

## 第 7 章

### 建設コスト



## 第7章 建設コスト

Table7-1に本プロジェクトの建設コストを、Table7-2にパイロットプロジェクトの建設コストをそれぞれ示す。パイロットプロジェクトの建設コストはTable7-1の建設コストに含まれている。外貨に対する輸入税率は次のとおりである。

Item	Import Duty Rate(%)
Center Terminal Unit	
Power Supply Unit	54
Other Equipment	36.6
Substation Remote Terminal Unit	52
Feeder Remote Terminal Unit	52
Data Transmission System	30

為替レートは 1 US\$ = 25.936 Baht 1 US\$ = 153.80 円 (1986年 9月22日現在) を用いた。

Table7-3-1～ 7-3-3にRegion毎の内訳を、Annex7-1～ 7-6にRegion毎、設備毎の内訳をそれぞれ示す。

Table 7-1 CONSTRUCTION COST OF THE PROJECT

(Unit: 1,000 US\$)

Item	Case 1			Case 2			Case 3			
	F.C.	L.C.		F.C.	L.C.		F.C.	L.C.		
		Duties	Others		Duties	Others		Duties	Others	
Center Terminal Unit	20,417	8,062	1,899	20,417	8,062	1,899	20,417	8,062	1,899	30,378
Substation Remote Terminal Unit	6,920	3,598	147	6,920	3,598	147	6,920	3,598	147	10,665
Feeder Remote Terminal Unit	11,972	6,228	581	14,510	7,543	741	21,967	11,423	1,015	34,405
Data Transmission System	17,348	5,206	1,064	18,687	5,606	1,154	22,615	6,785	1,416	30,816
Sub-total (CIF)	56,657	23,094	3,691	60,534	24,809	3,941	71,919	29,868	4,477	106,264
Contingency (incl. Eng. Fee)	5,666	2,309	369	6,053	2,481	394	7,192	2,987	448	10,627
Total	62,323	25,403	4,060	66,587	27,290	4,335	79,111	32,855	4,925	116,891

Table 7-2 CONSTRUCTION COST OF THE PILOT PROJECT

(Unit: 1,000 US\$)

Item	Case 1			Case 2			Case 3			
	F.C.	L.C.		F.C.	L.C.		F.C.	L.C.		
		Duties	Others		Duties	Others		Duties	Others	
Pilot Distribution Dispatching Center	6,275	2,562	328	6,964	2,867	373	8,083	3,364	426	11,873
Training Unit	575	219	1	575	219	1	575	219	1	795
Sub-total (CIF)	6,850	2,781	329	7,539	3,086	374	8,658	3,583	427	12,668
Contingency (incl. Eng. Fee)	685	278	33	754	309	37	866	358	43	1,267
Total	7,535	3,059	362	8,293	3,395	411	9,524	3,941	470	13,935

Table 7-3-1 CONSTRUCTION COST BY REGION (CASE 1)

(Unit: 1,000 US\$)

Region	Center Terminal Unit		Substation Remote Terminal Unit		Feeder Remote Terminal Unit		Data Transmission System		Total		
	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	
										Duties	Others
N1	1,419	146	545	12	984	50	1,393	61	4,341	1,777	269
N2	1,419	146	543	11	817	40	1,529	88	4,308	1,730	285
N3	1,419	146	546	12	894	44	1,375	109	4,234	1,726	311
NE1	1,419	146	633	13	1,017	50	1,857	131	4,926	1,979	340
NE2	1,419	146	451	10	638	32	1,299	107	3,807	1,521	295
NE3	1,419	146	483	10	857	40	1,336	86	4,095	1,662	282
C1	1,419	146	904	19	1,851	90	1,632	85	6,006	2,547	340
C2	1,419	146	678	14	1,326	60	1,447	93	4,870	2,041	313
C3	2,814	146	598	13	1,440	73	1,423	96	6,275	2,562	328
S1	2,838	292	523	11	744	38	1,440	85	5,545	2,219	426
S2	1,419	146	517	11	610	28	1,174	71	3,720	1,502	256
S3	1,419	146	499	11	794	36	1,243	52	3,955	1,609	245
Training Center	575	1	-	-	-	-	-	-	575	219	1
Total	20,417	1,899	6,920	147	11,972	581	17,348	1,064	56,657	23,094	3,691

Table 7-3-2 CONSTRUCTION COST BY REGION (CASE 2)

(Unit: 1,000 US\$)

Region	Center Terminal Unit		Substation Remote Terminal Unit		Feeder Remote Terminal Unit		Data Transmission System		Total		
	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	
										Duties	Others
N1	1,419	146	545	12	1,266	69	1,541	71	4,771	1,967	298
N2	1,419	146	543	11	958	48	1,603	93	4,523	1,825	298
N3	1,419	146	546	12	1,091	57	1,479	116	4,535	1,859	331
NE1	1,419	146	633	13	1,158	59	1,932	136	5,142	2,075	354
NE2	1,419	146	451	10	723	38	1,343	110	3,936	1,578	304
NE3	1,419	146	483	10	970	47	1,396	90	4,268	1,738	293
C1	1,419	146	904	19	2,358	122	2,100	103	6,781	2,890	390
C2	1,419	146	678	14	1,552	74	1,566	101	5,215	2,194	335
C3	2,814	146	598	13	1,891	102	1,661	112	6,964	2,867	373
S1	2,838	292	523	11	941	50	1,544	92	5,846	2,352	445
S2	1,419	146	517	11	723	35	1,234	75	3,893	1,579	267
S3	1,419	146	499	11	879	40	1,288	55	4,085	1,666	252
Training Center	575	1	-	-	-	-	-	-	575	219	1
Total	20,417	1,899	6,920	147	14,510	741	18,687	1,154	60,534	24,809	3,941

Table 7-3-3 CONSTRUCTION COST BY REGION (CASE 3)

(Unit: 1,000 US\$)

Region	Center Terminal Unit		Substation Remote Terminal Unit		Feeder Remote Terminal Unit		Data Transmission System		Total		
	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	
										Duties	Others
N1	1,419	146	545	12	1,703	85	1,772	86	5,439	2,265	329
N2	1,419	146	543	11	1,550	70	1,915	114	5,427	2,227	341
N3	1,419	146	546	12	1,613	76	1,754	134	5,332	2,213	368
NE1	1,419	146	633	13	1,736	80	2,236	156	6,024	2,467	395
NE2	1,419	146	451	10	1,146	52	1,566	125	4,582	1,865	333
NE3	1,419	146	483	10	1,590	69	1,723	112	5,215	2,159	337
C1	1,419	146	904	19	3,415	161	2,657	140	8,395	3,607	466
C2	1,419	146	678	14	2,581	111	2,108	137	6,786	2,891	408
C3	2,814	146	598	13	2,624	129	2,047	138	8,083	3,364	426
S1	2,838	292	523	11	1,364	66	1,766	107	6,491	2,639	476
S2	1,419	146	517	11	1,174	53	1,471	91	4,581	1,884	301
S3	1,419	146	499	11	1,471	63	1,600	76	4,989	2,068	296
Training Center	575	1	-	-	-	-	-	-	575	219	1
Total	20,417	1,899	6,920	147	21,967	1,015	22,615	1,416	71,919	29,868	4,477





## 第 8 章

### プロジェクトの実施計画



## 第8章 プロジェクトの実施計画

### 8-1 プロジェクト実施の考え方

Clause5-1で述べたとおり、PEAの配電指令業務は従来の方式では対応が困難になってきており、更に将来における指令業務の複雑化ならびに高信頼度に対する社会的要請の高度化を考慮すると本プロジェクトは早急に実施する必要がある。しかも第6章で述べたとおりパイロット配電指令センターによるシステムの検証、技術の習得等を必要とするため、パイロットプロジェクトは出来るだけ早期に着手することが望ましい。

本プロジェクトの実施は、Central Region3におけるパイロットプロジェクトと残り11Regionに対するマスタープロジェクトとに分けられる。マスタープロジェクトについてつぎの2案を検討した。

#### (1) 第 1 案

Region毎に実施する。実施順位はTable8-1に示すとおりとする。

#### (2) 第 2 案

各RegionをA-Zone（都市部および工業地帯）とB-zone（農村部）の2つのZoneに分け、まずA-Zoneを実施しA-Zone終了後B-Zoneを実施する。

### 8-2 実 施 計 画

実施計画の検討は、最適案として選定したケース2について行った。マスタープロジェクトの建設コストはケース2の場合 86.1M.US\$(2,233M.Baht) に及ぶため実施期間は5年とし、さらに前期3ヵ年、後期2ヵ年に分けた。実施計画は次のとおりである。

#### (1) 第 1 案

Table8-2に年度毎の実施Regionおよび建設コストを、Table8-3にRegion毎の監視制御対象設備および建設コストをそれぞれ示す。

Table8-1の実施順位に従って毎年2Regionづつ実施し、最終年度に3Regionを実施することとした。

## (2) 第 2 案

Table8-2に年度毎の実施Zoneおよび建設コストを、Table8-4にZone毎の監視制御対象設備および建設コストをそれぞれ示す。

前期3ヵ年にA-Zoneを、後期2ヵ年にB-Zoneを実施することとし、実施順位はTable8-1によった。

## (3) 両案の比較

プロジェクトの実施面からみると第1案が優れている。すなわち、第1案の場合は実施計画の作成、工事施工およびソフトウェアの適用等が一度で実施できるのに対し、第2案の場合はそれぞれを分割して実施することとなる。一方、指令システムの運用面からみると、第2案の場合は3ヵ年で全Regionに指令センターが設置され、しかも都市部および工業地帯を優先して実施出来るので、第2案が優れている。

一般に供給信頼度向上のプロジェクトは高信頼度を要求される地域を優先して実施するのが通例であるが、本プロジェクトの場合は自動指令システムがPEAにとって最初の経験であるため

① 実施計画および工事施工はRegion毎に一括して実施するのが効率的であること。

② ソフトウェアのメンテナンスを極力少なくすることが望ましいこと。

を考慮して第1案を採用することとした。

## (4) 実施計画

以上にもとづき、本プロジェクトは次の3段階に分けて実施するものとする。

### ① 第1段階

パイロット配電指令センター（C3 Region）およびトレーニングユニット（トレーニングセンター）

### ② 第2段階

6 Region（C1, C2, S1, S2, S3, NE3）の配電指令センター

### ③ 第3段階

5 Region（N1, N2, N3, NE1, NE2）の配電指令センター

各実施段階においては、無線中継局サイトおよび無線ルートの詳細な調査、検討、将来の配電系統計画を考慮した自動開閉器の適正配置、詳細設計、各機器の詳細仕様の作成、教育訓練の実施等が必要となる。これ等の業務を含め本プロジェクトを効率的に推進するためにはTable8-5に例示したようなプロジェクト実施体制を確立するとともに、経験豊富なコンサルタントの協力が必要と考えられる。

本システムにおける各機器は、指令センターから無線中継局、変電所、配電線の各機器にいたるまで、総合システムとして設計、製作が行なわれる必要があるため、機材調達に際しては一括発注方式が是非必要である。

