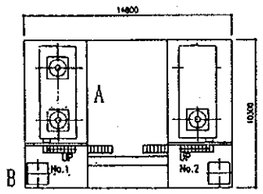
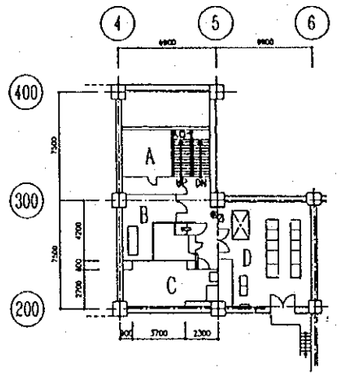


ROOF

A;Cooling Tower

B;Water Tank



B1

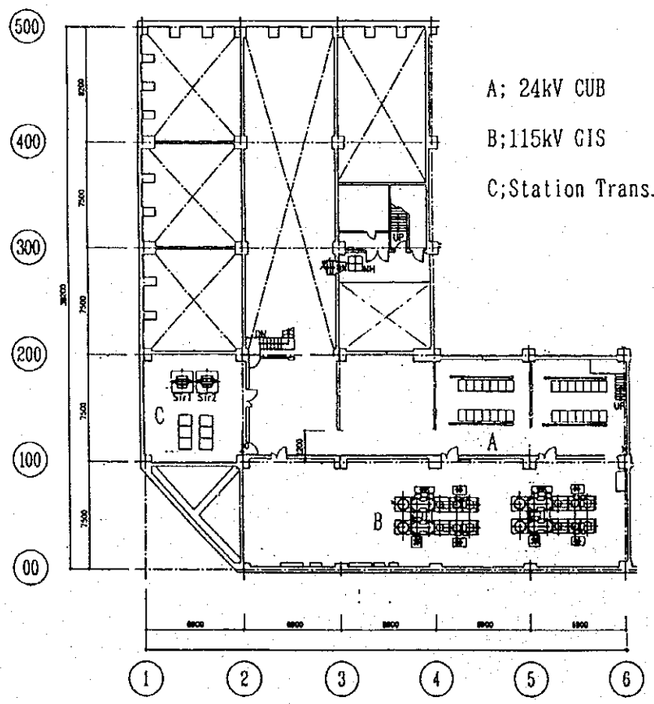
A;Ventilator Room

B;Storage Battery Room

C;Rest Room

D;Control Room

Story	Floor Area
Roof	150.38 m²
B1	155.25 m²
B2	983.25 m²
B3	983.25 m²
pipe shaft B1～F9	40.66 m²
	Total 2,312.79 m²

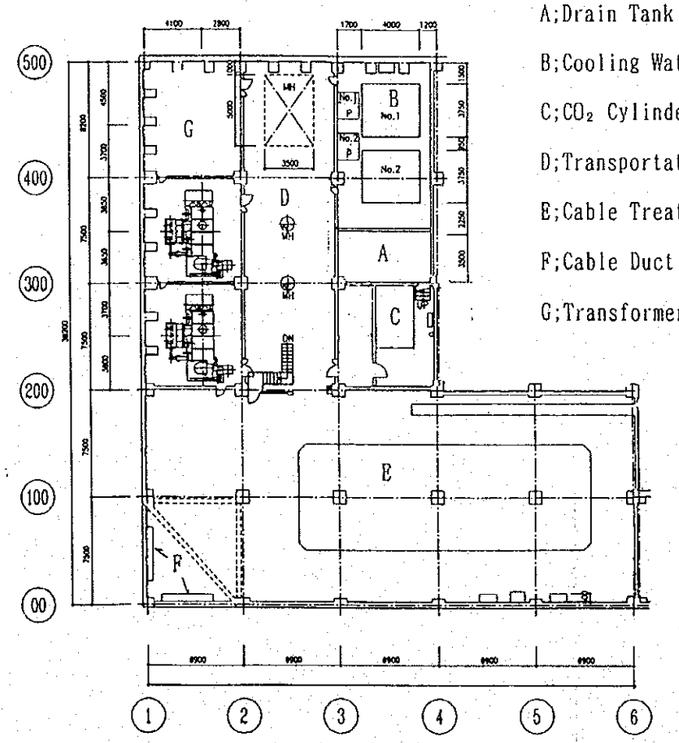


B2

A; 24kV CUB

B;115kV GIS

C;Station Trans.



B3

A;Drain Tank

B;Cooling Water Tank

C;CO_2 Cylinder

D;Transportation Road

E;Cable Treatment Room

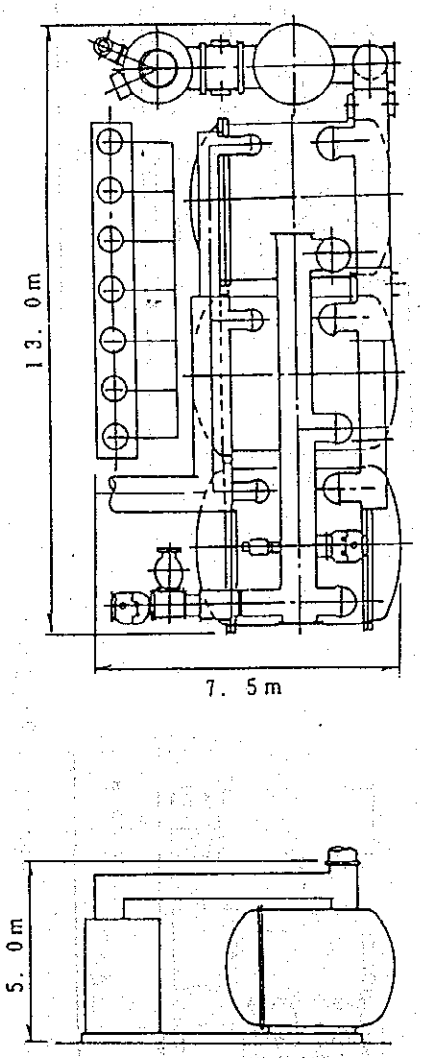
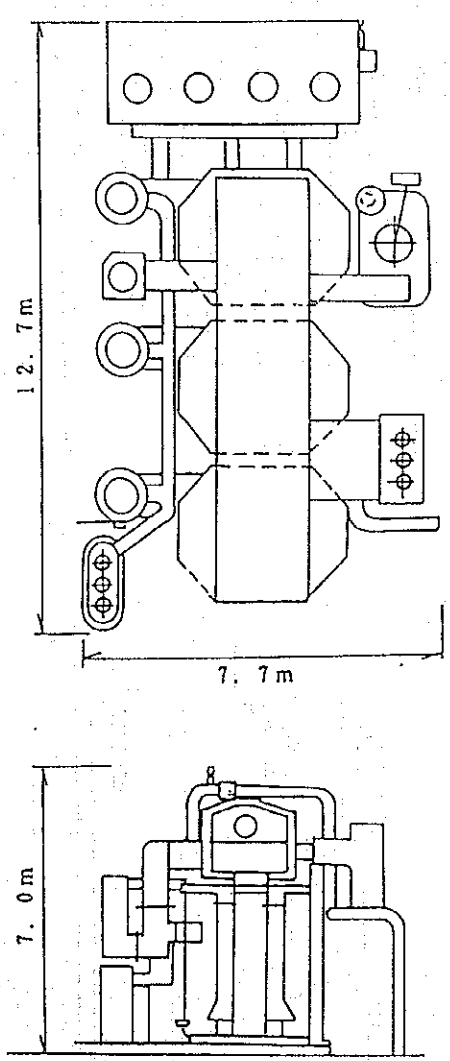
F;Cable Duct

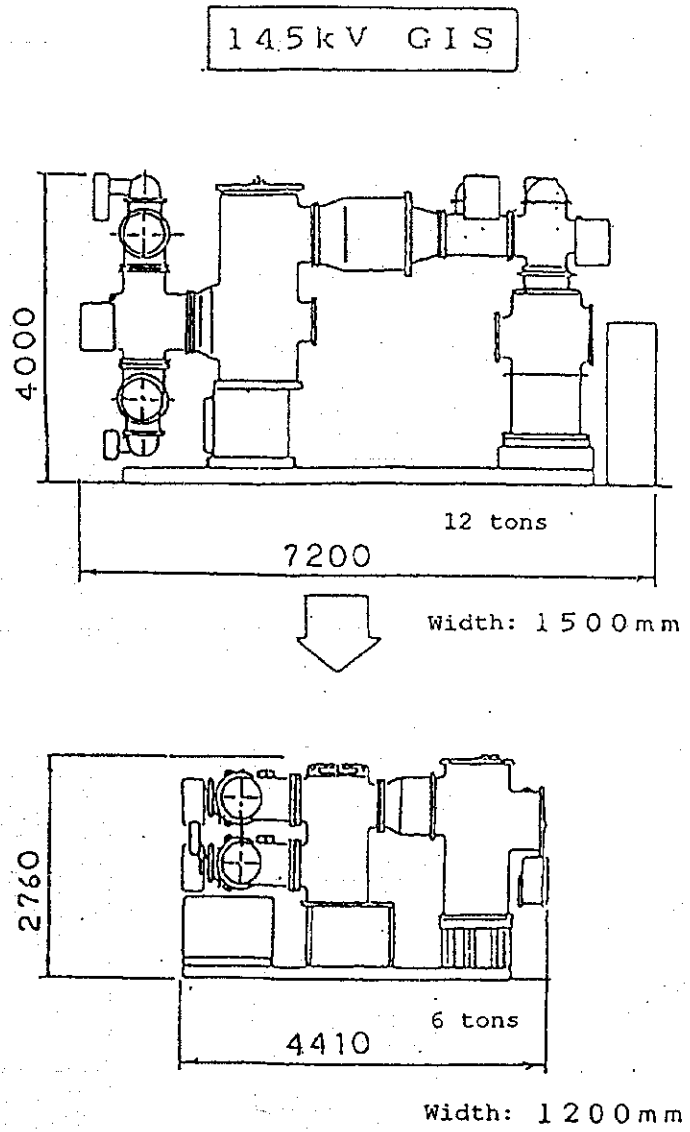
G;Transformer Room

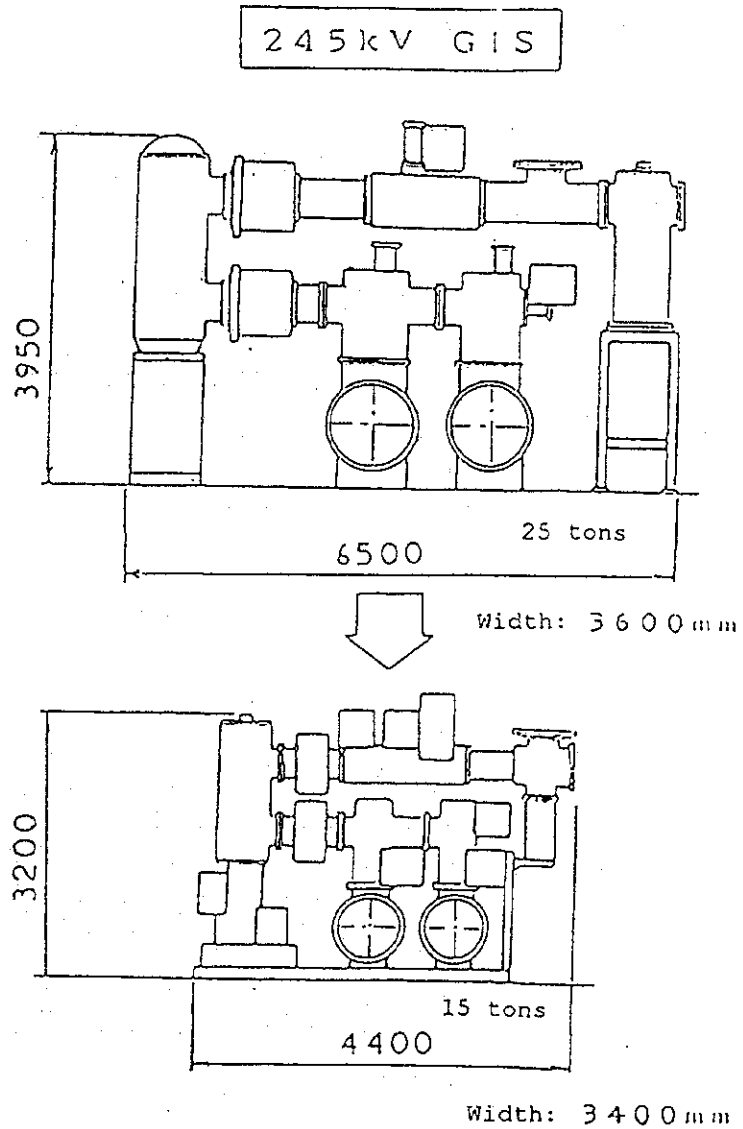
Appendix 9.8-1 Underground Substation Layout Drawing
(115 kV , 3 x 60 MVA)

Appendix 9.9 - 1

Outlines of Gas Insulated and Oil Immersed Transformers

275kV 300MVA Gas insulated transformer		275kV 300MVA Oil immersed transformer	
			
Floorage	$98m^2$ (100%) 13.0m × 7.5m	Floorage	$98m^2$ (100%) 12.7m × 7.7m
Volume	$488m^3$ (71%) 13.0m × 7.5m × 5.0m	Volume	$685m^3$ (100%) 12.7m × 7.7m × 7.0m





* Decrease in volume: 34%

* Decrease in volume: 52%

Appendix 9.9 - 2 Change of GIS Outlines

APPENDIX

for

CHAPTER 10

Appendix 10.5-1 Construction Cost of Transmission Line

Number	Project Name	No of Circuit	Completion Year	OH 2x450 sq.mm.	UC 2x1200 sq.mm.	FC		LC		TAX		Engineering Fee		Contingencies				Total		
						OH	UC	OH	UC	OH	UC	OH	UC	OH		UC		OH	UC	Total
														FC	LC	FC	LC			
00-001	T/S LAMPHAO - T/S SANAMPAO	2ckt	2000		15.6	.00	1,149.88	.00	209.01	.00	218.22	.00	95.18	.00	.00	114.00	20.00	.00	1,809.17	1,809.17
97-002	T/S SOUTH THONBURI - T/S THANONTOK	1ckt	1997	1	0.6	5.43	44.23	22.15	11.74	3.09	8.65	1.93	3.92	.54	2.22	4.42	1.17	35.37	74.12	109.49
						.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	Total			1	16.2	5.43	1,194.10	22.15	221.64	3.09	226.87	1.93	99.10	.54	2.22	119.41	22.16	35.37	1,883.29	1,918.66

Number	Project Name	No of Circuit	Completion Year	OH 2x400 sq.mm	UG 2x800 sq.mm	UG 2x1200 sq.mm	FC OH	FC UG	LC OH	LC UG	TAX OH	TAX UG	Engineering Fee OH	Engineering Fee UG	Contingencies OH FC	Contingencies OH LC	Contingencies UG FC	Contingencies UG LC	Contingencies FC	Contingencies LC	Total OH	Total UG	Total
97-004	T/S JANGWATANA - S/S NUANGTHONG 4	1ckt	1997		1		.00	12.85	.00	4.39	.00	2.58	.00	1.21	.00	.00	1.29	.44	1.29	.44	.00	22.70	22.70
97-005	T/S TEPARAK - S/S BANGPING	1ckt	1997	12.2	3		7.06	38.56	26.36	13.17	3.89	7.75	2.37	3.62	.71	2.63	3.86	1.33	4.56	4.00	43.55	68.27	111.85
97-035	Interection to S/S BANGNAMJUED	1ckt	1997	12	0.1		6.95	1.29	26.43	.44	3.82	.26	2.34	.12	.69	2.64	.12	.04	.82	2.69	42.87	2.28	45.14
97-044	T/S RATCHADA - THANON RATCHAPHISEK	1ckt	1997		2.2		.00	41.13	.00	14.05	.00	8.26	.00	3.86	.00	.00	4.11	1.41	4.11	1.41	.00	72.83	72.83
97-050	THANON JANGWATANA - BANGKHEN WATER WORKS	1ckt	1997	1.4			.81	.00	3.08	.00	.45	.00	.27	.00	.08	.31	.00	.00	.08	.31	5.00	.00	5.00
97-052	S/S NUANGTHONG 4 - S/S NUANGTHONG 5	1ckt	1997		0.3		.00	3.86	.00	1.32	.00	.77	.00	.36	.00	.00	.39	.13	.39	.12	.00	6.82	6.82
97-055	LINK S/S BANGTONGPANG	2ckt	1997	2	0.1		1.10	1.29	2.94	.27	.52	.25	.28	.11	.11	.29	.12	.03	.24	.32	5.25	2.06	7.31
97-059	THANON VITAYADEE RANGSIT - KLONG PRAPA	1ckt	1997	3			1.74	.00	6.61	.00	.96	.00	.58	.00	.17	.66	.00	.00	.17	.66	10.72	.00	10.72
97-060	THANON JANGWATNA - THANON NGAM WONG WAN	1ckt	1997	4.9			2.81	.00	9.91	.00	1.43	.00	.38	.00	.26	.99	.00	.00	.26	.99	16.08	.00	16.08
97-061	T/S JANGWATANA - THANON JANGWATANA	1ckt	1997	1.6			.92	.00	3.52	.00	.51	.00	.31	.00	.09	.35	.00	.00	.09	.35	5.72	.00	5.72
97-086	T/S SOUTH BANGKOK - S/S PAKNAM	1ckt	1997	1.4	0.2		.41	1.29	.67	.22	.16	.24	.08	.11	.04	.07	.12	.02	.17	.09	1.42	2.00	3.42
97-087	T/S SOUTH BANGKOK - S/S BANGPING	1ckt	1997	7	0.3		2.02	1.93	3.35	.33	.81	.36	.38	.16	.20	.33	.19	.02	.40	.37	7.10	3.01	10.11
97-102	KLONGPRAPA - PAKKRED INTERSECTION	1ckt	1997	5.6	0.5		5.74	7.24	17.15	2.15	2.82	1.43	1.60	.66	.57	1.72	.72	.23	1.30	1.92	29.61	12.42	42.03
98-007	S/S SHINPLEE - THANON #340	1ckt	1998	2.5			1.45	.00	5.51	.00	.80	.00	.49	.00	.14	.55	.00	.00	.14	.55	8.93	.00	8.93
98-010	T/S KLONGRANGSIT - THANON JANGWATANA	1ckt	1998	6	0.2		3.47	2.57	13.21	.88	1.91	.52	1.17	.24	.35	1.32	.26	.09	.60	1.41	21.43	4.55	25.98
98-011	T/S ON NUCH - THANON RONKLAO	1ckt	1998	6.6	0.8		3.82	10.28	14.53	3.51	2.10	2.07	1.28	.97	.38	1.45	1.03	.35	1.41	1.80	23.55	18.21	41.76
98-012	T/S BANGKOK NOI - S/S TAWEEWATTANA	1ckt	1998	5.1	0.2		2.95	3.86	11.23	1.32	1.62	.77	.99	.36	.30	1.13	.35	.12	.68	1.25	18.22	6.82	25.03
98-013	S/S TAWEEWATTANA - S/S SHINPLEE	1ckt	1998	17.8	0.2		10.31	2.57	39.20	.88	5.67	.52	3.47	.24	1.02	3.92	.26	.09	1.29	4.01	63.59	4.55	68.14
98-017	T/S SAINOI - S/S BANGRAKYAI	1ckt	1998	13.5			7.82	.00	29.73	.00	4.20	.00	2.62	.00	.78	2.97	.00	.00	.78	2.97	48.23	.00	48.23
98-018	S/S SAMANBINNAK - THANON #340	1ckt	1998	7.9			4.57	.00	17.40	.00	2.52	.00	1.54	.00	.46	1.74	.00	.00	.46	1.74	28.23	.00	28.23
98-019	S/S CHALONGKRUNG - THANON LARDKRABANG	1ckt	1998	4.8			2.78	.00	10.57	.00	1.52	.00	.93	.00	.28	1.06	.00	.00	.28	1.06	17.15	.00	17.15
98-020	S/S TUBYAO - THANON RONKLAO	1ckt	1998	8.4	0.2		4.86	2.57	18.50	.88	2.68	.52	1.64	.24	.49	1.85	.26	.09	.74	1.94	30.01	4.55	34.56
98-056	T/S ON NUCH - THANON KINGKAEW - LARDKRABANG	1ckt	1998	5.9	0.8		3.42	10.28	12.92	3.51	1.88	2.07	1.15	.97	.34	1.30	1.03	.35	1.37	1.65	21.08	18.21	39.29
98-057	LINK S/S NONTHABURI	1ckt	1998		0.1		.00	1.29	.00	.44	.00	.26	.00	.12	.00	.00	.12	.04	.12	.04	.00	2.28	2.28
98-058	THANON RONKLAO - S/S TUBYAO	1ckt	1998	8.4	0.2		4.86	2.57	18.50	.88	2.68	.52	1.64	.24	.49	1.85	.26	.09	.74	1.94	30.01	4.55	34.56
98-088	T/S BANGPLEE-THANON WAT KINGKAEW INTERSECTION	1ckt	1998	2.2	0.7		.64	4.50	1.05	.77	.25	.85	.12	.37	.06	.11	.45	.08	.51	.18	2.23	7.02	9.25
98-089	T/S BANGPLEE - S/S SOUTH BANGPLEE	1ckt	1998	4.7	0.3		1.36	1.93	2.25	.33	.54	.36	.25	.16	.14	.22	.19	.03	.33	.26	4.77	3.01	7.77
98-090	KLONGPRAPA - S/S LARDPLAKAO	1ckt	1998	7.5	0.6		2.18	3.86	3.59	.66	.87	.72	.40	.32	.22	.38	.39	.07	.60	.42	7.61	6.01	13.62
98-103	THANON RAMA 3 - S/S MAHANEK	1ckt	1998	2.7	0.2		2.72	5.34	8.13	1.58	1.34	1.06	.76	.48	.27	.81	.52	.16	.81	.97	14.04	9.15	23.19
98-104	KLONG PRAPA - S/S NONTHABURI	1ckt	1998	3.2	0.3		3.24	4.77	9.69	1.41	1.80	.94	.91	.42	.32	.97	.48	.14	.80	1.11	16.73	8.17	24.90
98-105	S/S NONTHABURI - PAKKRED INTERSECTION	1ckt	1998	4.8			4.94	.00	14.74	.00	2.43	.00	1.38	.00	.49	1.47	.00	.00	.49	1.47	25.46	.00	25.46
98-106	S/S BANGPOOD - END OF MEA BOUNDARY	1ckt	1998	2			2.04	.00	6.09	.00	1.01	.00	.57	.00	.20	.61	.00	.00	.20	.61	10.52	.00	10.52
99-005	T/S THANONTOK - S/S THOKCHAN	1ckt	1999	3.8	0.8		2.20	10.28	8.37	3.51	1.21	2.07	.74	.97	.22	.84	1.03	.35	1.25	1.19	13.57	18.21	31.78
99-006	LINK S/S KLONGKUY	2ckt	1999	6.6	0.4		3.62	5.14	9.71	1.07	1.71	.98	.92	.43	.36	.97	.51	.11	.88	1.08	17.31	8.25	25.56
99-021	LINK S/S BHAGKAE	2ckt	1999	0.6	2.4		.32	30.84	.88	6.41	.16	5.91	.08	2.61	.03	.09	3.08	.64	3.12	.73	1.57	49.50	51.07
99-022	S/S NINBURI - THANON SUKA PHIBAN 2	1ckt	1999	3.6			2.08	.00	7.93	.00	1.15	.00	.70	.00	.21	.79	.00	.00	.21	.79	12.86	.00	12.86
99-023	THANON SUKA PHIBAN 2 - S/S RAMINTRA	1ckt	1999	6.2			3.59	.00	13.65	.00	1.98	.00	1.21	.00	.36	1.37	.00	.00	.36	1.37	22.15	.00	22.15
99-024	S/S SANYARN - T/S THANONTOK	1ckt	1999	11.3	4.2		6.54	55.26	24.38	18.88	3.60	11.10	2.20	5.19	.65	2.49	5.53	1.89	6.18	4.28	40.37	97.85	138.22
99-025	S/S SEANYAI - THANON #340	1ckt	1999	11	0.4		6.37	5.14	24.22	1.76	3.50	1.03	2.14	.43	.64	2.42	.51	.18	1.15	2.60	39.30	9.10	48.40
99-026	S/S SRIWANYA - S/S SRITHANYA	1ckt	1999	3	1		1.74	12.85	6.61	4.39	.96	2.58	.58	1.21	.17	.66	1.23	.44	1.46	1.10	10.72	22.76	33.47
99-027	T/S THANONTOK - S/S SATORN	1ckt	1999	3.4	5		1.97	64.26	7.49	21.96	1.08	12.91	.66	6.04	.20	.75	6.43	2.20	6.62	2.94	12.15	113.78	125.93
99-028	LINK S/S THOKCHAN	1ckt	1999		0.5		.00	6.43	.00	2.20	.00	1.29	.00	.60	.00	.00	.64	.22	.64	.22	.00	11.38	11.38
99-029	S/S SATRON - S/S SANYARN	1ckt	1999		3.2		.00	41.13	.00	14.05	.00	8.26	.00	3.86	.00	.00	4.11	1.41	4.11	1.41	.00	72.82	72.82
99-030	T/S BANGKOK NOI - S/S BANGKRADEE	1ckt	1999		1.5		.00	19.28	.00	6.59	.00	3.87	.00	1.81	.00	.00	1.93	.66	1.92	.66	.00	34.13	34.13
99-031	THANON KHACHAI - THANON PHRAKAN 2	1ckt	1999	6.3			3.65	.00	13.87	.00	2.01	.00	1.23	.00	.36	1.33	.00	.00	.36	1.33	22.51	.00	22.51
99-032	T/S BANGKOK NOI - S/S KHACHAI	1ckt	1999	9	1.5		5.21	19.28	19.82	6.59	2.87	3.87	1.75	1.81	.52	1.98	1.93	.66	2.45	2.64	32.15	34.13	66.28
99-033	LINK S/S TAIBAN	2ckt	1999	3.8	0.1		2.09	1.29	5.59	.27	.98	.25	.54	.11	.21	.56	.13	.03	.34	.59	9.97	2.06	12.03
99-037	T/S SAINOI - S/S THANON RATANATIBET	1ckt	1999	14	0.5		8.11	6.43	30.83	2.20	4.46	1.29	2.73	.60	.81	3.08	.64	.22	1.45	3.30	50.01	11.38	61.39
99-045	LINK S/S PATARAKARN	2ckt	1999		0.5		.00	6.43	.00	1.34	.00	1.23	.00	.54	.00	.00	.64	.13	.64	.13	.00	10.31	10.31
99-049	LINK S/S BANGKAEN	1ckt	1999		0.1		.00	1.29	.00	.44	.00	.26	.00	.12	.00	.00	.13	.04	.13	.04	.00	2.28	2.28
99-051	T/S JANGWATANA - S/S NUANGTHONG 5	1ckt	1999		1.3		.00	16.73	.00	5.71	.00	3.36	.00	1.57	.00	.00	1.67	.57	1.67	.57	.00	29.53	29.53

