10.5.2 Construction Cost of Substations

The total amount of the construction cost of substations in the respectively scheduled commissioning years indicated in Clause 10.2.2 is presented in the table below in terms of the price level in 1955. The exchange rate is US\$1 = 25 Baht.

(Unit: M. Baht)

Planning year	2001	2006	2011	2016
Period from the last year	5	6+ 5 *!/	5	5
Total amount	15,796	9,772	6,702	5,646
	(631.82)	(390.89)	(268.06)	(225.85)
Annual investment	3, 159	1,954	1,340	1,129
	(126. 36)	(78.18)	(53.61)	(45.17)

Figures in parenthesis are construction cost in Million US\$.

The total construction cost of substation is estimated at 37,916 million Baht (US\$ 1,516.62 million), and the construction cost of distribution substations shares 81.7% (30,979 million Baht) of the total cost.

The yearly average amount of investment to be required for construction and modernization of substations is estimated to range from $1,129 \sim 3,159$ million Baht per year (from $45.17 \sim 126.36$ million US\$ per year) in terms of the price level in FY 1995. Particularly during the 5 years (Eighth Plan) from FY 1997 through to FY 2001, 15,796 million Baht (US\$ 631.82 million) corresponding to as much as 41.7% of the total amount of investment will have to be invested.

115 kV or 69 kV Distribution Substation (Unit: M. Baht)

Planning year	2001	2006	2011	2016
Foreign currency	7,790	4,399	3, 114	2,080
Local currency	5,897	3,309	2,645	1,744
Total amount	13,687 (547.48)	7,708 (308.32)	5,759 (124.56)	3,824 (83.20)

Figures in parenthesis are construction cost in Million US\$.

230 kV Terminal Station

(Unit: M. Baht)

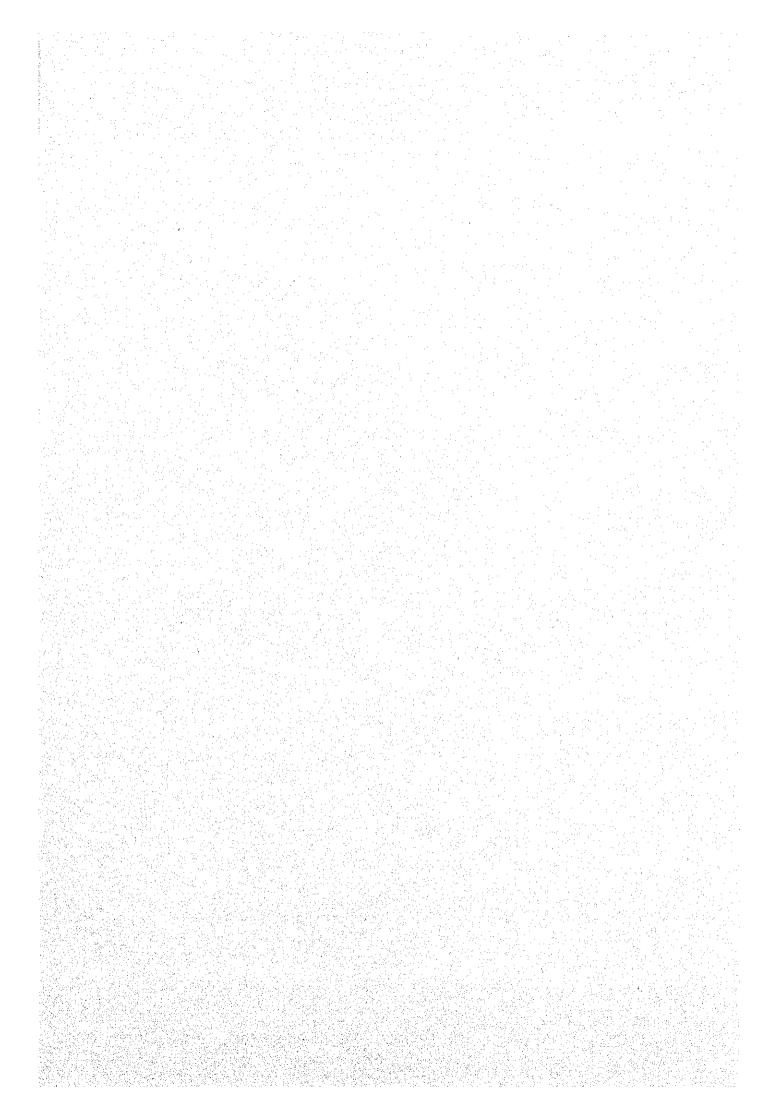
Planning year	2001	2006	2011	2016
Foreign currency	1,358	1,468	615	1,166
Local currency	750	596	328	656
Total amount	2, 108 (84. 32)	2,064 (82.56)	943 (37.72)	1,822 (72.88)

Figures in parenthesis are construction cost in Million US\$.

The construction cost of the respective substations to be allocated in the respective fiscal years is presented in Tables 10.5-1 and 10.5-2.

Although the work period required for construction of substations may vary more or less depending on the construction system of MEA (Refer to Clause 10.2.2), such a period is estimated to range from 15 months to 25 months after entering into a contract with an equipment manufacturer or contractor. Therefore, it is estimated that 40% of the total construction cost be disbursed in the initial fiscal year as a partial portion of the land acquisition and civil work costs as well as part of the procurement cost of materials, and remaining 60% be disbursed in the next fiscal year.

Meanwhile, the breakdown of the construction and addition costs of the respective substation (divided into foreign and local currency portions, direct and indirect costs) is presented in Appendix 10.5-2 and 10.5-3.



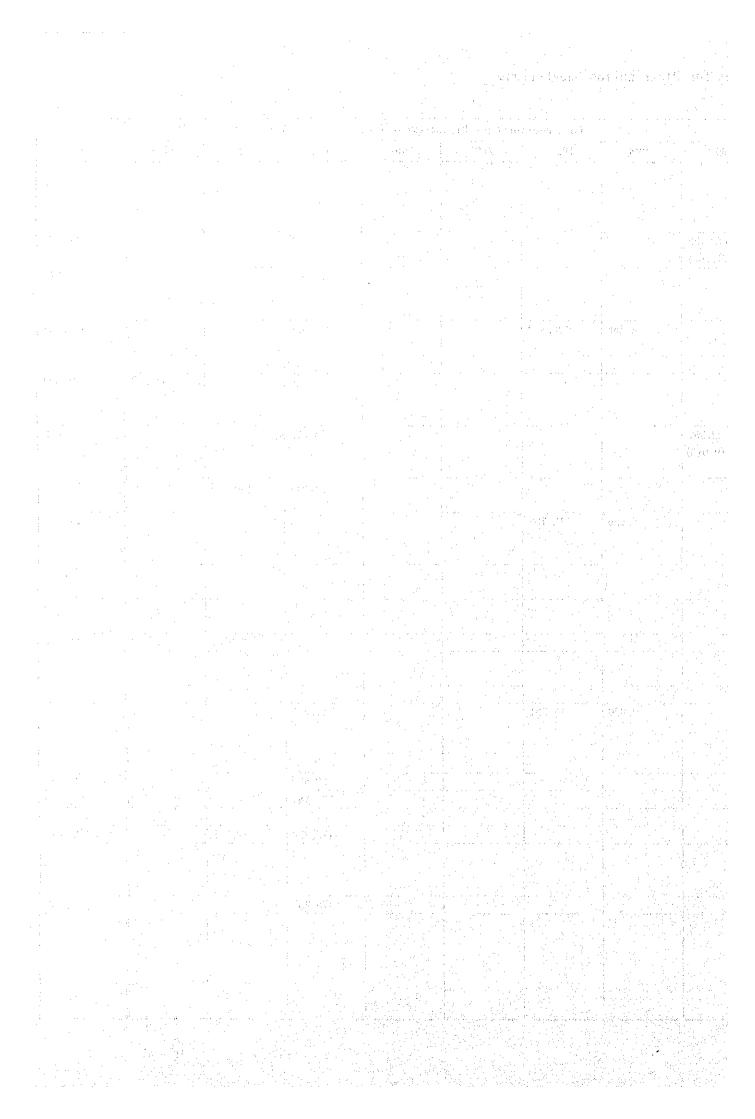
		Voltage		Number and Capac	city (MVA)			the second	Construct	ion Cost Di	sbursement	(Price Leve	el in Year 19	95, Million	Baht)	
No.	Substation	(kV)	199	97 ~ 2001	~ 2006	~ 2011	~ 2016	1997	1998	1999	2000	2001	2006	2011	2016	Total
1	South Thonburi	230 - 69	4×200	The state of the s	4×200	4×200	2×200 2×300	6, 319 (2, 528)				·			58. 056	64. 375
2	Klongrangsit	230 - 115 230 - 69	2×200 2×200		2×200 3×200	3×200 3×200	4×200 3×200	29. 028 (11. 611)					29, 028	29. 028	29, 028	116. 112
3	Nongjok	230 - 115	2×200 1×300		2×200	4×300	4×300	29. 028 (11. 611)						29. 028		58, 056
4	Teparak	230 - 115 230 - 69	1×300 1×300	2×300 2×300 (1998)	2×300 2×300	2×300 2×300	2×300 2×300	2. 528	3. 791		· ·					6. 319
5	Jangwatana	230 - 115	2×300	3×300 (1998)	4×300	4×300	4×300	6. 053	9. 079				6. 319			21. 451
6	Sainoi	230 - 115	1×300	2×300 (1999)	2×300	2×300	3×300		11.611	17. 417					29. 028	58. 056
7	Bangkoknoi	230 - 115	1×300	2×300 (2000)	2×300	3×300	4×300			2, 528	3. 791			212. 939	6. 319	225, 577
8	Bangkapi	230 - 69	4×200	2×200 2×300	2×200 2×300	2×200 2×300	4×300				23, 222	34. 833			58. 056	116.111
9	North Bangkok	230 - 69	2×200 1×285	4×200	4×200	4×200	2×200 2×300				23, 222	34. 833			58. 056	116, 111
10	South Bangkok	230 - 69	4×200	2×200 2×300	2×200 2×300	4×300	4×300				23, 222	34, 833	29. 028	58, 056		145. 139
11	Bangplee	230 - 115 230 - 115	2×200 3×200		3×200 4×200	3×200 4×200	3×200 2×200						29. 028		58. 056	87.084
	n t	230 - 115		1×300	2×300	3×300	2×300 3×300				86, 189	129. 284	6. 319	212. 939		434, 731
12	Bangbor Onnuj	230 - 115		2×300 (1998)	3×300	3×300 4×300	4×300	86. 189	129, 284		80, 100	123, 201	15. 132	212. 939		443. 544
14	Lardprao	230 - 69	4×200	(1000)	2×200 2×300	2×200 2×300	4×300						58.056		58, 056	116.112
15	Sanampao	230 - 115 230 - 69		1×300 1×300	1×300 2×300	2×300 2×300	3×300 2×300			355, 652	533. 479		68. 023	75. 615	75. 615	1, 108. 384
16	Ratchada	230 - 115		(2000) 1×300 (2000)	1×300	2×300	2×300			86. 189	129. 284			29. 028	29. 028	273. 529
		230 - 69	2×300		2×300	2×300	3×300									
17	Talingchan	230 - 115			2×300	3×300	4×300						215. 473	15, 132	6.319	236, 924
18	Thonburi	230 - 69			1×300	2×300	2 × 200						527, 910 756, 720	68. 023	75. 615	595, 933 832, 335
19 20	Klongtoei Patanakarn	230 - 115 230 - 115			2×300 3×300	2×300 3×300	3×300 4×300						323. 211		6. 319	329. 530
21	Thanontok	230 - 115		2×300 (1999)	2×300	2×300	2×300		110.822	166, 234			Sauc Gra		3. 3.7	277.056
22	Ramintra	230 - 115		· · · · · · · · · · · · · · · · · · ·			2×300				1 11 1				926. 901	926. 901
23	Ratburana	230 - 115 230 - 69					2×300 2×300								347.701	347. 701
						Total		159. 145 (25. 750)		628. 020	822. 409	233. 783	2, 064. 247	942.727	1, 822. 153	6, 937. 071

Note: Figures in parenthesis are construction cost to be disbursed in FY 1996

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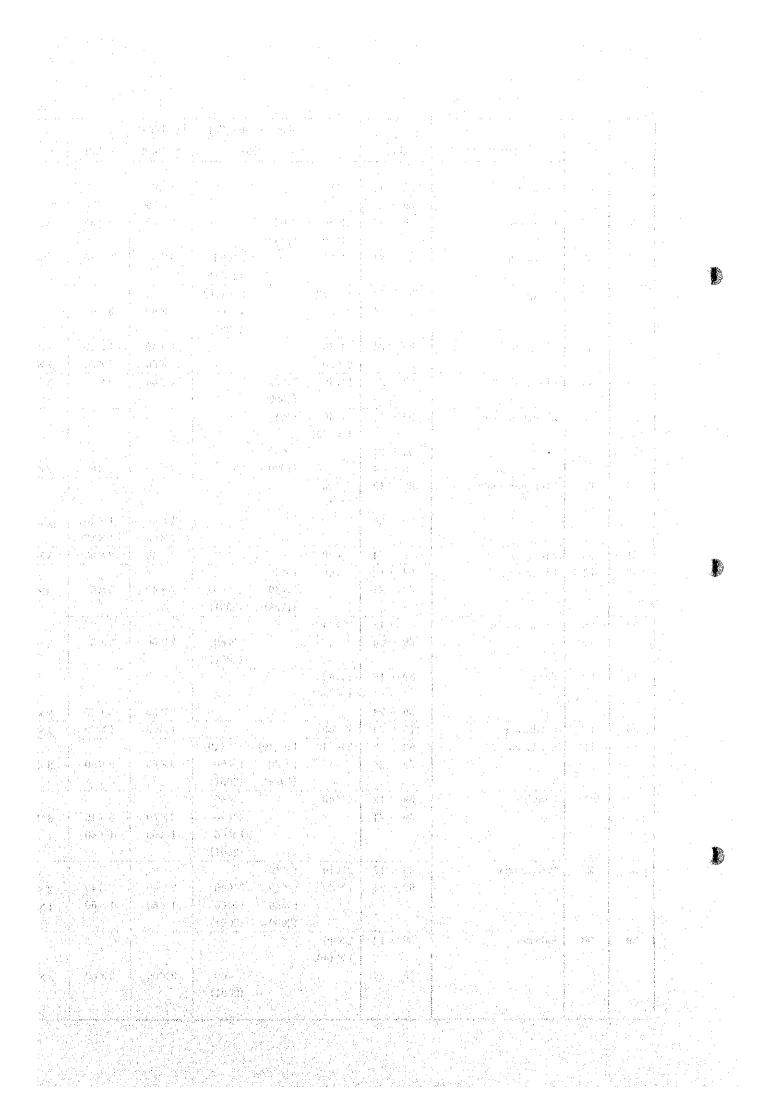
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기업 기회생활은 기회에 가장 있는 문자를 받는 것을 보는 것으로 보는 문제에 가는 생활한 경험에 살아 있는 것으로 보는 것 - 이 불편하게 할 것은 생활한 문제에 가장 하는 것으로 보는 것으로 보는 것을 보면 하는 것을 보는 것으로 보	77.0
- 제공과 발문가 보고 함께 하면도 하는데 이 사고는 물리는 가게 하면 이 이 교육이 되었다.	
사용 (현실하는) 발표함(하여) 현실 (1) 이 기계의 사용한 사람들은 사용하는 사용을 받았다. 전 (1) 한 10 분들은 사용하는 사용을 받았다. 사용 (1) 발표한 문제 (1) 발표한 전 (1) 사용 (1) 사용 (1) 분기 (1) 사용 (2) 보고 (1) 사용을 받았다. 사용 (1) 사용 (1) 사용 (1) 사용 (1) 사용 (1) 사용 (1)	
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는 분들도 있다. 그런 어디에서 그런 사람들이 되었다. 그는 사람들은 말이다는 그는 경우에게 살려왔습니다. 그는 그는 전에서 그리는 그는 그는 그는 그는 그를 보고 있다. - 일본 경우에 그리는 데 말이 되었다. 그는 그는 그는 그는 그는 그는 그를 되었다. 그는 그는 그를 되었다. 그는 그는 그를 되었다. 그는 그를 보고 있다.	
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는 하는데 보고 있다는 것은 1일을 하는 1일을 위한 경우 1일을 하는데 1일을 하는데 보고 되었다는데 1일을 하는데 1일을 하는데 1일을 하는데 1일을 하는데 1일을 하는데 1일을 하는데 1일을 	٠.