### 8-3 実 施 工 程

本プロジェクトの実施工程をTable8-6に示す。

Table 8-1 IMPLEMENTATION RANKING BY REGIONS

Region	Construction Cost A (1,000 US\$)	Benefit (1995)						Total B (1,000 US\$)	B/A (%)	Supply Energy (1995) (Gwh)	Ranking
		Reduction of Interruption Energy		Reduction of C/S Operators		Reduction of Big Customer's Losses					
		Energy (MWh)	Amount (1,000 US\$)	Operators	Amount (1,000 US\$)	Energy (MWh)	Amount (1,000 US\$)				
N1	7,740	924.1	15	12	34	14.1	30	79	1.0	1,448	9
N2	7,311	632.2	10	16	46	20.7	43	99	1.4	1,049	11
N3	7,397	636.5	10	9	26	18.0	38	74	1.0	993	12
NE1	8,327	2,071.8	33	14	40	230.5	485	558	6.7	1,229	8
NE2	6,400	765.7	12	10	28	31.4	66	106	1.7	957	10
NE3	6,929	538.7	9	21	60	212.6	448	517	7.5	1,262	7
C1	11,067	1,925.7	31	23	65	1,567.3	3,301	3,397	30.7	4,042	2
C2	8,518	1,187.0	19	17	48	363.7	766	833	9.8	2,939	3
C3	11,224	1,491.4	24	20	57	851.2	1,793	1,874	16.7	3,134	1
S1	9,508	1,693.5	27	13	37	402.0	847	911	9.6	1,277	5
S2	6,313	1,489.6	24	8	23	372.9	785	832	13.2	1,182	4
S3	6,603	2,058.6	33	10	28	238.2	502	563	8.5	1,448	6
Total	97,337	15,414.8	247	173	492	4,322.6	9,104	9,843	10.1	20,960	

Table 8-2 IMPLEMENTATION SCHEDULE FOR 11 REGIONS

Alternatives	Year	Regions or Zones to be Implemented	Construction Cost (1,000 US\$)
Alternative 1	1990	C1 C2	19,585
	1991	S1 S2	15,821
	1992	NE3 S3	13,532
	1993	NE1 N1	16,067
	1994	N2 N3 NE2	21,108
Alternative 2	1990	C1-A C2-A S1-A	18,434
	1991	S2-A S3-A NE1-A NE3-A	17,488
	1992	NE2-A N1-A N2-A N3-A	17,503
	1993	C1-B C2-B S1-B S2-B NE1-B	16,382
	1994	S3-B NE2-B NE3-B N1-B N2-B N3-B	16,306

Table 8-3 FACILITIES TO BE SUPERVISORY CONTROLLED AND CONSTRUCTION COST BY REGIONS (1994)

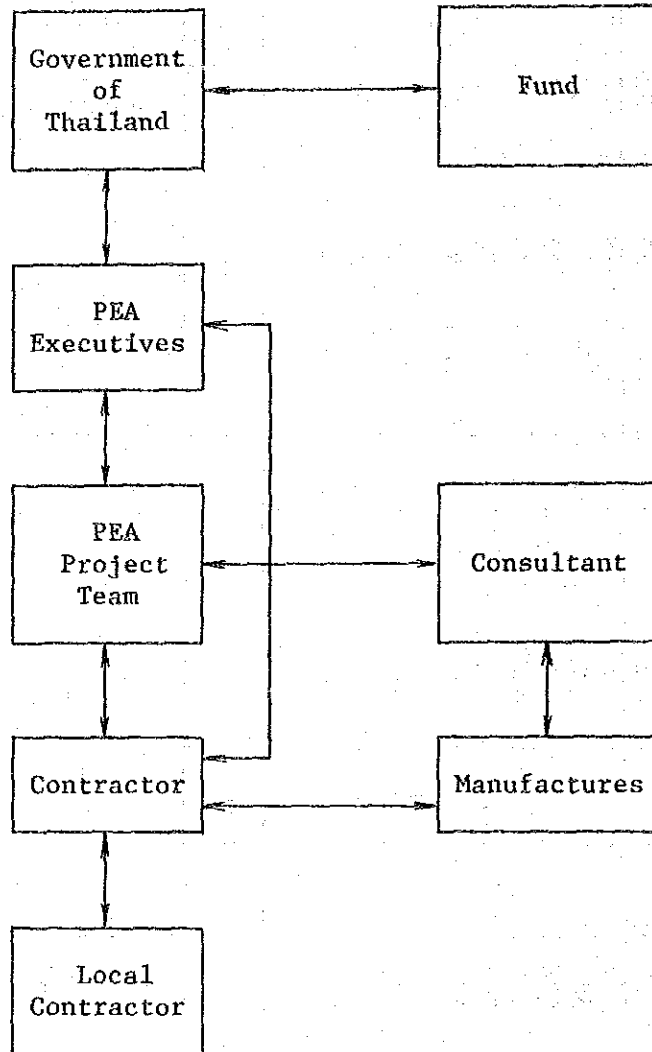
Region	Supply Energy (GWh)	No. of Dispatching Center	No. of Repeater Station	No. of Substation	No. of Bank	No. of Feeder	No. of Sectionalizer	No. of Recloser	Construction Cost (1,000 US\$)
N1	1,344	1	2	12	19	59	77	34	7,740
N2	993	1	3	12	20	58	54	37	7,311
N3	945	1	2	12	16	60	65	33	7,397
NE1	1,168	1	3	14	20	68	55	72	8,327
NE2	893	1	2	10	19	47	29	59	6,400
NE3	1,206	1	2	10	18	64	53	42	6,929
C1	3,875	1	1	19	31	115	159	22	11,067
C2	2,800	1	1	14	26	90	101	24	8,518
C3	-	-	-	-	-	-	-	-	-
S1	1,202	2	3	12	15	48	57	26	9,508
S2	1,117	1	2	12	16	45	43	22	6,313
S3	1,357	1	2	11	16	54	51	30	6,603
Total	16,900	12	23	138	216	708	744	401	86,113



Table 8-4 FACILITIES TO BE SUPERVISORY CONTROLLED AND CONSTRUCTION COST BY ZONES (1994)

Zone	Substation	Supply Energy (GWh)	No. of Dispatching Center	No. of Repeater Station	No. of Substation	No. of Bank	No. of Feeder	No. of Sectionalizer	No. of Recloser	Construction Cost (1,000 US\$)
N1-A	CMA, CMB, CMC, CRA	779	1	2	4	8	24	33	18	4,895
N2-A	PLA, PIA, UTA	485	1	1	3	6	19	17	18	3,142
N3-A	LPA, LPB, SBA, NSA	588	1	1	3	7	26	32	19	4,677
NE1-A	UDA, UDB, KKA, KKB	606	1	1	4	6	22	29	25	4,789
NE2-A	UBA, SJA, YTA	442	1	1	3	8	16	4	26	3,789
NE3-A	NRA, NRB	544	1	-	2	5	20	23	15	3,940
C1-A	BKA, BMA, PQA, TYA, NVA, SRB, SRC	2,570	1	1	7	12	49	79	5	6,411
C2-A	CBA, CCA, BLA, RAA, RAC	1,976	1	1	5	14	45	52	10	5,405
S1-A	PBA, SSA, CAA, CPA	734	2	-	4	6	20	24	17	6,618
S2-A	NTA, PPA, SNA, LRA	625	1	1	4	7	20	19	12	4,128
S3-A	HYA, HYB, SLA, PTA	887	1	2	4	7	27	34	3	4,631
Total		10,236	12	11	43	86	288	346	168	53,425
N1-B		565	-	-	8	11	35	44	16	2,845
N2-B		509	-	2	9	14	39	37	19	3,169
N3-B		357	-	1	9	9	34	33	14	2,720
NE1-B		562	-	2	10	14	46	26	47	3,538
NE2-B		451	-	1	7	11	31	25	33	2,611
NE3-B		662	-	2	8	13	44	30	27	2,989
C1-B		1,305	-	-	12	19	66	80	17	4,656
C2-B		824	-	-	9	12	45	49	14	3,113
S1-B		468	-	3	8	9	28	33	9	2,890
S2-B		492	-	1	8	9	25	24	10	2,185
S3-B		469	-	-	7	9	27	17	27	1,972
Total		6,664	-	12	95	130	420	398	233	32,688

Table 8-5 INSTITUTIONAL FRAMEWORK FOR THE PROJECT







## 第 9 章

### 經 濟 評 価



## 第9章 経済評価

### 9-1 経済評価の方法

本報告書では、電力系統拡充プロジェクトにおいて一般的に用いられているIRR (Internal Rate of Return) によって経済評価を行った。本プロジェクトの場合PEAの財務上からみた経済効果はないので、大口需要家の停電減少による便益を含めたEIRR (Economic Internal Rate of Return) によった。

### 9-2 経済評価

#### (1) 費用

建設コストについては第7章に示したとおりである。建設コストは、輸入税を除いた投資額を考慮し、計算期間以後の減価償却残額を現在価値に引き直し投資額から差引いた。投資スケジュールは第8章に示したとおりである。

運転経費はPEAの実績値を考慮して投資額の1%とした。

#### (2) 便益

本プロジェクトによって生ずる次の便益を考慮した。

##### ① 停電減少によるPEAの便益

この便益は、停電電力量の減少分に0.016US\$(0.41Baht=1985年度の売電単価1.69Baht-買電単価1.28Baht)を乗じて算定した(Table9-1参照)。停電電力量の減少分は、停電電力量の想定値に停電減少率(Clause5-2-(4)参照)を乗じて求めた。また停電電力量は将来停電回数が年率5%で減少すると仮定して想定した。Annex 9-1-1~9-1-3に停電電力量とその減少分の想定値を示す。

##### ② 制御所運転要員の削減によるPEAの便益

本プロジェクトを実施すると制御所運転要員の削減が可能となる。PEAは、1ヵ所当り3~4名のオペレータを1名に削減する意向を持っている。

Clause3-4-(1)でのべたとおり、現在242名のオペレータが制御所の運転を行っているが、本プロジェクトの実施により173名の削減が可能である。(Table

9-1参照)。1人当りの人件費は1985年度におけるPEAの実績値2.845US\$(73,795Baht)を用いた。

### ③ 停電減少による大口需要家の便益

停電による大口需要家の損失額は、停電電力量 1 kwh 当り 2,106US\$(54.62 Baht) と推定される。(Clause3-5参照)。この便益は、大口需要家停電電力量の減少分に上記単価を乗じて算定した(Table9-1 参照)。停電電力量の減少分は上記①と同じ手法で想定した。Annex9-2-1～ 9-2-3に大口需要家の停電電力量とその減少分の想定値を示す。

### (3) E I R R

Table9-2にNet In-Flow を、Table9-3およびFig.9-1 にNet Present Value をそれぞれ示す。E I R R は、ケース1 11.20 %、ケース2 13.44 %、ケース3 11.89 %となり、ケース2が最適案である。