Number	Project Name	No of Circuit	Completion Year	OH 2x400 sq.mm	UG 2x300 sq.mm	UG 2x1200 sq.mm	FC OH	FC UG	LC OH	LC UG	TAX OH	TAX UG	Engineering Fee OH	Engineering Fee UG	Contingencies OH FC	Contingencies OH LC	Contingencies UG FC	Contingencies UG LC	Contingencies FC	Contingencies LC	Total OH	Total UG	Total Total
99-098	S/S RAMINTRA - S/S NIMBURI	1ckt	1999	10			2.90	.00	4.78	.00	1.16	.00	.54	.00	.29	.48	.00	.00	.29	.48	10.14	.00	10.14
99-107	S/S SRITUNYA - NGAM WONG WAN INTERSECTION	1ckt	1999	1.9			1.96	.00	5.85	.00	.97	.00	.55	.00	.20	.59	.00	.00	.20	.59	10.16	.00	10.16
00-002	T/S RATCHADA - S/S DINDAENG	1ckt	2000	2	55.5		1.16	70.83	4.40	24.15	.64	14.26	.39	6.64	.12	.44	7.07	2.42	7.19	2.86	7.14	125.10	132.3
00-008	T/S NONGJOK - S/S NIMBURI	1ckt	2000	7	0.5		4.05	6.42	15.41	2.20	2.23	1.29	1.36	.60	.41	1.54	.64	.23	1.05	1.76	25.01	11.39	36.39
00-014	S/S BANGJAK - THANON SRINAKHARIN	1ckt	2000	5.5	0.2		3.18	2.57	12.11	.88	1.72	.52	1.07	.24	.32	1.21	.20	.09	.58	1.36	19.02	4.52	24.21
00-015	T/S ON NUCH - THANON SRINAKHARIN	1ckt	2000	5.3	0.8		3.07	10.28	11.67	3.51	1.69	2.07	1.02	.97	.31	1.17	1.02	.32	1.34	1.52	18.93	18.21	37.14
00-016	T/S ON NUCH - S/S BANGJAK	1ckt	2000	10.8	1		6.25	12.85	23.78	4.39	3.44	2.58	2.10	1.21	.62	2.38	1.23	.44	1.91	2.82	38.58	22.70	61.28
00-036	T/T TEPARAK - THANON PREAK KRASA	1ckt	2000	8.6	3		4.98	38.56	18.94	13.17	2.74	7.75	1.67	3.62	.50	1.83	3.86	1.32	4.23	3.21	30.72	68.27	98.99
00-038	T/S SAMANPAD - S/S DINDAENG	1ckt	2000		2.7		.00	34.70	.00	11.86	.00	6.97	.00	3.26	.00	.00	3.47	1.19	3.47	1.19	.00	61.44	61.44
00-039	LINE S/S HUANGTHONG 6	2ckt	2000		2.7		.00	34.70	.00	7.21	.00	6.65	.00	2.93	.00	.00	3.47	.72	3.47	.72	.00	55.69	55.69
00-040	LINE S/S PRAVES	2ckt	2000		0.5		.00	6.42	.00	1.34	.00	1.23	.00	.54	.00	.00	.64	.13	.64	.13	.00	10.31	10.31
00-041	T/S NONGJOK - S/S EKBURI	1ckt	2000	16.5	0.7		9.55	9.00	36.33	3.07	5.26	1.81	3.21	.84	.96	3.63	.90	.31	1.85	2.94	58.94	15.93	74.87
00-042	LINE S/S RAMINTRA	1ckt	2000	1	0.1		.58	1.29	2.20	.44	.32	.26	.19	.12	.06	.22	.13	.04	.13	.26	3.57	2.28	5.85
00-043	S/S PRONPONG - S/S DINDAENG	1ckt	2000		4		.00	51.41	.00	17.56	.00	10.33	.00	4.83	.00	.00	5.14	1.76	5.14	1.76	.00	91.03	91.03
00-044	LINE S/S SUWINTAWONG	2ckt	2000		0.5		.00	6.42	.00	1.34	.00	1.23	.00	.54	.00	.00	.64	.13	.64	.13	.00	10.31	10.31
00-092	S/S BANGPLEE - S/S HUANG KAI	1ckt	2000	15.5	0.5		4.50	3.21	7.41	.55	1.80	.61	.82	.26	.45	.74	.32	.06	.77	.80	15.72	5.01	20.73
00-093	S/S PAKNAM - THANON PRAKASA	1ckt	2000	3.5			1.02	.00	1.67	.00	.41	.00	.19	.00	.10	.17	.00	.00	.10	.17	3.55	.00	3.55
01-034	T/S BNAGBON - THANON BANGNA TRAD	2ckt	2001	6	0.5		3.30	6.42	8.82	1.34	1.55	1.23	.85	.54	.32	.88	.64	.13	.97	1.02	15.74	10.31	26.05
01-046	T/S RATCHADA - S/S PLUBPLA	1ckt	2001		3.6		.00	46.27	.00	15.81	.00	9.30	.00	4.35	.00	.00	4.63	1.58	4.63	1.58	.00	81.92	81.92
01-047	S/S PLUBPLA - S/S PRONPONG	1ckt	2001		.4		.00	51.41	.00	17.56	.00	10.33	.00	4.83	.00	.00	5.14	1.76	5.14	1.76	.00	91.03	91.03
01-052	T/S JANGWATANA - S/S HUANGTHONG 7	1ckt	2001		2		.00	25.70	.00	8.78	.00	5.16	.00	2.41	.00	.00	2.57	.88	2.57	.88	.00	45.51	45.51
01-054	S/S HUANGTHONG 1 - S/S HUANGTHONG 7	1ckt	2001		1.4		.00	17.99	.00	6.15	.00	3.62	.00	1.69	.00	.00	1.80	.61	1.80	.61	.00	31.86	31.86
01-084	THANONSUKHUMVIT - THANON TAIBAN	1ckt	2001	3.4			.99	.00	1.63	.00	.23	.00	.18	.00	.10	.16	.00	.00	.10	.16	3.45	.00	3.45
							.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	Total			244.5	71.4	0	191.79	904.14	668.23	292.04	101.11	180.49	50.06	83.73	19.18	66.63	90.41	29.20	109.59	95.53	1,105.02	1,580.01	2,685.03

Number	Project Name	No of Circuit	Completion Year	OH 2x400 sq.mm	UG 2x800 sq.mm	UG 2x1200 sq.mm	FC OH	FC UC	LC OH	LC UC	TAX OH	TAX UC	Engineering Fee OH	Engineering Fee UC	Contingencies OH FC	Contingencies OH LC	Contingencies UC FC	Contingencies UC LC	Contingencies FC	Contingencies LC	Total OH	Total UC	Total Total
01-062	S/S WATKANPANE - EKACHAI	1ckt	2001		1.5		.00	16.27	.00	6.54	.00	3.34	.00	1.60	.00	.00	1.63	.65	1.63	.65	.00	30.04	30.04
97-063	T/S SOUTH THONBURI - S/S BANGKOD	1ckt	1997		6.5		.00	70.52	.00	28.30	.00	14.47	.00	6.92	.00	.00	7.05	2.84	7.05	2.84	.00	130.15	130.15
97-064	S/W SAMRONG - S/S POOJAD	1ckt	1997		2.7		.00	29.25	.00	11.76	.00	6.01	.00	2.88	.00	.00	2.93	1.18	2.93	1.18	.00	54.00	54.00
99-065	LINE S/S TRA-KWIAN	2ckt	1999		2.4	1	.00	26.04	.00	7.75	.00	5.15	.00	2.37	.00	.00	2.60	.77	2.60	.77	.00	44.68	44.68
99-066	T/S THANONTOK - S/S SRIWIANG	1ckt	1999	3.3	3.2		1.72	34.72	6.87	13.98	.97	7.12	.60	3.41	.17	.69	3.47	1.40	3.64	2.08	11.03	64.08	75.10
99-067	S/S SRIWIANG - S/S SIPRAYA	1ckt	1999		1.4		.00	15.19	.00	6.11	.00	3.12	.00	1.49	.00	.00	1.52	.61	1.52	.61	.00	28.03	28.03
00-068	LINE S/S KLONGNAI	1ckt	2000		1		.00	10.85	.00	4.38	.00	2.23	.00	1.06	.00	.00	1.08	.44	1.08	.44	.00	20.02	20.02
01-069	LINE S/S WUTTAKART	2ckt	2001	4	0.5		1.93	5.42	5.45	1.61	.94	1.07	.52	.49	.20	.55	.54	.16	.74	.71	9.64	9.31	18.95
98-070	T/S SOUTH THONBURI - S/S WATKAMPAENG	1ckt	1998		2.6		.00	28.21	.00	11.34	.00	5.79	.00	2.77	.00	.00	2.82	1.13	2.82	1.13	.00	52.05	52.05
00-071	T/S TEPARAK - S/W SAMRONG	1ckt	2000	12	2.4		6.26	26.04	25.00	10.47	3.52	5.34	2.19	2.56	.62	2.50	2.60	1.05	3.22	3.55	40.10	48.06	88.10
00-072	T/S TEPARAK - THON SUKHUMVIT	1ckt	2000	10.2	2.4		5.32	26.04	21.25	10.47	3.00	5.34	1.86	2.56	.52	2.12	2.60	1.05	3.14	3.17	34.03	48.06	82.14
00-073	T/S SANAMPAO - THANON PHAHON YOTHIN	1ckt	2000		0.3		.00	3.25	.00	1.31	.00	.67	.00	.32	.00	.00	.32	.12	.22	.13	.00	6.01	6.01
00-074	T/S SANAMPAO - THANON YOTHEE	1ckt	2000	1	3		.52	32.55	2.08	13.09	.29	6.68	.18	3.15	.05	.21	3.25	1.31	3.31	1.52	3.34	60.07	63.41
00-075	T/S SANAMPAO - THANON SRIAYUDTAYA	1ckt	2000		2.2		.00	23.37	.00	9.60	.00	4.90	.00	2.34	.00	.00	2.39	.96	2.39	.96	.00	44.05	44.05
00-076	LINE S/S KINGPETCH	1ckt	2000		1		.00	10.85	.00	4.36	.00	2.23	.00	1.06	.00	.00	1.08	.44	1.08	.44	.00	20.02	20.02
99-077	S/S WANGPETCHABOON - INTERSECTION RAJATEVEE	1ckt	1999	1	0.7		.52	7.59	2.08	3.05	.29	1.56	.18	.75	.05	.21	.76	.31	.81	.51	3.34	14.02	17.36
00-078	LINE S/S SANSAB	1ckt	2000		2.2		.00	23.37	.00	9.60	.00	4.90	.00	2.34	.00	.00	2.39	.96	2.39	.96	.00	44.05	44.05
97-079	LINE S/S PRAISINGTO	1ckt	1997	1.2			.63	.00	2.50	.00	.35	.00	.22	.00	.06	.25	.00	.00	.06	.25	4.01	.00	4.01
98-080	THANON SUKSAWAT - SOI SUANSON	1ckt	1998	3.7	0.7		1.93	7.59	7.71	3.05	1.09	1.56	.67	.75	.19	.77	.76	.31	.95	1.08	12.37	14.02	26.38
98-081	SOI SUANSON - THANON SUKHUMVIT	1ckt	1998	1.8			.94	.00	3.75	.00	.53	.00	.33	.00	.09	.37	.00	.00	.09	.37	6.02	.00	6.02
01-082	LINE S/S BANKAI	2ckt	2001	4.4	0.1		2.18	1.08	6.00	.22	1.04	.21	.57	.10	.22	.60	.11	.03	.33	.63	10.60	1.86	12.46
98-083	S/S TONBURIROM - THANON #340	1ckt	1998	2.8	0.1		1.46	1.08	5.83	.44	.82	.22	.51	.11	.15	.58	.11	.04	.25	.63	9.36	2.00	11.36
98-084	S/S THONBURIROM - THANON SUKSAWAT	1ckt	1998	2.7	0.5		1.41	5.42	5.62	2.18	.79	1.11	.49	.53	.14	.56	.54	.22	.68	.75	9.03	10.01	19.04
98-085	LINE S/S JATUJAC	2ckt	1998		0.5		.00	5.42	.00	1.61	.00	1.07	.00	.49	.00	.00	.54	.16	.54	.16	.00	9.31	9.31
97-095	IN FRONT OF S/S BANG YEE KHAN	1ckt	1997		0.1		.00	.54	.00	.11	.00	.10	.00	.05	.00	.00	.05	.01	.05	.01	.00	.87	.87
97-096	S/S BOCHIT - S/S SANSAB	1ckt	1997	5.3			1.38	.00	2.20	.00	.55	.00	.25	.00	.14	.22	.00	.00	.14	.22	4.75	.00	4.75
97-097	S/S NAIAD - OLD RAILWAY	1ckt	1997	0.2			.05	.00	.08	.00	.02	.00	.01	.00	.01	.01	.00	.00	.01	.01	.18	.00	.18
97-098	IN FRONT OF S/S PRAKANONG	1ckt	1997		1.1		.00	5.97	.00	1.19	.00	1.14	.00	.50	.00	.00	.60	.12	.60	.12	.00	9.52	9.52
97-099	THANON RAMA2 AT TOLL GATE OF EXPRESS WAY	1ckt	1997		0.6		.00	3.26	.00	.65	.00	.62	.00	.27	.00	.00	.33	.07	.33	.07	.00	5.19	5.19
98-100	S/S RAMASAN - THANON RAJPRAOP	1ckt	1998	0.2	0.1		.05	.54	.08	.11	.02	.10	.01	.05	.01	.01	.05	.01	.06	.02	.18	.87	1.04
98-101	S/S CHOAKLANG - THANON LARD PRAO	1ckt	1998	1.5			.39	.00	.62	.00	.15	.00	.07	.00	.04	.06	.00	.00	.04	.06	1.34	.00	1.34
							.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	Total						26.76	421.48	97.14	163.43	14.40	86.04	8.67	40.95	2.68	9.71	43.15	16.34	44.52	26.05	159.36	770.41	929.78

230kV Transmission Line

Number	Project Name	No of Circuit	Completion Year	OH 2x400 sq.mm.	UG 2x1200 sq.mm.	FC OH	FC UG	LC OH	LC UG	TAX OH	TAX UG	Engineering Fee OH	Engineering Fee UG	Contingencies OH FC	Contingencies OH LC	Contingencies UG FC	Contingencies UG LC	Total OH	Total UG	Total Total
06-001	T/S BANGKAPI - T/S KLONGTOEY	2ckt	2006		15.4	.00	1,135.13	.00	207.21	.00	215.42	.00	93.06	.00	.00	113.51	20.72	.00	1,785.97	1,785.97
06-002	T/S BANGKOK NOI - T/S TRANNUTI	2ckt	2006		20.8	.00	1,533.17	.00	279.87	.00	290.96	.00	126.91	.00	.00	153.32	27.99	.00	2,412.22	2,412.22
06-003	T/S LADPRAO - T/S SAMANPAO	1ckt	2006		7.8	.00	574.94	.00	152.56	.00	112.44	.00	50.92	.00	.00	57.49	15.26	.00	963.62	963.62
						.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	Total			.00	44.00	.00	3,243.24	.00	639.65	.00	618.83	.00	271.90	.00	.00	324.32	63.96	.00	5,161.81	5,161.81

Number	Project Name	No of Circuit	Completion Year	OH 2x400 sq.mm.	UG 2x800 sq.mm.	FC OH	FC UG	LC OH	LC UG	TAX OH	TAX UG	Engineering Fee OH	Engineering Fee UG	Contingencies OH FC	Contingencies OH LC	Contingencies UG FC	Contingencies UG LC	Total OH	Total UG	Total Total
06-004	LINK S/S NUANGTHONG 5	2ckt	2006		1.5	.00	19.28	.00	4.01	.00	3.69	.00	1.63	.00	.00	1.93	.40	.00	30.94	30.94
06-005	LINK S/S NUANGTHONG 8	2ckt	2006		5.7	.00	73.26	.00	15.23	.00	14.03	.00	6.19	.00	.00	7.33	1.52	.00	117.56	117.56
06-006	LINK S/S BANGTALARD	2ckt	2006	4.2	0.1	2.31	1.29	6.18	.27	1.09	.25	.59	.11	.23	.62	.13	.03	11.02	2.06	13.08
06-007	KLONGPRAPA - S/S DONMUANG	1ckt	2006	3.5		2.03	.00	7.71	.00	1.12	.00	.68	.00	.20	.77	.00	.00	12.50	.00	12.50
06-008	TRANON VIPAVADEERANGSIT - S/S SANAMIRON	1ckt	2006	2	0.1	1.16	1.29	4.40	.44	.64	.26	.39	.12	.12	.44	.13	.04	7.14	2.28	9.42
06-009	TRANON PHAHONYOTIN - S/S JORAKABUO	1ckt	2006	6.2	0.1	3.59	1.29	13.65	.44	1.98	.26	1.21	.12	.36	1.37	.13	.04	22.15	2.28	24.42
06-010	S/S SANAMIRON - T/S ON NUCH	1ckt	2006	21.2	0.8	12.27	10.28	46.68	3.51	6.75	2.07	4.13	.97	1.23	4.67	1.03	.35	75.73	18.21	93.94
06-011	S/S JORAKABUO - S/S RAMINTRA	1ckt	2006	2.4	0.1	1.39	1.29	5.28	.44	.76	.26	.47	.12	.14	.53	.13	.04	8.57	2.28	10.85
06-012	S/S KLONGMAHASAWAD-TRANON PINKIAO-NAKHON CHAISRI	1ckt	2006	2.6		1.51	.00	5.73	.00	.83	.00	.51	.00	.15	.57	.00	.00	9.29	.00	9.29
06-013	S/S KLONGKUN - SUKHA PHIBAN 2	1ckt	2006	6.3	0.1	3.94	1.29	14.97	.44	2.17	.26	1.32	.12	.39	1.50	.13	.04	24.29	2.28	26.57
06-014	LINK S/S SRITHANYA	1ckt	2006		0.2	.00	2.57	.00	.88	.00	.52	.00	.24	.00	.00	.26	.09	.00	4.55	4.55
06-015	T/S TALINGCHAN - TRANON TIVANON	1ckt	2006	10.5	0.2	11.29	2.57	42.94	.88	6.21	.52	3.80	.24	1.13	4.29	.26	.09	69.66	4.55	74.21
06-017	T/S SAINOI - TRANON TI YA NON	1ckt	2006	30.4	0.2	17.60	2.57	66.94	.88	9.68	.52	5.92	.24	1.76	6.68	.26	.09	108.60	4.55	113.15
06-019	FRONT OF T/S TALINGCHAN	3ckt	2006		0.6	.00	7.71	.00	1.95	.00	1.50	.00	.68	.00	.00	.77	.20	.00	12.80	12.80
06-020	S/S TROKCHAN - TRANON SATUPRADIT	1ckt	2006	1.2		.09	.00	2.64	.00	.38	.00	.23	.00	.07	.26	.00	.00	4.29	.00	4.29
06-021	S/S SEIMPLEE - TRANON CROSS OVER CHAOPHRAYA	1ckt	2006	4		2.32	.00	8.81	.00	1.27	.00	.78	.00	.23	.88	.00	.00	14.29	.00	14.29
06-024	S/S BANGKAE - S/S KLONGSANAMCHAI	1ckt	2006	10.6	10.6	6.14	136.23	23.34	46.54	3.38	27.37	2.06	12.79	.61	2.33	13.62	4.65	37.87	241.22	279.09
06-025	S/S RAMINTRA	1ckt	2006	0.2		.12	.00	.44	.00	.06	.00	.04	.00	.01	.04	.00	.00	.71	.00	.71
06-026	LINK S/S CHALONGKRUNG	1ckt	2006	0.2	0.1	.12	1.29	.44	.44	.06	.26	.04	.12	.01	.04	.13	.04	.71	2.28	2.99
06-027	S/S BANGKAE - S/S THONBURIROM	1ckt	2006	15.2	0.1	8.80	1.29	33.47	.44	4.84	.26	2.96	.12	.88	3.35	.13	.04	54.30	2.28	56.58
06-028	LINK S/S KLONGNA	2ckt	2006		0.1	.00	1.29	.00	.27	.00	.25	.00	.11	.00	.00	.13	.03	.00	2.06	2.06
06-029	TRANON PRACHAUTIS - SOI SUANSON	1ckt	2006	7.4		4.28	.00	16.29	.00	2.36	.00	1.44	.00	.43	1.63	.00	.00	26.44	.00	26.44
06-030	LINK S/S BANGHUASAE	2ckt	2006		0.1	.00	1.29	.00	.27	.00	.25	.00	.11	.00	.00	.13	.03	.00	2.06	2.06
06-031	T/S SOUTH BANGKOK - TRANON #340	1ckt	2006	2.5	0.2	1.45	2.57	5.51	.88	.80	.52	.49	.24	.14	.55	.26	.09	8.93	4.55	13.48
06-032	LINK S/S LAND & HOUSE	2ckt	2006		0.5	.00	6.43	.00	1.34	.00	1.23	.00	.54	.00	.00	.64	.13	.00	10.31	10.31
06-034	LINK S/S BANGKAEF	2ckt	2006		0.2	.00	2.57	.00	.53	.00	.49	.00	.22	.00	.00	.26	.05	.00	4.12	4.12
06-036	T/S KLONGTOEY - S/S ASOKE	1ckt	2006		2.6	.00	33.42	.00	11.42	.00	6.71	.00	3.14	.00	.00	3.34	1.14	.00	59.17	59.17
06-038	T/S SANAMPAO - S/S RAJCHAPRAROP	1ckt	2006		3.2	.00	41.13	.00	14.05	.00	8.26	.00	3.86	.00	.00	4.11	1.41	.00	72.82	72.82
06-039	S/S RAJCHAPRAROP - S/S NA-NA	1ckt	2006		1.9	.00	24.42	.00	8.34	.00	4.91	.00	2.29	.00	.00	2.44	.83	.00	43.24	43.24
06-040	S/S NA-NA - S/S ASOKE	1ckt	2006		1.6	.00	20.56	.00	7.03	.00	4.13	.00	1.93	.00	.00	2.06	.70	.00	36.41	36.41
06-041	T/S PATANAKARN - S/S NA-NA	1ckt	2006		8	.00	102.82	.00	35.13	.00	20.65	.00	9.66	.00	.00	10.28	3.51	.00	182.05	182.05
06-042	S/S PATANAKARN - S/S PRONPONG	1ckt	2006		6.1	.00	78.40	.00	26.79	.00	15.75	.00	7.36	.00	.00	7.84	2.68	.00	138.81	138.81
06-045	T/S PATANAKARN - S/S PRARAM 9	1ckt	2006		6.2	.00	79.68	.00	27.22	.00	16.01	.00	7.48	.00	.00	7.97	2.72	.00	141.09	141.09
06-046	EKAMAI - RAMINTRA EXPRESS WAY - S/S PRARAM 9	1ckt	2006		1.8	.00	23.13	.00	7.90	.00	4.65	.00	2.17	.00	.00	2.31	.79	.00	40.96	40.96
06-047	T/S PATANAKAN - KLONGTON INTERSECTION	1ckt	2006		3	.00	38.56	.00	13.17	.00	7.75	.00	3.62	.00	.00	3.86	1.32	.00	68.27	68.27
06-048	T/S PATANAKAN - S/S HUAMAK	1ckt	2006		7.4	.00	95.10	.00	32.49	.00	19.11	.00	8.93	.00	.00	9.51	3.25	.00	168.40	168.40
06-049	LINK S/S SRINAKARIN	1ckt	2006		0.1	.00	1.29	.00	.44	.00	.26	.00	.12	.00	.00	.13	.04	.00	2.28	2.28
06-050	T/S ON NUCH - TRANON SUKAPHIBAN 2	1ckt	2006	8.2	0.8	4.75	10.28	18.06	3.51	2.61	2.07	1.60	.97	.47	1.81	1.03	.35	29.29	18.21	47.50
06-051	T/S MONGJOK - S/S SONGSUNTISUK	1ckt	2006	10.5	8.3	6.08	3.86	23.12	1.32	3.35	.77	2.04	.36	.61	2.31	.39	.13	37.51	6.83	44.34
06-052	S/S SONGSUNTISUK - TRANON SUWINTAWONG	1ckt	2006	7	0.1	4.05	1.29	15.41	.44	2.23	.26	1.36	.12	.41	1.54	.13	.04	25.01	2.28	27.28
06-053	T/S MONGJOK - TRANON CHALONGKRUNG	1ckt	2006	3.5		2.03	.00	7.71	.00	1.12	.00	.68	.00	.20	.77	.00	.00	12.50	.00	12.50
06-054	T/S BANGBOR - ENTER OF BANGPU INDUSTRIAL	1ckt	2006	27.5	0.2	15.92	2.57	60.56	.88	8.76	.52	5.35	.24	1.59	6.06	.26	.09	98.24	4.55	102.79
06-055	T/S BANGBOR - KLONGTUMKAI	1ckt	2006	24.5	0.2	14.19	2.57	53.95	.88	7.81	.52	4.77	.24	1.42	5.39	.26	.09	87.52	4.55	92.07
06-056	T/S BANGBOR - S/S NUANGNAI	1ckt	2006	5		2.90	.00	11.01	.00	1.59	.00	.97	.00	.29	1.10	.00	.00	17.86	.00	17.86
06-057	S/S BANGBOR - S/S NUANGNAI	1ckt	2006	5.5	0.2	3.18	2.57	12.11	.88	1.75	.52	1.07	.24	.32	1.21	.26	.09	19.65	4.55	24.20