· ·		<u> </u>	18.14	Number and Capac	ity (MVA)					Construction	on Cost Disb	ursement (Pri	ce level in Y	ear 1995)		1/3
No.	ABB	Substation	Voltage (kV)	1997 ~ 2001	~ 2006	~ 2011	~ 2016	1997	1998	1999	2000	2001	2006	2011	2016	Total
			(KT)	1337 2001	2000	541					· · · · · · · · · · · · · · · · · · ·					
, 1	ВВ	Bangbon	69 - 12	3×40 2×40											.	0
•		Dungivon	69 - 24	1×40 3×40	3×40	3×40	3×40					:				
				(1999) (2001)										·		
2	BN	Bangchalong	115 - 24	2×60	3×60	3×60	3×60	178. 232					22. 551			200. 783
					* * .			(71, 293)								
3	BA	Bangkapi	69 - 12	2×40					-				21. 322		ľ	21.322
			69 - 24	1×60	1×40	1×40	1×40							-		
					2×60	2×60	2×60					:				
4	KA	Bangkhaen	115 - 24	1×60 2×60	3×60	3×60	3×60	·	84. 255	126, 383			22, 551			233, 189
]				(1999)												
5	BR	Bangkhunprom	69 - 12	3×40	3×40	3×40	3×40								01.000	0
6	BL.	Bangklo	69 - 12	1×40					•						21.322	21, 322
	; ·		69 - 24	1×40 2×40	2×40	2×40	1×40									
				(2001)			2×60	20				<u> </u>	91 999			43, 873
7	B0	Bangkoknoi	69 - 12	1×40				22.551					21, 322			45, 615
	l ·		69 - 24	1×60	1×40	1×40	1×40	(9. 020)			. *					
ļ					2×60	2×60	2×60						31, 585	158, 094		189. 679
8	BC	Bangkrachao	69 - 12	2×10	1 > / CD	2×60	2×60						31,305	100, 05-1		100.0.0
	511	D 1	69 - 24	2×(40) 2×(40)	1×60	2 ^ 60	2/00		8, 529	12. 793						21. 322
9	ВМ	Bangmod	69 - 12 69 - 24	1×60	3×60	3×60	3×60		0,025	12.,50						
			09 - 24	(1999)	3700	3200	37.00	İ				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				
10	BG	Bangha	69 - 24	2×40	2×40	2×40	1×40								21. 322	21. 322
10	1 00	Dangha	00 24	27.40			1×60									
11	BJ	Bangnamjued	115 - 24	1×20	1×20	1×20	1×20									0
1	"	bangnamusa		2×60	2×60	2×60	2×60									
12	BI	Bangping	115 - 24	2×60	2×60	3×60	3×60		1 141					22. 551		22, 551
13	ВК	Bangplakod	69 - 12	3×(40)												0
			69 - 24		3×60	3×60	3×60									
14	BP	Bangplee	69 - 24	2×60	2×60	2×60	2×60									0
15	PG	Bangpongpang	69 - 12	1×40					9.020	13. 531			22. 551			45. 102
			69 - 24	1×60												
			115 - 24	2×60	3×60	3×60	3×60							4.	·	
				(1999)									00.551			22. 551
16	BD	Bangpood	115 - 24		3×60	3×60	3×60	<u> </u>					22, 551			233, 189
17:	BU	Bangpu	115 - 24	2×40	3×60	3×60	3×60						233, 189			233, 109
18	RY	Bangrakyai	115 - 24		2×60	2×60	2×60						178, 232	22, 551		200. 783
19	BS	Bangsaotong	115 - 24		2×60	3×60	3×60			<u> </u>			110, 232	22, 551		200. 700
20	BY	Bangyeekhan	69 - 12		0 × 10	0 > 40	0.740									Ĭ
			69 - 24	1×40 2×40 (2001)	2×40	2×40	2×40									
		Chalanshaan	115 - 24		2×60	2×60	2×60		 				178. 232			178, 232
21	CG	Chalongkrung Chankasem	69 - 12		2700	2700	4/100	-					1.3.202			0
ZZ	CK	Chankased	69 - 12 $69 - 24$	and the second of the second o	2×40	2×40	2×40									
			09 - 24	1×60	1×60	1×60	1×60									
1				(1999)	1,00	1,700	1,,,,,,,,,,									
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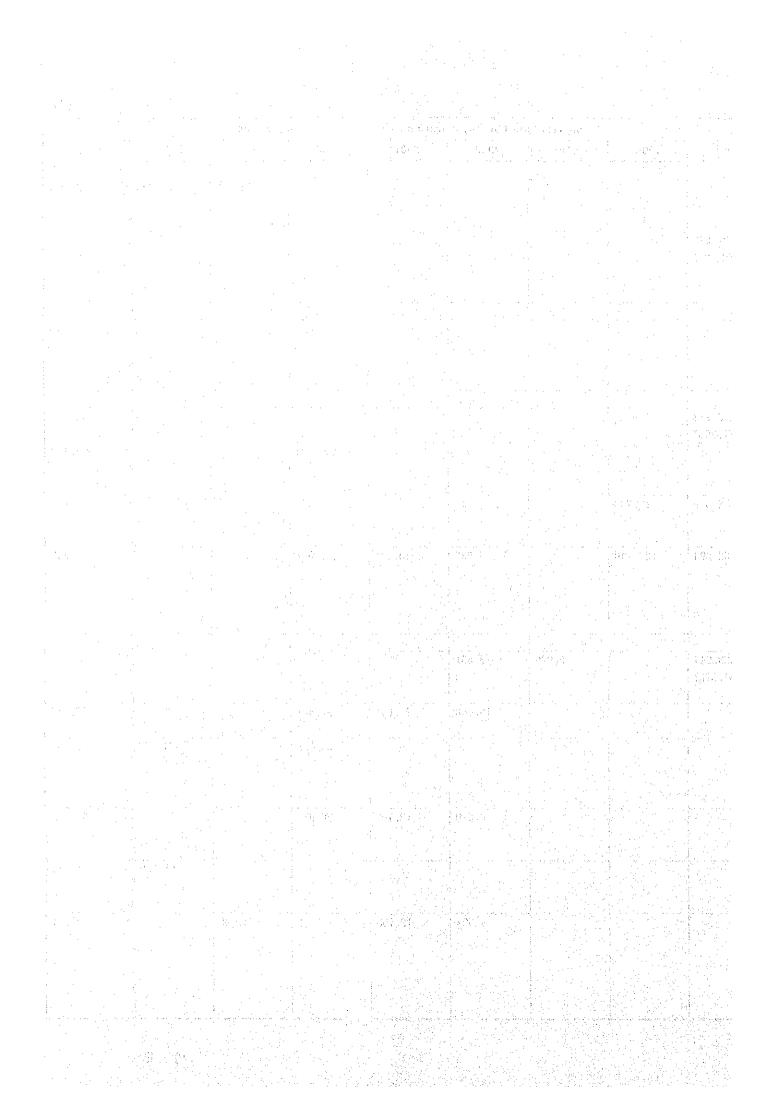


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마는 그 사람들은 경기를 보는 것이 하는 것이 되었다. 그는 그는 그는 그는 그는 그는 그를 보는 것이 되었다. 그는 그를 보는 것이 그를 보는 것이 그는 그는 그는 그를 보는 것이다. - 1880년 1일 - 1881년 1일 - 1881년 1일 전기를 보고 있다. 그는 그를 보고 있는 것이 되었다는 것이 없는 것이 되었다. 그는 그를 보고 있다. 그는 그를 보고 있다.			•	
- 문화및 보호님은 문화를 통화되고 하는데 (설명을 함은) 및 제기 (1) 및 보호로				
				(<u>189</u>)
- 멋졌다. : [2015년 - 1915년 r>				
- 캠프트를 발속을 통점으로만했다고 됐겠다고 내를 만하는 것이다.				
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하는 이 전에 하는 것도 되는 것이 하는 것이 되었다. 그는 것이 하는 것이 되었다. 그는 것이 되었다. 그는 것이 되었다. 그는 것이 되었다. 				

<u> </u>	Τ	T		Voltage	Number and Capa	eity (MVA)					Constructi	on Cost Disbu	rsement (Pri	ce level in '	Year 1995)		
No.	ABB	в	Substation	(kV)	1997 ~ 2001	~ 2006	~ 2011	~ 2016	1997	1998	1999	2000	2001	2006	2011	2016	Total
	 	-+												100.05			189, 250
23	CL	. C	Chidlom	230 - 12	2×50									189, 25		Ì	169, 200
				69 - 24		2×60	2×60	2×60	01.055	106 202			•	22, 551			233, 189
24	DM	1 [Donmuang	115 - 24	2×40 2×60	3×60	3×60	3×60	84. 255	126, 383				22, 001			200, 103
					1×60 (1998)	3×60	3×60	3×60			·	8, 529	12.793				21.322
25	HK	\	luaykwang	69 - 24	2×60 3×60 (2001)	3 > 00	3 ^ 00	3 × 00				0, 020	12. 100				
00		, - ;	71	69 - 12	$3\times(40) \qquad \qquad 2\times(40)$		<u> </u>		<u> </u>		i						0,000
26	KP	· '	Kingpetch	69 - 24	1×60	3×60	3×60	3×60			1.1 1.1	.					
		ľ	·		(2001)												l
27	KJ	, 	Klongjan	69 - 24	1×40	1×40	1×40	1×40							-		0,000
"	",	' '	n Tongjan		2×60	2×60	2×60	2×60		:		·					
28	Кл	М	Klongmai	69 - 24	1×40 2×60	2×60	3×60	3×60			75, 700	113, 550			21, 322		210, 572
			_	٠.	(2000)												
29	SC	C I	Klongsanamchai	69 - 12	1×40 1×40				158. 094					210, 638		22, 551	391. 283
					1×(40)		:		(63. 238)		: :		-				!
				69 - 24	1×60			ļ									
				115 - 24	(1999)	2×60	2×60_	3×60			· · · · · · · · · · · · · · · · · · ·			21.322		21.322	42,644
30	KS	S	Klongsanpasamit	69 - 12	2×20									21,022		31.002	
				69 - 24	1×40	1×40	1×40	2×60						*			
				09 - 24		1×60	1×60	2 ~ 00					. *.				
31	KI	N .	Klongsarn	69 - 24	2×40	2×40	2×60	2×60							164, 744		164, 744
32	K'		Klongtoei	69 - 12	2×40 1×40										183.112		183, 112
				69 - 24	1×40 2×40	2×40	3×60	3×60									
					(1998) (2001)												
33	W	/G	Klongwatsing	69 - 12	2×(40)										21, 322		21.322
		.]		69 - 24	2×60	2×60	3×60	3×60								1	
					(2001)									91 000	01 200		42.644
34	. К	(U	Krunai	69 - 12	1×40									21.322	21.322		42.044
					1× (40)	0 > 0	2 × 00								t 1.	-	
			1 1 1 1	69 - 24	1 ∨ 60	2×60 1×60	3×60 1×60	3×60								158. 094	158. 094
35			Lardplakao Lardprao	115 - 24 69 - 12	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		1700	2×60	183, 112			8, 529	12.793			1	204, 434
. 30	.	ar	Laruprao	69 - 24	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	3×60	3×60	3×60	(73, 245)								
				05 21	(1999) (2001)			37.00								1	ĺ
37		LN	Lumpini	69 - 12							13 3	8. 529	12.793				21, 322
				69 - 24	and the second s	3×40	3×40	3×40									
		1			1×60	1×60	1×60	1×60									
		•			(2001)		- <u> </u>					ļ					
38	N	MN	Mahaisawan	69 - 12													0
				69 - 24		2×40	2×40	2×40									
					1×60 1×60	1×60	1×60	1×60									
			<u> </u>	1	(2000) (2001)							00.074	139.913				233. 189
39	l N	MM	Mahamek	69 - 12								93. 276	139, 913				255, 109
				110 01	1×(40)	2 V 60	2 V 60	0.200									
1				115 - 24	3×60 (2001)	3×60	3×60	3×60									
					(2001)												
1	- I .		production to the second control of the second	1			31 1 38 1 48 1 C	1 1 m 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			<u> </u>	<u> </u>					<u></u>