## 9-3 財務分析

財務分析はケース2について行った。

### (1) 所要資金

建設コストについては第7章に、投資スケジュールについては第8章に述べたとおりである。

年利および返済期間はP E Aの借入れ実績等を考慮して次のとおりとした。

	年 利	返済期間 (据置期間)
外 貨	3.0%	20年 (10年)
内 貨	12.0%	15年 (5年)

### (2) 収 入

停電減少および制御所運転員の減少によるP E Aの便益から運転経費を差引いたものを収入とした。

### (3) 返済支払スケジュール

(1) で述べた条件にもとづいた返済支払スケジュールはTable9-4に示すとおりである。

### (4) キャッシュフロー

(1) および(2) で述べた条件にもとづいたキャッシュフローはTable9-5に示すとおりである。



1988年から2007年にかけてのキャッシュバランスは 119.3M.US\$ の不足となり、これは同期間における電気料金収入額の 0.40 %に相当する。年度別にみると2004年までは不足額が増加し、2004年の 8.7M.US\$ を最高としてそれ以降は減少傾向をたどる。電気料金収入額については、収入単価を1985年度の実績値 1.69Baht/kWh とし、1996年以降の販売電力量は1995年度の想定値を年率 5.567% (1994年度～1995年度の伸び率) で伸ばした。(Annex9-3参照)

#### 9-4 感 度 分 析

##### (1) E I R R

E I R R は自動開閉器の設置台数と大口需要家の便益によって大きく影響される。従って、ここではこの2つの要素について感度分析を行った。

##### ① 自動開閉器設置台数の影響

Clause5-2-(4) で述べたとおり、自動開閉器の停電減少への寄与率は設置台数が増加するにつれて小さくなる。ここでは、すでに検討した3ケースのほか、ケース4およびケース5を追加して、自動開閉器設置台数がE I R Rにおよぼす影響を分析した。その結果は下表に示すとおりで次のとおり要約される。

- 最初の1台目の効果が最も大きい。
- ケース2 (連係回線に2台、放射線状回線に1台) のE I R Rが最も高い。
- ケース2より開閉器を増加するとE I R Rは低下する。

Case	No. of Sectionalizers	EIRR (%)	Installation Criteria	
			Interconnected Line	Radial Line
Case 1	691	11.20	1	1
Case 2	871	13.44	2	1
Case 3	1,400	11.89	2	2
Case 4	1,580	12.18	3	2
Case 5	2,164	10.06	3	3

② 大口需要家の便益の影響

大口需要家がうける停電電力量 1 kWh 当りの損失額が E I R R におよぼす影響をケース 2 について分析した。その結果は次表のとおりである。

Losses/1kWh of Interruption Energy	EIRR
54.62 Baht/kWh (Base Case)	13.44 %
60.08 (10% up)	15.51 %
49.16 (10% down)	11.35 %
43.70 (20% down)	9.26 %
38.23 (30% down)	7.13 %

(2) F I R R

本プロジェクトによる P E A の便益は建設コストと比較して非常に小さいため F I R R (Financial Internal Rate of Return) は求められない。従って、ここでは F I R R と所要増分収入額との関係について分析を行った。分析はケース 2 について行い、所要増分収入額は電気料金収入額に対する比率で表わした (Annex 9-3, 9-4 参照)。その結果は次表のとおりである。

FIRR (%)	5	10	15
Required Incremental Revenue (% of Electric Revenue)	0.306	0.419	0.522

9-5 結 論

以上により、本調査ではケース 2 を最適案として選定した。

本プロジェクトは国家経済的にみてフィージブルである。Clause 5-1 で述べた本プロジェクトの必要性、とくに P E A 管内における今後の工業用電力需要の増加を考えると、本プロジェクトは工場における生産性向上に大きく寄与するとともに、工業投資の促進をうながし、タイ国経済発展に大きく貢献すると考えられる。また、本プロジェクトの効果は、本調査で検討した経済効果だけでなく、

- ① 供給信頼度の向上
- ② 工業投資および電力消費の促進
- ③ 民生の向上

などの効果が大きく、いわゆる社会収益率は本調査のEIRRよりかなり高い値になると思われる。

本プロジェクトによるPEAの財務上の便益は小さいが、そのほかに、次に示すとおり、財務的評価の難しい多くの便益が期待できる。

- ① 適正かつタイムリーな情報収集による設備の有効利用
- ② 配電設備の運転および計画のためのデータ精度の向上
- ③ 自動指令システムおよび通信システムの改善による電化工事、系統強化工事など他プロジェクトの効率的実施への寄与
- ④ 事故区間の探査、健全区間への電力融通等のための労働力の削減
- ⑤ 安全とよりよいサービスに対する社会的要請への対応とPEAおよび政府に対する信頼関係の醸成への寄与

本プロジェクトによるPEAの財務上の負担は少なからぬ額にのぼると予測されるが、本プロジェクトは、国内外の金融関係機関の支援を得て、PEAの総合収支のなかで実施可能であると考えられる。

Fig 9-1 NET PRESENT VALUE CURVE

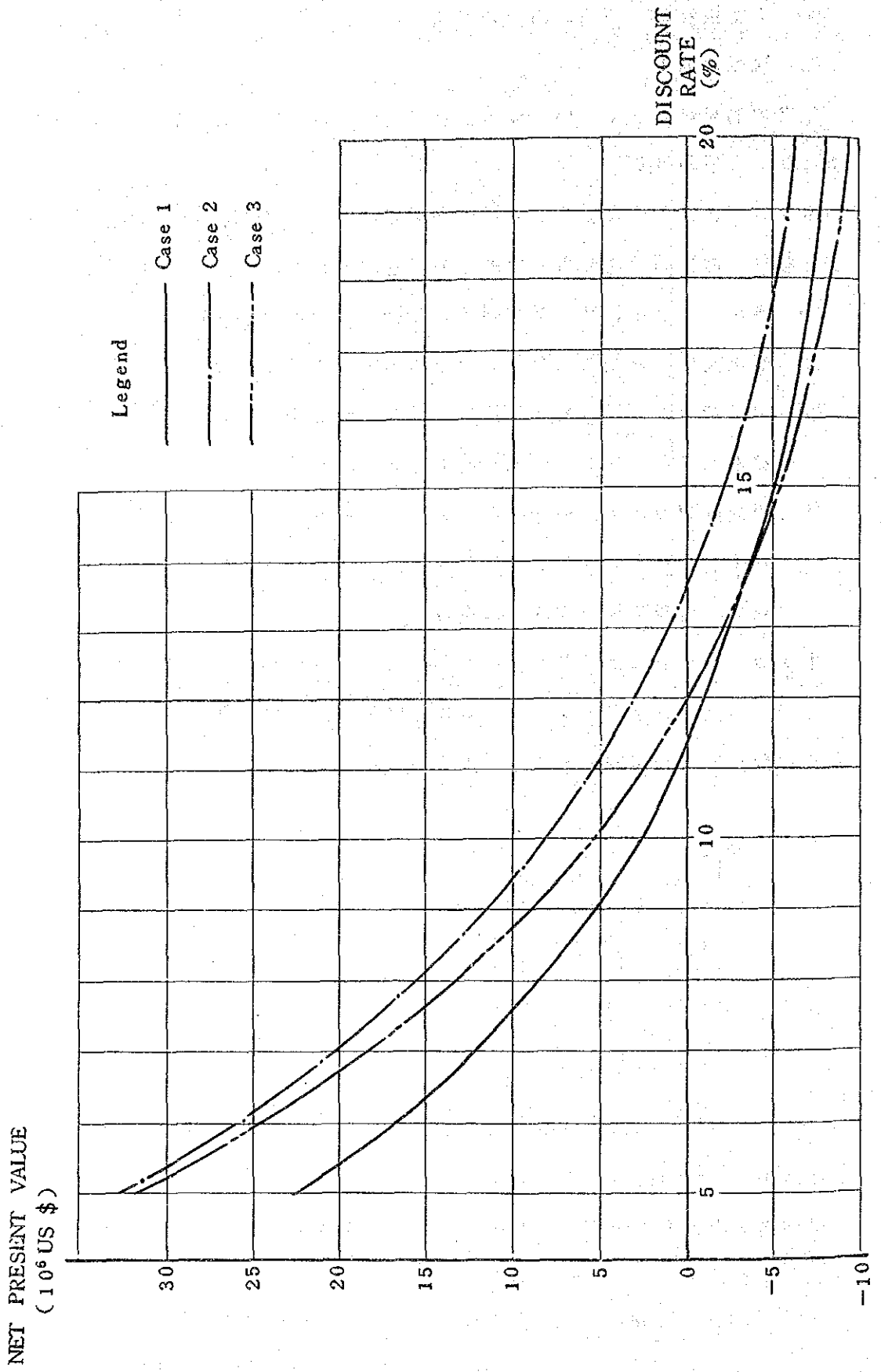


Table 9-1-1 COST AND BENEFIT (CASE 1)

(Unit: 1,000 US\$)

Year	Implementation Schedule	Investment Cost			Benefit				Remarks		
		F.C.	L.C.	Total	Decremental Interruption Energy		Reduction of C/S Operators			Reduction of Big Customer's Losses	
					Energy (MWh)	Amount	Operators	Amount		Energy (MWh)	Amount
1986		-	-	-	0	0	0	0	0	0	Exchange Rate: \$1.00 = 25.9359 Baht \$1.00 = 153.8 Yen  Estimated Rate of Interrupted Energy: 0.016 \$/kWh  Salaries & Wages: 2,845 \$/Operator  Big Customer's Losses: 2.106 \$/kWh
1987		-	-	0	0	0	0	0	0		
1988	C3, Training C	7,535	362	7,897	0	0	0	0	0	0	
1989					1,085	17	20	57	666	1,402	
1990	C1, C2	11,964	718	12,682	1,110	18	20	57	673	1,418	
1991	S1, S2	10,192	751	10,943	3,787	61	60	171	2,265	4,771	
1992	NE3, S3	8,854	580	9,434	6,462	103	82	233	2,947	6,206	
1993	NE1, N1	10,194	670	10,864	8,738	140	104	296	2,347	7,050	
1994	N2, N3, NE2	13,584	979	14,563	11,306	181	138	393	3,553	7,483	
1995					13,121	210	173	492	3,603	7,588	
1996					13,190	211	173	492	3,595	7,571	
1997					13,264	212	173	492	3,587	7,554	
1998					13,324	213	173	492	3,579	7,538	
1999					13,396	214	173	492	3,572	7,522	
2000					13,464	215	173	492	3,563	7,505	
2001					13,534	217	173	492	3,555	7,487	
2002					13,609	218	173	492	3,548	7,471	
2003					13,682	219	173	492	3,539	7,454	
2004					13,761	220	173	492	3,532	7,438	
2005					13,831	221	173	492	3,524	7,422	
2006					13,910	223	173	492	3,516	7,405	
2007					13,987	224	173	492	3,508	7,389	

Table 9-1-2 COST AND BENEFIT (CASE 2)

(Unit: 1,000 US\$)