115kV Transmission Line

Number	Project Name	No of Circuit	Completion Year	OH 2x400 sq.mm.	UG 2x800 sq.mm.	FC		LC		TAX		Engineering Fee		Contingencies				Total		
						OH	UG	OH	UG	OH	UG	OH	UG	OH		UG		OH	UG	Total
														FC	LC	FC	LC			
06-058	S/S HUANGNAI - S/S BANGSAMTONG	1ckt	2006	1	6.1	.58	1.29	2.20	.44	.32	.26	.19	.12	.05	.22	.13	.04	3.57	2.28	5.85
06-059	T/S KLONGTOEY - SO1 SAIMANTIP	1ckt	2006		1.1	.00	14.14	.00	4.33	.00	2.84	.00	1.33	.00	.00	1.41	.48	.00	25.03	25.03
06-060	T/S NATCHADA - THANON PRACHATIS	1ckt	2006		1.1	.00	14.14	.00	4.33	.00	2.84	.00	1.33	.00	.00	1.41	.48	.00	25.03	25.03
						.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	Total			232.8	67.6	134.67	468.79	509.55	282.05	73.91	173.52	45.10	80.56	13.47	50.06	86.88	28.21	827.66	1,520.01	2,347.66

Number	Project Name	No of Circuit	Completion Year	OH 2x400 sq.mm.	UG 2x800 sq.mm.	FC OH	FC UG	LC OH	LC UG	TAX OH	TAX UG	Engineering Fee OH	Engineering Fee UG	Contingencies OH FC	Contingencies OH LC	Contingencies UG FC	Contingencies UG LC	Total OH	Total UG	Total Total
06-061	S/S NONGKHAM - KLONGTAPEERATANA	1ckt	2006	4.2	0.1	2.19	1.08	8.75	.44	1.24	.22	.77	.11	.22	.87	.11	.04	14.04	2.00	16.04
06-062	T/S SOUTH THONBURI - THANON RANGKUNTIEN	1ckt	2006		0.9	.00	9.76	.00	3.93	.00	2.00	.00	.96	.00	.00	.03	.39	.00	18.02	18.02
06-063	S/S RANGNON - THANON RANGKUNTIEN	1ckt	2006	0.5	0.1	.26	1.08	1.04	.44	.15	.22	.09	.11	.03	.10	.11	.04	1.67	2.00	3.67
06-064	LINK S/S WATKAMPAENG	1ckt	2006		0.2	.00	2.17	.00	.87	.00	.45	.00	.21	.00	.00	.22	.09	.00	4.00	4.00
06-065	THAMMN SUKSAWAT - THANON RASBURANA	1ckt	2006	0.7		.37	.00	1.46	.00	.21	.00	.13	.00	.04	.15	.00	.00	2.34	.00	2.34
06-066	BANGKOK STEEL - INTERSECTION OF THANON	1ckt	2006	1.5	3.6	.78	39.06	3.12	15.71	.44	8.01	.27	3.83	.08	.31	3.91	1.57	5.01	72.09	77.10
06-067	LINK S/S JANGRON	1ckt	2006		0.1	.00	1.08	.00	.44	.00	.22	.00	.11	.00	.00	.11	.04	.00	2.00	2.00
06-068	S/S MAMAISAWAN - TAPAR INTERSECTION	1ckt	2006	1.4	0.2	.73	2.17	2.92	.87	.41	.45	.26	.21	.07	.29	.22	.09	4.68	4.00	8.68
06-069	LING S/S WATDEEDOD	2ckt	2006		0.1	.00	1.08	.00	.32	.00	.21	.00	.10	.00	.00	.11	.03	.00	1.86	1.86
06-070	TAPRA INTERSECTION - NONG WEANLEK	1ckt	2006	2	1.2	1.04	13.02	4.17	5.25	.59	2.67	.36	1.28	.10	.42	1.30	.52	6.68	24.03	30.71
06-071	T/S THONBURI - NONG WEANLEK	1ckt	2006		2	.00	21.70	.00	8.73	.00	4.45	.00	2.13	.09	.00	2.17	.87	.00	40.05	40.05
06-072	S/S SAPANMAI - THANON RAM INTRA	1ckt	2006	3.2	0.5	1.67	5.42	6.67	2.18	.94	1.11	.58	.53	.17	.67	.54	.22	10.69	10.01	20.71
06-073	S/S KASET - KASET INTERSECTION	1ckt	2006	2.6	0.1	1.36	1.08	5.42	.44	.76	.22	.47	.11	.14	.54	.11	.04	8.69	2.00	10.69
06-074	S/S WANGTHONGLANG - S/S KLONGJAN	1ckt	2006	4.3	0.1	2.24	1.08	8.96	.44	1.26	.22	.78	.11	.22	.90	.11	.04	14.37	2.00	16.37
06-075	LING S/S KLONGJAN	1ckt	2006		0.1	.00	1.08	.00	.44	.00	.22	.00	.11	.00	.00	.11	.04	.00	2.00	2.00
06-076	S/S KLONGJAN - S/S RAMKHAMHAENG	1ckt	2006	3.9		2.04	.00	8.12	.00	1.15	.00	.71	.00	.20	.81	.00	.00	13.03	.00	13.03
06-077	S/S RAMKHAMHAENG - KLONGTON INTERSECTION	1ckt	2006		3.2	.00	34.72	.00	13.96	.00	7.12	.00	3.41	.00	.00	3.47	1.40	.00	64.08	64.08
06-078	S/S PRACHACHUEN - S/S BANGSON	1ckt	2006	3.1		1.62	.00	6.46	.00	.91	.00	.57	.00	.16	.65	.00	.00	10.36	.00	10.36
06-079	KLONG PRAPA - SAPANKUEY INTERSECTION	1ckt	2006		1.2	.00	13.02	.00	5.24	.00	2.67	.00	1.28	.00	.00	1.30	.52	.00	24.03	24.03
06-080	T/S SANAMPAO - S/S SAILOM	1ckt	2006	1.2	0.2	.63	2.17	2.50	.87	.35	.45	.22	.21	.06	.25	.22	.09	4.01	4.00	8.02
06-081	FRONT T/S SANAMPAO	1ckt	2006		0.3	.00	3.25	.00	1.31	.00	.67	.00	.32	.00	.00	.33	.13	.00	6.01	6.01
06-082	THANON YOTHEE - THANON SRIAYUDTAYA	1ckt	2006	0.5		.26	.00	1.04	.00	.15	.00	.09	.00	.03	.10	.00	.00	1.67	.00	1.67
06-083	S/S KINGPETCH - S/S PRATHUNWAN	1ckt	2006		1.6	.00	17.36	.00	6.98	.00	3.56	.00	1.70	.00	.00	1.74	.70	.00	32.04	32.04
06-084	S/S PRATHUNWAN - S/S SURAWONG	1ckt	2006		2.6	.00	28.21	.00	11.34	.00	5.79	.00	2.77	.00	.00	2.82	1.13	.00	52.06	52.06
06-085	LINK S/S YERAPHAKT	1ckt	2006		0.1	.00	1.08	.00	.44	.00	.22	.00	.11	.00	.00	.11	.04	.00	2.00	2.00
06-086	S/S SANSAB - AO SO NO TO INTERSECTION	1ckt	2006		0.5	.00	5.42	.00	2.18	.00	1.11	.00	.53	.00	.00	.54	.22	.00	10.01	10.01
06-087	T/S BANGKAPI - THANON RATCHADAPHISEK	1ckt	2006		4.2	.00	45.57	.00	18.32	.00	9.35	.00	4.47	.00	.00	4.56	1.83	.00	84.10	84.10
06-088	S/S SOONVIJAI - THANON PRARAM 9	1ckt	2006		2	.00	21.70	.00	8.73	.00	4.45	.00	2.13	.00	.00	2.17	.87	.00	40.05	40.05
06-089	S/S PRASANMIT - THANON PETCHABURI	1ckt	2006		2	.00	21.70	.00	8.73	.00	4.45	.00	2.13	.00	.00	2.17	.87	.00	40.05	40.05
06-090	BANKLEYTI - THANON SUKHUMVIT	1ckt	2006		1.4	.00	15.19	.00	6.11	.00	3.12	.00	1.49	.00	.00	1.52	.61	.00	28.03	28.03
06-091	LINK S/S NONSEE	1ckt	2006	0.1	0.1	.05	1.08	.21	.44	.03	.22	.02	.11	.01	.02	.11	.04	.33	2.00	2.34
06-092	S/S MAI-AD - S/S NITR-UDOM	1ckt	2006	2.9		1.51	.00	6.04	.00	.85	.00	.53	.00	.15	.60	.00	.00	9.60	.00	9.60
06-093	S/S NITR-UDOM - THANON SUKHUMVIT	1ckt	2006	1.4	0.1	.73	1.08	2.92	.44	.41	.22	.26	.11	.07	.29	.11	.04	4.68	2.00	6.68
06-094	T/S TEPARAK - S/V SAMRONG	1ckt	2006	9.3	1.6	4.85	17.36	19.37	6.98	2.73	3.56	1.70	1.70	.49	1.94	1.74	.70	31.08	32.04	63.12
						.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	Total			42.8	30.4	22.34	329.81	89.15	132.52	12.59	67.65	7.80	32.36	2.23	8.92	32.08	13.25	143.03	608.58	751.61

Number	Project Name	No of Circuit	Completion Year	OH 2x400 sq.mm.	UG 2x800 sq.mm.	FC OH	FC UG	LC OH	LC UG	TAX OH	TAX UG	Engineering Fee OH	Engineering Fee UG	Contingencies OH FC	Contingencies OH LC	Contingencies UG FC	Contingencies UG LC	Total OH	Total UG	Total Total
11-002	FRONT OF S/S PAKNAM - TIVANON Rd.	1ckt	2011	2		1.16	.00	4.40	.00	.64	.00	.39	.00	.12	.44	.00	.00	7.14	.00	7.14
11-004	T/S TALINGCHAN - VIPHAVADI RANGSIT Rd.	1ckt	2011	10.4	0.2	11.23	2.57	42.72	.88	6.18	.52	3.78	.24	1.12	4.27	.26	.09	69.30	4.55	73.85
11-006	T/S TALINGCHAN - NEW Road INTERSECTION	1ckt	2011	2	0.2	1.16	2.57	4.40	.88	.64	.52	.39	.24	.12	.44	.26	.09	7.14	4.55	11.70
11-008	MODIFIED AT THE FRONT OF T/S TALINGCHAN	2ckt	2011		0.2	.00	2.57	.00	.53	.00	.49	.00	.22	.00	.00	.26	.05	.00	4.12	4.12
11-011	LINK S/S PIKILAO	2ckt	2011	5.6	0.1	3.08	1.29	8.23	.27	1.45	.25	.70	.11	.31	.82	.13	.03	14.60	2.06	16.75
11-012	LINK S/S NONGYAI	2ckt	2011		0.1	.00	1.29	.00	.27	.00	.25	.00	.11	.00	.00	.13	.03	.00	2.06	2.06
11-013	LINK S/S SATORNTAI	1ckt	2011		1	.00	12.85	.00	4.39	.00	2.58	.00	1.21	.00	.00	1.29	.44	.00	22.76	22.76
11-015	T/S KLONGTOEY - SATHON Rd.	1ckt	2011		1.2	.00	15.42	.00	5.27	.00	3.10	.00	1.45	.00	.00	1.54	.53	.00	27.31	27.31
11-016	T/S SANAMPAO - S/S SAMYAEN	1ckt	2011		4.6	.00	59.12	.00	20.20	.00	11.88	.00	5.55	.00	.00	5.91	2.02	.00	104.68	104.68
11-017	T/S SANAMPAO - S/S RAJCHAKRU	1ckt	2011		2	.00	25.70	.00	8.78	.00	5.16	.00	2.41	.00	.00	2.57	.88	.00	45.51	45.51
11-018	S/S RAJCHAKRU - S/S JATUJAC	1ckt	2011		2.4	.00	30.84	.00	10.54	.00	6.20	.00	2.90	.00	.00	3.08	1.05	.00	54.62	54.62
11-019	S/S JATUJAC - RATCHADAPISEK Rd.	1ckt	2011		2.2	.00	28.27	.00	9.66	.00	5.68	.00	2.66	.00	.00	2.83	.97	.00	50.06	50.06
11-020	LINK S/S TIANRUAMMIT	2ckt	2011		1	.00	12.85	.00	2.67	.00	2.46	.00	1.09	.00	.00	1.29	.27	.00	20.62	20.62
11-021	T/S PAYAMAKARN - KASET Rd. - SUKHAPHIBAN 1	1ckt	2011	7.9	4.5	4.57	57.83	17.40	19.76	2.52	11.62	1.54	5.43	.46	1.74	5.78	1.98	28.22	102.40	130.63
11-023	S/S NIMITMAI - S/S SUWINTAWONG	2ckt	2011	16.4	0.1	9.02	1.29	24.12	.27	4.25	.25	2.32	.11	.90	2.41	.13	.03	43.02	2.06	45.08
11-024	FRONT OF S/S CHALONGKRUNG - SUWINTAWONG Rd.	1ckt	2011	9		5.21	.00	19.82	.00	2.87	.00	1.75	.00	.52	1.98	.00	.00	32.15	.00	32.15
11-025	LINK S/S LEANGPANG	2ckt	2011		0.1	.00	1.29	.00	.27	.00	.25	.00	.11	.00	.00	.13	.03	.00	2.06	2.06
11-026	FRONT OF S/S PRAYES - KINGKAEW Rd.	1ckt	2011	2.6		1.51	.00	5.73	.00	.83	.00	.51	.00	.15	.57	.00	.00	9.29	.00	9.29
11-028	T/S BANGBOR - TEPARAK Rd.	1ckt	2011	1	0.2	.58	2.57	2.20	.88	.32	.52	.19	.24	.06	.22	.26	.09	3.57	4.55	8.12
11-016	S/S BANGBUATONG - S/S SRIMPLEE	1ckt	2011	13.5	0.1	7.82	1.29	29.73	.44	4.30	.26	2.63	.12	.78	2.97	.13	.04	48.23	2.28	50.50
11-018	S/S BANGBUATONG - THANON #340	1ckt	2011	5.6	0.1	3.24	1.29	12.33	.44	1.78	.26	1.09	.12	.32	1.23	.13	.04	20.01	2.28	22.28
11-022	LINK S/S KLONGBANGPI	2ckt	2011		0.1	.00	1.29	.00	.27	.00	.25	.00	.11	.00	.00	.13	.03	.00	2.06	2.06
11-023	LINK S/S TUNGKRU	2ckt	2011		0.1	.00	1.29	.00	.27	.00	.25	.00	.11	.00	.00	.13	.03	.00	2.06	2.06
11-033	LINK S/S BAGPLEEYAI	2ckt	2011		0.2	.00	2.57	.00	.53	.00	.49	.00	.22	.00	.00	.26	.05	.00	4.12	4.12
11-035	LINK S/S KRUNGTEPKREETA	2ckt	2011	4	0.1	2.20	1.29	5.88	.27	1.04	.25	.57	.11	.22	.59	.13	.03	10.49	2.06	12.55
11-037	LINK S/S KLONGPUNE	2ckt	2011		0.1	.00	1.29	.00	.27	.00	.25	.00	.11	.00	.00	.13	.03	.00	2.06	2.06
11-043	S/S TONGLOR - THANON ON NUCH	1ckt	2011		3.9	.00	50.12	.00	17.12	.00	10.07	.00	4.71	.00	.00	5.01	1.71	.00	88.75	88.75
11-044	S/S TONGLOR - THANON RATCHADAPHISEK	1ckt	2011		4.8	.00	61.69	.00	21.08	.00	12.39	.00	5.79	.00	.00	6.17	2.11	.00	109.23	109.23
						.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	Total			89	29.6	50.78	380.42	176.96	126.19	26.81	76.17	15.94	35.46	5.08	17.70	38.04	12.62	293.26	668.90	962.16

69kV Transmission Line

Number	Project Name	No of Circuit	Completion Year	OH 2x400 sq.mm.	UC 2x800 sq.mm.	FC OH	FC UC	LC OH	LC UC	TAX OH	TAX UC	Engineering Fee OH	Engineering Fee UC	Contingencies OH FC	Contingencies OH LC	Contingencies UG FC	Contingencies UG LC	Total OH	Total UC	Total Total
11-031	S/S KLONGNAI - VIPAVADI RANGSIT Rd.	1ckt	2011		2	.00	21.70	.00	8.73	.00	4.45	.00	2.13	.00	.00	2.17	.87	.00	40.05	40.05
11-032	SONGPHAPA Rd. - IN FRONT OF AIRPORT 2	1ckt	2011		3	.00	32.55	.00	13.09	.00	6.68	.00	3.19	.00	.00	3.25	1.31	.00	60.07	60.07
11-034	S/S KASET - PRACHACHUEN Rd.	1ckt	2011	2.6	0.3	1.36	3.25	5.42	1.31	.76	.67	.47	.32	.14	.54	.33	.13	8.69	6.01	14.70
11-035	T/S LARDPRAO - S/S PRACHACHUEN	1ckt	2011	2.1	0.1	1.10	1.08	4.37	.44	.62	.22	.38	.11	.11	.44	.11	.04	7.02	2.00	9.02
11-036	MODIFIED AT THE FRONT OF S/S PRACHACHUEN	1ckt	2011	0.1		.05	.00	.21	.00	.03	.00	.02	.00	.01	.02	.00	.00	.33	.00	.33
11-038	MODIFIED AT SAPAN KWAY INTERSECTION	1ckt	2011	0.1		.05	.00	.21	.00	.03	.00	.02	.00	.01	.02	.00	.00	.33	.00	.33
11-039	T/S SAMAKPAO - S/S TRINIT	1ckt	2011	1	5.2	.52	56.41	2.08	22.60	.29	11.57	.18	5.54	.05	.21	5.64	2.27	3.34	104.12	107.47
11-040	S/S NANGLERNG - S/S TRINIT	1ckt	2011	2.5	1	1.31	10.85	5.21	4.36	.74	2.23	.46	1.06	.13	.52	1.08	.44	8.35	20.02	28.38
11-041	LINE S/S KLONGTOEY	1ckt	2011		0.5	.00	5.42	.00	2.18	.00	1.11	.00	.53	.00	.00	.54	.22	.00	10.01	10.01
11-042	T/S THONBURI - NAWAISAWAN Rd.	1ckt	2011	2.1	1	1.10	10.85	4.37	4.36	.62	2.23	.38	1.06	.11	.44	1.08	.44	7.02	20.02	27.04
11-043	LINE S/S KLONGWATSING	1ckt	2011		0.3	.00	3.25	.00	1.31	.00	.67	.00	.32	.00	.00	.33	.13	.00	6.01	6.01
11-044	S/S WATHANPAERG - BANGKHUNTIAN Rd.	1ckt	2011		2	.00	21.70	.00	8.73	.00	4.45	.00	2.13	.00	.00	2.17	.87	.00	40.05	40.05
11-045	S/S JANGHON - SUSAWAD Rd.	1ckt	2011	2.4	0.1	1.25	1.08	5.00	.44	.71	.22	.44	.11	.13	.50	.11	.04	8.02	2.00	10.02
11-046	S/S KRUEAI - SUSAWAD Rd.	1ckt	2011	0.6	0.1	.31	1.08	1.25	.44	.18	.22	.11	.11	.03	.12	.11	.04	2.01	2.00	4.01
11-047	S/S SAMRONG - S/S NITE-UDOM	1ckt	2011		1.1	.00	11.93	.00	4.80	.00	2.45	.00	1.17	.00	.00	1.19	.48	.00	22.03	22.03
11-048	S/S SUANSOM - TOOJAO SAMING PRAI Rd	1ckt	2011	1.4	0.1	.73	1.08	2.92	.44	.41	.22	.26	.11	.07	.29	.11	.04	4.68	2.00	6.68
						.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	Total			14.9	16.8	7.78	182.26	31.04	73.30	4.38	37.39	2.72	17.89	.78	3.10	18.23	7.33	49.79	336.49	386.19

230kV Transmission Line

Number	Project Name	No of Circuit	Completion Year	OH 2x400 sq.mm.	UC 2x1200 sq.mm.	FC		LC		TAX		Engineering Fee		Contingencies				Total		
						OH	UC	OH	UC	OH	UC	OH	UC	OH		UC		OH	UC	Total
														FC	LC	FC	LC			
16-001	OKHOJ T/S - RANIPTRA T/S	2ckt	2016	26	12	16.90	884.52	48.02	161.47	8.16	167.86	4.54	73.22	1.69	4.50	88.45	16.15	84.12	1,391.67	1,475.79
16-002	LINE RATHURAMA T/S (4ckt) TO BE CONSTRUCTED	4ckt	2016	2		1.75	.00	5.40	.00	.88	.00	.50	.00	.18	.54	.00	.00	9.24	.00	9.24
	BY ECAT (2X1272)					.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	Total				12.00	18.65	884.52	53.42	161.47	9.04	167.86	5.05	73.22	1.87	5.34	88.45	16.15	93.36	1,391.67	1,485.03

