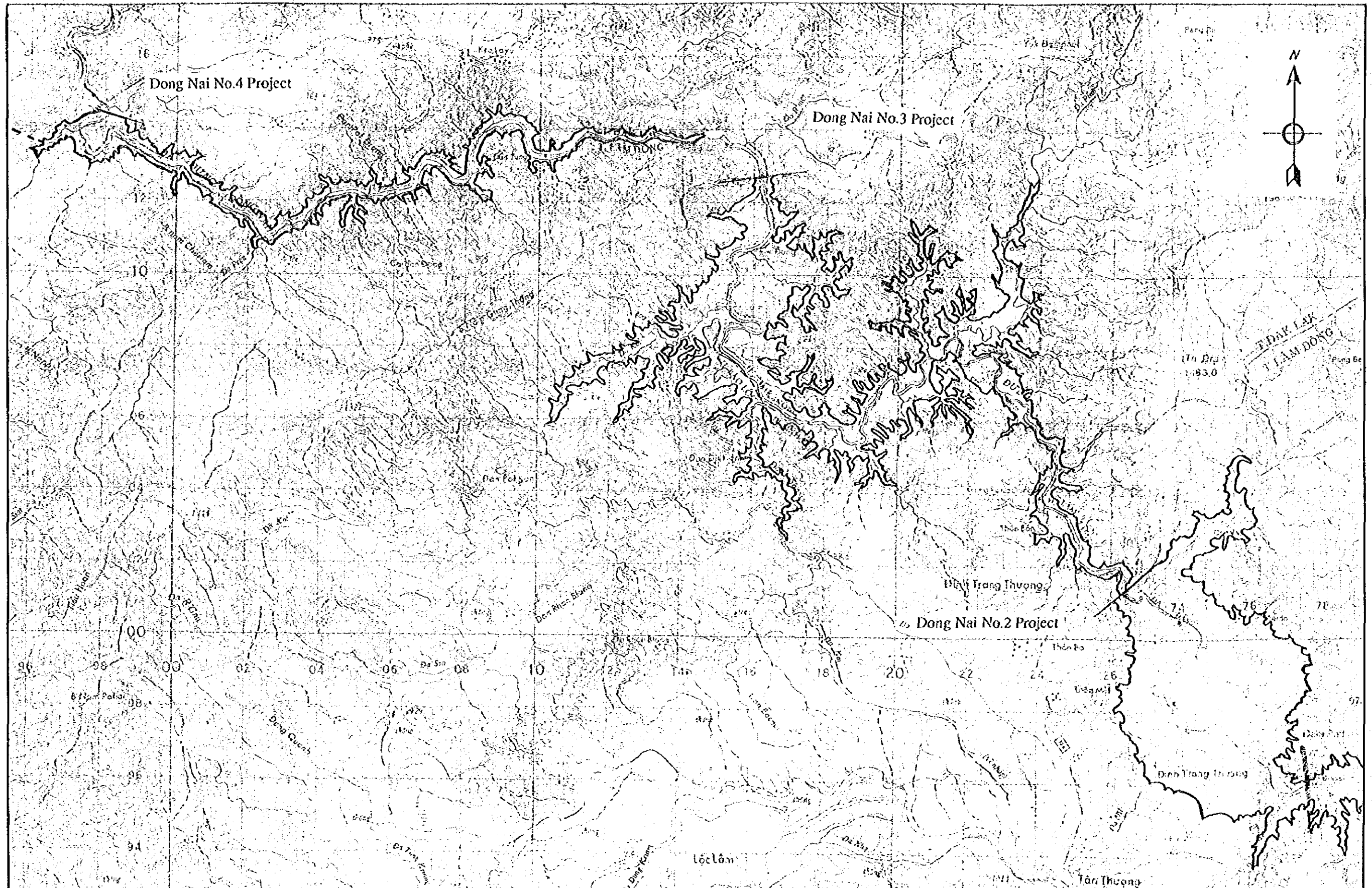
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 AND SURROUNDING BASINS
 WATER RESOURCES DEVELOPMENT
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Figure 4.2
 Hydropower Potential Scheme Sites