Year	Implementation Schedule	Investment Cost		Decremental Interruption Energy		Benefit			Remarks		
		F.C.	L.C.	Total	Energy (MWh)	Amount	Reduction of C/S Operators	Amount		Energy (MWh)	Amount
1986		-	-	-	0	0	0	0	0		
1987		-	-	-	0	0	0	0	0		
1988	C3, Training C	8,293	411	8,704	0	0	0	0	0		
1989					1,336	21	20	57	820	1,727	
1990	C1, C2	13,195	798	13,994	1,367	22	20	57	829	1,746	
1991	S1, S2	10,713	784	11,497	4,606	74	60	171	2,777	5,848	
1992	NE3, S3	9,189	599	9,788	7,744	124	82	233	3,578	7,535	
1993	NE1, N1	10,904	717	11,621	10,310	165	104	296	4,030	8,486	
1994	N2, N3, NE2	14,293	1,026	15,319	13,344	214	138	393	4,187	8,819	
1995					15,415	247	173	492	4,323	9,104	
1996					15,495	248	173	492	4,313	9,084	
1997					15,581	249	173	492	4,304	9,064	
1998					15,651	250	173	492	4,295	9,044	
1999					15,734	252	173	492	4,285	9,025	
2000					15,814	253	173	492	4,276	9,004	
2001					15,895	254	173	492	4,266	8,983	
2002					15,982	256	173	492	4,257	8,964	
2003					16,068	257	173	492	4,247	8,943	
2004					16,159	259	173	492	4,237	8,924	
2005					16,241	260	173	492	4,229	8,905	
2006					16,333	261	173	492	4,218	8,884	
2007					16,423	263	173	492	4,209	8,865	

Exchange Rate:  
\$1.00 = 25.9359 Baht  
\$1.00 = 153.8 Yen

Estimated Rate of Interrupted Energy:  
0.016 \$/kWh

Salaries & Wages:  
2,845 \$/Operator

Big Customer's Losses:  
2.106 \$/kWh

Table 9-1-3 COST AND BENEFIT (CASE 3)

(Unit: 1,000 US\$)

Year	Implementation Schedule	Investment Cost		Decremental Interruption Energy		Benefit Reduction of C/S Operators		Reduction of Big Customer's Losses		Remarks	
		F.C.	L.C.	Total	Energy (MWh)	Amount	Operators	Amount	Energy (MWh)		Amount
1986		-	-	-	0	0	0	0	0		
1987		-	-	-	0	0	0	0	0		
1988	C3, Training C	9,524	470	9,994	0	0	0	0	0		
1989					1,447	23	20	57	888	1,870	
1990	C1, C2	16,699	961	17,660	1,480	24	20	57	898	1,891	
1991	S1, S2	12,179	854	13,033	5,050	81	60	171	3,021	6,361	
1992	NE3, S3	11,225	697	11,922	8,616	138	82	233	3,929	8,275	
1993	NE1, N1	12,609	797	13,406	11,650	186	104	296	4,463	9,399	
1994	N2, N3, NE2	16,875	1,146	18,021	15,075	241	138	393	4,737	9,977	
1995					17,495	280	173	492	4,804	10,117	
1996					17,587	281	173	492	4,793	10,095	
1997					17,686	283	173	492	4,783	10,072	
1998					17,765	284	173	492	4,772	10,051	
1999					17,861	286	173	492	4,762	10,029	
2000					17,952	287	173	492	4,751	10,006	
2001					18,045	289	173	492	4,740	9,983	
2002					18,146	290	173	492	4,730	9,962	
2003					18,243	292	173	492	4,719	9,939	
2004					18,348	294	173	492	4,709	9,917	
2005					18,442	295	173	492	4,699	9,896	
2006					18,546	297	173	492	4,688	9,873	
2007					18,650	298	173	492	4,678	9,852	

Exchange Rate:  
\$1.00  
= 25.9359 Baht  
\$1.00  
= 153.8 Yen

Estimated Rate  
of Interrupted  
Energy:  
0.016 \$/kWh

Salaries &  
Wages:  
2,845  
\$/Operator

Big Customer's  
Losses:  
2.106 \$/kWh

Table 9-2-1 NET IN-FLOW (CASE 1)

(Unit: 1,000 US\$)

Year	Cost			Benefit				Net In-Flow (2) - (1)
	Investment	Operating	Total (1)	Decremental Int. Energy	Reduction C. Center Operator	Reduction Customer's Losses	Total (2)	
1986	-	0	0	0	0	0	0	0
1987	-	0	0	0	0	0	0	0
1988	7,897	0	7,897	0	0	0	0	(7,897)
1989		79	79	17	57	1,402	1,476	1,397
1990	12,682	79	12,761	18	57	1,418	1,493	(11,268)
1991	10,943	206	11,149	61	171	4,771	5,003	(6,146)
1992	9,434	315	9,749	103	233	6,206	6,542	(3,207)
1993	10,864	409	11,273	140	296	7,050	7,486	(3,787)
1994	14,563	518	15,081	181	393	7,483	8,057	(7,024)
1995		664	664	210	492	7,588	8,290	7,626
1996		664	664	211	492	7,571	8,274	7,610
1997		664	664	212	492	7,554	8,258	7,594
1998		664	664	213	492	7,538	8,243	7,579
1999		664	664	214	492	7,522	8,228	7,564
2000		664	664	215	492	7,505	8,212	7,548
2001		664	664	217	492	7,487	8,196	7,532
2002		664	664	218	492	7,471	8,181	7,517
2003		664	664	219	492	7,454	8,165	7,501
2004		664	664	220	492	7,438	8,150	7,486
2005		664	664	221	492	7,422	8,135	7,471
2006		664	664	223	492	7,405	8,120	7,456
2007	(11,881)	664	(11,217)	224	492	7,389	8,105	19,322
	54,502	10,238	64,740	3,337	7,603	125,674	136,614	71,874



Table 9-2-2 NET IN-FLOW (CASE 2)

(Unit: 1,000 US\$)

Year	Cost			Benefit				Net In-Flow (2) - (1)
	Investment	Operating	Total (1)	Decremental Int. Energy	Reduction C. Center Operator	Reduction Customer's Losses	Total (2)	
1986	-	0	0	0	0	0	0	0
1987	-	0	0	0	0	0	0	0
1988	8,704	0	8,704	0	0	0	0	(8,704)
1989		87	87	21	57	1,727	1,805	1,718
1990	13,993	87	14,080	22	57	1,746	1,825	(12,255)
1991	11,497	227	11,724	74	171	5,848	6,093	(5,631)
1992	9,788	342	10,130	124	233	7,535	7,892	(2,238)
1993	11,621	440	12,061	165	296	8,486	8,947	(3,114)
1994	15,319	556	15,875	214	393	8,819	9,426	(6,449)
1995		709	709	247	492	9,104	9,843	9,134
1996		709	709	248	492	9,084	9,824	9,115
1997		709	709	249	492	9,064	9,805	9,096
1998		709	709	250	492	9,044	9,786	9,077
1999		709	709	252	492	9,025	9,769	9,060
2000		709	709	253	492	9,004	9,749	9,040
2001		709	709	254	492	8,983	9,729	9,020
2002		709	709	256	492	8,964	9,712	9,003
2003		709	709	257	492	8,943	9,692	8,983
2004		709	709	259	492	8,924	9,675	8,966
2005		709	709	260	492	8,905	9,657	8,948
2006		709	709	261	492	8,884	9,637	8,928
2007	(12,582)	709	(11,873)	263	492	8,865	9,620	21,493
	58,340	10,956	69,296	3,929	7,603	150,954	162,486	93,190

Table 9-2-3 NET IN-FLOW (CASE 3)

(Unit: 1,000 US\$)

Year	Cost			Benefit			Net In-Flow (2) - (1)
	Investment	Operating	Total (1)	Decremental Int. Energy	Reduction C. Center Operator	Reduction Customer's Losses	
1986	-	0	0	0	0	0	0
1987	-	0	0	0	0	0	0
1988	9,994	0	9,994	0	0	0	(9,994)
1989	17,660	100	17,760	23	57	1,870	1,950
1990	13,033	100	13,130	24	57	1,891	1,972
1991	11,922	277	12,329	81	171	6,361	6,613
1992	13,406	407	13,932	138	233	8,275	8,646
1993	18,021	526	18,681	186	296	9,399	9,881
1994		660	660	241	393	9,977	10,611
1995		840	840	280	492	10,117	10,889
1996		840	840	281	492	10,095	10,868
1997		840	840	283	492	10,072	10,847
1998		840	840	284	492	10,051	10,827
1999		840	840	286	492	10,029	10,807
2000		840	840	287	492	10,006	10,785
2001		840	840	289	492	9,983	10,764
2002		840	840	290	492	9,962	10,744
2003		840	840	292	492	9,939	10,723
2004		840	840	294	492	9,917	10,703
2005		840	840	295	492	9,896	10,683
2006		840	840	297	492	9,873	10,662
2007	(14,863)	840	(14,023)	298	492	9,852	10,642
	69,173	12,990	82,163	4,449	7,603	167,565	179,617
							97,454

Table 9-3 NET PRESENT VALUE

(Unit: 1,000 US\$)

Items	Discount Rate (%)											
	5	6	7	8	9	10	11	12				
Case 1	22,344	16,843	12,263	8,443	5,263	2,616	408	(1,424)				
Case 2	32,803	25,978	20,260	15,458	11,425	8,037	5,189	2,798				
Case 3	31,734	24,386	18,248	13,120	8,836	5,251	2,261	(234)				
Net Present Value (1986 Price)												

Items	Discount Rate (%)											
	13	14	15	16	17	18	19	20				
Case 1	(2,937)	(4,191)	(5,224)	(6,071)	(6,758)	(7,315)	(7,758)	(8,108)				
Case 2	789	(895)	(2,306)	(3,484)	(4,470)	(5,284)	(5,957)	(6,513)				
Case 3	(2,316)	(4,044)	(5,476)	(6,661)	(7,633)	(8,424)	(9,065)	(9,578)				
Net Present Value (1986 Price)												

Table 9-4 AMORTIZATION SCHEDULE (CASE 2)

(Unit: 1,000 US\$)

Year	Loan Schedule			Amortization Schedule																	
	F.C.	L.C.	Total	Principal		Balance		Interest													
				F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	Total											
1986																					
1987	8,293	3,806	12,099																		
1988	13,195	6,390	19,585																		
1989	10,713	5,108	15,821																		
1990	9,189	4,343	13,532																		
1991	10,904	5,163	16,067																		
1992	14,293	6,815	21,108																		
1993				254																	
1994				254																	
1995				680																	
1996				1,021																	
1997				1,311																	
1998				1,655																	
1999				2,109																	
2000				2,109																	
2001				2,109																	
2002				2,109																	
2003				2,109																	
2004				2,109																	
2005				2,109																	
2006				2,109																	
2007				2,105																	
Sub-Total	66,587	31,625	98,212	21,521	24,152	45,673	-	-	30,289	43,919	74,208										