115kV Transmission Line

Number	Project Name	No of Circuit	Completion Year	OH 2x400 sq.mm.	UG 2x800 sq.mm.	FC		LC		TAX		Engineering Fee		Contingencies				Total		
						OH	UG	OH	UG	OH	UG	OH	UG	OH		UG		OH	UG	Total
														FC	LC	FC	LC			
16-003	RATBURANA T/S - No.340 Rd.	1ckt	2016	1	1.8	.58	23.13	2.20	7.90	.32	4.65	.10	2.17	.06	.22	2.31	.79	3.57	40.96	44.53
16-004	RATBURANA T/S - No.340 Rd.	1ckt	2016		1.7	.00	21.85	.00	7.46	.00	4.30	.00	2.05	.00	.00	2.18	.75	.00	38.69	38.69
16-005	RATBURANA T/S - No.340 Rd.	1ckt	2016		1.5	.00	19.28	.00	6.59	.00	3.87	.00	1.81	.00	.00	1.93	.66	.00	34.13	34.13
16-006	KLONGRANGSIT T/S - MAUNGTHONGS D/S	1ckt	2016	6	2.5	3.47	32.13	13.21	10.98	1.91	6.46	1.17	3.02	.35	1.32	3.21	1.10	21.43	56.89	78.33
16-007	KLONGRANGSIT T/S - MAUNGTHONGS D/S	1ckt	2016	4.5	1.5	2.61	19.28	9.91	6.59	1.43	3.87	.88	1.81	.26	.99	1.93	.66	16.08	34.13	50.21
16-049	LINK S/S BANGERUAY	2ckt	2016		0.1	.00	1.29	.00	.27	.00	.25	.00	.11	.00	.00	.13	.03	.00	2.06	2.06
16-001	LINK S/S BANGPANG	2ckt	2016		0.1	.00	1.29	.00	.27	.00	.25	.00	.11	.00	.00	.13	.03	.00	2.06	2.06
16-027	LINK S/S BANGPLA	2ckt	2016		0.1	.00	1.29	.00	.27	.00	.25	.00	.11	.00	.00	.13	.03	.00	2.06	2.06
16-029	T/S BANGBOR - S/S KLONGDAN	1ckt	2016	6	0.3	3.47	3.86	13.21	1.32	1.91	.77	1.17	.36	.35	1.32	.39	.13	21.43	6.83	28.26
16-030	LINK S/S KLONGDAN	1ckt	2016		0.3	.00	3.86	.00	1.32	.00	.77	.00	.36	.00	.00	.39	.13	.00	6.83	6.83
16-022	LINK S/S KLONGGRATIAM	2ckt	2016	1	0.1	.55	1.29	1.47	.27	.26	.25	.14	.11	.06	.15	.13	.03	2.62	2.06	4.69
16-005	S/S LUMPAGSHE - RAM INTHRA Rd.	2ckt	2016	6.7	0.1	3.69	1.29	9.85	.27	1.74	.25	.95	.11	.37	.09	.13	.03	17.57	2.06	19.64
16-003	LINK S/S PONGPETCH	1ckt	2016		0.1	.00	1.29	.00	.44	.00	.26	.00	.12	.00	.00	.13	.04	.00	2.28	2.28
16-007	LINK S/S PUTTAMONTON	1ckt	2016		0.1	.00	1.29	.00	.44	.00	.26	.00	.12	.00	.00	.13	.04	.00	2.28	2.28
16-014	S/S RAJDAMRI - WANA 4 Rd.	2ckt	2016		2.4	.00	30.84	.00	6.41	.00	5.91	.00	2.61	.00	.00	3.08	.64	.00	49.50	49.50
16-009	THE FRONT OF S/S SHINPLEE - S/S TALINGCHAN	1ckt	2016	3.4	0.1	1.97	1.29	7.49	.44	1.08	.26	.66	.12	.20	.75	.13	.04	12.15	2.28	14.42
16-010	T/S TALINGCHAN - S/S TLINGCHAN	1ckt	2016	4.8	0.3	2.78	3.86	10.57	1.32	1.53	.77	.93	.36	.28	1.06	.39	.13	17.15	6.83	23.97
						.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	Total			33.4	13.1	19.12	168.36	67.91	52.54	10.18	33.48	6.00	15.46	1.91	6.79	16.84	5.25	112.01	291.93	403.94

69kV Transmission Line

Number	Project Name	No of Circuit	Completion Year	OH 2x400 sq.mm.	UG 2x800 sq.mm.	FC OH	FC UG	LC OH	LC UG	TAX OH	TAX UG	Engineering Fee OH	Engineering Fee UG	Contingencies OH FC	Contingencies OH LC	Contingencies UG FC	Contingencies UG LC	Total OH	Total UG	Total Total
16-008	RATBURANA T/S - SUKSAWAT Rd.	1ckt	2016	2	1.7	1.04	18.44	4.17	7.42	.59	3.78	.36	1.81	.10	.42	1.84	.74	6.68	34.04	40.72
16-009	RATBURANA T/S - SUKSAWAT Rd.	1ckt	2016	2	1.5	1.04	16.27	4.17	6.54	.59	3.34	.36	1.60	.10	.42	1.63	.65	6.68	30.04	36.72
16-010	RATBURANA T/S - SUKSAWAT Rd.	1ckt	2016	11	0.5	5.74	5.42	22.91	2.18	3.23	1.11	2.01	.53	.57	2.20	.54	.22	36.76	10.01	46.77
16-011	AMOUND BANGSON D/S	1ckt	2016	0.1	0.5	.05	5.42	.21	2.18	.03	1.11	.02	.53	.01	.02	.54	.22	.33	10.01	10.35
16-012	LINK POOJAO D/S	1ckt	2016		0.1	.00	1.08	.00	.44	.00	.22	.00	.11	.00	.00	.11	.04	.00	2.00	2.00
16-013	LINK VATDEEDOO D/S	1ckt	2016		0.1	.00	1.08	.00	.44	.00	.22	.00	.11	.00	.00	.11	.04	.00	2.00	2.00
16-014	NORTH BANGKOK T/S - SAKSEN D/S	1ckt	2016	4.5	0.6	2.35	6.51	9.37	2.62	1.32	1.34	.82	.64	.23	.94	.65	.26	15.04	12.01	27.05
16-033	LINK S/S BANNAI	1ckt	2016		0.1	.00	1.08	.00	.44	.00	.22	.00	.11	.00	.00	.11	.04	.00	2.00	2.00
16-037	LINK S/S BANGSON	1ckt	2016		0.1	.00	1.08	.00	.44	.00	.22	.00	.11	.00	.00	.11	.04	.00	2.00	2.00
						.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	Total					10.23	56.41	40.83	22.69	5.76	11.57	3.57	5.54	1.02	4.03	5.64	2.27	65.50	104.12	169.62

Appendix 10.5-2 Construction Expenses for Terminal Stations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 1997					
1. Direct Cost					
1.1 Material & Construction Costs					
(1) Addition of South Thonburi T/S	230 - 69	3×200 → 4×200	2.555	2.100	4.655
(2) Addition of Klongrangsit T/S	230 - 115	1×200 → 2×200	16.674	5.250	21.924
(3) Addition of Nangjok T/S	230 - 115	2×200 → 2×200 1×300	16.674	5.250	21.924
1.2 Acquisition of Land			0	0	0
Sub-total			35.903	12.600	48.503
2. Indirect Cost					
(1) Engineering and Supervision			—	3.395	3.395
(2) Contingency			3.590	1.260	4.850
(3) Import Duty			—	3.955	3.955
(4) VAT			—	3.672	3.672
Sub-total			3.590	12.282	15.872
Total			39.493	24.882	64.375

Appendix 10.5-2 Construction Expenses for Terminal Stations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 1998					
1. Direct Cost					
1.1 Material & Construction Costs					
(1) Construction of Onnuj T/S	230 - 115	1×300	131.035	36.750	167.785
(2) Addition of Terapak T/S	230 - 115 230 - 69	1×300 → 2×300 1×300 → 2×300	2.555	2.100	4.655
(3) Addition of Jangwatana T/S	230 - 115	2×300 → 3×300	9.369	2.100	11.469
1.2 Acquisition of Land			0	0	0
Sub-total			142.959	40.950	183.909
2. Indirect Cost					
(1) Engineering and Supervision			—	12.874	12.874
(2) Contingency			14.296	4.095	18.391
(3) Import Duty			—	8.297	8.297
(4) VAT			—	13.454	13.454
Sub-total			14.296	38.720	53.016
Total			157.255	79.670	236.925

Appendix 10.5-2 Construction Expenses for Terminal Stations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 1999					
1. Direct Cost					
1.1 Material & Construction Costs					
(1) Construction of Thanontok T/S	230 - 115	2×300	205.983	7.350	213.333
(2) Addition of Sainoi T/S	230 - 115	1×300 → 2×300	16.674	5.250	21.924
1.2 Acquisition of Land			—	0	0
Sub-total			222.657	12.600	235.257
2. Indirect Cost					
(1) Engineering and Supervision			—	16.468	16.468
(2) Contingency			22.266	1.260	23.526
(3) Import Duty			—	13.425	13.425
(4) VAT			—	17.408	17.408
Sub-total			22.266	48.561	70.827
Total			244.923	61.161	306.084

Appendix 10.5-2 Construction Expenses for Terminal Stations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 2000					
1. Direct Cost					
1.1 Material & Construction Costs					
(1) Construction of Sanampao T/S	230 - 115 230 - 69	1×300 1×300	502.605	54.600	557.205
(2) Construction of Ratchada T/S	230 - 115	1×300	131.035	36.750	167.785
(3) Addition of Bangkoknoi T/S	230 - 115	1×300 → 2×300	2.555	2.100	4.655
1.2 Acquisition of Land			—	136.718	136.718
Sub-total			636.195	230.168	866.363
2. Indirect Cost					
(1) Engineering and Supervision			—	60.645	60.645
(2) Contingency			63.619	23.017	86.636
(3) Import Duty			—	34.237	34.237
(4) VAT			—	63.042	63.042
Sub-total			63.619	180.941	244.560
Total			699.814	411.109	1,110.923

Appendix 10.5-2 Construction Expenses for Terminal Stations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 2001					
1. Direct Cost					
1.1 Material & Construction Costs					
(1) Construction of Bangbor T/S	230 - 115	1×300	131.035	36.750	167.785
(2) Addition of Bangkapi T/S	230 - 69	4×200 → 2×200 2×300	33.348	10.500	43.848
(3) Addition of North Bangkok T/S	230 - 69	2×200 → 4×200 1×285	33.348	10.500	43.848
(4) Addition of South Bangkok T/S	230 - 69	4×200 → 2×200 2×300	33.348	10.500	43.848
1.2 Acquisition of Land			—	0	0
Sub-total			231.079	68.250	299.329
2. Indirect Cost					
(1) Engineering and Supervision			—	20.953	20.953
(2) Contingency			23.108	6.825	29.933
(3) Import Duty			—	17.267	17.267
(4) VAT			—	22.162	22.162
Sub-total			23.108	67.207	90.315
Total			254.187	135.457	389.644

Appendix 10.5-2 Construction Expenses for Terminal Stations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 2006 (2002~2006)					
1. Direct Cost					
1.1 Material & Construction Costs					
(1) Construction of Klongtoey T/S	230 - 115	2×300	531.806	54.600	586.406
(2) Construction of Patanakarn T/S	230 - 115	3×300	196.552	55.125	251.677
(3) Construction of Talingchan T/S	230 - 115	2×300	131.035	36.750	167.785
(4) Construction of Thonburi T/S	230 - 69	1×300	370.233	38.220	408.453
(5) Addition of Bangplee T/S	230 - 115	3×200 → 4×200	16.674	5.250	21.924
(6) Addition of South Bangkok T/S	230 - 115	2×200 → 3×200	16.674	5.250	21.924
(7) Addition of Jangwatana T/S	230 - 115	3×300 → 4×300	2.555	2.100	4.655
(8) Addition of Bangbor T/S	230 - 115	1×300 → 2×300	2.555	2.100	4.655
(9) Addition of Onnuj T/S	230 - 115	2×300 → 3×300	9.369	2.100	11.469
(10) Addition of Klongrangsit T/S	230 - 69	2×200 → 3×200	16.674	5.250	21.924
(11) Addition of Lardprao T/S	230 - 69	4×200 → 2×200 2×300	33.348	10.500	43.848
(12) Addition of Sanampao T/S	230 - 69	1×300 → 2×300	44.405	7.350	51.755
1.2 Acquisition of Land			—	0	0
Sub-total			1,371.880	224.595	1,596.475

Appendix 10.5-2 Construction Expenses for Terminal Stations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 2006 (2002～2006)					
2. Indirect Cost					
(1) Engineering and Supervision			—	111.753	111.753
(2) Contingency			137.188	22.460	159.648
(3) Import Duty			—	79.084	79.084
(4) VAT			—	117.289	117.289
Sub-total			137.188	330.586	467.774
Total			1,509.068	555.181	2,064.249

Appendix 10.5-2 Construction Expenses for Terminal Stations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 2011 (2007~2011)					
1. Direct Cost					
1.1 Material & Construction Costs					
(1) Addition of Klongrangsit T/S	230 - 115	2×200 → 3×200	16.674	5.250	21.924
(2) Addition of Nonjok T/S	230 - 115	2×200 → 4×300 1×300	16.674	5.250	21.924
(3) Addition of Bangkoknoi T/S	230 - 115	2×300 → 3×300	128.991	36.750	165.741
(4) Addition of Bangbor T/S	230 - 115	2×300 → 3×300	128.991	36.750	165.741
(5) Addition of Onnuj T/S	230 - 115	3×300 → 4×300	128.991	36.750	165.741
(6) Addition of Ratchada T/S	230 - 115	1×300 → 2×300	16.674	5.250	21.924
(7) Addition of Sanampao T/S	230 - 115	1×300 → 2×300	50.250	7.350	57.600
(8) Addition of Talingchan T/S	230 - 115	2×300 → 3×300	9.369	2.100	11.469
(9) Addition of South Bangkok T/S	230 - 69	2×200 → 4×300 2×300	33.348	10.500	43.848
(10) Addition of Thonburi T/S	230 - 69	1×300 → 2×300	44.405	7.350	51.755
1.2 Acquisition of Land			—	0	0
Sub-total			574.367	153.300	727.667

Appendix 10.5-2 Construction Expenses for Terminal Stations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 2011 (2007～2011)					
2. Indirect Cost					
(1) Engineering and Supervision			—	50.937	50.937
(2) Contingency			57.437	15.330	72.767
(3) Import Duty			—	37.778	37.778
(4) VAT			—	53.581	53.581
Sub-total			57.437	157.626	215.063
Total			631.804	310.926	942.730

Appendix 10.5-2 Construction Expenses for Terminal Stations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 2016 (2012~2016)					
1. Direct Cost					
1.1 Material & Construction Costs					
(1) Construction of Ramintra T/S	230 - 115	2×300	531.806	54.600	586.406
(2) Construction of Ratburana T/S	230 - 115 230 - 69	2×300 2×300	232.737	36.750	269.487
(3) Addition of Bangplee T/S	230 - 115	4×200 → 2×200 2×300	33.348	10.500	43.848
(4) Addition of Klongrangsit T/S	230 - 115	3×200 → 4×200	16.674	5.250	21.924
(5) Addition of Bangkoknoi T/S	230 - 115	3×300 → 4×300	2.555	2.100	4.655
(6) Addition of Sainoi T/S	230 - 115	2×300 → 3×300	16.674	5.250	21.924
(7) Addition of Sanampao T/S	230 - 115	2×300 → 3×300	50.250	7.350	57.600
(8) Addition of Klongtoey T/S	230 - 115	2×300 → 3×300	50.250	7.350	57.600
(9) Addition of Patanakarn T/S	230 - 115	3×300 → 4×300	2.555	2.100	4.655
(10) Addition of Talingchan T/S	230 - 115	3×300 → 4×300	2.555	2.100	4.655
(11) Addition of Bangkapi T/S	230 - 69	2×200 → 4×300 2×300	33.348	10.500	43.848
(12) Addition of Laraprao T/S	230 - 69	2×200 → 4×300 2×300	33.348	10.500	43.848
(13) Addition of North Bangkok T/S	230 - 69	4×200 → 2×200 2×300	33.348	10.500	43.848
(14) Addition of South Thonburi T/S	230 - 69	4×200 → 2×200 2×300	33.348	10.500	43.848

Appendix 10.5-2 Construction Expenses for Terminal Stations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 2016 (2012～2016)					
(15) Addition of Ratchada T/S	230 - 69	2×300 → 3×300	16.674	5.250	21.924
1.2 Acquisition of Land			—	136.718	136.718
Sub-total			1,089.470	317.318	1,406.788
2. Indirect Cost					
(1) Engineering and Supervision			—	98.475	98.475
(2) Contingency			108.947	31.732	140.679
(3) Import Duty			—	72.654	72.654
(4) VAT			—	103.561	103.561
Sub-total			108.947	306.422	415.369
Total			1,198.417	623.740	1,822.157

Appendix 10.5-3 Construction Expenses for Distribution Substations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 1997					
1. Direct Cost					
1.1 Material & Construction Costs					
(1) Construction of Taiban D/S	115 - 24	1×60	21.603	3.339	24.942
(2) Construction of Dindaeng D/S	69 - 12	1×(40)	20.674	3.339	24.013
(3) Construction of Klongkum D/S	115 - 24	1×60	21.603	3.339	24.942
(4) Construction of Samyarn D/S	115 - 24	1×60	21.603	3.339	24.942
(5) Construction of Samyarn D/S	115 - 12	1×(40)	21.603	3.339	24.942
(6) Construction of Trokchan D/S	115 - 12	1×(40)	21.603	3.339	24.942
(7) Addition of Bangchalong D/S	115 - 24	1×60 → 2×60	103.411	32.550	135.961
(8) Addition and Modification of Bangkoknoi D/S	69 - 12/24	2×40 → 1×40 1×60	15.887	0.840	16.727
(9) Addition of Klongsanamchai D/S	69 - 12	1×40 → 1×40 1×(40)	87.881	32.550	120.431
(10) Addition and Modification of Lardprao D/S	69 - 12	2×20 → 2×(40)	105.749	32.550	138.299
(11) Addition of Makasan D/S	69 - 12	2×40 → 2×40 1×(40)	14.958	0.840	15.798
(12) Addition of Muangthong 1 D/S	115 - 24	1×60 → 2×60	103.411	32.550	135.961
(13) Addition and Modification of Pakkred D/S	69 - 12/24 →115 - 12/24	2×40 → 1×40 1×60 2×60	138.932	34.125	173.057
(14) Addition of Bangson D/S	69 - 12/24	1×(40) → 2×(40)	87.881	32.550	120.431
(15) Addition and Modification of Bearing D/S	69 - 24 →115 - 24	1×60 → 2×60	126.792	32.550	159.342

Appendix 10.5-3 Construction Expenses for Distribution Substations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 1997					
(16) Addition and Modification of Ekamai D/S	69 - 12/24	1×(40) → 2×(40) 1×60	110.334	32.550	142.884
(17) Addition of Khotor D/S	115 - 24	1×60 → 2×60	103.411	32.550	135.961
(18) Addition of Muangthong 3 D/S	115 - 24	1×60 → 2×60	103.411	32.550	135.961
(19) Addition of Sainamtip D/S	69 - 12/24	1×60 → 1×(40) 1×60	87.881	32.550	120.431
(20) Addition of South Bangplee D/S	115 - 24	1×60 → 2×60	103.411	32.550	135.961
(21) Addition of Surasak D/S	69 - 12	1×(40) → 2×(40)	87.881	32.550	120.431
(22) Addition of Bangbor D/S	115 - 24	1×60 → 2×60	103.411	32.550	135.961
(23) Addition of Ghoaklang D/S	69 - 12	1×60 → 2×60	87.881	32.550	120.431
(24) Addition of Jangwatana D/S	115 - 24	1×60 → 2×60	103.411	32.550	135.961
1.2 Acquisition of Land			0	337.336	337.336
Sub-total			1,804.623	881.425	2,686.048
2. Indirect Cost					
(1) Engineering & Supervision			—	188.023	188.023
(2) Contingency			180.462	88.143	268.605
(3) Import duty			—	170.968	170.968
(4) VAT			—	199.991	199.991
Sub-total			180.462	647.125	827.587
Total			1,985.085	1,528.550	3,513.635

Appendix 10.5-3 Construction Expenses for Distribution Substations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 1998					
1. Direct Cost					
1.1 Material & Construction Costs					
(1) Construction of Jatujag D/S	69 - 12	2×(40)	110.334	32.550	142.884
(2) Construction of Kaset D/S	69 - 12/24	1×(40)+1×60	110.334	32.550	142.884
(3) Construction of Shimplee D/S	115 - 24	1×60	21.603	3.339	24.942
(4) Construction of Tubyao D/S	115 - 24	1×60	21.603	3.339	24.942
(5) Construction of Watkampalng D/S	69 - 24	1×40	20.674	3.339	24.013
(6) Addition and Modification of Donmuang D/S	69 - 12/24 →115 - 24	2×40 → 2×60 1×60	126.792	32.550	159.342
(7) Addition and Modification of Nongkham D/S	69 - 12/24	1×40 → 2×60 1×60	14.958	0.840	15.798
(8) Modification of Nonthaburi D/S	69 - 12 →115 - 12/24	2×20+1×40 → 1×60+1×40	122.887	32.550	155.437
(9) Addition of Thanontok D/S	69 - 12/24	1×40 → 1×40 1×(40)	96.397	32.550	128.947
(10) Addition of Taweewattana D/S	115 - 24	1×60 → 2×60	103.411	32.550	135.961
(11) Addition of Thonburirom D/S	69 - 12	1×(40) → 2×(40)	87.881	32.550	120.431
(12) Addition of Bangshan	115 - 24	1×60 → 2×60	103.411	32.550	135.961
(13) Addition of Muangthong 4 D/S	115 - 24	1×60 → 2×60	103.411	32.550	135.961
(14) Addition of Samyarn D/S	115 - 12	1×(40) → 2×(40)	103.411	32.550	135.961
(15) Addition of Trokchan D/S	115 - 12	1×(40) → 2×(40)	103.411	32.550	135.961

Appendix 10.5-3 Construction Expenses for Distribution Substations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 1998			—	81.285	81.285
1.2 Acquisition of Land					
Sub-total			1,250.518	450.192	1,700.710
2. Indirect Cost					
- Engineering & Supervision			—	119.050	119.050
- Contingency			125.052	45.019	170.071
- Import duty	—	—	—	119.099	119.099
- VAT			—	127.387	127.387
Sub-total			125.052	410.555	535.607
Total			1,375.570	860.747	2,236.317

Appendix 10.5-3 Construction Expenses for Distribution Substations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 1999					
1. Direct Cost					
1.1 Material & Construction Costs					
(1) Construction of Muangthong 5 D/S	115 - 24	2×60	126.792	32.550	159.342
(2) Construction of Patanakarn D/S	115 - 24	1×60	21.603	3.339	24.942
(3) Construction of Sriwiang D/S	69 - 12	2×(40)	110.334	32.550	142.884
(4) Construction of Tha-kwian D/S	69 - 12	2×(40)	110.334	32.550	142.884
(5) Addition of Bangkhaen D/S	115 - 24	1×60 → 2×60	103.411	32.550	135.961
(6) Addition of Bangrnod D/S	69 - 12/24	2×(40) → 2×(40) 1×60	14.958	0.840	15.798
(7) Addition and Modification of Bangpongpang D/S	115 - 24	1×40 → 2×60 1×60	15.887	0.840	16.727
(8) Addition and Modification of Samrong D/S	69 - 12/24	2×40 → 1×40 1×60 2×60	14.958	0.840	15.798
(9) Addition of Wangpetchaboon D/S	69 - 12	2×40 → 2×40 1×(40)	14.958	0.840	15.798
(10) Addition and Modification of Bangkradee D/S	69 - 12 →115 - 24	1×(40) → 2×60	126.792	32.550	159.342
(11) Modification of Ekachai D/S	69 - 12 →115 - 24	1×(40) → 1×60	21.603	3.339	24.942
(12) Addition of Klongkum D/S	115 - 24	1×60 → 2×60	103.411	32.550	135.961
(13) Addition and Modification of Bangkae D/S	69 - 12 →115 - 12	1×40 → 2×(40)	126.792	32.550	159.342

Appendix 10.5-3 Construction Expenses for Distribution Substations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 1999					
1.2 Acquisition of Land for D/S			0.000	94.6	94.600
Sub-total			911.833	332.488	1,244.321
2. Indirect Cost					
- Engineering & Supervision			—	87.102	87.102
- Contingency			91.183	33.249	124.432
- Import duty			—	89.058	89.058
- VAT			—	93.337	93.337
Sub-total			91.183	302.746	393.929
Total			1,003.016	635.234	1,638.250

Appendix 10.5-3 Construction Expenses for Distribution Substations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 2000					
1. Direct Cost					
1.1 Material & Construction Costs					
(1) Construction of Muangthong 6 D/S	115 - 24	2×60	126.792	32.550	159.342
(2) Construction of Prawes D/S	115 - 24	2×60	126.792	32.550	159.342
(3) Construction of Prompong D/S	115 - 24	2×60	126.792	32.550	159.342
(4) Construction of Suwintawong D/S	115 - 24	2×60	126.792	32.550	159.342
(5) Construction of Wuttakart D/S	69 - 12/24	1×(40)+1×60	110.334	32.550	142.884
(6) Addition and Modification of Klongmai D/S	69 - 24	1×40 → 2×60	110.334	32.550	142.884
(7) Addition and Modification of Pakkred D/S	115 - 12/24	1×40 → 3×60 2×60	15.887	0.840	16.727
(8) Addition of Ekburi D/S	115 - 24	1×60 → 2×60	103.411	32.550	135.961
(9) Addition of Taiban D/S	115 - 24	1×60 2×60	103.411	32.550	135.961
(10) Addition and Modification of Bangjak D/S	115 - 12/24	1×(40) → 1×(40) 1×60	103.411	32.550	135.961
(11) Addition of Dindaeng D/S	69 - 12	1×(40) → 2×(40)	87.881	32.550	120.431
(12) Addition of Shimplee D/S	115 - 24	1×60 → 2×60	103.411	32.550	135.961
1.2 Acquisition of Land for D/S			—	217.965	217.965
Sub-total			1,245.248	576.855	1,822.103