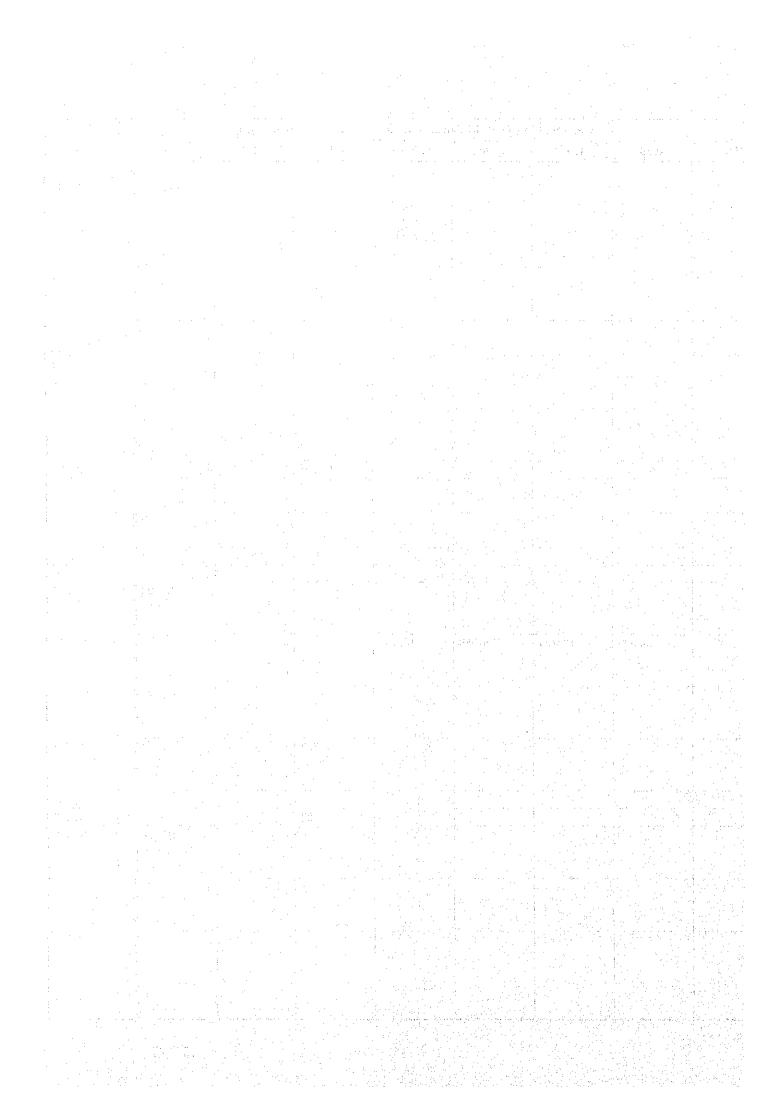


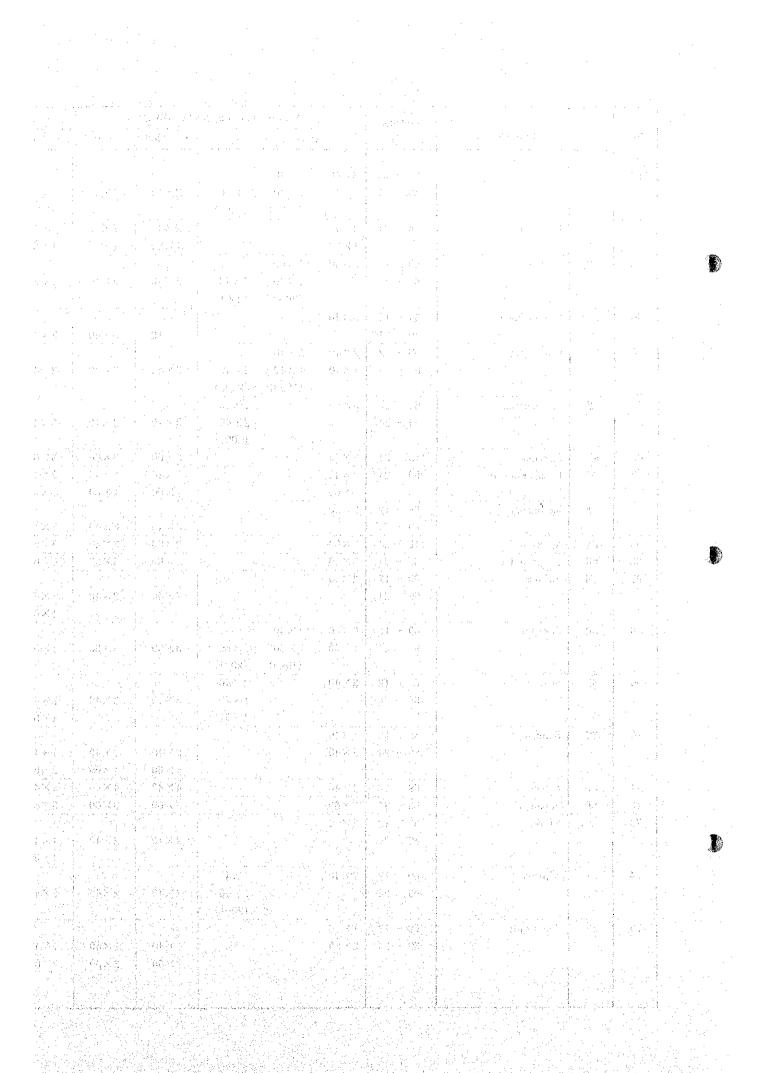
				T		· (max)				······································	Construction	on Cost Disbu	noumant (Dri	vo lovel in Y	oar 1995)		3/3
	1		Voltage		mber and Capac		· 									0010	T- 4 - 1
No.	ABB	Substation	(kV)	1997	~ 2001	~ 2006	~ 2011	~ 2016	1997	1998	1999	2000	2001	2006	2011	2016	Total
															21, 322	21. 322	42. 644
40	MA	Mai-ad	69 - 12	2×40		242	1.240								21, 322	21. 322	42.044
,		.'	69 - 24		2×40	2×40	1×40	2×60									
					(2001)		1×60		01.000								21, 322
41	MS	. Makasan	69 - 12	2×40	2×40				21, 322								21, 322
				1×(40)			22440	0 \ 40	(8, 529)			•			•		
			69 - 24		1×60	2×40	2×40	2×40		·							
					(2001)	1×60	1×60	1×60						22, 551			22, 551
42	MB	Minburi	115 - 24	2×60		3×60	3×60	3×60					· · · · · · · · · · · · · · · · · · ·	22, 331			22.001
43	MC	Mochit	69 - 12	2×40													V
				1×(40)			010	0 > 4 + 10									
			69 - 24			2×40	2×40	2×40								.	
						1×60	1×60	1×60									
44	MG	Muangmain	115 - 24	2×60		2×60	2×60	2×60	170 020	<u> </u>							178. 232
45	MI	Muangthong 1	115 - 24	2×60	•	2×60	2×60	2×60	178, 232			. 1	: .				110. 202
				12/(10)			ļ		(71, 293)	: .		:		233. 189			233. 189
46	NN	Na-na	69 - 12	1 × (40)		·								200, 109		·	200. 100
			69 - 24	2×60	· · · · · · · · · · · · · · · · · · ·	0.400	22.00	2 > 60							,		
			115 - 24			3×60	3×60	3×60	8. 529	12.793				21, 322			42.644
47	NH	Nongkham	69 - 12	1×40	V 00	3×60	3×60	3×60	0.029	12. 195				21,022			1
			69 - 24	ſ	× 60	3 > 00	3 ^ 00	3 ~ 00								-	1.0
40	BYE?	N	69 - 12		998)	· · · · · · · · · · · · · · · · · · ·			82. 094	123. 140		9.020	13. 531	22, 551			250, 336
48	NR	Nonthaburi	09 - 12	1×40			. :		02.034	120. 140		0,323	10.001	25,001		•	
			115 - 12		×40		1										
			115 - 12		×60 2×60	3×60	3×60	3×60				 					
			110 - 24		(2001)	3.700	3,00	3,700									
49	NK	North Bangkok	69 - 24	3×40	(2001)	3×40	3×40	3×40									0
50	PE	Pakkred	115 - 12	1×40				3/40	228.944		9. 020	13, 531	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1				251.495
] 00		I dikir cu	115 - 24		×60	3×60	3×60	3×60	(91, 578)								
	1			1 :	2000)												
51	PN	Paknam	115 - 24		2×60	3×60	3×60	3×60				18.040	27, 061	22, 551			67.652
	'''	Turrium	1.10		(2001)					1. A.							
52	PS	Petchkasem	69 - 12	1×40	2×22.4	<u> </u>								31.585		21. 322	52, 907
1		1,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5		2×22.4			1.5										
			69 - 24	i i	1×40	1×40	1×40	2×60						11			
					(2001)	1×60	1×60										
53	PI	Phaisingto	69 ~ 12	1×40								8, 529	12.793	60, 971			82, 293
			69 - 24		3×60	4×60	4×60	4×60									
					(2001)												
54	PJ	Poojao	69 - 12	3×40												21.322	21.322
			69 - 24	1	3×40	3×40	3×40	2×40									
	`				(2001)			1×60									
55	PC	Prachachuen	69 - 12	2×40						eggi Afric		8. 529	12, 793		21.322		42.644
			69 - 24		1×40	1×40	1×40	1×40									
					1×60	1×60	2×60	2×60									
					(2001)												*
					생물 본 유작성	1 2 2 2							<u></u>				
			10000			-1			and the second	taron angles (Alicho)	and the state of t	and the state of the	971 F 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				7



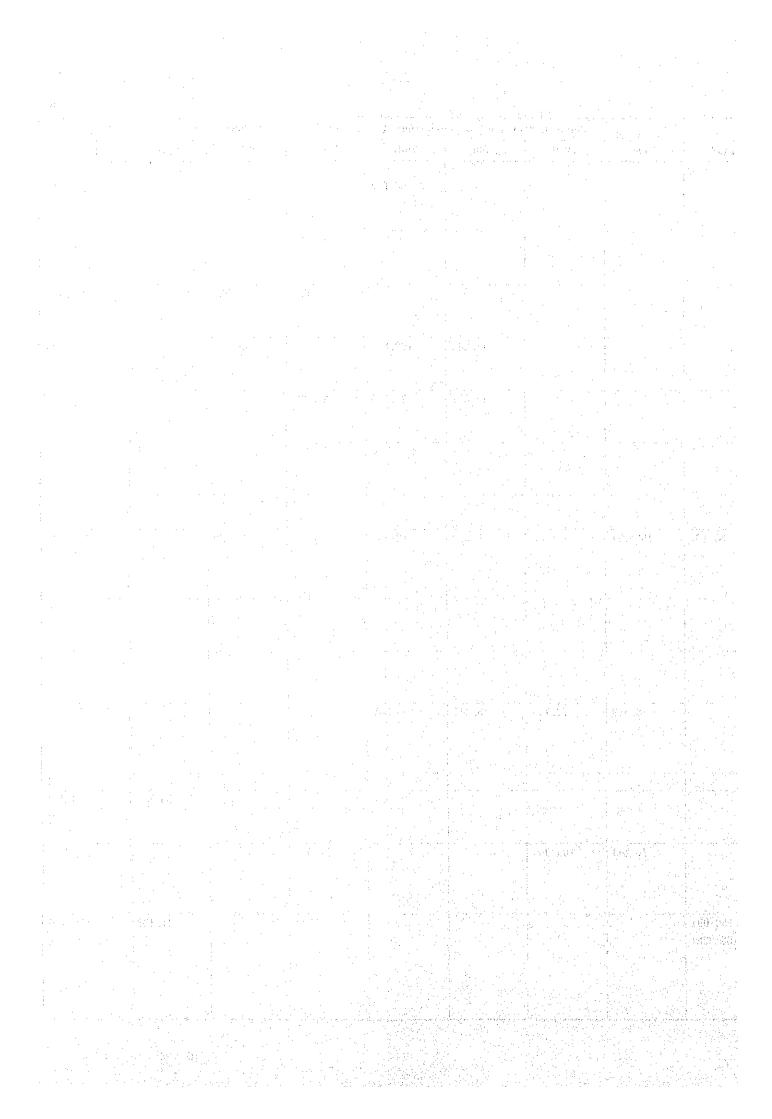
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 A. Construction of the second s				
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그녀를 걸고 된 강축되는데, 빨리 없는 전에 그리다 봤었다.		1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1		y i
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는 보통한 경험 등을 통해보고 있다면 하고 있었다. 그는 그런 이번 그를 받는 것은 이번 이름이 되었다. 그는 것이 들어진 것은 그는 것들은 것들은 것들은 그렇지 않는 것은 것이 되었다.				
이 전상을 통고하면 되고 하다는 소식인상, 회에 하늘의, 경우 경험 소리업 생각한 -	edit Aldinos P			WHEN AND

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			Yoltage	Number and Capac	,	·	· · ·	_ 	·		on Cost Disbu				2012	<i>m</i> . 1
No.	ABB	Substation	(kV)	1997 ~ 2001	~ 2006	~ 2011	~ 2016	1997	1998	1999	2000	2001	2006	2011	2016	Total
															100 110	
56	PK	Prakanong	69 - 12	2×40 1×40											183.112	183, 112
		i e	69 - 24	1×40 2×40	2×40	2×40	2×60		.			:			ĺ	
	·			(1998) (2001)	-				.:		· .					
57	PR	Prakasa	115 - 24	2×40	2×40	2×40	2×40							'		U
				1×60	1×60	1×60	1×60								·	
58	PO ·	Pranok	69 ~ 12	2×40 1×40											j	. 0
			69 - 24	1×40 2×40	2×40	2×40	2×40									
		i i		(2000) (2001)												· · · · · · · · · · · · · · · · · · ·
59	PD	Prapradaeng	69 - 12	3×40										1		0
	·		69 - 24		3×40	3×40	3×40					·				
60	PA	Prasanmit	69 - 12	2×40 2×40												. 0
			69 - 24	1×40 1×40 3×40	3×40	3×40	3×40	•				-				
			-	(1998) (2000)												
61	PM	Prathumwan	69 - 12	3×40 1×40				· ·								. 0
	[. "	69 - 24	2×40	3×40	3×40	3×40								4	
				(2001)	<u> </u>											
62	RT	Ramintra	115 - 24	2×60	3×60	3×60	3×60			•	s 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		22, 551			22, 551
63	RH	Ramkhamhaeng	69 - 24	2×40	2×40	2×40	2×40									0
				1×60	1×60	1×60	1×60									
64	RŅ	Rasburana	69 - 12	3×40							2.00				[]	0
			69 - 24		3×40	3×40	3×40									
65	RK	Romklao	115 - 24	2×60	2×60	3×60	3×60							22, 551		22.6
66	RC	Rungpracha	69 - 24	3×60	3×60	3×60	3×60								01.000	0, 000
67	SM	Sailom	69 - 12	2×40									*		21, 322	21, 322
1			69 - 24		2×40	2×40	1×40									
	<u> </u>				·		1×60				0 500	10 700				42, 644
68	SR	Samrong	69 - 12	2×40 1×40					8, 529	12, 793	8, 529	12. 793	le grand de la company			42, 044
			69 - 24	1×60 2×60 3×60	3×60	3×60	3×60									
				(1999) (2001)			<u> </u>								21. 322	21. 322
69	SN	Samsen	69 - 12	3×40 2×40											21. 322	21. 322
· .	i		69 - 24	1×40	3×40	3×40	2×40									
				(2001)			1×60	<u> </u>					01 000		91 202	42.644
70	SS	Sansah	69 - 12	1×40									21.322	•	21. 322	42.044
			69 - 24	2×40	2×40	2×40	1×40	1.								
					1×60	1×60	2×60			1 1						0
71	SD	Sapandam	69 - 12		4×40	4×40	4×40		<u> </u>				21, 322			21, 322
72	SP	Sapanmai	69 - 24	2×60	3×60	3×60	3×60	19 (1) (1) (1) (1) (1) (1) (1) (1			-	<u> </u>	21. 322	*	21.322	21. 322
73	SL	Silom	69 - 12	•	0	0.4.0	13770								21.342	21. 324
			69 - 24		2×40	2×40	1×40									
	1			0.440			1×60		1	 		-				0
74	SY	Sipraya	69 - 12		03440	0.2.0	0.7.10								-	U
			69 - 24	_ I	2×40	2×40	2×40								avalent spirit	
			1 - 1	(2001)	-							-				
75	SV	Soonvijai	69 - 12	· ·		132.00										
	ŀ		69 - 24	2×60	1×40	1×40	1×40					1				
					2×60	2×60	2×60									the second
1								1				4			1 1	