Table 9-4 AMORTIZATION SCHEDULE (CASE 2)

(Unit: 1,000 US\$)

(Continued)

Year	Loan Schedule			Amortization Schedule			Interest					
	F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.	Total			
										Balance		
2008				3,330	1,855	5,185	41,736	5,618	47,354	1,252	674	1,926
2009				3,330	1,855	5,185	38,406	3,763	42,169	1,152	452	1,604
2010				3,330	1,422	4,752	35,076	2,341	37,417	1,052	281	1,333
2011				3,330	1,081	4,411	31,746	1,260	33,006	952	151	1,103
2012				3,330	801	4,131	28,416	459	28,875	853	55	908
2013				3,330	459	3,789	25,086	0	25,086	753	0	753
2014				3,330		3,330	21,756		21,756	653		653
2015				3,330		3,330	18,426		18,426	553		553
2016				3,330		3,330	15,096		15,096	453		453
2017				3,323		3,323	11,773		11,773	353		353
2018				2,915		2,915	8,858		8,858	266		266
2019				2,910		2,910	5,948		5,948	178		178
2020				2,248		2,248	3,700		3,700	111		111
2021				1,728		1,728	1,972		1,972	59		59
2022				1,264		1,264	708		708	21		21
2023				708		708	0		0	0		0
Sub-Total				45,066	7,473	52,539	-	-	-	8,661	1,613	10,274
Total	66,587	31,625	98,212	66,587	31,625	98,212	-	-	-	38,950	45,532	84,482

Table 9-5 CASH FLOW STATEMENT (CASE 2)

(Unit: 1,000 US\$)

Item	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
1. Sources of Funds											
Operating Profit	12,099	(9)	19,577	15,839	13,547	16,088	21,159	30	31	32	33
Long Term Debt	12,099	(9)	(8)	18	15	21	51	30	31	32	33
			19,585	15,821	13,532	16,067	21,108	-	-	-	-
2. Uses of Funds											
Investment	12,805	706	21,453	18,623	17,132	20,837	27,094	6,330	6,549	6,682	7,229
Repayment	12,099	-	19,585	15,821	13,532	16,067	21,108	-	-	-	-
Interest	706	706	1,868	2,802	3,600	4,516	5,732	680	1,021	1,311	2,070
								5,650	5,528	5,371	5,159
3. Cash Balance	(706)	(715)	(1,876)	(2,784)	(3,585)	(4,749)	(5,935)	(6,300)	(6,518)	(6,650)	(7,196)
Electric Revenues	775,398	862,954	924,948	990,336	1,054,024	1,118,787	1,184,209	1,250,132	1,319,723	1,393,192	1,470,746
(1)/(2)	(0.09)	(0.08)	(0.20)	(0.28)	(0.34)	(0.42)	(0.50)	(0.50)	(0.49)	(0.48)	(0.49)

Item	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total
1. Sources of Funds										
Operating Profit	35	36	37	39	40	42	43	44	46	98,788
Long Term Debt	35	36	37	39	40	42	43	44	46	576
	-	-	-	-	-	-	-	-	-	98,212
2. Uses of Funds										
Investment	7,417	7,792	8,027	8,171	8,384	8,745	8,393	8,040	7,684	218,093
Repayment	2,524	3,184	3,720	4,179	4,724	5,439	5,439	5,439	5,435	98,212
Interest	4,893	4,608	4,307	3,992	3,660	3,306	2,954	2,601	2,249	45,673
										74,208
3. Cash Balance	(7,382)	(7,756)	(7,990)	(8,132)	(8,344)	(8,703)	(8,350)	(7,996)	(7,638)	(119,305)
Electric Revenues	1,552,620	1,639,056	1,730,300	1,826,620	1,928,304	2,035,649	2,148,970	2,268,605	2,394,893	29,869,466
(1)/(2)	(0.48)	(0.47)	(0.46)	(0.45)	(0.43)	(0.43)	(0.39)	(0.35)	(0.32)	(0.40)

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TYPE OF POWER PLANT	FISCAL YEAR										
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
HYDRO POWER PLANT (%)	1,813.62 28.08	1,998.12 30.07	2,238.12 32.51	2,238.12 32.21	2,238.12 30.88	2,238.12 29.89	2,238.12 29.89	2,418.12 31.11	2,418.12 30.37	2,418.12 28.74	2,998.12 32.79
THERMAL OIL FIRED (%)	342.50 5.30	342.50 5.15	342.50 4.98	417.50 6.01	417.50 5.76	417.50 5.58	417.50 5.58	417.50 5.37	180.00 2.26	180.00 2.14	180.00 1.97
LIGNITE FIRED (%)	885.00 13.70	885.00 13.32	885.00 12.86	885.00 12.74	1,185.00 16.35	1,425.00 19.03	1,425.00 19.03	1,500.00 19.30	1,500.00 18.84	1,500.00 17.83	1,500.00 16.41
NATURAL GAS FIRED (%)	2,400.00 37.15	2,400.00 36.12	2,400.00 34.86	2,400.00 34.54	2,400.00 33.11	2,400.00 32.05	2,400.00 32.05	2,400.00 30.87	2,400.00 30.14	2,400.00 28.53	2,400.00 26.25
SUB-TOTAL (%)	3,627.50 56.16	3,627.50 54.60	3,627.50 52.69	3,702.50 53.28	4,002.50 55.22	4,242.50 56.65	4,242.50 56.65	4,317.50 55.54	4,080.00 51.24	4,080.00 48.50	4,080.00 44.62
GAS TURB. POWER PLANT (%)	265.00 4.10	265.00 3.99	265.00 3.85	265.00 3.81	265.00 3.66	265.00 3.54	265.00 3.54	145.00 1.87	145.00 1.82	145.00 1.72	145.00 1.59
TURB. & CON. PO. PLANT (%)	720.00 11.15	720.00 10.84	720.00 10.46	720.00 10.36	720.00 9.93	720.00 9.61	720.00 9.61	870.00 11.19	1,320.00 16.58	1,770.00 21.04	1,920.00 21.00
DIESEL POWER PLANT (%)	33.60 0.52	33.60 0.51	33.60 0.49	23.00 0.33	23.00 0.32	23.00 0.31	23.00 0.31	23.00 0.30	0.00	0.00	0.00
TOTAL	6,459.72	6,644.22	6,884.22	6,948.62	7,248.62	7,488.62	7,488.62	7,773.62	7,963.12	8,413.12	9,143.12

## EXPANSION PLAN OF HYDRO POWER PLANT (EGAT)

(UNIT: MW)

PLANT NAME	FISCAL YEAR											
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	
BHUMIBOL	535.00	535.00	535.00	535.00	535.00	535.00	535.00	535.00	535.00	535.00	535.00	535.00
SIRIKIT	375.00	375.00	375.00	375.00	375.00	375.00	375.00	375.00	375.00	375.00	375.00	375.00
UBOL RATANA	25.20	25.20	25.20	25.20	25.20	25.20	25.20	25.20	25.20	25.20	25.20	25.20
SIRINDHORN	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00	36.00
CHULABHORN	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
KANG KRACHAN	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00
NAM PUNG	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
SRINAGARIND	360.00	540.00	540.00	540.00	540.00	540.00	540.00	720.00	720.00	720.00	720.00	720.00
BANG LANG	72.00	72.00	72.00	72.00	72.00	72.00	72.00	72.00	72.00	72.00	72.00	72.00
THA THUNG NA	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00
KHAO LAEM	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00
MAE NGAI	4.50	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
HUAI KUM	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
BAN SANTI	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
BANYANG	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
BAN KHUN KLANG	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
KLONG CHONG KLUM	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
CHIEW LARN	-	-	240.00	240.00	240.00	240.00	240.00	240.00	240.00	240.00	240.00	240.00
NAM CHON	-	-	-	-	-	-	-	-	-	-	-	580.00
TOTAL	1,813.62	1,998.12	2,238.12	2,238.12	2,238.12	2,238.12	2,238.12	2,418.12	2,418.12	2,418.12	2,418.12	2,998.12

PLANT NAME	FISCAL YEAR											
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	
OIL FIRED												
NORTH BANGKOK	237.50	237.50	237.50	237.50	237.50	237.50	237.50	237.50	-	-	-	-
SURAT THANI	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
KHANOM	75.00	75.00	75.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
SUB-TOTAL	342.50	342.50	342.50	417.50	417.50	417.50	417.50	417.50	180.00	180.00	180.00	180.00
LIGNITE FIRED												
KRABI	60.00	60.00	60.00	60.00	60.00	-	-	-	-	-	-	-
MAE MOH	825.00	825.00	825.00	825.00	1,125.00	1,425.00	1,425.00	1,425.00	1,425.00	1,425.00	1,425.00	1,425.00
KRABI 2	-	-	-	-	-	-	-	75.00	75.00	75.00	75.00	75.00
SUB-TOTAL	885.00	885.00	885.00	885.00	1,185.00	1,425.00	1,425.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00
NATURAL GAS FIRED												
SOUTH BANGKOK	1,300.00	1,300.00	1,300.00	1,300.00	1,300.00	1,300.00	1,300.00	1,300.00	1,300.00	1,300.00	1,300.00	1,300.00
BANG PAKONG	1,100.00	1,100.00	1,100.00	1,100.00	1,100.00	1,100.00	1,100.00	1,100.00	1,100.00	1,100.00	1,100.00	1,100.00
SUB-TOTAL	2,400.00	2,400.00	2,400.00	2,400.00	2,400.00	2,400.00	2,400.00	2,400.00	2,400.00	2,400.00	2,400.00	2,400.00
TOTAL	3,627.50	3,627.50	3,627.50	3,702.50	4,002.50	4,242.50	4,242.50	4,317.50	4,080.00	4,080.00	4,080.00	4,080.00

## EXPANSION PLAN OF GAS TURBINE PLANT (EGAT)

(UNIT: MW)

PLANT NAME	FISCAL YEAR											
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	
DIESEL OIL FIRED												
NAXHON RATCHASIMA	15.00	15.00	15.00	15.00	15.00	15.00	15.00	-	-	-	-	-
HAT YAI	45.00	45.00	45.00	45.00	45.00	45.00	45.00	-	-	-	-	-
UDON THANI	15.00	15.00	15.00	15.00	15.00	15.00	15.00	-	-	-	-	-
SURAT THANI	45.00	45.00	45.00	45.00	45.00	45.00	45.00	-	-	-	-	-
SUB-TOTAL	120.00	120.00	120.00	120.00	120.00	120.00	120.00	-	-	-	-	-
NATURAL GAS FIRED												
SOUTH BANGKOK	25.00	-	-	-	-	-	-	-	-	-	-	-
LAN KRABUE	120.00	120.00	120.00	120.00	120.00	120.00	120.00	120.00	120.00	120.00	120.00	120.00
CHANGWAT SONGKHLA	-	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
SUB-TOTAL	145.00	145.00	145.00	145.00	145.00	145.00	145.00	145.00	145.00	145.00	145.00	145.00
TOTAL	265.00	265.00	265.00	265.00	265.00	265.00	265.00	145.00	145.00	145.00	145.00	145.00