Appendix 10.5-3 Construction Expenses for Distribution Substations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 2000					
2. Indirect Cost					
- Engineering & Supervision			—	127.547	127.547
- Contingency			124.525	57.685	182.210
- Import duty			—	117.282	117.282
- VAT			—	135.757	135.757
Sub-total			124.525	438.271	562.796
Total			1,369.773	1,015.126	2,384.899

Appendix 10.5-3 Construction Expenses for Distribution Substations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 2001					
1. Direct Cost					
1.1 Material & Construction Costs					
(1) Construction of Banmai D/S	69 - 24	2×60	110.334	32.550	142.884
(2) Construction of Muangthong 7 D/S	115 - 24	2×60	126.792	32.550	159.342
(3) Construction of Nanglerng D/S	69 - 12	2×40	110.334	32.550	142.884
(4) Construction of Plubpla D/S	115 - 24	2×60	126.792	32.550	159.342
(5) Construction of Sainoi D/S	115 - 24	2×60	126.792	32.550	159.342
(6) Construction of Satorn D/S	115 - 24	2×60	126.792	32.550	159.342
(7) Construction of Suanyai D/S	115 - 24	2×60	126.792	32.550	159.342
(8) Addition of Huaykwang D/S	69 - 24	2×60 → 3×60	14.958	0.840	15.798
(9) Addition of Lardprao D/S	69 - 12/24	1×(40) → 2×(40) 1×60 1×60	14.958	0.840	15.798
(10) Addition and Modification of Lumpini D/S	69 - 12/24	4×40 → 3×40 1×60	14.958	0.840	15.798
(11) Addition and Modification of Mahamek D/S	69 - 12 →115 - 24	2×40 → 3×60 1×(40)	142.679	33.390	176.069
(12) Addition and Modification of Nonthaburi D/S	115 - 12/24	1×40 → 2×60 1×60	15.887	0.840	16.727
(13) Addition and Modification of Paknam D/S	115 - 24	2×40 → 2×60	31.774	1.680	33.454
(14) Addition and Modification of Phaisingto D/S	69 - 12/24	1×40 → 3×60 2×60	14.958	0.840	15.798

Appendix 10.5-3 Construction Expenses for Distribution Substations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 2001					
(15) Addition and Modification of Prachachuen	69 - 12/24	2×40 → 1×40 1×60	14.958	0.840	15.798
(16) Addition and Modification of Samrong D/S	69 - 24	1×40 → 3×60 2×60	14.958	0.840	15.798
(17) Addition and Modification of South Bangkok	69 - 12/24	2×20 → 1×60	91.812	32.550	124.362
(18) Addition and Modification of Suansom D/S	69 - 12/24	2×40 → 2×60	105.749	32.550	138.299
(19) Addition and Modification of Surawong D/S	69 - 12/24	3×40 → 1×40 2×60	29.916	1.680	31.596
(20) Addition and Modification of Thanontok D/S	69 - 12/24	1×40 → 2×60 1×(40)	14.958	0.840	15.798
(21) Addition and Modification of Wangpetchaboon D/S	69 - 12/24	2×40 → 3×60 1×(40)	105.749	32.550	138.299
(22) Addition and Modification of Huamak D/S	69 - 24	1×40 → 1×60	14.958	0.840	15.798
(23) Addition of Khoter D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(24) Addition of Sainamtip D/S	69 - 24	2×60 → 3×60	14.958	0.840	15.798
(25) Addition of Srieiam D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(26) Addition of Ekachai D/S	115 - 24	1×60 → 2×60	103.411	32.550	135.961
(27) Addition of Klongprapa D/S	115 - 24	1×60 → 2×60	103.411	32.550	135.961
(28) Addition of Patanakarn D/S	115 - 24	1×60 → 2×60	103.411	32.550	135.961
(29) Addition of Tubyao D/S	115 - 24	1×60 → 2×60	103.411	32.550	135.961
(30) Addition of Watkampaeng D/S	69 - 12/24	1×40 → 2×60	110.334	32.550	142.884

Appendix 10.5-3 Construction Expenses for Distribution Substations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 2001					
1.2 Acquisition of Land for D/S			0.000	378.689	378.689
Sub-total			2,068.568	913.769	2,982.337
2. Indirect Cost					
- Engineering & Supervision			—	208.764	208.764
- Contingency			206.857	91.377	298.234
- Import duty			—	202.233	202.233
- VAT			—	222.920	222.920
Sub-total			206.857	725.294	932.151
Total			2,275.425	1,639.063	3,914.488

Appendix 10.5-3 Construction Expenses for Distribution Substations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 2006 (2002~2006)					
1. Direct Cost					
1.1 Material & Construction Costs					
(1) Construction of Asoke D/S	115 - 24	2×60	126.792	32.550	159.342
(2) Construction of Banghuasae D/S	115 - 24	2×60	126.792	32.550	159.342
(3) Construction of Bangkaew D/S	115 - 24	2×60	126.792	32.550	159.342
(4) Construction of Bangtalard D/S	115 - 24	2×60	126.792	32.550	159.342
(5) Construction of Jorakabuo D/S	115 - 24	2×60	142.679	33.390	176.069
(6) Construction of Klongna D/S	115 - 24	2×60	126.792	32.550	159.342
(7) Construction of Land & House D/S	115 - 24	2×60	126.792	32.550	159.342
(8) Construction of Muangthong 8 D/S	115 - 24	2×60	126.792	32.550	159.342
(9) Construction of Muangthong 9 D/S	115 - 24	2×60	126.792	32.550	159.342
(10) Construction of Praramkao D/S	115 - 24	2×60	126.792	32.550	159.342
(11) Construction of Rajchaprarop D/S	115 - 24	3×60	142.679	33.390	176.069
(12) Construction of Sanampao D/S	115 - 24	2×60	126.792	32.550	159.342
(13) Construction of Sananikom D/S	115 - 24	2×60	126.792	32.550	159.342
(14) Construction of Songsunikom D/S	115 - 24	2×60	126.792	32.550	159.342
(15) Construction of Srinakarin D/S	115 - 24	2×60	126.792	32.550	159.342
(16) Construction of Watdeedod D/S	69 - 24	2×60	110.334	32.550	142.884
(17) Addition of Bangchalong D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(18) Addition and Modification of Bangkapi D/S	69 - 12/24	2×40 → 1×40 1×60 2×60	14.958	0.840	15.798
(19) Addition of Bangkaen D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727

Appendix 10.5-3 Construction Expenses for Distribution Substations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 2006 (2002~2006)					
(20) Addition of Bangkok noi D/S	69 - 12/24	1×40 → 1×40 1×60 2×60	14.958	0.840	15.798
(21) Addition and Modification of Bangkrachao D/S	69 - 12/24	2×10 → 1×60	20.674	3.339	24.013
(22) Addition of Bangpongpang D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(23) Addition of Bangpood D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(24) Addition and Modification of Bangpu D/S	115 - 24	2×60 → 3×60	142.679	33.390	176.069
(25) Addition of Bangsaotong D/S	115 - 24	1×60 → 2×60	103.411	32.550	135.961
(26) Addition of Chalongkrung D/S	115 - 24	1×60 → 2×60	103.411	32.550	135.961
(27) Modification of Chidlom D/S	115 - 24 69 - 24	2×50 → 2×60	110.334	32.550	142.884
(28) Addition of Donmuang D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(29) Addition and Modification of Klongsanamchai D/S	69 - 12/24 →115 - 24	1×40 → 2×60 1×60	126.792	32.550	159.342
(30) Addition and Modification of Klongsanpasamit D/S	69 - 12/24	2×20 → 1×60 1×40 1×40	14.958	0.840	15.798
(31) Addition and Modification of Krunai D/S	69 - 12/24	1×40 → 2×60 1×(40)	14.958	0.840	15.798
(32) Addition of Minburi D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(33) Modification of Na-na D/S	69 - 12/24 →115 - 24	1×(40)+2×60 → 3×60	142.679	33.390	176.069
(34) Addition of Nongkham D/S	69 - 24	2×60 → 3×60	14.958	0.840	15.798
(35) Addition of Nonthaburi D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727

Appendix 10.5-3 Construction Expenses for Distribution Substations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 2006 (2002~2006)					
(36) Addition of Paknam D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(37) Addition and Modification of Petchkasem D/S	69 - 24	2×22.4 → 1×60 1×40 → 1×40	20.674	3.339	24.013
(38) Addition of Phaisingto D/S	69 - 24	3×60 → 4×60	42.307	3.339	45.646
(39) Addition of Ramintra D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(40) Addition and Modification of Sansab D/S	69 - 12/24	3×40 → 2×40 1×60	14.958	0.840	15.798
(41) Addition of Sapanmai D/S	69 - 24	2×60 → 3×60	14.958	0.840	15.798
(42) Addition of South Thonburi D/S	69 - 24	2×60 → 3×60	14.958	0.840	15.798
(43) Addition of Srithanya D/S	69 - 24 →115 - 24	1×(40) → 2×60	126.792	32.550	159.342
(44) Addition and Modification of Surawong D/S	69 - 12/24	1×40 → 3×60 2×60	14.958	0.840	15.798
(45) Addition of Bangkaen D/S	115 - 12/24	1×(40) → 3×60 1×60	15.887	0.840	16.727
(46) Addition and Modification of Ekamai D/S	69 - 24 →115 - 24	1×(40) → 3×60 2×60	142.679	33.390	176.069
(47) Addition and Modification of Huamak D/S	69 - 24 →115 - 24	1×60 → 2×60	126.792	32.550	159.342
(48) Addition of Intamara D/S	69 - 24	2×60 → 3×60	14.958	0.840	15.798
(49) Addition of Jangron D/S	69 - 12/24	1×(40) → 2×60	87.881	32.550	120.431
(50) Addition of Sanambinnam D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(51) Addition of Saorahong D/S	115 - 24	1×60 → 2×60	103.411	32.550	135.961
(52) Addition of Yenarkart D/S	69 - 24	2×60 → 3×60	14.958	0.840	15.798

Appendix 10.5-3 Construction Expenses for Distribution Substations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 2006 (2002~2006)					
(53) Addition of Bangjak D/S	115 - 24	1×(40) → 3×60 1×60	15.887	0.840	16.727
(54) Addition and Modification of Ghoaklang D/S	69 - 24 →115 - 24	2×60 → 3×60	142.679	33.390	176.069
(55) Addition of Jangwatana D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(56) Addition of Mitr-udom D/S	69 - 12/24	1×40 → 2×60	110.334	32.550	142.884
(57) Addition of Nanglerng D/S	69 - 12	2×40 → 3×40	11.242	0.840	12.082
(58) Addition of Patanakarn D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(59) Addition of Trokchan D/S	115 - 12/24	2×(40) → 3×60	15.887	0.840	16.727
1.2 Acquisition of Land			—	777.392	777.392
Sub-total			4,111.602	1,759.079	5,870.681
2. Indirect Cost					
- Engineering & Supervision			—	410.948	410.948
- Contingency			411.160	175.908	587.068
- Import Duty	—	—	—	401.177	401.177
- VAT			—	439.030	439.030
Sub-total			411.160	1,427.063	1,838.223
Total			4,522.762	3,186.142	7,708.904

Appendix 10.5-3 Construction Expenses for Distribution Substations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 2011 (2007~2011)					
1. Direct Cost					
1.1 Material & Construction Costs					
(1) Construction of Bangbuotong D/S	115 - 24	3×60	142.679	33.390	176.069
(2) Construction of Bangpleeyai D/S	115 - 24	2×60	126.792	32.550	159.342
(3) Construction of Klongbangpi D/S	115 - 24	3×60	142.679	33.390	176.069
(4) Construction of Klongpume D/S	115 - 24	2×60	126.792	32.550	159.342
(5) Construction of Krungtepkreeta D/S	115 - 24	3×60	142.679	33.390	176.069
(6) Construction of Tonglor D/S	115 - 24	2×60	126.792	32.550	159.342
(7) Construction of Tungkru D/S	115 - 24	2×60	126.792	32.550	159.342
(8) Construction of Luangpang D/S	115 - 24	2×60	126.792	32.550	159.342
(9) Construction of Nimitmai D/S	115 - 24	2×60	126.792	32.550	159.342
(10) Construction of Nongyai D/S	115 - 24	2×60	126.792	32.550	159.342
(11) Construction of Pinklao D/S	115 - 24	3×60	142.679	33.390	176.069
(12) Construction of Rajchakru D/S	115 - 24	2×60	126.792	32.550	159.342
(13) Construction of Satorntai D/S	115 - 24	3×60	142.679	33.390	176.069
(14) Construction of Tiamruammit D/S	115 - 24	2×60	126.792	32.550	159.342
(15) Construction of Trimit D/S	69 - 12	3×40	99.294	32.550	131.844
(16) Addition of Bangkrachao D/S	69 - 24	1×60 → 2×60	87.881	32.550	120.431
(17) Addition of Bangping D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(18) Addition of Bangsaotong D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(19) Addition of Klongmai D/S	69 - 24	2×60 → 3×60	14.958	0.840	15.798

Appendix 10.5-3 Construction Expenses for Distribution Substations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 2011 (2007~2011)					
(20) Addition and Modification of Klongsarn D/S	69 - 24	2×40 → 2×60	92.113	32.550	124.663
(21) Addition and Modification of Klongtoei D/S	69 - 24	2×40 → 3×60	105.749	32.550	138.299
(22) Addition of Klongwatsing D/S	69 - 24	2×60 → 3×60	14.958	0.840	15.798
(23) Addition of Krunai D/S	69 - 24	2×60 → 3×60	14.958	0.840	15.798
(24) Addition of Modification of Mai-ad D/S	69 - 24	2×40 → 1×40 1×60	14.958	0.840	15.798
(25) Addition of Prachachuen D/S	69 - 24	1×40 → 1×40 1×60 2×60	14.958	0.840	15.798
(26) Addition of Romklao D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(27) Addition of Srithanya D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(28) Addition of Suansom D/S	69 - 24	2×60 → 3×60	14.958	0.840	15.798
(29) Addition of Thanontok D/S	69 - 24	2×60 → 3×60	14.958	0.840	15.798
(30) Addition of Bearing D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(31) Addition of Jangrom D/S	69 - 24	2×60 → 3×60	14.958	0.840	15.798
(32) Addition of Klongmahasawad D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(33) Addition of Lardkrabang D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(34) Addition of Nonsee D/S	69 - 24	2×60 → 3×60	14.958	0.840	15.798
(35) Addition of Pradipat D/S	69 - 24	2×60 → 3×60	14.958	0.840	15.798
(36) Addition of Tungsonghong D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(37) Addition of Bangkradee D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(38) Addition of Bangshan D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(39) Addition of Dindaeng	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(40) Addition of Ekachai D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727

Appendix 10.5-3 Construction Expenses for Distribution Substations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 2011 (2007~2011)					
(41) Addition and Modification of Jatujag D/S	69 - 12/24 →115 - 24	2×60 → 3×60	142.679	33.390	176.069
(42) Addition of Kaset D/S	69 - 24	2×60 → 3×60	14.958	0.840	15.798
(43) Addition of Klongkum D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(44) Addition of Klongprapa D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(45) Addition of Mitr-dum D/S	69 - 24	2×60 → 3×60	14.958	0.840	15.798
(46) Addition of Prompong D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(47) Addition of Samyarn D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(48) Addition of Satorn D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(49) Addition of Shimplee D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(50) Addition of Watkampaeng D/S	69 - 24	2×60 → 3×60	14.958	0.840	15.798
(51) Addition of Asoke D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(52) Addition of Banghuasae D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(53) Addition of Land & House D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
2.1 Acquisition of Land			—	832.920	832.920
Sub-total			2,910.320	1,484.970	4,395.290
2. Indirect Cost					
- Engineering & Supervision			—	307.670	307.670
- Contingency			291.032	148.497	439.529
- Import Duty	—	—	—	288.504	288.504
- VAT			—	327.865	327.865
Sub-total			291.032	1,072.536	1,363.568
Total			3,201.352	2,557.506	5,758.858

Appendix 10.5-3 Construction Expenses for Distribution Substations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 2016 (2012~2016)					
1. Direct Cost					
1.1 Material & Construction Costs					
(1) Construction of Bangkruay D/S	115 - 24	2×60	126.792	32.550	159.342
(2) Construction of Bangpang D/S	115 - 24	2×60	126.792	32.550	159.342
(3) Construction of Bangpla D/S	115 - 24	2×60	126.792	32.550	159.342
(4) Construction of Klongdan D/S	115 - 24	2×60	126.792	32.550	159.342
(5) Construction of Klonggratiam D/S	115 - 24	3×60	142.679	33.390	176.069
(6) Construction of Lumpagshe D/S	115 - 24	3×60	142.679	33.390	176.069
(7) Construction of Pongpetch D/S	115 - 24	2×60	126.792	32.550	159.342
(8) Construction of Puttamonton D/S	115 - 24	2×60	126.792	32.550	159.342
(9) Construction of Rajdamri D/S	115 - 24	2×60	126.792	32.550	159.342
(10) Construction of Talingchan D/S	115 - 24	2×60	126.792	32.550	159.342
(11) Addition of Bangklo D/S	69 - 24	2×40 → 1×40 1×60	14.958	0.840	15.798
(12) Addition and Modification of Bangna D/S	69 - 24	2×40 → 1×40 1×60	14.958	0.840	15.798
(13) Addition of Klongsanamchai D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(14) Addition and Modification of Klongsanpasamit D/S	69 - 24	1×40 → 2×60 1×60	14.958	0.840	15.798
(15) Addition of Lardplakao D/S	69 - 24	1×60 → 2×60	87.881	32.550	120.431
(16) Addition and Modification of Mai-ad D/S	69 - 24	1×40 → 2×60 1×60	14.958	0.840	15.798

Appendix 10.5-3 Construction Expenses for Distribution Substations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 2016 (2012～2016)					
(17) Addition and Modification of Petchkasem D/S	69 - 24	1×40 → 2×60 1×60	14.958	0.840	15.798
(18) Addition and Modification of Poojao D/S	69 - 24	3×40 → 2×40 1×60	14.958	0.840	15.798
(19) Addition and Modification of Prakanong D/S	69 - 24	2×40 → 2×60	105.749	32.550	138.299
(20) Addition and Modification of Sailom D/S	69 - 24	2×40 → 1×40 1×60	14.958	0.840	15.798
(21) Addition and Modification of Samsen D/S	69 - 24	3×40 → 2×40 1×60	14.958	0.840	15.798
(22) Addition and Modification of Sansab D/S	69 - 24	2×40 → 1×40 1×60 2×60	14.958	0.840	15.798
(23) Addition and Modification of Silom	69 - 24	2×40 → 1×40 1×60	14.958	0.840	15.798
(24) Addition of Wetlieb D/S	69 - 12	3×40 → 4×40	40.707	3.360	44.067
(25) Addition of Bangson D/S	69 - 24	2×60 → 3×60	14.958	0.840	15.798
(26) Addition of Ekburi D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(27) Addition of Huamak D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(28) Addition of Muangthong 3 D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(29) Addition of Banmai D/S	69 - 24	2×60 → 3×60	14.958	0.840	15.798
(30) Addition of Muangthong 4 D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(31) Addition of Muangthong 7 D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(32) Addition of Nanglerng D/S	69 - 12	3×40 → 4×40	40.707	3.360	44.067
(33) Addition of Prawes D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727

Appendix 10.5-3 Construction Expenses for Distribution Substations

FY 1995 Price

Description	Voltage (kV)	Capacity (MVA)	Construction Expenses (Million Baht)		
			FC	LC	Total
Completed in FY 2016 (2012~2016)					
(34) Addition of Tubyao D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(35) Addition of Klongpume D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(36) Addition of Sananikom D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(37) Addition of Srinakarin D/S	115 - 24	2×60 → 3×60	15.887	0.840	16.727
(38) Addition of Watdeedod D/S	69 - 24	2×60 → 3×60	14.958	0.840	15.798
1.2 Acquisition of Land			—	555.280	555.280
Sub-total			1,943.949	974.440	2,918.389
2. Indirect Cost					
- Engineering & Supervision			—	204.287	204.287
- Contingency			194.395	97.444	291.839
- Import Duty			—	191.928	191.928
- VAT			—	217.722	217.722
Sub-total			194.395	711.381	905.776
Total			2,138.344	1,685.821	3,824.165

APPENDIX

for

CHAPTER 11

Appendix 11.3-1 Estimation for Energy Purchase and Energy Sales

FY	MEA Forecast							JICA Forecast			Energy Saving
	Energy Purchase	Energy Sales	Street Lighting Consumption		Energy Sales Exclude Street Lighting		Energy Loss	Energy Purchase	Energy Sales	Energy Loss	
	A	B	C	C/B	D	D/B	1-B/A	E	B	1-B/A	E-A
	GWh	GWh	GWh	%	GWh	%	%	GWh	GWh	%	GWh
1990	18,623	17,725	84	0.47%	17,641	99.53%	4.82%	18,623	17,725	4.82%	
1991	20,777	19,851	99	0.50%	19,761	99.55%	4.46%	20,777	19,851	4.46%	
1992	22,946	21,968	99	0.45%	21,869	99.55%	4.26%	22,946	21,968	4.26%	
1993	24,873	23,849	106	0.44%	23,743	99.56%	4.12%	24,873	23,849	4.12%	
1994	27,525	26,370	115	0.44%	26,255	99.56%	4.20%	27,525	26,370	4.20%	
1995	30,387	28,959	126	0.44%	28,833	99.56%	4.70%	30,387	28,959	4.70%	
1996	33,226	31,664	138	0.44%	31,526	99.56%	4.70%	33,226	31,664	4.70%	
1997	35,881	34,194	149	0.44%	34,045	99.56%	4.70%	35,881	34,194	4.83%	
1998	38,632	36,817	161	0.44%	36,656	99.56%	4.70%	38,577	36,817	4.56%	-55
1999	41,573	39,619	173	0.44%	39,446	99.56%	4.70%	41,488	39,619	4.50%	-85
2000	44,644	42,546	186	0.44%	42,360	99.56%	4.70%	44,525	42,546	4.44%	-119
2001	48,085	45,825	200	0.44%	45,625	99.56%	4.70%	47,980	45,825	4.49%	-105
2002	51,085	48,684	212	0.44%	48,472	99.56%	4.70%	50,974	48,684	4.49%	-111
2003	54,009	51,471	224	0.44%	51,247	99.56%	4.70%	53,892	51,471	4.49%	-117
2004	57,066	54,384	237	0.44%	54,147	99.56%	4.70%	56,942	54,384	4.49%	-124
2005	60,181	57,353	250	0.44%	57,103	99.56%	4.70%	60,051	57,353	4.49%	-130
2006	63,345	60,367	263	0.44%	60,104	99.56%	4.70%	63,202	60,367	4.49%	-143
2007	66,549	63,421	277	0.44%	63,144	99.56%	4.70%	66,399	63,421	4.49%	-150
2008	69,794	66,514	290	0.44%	66,224	99.56%	4.70%	69,637	66,514	4.49%	-157
2009	73,080	69,646	304	0.44%	69,342	99.56%	4.70%	72,916	69,646	4.49%	-164
2010	76,407	72,816	318	0.44%	72,498	99.56%	4.70%	76,235	72,816	4.49%	-172
2011	79,775	76,026	332	0.44%	75,694	99.56%	4.70%	79,607	76,026	4.50%	-168
2012	82,587	78,705	343	0.44%	78,362	99.56%	4.70%	82,412	78,705	4.50%	-175
2013	85,398	81,385	355	0.44%	81,030	99.56%	4.70%	85,218	81,385	4.50%	-180
2014	88,210	84,064	367	0.44%	83,697	99.56%	4.70%	88,024	84,064	4.50%	-186
2015	91,021	86,743	378	0.44%	86,365	99.56%	4.70%	90,829	86,743	4.50%	-192
2016	93,833	89,423	390	0.44%	89,033	99.56%	4.70%	93,665	89,423	4.53%	-168

Appendix 11.3-2 Incremental Electric Energy Purchase and Sales in MEA Area, which will become available by this Project

(GWh)