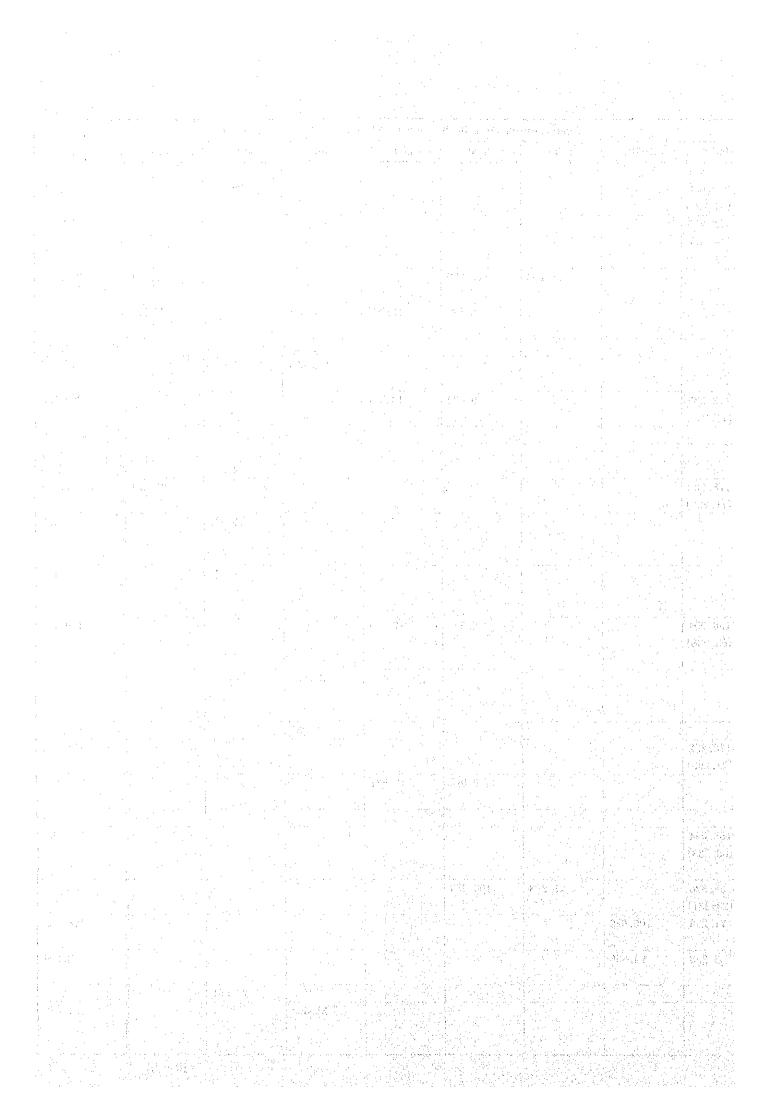




	Voltage Number and Capacity (MVA)							Construction Cost Disbursement (Price level in Year 1995)									
No.	ABB	Substation	Voltage (kV)	19	97 ~ 2001	~ 2006	~ 2011	~ 2016	1997	1998	1999	2000	2001	2006	2011	2016	Total
			(8.17	13	01 2001												
76	SK	South Bangkok	69 - 12	2×20								65, 736	98, 603				164, 339
1.0	U.I.	Journ Bangnen	69 - 24		1×60	1×60	1×60	1×60	i				-				
					(2001)												
77	ST	South Thomburi	69 - 12	2×(40)	1×(40)									21, 322			21. 322
		•	69 - 24		1×60 2×60	3×60	3×60	3×60					·	••			
					(1999) (2000)			1									····
78	YA	Srithanya	69 - 12	1×(40)								. :		210. 638	22, 551		233, 189
			69 - 24		L× (40)		•	· .									
			115 - 24		(1999)	2×60	3×60	3×60		:							
79	SO	Suansom	69 - 12	2×40								73. 245	109, 867	,	21. 322		204. 434
			69 - 24		2×60	2×60	3×60	3×60							."		
					(2001)												
80	SU	Surawong	69 - 12	3×40	1×40			1				17.057	25, 586	21.322			63, 965
	1		69 - 24		2×60	3×60	3×60	3×60								.	
	<u> </u>				(2001)	·	<u> </u>	<u> </u>								-	
81	TS	Taksin	69 - 12	1×40										· .		.	0
·	1		69 - 24	1×40	2×40	2×40	2×40	2×40					1 .		•		
			<u> </u>		(1999)												0
82	TP	Teparak	69 - 24	2×40		2×40	2×40	2×40						٠٠.			U
	<u> </u>			1×60		1×60	1×60	1×60	60 101	102. 287	<u> </u>	8, 529	12, 793		21.322		213, 122
83	TT	Thanontok	69 - 12	1×40	1×40				68. 191	102. 281		6, 5,29	12, 193		21.322		210.122
			00 04		1×(40)	0 > 00	3×60	2 > 60									
	1		69 - 24		2×60 (1998) (2001)	2×60	3 × 60	3×60									
	700	Tri	69 - 12	2×40	(1998) (2001)	-											0
84	ТВ	Thonburi	69 - 12	1×60		2×40	2×40	2×40							·		
			09 - 24	1,000		1×60	1×60	1×60									
85	TK	Tongkung	69 - 12	2×40	<u> </u>	1700	17700	17.00									0
00	I IN	Tolignuing	69 - 24	27.40	2×40	2×40	2×40	2×40								•	
			00 24	1 1 1 1 1	(2001)						*. *						
86	WB	Wangpetchaboon	69 - 12	2×40	2×40			1	:	8. 529	12. 793	73, 245	109.867				204. 434
	"2	, and by containing	7		1×(40)					7 i							
			69 - 24		3×60	3×60	3×60	3×60									
- '					(1999) (2001)												
87	WT	Wangthonglang	69 - 24	3×60		3×60	3×60	3×60									0
88	WL	Watlieb	69 - 12			3×40	3×40	4×40					1			58, 842	58. 842
89	YT	Yothee	69 - 12					1.0									0
			69 - 24	1		2×40	2×40	2×40									
90	BE	Bangkaen	69 - 12							71, 293	106, 939			22, 551			200, 783
			115 - 12		$2\times(40)$ $1\times(40)$												
			115 - 24		1×60	3×60	3×60	3×60					100				
					(1999) (2001)												
91	BZ	Bangson	69 - 12		1×(40)				158. 094							21.322	179, 416
			69 - 24		1×60 2×60	2×60	2×60	3×60	(63, 238)								•
	1				(1999) (2001)												
	1:																
	1 2 2 -										Interpretation		Taking THE	164419			



				Number and Capa	and the (MVA)				·	Construction	on Cost Disbu	rsement (Pric	e lovel in Ye	ar 1995)		
A7	400	Cubutatian	Voltage				0010	1007	1998	1999	2000	2001	2006	2011	2016	Total
No.	ABB	Substation	(kV)	1997 ~ 2001	~ 2006	~ 2011	~ 2016	1997	1998	1999	2000	2001	2006	2011	2010	TOTAL
				0.400	0.770	0 > 00	2 2 50	010 620				Peterson		22, 551		233, 189
92	RI	Bearing	115 - 24	2×60	2×60	3×60	3×60	210, 638 (84, 255)		·			٠.	22, 331		200, 105
								189, 250			· ·		233. 189			422. 439
93	EM	Ekamai	69 - 12	2×(40) 1×(40)									233, 109			122. 105
			69 - 24	1×60 2×60		24.00	0.400	(75, 700)								
			115 - 24	(1998)	3×60	3×60	3×60			71. 293	100,020				22. 551	200, 783
94	EB	Ekuburi	115 - 24	1×60 2×60	2×60	2×60	3×60			71. 293	106.939				22. 551	200, 165
				(2000)			·				8. 529	12, 793	210, 638		22, 551	254. 511
95	HA	Huamak	- 69 - 24	1×40 1×60						<i>;</i>	0, 529	12, 195	210.036		22, 001	204.00
			115 - 24	(2001)	2×60	2×60	3×60						21.322			21. 322
96	IN	Intamara	69 - 24	2×60	3×60	3×60	3×60							21.322		179. 416
97	JR	Jangron	69 - 12	1×(40)									158. 094	21. 322		175, 410
			69 - 24		2×60	3×60	3×60	140 000	<u>.</u>		0.000	10.501				200, 783
98	ко	Khotor	115 - 24	2×60 3×60	3×60	3×60	3×60	178. 232			9, 020	13, 531	Ę			200, 103
				(2001)			10 .	(71, 293)								0
99	KI	Kingkaew	115 - 24	2×60	2×60	2×60	2×60									22, 6
100	KH	Klongmahasawad	115 - 24	2×60	2×60	3×60	3×60				<u></u>			22, 551		22, 6
101	LB	Lardkrabang	115 - 24	2×60	2×60	3×60	3×60							22, 551		
102	МЗ	Muangthong 3	115 - 24	2×60	2×60	2×60	3×60	178, 232							22, 551	200. 783
								(71, 293)			*.			24 222		0.1.0
103	NS	Nonsee	69 - 12	2×(40) 1×(40)			1.7							21.322		21.3
			69 - 24	1×60 2×60	2×60	3×60	3×60								. [
				(1998) (2001)		ļ								21.000		
104	PP	Pradipat	69 - 12	2×(40) 1×(40)									1 - 1	21, 322		21.3
	1		69 - 24	1×60 2×60	2×60	3×60	3×60							,		
,			11 11	(1998) (2001)		<u> </u>									_ 	170 110
105	SA	Sainamtip	69 - 12	1×(40)				158, 094			8. 529	12, 793				179.416
			69 - 24	1×60 2×60 3×60				(63. 238)						L. Control of the Con	ł	
			115 - 24	(1998) (2001)	3×60	3×60	3×60									00 551
106	SB	Sanambinnam	115 - 12	1×(40)		1							22, 551			22. 551
	1		115 - 24	1×60 2×60	3×60	3×60	3×60							i	1	•
				(2001)												450.000
107	RG	Saorahong	115 - 24	1×60	2×60	2×60	2×60						178. 232	····		178. 232
108	OB	South Bangplee	115 - 24	2×60	2×60	2×60	2×60	178. 232								178, 232
								(71, 293)						···		
109	SE	Srieiam	115 - 24	2×60 3×60	3×60	3×60	3×60				9, 020	13, 531				22, 551
				(2001)												
110	SG	Suanluang	115 - 24	3×60	3×60	3×60	3×60									(
111	UK	Surasak	69 - 12	2×(40)				158. 094								158. 094
	1.1		69 - 24	2×60	2×60	2×60	2×60	(63, 238)								
				(2001)												
112	TN	Taiban	115 - 24	1×60 2×60	2×60	2×60	2×60	58. 328		71, 293	106. 939					236, 560
				(2000)				(23, 331)								1
113	TW	Taweewattana	115 - 24	1×60 2×60	2×60	2×60	2×60	71. 293	106. 939							178, 232
			The state of the state of	(1998)												
114	TR	Thomburirom	69 - 12	1×(40) 2×(40)				63, 238	94.856							158.09
	'		115 - 24	!	2×60	2×60	2×60									
115	TH	Tungsonghong	115 - 24	2×60	2×60	3×60	3×60							22. 551		22. (
116	YK	Yenarkart	69 - 12	2×(40)									21, 322			21.32
			69 - 24	2×60	3×60	3×60	3×60									
1	44							A Company of the Comp				1				



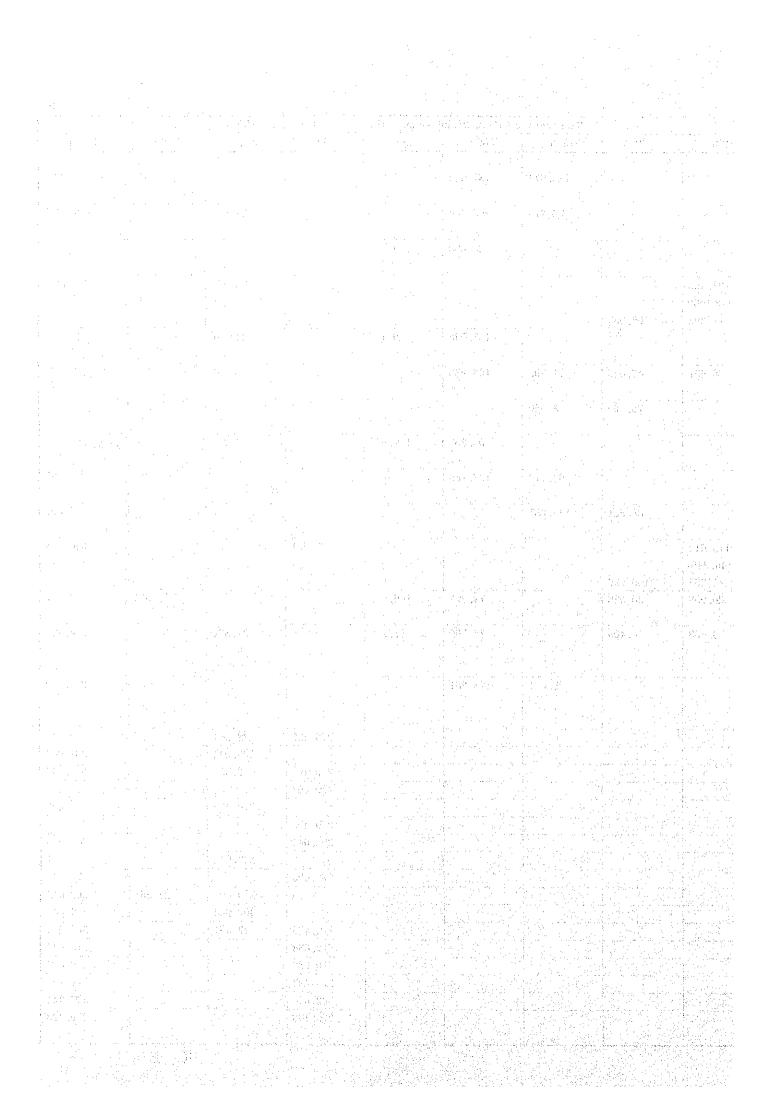
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			Voltage	Number and Capac	ity (MVA)					Construction	on Cost Disbu	rsement (Pric	e level in Y	ear 1995)		
No.	ABB	Substation	(kV)	1997 ~ 2001	~ 2006	~ 2011	~ 2016	1997	1998	1999	2000	2001	2006	2011	2016	Total
117	ΛВ	Bangbor	115 - 24	2×60	2×60	2×60	2×60	178, 232 (71, 293)								178, 232
118	JК	Bang jak	115 - 12 115 - 24	1×(40) 1×(40) 1×60 (2000)	3×60	3×60	3×60			71, 293	106, 939		22, 551			200, 783
119	KD	Bangkradee	69 - 12 115 - 24	1×(40) 2×60 (1999)	2×60	3×60	3×60	:	84. 255	126. 383				22, 551		233. 189
120	BH -	Bangshan	115 - 24	1×60 2×60 (1998)	2×60	3×60	3×60	71, 293	106, 939				·	22, 551		200, 783
121	MI	Banmai	69 - 24	2×60 (2001)	2×60	2×60	3×60				81.631	122. 446			21, 322	225. 399
122	DD	Dindaeng	69 - 12 115 - 12 115 - 24	1×(40) 2×(40) (2000)	2×60	3×60	3×60	161.132 (64.453)		63, 238	94. 856			22, 551		341.777
123	EC	Ekachai	69 - 12 115 - 24	1×(40) 1×60 2×60 (1999) (2001)	2×60	3×60	3×60		13.510	20. 266	71, 293	106. 939		22. 551		234, 559
124	GK	Ghoaklang	69 - 24 115 - 24	2×60	3×60	3×60	3×60	158. 094 (63. 238)					233. 189			391, 283
125	JW	Jangwatana	115 - 24	2×60	3×60	3×60	3×60	178, 232 (71, 293)					22, 551			200, 783
126	JJ	Jatujag	69 - 12 69 - 24 115 - 24	2×(40) (1998) 2×60 (2001)	2×60	3×60	3×60	75, 700	113, 550					233, 189		422. 439
127	KE	Kaset	69 - 12 69 - 24	1×(40) 1×60 2×60 (1998) (1999)	2×60	3×60	3×60	75, 700	113. 550					21.322		210. 572
128	KG	Klongkum	115 - 24	1×60 2×60 (1999)	2×60	3×60	3×60	53, 418	71. 293	106, 939				22. 551		254. 201
129	KL	Klongprapa	115 - 24	_ 	2×60	3×60	3×60				71. 293	106. 939		22, 551	·	200. 783
130	MU	Mitr-udom	69 - 12 69 - 24	1×40	2×60	3×60	3×60						189, 250	21. 322		210.572
131	M4	Muangthong 4	115 - 24	1×60 2×60 (1998)	2×60	2×60	3×60	33.776 (13.510) 71.293	1						22. 551	234. 559
132	M5	Muangthong 5	115 - 24	2×60 (1999)	2×60	2×60	2×60	11, 200	84. 255	126, 383						210, 638
133	M6	Muangthong 6	115 - 24		2×60	2×60	2×60			84. 255	126. 383					210, 638
134	M7	Muangthong 7	115 - 24		2×60	2×60	3×60				84. 255	126.383			22, 551	233, 189
135	NL	Nanglerng	69 - 12	2×40 (2001)	3×40	3×40	4×40				113.070	169.604	16, 184		58. 842	357.700
136	TA	Patanakarn	115 - 24	1×60 2×60 (1999) (2001)	3×60	3×60	3×60		50, 611	75.917	71, 293	106, 939	22, 551			327, 311
137	PL	Plubpla	115 - 24	2×60 (2001)	2×60	2×60	2×60				120. 265	180.397				300, 662