PLANT NAME	FISCAL YEAR											
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	
BANG PAKONG THERMAL PLANT GAS TURBINE PLANT	240.00	240.00	240.00	240.00	240.00	240.00	240.00	240.00	240.00	240.00	240.00	240.00
	480.00	480.00	480.00	480.00	480.00	480.00	480.00	480.00	480.00	480.00	480.00	480.00
KHANOM	-	-	-	-	-	-	-	150.00	300.00	450.00	600.00	600.00
NAM PHONG	-	-	-	-	-	-	-	-	300.00	600.00	600.00	600.00
TOTAL	720.00	720.00	720.00	720.00	720.00	720.00	720.00	870.00	1,320.00	1,770.00	1,920.00	1,920.00

## EXPANSION PLAN OF DIESEL POWER PLANT (EGAT)

(UNIT: MW)

PLANT NAME	FISCAL YEAR											
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	
PHUKET	10.60	10.60	10.60									
CHIANG MAI	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-	-	-	-
MAE MOH	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	-	-	-	-
BANG LANG	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	-	-	-	-
KHAO LAEM	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	-	-	-	-
NAKHON SI THAMMARAT	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	-	-	-	-
KRABI	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	-	-	-	-
TOTAL	33.60	33.60	33.60	23.00	23.00	23.00	23.00	23.00	-	-	-	-

OFFICE	REGION	N1	N2	N3	NE1	NE2	NE3	C1	C2	C3	S1	S2	S3	TOTAL
ELECTRIC OFFICE	A	10	10	10	11	10	8	11	9	8	7	7	10	111
	1st GRADE	1			2	1	1	1						6
	2nd GRADE	3	2	3	1	4	3	3	4	5	1	2	3	34
	3rd GRADE	4	8	6	5	2	3	4	3	3	6	4	6	54
	4th GRADE	2		1	3	3	1	3	2			1	1	17
CUSTOMER S.C.	B	17	19	13	16	8	17	15	6	18	11	13	5	158
CUSTOMER S. SUB-C	C	113	111	74	178	154	92	66	38	47	36	48	76	1,033
TOTAL (A+B+C)		140	140	97	205	172	117	92	53	73	54	68	91	1,302
AREA (KM)	D	71,946	74,147	40,655	61,034	57,640	49,475	22,644	21,963	27,864	28,145	37,349	24,830	517,692
CCT LENGTH OF H.V. LINE	E	7,624	7,256	6,616	11,824	11,768	7,363	7,087	6,084	8,566	4,200	5,626	5,050	89,064
D/(A+B)		2,665	2,557	1,768	2,261	3,202	1,979	871	1,464	1,072	1,564	1,867	1,655	1,925
E/(A+B)		282	250	288	438	654	295	273	406	329	233	281	337	331

OFFICE	REGION											TOTAL	
	N1	N2	N3	NE1	NE2	NE3	C1	C2	C3	S1	S2		S3
ELECTRIC OFFICE	915	864	791	870	800	640	890	763	811	604	542	761	9,251
1st GRADE	186			298	147	158	136						925
2nd GRADE	439	232	331	86	401	291	365	448	571	110	213	351	3,838
3rd GRADE	229	632	421	364	134	169	300	232	240	494	279	373	3,867
4th GRADE	61		39	122	118	22	89	83			50	37	621
CUSTOMER S.C.	313	265	269	284	96	247	303	152	405	199	138	96	2,767
CUSTOMER S. SUB-C.	214	172	175	296	271	128	147	96	96	64	65	169	1,893
TOTAL	1,442	1,301	1,235	1,450	1,167	1,015	1,340	1,011	1,312	867	745	1,026	13,911

OFFICE	REGION													TOTAL
	N1	N2	N3	NE1	NE2	NE3	C1	C2	C3	S1	S2	S3	TOTAL	
ELECTRIC OFFICE	180	167	132	150	139	130	187	155	150	117	109	140	1,756	
1st GRADE	35			62	27	36	27						187	
2nd GRADE	83	45	59	10	69	51	82	97	104	24	45	69	738	
3rd GRADE	42	122	67	59	27	30	60	45	46	93	55	68	714	
4th GRADE	20		6	19	16	13	18	13			9	3	117	
CUSTOMER S.C.	176	163	140	138	53	157	175	80	208	108	85	42	1,525	
CUSTOMER S. SUB-C.	214	172	175	296	271	128	147	96	96	64	65	169	1,893	
TOTAL	570	502	447	584	463	415	509	331	454	289	259	351	5,174	

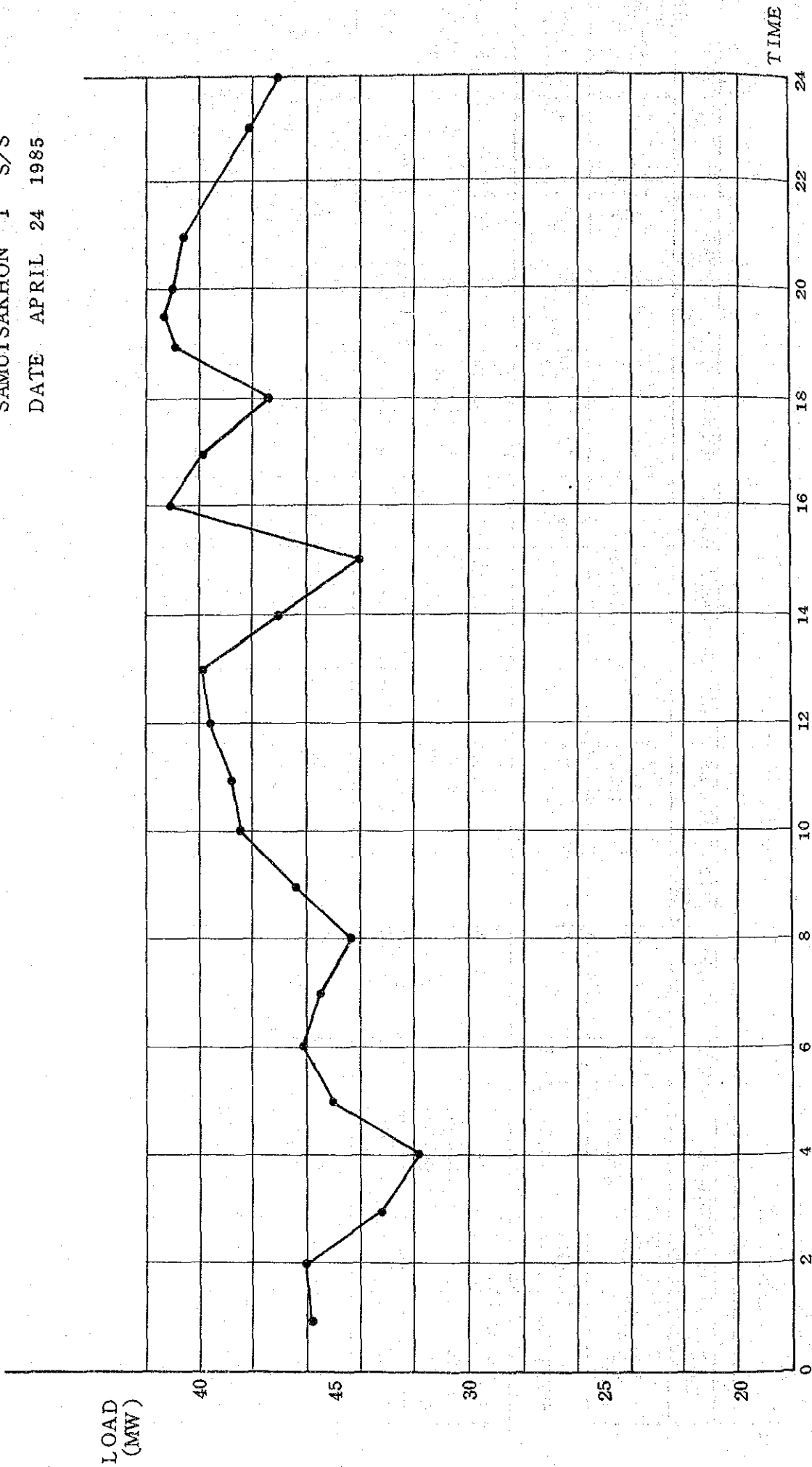
OFFICE	REGION											TOTAL	
	N1	N2	N3	NE1	NE2	NE3	C1	C2	C3	S1	S2	S3	TOTAL
CONSTRUCTION													
REGIONAL OFFICE	5	19	3	21	33	17	10	20	4	9	11	15	167
ELECTRIC OFFICE	75	28	35	34	48	33	57	32	42	34	29	29	476
CUSTOMER S.C.		12	8	15	3	14	8		26	4	6	2	98
CUSTOMER S. SUB-C.			3			6							9
SUB-TOTAL	80	59	49	70	84	70	75	52	72	47	46	46	750
MAINTENANCE													
REGIONAL OFFICE	16	18	9	13	13	14	8	13	1	8	12	19	144
ELECTRIC OFFICE	96	61	45	44	69	35	62	67	22	38	44	56	639
CUSTOMER S.C.		20	14	24	12	14	28		7	11	12	9	151
CUSTOMER S. SUB-C.		1	8			8	2		1	7			27
SUB-TOTAL	112	100	76	81	94	71	100	80	31	64	68	84	961
OTHERS													
REGIONAL OFFICE	13	13	10	9	10	11	19	15	20	18	21	20	179
ELECTRIC OFFICE	31	25	19	43	25	33	17	46	48	40	38	22	387
CUSTOMER S.C.		17	8	16	9	6	2		40	7	7	1	113
CUSTOMER S. SUB-C.			3			3			1				7
SUB-TOTAL	44	55	40	68	44	53	38	61	109	65	66	43	686
TOTAL													
REGIONAL OFFICE	34	50	22	43	56	42	37	48	25	35	44	54	490
ELECTRIC OFFICE	202	114	99	121	142	101	136	145	112	112	111	107	1,502
CUSTOMER S.C.	0	49	30	55	24	34	38	0	73	22	25	12	362
CUSTOMER S. SUB-C.	0	1	14	0	0	17	2	0	2	7	0	0	43
TOTAL	236	214	165	219	222	194	213	193	212	176	180	173	2,397