FY	Energy Purchase			Energy Sales, Including Street Lighting			Energy Sales, Excluding Street Lighting		
	Electric Energy	FY 1997 Forecast	Incremental Electric Energy	Electric Energy	FY 1997 Forecast	Incremental Electric Energy	Electric Energy	FY 1997 Forecast	Incremental Electric Energy
1998	38,577	35,881	2,696	36,817	34,194	2,623	36,656	34,045	2,612
1999	41,488	35,881	5,607	39,619	34,194	5,425	39,446	34,045	5,401
2000	44,525	35,881	8,644	42,546	34,194	8,352	42,360	34,045	8,316
2001	47,980	35,881	12,099	45,825	34,194	11,631	45,625	34,045	11,580
2002	50,974	35,881	15,093	48,684	34,194	14,490	48,472	34,045	14,427
2003	53,892	35,881	18,011	51,471	34,194	17,277	51,247	34,045	17,202
2004	56,942	35,881	21,061	54,384	34,194	20,190	54,147	34,045	20,102
2005	60,051	35,881	24,170	57,353	34,194	23,159	57,103	34,045	23,058
2006	63,202	35,881	27,321	60,367	34,194	26,173	60,104	34,045	26,059
2007	66,399	35,881	30,518	63,421	34,194	29,227	63,144	34,045	29,100
2008	69,637	35,881	33,756	66,514	34,194	32,320	66,224	34,045	32,179
2009	72,916	35,881	37,035	69,646	34,194	35,452	69,342	34,045	35,297
2010	76,235	35,881	40,354	72,816	34,194	38,622	72,498	34,045	38,454
2011	79,607	35,881	43,726	76,026	34,194	41,832	75,694	34,045	41,650
2012	82,412	35,881	46,531	78,705	34,194	44,511	78,362	34,045	44,317
2013	85,218	35,881	49,337	81,385	34,194	47,191	81,030	34,045	46,985
2014	88,024	35,881	52,143	84,064	34,194	49,870	83,697	34,045	49,653
2015	90,829	35,881	54,948	86,743	34,194	52,549	86,365	34,045	52,320
2016	93,665	35,881	57,784	89,423	34,194	55,229	89,033	34,045	54,988
2017	93,665	35,881	57,784	89,423	34,194	55,229	89,033	34,045	54,988
2018	93,665	35,881	57,784	89,423	34,194	55,229	89,033	34,045	54,988
2019	93,665	35,881	57,784	89,423	34,194	55,229	89,033	34,045	54,988
2020	93,665	35,881	57,784	89,423	34,194	55,229	89,033	34,045	54,988
2021	93,665	35,881	57,784	89,423	34,194	55,229	89,033	34,045	54,988
2022	93,665	35,881	57,784	89,423	34,194	55,229	89,033	34,045	54,988
2023	93,665	35,881	57,784	89,423	34,194	55,229	89,033	34,045	54,988
2024	93,665	35,881	57,784	89,423	34,194	55,229	89,033	34,045	54,988
2025	93,665	35,881	57,784	89,423	34,194	55,229	89,033	34,045	54,988
2026	93,665	35,881	57,784	89,423	34,194	55,229	89,033	34,045	54,988
2027	93,665	35,881	57,784	89,423	34,194	55,229	89,033	34,045	54,988
2028	93,665	35,881	57,784	89,423	34,194	55,229	89,033	34,045	54,988
2029	93,665	35,881	57,784	89,423	34,194	55,229	89,033	34,045	54,988
Total	2,480,214	1,148,192	1,332,022	2,368,308	1,094,208	1,274,100	2,357,980	1,089,436	1,268,544

Appendix 11.3-3 Total Energy Losses

FY	Subtransmission MW Loss			Subtransmission GWh Loss					Total Energy Losses	
	Terminal Station (Transformer) A MW	Distribution Substation (Power Load) B, MW	Subtransmission Loss C=A-B MW	Load D=Ax8760x0.65 GWh	Loss E=Cx8760x0.50 GWh	Loss Ratio F=E/D %	1996 MEA Forecast Loss Ratio G	Decrement Percent Compare with 1996 MEA Forecast, H=F-G	MEA Forecast I, %	JICA Forecast J=H+I, %
1996							0.51%		4.70%	
1997	6,331.4	6,279.0	52.4	36,051.0	229.5	0.64%		0.13%	4.70%	4.83%
1998	6,807.0	6,774.1	32.9	38,759.1	144.1	0.37%		-0.14%	4.70%	4.56%
1999	7,364.0	7,333.9	30.1	41,930.6	131.8	0.31%		-0.20%	4.70%	4.50%
2000	7,814.1	7,788.2	25.9	44,493.5	113.4	0.25%		-0.26%	4.70%	4.44%
2001	8,396.0	8,363.0	33.0	47,806.8	144.5	0.30%		-0.21%	4.70%	4.49%
2002								-0.21%	4.70%	4.49%
2003								-0.21%	4.70%	4.49%
2004								-0.21%	4.70%	4.49%
2005								-0.21%	4.70%	4.49%
2006	10,890.7	10,848.9	41.8	62,011.6	183.1	0.30%		-0.21%	4.70%	4.49%
2007								-0.21%	4.70%	4.49%
2008								-0.21%	4.70%	4.49%
2009								-0.21%	4.70%	4.49%
2010								-0.21%	4.70%	4.49%
2011	13,675.2	13,620.4	54.8	77,866.6	240.0	0.31%		-0.20%	4.70%	4.50%
2012								-0.20%	4.70%	4.50%
2013								-0.20%	4.70%	4.50%
2014								-0.20%	4.70%	4.50%
2015								-0.20%	4.70%	4.50%
2016	16,062.9	15,992.2	70.7	91,462.2	309.7	0.34%		-0.17%	4.70%	4.53%

Load Factor : 0.65
Loss Factor : 0.50

Appendix 11.4-1 Construction Cost for Economic Analysis

(1,000 US$)

FY	Subtransmission Line				Distribution Substation				Telecommunication				Distribution Facilities				Total
	Construction Cost for A	Value Added Tax B	Import Duty C	Construction Cost for for Analysis D=A-(B+C)	Construction Cost for E	Value Added Tax F	Import Duty G	Construction Cost for for Analysis H=E-(F+G)	Construction Cost for I	Value Added Tax J	Import Duty K	Construction Cost for for Analysis L=I-(J+K)	Construction Cost for M	Value Added Tax N	Import Duty O	Construction Cost for for Analysis P=M-(N+O)	Construction Cost for Analysis Q=H+L+P
1996					57,248	3,259	2,799	51,191	0	0	0	0	38,345	2,183	1,875	34,288	85,478
1997	28,048	1,597	1,391	25,060	125,444	7,142	6,237	112,066	2,948	173	687	2,087	104,784	5,969	5,569	93,245	232,459
1998	23,690	1,347	964	21,379	90,468	5,152	4,698	80,618	2,433	143	568	1,722	78,092	4,448	4,173	69,471	173,190
1999	39,904	2,272	1,979	35,653	102,597	5,838	4,884	91,875	2,059	121	478	1,460	96,827	5,513	4,917	86,396	215,384
2000	116,044	6,616	6,786	102,642	152,766	8,692	7,148	136,925	3,088	181	717	2,190	182,118	10,375	9,814	161,929	403,686
2001	13,655	778	750	12,127	103,299	5,882	5,268	92,149	2,948	173	687	2,087	80,310	4,577	4,491	71,242	177,606
2002	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	156,370	8,901	7,684	139,785	0	0	0	0	104,737	5,962	5,147	93,628	233,413
2006	330,478	18,839	19,023	292,616	234,556	13,352	11,526	209,678	6,784	398	1,584	4,802	383,004	21,828	21,523	339,653	846,748
2007	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	107,226	6,103	5,221	95,902	0	0	0	0	71,820	4,088	3,497	64,235	160,137
2011	53,935	3,071	2,719	48,145	160,838	9,155	7,830	143,853	3,861	227	896	2,738	146,441	8,340	7,666	130,434	325,169
2012	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2015	0	0	0	0	90,341	5,141	4,233	80,967	0	0	0	0	60,511	3,443	2,835	54,232	135,199
2016	82,344	4,895	4,821	72,828	135,512	7,710	6,350	121,451	3,064	180	717	2,167	147,972	8,429	7,963	131,580	328,026
Total	688,097	39,213	38,435	610,449	1,516,665	86,327	73,878	1,356,460	27,184	1,595	6,335	19,254	1,494,960	85,156	79,471	1,330,333	3,316,495

Appendix 11.4-2 Operation and Maintenance Cost

(1,000 US$)

FY	Subtransmission Line		Distribution Substation		Telecommunication		Distribution Facilities		Total
	Construction Cost without VAT and Import Duty	Operation and Maintenance Cost 3.00%	Construction Cost without VAT and Import Duty	Operation and Maintenance Cost 4.00%	Construction Cost without VAT and Import Duty	Operation and Maintenance Cost 4.00%	Construction Cost without VAT and Import Duty	Operation and Maintenance Cost 4.00%	Operation and Maintenance Cost
1996	0	0	51,191	0	0	0	34,288	0	0
1997	25,060	0	112,066	0	2,087	0	93,245	0	0
1998	21,379	752	80,618	5,119	1,722	83	69,471	4,156	10,110
1999	35,653	1,393	91,875	8,647	1,460	152	86,396	7,138	17,331
2000	102,642	2,463	136,925	11,417	2,190	211	161,929	9,988	24,078
2001	12,127	5,542	92,149	16,450	2,087	298	71,242	16,167	38,457
2002	0	5,906	0	22,593	0	382	0	20,663	49,544
2003	0	5,906	0	22,593	0	382	0	20,663	49,544
2004	0	5,906	0	22,593	0	382	0	20,663	49,544
2005	0	5,906	139,785	22,593	0	382	93,628	20,663	49,544
2006	292,616	5,906	209,678	22,593	4,802	382	339,653	20,663	49,544
2007	0	14,684	0	36,571	0	574	0	37,994	89,824
2008	0	14,684	0	36,571	0	574	0	37,994	89,824
2009	0	14,684	0	36,571	0	574	0	37,994	89,824
2010	0	14,684	95,902	36,571	0	574	64,235	37,994	89,824
2011	48,145	14,684	143,853	36,571	2,738	574	130,434	37,994	89,824
2012	0	16,129	0	46,162	0	683	0	45,781	108,755
2013	0	16,129	0	46,162	0	683	0	45,781	108,755
2014	0	16,129	0	46,162	0	683	0	45,781	108,755
2015	0	16,129	80,967	46,162	0	683	54,232	45,781	108,755
2016	72,828	16,129	121,451	46,162	2,167	683	131,580	45,781	108,755
2017		18,313		54,258		770		53,213	126,555
2018		18,313		54,258		770		53,213	126,555
2019		18,313		54,258		770		53,213	126,555
2020		18,313		54,258		770		53,213	126,555
2021		18,313		54,258		770		53,213	126,555
2022		18,313		54,258		770		53,213	126,555
2023		18,313		54,258		770		53,213	126,555
2024		18,313		54,258		770		53,213	126,555
2025		18,313		54,258		770		53,213	126,555
2026		18,313		54,258		770		53,213	126,555
2027		18,313		54,258		770		53,213	126,555
2028		18,313		54,258		770		53,213	126,555
2029		18,313		54,258		770		53,213	126,555
Total	610,449	431,819	1,356,460	1,273,622	19,254	18,953	1,330,333	1,251,412	2,975,806

Appendix 11.4-3 MEA's Average Energy Purchase and Sales Price

No.	FY	Energy Purchase Price, per kWh Purchase			Energy Sales Price, per kWh Sales		
		Actual Average Purchase Price (Baht/kWh)	Constant 1995 Price (Baht/kWh)	Estimation Purchase Price (Baht/kWh)	Actual Average Sales Price (Baht/kWh)	Constant 1995 Price (Baht/kWh)	Estimation Sales Price (Baht/kWh)
	1990				1.7905		
	1991				1.8039		
	1992	1.4426			1.7510		
	1993	1.4637			1.7766		
	1994	1.4460			1.7720		
	1995	1.3893	1.3893	1.3893	1.7444	1.7444	1.7444
1	1996		1.3893	1.4588		1.7444	1.8316
2	1997		1.3893	1.5317		1.7444	1.9232
3	1998		1.3893	1.6083		1.7444	2.0194
4	1999		1.3893	1.6887		1.7444	2.1203
5	2000		1.3893	1.7731		1.7444	2.2263
6	2001		1.3893	1.8618		1.7444	2.3377
7	2002		1.3893	1.9549		1.7444	2.4545
8	2003		1.3893	2.0526		1.7444	2.5773
9	2004		1.3893	2.1553		1.7444	2.7061
10	2005		1.3893	2.2630		1.7444	2.8414
11	2006		1.3893	2.3762		1.7444	2.9835
12	2007		1.3893	2.4950		1.7444	3.1327
13	2008		1.3893	2.6197		1.7444	3.2893
14	2009		1.3893	2.7507		1.7444	3.4538
15	2010		1.3893	2.8883		1.7444	3.6265
16	2011		1.3893	3.0327		1.7444	3.8078
17	2012		1.3893	3.1843		1.7444	3.9982
18	2013		1.3893	3.3435		1.7444	4.1981
19	2014		1.3893	3.5107		1.7444	4.4080
20	2015		1.3893	3.6862		1.7444	4.6284
21	2016		1.3893	3.8705		1.7444	4.8598
22	2017		1.3893	4.0641		1.7444	5.1028
23	2018		1.3893	4.2673		1.7444	5.3580
24	2019		1.3893	4.4806		1.7444	5.6259
25	2020		1.3893	4.7047		1.7444	5.9072
26	2021		1.3893	4.9399		1.7444	6.2025
27	2022		1.3893	5.1869		1.7444	6.5126
28	2023		1.3893	5.4462		1.7444	6.8383
29	2024		1.3893	5.7185		1.7444	7.1802
30	2025		1.3893	6.0045		1.7444	7.5392
31	2026		1.3893	6.3047		1.7444	7.9162
32	2027		1.3893	6.6199		1.7444	8.3120
33	2028		1.3893	6.9509		1.7444	8.7276
34	2029		1.3893	7.2985		1.7444	9.1639

Escalation : 5.00%

Appendix 11.4-4 Energy Purchase, Sales and Environmental Pollution Prevention Cost

FY	Energy Purchase				Energy sales				Environmental Pollution Prevention Cost				Benefit
	Incremental Energy A	Purchase Price of MEA B	Purchase Baht C=AxB	Purchase Dollar	Incremental Energy without Street Lighting D	Sales Price of MEA E	Sales Baht F=DxE	Sales Dollar G	Energy Saving H	De-SOx & De-NOx Operation Cost I	Benefit Baht J=Hxd	Benefit Dollar K	Total Dollar G+K
	GWh	Baht/kWh	Million Baht	1,000 US$	GWh	Baht/kWh	Million Baht	1,000 US$	GWh	Baht/kWh	Million Baht	1,000 US$	1,000 US$
1998	2,696	1.3893	3,745.26	149,811	2,612	1.7444	4,555.61	182,224	55	0.1633	9.02	361	182,585
1999	5,607	1.3893	7,789.50	311,580	5,401	1.7444	9,422.10	376,884	85	0.1633	13.92	557	377,441
2000	8,644	1.3893	12,009.28	480,371	8,316	1.7444	14,505.69	580,228	119	0.1633	19.41	776	581,004
2001	12,099	1.3893	16,809.76	672,390	11,580	1.7444	20,200.64	808,025	105	0.1633	17.07	683	808,708
2002	15,093	1.3893	20,968.60	838,744	14,427	1.7444	25,166.13	1,006,645	111	0.1633	18.14	726	1,007,371
2003	18,011	1.3893	25,022.70	1,000,908	17,202	1.7444	30,006.57	1,200,263	117	0.1633	19.10	764	1,201,027
2004	21,061	1.3893	29,260.09	1,170,404	20,102	1.7444	35,065.84	1,402,634	124	0.1633	20.24	810	1,403,444
2005	24,170	1.3893	33,578.94	1,343,158	23,058	1.7444	40,222.38	1,608,895	130	0.1633	21.28	851	1,609,746
2006	27,321	1.3893	37,956.72	1,518,269	26,059	1.7444	45,457.07	1,818,283	143	0.1633	23.39	936	1,819,219
2007	30,518	1.3893	42,398.88	1,695,955	29,100	1.7444	50,761.24	2,030,450	150	0.1633	24.47	979	2,031,428
2008	33,756	1.3893	46,897.77	1,875,911	32,179	1.7444	56,133.14	2,245,326	157	0.1633	25.57	1,023	2,246,348
2009	37,035	1.3893	51,453.39	2,058,136	35,297	1.7444	61,572.77	2,462,911	164	0.1633	26.70	1,068	2,463,979
2010	40,354	1.3893	56,064.28	2,242,571	38,454	1.7444	67,078.41	2,683,136	172	0.1633	28.03	1,121	2,684,258
2011	43,726	1.3893	60,748.42	2,429,937	41,650	1.7444	72,653.51	2,906,140	168	0.1633	27.45	1,098	2,907,238
2012	46,531	1.3893	64,645.66	2,585,826	44,317	1.7444	77,306.38	3,092,255	175	0.1633	28.56	1,142	3,093,398
2013	49,337	1.3893	68,544.36	2,741,774	46,985	1.7444	81,960.98	3,278,439	180	0.1633	29.34	1,174	3,279,613
2014	52,143	1.3893	72,441.60	2,897,664	49,653	1.7444	86,613.85	3,464,554	186	0.1633	30.45	1,218	3,465,772
2015	54,948	1.3893	76,338.84	3,053,554	52,320	1.7444	91,266.72	3,650,669	192	0.1633	31.40	1,256	3,651,925
2016	57,784	1.3893	80,278.86	3,211,154	54,988	1.7444	95,921.32	3,836,853	168	0.1633	27.49	1,100	3,837,952
2017	57,784	1.3893	80,278.86	3,211,154	54,988	1.7444	95,921.32	3,836,853	168	0.1633	27.49	1,100	3,837,952
2018	57,784	1.3893	80,278.86	3,211,154	54,988	1.7444	95,921.32	3,836,853	168	0.1633	27.49	1,100	3,837,952
2019	57,784	1.3893	80,278.86	3,211,154	54,988	1.7444	95,921.32	3,836,853	168	0.1633	27.49	1,100	3,837,952
2020	57,784	1.3893	80,278.86	3,211,154	54,988	1.7444	95,921.32	3,836,853	168	0.1633	27.49	1,100	3,837,952
2021	57,784	1.3893	80,278.86	3,211,154	54,988	1.7444	95,921.32	3,836,853	168	0.1633	27.49	1,100	3,837,952
2022	57,784	1.3893	80,278.86	3,211,154	54,988	1.7444	95,921.32	3,836,853	168	0.1633	27.49	1,100	3,837,952
2023	57,784	1.3893	80,278.86	3,211,154	54,988	1.7444	95,921.32	3,836,853	168	0.1633	27.49	1,100	3,837,952
2024	57,784	1.3893	80,278.86	3,211,154	54,988	1.7444	95,921.32	3,836,853	168	0.1633	27.49	1,100	3,837,952
2025	57,784	1.3893	80,278.86	3,211,154	54,988	1.7444	95,921.32	3,836,853	168	0.1633	27.49	1,100	3,837,952
2026	57,784	1.3893	80,278.86	3,211,154	54,988	1.7444	95,921.32	3,836,853	168	0.1633	27.49	1,100	3,837,952
2027	57,784	1.3893	80,278.86	3,211,154	54,988	1.7444	95,921.32	3,836,853	168	0.1633	27.49	1,100	3,837,952
2028	57,784	1.3893	80,278.86	3,211,154	54,988	1.7444	95,921.32	3,836,853	168	0.1633	27.49	1,100	3,837,952
2029	57,784	1.3893	80,278.86	3,211,154	54,988	1.7444	95,921.32	3,836,853	168	0.1633	27.49	1,100	3,837,952
Total	1,332,022		1,850,578.07	74,023,123	1,268,544		2,212,847.51	88,513,900	4,889		798.39	31,935	88,545,836

US 1$ = 25.00 Baht

Control Sulfur Oxide Cost : 16.00 Stang/kWh
Control Nitrogen Oxides Cost : 0.33 Stang/kWh

Appendix 11.4-5 Benefit Flow and Cost Flow of the Project

(1,000 US$)

Discount Rate	No.	FY	Cost: Construction	Cost: O & M	Cost: Energy Purchase	Cost: Total	Cost: PV	Benefit: Total	Benefit: PV	NPV
10.00%	1	1996	85,478			85,478	77,708		0	-77,708
	2	1997	232,459			232,459	192,115		0	-192,115
	3	1998	173,190	10,110	149,811	333,111	250,271	182,585	137,179	-113,092
	4	1999	215,384	17,331	311,580	544,295	371,761	377,441	257,797	-113,964
	5	2000	403,686	24,078	480,371	908,135	563,880	581,004	360,758	-203,123
	6	2001	177,606	38,457	672,390	888,453	501,509	808,708	456,495	-45,014
	7	2002	0	49,544	838,744	888,287	455,832	1,007,371	516,940	61,108
	8	2003	0	49,544	1,000,908	1,050,452	490,043	1,201,027	560,288	70,244
	9	2004	0	49,544	1,170,404	1,219,947	517,377	1,403,444	595,197	77,820
	10	2005	233,413	49,544	1,343,158	1,626,115	626,938	1,609,746	620,627	-6,311
	11	2006	846,748	49,544	1,518,269	2,414,560	846,289	1,819,219	637,625	-208,664
	12	2007	0	89,824	1,695,955	1,785,779	569,004	2,031,428	647,276	78,271
	13	2008	0	89,824	1,875,911	1,965,735	569,403	2,246,348	650,687	81,284
	14	2009	0	89,824	2,058,136	2,147,960	565,625	2,463,979	648,843	83,218
	15	2010	160,137	89,824	2,242,571	2,492,532	596,692	2,684,258	642,590	45,898
	16	2011	325,169	89,824	2,429,937	2,844,930	619,140	2,907,238	632,700	13,560
	17	2012	0	108,755	2,585,826	2,694,581	533,108	3,093,398	612,012	78,904
	18	2013	0	108,755	2,741,774	2,850,529	512,693	3,279,613	589,867	77,175
	19	2014	0	108,755	2,897,664	3,006,419	491,573	3,465,772	566,681	75,108
	20	2015	135,199	108,755	3,053,554	3,297,507	490,153	3,651,925	542,835	52,682
	21	2016	328,026	108,755	3,211,154	3,647,935	492,948	3,837,952	518,625	25,677
	22	2017		126,555	3,211,154	3,337,710	410,024	3,837,952	471,477	61,453
	23	2018		126,555	3,211,154	3,337,710	372,749	3,837,952	428,615	55,866
	24	2019		126,555	3,211,154	3,337,710	338,863	3,837,952	389,650	50,787
	25	2020		126,555	3,211,154	3,337,710	308,057	3,837,952	354,228	46,170
	26	2021		126,555	3,211,154	3,337,710	280,052	3,837,952	322,025	41,973
	27	2022		126,555	3,211,154	3,337,710	254,593	3,837,952	292,750	38,157
	28	2023		126,555	3,211,154	3,337,710	231,448	3,837,952	266,136	34,689
	29	2024		126,555	3,211,154	3,337,710	210,407	3,837,952	241,942	31,535
	30	2025		126,555	3,211,154	3,337,710	191,279	3,837,952	219,947	28,668
	31	2026		126,555	3,211,154	3,337,710	173,890	3,837,952	199,952	26,062
	32	2027		126,555	3,211,154	3,337,710	158,082	3,837,952	181,775	23,693
	33	2028		126,555	3,211,154	3,337,710	143,711	3,837,952	165,250	21,539
	34	2029		126,555	3,211,154	3,337,710	130,646	3,837,952	150,227	19,581
		Total	3,316,495	2,975,806	74,023,123	80,315,424	13,537,865	88,545,836	13,878,998	341,133

B-C	341,133
B/C	1.025198

Appendix 11.4-6 Calculation of EIRR

(1,000 US$)