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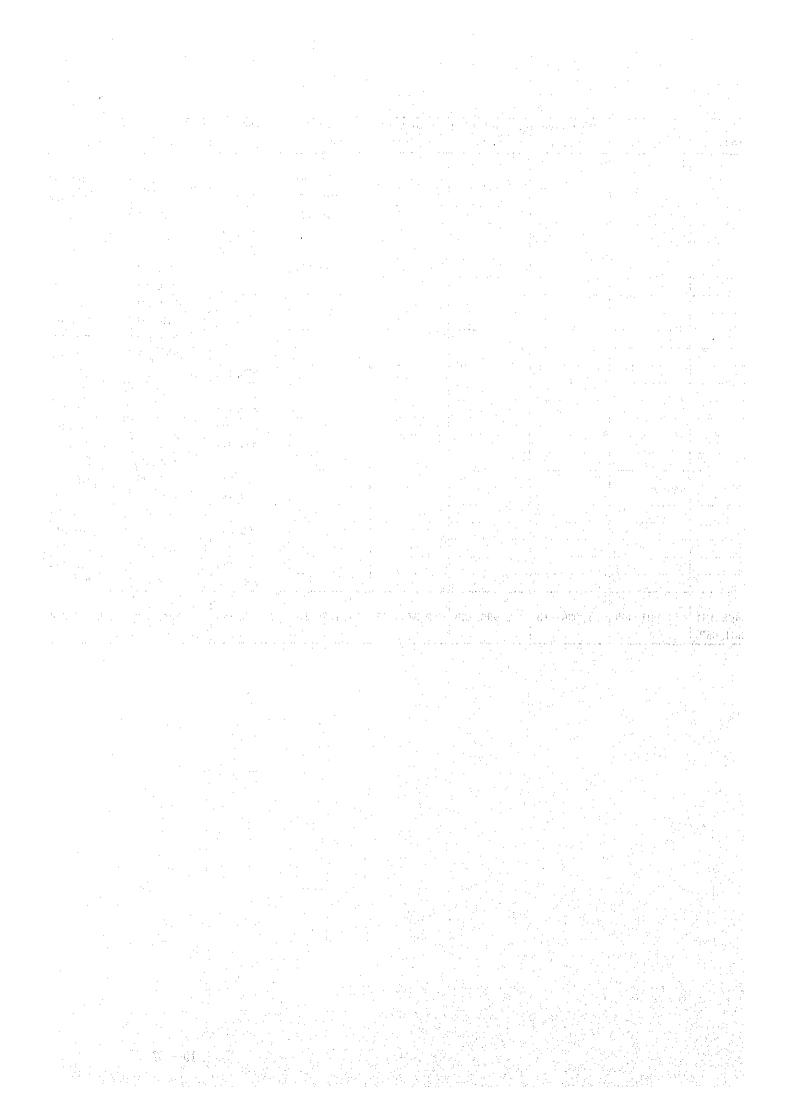
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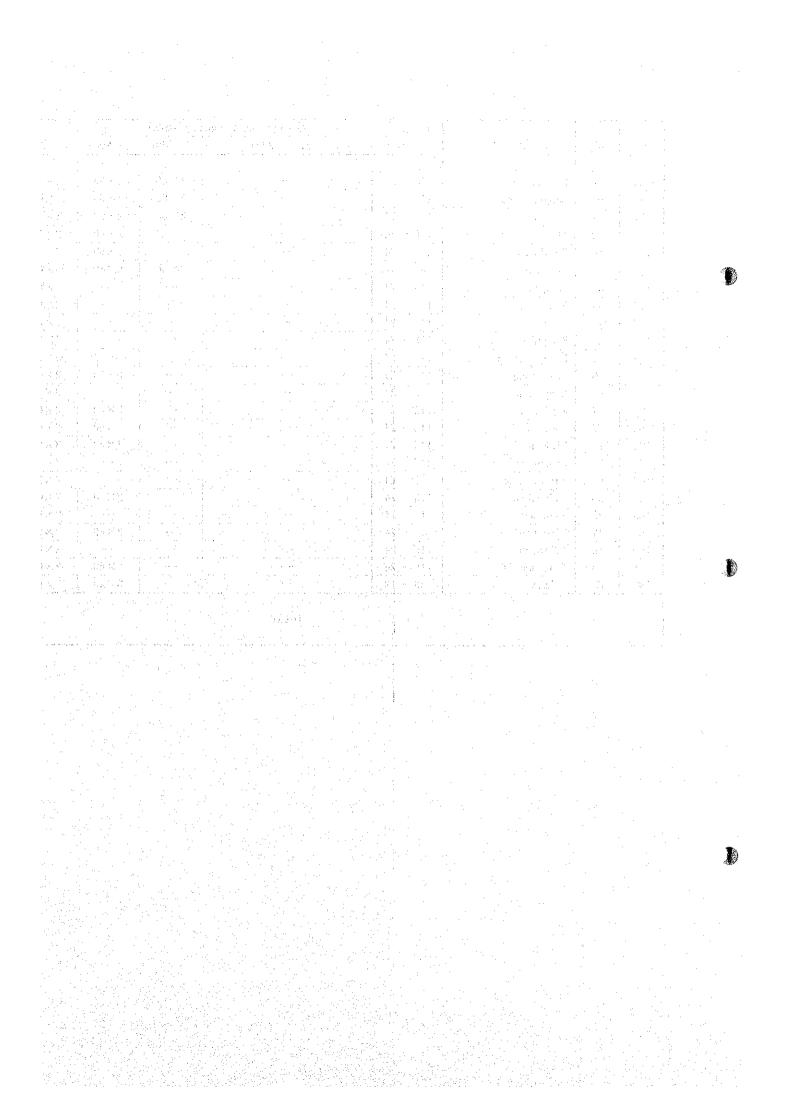
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No.	ABB	Substation	Voltage	1997 ~ 2001	~ 2006	~ 2011	~ 2016	1997	1998	1999	2000	2001	2006	2011	2016	Total
NO.	ADD	Substation	(kV)	1997 ~ 2001	.0 2000	2011	2010	1991	1336	1333	2000	2001	- 5555			
138	РW	Prawes	115 - 24	2×60 (2000)	2×60	2×60	3×60			120, 674	181.012				22. 551	324. 237
139	RP	Prompong	115 - 24	2×60 (2000)	2×60	3×60	3×60	-		138, 270	207. 404		·	22, 551		368. 225
140	SI	Sainoi	115 - 24	2×60 (2001)	2×60	2×60	2×60				88, 838	133, 257		·		222, 095
141	YN	Samyarn	115 - 12	1×(40) 2×(40) (1998)	· · · · · · · · · · · · · · · · · · ·			197. 456 (78. 982)						22. 551		398, 239
			115 - 24		2×60	3×60	3×60	71. 293	106, 939					00.551		A) 2 700
142	SII	Satorn	115 - 24	2×60 (2001)	2×60	3×60	3×60				166, 095	249, 143		22, 551		437, 789
143	HP	Shimplee	115 - 24	1×60 2×60 (1998) (2000)	2×60	3×60	3×60	30. 697	46, 045	71.293	106, 939			22, 551		277, 525
144	SW	Sriwiang	69 - 12 69 - 24	2×(40) (1999)	2×60	2×60	2×60		75. 700	113, 550						189. 250
145	YI	Suanyai	115 - 24	2×60 (2001)	2×60	2×60	2×60				106. 352	159, 527				265, 879
146	₩₩	Suwintawong	115 - 24	2×60 (2000)	2×60	2×60	2×60			92.112	138. 168					230, 280
147	TI	Tha-kwian	69 - 12	2×(40)	2×60	2×60	2×60		85. 521	128. 281						213. 802
148	TC	Trokchan	69 - 24 115 - 12	(1999) 1×(40) 2×(40)	2 × 60	2 × 60	2×00	115.613					22. 551		1	316, 396
			115 - 24	(1998)	3×60	3×60	3×60	(46. 245) 71. 293	106. 939							
149	TY	Tubyao	115 - 24	1×60 2×60 (1998) (2001)	2×60	2×60	3×60	20, 058	30, 086		71, 293	106. 939			22. 551	250. 927
150	₩K	Watkampaeng	69 - 12 69 - 24	1×40 (1998) 2×60	2×60	3×60	3×60	29. 603	44, 405		75, 700	113.55		21.322		284, 580
151	WR	Wuttakart	69 - 12	(2001) 1×(40)						85, 521	128. 281	N. N.				213. 802
151	ис	Huttakart	69 - 24	1×60 2×60 (2000) (2001)	2×60	2×60	2×60									
152	AK	Asoke	115 - 24	(2000) (2001)	2×60	3×60	3×60	<u> </u>					279. 493	22.551		302.044
153		Banghuotong	115 - 24			3×60	3×60							302, 044		302, 044
154		Banghuasae	115 - 24		2×60	3×60	3×60						279, 493	22. 551		302.044
155		Bangkaew	115 - 24		2×60	2×60	2×60						279, 493			279, 493
156		Bangpleeyai	115 - 24	_		2×60	2×60							279, 493		279. 493
157		Bangtalard	115 - 24		2×60	2×60	2×60						279, 493			279.493
158		Jorakabuo	115 - 24	<u> </u>	3×60	3×60	3×60						302, 044			302, 044
159		Klongbangpi	115 - 24	<u>-</u>		3×60	3×60							302, 044		302.044
· 1——		Klongna	115 - 24		2×60	2×60	2×60						279.493			279, 493
160		Klongpume	115 - 24	<u> </u>		2×60	3×60							279, 493	22. 551	302.044
161		Krungtepkreeta	115 - 24			3×60	3×60							302.044		302, 044
162		Land & House	115 - 24		2×60	3×60	3×60						279.493			302.044
163			115 - 24		2×60	2×60	2×60					1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	210, 638			210, 638
164		Muangthong 8			2×60	2×60	2×60			-			210, 638			210, 638
165	—- j	Muangthong 9	115 - 24		2×60	2×60 2×60	2×60 2×60						279.493			279, 493
166	~	Praramkao	115 - 24			3×60	3×60						302.044			302, 044
167		Rajchaprarop	115 - 24	···	3×60						1 3 4 4 5 5 5 5 5 5 6 5 6 6 6 6 6 6 6 6 6 6		279, 493			279. 493
168	NP	Sanampao	115 - 24		2×60	2×60	2×60						219,493			210.490



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· 1			Voltage	Number and Capac	ity (MVA)		Construction Cost Disbursement (Price level in Year 1995)									
No.	ABB	Substation	(kV)	1997 ~ 2001	~ 2006	~ 2011	~ 2016	1997	1998	1999	2000	2001	2006	2011	2016	Total
												:	·	. 1		
169	OM	Sananikom	115 - 24	نبس	2×60	2×60	3×60						279, 493		22, 551	302. 044
170	08	Songsunikom	115 - 24		2×60	2×60	2×60						279, 493			279, 493
171	IR	Srinakarin	115 - 24	. <u></u>	2×60	2×60	3×60						279. 493		22, 551	302.044
172	LO	Thonglor	115 - 24	<u></u>		2×60	2×60							279, 493		279. 493
173	TU	Tungkru	115 - 24	<u> </u>		2×60	2×60							279, 493		279, 493
174	WD	Watdeedod	69 - 24		2×60	2×60	3×60						259, 104	<u> </u>	21.322	280. 426
175	GY	Bangkruay	115 - 24		- <u>-</u> -		2×60					:			279. 493	279, 493
176	GG	Bangpang	115 - 24				2×60								279, 493	279, 493
177	AA	Bangpla	115 - 24	. Annual			2×60		_			i			279, 493	279, 493
178	LD	Klongdan	115 - 24	<u> </u>		-	2×60								279. 493	279, 493
179	GT	Klonggratiam	115 - 24			_	3×60					. :			302. 044	302. 044
180	LG	Luangpang	115 - 24	-	T -	2×60	2×60							279, 493		279, 493
181	LS	Lumpagshe	115 - 24		_		3×60								302.044	302, 044
182	NI	Nimitmai	115 - 24	<u> </u>		2×60	2×60		:					279, 493		279. 493
183	NY	Nongyai	115 - 24	.—	T : -	2×60	2×60							279. 493		279, 493
184	IL	Pinklao	115 - 24		<u> </u>	3×60	3×60							302, 044		302.044
185	PH	Pongpetch	115 - 24				2×60								279. 493	279, 493
186	PT	Puttamonton	115 - 24	-	T -	_	2×60								279. 493	279, 493
187	RO	Rajchakru	115 - 24	-	_	2×60	2×60					i-	· ·	279. 493	070 100	279. 493
188	RR	Rajdamri	115 - 24	- :	<u> </u>		2×60								279, 493	279. 493
189	ΑT	Satorntai	115 - 24			3×60	3×60	en en en en en en en en en en en en en e						302. 044		302.044
190	TL	Talingchan	115 - 24		_		2×60							770 125	279, 493	279, 493
191	TM	Tiamruammit	115 - 24			2×60	2×60							279. 493		279, 493
192	RM	Trimit	69 - 12	_		3×40	3×40							243, 313		243. 313
											0.000.555	0.040.000	7 707 000	c 750 0cc	3, 824, 169	30, 978, 614
				Total				4, 408. 164	1, 997, 090	1, 936. 913	2, 996. 739	2, 348. 690	7, 707. 983	5, 758. 866	3,024.109	50, 510, 014
								(1, 384, 089)	1 · 1							





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	하는 이 물에 가지 않는 살이 많이 어떻잖아.
반으기는 어느 경찰을 되다. 호텔을 연극하는	
	입사하고 하면 보고 이 전쟁으로 그렇게 이 없을다.
그들이 그는 그렇게 고려왔다면 앞 결과 그들고 있다.	
	그는 현 나는 그 경험이 전하는 회장 발표를 열심했다.
그러가 그리 강인 하고 보고 환경 회원을 하는다.	사이다는 아이 아이는 하는 것이다. 그는 물로 여름였다.
시민 그는 사람들은 아이들이 얼마를 가는 것이다.	
그리고 그는 그 사람 하면 된 일본 중요 중요를 모양했다고 됐다.	힘들어 나는데 너 어머니는 것 않는데 얼마를 하네요?
	보이 되어 보는 것 같은 말로 가능하는 생각을 하고 있었다.
	이것은 이 사이 스탠딩인 얼마면 이로를 통해되었다.
	사람들은 나는 사람들은 그들은 일을 했다고 있었다.
	중요한 아이지 않는 한다면 하는 사람들이 되는 사람들이 없다.
이 아니는 아이들 아이를 하는 말을 하는데 살아 먹는 것이다.	이어보고 있습니다. 그는 사람들이 되는 사람들이 얼마나 되었다.
	그는 일본 이 물건이 되는데 그 모양을 가고싶었다.
	이 보다가 그 사람들은 아내가 살길 수 있는 것 같아 했다.
하는 사람들은 사람이 있는 이 사람들이 가지 않는 것은	
그리는 그 이번 가장 이번 생각 회를 가장하는 것이다.	
이 보고 하고 하는 생님, 않으셨습니 살이 되고 밝혔다.	
상으로 보고 있는데 보고 있는데 함께 되었다. 그 사람들이 되었다. 그 사람들이 되었다. 그 사람들이 보고 한국을 하는데 함께 되었다. 그는데 보고 있는데 아니라 보고 있는데 그렇게 하고 있는데 그를 보고 있는데 그를 보고 있다. 그를 보고 있는데 그를 보고 있다. 그를 보고 있는데 그를 보고 있다.	0

10.5.3 Telecommunication Equipment

The total amount of the construction cost of telecommunication facilities in the respectively relevant fiscal years is presented in the Table below based on the price level in FY 1995.

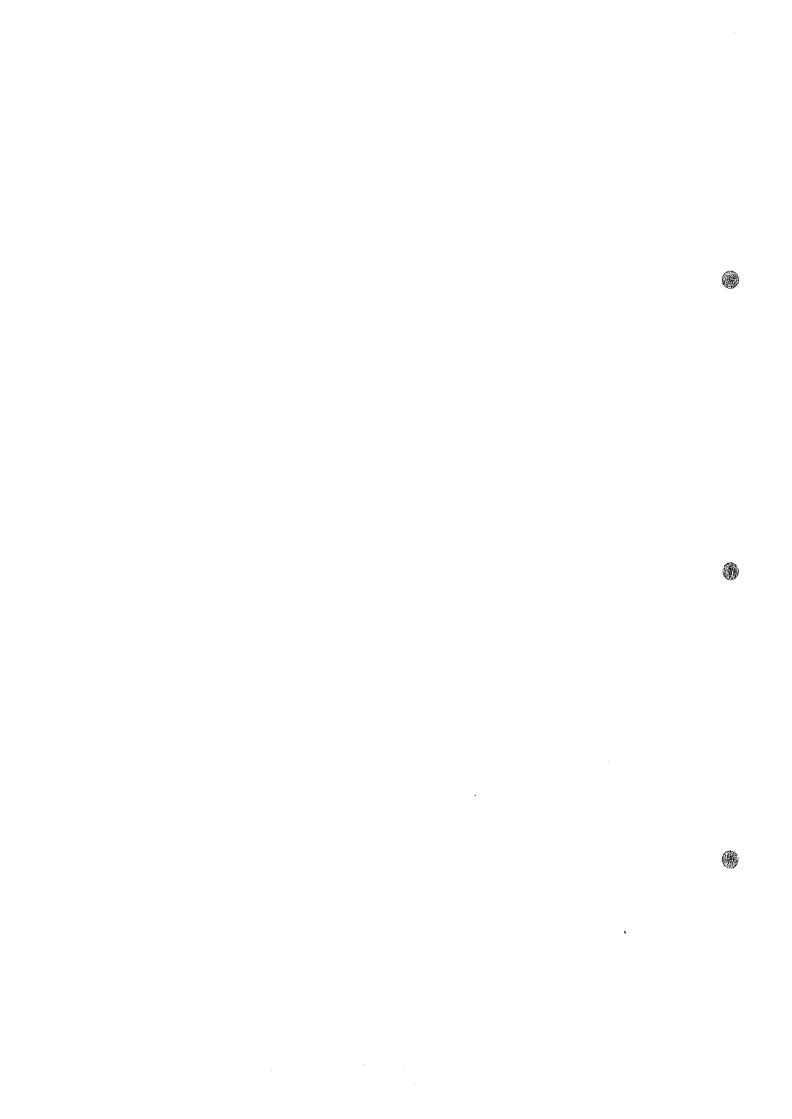
The exchange rate is US\$ 1 = 25.0 Baht.