REGIONS	RESIDENTIAL (%)		SMALL BUSINESS (%)		LARGE BUSINESS (%)		SMALL INDUSTRIAL (%)		LARGE INDUSTRIAL (%)		OTHERS (%)		TOTAL (%)	
N1		275.50		67.40		78.95		52.74		7.46		44.71		526.76
N2		262.87		44.10		48.48		39.83		11.70		39.74		446.72
N3		235.94		51.75		60.24		47.29		9.49		22.77		427.48
SUB-TOTAL	26.6	774.31	23.8	163.25	26.4	187.67	11.0	139.86	1.1	28.65	24.0	107.22	16.4	1,400.96
NE1		259.78		67.80		58.62		65.32		46.10		49.25		546.15
NE2		203.54		37.82		26.06		36.39		13.27		30.64		347.72
NE3		242.57		51.79		61.90		73.87		168.09		23.84		622.06
SUB-TOTAL	24.2	705.89	22.9	156.69	20.6	146.58	13.8	175.58	9.0	227.46	23.2	103.73	17.7	1,515.93
C1		263.36		50.92		44.58		154.16		1,109.87		29.20		1,652.09
C2		290.92		98.48		127.52		170.32		304.00		23.47		1,014.71
C3		297.12		78.41		38.72		291.42		603.34		118.95		1,427.96
SUB-TOTAL	29.2	851.40	33.3	227.81	29.7	210.82	48.5	615.90	79.7	2,017.21	38.4	171.62	47.9	4,094.76
S1		173.18		35.54		34.44		120.98		102.35		13.90		480.39
S2		188.08		48.26		54.22		112.62		99.73		18.66		521.57
S3		219.14		53.35		76.97		105.56		56.60		31.87		543.49
SUB-TOTAL	19.9	580.40	20.0	137.15	23.3	165.63	26.7	339.16	10.2	258.68	14.4	64.43	18.1	1,545.45
TOTAL	100.0	2,912.00	100.0	684.90	100.0	710.70	100.0	1,270.50	100.0	2,532.00	100.0	447.00	100.0	8,557.10