Discount Rate	No.	FY	Cost: Construction	Cost: O & M	Cost: Energy Purchase	Cost: Total	Cost: PV	Benefit: Total	Benefit: PV	NPV
12.5811%	1	1996	85,478	0		85,478	75,926		0	-75,926
	2	1997	232,459	0		232,459	183,407		0	-183,407
	3	1998	173,190	10,110	149,811	333,111	233,449	182,585	127,958	-105,491
	4	1999	215,384	17,331	311,580	544,295	338,822	377,441	234,956	-103,867
	5	2000	403,686	24,078	480,371	908,135	502,137	581,004	321,256	-180,881
	6	2001	177,606	38,457	672,390	888,453	436,356	808,708	397,190	-39,166
	7	2002	0	49,544	838,744	888,287	387,520	1,007,371	439,471	51,951
	8	2003	0	49,544	1,000,908	1,050,452	407,053	1,201,027	465,401	58,348
	9	2004	0	49,544	1,170,404	1,219,947	419,904	1,403,444	483,064	63,159
	10	2005	233,413	49,544	1,343,158	1,626,115	497,159	1,609,746	492,154	-5,004
	11	2006	846,748	49,544	1,518,269	2,414,560	655,717	1,819,219	494,041	-161,676
	12	2007	0	89,824	1,695,955	1,785,779	430,765	2,031,428	490,020	59,255
	13	2008	0	89,824	1,875,911	1,965,735	421,184	2,246,348	481,309	60,125
	14	2009	0	89,824	2,058,136	2,147,960	408,797	2,463,979	468,941	60,144
	15	2010	160,137	89,824	2,242,571	2,492,532	421,363	2,684,258	453,774	32,411
	16	2011	325,169	89,824	2,429,937	2,844,930	427,190	2,907,238	436,547	9,356
	17	2012	0	108,755	2,585,826	2,694,581	359,398	3,093,398	412,591	53,193
	18	2013	0	108,755	2,741,774	2,850,529	337,710	3,279,613	388,545	50,835
	19	2014	0	108,755	2,897,664	3,006,419	316,375	3,465,772	364,715	48,339
	20	2015	135,199	108,755	3,053,554	3,297,507	308,229	3,651,925	341,357	33,129
	21	2016	328,026	108,755	3,211,154	3,647,935	302,879	3,837,952	318,656	15,777
	22	2017		126,555	3,211,154	3,337,710	246,153	3,837,952	283,045	36,892
	23	2018		126,555	3,211,154	3,337,710	218,645	3,837,952	251,414	32,770
	24	2019		126,555	3,211,154	3,337,710	194,211	3,837,952	223,318	29,108
	25	2020		126,555	3,211,154	3,337,710	172,508	3,837,952	198,362	25,855
	26	2021		126,555	3,211,154	3,337,710	153,230	3,837,952	176,195	22,965
	27	2022		126,555	3,211,154	3,337,710	136,106	3,837,952	156,505	20,399
	28	2023		126,555	3,211,154	3,337,710	120,896	3,837,952	139,015	18,119
	29	2024		126,555	3,211,154	3,337,710	107,385	3,837,952	123,480	16,095
	30	2025		126,555	3,211,154	3,337,710	95,385	3,837,952	109,681	14,296
	31	2026		126,555	3,211,154	3,337,710	84,726	3,837,952	97,424	12,698
	32	2027		126,555	3,211,154	3,337,710	75,257	3,837,952	86,537	11,279
	33	2028		126,555	3,211,154	3,337,710	66,847	3,837,952	76,866	10,019
	34	2029		126,555	3,211,154	3,337,710	59,377	3,837,952	68,276	8,899
		Total	3,316,495	2,975,806	74,023,123	80,315,424	9,602,065	88,545,836	9,602,065	0

B-C	0
B/C	1.0000

APPENDIX

for

CHAPTER 12

Appendix 12.4-1 Construction Cost for Financial Analysis

(1,000 US$)

FY	Subtransmission Line			Distribution Substation			Telecommunication			Distribution System			Total
	Total Construction Cost A	Value Added Tax B	Construction Cost Analysis C=A-B	Total Construction Cost D	Value Added Tax E	Construction Cost Analysis F=D-E	Total Construction Cost G	Value Added Tax H	Construction Cost Analysis I=G+H	Total Construction Cost J	Value Added Tax K	Construction Cost Analysis L=J+K	Construction Cost for Analysis C+F+I+L
1996	0	0	0	57,248	3,259	53,990	0	0	0	38,345	2,183	36,162	90,152
1997	28,048	1,597	26,451	125,444	7,142	118,303	2,948	173	2,775	104,784	5,969	98,815	246,344
1998	23,690	1,347	22,343	90,468	5,152	85,316	2,433	143	2,290	78,092	4,448	73,644	183,593
1999	39,904	2,272	37,632	102,597	5,838	96,759	2,059	121	1,938	96,827	5,513	91,313	227,643
2000	116,044	6,616	109,428	152,766	8,692	144,073	3,088	181	2,907	182,118	10,375	171,743	428,151
2001	13,655	778	12,877	103,299	5,882	97,417	2,948	173	2,775	80,310	4,577	75,734	188,802
2002	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	156,370	8,901	147,469	0	0	0	104,737	5,962	98,775	246,244
2006	330,478	18,839	311,639	234,556	13,352	221,204	6,784	398	6,386	383,004	21,828	361,176	900,406
2007	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	107,226	6,103	101,122	0	0	0	71,820	4,088	67,732	168,854
2011	53,935	3,071	50,864	160,838	9,155	151,683	3,861	227	3,634	146,441	8,340	138,100	344,281
2012	0	0	0	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0	0	0	0
2015	0	0	0	90,341	5,141	85,200	0	0	0	60,511	3,443	57,067	142,268
2016	82,344	4,695	77,649	135,512	7,710	127,801	3,064	180	2,884	147,972	8,429	139,543	347,878
Total	688,097	39,213	648,884	1,516,665	86,327	1,430,338	27,184	1,595	25,589	1,494,960	85,156	1,409,804	3,514,615

Appendix 12.4-2 Calculation of FIRR

(1,000 US$)

Discount Rate	No.	FY	Cost: Construction	Cost: O & M	Cost: Energy Purchase	Cost: Total	Cost: PV	Benefit: Energy Sales	Benefit: PV	NPV
11.7922%	1	1996	90,152	0		90,152	80,642		0	-80,642
	2	1997	246,344	0		246,344	197,114		0	-197,114
	3	1998	183,593	10,110	149,811	343,514	245,873	182,224	130,428	-115,444
	4	1999	227,643	17,331	311,580	556,554	356,337	376,884	241,303	-115,035
	5	2000	428,151	24,078	480,371	932,600	534,120	580,228	332,309	-201,811
	6	2001	188,802	38,457	672,390	899,650	460,899	808,025	413,958	-46,940
	7	2002	0	49,544	838,744	888,287	407,075	1,006,645	461,314	54,240
	8	2003	0	49,544	1,000,908	1,050,452	430,611	1,200,263	492,023	61,412
	9	2004	0	49,544	1,170,404	1,219,947	447,341	1,402,634	514,330	66,989
	10	2005	246,244	49,544	1,343,158	1,638,945	537,589	1,608,895	527,733	-9,857
	11	2006	900,406	49,544	1,518,269	2,468,218	724,200	1,818,283	533,502	-190,697
	12	2007	0	89,824	1,695,955	1,785,779	468,696	2,030,450	532,912	64,216
	13	2008	0	89,824	1,875,911	1,965,735	461,506	2,245,326	527,147	65,641
	14	2009	0	89,824	2,058,136	2,147,960	451,094	2,462,911	517,237	66,143
	15	2010	168,854	89,824	2,242,571	2,501,249	469,879	2,683,136	504,048	34,169
	16	2011	344,281	89,824	2,429,937	2,864,042	481,280	2,906,140	488,354	7,074
	17	2012	0	108,755	2,585,826	2,694,581	405,040	3,092,255	464,817	59,777
	18	2013	0	108,755	2,741,774	2,850,529	383,284	3,278,439	440,821	57,537
	19	2014	0	108,755	2,897,664	3,006,419	361,604	3,464,554	416,707	55,103
	20	2015	142,268	108,755	3,053,554	3,304,576	355,540	3,650,669	392,776	37,236
	21	2016	347,878	108,755	3,211,154	3,667,786	352,992	3,836,853	369,263	16,271
	22	2017		126,555	3,211,154	3,337,710	287,342	3,836,853	330,312	42,971
	23	2018		126,555	3,211,154	3,337,710	257,032	3,836,853	295,470	38,438
	24	2019		126,555	3,211,154	3,337,710	229,919	3,836,853	264,303	34,384
	25	2020		126,555	3,211,154	3,337,710	205,667	3,836,853	236,424	30,757
	26	2021		126,555	3,211,154	3,337,710	183,972	3,836,853	211,485	27,512
	27	2022		126,555	3,211,154	3,337,710	164,567	3,836,853	189,177	24,610
	28	2023		126,555	3,211,154	3,337,710	147,208	3,836,853	169,222	22,014
	29	2024		126,555	3,211,154	3,337,710	131,680	3,836,853	151,372	19,692
	30	2025		126,555	3,211,154	3,337,710	117,790	3,836,853	135,405	17,615
	31	2026		126,555	3,211,154	3,337,710	105,365	3,836,853	121,122	15,757
	32	2027		126,555	3,211,154	3,337,710	94,251	3,836,853	108,348	14,095
	33	2028		126,555	3,211,154	3,337,710	84,309	3,836,853	96,917	12,608
	34	2029		126,555	3,211,154	3,337,710	75,416	3,836,853	86,694	11,278
		Total	3,514,615	2,975,806	74,023,123	80,513,543	10,697,232	88,513,900	10,697,232	0

B-C	0
B/C	1.0000

Appendix 12.5-1 Construction Cost divided into Foreign and Local Currency Portion

(1,000 US$)

FY	Construction Cost for Subtransmission Line				Construction Cost for Substation				Construction Cost for Telecommunication				Construction Cost for Distribution System				Total Const.Cost
	Total (a)+(b)	Foreign (a)	Local (b)	Local Vat (c)	Total (d)+(e)	Foreign (d)	Local (e)	Local Vat (f)	Total (g)+(h)	Foreign (g)	Local (h)	Local Vat (i)	Total (j)+(k)	Foreign (j)	Local (k)	Local Vat (l)	a+b+d+e g+h+j+k
1996	0	0	0	0	57,248	32,393	24,855	3,259	0	0	0	0	38,345	21,697	16,648	2,183	95,593
1997	28,048	13,558	14,490	1,597	85,872	48,590	37,283	4,868	2,948	1,722	1,226	173	78,278	42,780	35,498	4,459	195,146
	28,048				143,121				2,948				116,623				290,740
1997	0	0	0	0	39,572	24,525	15,047	2,254	0	0	0	0	26,505	16,427	10,078	1,509	66,077
1998	23,690	7,490	16,200	1,347	59,358	36,788	22,570	3,380	2,433	1,421	1,012	143	57,255	30,609	26,646	3,262	142,736
	23,690				98,930				2,433				83,760				208,813
1998	0	0	0	0	31,110	19,967	11,143	1,772	0	0	0	0	20,837	13,374	7,463	1,187	51,947
1999	39,904	19,367	20,536	2,272	46,664	29,951	16,713	2,658	2,059	1,204	855	121	59,362	33,840	25,523	3,383	147,969
	39,904				77,774				2,059				80,200				199,936
1999	0	0	0	0	55,933	33,114	22,820	3,181	0	0	0	0	37,464	22,180	15,285	2,131	93,397
2000	116,044	72,430	43,614	6,616	83,900	49,670	34,229	4,771	3,088	1,806	1,283	181	135,991	82,992	52,999	7,749	339,023
	116,044				139,833				3,088				173,455				432,420
2000	0	0	0	0	68,866	40,474	28,392	3,921	0	0	0	0	46,127	27,110	19,017	2,626	114,993
2001	13,655	7,878	5,777	778	103,299	60,711	42,588	5,882	2,948	1,722	1,226	173	80,310	47,094	33,216	4,577	200,212
	13,655				172,165				2,948				126,437				315,205
2005	0	0	0	0	156,370	96,509	59,861	8,901	0	0	0	0	104,737	64,642	40,095	5,962	261,107
2006	330,478	202,350	128,128	18,839	234,556	144,764	89,792	13,352	6,784	3,961	2,823	398	383,004	235,151	147,853	21,828	954,821
	330,478				390,926				6,784				487,741				1,215,929
2010	0	0	0	0	107,226	61,330	45,895	6,103	0	0	0	0	71,820	41,079	30,741	4,088	179,045
2011	53,935	27,335	26,600	3,071	160,838	91,996	68,842	9,155	3,861	2,257	1,603	227	146,441	81,440	65,001	8,340	365,074
	53,935				268,064				3,861				218,261				544,119
2015	0	0	0	0	90,341	53,388	36,953	5,141	0	0	0	0	60,511	35,759	24,751	3,443	150,852
2016	82,344	50,921	31,423	4,695	135,512	80,082	55,429	7,710	3,064	1,788	1,276	180	147,972	88,944	59,028	8,429	368,892
	82,344				225,853				3,064				208,483				519,744
Total	688,097	401,329	286,768	39,213	1,516,865	904,252	612,413	86,327	27,184	15,880	11,304	1,595	1,494,960	885,116	609,843	85,156	3,726,906

Appendix 12.5-2 Calculation of Interest during Construction

(1,000 US$)

FY	Construction Cost without VAT before Escalation			Construction Cost without VAT after Escalation			Interest during Construction			Financing for Construction		
	Foreign a+d+g+j	Local b-c+ e-f+h-i+k-l	Total	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Grand Total
1996	54,090	36,062	90,152	55,280	37,637	92,918	1,935	2,446	4,381	57,215	40,084	97,299
1997	106,649	77,380	184,029	111,394	84,310	195,704	7,768	10,373	18,141	119,162	94,683	213,845
			274,181			288,621			22,523			311,144
1997	40,952	21,362	62,314	42,774	23,204	65,977	1,497	1,508	3,005	44,271	24,712	68,982
1998	76,307	58,297	134,605	81,455	66,357	147,813	5,845	7,330	13,175	87,301	73,687	160,987
			196,919			213,790			16,180			229,970
1998	33,341	15,647	48,988	35,590	17,675	53,265	1,246	1,149	2,395	36,836	18,824	55,660
1999	84,362	55,195	139,557	92,034	65,399	157,433	5,712	6,549	12,261	97,746	71,948	169,694
			188,545			210,698			14,656			225,354
1999	55,293	32,793	88,086	60,322	38,917	99,239	2,111	2,530	4,641	62,433	41,447	103,880
2000	206,899	112,808	319,706	230,682	138,849	369,530	12,296	14,084	26,381	242,978	152,933	395,911
			407,792			468,769			31,022			499,791
2000	67,584	40,861	108,445	75,352	50,511	125,863	2,637	3,283	5,921	77,989	53,794	131,783
2001	117,405	71,397	188,802	133,780	91,935	225,715	9,957	12,542	22,499	143,737	104,477	248,214
			297,247			351,577			28,420			379,997
2005	161,151	85,093	246,244	200,328	129,702	330,030	7,011	8,431	15,442	207,340	138,133	345,472
2006	586,226	314,180	900,406	744,774	497,341	1,242,115	40,090	49,188	89,278	784,864	546,529	1,331,393
			1,146,650			1,572,145			104,721			1,676,866
2010	102,410	66,445	168,854	141,940	127,577	269,517	4,968	8,292	13,260	146,908	135,869	282,777
2011	203,027	141,254	344,281	287,587	283,791	571,378	20,001	35,031	55,033	307,588	318,823	626,411
			513,136			840,895			68,293			909,188
2015	89,147	53,120	142,268	137,761	126,827	264,588	4,822	8,244	13,065	142,583	135,070	277,653
2016	221,735	126,142	347,878	350,190	310,447	660,637	21,900	36,667	58,566	372,090	347,114	719,203
			490,145			925,225			71,632			996,857
Total	2,206,578	1,308,036	3,514,615	2,781,243	2,090,478	4,871,721	149,798	207,647	357,445	2,931,041	2,298,125	5,229,166

Escalation
Foreign Currency Portion 2.2%
Local Currency Portion 5.0%

Interest Rate
Foreign Currency Portion 7.0%
Local Currency Portion 13.0%

Appendix 12.5-3 Operation and Maintenance Cost

(1,000 US$)

FY	Subtransmission Line				Distribution Substation				Telecommunication				Distribution Facilities				Total
	Construction Cost			Operation and Maintenance Cost	Construction Cost			Operation and Maintenance Cost	Construction Cost			Operation and Maintenance Cost	Construction Cost			Operation and Maintenance Cost	Operation and Maintenance Cost
	without VAT and Import Duty	Escalation	Total		without VAT and Import Duty	Escalation	Total		without VAT and Import Duty	Escalation	Total		without VAT and Import Duty	Escalation	Total		
1996	0	0	0	0	51,191	1,595	52,786	0	0	0	0	0	34,288	1,068	35,356	0	0
1997	25,060	1,732	26,792	0	112,066	6,975	119,041	0	2,087	108	2,195	0	93,245	5,904	99,150	0	0
1998	21,379	2,652	24,030	804	80,618	7,265	87,883	5,378	1,722	135	1,857	88	69,471	6,733	76,204	4,379	10,648
1999	35,653	5,118	40,771	1,551	91,875	11,444	103,319	9,361	1,460	155	1,615	165	86,396	11,197	97,593	7,766	18,843
2000	102,642	15,929	118,571	2,826	136,925	22,361	159,286	12,739	2,190	295	2,485	234	161,929	25,845	187,774	11,213	27,012
2001	12,127	2,443	14,570	6,477	92,149	18,385	110,534	18,946	2,087	342	2,430	340	71,242	14,180	85,422	18,703	44,466
2002	0	0	0	7,130	0	0	0	26,854	0	0	0	446	0	0	0	24,654	59,085
2003	0	0	0	7,367	0	0	0	27,745	0	0	0	459	0	0	0	25,472	61,042
2004	0	0	0	7,611	0	0	0	28,666	0	0	0	471	0	0	0	26,316	63,065
2005	0	0	0	7,865	139,785	48,309	188,094	29,617	0	0	0	485	93,628	32,357	125,986	27,189	65,155
2006	292,616	113,182	405,797	8,126	209,678	81,211	290,889	30,600	4,802	1,557	6,359	498	339,653	131,248	470,900	28,090	67,314
2007	0	0	0	20,570	0	0	0	50,775	0	0	0	766	0	0	0	52,897	125,008
2008	0	0	0	21,254	0	0	0	52,460	0	0	0	788	0	0	0	54,650	129,151
2009	0	0	0	21,960	0	0	0	54,200	0	0	0	810	0	0	0	56,462	133,432
2010	0	0	0	22,690	95,902	58,269	154,171	55,999	0	0	0	832	64,235	39,029	103,264	58,334	137,855
2011	48,145	34,667	82,812	23,445	143,853	95,169	239,022	57,857	2,738	1,399	4,136	855	130,434	87,901	218,335	60,268	142,425
2012	0	0	0	26,708	0	0	0	75,504	0	0	0	1,044	0	0	0	75,130	178,387
2013	0	0	0	27,596	0	0	0	78,010	0	0	0	1,074	0	0	0	77,621	184,300
2014	0	0	0	28,514	0	0	0	80,598	0	0	0	1,103	0	0	0	80,194	190,409
2015	0	0	0	29,461	80,967	70,946	151,913	83,273	0	0	0	1,134	54,232	47,520	101,752	82,853	196,721
2016	72,828	64,715	137,543	30,441	121,451	114,127	235,578	86,036	2,167	1,575	3,742	1,166	131,580	120,843	252,423	85,599	203,242
2017				35,579				104,390				1,348				102,604	243,922
2018				36,762				107,854				1,385				106,006	252,007
2019				37,984				111,433				1,424				109,520	260,361
2020				39,247				115,131				1,463				113,151	268,992
2021				40,551				118,951				1,504				116,902	277,909
2022				41,899				122,898				1,546				120,778	287,121
2023				43,292				126,976				1,589				124,782	296,639
2024				44,731				131,189				1,633				128,919	306,473
2025				46,218				135,542				1,679				133,193	316,632
2026				47,755				140,040				1,725				137,609	327,129
2027				49,342				144,687				1,773				142,171	337,973
2028				50,982				149,488				1,823				146,884	349,177
2029				52,677				154,448				1,873				151,754	360,753
Total	610,449	240,437	850,886	869,416	1,356,460	536,056	1,892,515	2,527,646	19,254	5,567	24,820	33,523	1,330,333	523,824	1,854,158	2,492,063	5,922,648

Appendix 12.5-4 Energy Purchase and Sales

FY	Energy Purchase				Energy sales			
	Incremental Energy A	Purchase Price of MEA B	Purchase Baht C=AxB	Purchase Dollar	Incremental Energy without Street Lighting D	Sales Price of MEA E	Sales Baht F=DxE	Sales Dollar
	GWh	Baht/kWh	Million Baht	1,000 US$	GWh	Baht/kWh	Million Baht	1,000 US$
1998	2,696	1.6083	4,335.61	173,424	2,612	2.0194	5,273.68	210,947
1999	5,607	1.6887	9,468.19	378,728	5,401	2.1203	11,452.62	458,105
2000	8,644	1.7731	15,327.23	613,089	8,316	2.2263	18,513.35	740,534
2001	12,099	1.8618	22,526.69	901,067	11,580	2.3377	27,070.78	1,082,831
2002	15,093	1.9549	29,504.92	1,180,197	14,427	2.4545	35,411.27	1,416,451
2003	18,011	2.0526	36,969.93	1,478,797	17,202	2.5773	44,333.37	1,773,335
2004	21,061	2.1553	45,392.00	1,815,680	20,102	2.7061	54,398.63	2,175,945
2005	24,170	2.2630	54,696.55	2,187,862	23,058	2.8414	65,518.02	2,620,721
2006	27,321	2.3762	64,918.87	2,596,755	26,059	2.9835	77,747.02	3,109,881
2007	30,518	2.4950	76,142.30	3,045,692	29,100	3.1327	91,159.89	3,646,396
2008	33,756	2.6197	88,432.75	3,537,310	32,179	3.2893	105,847.40	4,233,896
2009	37,035	2.7507	101,874.20	4,074,968	35,297	3.4538	121,909.88	4,876,395
2010	40,354	2.8883	116,553.62	4,662,145	38,454	3.6265	139,451.19	5,578,047
2011	43,726	3.0327	132,606.18	5,304,247	41,650	3.8078	158,593.50	6,343,740
2012	46,531	3.1843	148,169.04	5,926,762	44,317	3.9982	177,187.63	7,087,505
2013	49,337	3.3435	164,960.17	6,598,407	46,985	4.1981	197,248.87	7,889,955
2014	52,143	3.5107	183,056.32	7,322,253	49,653	4.4080	218,868.88	8,754,755
2015	54,948	3.6862	202,549.68	8,101,987	52,320	4.6284	242,157.77	9,686,311
2016	57,784	3.8705	223,653.89	8,946,156	54,988	4.8598	267,233.21	10,689,328
2017	57,784	4.0641	234,836.59	9,393,463	54,988	5.1028	280,594.87	11,223,795
2018	57,784	4.2673	246,578.42	9,863,137	54,988	5.3580	294,624.62	11,784,985
2019	57,784	4.4806	258,907.34	10,356,293	54,988	5.6259	309,355.85	12,374,234
2020	57,784	4.7047	271,852.70	10,874,108	54,988	5.9072	324,823.64	12,992,946
2021	57,784	4.9399	285,445.34	11,417,814	54,988	6.2025	341,064.82	13,642,593
2022	57,784	5.1869	299,717.61	11,988,704	54,988	6.5126	358,118.06	14,324,722
2023	57,784	5.4462	314,703.49	12,588,139	54,988	6.8383	376,023.97	15,040,959
2024	57,784	5.7185	330,438.66	13,217,546	54,988	7.1802	394,825.16	15,793,007
2025	57,784	6.0045	346,960.59	13,878,424	54,988	7.5392	414,566.42	16,582,657
2026	57,784	6.3047	364,308.62	14,572,345	54,988	7.9162	435,294.74	17,411,790
2027	57,784	6.6199	382,524.05	15,300,962	54,988	8.3120	457,059.48	18,282,379
2028	57,784	6.9509	401,650.26	16,066,010	54,988	8.7276	479,912.45	19,196,498
2029	57,784	7.2985	421,732.77	16,869,311	54,988	9.1639	503,908.08	20,156,323
Total	1,332,022		5,880,794.56	235,231,782	1,268,544		7,029,549.13	281,181,965

Appendix 12.5-5 Repayment Schedule of Debt (Loan Supplied 1996 - 1997)

(1,000 US$)

No	FY	Financing for Construction			Repayment of Foreign Currency				Repayment of Local Currency			
		Foreign	Local	Total	Interest	Principal	Total	Balance	Interest	Principal	Total	Balance
	1996	57,215	40,084	97,299								
	1997	119,162	94,683	213,845				176,378				134,766
1	1998				12,346	4,302	16,649	172,075	17,520	10,564	28,084	124,203
2	1999				12,045	4,604	16,649	167,472	16,146	11,937	28,084	112,265
3	2000				11,723	4,926	16,649	162,546	14,594	13,489	28,084	98,776
4	2001				11,378	5,271	16,649	157,275	12,841	15,243	28,084	83,534
5	2002				11,009	5,640	16,649	151,636	10,859	17,224	28,084	66,310
6	2003				10,615	6,034	16,649	145,601	8,620	19,463	28,084	46,846
7	2004				10,192	6,457	16,649	139,145	6,090	21,994	28,084	24,853
8	2005				9,740	6,909	16,649	132,236	3,231	24,853	28,084	0
9	2006				9,257	7,392	16,649	124,844				
10	2007				8,739	7,910	16,649	116,934				
11	2008				8,185	8,463	16,649	108,471				
12	2009				7,593	9,056	16,649	99,415				
13	2010				6,959	9,690	16,649	89,725				
14	2011				6,281	10,368	16,649	79,357				
15	2012				5,555	11,094	16,649	68,263				
16	2013				4,778	11,870	16,649	56,393				
17	2014				3,948	12,701	16,649	43,692				
18	2015				3,058	13,590	16,649	30,101				
19	2016				2,107	14,542	16,649	15,560				
20	2017				1,089	15,560	16,649	0				
	Total	176,378	134,766	311,144	156,596	176,378	332,976		89,902	134,766	224,668	