Telecommunication Facilities (Cost in FY 1995)

Planned Year		1997	1998	1999	2000	2001
Period from t	he last	1	1	1	1	1
Total	(M. Baht)	52.2	43.1	36.5	54.8	52.2
Total	(M.US\$)	2.1	1.7	1.5	2. 2	2.1

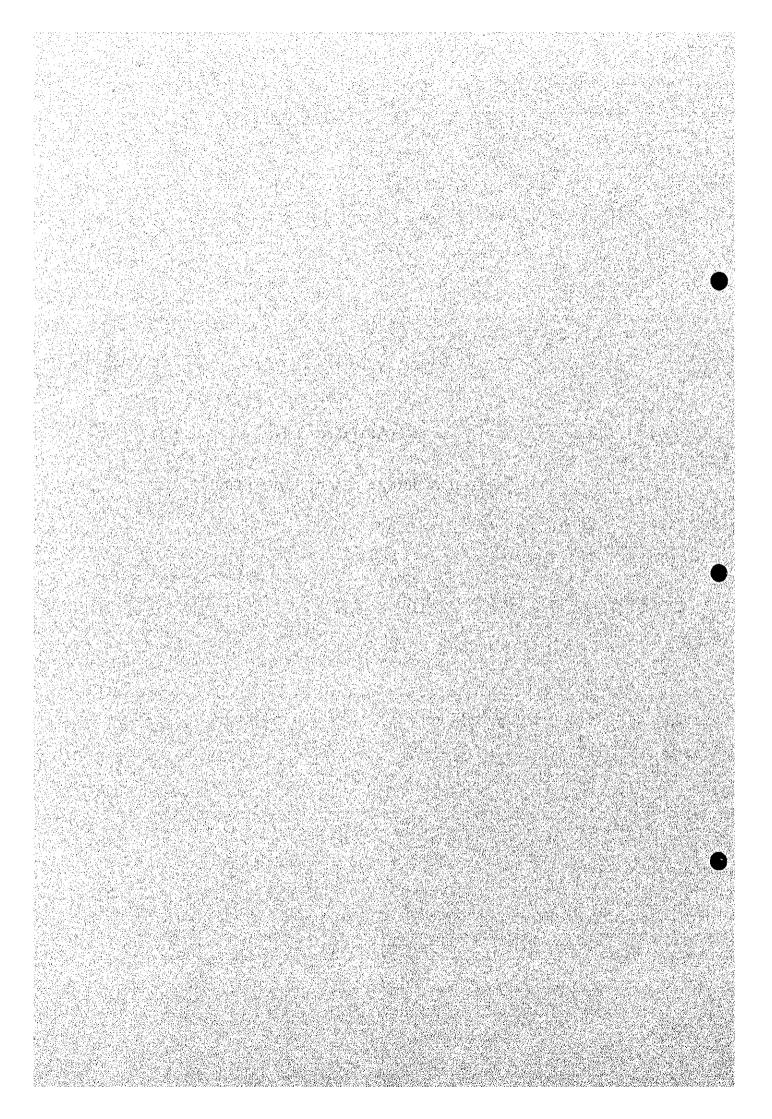
Planned Year		2006	2011	2016
Period from the	last	5	5	5
Total	(M. Baht)	120.0	68.4	54.2
Total	(M. US\$)	4.8	2.7	2.2
Annual Invest.	(M. Baht)	24.0	13.7	10.8
Annual Invest	(M. US\$)	1.0	0.5	0.4

The total construction cost of the telecommunication facilities is US\$19.30 million based on the exchange rate of US dollar in FY 1995. The telecommunication facilities implied herein refer to those for the SCADA system (RTUs and UHF radio equipment). Therefore, the construction cost of the optical fiber telecommunication system between district offices is not included in the above total construction cost. Moreover, the construction cost of the telecommunication facilities (voice radio system, etc.) other than the SCADA system related to construction of substations are not allocated in the total cost since this cost is included in the substation construction cost.



CHAPTER 11

ECONOMIC EVALUATION



CHAPTER 11 ECONOMIC EVALUATION

11.1 General

The economic performance of this Power Distribution Improvement and Expansion Plan in the Metropolitan Area (the Project) is assessed from the increased benefit (B-C), the ratio of benefit against the cost (B/C), and the Economical Internal Rate of Return (EIRR) which provides a value equal to the Project when its value is converted to the present value.

In this feasibility study by JICA, we did not estimate the construction cost of distribution facilities. But without the distribution facilities construction cost, we can not asses the reasonable economic and financial performance of this Project. So, by using the data from the Annual Report of MEA FY 1994, we estimate the construction cost as follows.

Distribution Facilities Construction Cost = Construction Cost by this project \times [Distribution Facilities Increase during FY 1994 / (Transmission and Distribution Substation + Subtransmission Lines Increase during FY 1994)]

This construction cost ratio is estimated at 66.98%.

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11.2 Premises Conditions for Economic Evaluation

The calculation for the economic assessment is conducted according to the following premises:

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(1) Electricity tariff rate was a second state of the first term of the first second s

The average sales price of MEA based on the current tariff system is applied. This average sales price is the tariff charged by MEA to every consumer. It is based on the invested amount and the cost of MEA for the subtransmission and distribution network.

(2) Total investment

Only MEA's construction cost related to this Project is appropriated. However, the interest during the construction, import taxes, VAT tax and the escalation factor are excluded. The construction cost is estimated based on the cost in FY 1995.

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The part of this Project is conducted by EGAT. Considering that the current electricity tariff system is based on the investment of each power company, EGAT's investment is excluded from the study.

(3) Currency exchange rate

Currency exchange rate is assumed that 1 US\$ = 25.0 Baht

(4) Operation and maintenance cost

The annual operation and maintenance cost is predetermined based on discussions with MEA. Accordingly, the cost of the subtransmission lines is 3.0% of the construction cost (import taxes and VAT tax excluded). The cost of terminal station and distribution substation, telecommunication facilities and distribution facilities are 4.0% of the construction cost, excluding the import taxes and VAT tax.

(5) Calculation period

The service life of the related facilities is specified for each facility by MEA. Since the subtransmission lines, distribution substations and telecommunication facilities consist of wide range of materials and equipment, a cumulative calculation is required to acquire an accurate total service life. In this Study, the service life of the major equipment and materials at each facility is regarded as being the total service life of the facility. In the case of the subtransmission lines, their service life is calculated from the weighted average service life of the overhead cables and underground cables. The total service life of the subtransmission, distribution substation, telecommunication facilities and distribution facilities are calculated from the weighted average of each facilities.

The calculations show this to be 22 years.

(a) Subtransmission line:

Overhead Line: 30 years

Underground cable: 25 years

Sub total: 26 years
(b) Substation: 25 years

(b) Substation: 25 years
(c) Telecommunication Facilities: 10 years

(C) Telecommunication Facilities: 10 years

(d) Distribution Facilities: 20 years
Total: 22 years

Considering that the facilities to be constructed under this Project will be completed one by one from FY 1997 to FY 2016 and their commercial operations will last 20 years from FY 1998 to FY 2017, the end period of this calculation is set from the middle point of the commercial operation period (that is FY 2008) for 22 years, until FY 2029. So, the basic calculation period is 32 years from FY 1998 to FY 2029.

(6) Discount rate

The discount rate is predetermined at 10% p.a.

(7) Electricity purchase

MEA's average purchase price from EGAT, based on the current fee system, is applied.

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11.3 Benefit Evaluation

The following items are considered as the benefits of this Project.

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(1) Increased power to consumers

when the facility completed in the end of FY 1997 starts providing the benefit from FY 1998, the electricity that exceeds the capacity in FY 1997 with the current facilities, is the actual benefit realized by this reinforcement project. Also, a new reinforcement project shall be conducted in response to increased demands after FY 2017.

Therefore, the balance after deducting the load (estimated demand) in FY 1997 in the MEA district from the yearly power consumption (estimated demand; flat after FY 2017 for the previously described reason) in the MEA district between FY 1998 and 2019 is regarded as the increased electricity made available to consumers. The benefit of this reinforcement project is acquired by multiplying this increased electricity and unit price (described later herein), then deducting the power generation cost. The increased electricity for each fiscal year is described in Table 11.3-2.

(2) Value of increased distribution power due to decreased outages realized by this Project.

The purpose of this Project is to expand the transmission and distribution and substation facilities in response to the increasing demand for MEA. The expansion project is planned to ensure the required supply reliability in the future, considering the current MEA facility standards.

Regarding each facility to be installed, MEA's present technological level has been studied thoroughly and it is seen as adequate for future application.

The facilities to be installed for this Project are designed assuming that no specification changes will be required. However, the exact failure ratio of MEA is unavailable, although it will be improved and is not, therefore, considered in this economic assessment.

(3) Reduced maintenance cost of power system facilities

As previously described, the failure ratio will be improved from the present level. However, the reduction of possible failure recovery cost is not considered in this economic assessment due to difficulties in acquiring the exact ratio.

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(4) Pollution prevention cost not required by this Project (1888) and Free Control of the Contro

This Project improves Subtransmission loss. The loss ratio is described in Table 11.3-3. Currently, the cost of desulfurization and denitrogen oxide is not included in the purchase price from EGAT. When it is added to the current fee, however, it will be 16 Stang/kWh for desulfurization and 0.33 Stang/kWh for nitrogen removal. Therefore, the amount equivalent to the improved transmission and distribution loss becomes the pollution prevention cost. The pollution prevention cost is described in Table 11.4-4.

an antronomie i komzetej je baranje, akan ngazin jej njektije nga komine jej jej je je Polje je velovim samo panar po penad desatropoj jej primaj energije bili dijelome. Analogije je velovimaj je velovimaj postanja produktion parti i je dovima drijakao akan

11.4 Economic assessment

11.4.1 Cost

(1) Construction cost

Regarding the total investment for this reinforcement Project, the import taxes and VAT tax are excluded from the construction cost estimated in the CHAPTER 10. Escalation is also not considered. The details for each fiscal year are described in Table 11.4-1.

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(2) Operation and maintenance cost

The operation and maintenance cost is calculated based on the previously described premises conditions. The details for each fiscal year are described in Table 11.4-2.

(3) Electricity purchase

The purchase price for the increased electricity required by MEA is described in Table 11.3-2. The unit price is described in Table 11.4-3.

11.4.2 Benefit

(1) Unit benefit cost of electricity

It is appropriate to use the amount after deducting the power subtransmission and distribution cost from MEA's average sales price as the unit price to evaluate the benefit of this Project. The reason for this is that the electricity fee is calculated by the power company for the public service based on the cost method, thus reflecting a "willingness to pay" on the part of the consumers in general.

MEA's average sales price is given in Table 11.4-3.

The present values of FY 1995 are applied as the standard values.

The amount, after multiplying the increased electricity and the unit price, and MEA's purchase price are described in Table 11.4-4.

(2) Unnecessary pollution prevention cost

The cost for desulfurization and nitrogen removal that is not required due to an improved loss ratio is described in Table 11.4-4.

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11.4.3 Economic Assessment Result

The benefit and cost flow in this Project are described in Table 11.4-5. EIRR calculation is described in Table 11.4-6. The acquired EIRR, B-C, and B/C are described below:

(1) EIRR:

12.58%

(2) B-C: Baht 8,528.32 Million (US\$ 341,133 Thousand)

The economic assessment of this Project shows a satisfactory EIRR, B-C, and B/C. This reinforcement project is, therefore, feasible in terms of its economical performance.

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Table 11.3-1 Estimation for Energy Purchase and Energy Sales

				MEA Forec	ast			J			
	Energy	Energy	Street L	ighting	Energy	Sales	Energy	Energy	Energy	Energy	Energy
FY	Purchase	Sales	Consu	mpton	Exclude St	eet Lighting	Loss	Purchase	Sales	Loss	Saving
	A	В	С	C/B	D	D/B	1-8/A	Ε	В	1-B/A	E-A
	GWh:	GWħ	GWh	%	GWh	%	%	GWh	GWn	%	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%	tir v i
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%	1 Ev
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		4.70%	, , ,	34,194	4.83%	
1998	38,632	36,817	161	0.44%	36,656	99.56%	4.70%		36,817	4.56%	-5
1999	41,573	39,619	. 173	0.44%	39,446	99,56%	4.70%	41,488	39,619	4.50%	-8
2000	44,644	42,546	186	0.44%	42,360	99.56%	4.70%	44,525	42,546	4.44%	-11
2001	48,085	45,825	200	0.44%	45,625	99.56%	4.70%		45,825	4.49%	-10
2002	51,085	48,684	212	0.44%	48,472	99.56%	4.70%		48,684	4.49%	-11
2003	54,009	51,471	224	0.44%	51,247	99.56%	4.70%	53,892	51,471	4.49%	i i . -1 1
2004	57,066	54,384	237	0.44%	54,147	99.56%	4.70%	56,942	54,384	4.49%	-12
2005	60,181	57,353	250	0.44%	57,103	99.56%	4.70%	60,051	57,353	4.49%	-13
2006	63,345	60,367	263	0.44%	60,104	99.56%	4.70%	63,202	60,367	4.49%	-14
2007	66,549	63,421	277	0.44%	63,144	99.56%	4.70%	66,399	63,421	4.49%	-15
2008	69,794	66,514	290	0.44%	66,224	99,56%	4.70%	69,637	66,514	4.49%	: .· : -15
2009	73,080	69,646	304	0.44%	69,342	99.56%	4.70%	72,916	69,646		-16
2010	76,407	72,816	318	0.44%	72,498	99.56%	4.70%	76,235	72,816	4.49%	-17
2011	79,775	76,026	332	0.44%	75,694	99.56%	4.70%	79,607	76,026		-16
2012	82,587	78,705	343	0.44%	78,362	99.56%	4.70%	82,412	78,705	4.50%	-17
2013	85,398	81,385	355	0.44%			4.70%		81,385	4.50%	-18
2014		84,064		0.44%	83,697	99.56%	4.70%	88,024	84,064	4.50%	-18
2015	and the second	86,743	378	0.44%			4.70%	90,829	86,743		-19
2016	1				1 1		4.70%	93,665	89,423	4.53%	-10

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

100		Which Wi	li become ava	liable by this	Project	<u> </u>			(CVh)
		Energy Purcha	9 4	Energy Sal	es, including S	treet Lighting	Energy Sak	s, Excluding S	treet Lighting
FY	Electric	FY 1997	incrementai	Electric	FY 1997	incremental	Electric	FY 1997	Incremental
	Energy	Forecast	Electric Energy	Energy	Forecast	Electric Energy	Energy	Forecast	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	35,861	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		35,881	46,531	78,705	34,194	44,511	78,362	34,045	44,317
2013		35,881	49,337	81,385	34,194	47,191	81,030	34,045	46,985
2014		35,881	52,143	84,064	34,194	49,870	83,697	34,045	49,653
2015		35,881	54,948	86,743	34,194		86,365	34,045	52,320
2016		35,881	57,784	89 423	34,194	55,229	89,033	34,045	54,988
2017		35,881	57,784	89 423	34,194	55,229	89,033	34,045	54,988
2018		35,881	57,784	89,423	34,194	55,229	89,033	34,045	54,988
2019	1	35,881	57,784	89,423	34,194	55,229	89,033	34,045	54,988
2020		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		35,881	57,784	89,423	34,194	55,229	89,033	34,045	54,988
2023		35,881	57,784	89,423	34,194	55,229	89,033	34,045	54,988
2024		35,881	57,784	89,423	34,194	55,229	89,033	34,045	54,988
2025	4	35,881	57,784	89,423	34,194	55,229	89,033	34,045	54,988
2026		35,881	57,784	89,423	34,194		89,033	34,045	54,988
2027		35,881	57,784	89,423	34,194		89,033	34,045	54,988
2028		35,881	57,784	89,423	34,194		89,033	34,045	54,988
2029		35,881	57,784	89,423	34,194	55,229	89,033	34,045	54,988
T-4-1	2,480,214	4 449 400	1,332,022	2 269 209	1,094,208	1,274,100	2,357,980	1 089 436	1,268,544