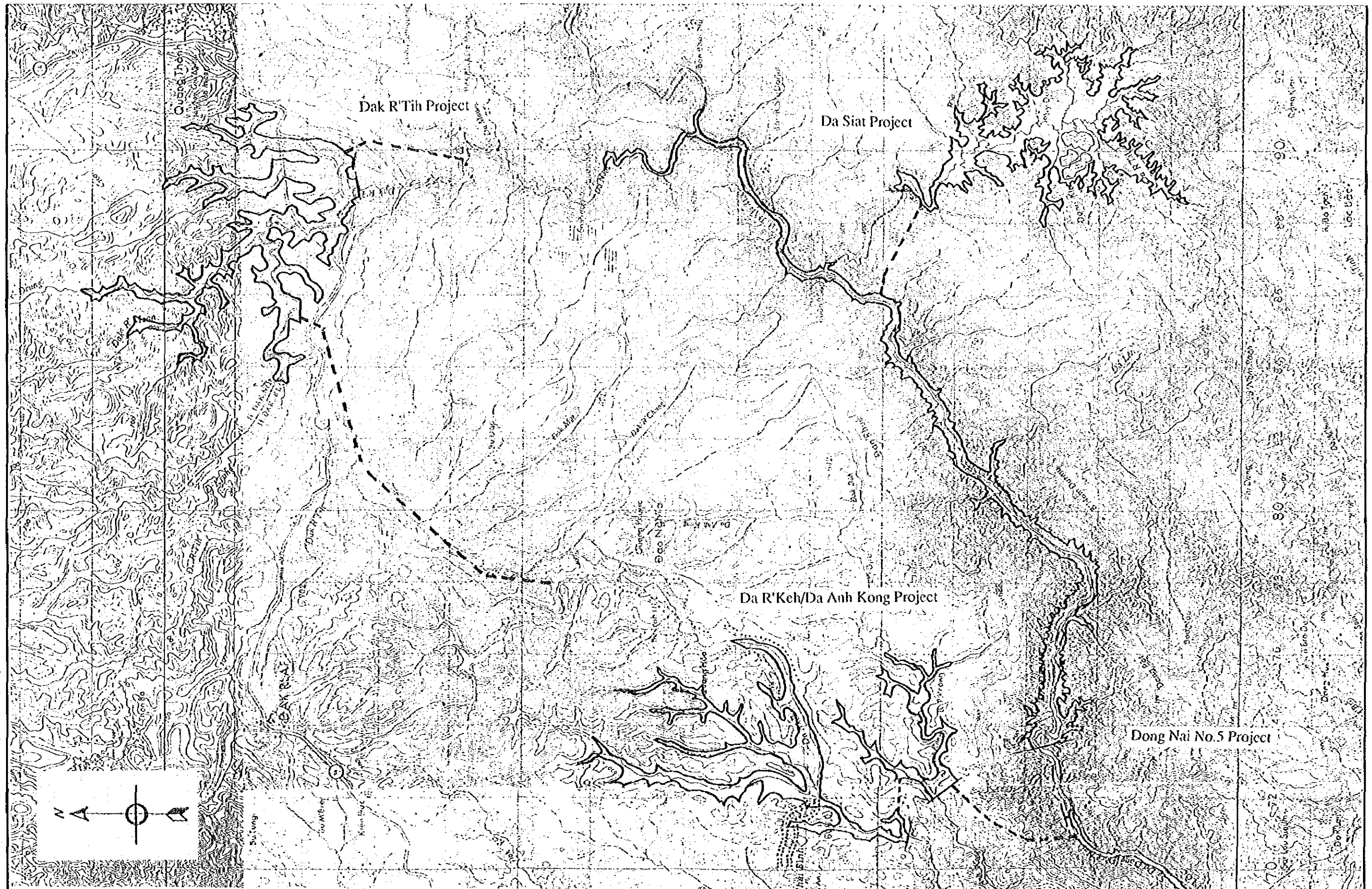
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Figure 4.3
Dai Ninh Project and Dong Nai No.1 Project



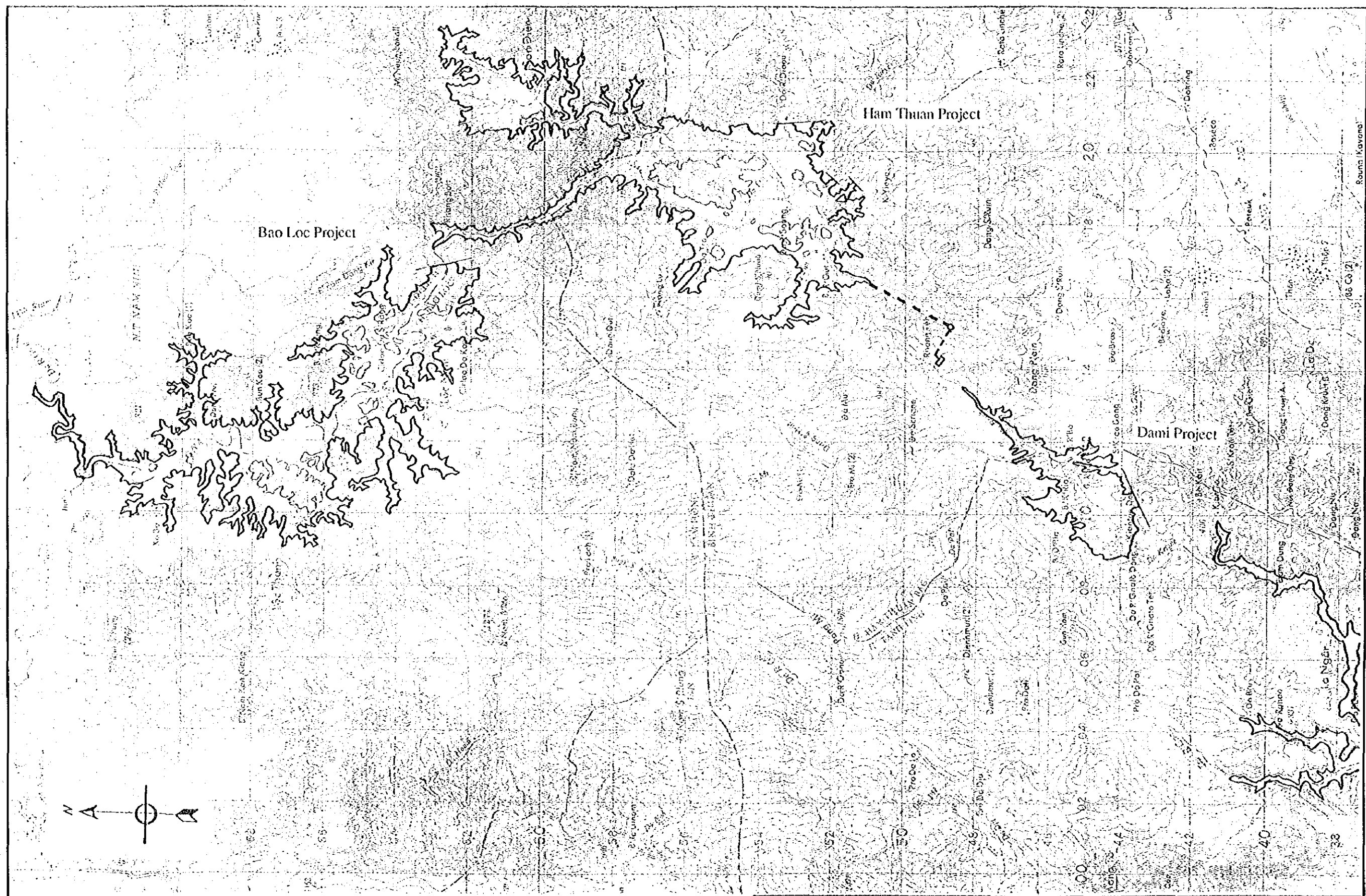
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Figure 4.4
Dong Nai No.2, No.3 and No.4 Project



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Figure 4.6
Dong Nai No. 5 Project



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Figure 4.9
 Bao Loc Project