Appendix 12.5-6 Repayment Schedule of Debt (Loan Supplied 1997 - 1998)

(1,000 US$)

No	FY	Financing for Construction			Repayment of Foreign Currency				Repayment of Local Currency			
		Foreign	Local	Total	Interest	Principal	Total	Balance	Interest	Principal	Total	Balance
	1997	44,271	24,712	68,982								
	1998	87,301	73,687	160,987				131,571				98,398
1	1999				9,210	3,209	12,419	128,362	12,792	7,713	20,505	90,685
2	2000				8,985	3,434	12,419	124,928	11,789	8,716	20,505	81,970
3	2001				8,745	3,674	12,419	121,253	10,656	9,849	20,505	72,121
4	2002				8,488	3,932	12,419	117,322	9,376	11,129	20,505	60,991
5	2003				8,213	4,207	12,419	113,115	7,929	12,576	20,505	48,415
6	2004				7,918	4,501	12,419	108,613	6,294	14,211	20,505	34,204
7	2005				7,603	4,816	12,419	103,797	4,447	16,058	20,505	18,146
8	2006				7,266	5,154	12,419	98,643	2,359	18,146	20,505	0
9	2007				6,905	5,514	12,419	93,129				
10	2008				6,519	5,900	12,419	87,229				
11	2009				6,106	6,313	12,419	80,915				
12	2010				5,664	6,755	12,419	74,160				
13	2011				5,191	7,228	12,419	66,932				
14	2012				4,685	7,734	12,419	59,198				
15	2013				4,144	8,276	12,419	50,922				
16	2014				3,565	8,855	12,419	42,067				
17	2015				2,945	9,475	12,419	32,592				
18	2016				2,281	10,138	12,419	22,454				
19	2017				1,572	10,848	12,419	11,607				
20	2018				812	11,607	12,419	0				
	Total	131,571	98,398	229,970	116,817	131,571	248,388		65,641	98,398	164,039	

Appendix 12.5-7 Repayment Schedule of Debt (Loan Supplied 1998 - 1999)

(1,000 US$)

No	FY	Financing for Construction			Repayment of Foreign Currency				Repayment of Local Currency			
		Foreign	Local	Total	Interest	Principal	Total	Balance	Interest	Principal	Total	Balance
	1998	36,836	18,824	55,660								
	1999	97,746	71,948	169,694				134,582				90,772
1	2000				9,421	3,283	12,704	131,299	11,800	7,115	18,916	83,656
2	2001				9,191	3,513	12,704	127,787	10,875	8,040	18,916	75,616
3	2002				8,945	3,759	12,704	124,028	9,830	9,086	18,916	66,531
4	2003				8,682	4,022	12,704	120,006	8,649	10,267	18,916	56,264
5	2004				8,400	4,303	12,704	115,703	7,314	11,601	18,916	44,663
6	2005				8,099	4,604	12,704	111,099	5,806	13,109	18,916	31,553
7	2006				7,777	4,927	12,704	106,172	4,102	14,814	18,916	16,739
8	2007				7,432	5,272	12,704	100,901	2,176	16,739	18,916	0
9	2008				7,063	5,641	12,704	95,260				
10	2009				6,668	6,035	12,704	89,225				
11	2010				6,246	6,458	12,704	82,767				
12	2011				5,794	6,910	12,704	75,857				
13	2012				5,310	7,394	12,704	68,463				
14	2013				4,792	7,911	12,704	60,552				
15	2014				4,239	8,465	12,704	52,087				
16	2015				3,646	9,057	12,704	43,030				
17	2016				3,012	9,692	12,704	33,338				
18	2017				2,334	10,370	12,704	22,968				
19	2018				1,608	11,096	12,704	11,873				
20	2019				831	11,873	12,704	0				
	Total	134,582	90,772	225,354	119,490	134,582	254,072		60,553	90,772	151,325	

Appendix 12.5-8 Repayment Schedule of Debt (Loan Supplied 1999 - 2000)

(1,000 US$)

No.	FY	Financing for Construction			Repayment of Foreign Currency				Repayment of Local Currency			
		Foreign	Local	Total	Interest	Principal	Total	Balance	Interest	Principal	Total	Balance
	1999	62,433	41,447	103,880								
	2000	242,978	152,933	395,911				305,411				194,380
1	2001				21,379	7,450	28,829	297,962	25,269	15,237	40,506	179,143
2	2002				20,857	7,971	28,829	289,990	23,289	17,218	40,506	161,925
3	2003				20,299	8,529	28,829	281,461	21,050	19,456	40,506	142,469
4	2004				19,702	9,126	28,829	272,334	18,521	21,985	40,506	120,484
5	2005				19,063	9,765	28,829	262,569	15,663	24,843	40,506	95,641
6	2006				18,380	10,449	28,829	252,120	12,433	28,073	40,506	67,568
7	2007				17,648	11,180	28,829	240,940	8,784	31,722	40,506	35,846
8	2008				16,866	11,963	28,829	228,977	4,660	35,846	40,506	0
9	2009				16,028	12,800	28,829	216,177				
10	2010				15,132	13,696	28,829	202,481				
11	2011				14,174	14,655	28,829	187,826				
12	2012				13,148	15,681	28,829	172,145				
13	2013				12,050	16,779	28,829	155,366				
14	2014				10,876	17,953	28,829	137,413				
15	2015				9,619	19,210	28,829	118,203				
16	2016				8,274	20,554	28,829	97,649				
17	2017				6,835	21,993	28,829	75,656				
18	2018				5,296	23,533	28,829	52,123				
19	2019				3,649	25,180	28,829	26,943				
20	2020				1,886	26,943	28,829	0				
	Total	305,411	194,380	499,791	271,162	305,411	576,574		129,669	194,380	324,049	

Appendix 12.5-9 Repayment Schedule of Debt (Loan Supplied 2000 - 2001)

(1,000 US$)

No.	FY	Financing for Construction			Repayment of Foreign Currency				Repayment of Local Currency			
		Foreign	Local	Total	Interest	Principal	Total	Balance	Interest	Principal	Total	Balance
	2000	77,989	53,794	131,783								
	2001	143,737	104,477	248,214				221,726				158,271
1	2002				15,521	5,409	20,929	216,318	20,575	12,406	32,982	145,864
2	2003				15,142	5,787	20,929	210,531	18,962	14,019	32,982	131,845
3	2004				14,737	6,192	20,929	204,338	17,140	15,842	32,982	116,004
4	2005				14,304	6,626	20,929	197,713	15,080	17,901	32,982	98,103
5	2006				13,840	7,090	20,929	190,623	12,753	20,228	32,982	77,874
6	2007				13,344	7,586	20,929	183,037	10,124	22,858	32,982	55,017
7	2008				12,813	8,117	20,929	174,921	7,152	25,829	32,982	29,187
8	2009				12,244	8,685	20,929	166,236	3,794	29,187	32,982	0
9	2010				11,636	9,293	20,929	156,943				
10	2011				10,986	9,943	20,929	146,999				
11	2012				10,290	10,639	20,929	136,360				
12	2013				9,545	11,384	20,929	124,976				
13	2014				8,748	12,181	20,929	112,795				
14	2015				7,896	13,034	20,929	99,761				
15	2016				6,983	13,946	20,929	85,815				
16	2017				6,007	14,922	20,929	70,892				
17	2018				4,962	15,967	20,929	54,925				
18	2019				3,845	17,085	20,929	37,841				
19	2020				2,649	18,281	20,929	19,560				
20	2021				1,369	19,560	20,929	0				
	Total	221,726	158,271	379,997	196,862	221,726	418,588		105,581	158,271	263,852	

Appendix 12.5-10 Repayment Schedule of Debt (Loan Supplied 2005 - 2006)

(1,000 US$)

No.	FY	Financing for Construction			Repayment of Foreign Currency				Repayment of Local Currency			
		Foreign	Local	Total	Interest	Principal	Total	Balance	Interest	Principal	Total	Balance
	2005	207,340	138,133	345,472								
	2006	784,864	546,529	1,331,393				992,204				684,662
1	2007				69,454	24,203	93,657	968,001	89,006	53,668	142,674	630,993
2	2008				67,760	25,897	93,657	942,104	82,029	60,645	142,674	570,348
3	2009				65,947	27,710	93,657	914,394	74,145	68,529	142,674	501,819
4	2010				64,008	29,649	93,657	884,745	65,236	77,438	142,674	424,381
5	2011				61,932	31,725	93,657	853,020	55,170	87,505	142,674	336,876
6	2012				59,711	33,946	93,657	819,075	43,794	98,881	142,674	237,996
7	2013				57,335	36,322	93,657	782,753	30,939	111,735	142,674	126,261
8	2014				54,793	38,864	93,657	743,888	16,414	126,261	142,674	0
9	2015				52,072	41,585	93,657	702,304				
10	2016				49,161	44,496	93,657	657,808				
11	2017				46,047	47,610	93,657	610,197				
12	2018				42,714	50,943	93,657	559,254				
13	2019				39,148	54,509	93,657	504,745				
14	2020				35,332	58,325	93,657	446,420				
15	2021				31,249	62,408	93,657	384,012				
16	2022				26,881	66,776	93,657	317,236				
17	2023				22,207	71,450	93,657	245,786				
18	2024				17,205	76,452	93,657	169,334				
19	2025				11,853	81,804	93,657	87,530				
20	2026				6,127	87,530	93,657	0				
	Total	992,204	684,662	1,676,866	880,937	992,204	1,873,141		456,734	684,662	1,141,395	

Appendix 12.5-11 Repayment Schedule of Debt (Loan Supplied 2010 - 2011)

(1,000 US$)

		Financing for Construction			Repayment of Foreign Currency				Repayment of Local Currency			
No	FY	Foreign	Local	Total	Interest	Principal	Total	Balance	Interest	Principal	Total	Balance
	2010	146,908	135,869	282,777								
	2011	307,588	318,823	626,411				454,496				454,692
1	2012				31,815	11,086	42,901	443,409	59,110	35,642	94,752	419,050
2	2013				31,039	11,863	42,901	431,547	54,477	40,275	94,752	378,775
3	2014				30,208	12,693	42,901	418,854	49,241	45,511	94,752	333,264
4	2015				29,320	13,581	42,901	405,272	43,324	51,427	94,752	281,837
5	2016				28,369	14,532	42,901	390,740	36,639	58,113	94,752	223,723
6	2017				27,352	15,549	42,901	375,191	29,084	65,668	94,752	158,056
7	2018				26,263	16,638	42,901	358,553	20,547	74,205	94,752	83,851
8	2019				25,099	17,802	42,901	340,751	10,901	83,851	94,752	0
9	2020				23,853	19,049	42,901	321,702				
10	2021				22,519	20,382	42,901	301,320				
11	2022				21,092	21,809	42,901	279,511				
12	2023				19,566	23,335	42,901	256,176				
13	2024				17,932	24,969	42,901	231,207				
14	2025				16,184	26,717	42,901	204,490				
15	2026				14,314	28,587	42,901	175,903				
16	2027				12,313	30,588	42,901	145,315				
17	2028				10,172	32,729	42,901	112,586				
18	2029				7,881	35,020	42,901	77,566				
19	2030				5,430	37,472	42,901	40,095				
20	2031				2,807	40,095	42,901	0				
	Total	454,496	454,692	909,188	403,528	454,496	858,023		303,322	454,692	758,014	

Appendix 12.5-12 Repayment Schedule of Debt (Loan Supplied 2015 - 2016)

(1,000 US$)

		Financing for Construction			Repayment of Foreign Currency				Repayment of Local Currency			
No	FY	Foreign	Local	Total	Interest	Principal	Total	Balance	Interest	Principal	Total	Balance
	2015	142,583	135,070	277,653								
	2016	372,090	347,114	719,203				514,672				482,184
1	2017				36,027	12,554	48,581	502,118	62,684	37,797	100,481	444,388
2	2018				35,148	13,433	48,581	488,685	57,770	42,710	100,481	401,677
3	2019				34,208	14,373	48,581	474,311	52,218	48,263	100,481	353,414
4	2020				33,202	15,380	48,581	458,932	45,944	54,537	100,481	298,877
5	2021				32,125	16,456	48,581	442,476	38,854	61,627	100,481	237,251
6	2022				30,973	17,608	48,581	424,867	30,843	69,638	100,481	167,612
7	2023				29,741	18,841	48,581	406,027	21,790	78,691	100,481	88,921
8	2024				28,422	20,160	48,581	385,867	11,560	88,921	100,481	0
9	2025				27,011	21,571	48,581	364,296				
10	2026				25,501	23,081	48,581	341,216				
11	2027				23,885	24,696	48,581	316,519				
12	2028				22,156	26,425	48,581	290,094				
13	2029				20,307	28,275	48,581	261,819				
14	2030				18,327	30,254	48,581	231,565				
15	2031				16,210	32,372	48,581	199,193				
16	2032				13,944	34,638	48,581	164,556				
17	2033				11,519	37,063	48,581	127,493				
18	2034				8,925	39,657	48,581	87,836				
19	2035				6,149	42,433	48,581	45,403				
20	2036				3,178	45,403	48,581	0				
	Total	514,672	482,184	996,857	456,956	514,672	971,629		321,662	482,184	803,847	

Appendix 12.5-13 Statement of Profit and Loss

(1,000 US$)

FY	Revenue A	Business Expenses: O & M Cost B	Business Expenses: Energy Purchase C	Business Expenses: Depreciation D	Business Expenses: Total E=B+C+D	Business Profit F=A-E	Financial Cost (Interest) G	Net Profit H=F-G
1998	210,947	10,648	173,424	14,143	198,215	12,732	29,866	-17,134
1999	458,105	18,843	378,728	24,596	422,166	35,939	50,193	-14,255
2000	740,534	27,012	613,089	34,839	674,940	65,594	68,313	-2,719
2001	1,082,831	44,466	901,067	57,557	1,003,090	79,741	110,335	-30,593
2002	1,416,451	59,085	1,180,197	74,830	1,314,111	102,339	138,749	-36,410
2003	1,773,335	61,042	1,478,797	74,830	1,614,669	158,665	128,161	30,504
2004	2,175,945	63,065	1,815,680	74,830	1,953,575	222,370	116,309	106,061
2005	2,620,721	65,155	2,187,862	74,830	2,327,847	292,874	103,036	189,837
2006	3,109,881	67,314	2,596,755	74,830	2,738,899	370,982	88,167	282,816
2007	3,646,396	125,008	3,045,692	151,051	3,321,751	324,645	233,612	91,033
2008	4,233,896	129,151	3,537,310	151,051	3,817,512	416,384	213,047	203,337
2009	4,876,395	133,432	4,074,968	151,051	4,359,451	516,944	192,527	324,417
2010	5,578,047	137,855	4,662,145	151,051	4,951,051	626,997	174,882	452,115
2011	6,343,740	142,425	5,304,247	151,051	5,597,723	746,017	159,527	586,490
2012	7,087,505	178,387	5,926,762	192,378	6,297,526	789,979	233,418	556,561
2013	7,889,955	184,300	6,598,407	192,378	6,975,085	914,870	209,100	705,770
2014	8,754,755	190,409	7,322,253	192,378	7,705,040	1,049,716	182,030	867,685
2015	9,686,311	196,721	8,101,987	192,378	8,491,086	1,195,225	151,880	1,043,345
2016	10,689,328	203,242	8,946,156	192,378	9,341,775	1,347,553	136,827	1,210,726
2017	11,223,795	243,922	9,393,463	237,689	9,875,074	1,348,721	219,031	1,129,690
2018	11,784,985	252,007	9,863,137	237,689	10,352,833	1,432,151	195,122	1,237,030
2019	12,374,234	260,361	10,356,293	237,689	10,854,344	1,519,890	169,898	1,349,992
2020	12,992,946	268,992	10,874,108	223,546	11,366,646	1,626,299	142,865	1,483,434
2021	13,642,593	277,909	11,417,814	213,093	11,908,816	1,733,777	126,117	1,607,660
2022	14,324,722	287,121	11,988,704	202,850	12,478,675	1,846,047	109,789	1,736,258
2023	15,040,959	296,639	12,588,139	180,132	13,064,911	1,976,048	93,303	1,882,745
2024	15,793,007	306,473	13,217,546	162,860	13,686,879	2,106,128	75,119	2,031,009
2025	16,582,657	316,632	13,878,424	162,860	14,357,916	2,224,741	55,049	2,169,693
2026	17,411,790	327,129	14,572,345	162,860	15,062,333	2,349,456	45,942	2,303,514
2027	18,282,379	337,973	15,300,962	162,860	15,801,795	2,480,584	36,198	2,444,386
2028	19,196,498	349,177	16,066,010	162,860	16,578,047	2,618,451	32,328	2,586,123
2029	20,156,323	360,753	16,869,311	86,638	17,316,702	2,839,621	28,188	2,811,434
Total	281,181,965	5,922,648	235,231,782	4,656,054	245,810,484	35,371,481	4,048,927	31,322,553

Appendix 12.5-14 Cash Flow

(1,000 US$)

FY	Cash Inflow: Financing	Cash Inflow: Net Profit	Cash Inflow: Depreciation	Cash Inflow: Total	Cash Outflow: Investment*	Cash Outflow: Repayment of Principal	Cash Outflow: Total	Balance: Total	Balance: Accumulated
1996	92,918			92,918	97,299	0	97,299	-4,381	-4,381
1997	261,681			261,681	282,827	0	282,827	-21,147	-25,528
1998	201,078	-17,134	14,143	198,087	216,647	14,866	231,513	-33,427	-58,955
1999	256,672	-14,255	24,596	267,013	273,574	27,463	301,037	-34,024	-92,979
2000	495,393	-2,719	34,839	527,513	527,695	40,963	568,658	-41,144	-134,123
2001	225,715	-30,593	57,557	252,678	248,214	68,276	316,490	-63,811	-197,934
2002		-36,410	74,830	38,420		93,772	93,772	-55,352	-253,287
2003		30,504	74,830	105,334		104,360	104,360	974	-252,313
2004		106,061	74,830	180,891		116,212	116,212	64,678	-187,635
2005	330,030	189,837	74,830	594,697	345,472	129,485	474,957	119,740	-67,895
2006	1,242,115	282,816	74,830	1,599,760	1,331,393	116,272	1,447,665	152,095	84,200
2007		91,033	151,051	242,084		186,652	186,652	55,431	139,632
2008		203,337	151,051	354,388		188,302	188,302	166,086	305,718
2009		324,417	151,051	475,468		168,316	168,316	307,152	612,870
2010	269,517	452,115	151,051	872,682	282,777	152,980	435,756	436,926	1,049,796
2011	571,378	586,490	151,051	1,308,919	626,411	168,334	794,745	514,174	1,563,970
2012		556,561	192,378	748,939		232,096	232,096	516,842	2,080,812
2013		705,770	192,378	898,148		256,414	256,414	641,734	2,722,546
2014		867,685	192,378	1,060,063		283,484	283,484	776,579	3,499,125
2015	264,588	1,043,345	192,378	1,500,311	277,653	170,960	448,613	1,051,697	4,550,822
2016	660,637	1,210,726	192,378	2,063,741	719,203	186,013	905,216	1,158,525	5,709,347
2017		1,129,690	237,689	1,367,379		252,872	252,872	1,114,508	6,823,855
2018		1,237,030	237,689	1,474,719		260,132	260,132	1,214,587	8,038,442
2019		1,349,992	237,689	1,587,682		272,936	272,936	1,314,745	9,353,187
2020		1,483,434	223,546	1,706,980		192,513	192,513	1,514,467	10,867,655
2021		1,607,660	213,093	1,820,754		180,433	180,433	1,640,321	12,507,975
2022		1,736,258	202,850	1,939,108		175,831	175,831	1,763,276	14,271,252
2023		1,882,745	180,132	2,062,877		192,318	192,318	1,870,559	16,141,811
2024		2,031,009	162,860	2,193,868		210,502	210,502	1,983,367	18,125,178
2025		2,169,693	162,860	2,332,552		130,091	130,091	2,202,461	20,327,639
2026		2,303,514	162,860	2,466,374		139,197	139,197	2,327,176	22,654,815
2027		2,444,386	162,860	2,607,245		55,284	55,284	2,551,961	25,206,777
2028		2,586,123	162,860	2,748,982		59,154	59,154	2,689,828	27,896,605
2029		2,811,434	86,638	2,898,072		63,295	63,295	2,834,777	30,731,382
Total	4,871,721	31,322,553	4,656,054	40,850,328	5,229,166	4,889,780	10,118,946	30,731,382	

* Note: Investment including interest during construction

Appendix 12.5-15 Calculation of Debt Service Ratio

(1,000 US$)

FY	Internal Fund Procured				Payment of Debt				Debt Service Ratio(A/B)
	Business Profit	Depreciation	Total	Accumulated (A)	Interest	Principal	Total	Accumulated (B)	
1996									
1997									
1998	12,732	14,143	26,875	26,875	29,866	14,866	44,732	44,732	0.60
1999	35,939	24,596	60,535	87,410	50,193	27,463	77,657	122,389	0.71
2000	65,594	34,839	100,433	187,843	68,313	40,963	109,276	231,665	0.81
2001	79,741	57,557	137,298	325,141	110,335	68,276	178,611	410,276	0.79
2002	102,339	74,830	177,169	502,310	138,749	93,772	232,522	642,797	0.78
2003	158,665	74,830	233,495	735,805	128,161	104,360	232,522	875,319	0.84
2004	222,370	74,830	297,200	1,033,005	116,309	116,212	232,522	1,107,840	0.93
2005	292,874	74,830	367,704	1,400,709	103,036	129,485	232,522	1,340,362	1.05
2006	370,982	74,830	445,812	1,846,521	88,167	116,272	204,438	1,544,800	1.20
2007	324,645	151,051	475,696	2,322,217	233,612	186,652	420,265	1,965,065	1.18
2008	416,384	151,051	567,435	2,889,651	213,047	188,302	401,349	2,366,413	1.22
2009	516,944	151,051	667,995	3,557,646	192,527	168,316	360,843	2,727,256	1.30
2010	626,997	151,051	778,048	4,335,694	174,882	152,980	327,861	3,055,118	1.42
2011	746,017	151,051	897,068	5,232,762	159,527	168,334	327,861	3,382,979	1.55
2012	789,979	192,378	982,357	6,215,119	233,418	232,096	465,514	3,848,493	1.61
2013	914,870	192,378	1,107,248	7,322,367	209,100	256,414	465,514	4,314,007	1.70
2014	1,049,716	192,378	1,242,093	8,564,460	182,030	283,484	465,514	4,779,522	1.79
2015	1,195,225	192,378	1,387,603	9,952,063	151,880	170,960	322,840	5,102,362	1.95
2016	1,347,553	192,378	1,539,931	11,491,994	136,827	186,013	322,840	5,425,201	2.12
2017	1,348,721	237,689	1,586,410	13,078,404	219,031	252,872	471,902	5,897,104	2.22
2018	1,432,151	237,689	1,669,841	14,748,244	195,122	260,132	455,253	6,352,357	2.32
2019	1,519,890	237,689	1,757,579	16,505,824	169,898	272,936	442,834	6,795,191	2.43
2020	1,626,299	223,546	1,849,846	18,355,669	142,865	192,513	335,379	7,130,569	2.57
2021	1,733,777	213,093	1,946,871	20,302,540	126,117	180,433	306,550	7,437,119	2.73
2022	1,846,047	202,850	2,048,897	22,351,437	109,789	175,831	285,620	7,722,740	2.89
2023	1,976,048	180,132	2,156,180	24,507,617	93,303	192,318	285,620	8,008,360	3.06
2024	2,106,128	162,860	2,268,987	26,776,604	75,119	210,502	285,620	8,293,981	3.23
2025	2,224,741	162,860	2,387,601	29,164,205	55,049	130,091	185,140	8,479,120	3.44
2026	2,349,456	162,860	2,512,316	31,676,521	45,942	139,197	185,140	8,664,260	3.66
2027	2,480,584	162,860	2,643,444	34,319,964	36,198	55,284	91,483	8,755,743	3.92
2028	2,618,451	162,860	2,781,311	37,101,275	32,328	59,154	91,483	8,847,225	4.19
2029	2,839,621	86,638	2,926,260	40,027,535	28,188	63,295	91,483	8,938,708	4.48
Total	35,371,481	4,656,054	40,027,535		4,048,927	4,889,780	8,938,708		

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