Table 11.3-3

	Subtr	ansmission MV	V Loss			Total				
:	Terminal Station	Distribution	Subtransmission				1996 MEA	Decrement	Energy	Losses
FY	(Transformer)	Substation	Loss	Load	Loss	Loss Ratio	Forecast	Percent Compare	MEA	JICA
	Α	(Power Load)	C×A-B	D=Ax8760x0.65	E=Cx8760x0.50	F=E/D	Loss Ratio	with 1996 MEA	Forecast	Forecas
	MW	B, MW	MW	GWh	GWh	*	G	Forecast, H=F-G	1, %	J=H+1
1996	57				1000	1.00	0.51%		4.70%	100
1997	6,331.4	6,279.0	52.4	36,051.0	229.5	0.64%	100	0.13%	4.70%	4.83
1998	6,807.0	6,774.1	32.9	38,759.1	144.1	0.37%	P. P.	-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	e. Joseph							-0.21%	4.70%	4.49
003								-0.21%	4.70%	4.49
2004	B - 1 14				a a sa a		. 4	-0.21%	4.70%	4.49
2005		r Thras			er i jarren e	1	1.1	-0.21%	4.70%	4.49
2006	10,890.7	10,848.9	41.8	62,011.6	183.1	0.30%	長年	-0.21%	4.70%	4.49
2007		To the second		11 (4.5)		E S	17.	-0.21%	4.70%	4.49
2008	4 1 4				April 1975	1 1 1 1 1 1		-0.21%	4.70%	4.49
2009					el en telligia del Composito del composito de			-0.21%	4.70%	4.49
2010					international designation in the second seco			-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				1.00	a Sanaii			-0.20%	4.70%	4.50
2014						10.04	1.5	-0.20%	4.70%	4.50
2015			dy Av E		and property	Ten. (4)	45.3	-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

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																	1
	I	Subtransm	ssion Line	1.00		Distribution	Substateon			Telecom	nuncation			Distribution	s Facilities		Total
	Construction	Velue	import	Construction	Complitudion	Value	Import	Construction	Construction	Value	import	Construction	Construction	Value	Import	Construction	Construction
ΕY	Cost for	Added	Duty	Cost for	Cost for	Added	Duty	Cost for	Contro	Added	Duty	Cost for	Cost for	Added	Duty	Cost for	Cost
	1	Tax		for Armhysis		Tinx		for Analysis		Tax		for Annilysis		Tex		for Armysis	for Armlysis
		8	c	D-A-18+C)	E	F	G	H+E-(F+G)			Ж.	L=HJ+K)	.	N	<u> </u>	P=#4N+Q)	D+H+L+P
1996					1,431,21	81.47	69.97	1,279.77	0.00	0.00	0,00		958.63	54.57	46.87	857.19	2,136.9
1997	701.20	39.92	34.77	626,51	3,136.11	178.54	155,92	2,801.65	73.69	4.33	17.18		2,619.59	149.22	139.24	2,331,14	5,811.4
1998	592.24	33.67	24,11	534.47	2,261,69	128.80	117,44	2,015.45	60.82	3.57	14.20		1,952.31	111.21	104,32	1,736.78	4,329.7
1999	997.60	56,79	49,48	891.33	2,564.93	145.96	122.10	2,296.67	51.48	3.02	11.95		2,420.66	137.83	122.93	2,159.91	5,384.6
2000	2,901.10	165.40	169.66	2,566.04	3,819,14	217.31	178.71	3,423,12	77.21	4.53	17,93		4,552.94	259.37	245.34	4,048.22	10,092.1
2001	341.37	19.45	18.75	303.17	2 582.48	147.05	131.70	2,303,73	73.69	4.33	17.18		2,007.76	114.42	112,28	1,781.06	4,440.1
2002	0,00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.0
2003	0.00	0,00	0,00	0.00	0.00	0,00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.0
2004	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.0
2005	0.00	0.00	0,00	0.00	3,909,26	222.53	192.10	3,494.63	0.00	0.00	0.00		2,618.43	149.05	128.67	2,340.71	5,835.3
2006	8,261,94	470.96	475.59	7,315.39	5,863,90	333,79	288.16	5,241.95	169.60	9.95	39.60		9,575.10		538.08	8,491.32	21,168.7
2007	0.00	0.00	0,00	0.00	0.00	0.00	0,00	0.00	0.00	0.00			0.00	0.00	0.00	0.00	0.0
2008	0,00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.0
2009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.0
2010	0.00	0.00	0.00	0,00	2,580.64	152.58	130.52	2,397.54	0.00	. 0.00	0.00			102.20	87.42	1,605.87	4,003.4
2011	1,348.36	76.77	67.98	1,203.61	4,020.95	228.87	195.76	3,596.32	96,52	5.66	22.41		3,661.02	208.51	191,66	3,260.85	8,129.2
2012	0.00	0.00	0.00	0.00	0.00	0.00	0,00		0.00	0.00	0.00		0.00	0.00	0.00		0.0
2013	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00			0.00	0.00		0.0
2014	0.00	0.00	0.00		0.00	0.00	0.00		0.00	0.00	0,00			0,00	0.00		
2015	0,00	0.00	0.00			128,52	105.83	2,024.18	0.00	0.00	0.00			86.08	70.89	1,355.80	3,379.9
2016	2,058.60	117.37	120.53	1,820.70	3 387,79	192.76	158.75	3,036.28	76.61	4.50	17.94	54,17	3,699.31	210.74	199.08	3,289.50	8,200.6
				I :	1.5	1 1									l		00 040 0
Total	17,202,42	980.33	960.87	15,261,22	37,916.63	2,158.18	1,846,96	33,911.49	679.61	39.89	158,39	481.34	37,374,00	2,128,89	1,905,77	33,258.33	82,912.3

Table 11.4-2 Operation and Maintenance Cost

<u> </u>	1111.202.	34.1 333.321 333			71,00,001					
		e Ne	18 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	4-1-6	:	2 (1) 41/44 43/49				
		Table 11.4-2	Operation	and Mainten	ance Chet			1 :		
		1 able 11.4-2	Operation	and Maniten	ance Cost	tile Silver	e Alice La Carta de La br>La Carta de La			(Million Baht)
Γ		Subtransm	nission Line	Distribution	Substation	Telecom	nunication	Distributio	n Facilities	Total
ľ	ľ	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Operation
ļ	FY	Cost	and	Cost	and	Cost	and	Cost	and	and
1		without	Maintenance	without	Maintenance	without	Maintenance	without	Maintenance	Maintenance
١	i	VAT and	Cost	VAT and	Cost	VAT and	Cost	VAT and	Cost	Cost
L	·	Import Duty	3.00%	Import Duty	4.00%	Import Duty	4.00%	Import Duty	0.00%	
Γ	1996	0.00	0.00	1,279.77	0.00	0.00	0.00	857.19	0.00	0.00
1	1997	626.51	0.00	2,801.65	0.00	52.18	0.00	2,331.14	0.00	0.00
	1998	534.47	18.80	2,015.45	127.98	43.06	2.09	1,736.78	103.90	252.76
	1999	891.33	34.83	2,296.87	216.18	36.50	3.81	2,159.91	178.45	433.27
	2000	2,566.04	61.57	3,423.12	285.42	54.76	5.27	4,048,22	249.69	601.95
1	2001	303.17	138,55	2,303.73	411.24	52.18	7.46	1,781.06	404.18	961.43
1	2002	0.00	147.65	0.00	564,82	0.00	9.55	0.00	516.57	1,238.59
1	2003	0.00	147.65	0.00	564.82	0.00	9.55	0.00	516.57	1,238.59 1,238.59
	2004	0.00	147.65	0.00	564.82	0.00	9,55	0.00	516.57 516.57	1,238.59
-	2005	0.00	147.65	3,494.63	564.82	0.00	9.55	2,340.71	516.57	1,238.59
ı	2006	7,315.39	147.65	5,241,95	564.82	120.04	9.55	8,491.32 0.00	949.85	2,245.60
1	2007	0.00	367,11	0.00	914.29	0.00	14.35 14.35	0.00	949.85	2,245.60
1	2008	0.00	367.11	0.00 0.00	914.29 914.29	0,00	14.35	0.00	949.85	2,245.60
1	2009	0.00	367.11		914.29	0.00	14.35	1,605.87	949.85	2,245.60
۱	2010 2011	0.00 1,203.61	367.11 367.11	2,397.54 3,596.32	914.29	68.45	14.35	3,260.85	949.85	2,245.60
- [2012	0.00	403.22	0.00	1,154.04	0.00	17.09	0.00	1,144.52	2,718.87
1	2012	0.00	403.22	0.00	1,154.04	0.00	17.09	0.00	1,144.52	2,718.87
	2014	0.00	403.22	0.00	1,154.04	0.00	17.09	0.00	1,144.52	2,718.87
-	2015	0.00	403.22	2,024.18	1,154.04	0.00	17.09	1,355.80	1,144.52	2,718.87
١	2016	1,820.70	403.22	3,036.28	1,154.04	54.17	17.09	3,289.50	1,144.52	2,718.87
-	2017	1,020.70	457.84	5,000.20	1,356.46		19.25		1,330.33	3,163.88
ı	2018		457.84		1,356,46		19,25	1.5	1,330.33	3,163.88
Į	2019		457.84		1,356.46		19.25		1,330.33	3,163.88
1	2020	in the second	457.84		1,356.46		19.25		1,330.33	3,163.88
	2021	al de Nerve	457.84	泰国 美国	1,356.46	laga da da	19.25		1,330.33	3,163.88
	2022		457.84		1,356.46		19.25		1,330.33	3,163.88
ļ	2023		457.84		1,356.46		19.25		1,330.33	3,163.88
1	2024	To be about	457.84		1,356.46		19.25	12. White	1,330.33	3,163.88
-	2025		457.84		1,356.46		19.25	10000	1,330.33	3,163.88
	2026	110,000	457.84	1 de la 1 de 1 de 1 de 1 de 1 de 1 de 1 de 1 d	1,356.46		19.25		1,330.33	3,163.88
- [2027		457.84	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1,356.46		19.25		1,330.33	3,163.88
١	2028		457.84		1,356.46		19.25		1,330.33	3,163.88
	2029		457.84		1,356.46	(A) (基本)	19.25		1,330.33	3,163.88
.	Total	15,261.22	10,795.46	33,911.49	31,840.55	481.34	473.84	33,258.33	31,285.29	74,395.14

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

			hase Price, per K	Vh Purchase	Energy:	Sales Price, per kt	Vn Sales
IO.	FY	Actual Average Purchase Price	Constant 1995 Price	Estimation Purchase Price	Actual Average Sales Price	Constant 1995 Price	Estimation Sales Price
		(Baht/kWh)	(Baht/kWh)	(Baht/kWh)	(Baht/kWh)	(Baht/kWh)	(Baht/k\Vh)
	1990	1 2 2		(00.10.111)	1.7905	(Ballokvin)	(Banoxvvn)
	1991				1,8039	*	
	1992	1.4426	1 4 4		1.7510		,
٠.,	1993	1.4637			1.7766	2.5	194
	1994	1,4460			1.7720	to see a second	\$1.4%
٠,	1995	1.3893	1.3893	1.3893	1.7444	1.7444	1,7444
1	1996		1.3893	1.4588	to see the	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	Here in	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	the South States	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. 1.	1.7444	2.9835
3	2007		1.3893	2.4950		1.7444	3.1327
4	2008		1.3893	2.6197		1,7444	3.2893
5	2010		1.3893	2.7507		1.7444	3.4538
16	2011		1.3893	2.8883	W 1 17, 641	1.7444	3.6265
7	2012		1.3893	3.0327	1 2	1.7444	3.8078
18	2012		1.3893	3.1843		1.7444	3.9982
9	2014		1.3893 1.3893	3.3435		1.7444	4.1981
20	2015		1.3893	3.5107		1.7444	4.4080
21	2016		1.3893	3.6862 3.8705	min server	1.7444	4.6284
22	2017		1.3893	4.0641		1.7444	4.8598
23	2018		1.3893	4.0641		1.7444	5.1028
4	2019		1,3893	4.4806		1.7444 1.7444	5.3580 5.6259
5	2020		1,3893	4.7047		1.7444	.,
26	2021		1.3893	4.9399		1.7444	5,9072 6,2025
27	2022	E 1879	1.3893	5.1869	part to the first	1.7444	6.5126
8	2023	12.4	1.3893	5.4462	45 × 11 × 1	1.7444	6.8383
9	2024		1.3893	5.7185		1.7444	7.1802
o	2025		1.3893	6.0045		1.7444	7.1802
31	2026		1.3893	6.3047		1.7444	7.9162
32	2027	1	1.3893	6.6199		1.7444	8.3120
33	2028	\$1 484	1.3893	6,9509		1.7444	8.7276
34	2029	5	1.3893	7.2985	Arrest I	1.7444	9,1639

Escalation: 5,00%
Table 11:4-4 Energy Purchase, Sales and Environmental Pollution Prevention Cost

		Energy Purcha	ise	1.5	Energy sales	1.43	Environment	al Pollution Prevention	Cost	Benefit
	Incremental	Purchase Price	Purchase	Incremental Energy	Sales Price	Sales	Energy	De-SOx & De-NOx	Benefit	Tetal
FY	Energy	of MEA	Bate	without Street Lighting	of MEA	Bald	Saving	Operation Cost	Balt	Baht
		8	C=AxB	D	E	F=DxE	G	н	I=GiH	F+1
	GVm	Baht/kV/h	Million Baht	GWh	Baht/kWh	Million Baht	GWh	Baht/k/Vh	Million Baht	Million Batt
1998	2,696	1.3893	3,745.26	2,612	1.7444	4,555.61	55	0.1633	9.02	
1999	5,607	1.3893	7,789.50	5,401	1.7444	9,422,10	85	0.1633	13.92	
2000		1 3893	12,009,28	8,316	1.7444	14,505.69	119	0.1633	19.41	
2001	12,099	1.3893	16,809.76	11,580	1.7444	20,200.64	105	0.1633	17.07	
2002	15,093	1.3893	20,968,60	14,427	1.7444	25,166,13	111	0.1633	18.14	
2003	18,011	1.3893	25,022.70	17,202	1.7444	30,006.57	117	0.1633	19.10	
2004	21,061	1.3893	29,260.09	20,102	1.7444	35,065,84	124	0.1633	20.24	
2005	24,170	1.3893	33,578,94	23,058	1.7444	40,222,38	130	0.1633	21.28	
2006	27,321	1.3893	37,956.72	26,059	1.7444	45,457.07	143	0.1633	23.39	
2007	30,518	1.3893	42,398.88	29,100	1.7444		150	0.1633	24.47	
2008	33,756	1.3893	46,897,77	32,179	1,7444	56,133.14	157	0,1633	25.57	
2009	37,035	1,3893	51,453.39	35,297	1.7444	61,572,77	164	0.1633	26.70	
2010	40,354	1.3893	56,064.28	38,454	1.7444	67,078,41	172	0.1633	28.03	
2011	43,726	1.3893	60,748,42	41,650	1.7444	72,653.51	168	0.1633	27.45	
2012	46,531	1.3893	64,645,66	44,317	1,7444	77,306.38	175	0.1633	28.56	
2013	49,337	1.3893	68,544.36	46,985	1.7444	81,960.98	180	0.1633	29.34	
2014	52,143	1.3893	72,441.60	49,653	1.7444	86,613,85	186	0.1633	30.45	
2015	54,948	1.3893	76,338.84	52,320	1.7444	91,266,72	192	0.1633	31.40	
2016	57,784	1:3893	80 278.86	54,988	1.7444	95,921.32	168	0.1633	27.49	
2017	57,784	1.3893	80,278.86	54 988	1.7444	95,921.32	168	0.1633	27.49	
2018	57,784	1.3893	80,278.86	54,988	1.7444	95,921,32	168	0.1633	27.49	95,948.81
2019	57,784	1.3893	80,278.86	54,988	1.7444	95,921.32	168	0.1633	27.49	
2020	57,784	1.3893	80 278 86	54,988	1.7444	95,921,32	168	0.1633	27.49	95,948,81
2021	57,784	1.3893	80,278.86	54,988	1.7444	95,921,32	168	0.1633	27.49	95,948.81
2022	57,784	1.3893	80 278 86	54,988	1.7444	95,921,32	168	0.1633	27.49	
2023	57,784	1.3893	80,278,86	54,988	1.7444	95,921.32	168	0.1633	27.49	95,948,81
2024	57,784	1.3893	80 278 86	54,988	1 7444	95,921.32	168	0.1633	27.49	95,948.81
2025	57,784	1.3893	80,278.86	54,988	1.7444	95,921.32	168	0.1633	27.49	95,948.81
2026	57,784	1.3893	80,278.86	54,988	1,7444	95,921,32	168	0.1633	27.49	
2027	57,784	1.3893	80,278,86	54,988	1.7444	95,921.32	168	0.1633	27.49	
2028	57,784	1.3893	80,278,86	54,988	1.7444	95,921,32	168	0.1633	27.49	
2029	57.784	1.3893	80,278.86	54,988	1.7444	95,921.32	168	0.1633	27.49	
) · .				0.,000		00,321.02	100	0,1033	21.49	95,948.81
Total	1,332,022	Mar (Mak)	1,850,578.07	1,268,544	-1 A_{i} A_{j} A_{i}	2,212,847,51	4,889	THURSDAY	709 20	2,213,645.89

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

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10-11 arti. $[(\gamma^{\pm},j_{1}^{\pm})]$

1.70%

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\$00 PK

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

										Million Baht)
Discount					Cost			Bene	efit	
Rate	No.	FY	Construction	O&M	Energy Purchase	Total	PV	Total	PV	NPV
10,00%	1	1996	2,136.96			2,136.96	1,942.69		0.00	-1,942.69
	2	1997	5,811.48			5,811.48	4,802.87		0.00	4,802.87
,	3	1998	4,329.75	252.76	3,745.26	8,327.77	6,256.78	4,564.62	3,429.47	-2,827.31
	4	1999	5,384.61	433.27	7,789.50	13,607.39	9.294.03	9,436.02	6,444,93	-2,849.10
	5	2000	10,092.14	601.95	12,009.28	22,703.38	14,097.01	14,525.10	9,018.95	-5,078.06
	6	2001	4,440.14	961.43	16,809.76	22,211.33	12,537.72	20,217.71	11,412.37	-1,125.35
	7	2002	0.00	1,238.59	20,968,60	. 22,207.19	11,395.80	25,184.26	12,923,51	1,527.71
,	8	2003	0.00	1,238.59	25,022.70	26,261.29	12,251.09	30,025.67	14,007.20	1,756.11
	9	2004	0.00	1,238.59	29,260.09	30,498.68	12,934.42	35,086.09	14,879,93	1,945.51
	10	2005	5,835.34	1,238,59	33,578,94	40,652.86	15,673.44	40,243.66	15,515.67	-157.77
	11	2006	21,168.70	1,238.59	37,956.72	60,364.01	21,157.22	45,480.47	15,940.63	-5,216,59
	12	2007	0.00	2,245.60	42,398.88	44,644.48	14,225.11	50,785.71	16,181.89	1,956.78
	13	2008	0.00	2,245.60	46,897.77	49,143.37	14,235.08	56,158.71	16,267,18	2,032.09
	14	2009	0.00	2,245.60	51,453,39	53,698.99	14,140.62	61,599.48	16,221.07	2,080.45
	15	2010	4,003.41	2,245.60	56,064.28	62,313.29	14,917.31	67,106.44	16,064,75	1,147.44
	16	2011	8,129.22	2,245.60	60,748.42	71,123.24	15,478:49	72,680.96	15,817.49	
	17	2012	0.00	2,718.87	64,645.66	67,364.53	13,327.71	77,334.94	15,300.31	1,972.59
	18	2013	0.00	2,718.87	68,544.36	71,263.22	12,817.32	81,990.32	14,746.68	1,929.36
	19	2014	0.00	2,718.87	72,441.60	75,160.47	12,289.34	86,644.30	14,167.04	1,877.70
	20	2015	3,379.98	2,718.87	76,338.84	82,437.69		91,298.12	13,570.88	1,317.05
	21	2016	8,200.65	2,718.87	80,278.86	91,198.37	12,323.69	95,948.81	12,965.62	
	22	2017		3,163.88	80,278.86	83,442.74	10,250.60		11,786.92	
	23	2018		3 163.88	80,278.86	83,442.74		95,948,81	10,715.39	
·	24	2019		3,163.86	80,278.86	63,442.74	8,471.57	95,948.81	9,741.26	
	25	2020		3,163.88	80,278.86				8,855,69	1,154.26
	26	2021	1	3,163.88	80,278,86				8,050.63	1,049.33
	27	2022	1	3,163.88	80,278.86	83,442.74	6,364.82		7,318.75	953,93
	28	2023		3,163.88	80,278.86		5,786.20		6,653.41	867.21
	29	2024		3,163,88	80,278.86		5,260.18	95,948.81	6,048.56	
	30	2025		3,163.88	80,278.86	83,442.74	4,781.98	95,948.81	5,498.69	
•	31	2026		3,163.88	80,278.86	83,442.74				651.55
	32	2027	1	3,163,88	80,278.86	83,442.74				592.32
	33	2028		3,163.88	80,278.86	83,442.74			i .	
	34	2029		3,163,88	80,278.86	83,442.74	3,266.16	95,948.81	3,755.68	489.52
		Total	82,912.39	74,395.14	1,850,578.07	2,007,885.59	338,446.62	2,213,645.89	<u> 346,974,94</u>	8,528,32

B-C 8,528.32 B/C 1.025196

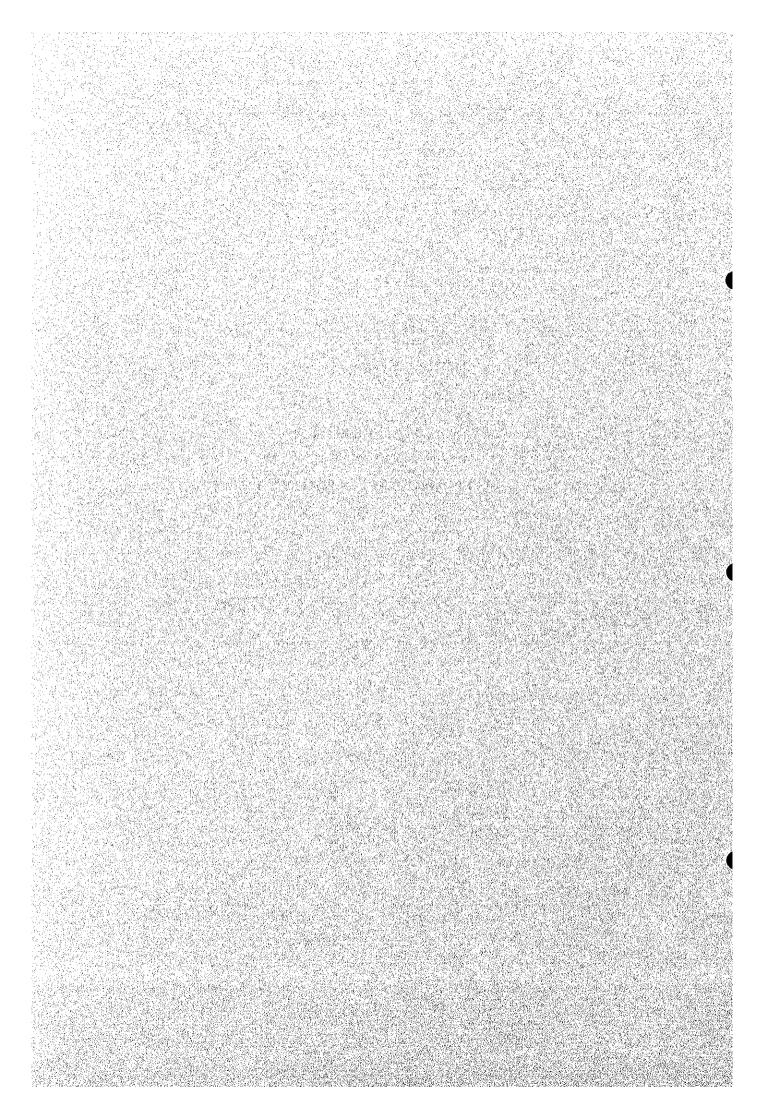
Table 11.4.6 Calculation of FIRE

			Table 11.4-6	Calculat	ion of EIRR					(million Baht)
Discount	——-Т	···			Cost			Bene	f it	
Rate	No.	FY	Construction	O&M	Energy Purchase	Total	PV	Total	PV	NPV
12.5811%	1	1996	2,136.96	0.00		2,136,96	1,898.15		0.00	-1,898.15
12.007770	ż	1997	5,811,48	0.00		5.811.48	4,585.17		0.00	-4,585.17
	· 3	1998	4,329.75	252.76	3,745.26	8,327,77	5,836.23	4,564.62	3,198.95	-2,637.27
	4	1999	5,384.61	433.27	7,789,50	13,607.39	8,470.56	9,436.02	5,873.89	-2,596.67
4 2 5 2	5	2000	10,092,14	601.95	12,009.28	22,703.38	12,553,43	14,525.10		-4,522.03
	6	2001	4,440,14	961.43	16,809.76	22,211.33	10,908.90	20,217.71	9,929.75	-979.15
	7	2002	0.00	1,238,59	20.968.60	22,207.19	9,688.00	25,184.26	10,986.77	1,298.77
5 4	8	2003	0.00	1,238.59		26,261.29	10,176.33	30,025.67	11,635.04	1,458.71
1	9	2004	0.00	1,238.59		30,498.68	10,497.61	35,086.09	12,076.59	1,578.98
	10	2005	5,835.34	1,238.59		40,652,86	12,428.96	40,243.66	12,303.86	-125.11
	11	2006	21,168.70	1,238.59	37,956.72	60,364.01	16,392.92	45,480.47	12,351.03	-4,041.89
	12	2007	0.00	2,245,60	42,398.88	44,644.48	10,769.12	50,785.71	12,250.51	1,481.38
	13	2008	0.00	2.245,60		49,143.37	10,529.60		12,032.73	1,503.13
	14	2009	0,00	2 245.60	51,453,39	53,698.99		61,599.48	11,723.53	1,503.61
	15	2010	4,003,41	2.245.60			10,534.07	67,106.44	11,344.36	810.28
	16	2011	8,129,22	2,245.60	60,748,42	71,123.24	10,679.76	72,680.96	10,913.67	233.90
	17	2012		2,718.87		67,364.53		77,334.94		1,329.83
	18	2013		2,718.87		71,263.22	8,442.76	81,990.32		1,270.87
	19	2014	0.00	2,718,87	72 441.60	75,160.47		86,644.30		1,208.48
	20	2015	3,379,98	2,718.87	76,338.84	82,437.69		91,298.12		828.21
	21	2016	8,200,65	2,718.87	80,278.86	91,198.37				394.42
	22	2017		3,163.88	80,278.86	83,442.74		95,948.81		
	23	2018	1	3,163.88	80,278.86	83,442.74	5,466.12	95,948.81	6,285.36	819.24
* * * * . *	24	2019		3,163,88	80,278.86	83,442.74	4,855.27	95,948,81		727.69
to the second	25	2020		3,163.88	80 278.86	83,442.74		95,948.81		646.37
	26	2021		3,163.88	80,278.86	83,442.74				574.14
	27	2022		3,163,88	80,278.86	83,442.74				509.98
and the second	28	2023	1. 1. 1. 1. 1. 1.	3,163,88	80,278.86	83,442.74				
	29	2024		3,163.88	80,278.86	83,442.74				
T 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	30	2025	100	3,163.88	80,278.86	83,442.74				357.40
	31	2026		3,163.88	80,278.86					
	32	2027		3,163.88	80,278.86	83,442.74				281.98
	33	2028	1	3,163.88	80,278.86					
	34	2029		3,163.88	80,278.86	83,442.74	1,484.42	95,948,81	1,706.90	222.48
and the sage	13.3	14 N								
e i to estado	E. de	Total	82,912.39	74,395.14	1,850,578.07	2,007,885.59	[240,051.63	12,213,645.8 <u>9</u>	240,051.63	0.00

B-C B/C 0.00

CHAPTER 12

FINANCIAL ANALYSIS



CHAPTER 12 FINANCIAL ANALYSIS

12.1 General

The following calculations are made for the financial analysis of this Project. The calculations are based on the electricity value (sales revenue) acquired in the economic assessment and the total cost of this Project, calculated at the domestic cost in Thailand.

Described in CHAPTER 11, JICA study team did not estimate the construction cost of distribution facilities. But the construction cost of distribution facilities are necessary to asses the financial performance or to calculate the debt service ratio for this Improvement and Expansion Plan. So we estimate the construction cost of distribution facilities is 66.98 % of total construction cost.

- (1) Calculation of Financial Internal Rate of Return (FIRR)
- (2) Production of loan reimbursement schedule
- (3) Production of profit and loss statement
- (4) Cash flow analysis and the cash of the table as a first of the cash of the
- (5) Calculation of debt service ratio

12.2 Analysis Method

(1) Calculation of Financial Internal Rate of Return (FIRR)

The Financial Internal Rate of Return (FIRR) is calculated so that the annual cost and profit become equal respectively to the current value when they are converted to the present value. It is then compared with the social discount rate that reflects the capital opportunity cost.

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The costs applied to this evaluation are the total invested capital (construction cost including import taxes) and the operation and maintenance cost. Fund procurement conditions such as the interest on the loan, the interest during the construction, principal reimbursement, and the loan reimbursement period are not considered in the total invested capital.

Consequently, the profitability of the investment is evaluated regardless of the fund procurement conditions.

(2) Calculation of debt service ratio

The Debt Service Ratio is the ratio of internal fund procurement (total of sales profit and depreciation) against the debt (total of interest and principal). The following three procedures are required to acquire this ratio:

- (1) Production of loan reimbursement schedule
- (2) Production of profit and loss statement
- (3) Cash flow analysis

The costs applied to this evaluation are the operation and maintenance cost and the depreciation. The depreciation is calculated based on the construction cost including the import taxes, interest during the construction and the escalation.

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12.3 Premises Conditions of Financial Analysis

The financial analysis is conducted based on the following premises;

12.3.1 Financial Internal Rate of Return (FIRR)

(1) Electricity sales revenue

The benefit related to the distribution facilities improvement project calculated in CHAPTER 11: ECONOMIC EVALUATION, is applied.

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(2) Construction cost Hills and American State () Appear the larvage whap your grade

The construction cost for MEA is applied as in the Economic Evaluation.

However, the construction cost includes the import taxes in this analysis.

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ting a factoric and respectively to administration of the transfer

(3) Operation and maintenance cost was a second and maintenance cost was a second and maintenance cost

The cost calculated in the CHAPTER 11 is applied.

(4) Electricity purchase

The price calculated in the CHAPTER 11 is applied.

(5) Escalation

Escalation is not considered.

12.3.2 Debt Service Ratio

(1) Electricity sales revenue

The same value in FIRR calculation is applied. However, a local currency escalation ratio of 5.0% is applied, considering the escalation.

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(2) Construction cost

The construction cost includes import taxes, interest during the construction, and the escalation.

(3) Operation and maintenance cost

Same as FIRR. However, the escalation is considered.

(4) Electricity purchasing

(A) 4 F (17) (25) 在17 F (17)

The same value in the FIRR calculation is applied. However, considering the escalation, a local currency escalation ratio of 5.0% is applied.

(5) Escalation

2.2% is applied to the foreign currencies and 5.0%/annum is applied to the local currency.

(6) Fund procurement conditions

(a) Foreign currencies: interest; 7% p.a. 7% p.a.

20 years principal equal payment

(b) Local currency: interest; 13% p.a.

8 years principal equal payment

The reimbursement period starts from FY 1998 for the loans acquired during FY 1996 and 1997. The details are described below.

Table 12.3-1 Construction and Reimbursement Period

Commercial Operation	Construction Period	Foreign Currency Portion Reimbursement Period	Local Currency Portion Reimbursement Period
FY 1998	FY 1996-1997	FY 1998-2017	FY 1998-2005
FY 1999	FY 1997-1998	FY 1999-2018	FY 1999-2006
FY 2000	FY 1998-1999	FY 2000-2019	FY 2000-2007
FY 2001	FY 1999-2000	FY 2001-2020	FY 2001-2008
FY 2002	FY 2000-2001	FY 2002-2021	FY 2002-2009
FY 2007	FY 2005-2006	FY 2007-2026	FY 2007-2014
FY 2012	FY 2010-2011	FY 2012-2031	FY 2012-2019
FY 2017	FY 2015-2016	FY 2017-2036	FY 2017-2024

(7) Depreciation

The service life is 22 years as calculated in CHAPTER 11. It is the amortization with no remaining assets.

12.4 Financial Internal Rate of Return (FIRR)

(1) Construction cost

The construction cost for FIRR calculation is described in Table 12.4-1.