ANNEX 3-6-1 DAILY LOAD CURVE

SAMUTSAKHON 1 S/S

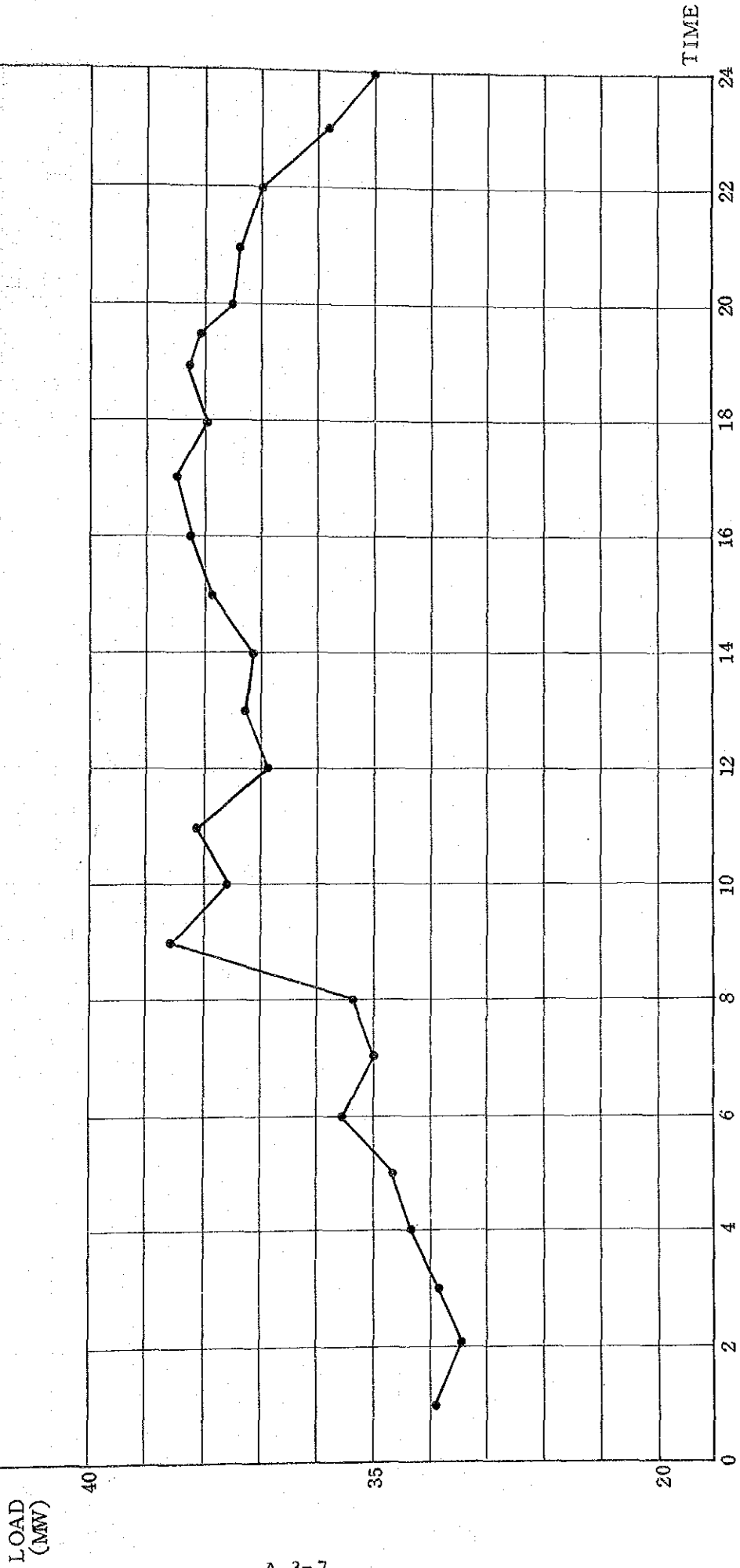
DATE APRIL 24 1985





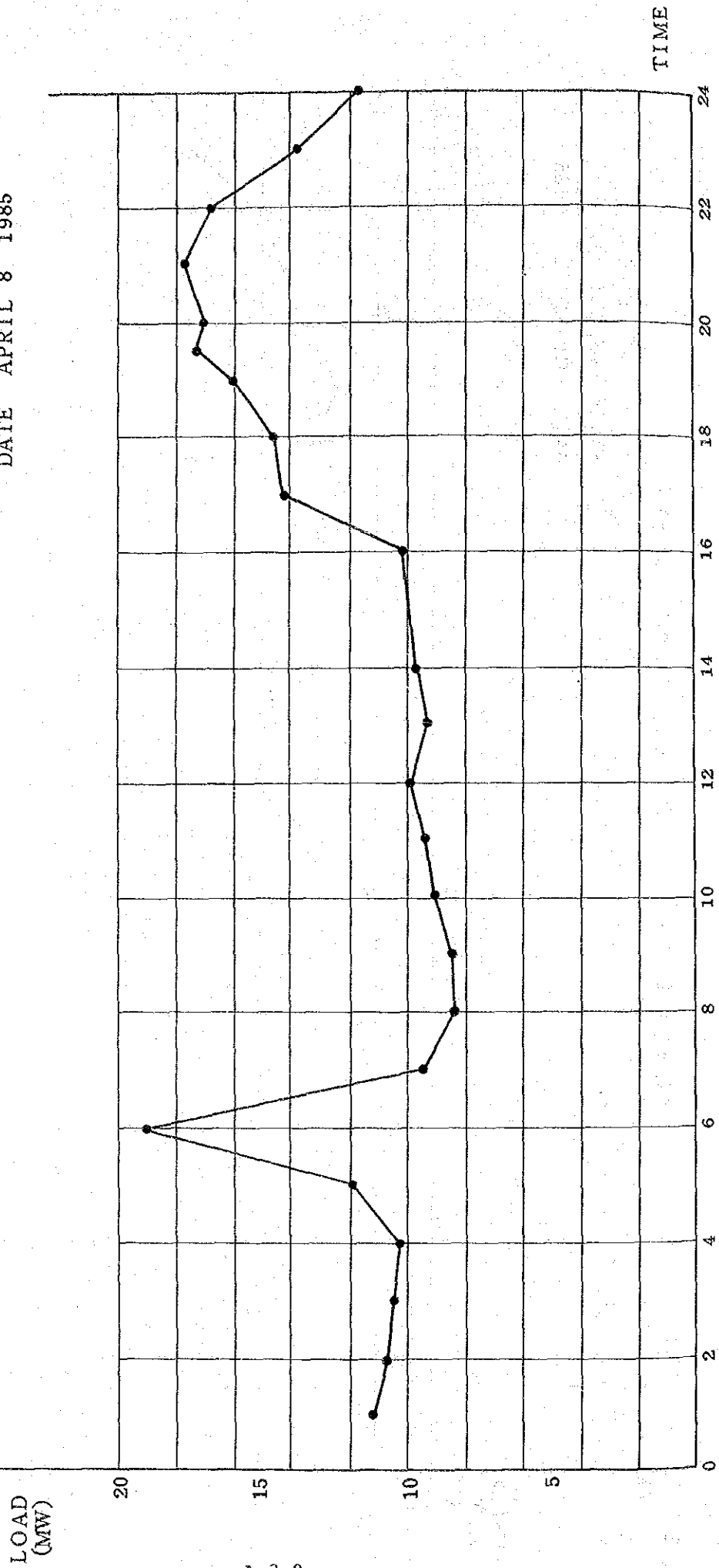
ANNEX 3-6-2 DAILY LOAD CURVE

SAMUTSAKHON 1 S/S  
DATE AUGUST 14 1985



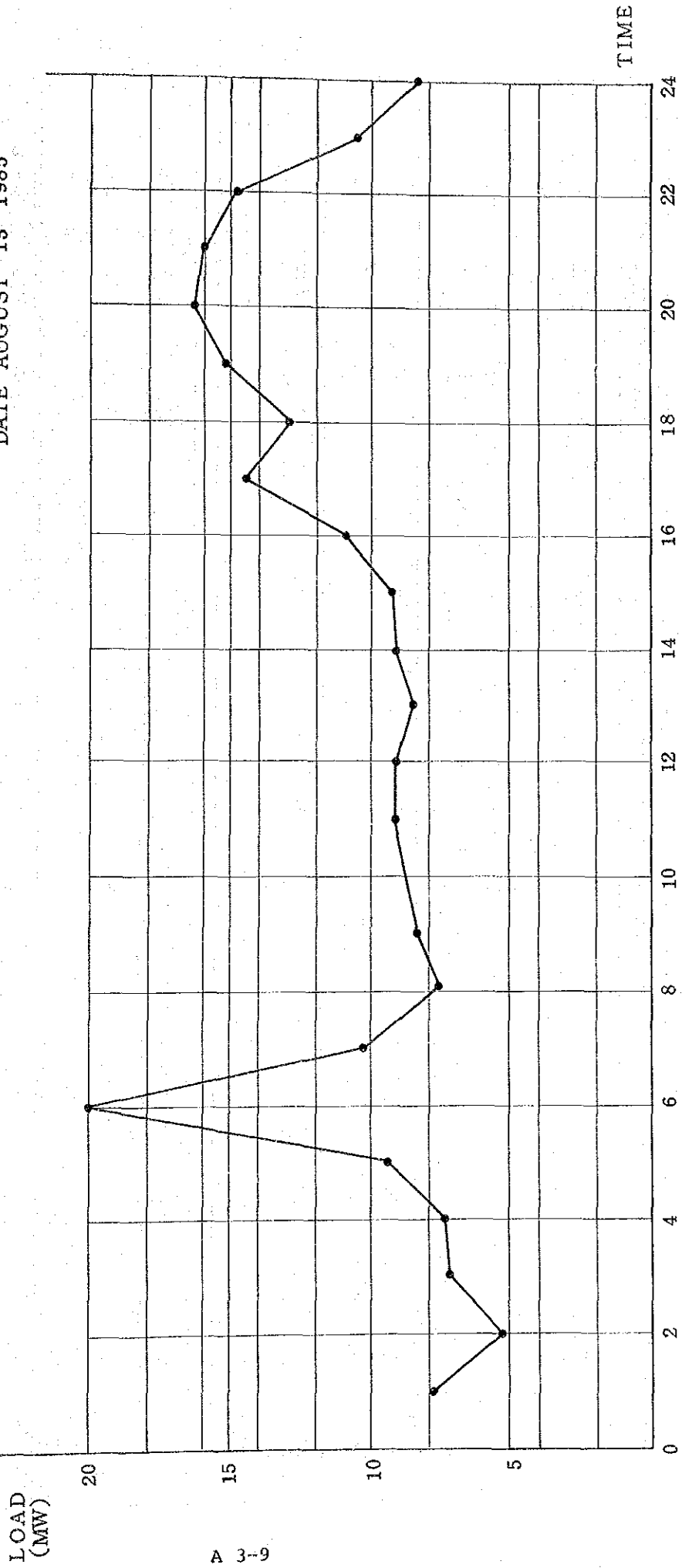
ANNEX 3-6-3 DAILY LOAD CURVE

SUPHANBURI S/S  
DATE APRIL 8 1985



ANNEX 3-6-4 DAILY LOAD CURVE

SUPHANBURI S/S  
DATE AUGUST 13 1985



REGION	ACTUAL										
	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
N1	47.6	40.3	43.2	43.3	46.0	44.3	40.8	41.5	42.1	42.8	42.9
N2	42.4	41.9	41.0	44.2	45.7	44.3	42.3	44.6	47.1	46.5	46.1
N3	46.1	45.9	45.8	48.5	46.9	48.9	51.2	48.7	50.1	50.4	51.6
NE1	43.2	44.1	44.1	45.3	45.2	46.4	43.6	42.5	41.4	41.6	41.1
NE2	39.8	38.0	41.3	42.8	41.1	41.0	36.8	40.3	35.9	38.2	38.4
NE3	50.7	52.0	50.4	50.8	51.9	55.2	52.0	46.7	48.9	48.2	49.9
C1	40.5	45.5	50.7	50.4	51.7	50.7	44.6	46.6	46.7	56.9	58.1
C2	49.8	51.7	51.3	52.7	55.9	58.1	56.5	56.8	58.2	56.7	58.9
C3	53.4	57.6	58.0	59.5	64.3	61.6	64.9	64.0	61.4	64.2	64.2
S1	49.7	50.8	47.8	48.2	59.3	56.3	51.4	54.1	58.6	53.5	58.3
S2	53.0	51.3	54.5	56.0	56.8	58.0	58.0	57.7	57.6	57.6	57.8
S3	51.3	41.5	51.0	52.2	54.3	56.6	53.1	52.1	50.4	54.2	54.8

REGION	FORECAST										
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	
N1	44.2	44.7	45.1	45.3	45.6	45.7	46.1	46.5	47.1	47.7	
N2	47.1	47.5	47.8	48.2	48.5	48.9	49.2	49.6	49.9	50.2	
N3	51.8	52.1	52.5	52.9	53.2	53.6	54.0	54.4	54.8	55.1	
NE1	43.4	43.8	44.1	44.5	44.9	45.3	45.7	46.0	46.4	46.8	
NE2	35.8	40.3	40.7	41.1	41.6	42.0	42.4	42.8	43.2	43.7	
NE3	52.0	52.4	52.8	53.2	53.6	54.0	54.4	54.8	55.2	55.6	
C1	66.9	65.7	66.4	67.5	67.6	67.8	68.0	68.1	68.3	68.6	
C2	59.0	61.9	61.6	61.6	61.7	61.7	62.1	62.4	62.7	63.1	
C3	61.1	64.5	64.9	65.2	65.6	66.0	66.4	66.8	67.2	67.6	
S1	58.6	59.1	60.1	60.5	61.0	61.4	61.8	62.3	62.7	63.2	
S2	57.4	58.4	58.8	59.3	59.7	60.1	60.5	61.0	61.4	61.8	
S3	46.9	54.5	54.9	55.3	55.7	56.1	56.6	57.2	57.7	58.3	

## ENERGY DEMAND BY REGION

(UNIT: GWh)

REGION	ACTUAL													GROWTH RATE (%/YEAR)
	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986		
N1	122.38	154.00	210.25	248.84	285.73	306.35	339.30	391.72	467.31	524.88	583.94	583.94	13.8	
N2	88.92	112.49	144.84	179.10	210.45	252.77	302.42	342.97	404.90	459.57	519.89	519.89	15.5	
N3	135.72	161.87	212.74	249.76	277.37	304.51	338.91	367.05	421.15	459.08	504.29	504.29	10.6	
SUB-TOTAL	345.03	428.37	567.83	677.70	773.55	863.63	980.63	1,101.73	1,293.35	1,443.53	1,608.12	1,608.12	13.2	
NE1	161.57	186.84	215.34	257.40	282.48	309.43	365.10	438.91	502.62	561.78	609.44	609.44	14.5	
NE2	71.16	88.84	113.07	142.40	160.44	184.02	225.36	253.16	307.91	359.73	406.18	406.18	17.2	
NE3	172.50	209.65	250.90	294.62	337.93	383.39	433.13	472.52	543.77	622.98	682.69	682.69	12.2	
SUB-TOTAL	405.23	485.33	579.31	694.43	780.85	876.84	1,023.60	1,164.60	1,354.30	1,544.49	1,698.31	1,698.31	14.1	
C1	285.52	370.68	475.45	540.88	571.50	642.79	739.20	864.34	1,111.93	1,292.20	1,762.19	1,762.19	22.3	
C2	221.79	278.24	339.34	442.89	505.24	571.53	650.16	712.38	863.11	979.52	1,113.03	1,113.03	14.3	
C3	464.06	608.22	709.13	808.09	972.73	1,022.61	1,082.78	1,136.66	1,275.71	1,386.51	1,505.24	1,505.24	8.0	
SUB-TOTAL	971.38	1,257.14	1,523.92	1,791.85	2,049.47	2,236.93	2,472.14	2,713.38	3,250.75	3,658.23	4,380.46	4,380.46	14.4	
S1	179.60	207.22	246.84	274.56	342.76	328.22	372.62	429.77	479.06	511.58	567.38	567.38	11.6	
S2	164.50	188.60	230.99	272.89	318.03	354.30	391.84	417.88	471.05	513.74	580.61	580.61	10.4	
S3	81.15	109.13	166.29	212.11	271.24	315.79	362.28	412.01	481.04	528.86	577.46	577.46	12.8	
SUB-TOTAL	425.24	504.95	644.12	759.56	932.03	998.30	1,126.74	1,259.66	1,431.16	1,554.19	1,725.45	1,725.45	11.6	
GRAND TOTAL	2,146.87	2,675.78	3,315.18	3,923.54	4,535.90	4,975.70	5,603.11	6,235.37	7,329.56	8,200.44	9,412.34	9,412.34	13.6	

REGION	FORECAST													GROWTH RATE (%/YEAR)
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997		
N1	635.97	707.76	773.56	850.09	936.72	1,035.28	1,138.12	1,241.78	1,344.01	1,447.94	1,447.94	1,447.94	9.5	
N2	542.30	600.39	653.02	707.28	763.89	821.28	879.00	936.40	993.35	1,049.47	1,049.47	1,049.47	7.3	
N3	548.76	607.07	651.69	698.11	747.19	796.79	846.59	895.96	944.86	993.02	993.02	993.02	7.0	
SUB-TOTAL	1,727.02	1,915.22	2,078.28	2,255.47	2,447.80	2,653.36	2,863.70	3,074.14	3,282.22	3,490.42	3,490.42	3,490.42	8.1	
NE1	654.75	721.05	781.96	844.30	909.21	974.66	1,040.09	1,104.54	1,167.79	1,229.36	1,229.36	1,229.36	7.3	
NE2	439.66	492.86	543.42	596.38	652.11	709.46	769.85	831.26	893.53	957.08	957.08	957.08	8.9	
NE3	719.44	786.49	845.23	904.67	966.24	1,027.58	1,088.46	1,147.97	1,206.11	1,262.25	1,262.25	1,262.25	6.3	
SUB-TOTAL	1,813.85	2,000.41	2,170.61	2,345.35	2,527.55	2,711.70	2,898.40	3,083.76	3,267.44	3,448.70	3,448.70	3,448.70	7.3	
C1	2,110.74	2,415.86	2,956.06	3,128.46	3,266.71	3,410.00	3,558.71	3,713.61	3,874.66	4,041.93	4,041.93	4,041.93	8.7	
C2	1,218.52	1,405.87	1,565.01	1,698.79	1,823.34	1,939.41	2,039.14	2,128.56	2,209.69	2,279.61	2,279.61	2,279.61	10.2	
C3	1,616.25	1,776.46	1,924.63	2,078.91	2,243.15	2,413.12	2,588.29	2,767.05	2,949.28	3,134.04	3,134.04	3,134.04	7.6	
SUB-TOTAL	4,945.50	5,598.19	6,445.70	7,306.16	7,744.16	8,214.53	8,672.56	9,142.40	9,623.63	10,114.58	10,114.58	10,114.58	8.7	
S1	596.09	661.62	781.55	845.37	912.63	982.50	1,054.40	1,127.85	1,202.32	1,277.24	1,277.24	1,277.24	8.5	
S2	618.73	677.57	736.42	796.08	858.57	922.42	987.25	1,052.24	1,117.18	1,181.59	1,181.59	1,181.59	7.4	
S3	633.90	723.00	796.54	892.47	992.40	1,095.60	1,180.10	1,267.11	1,356.50	1,447.87	1,447.87	1,447.87	9.6	
SUB-TOTAL	1,848.73	2,062.18	2,314.51	2,533.92	2,763.60	3,000.52	3,221.75	3,447.20	3,676.00	3,906.70	3,906.70	3,906.70	8.5	
GRAND TOTAL	10,335.10	11,576.00	13,009.10	14,440.89	15,483.12	16,580.10	17,656.40	18,747.50	19,849.29	20,960.40	20,960.40	20,960.40	8.3	

(UNIT: MW)

REGION	ACTUAL											GROWTH RATE (%/YEAR)
	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	
N1	29.37	43.61	55.60	65.64	70.96	78.96	95.04	107.68	126.62	140.07	155.41	14.5
N2	23.94	30.64	40.37	46.23	52.61	65.18	81.64	87.74	98.05	112.91	128.67	14.6
N3	33.11	40.30	52.97	58.83	67.52	71.13	75.51	86.04	96.00	104.00	111.63	9.4
SUB-TOTAL	86.41	114.55	148.94	170.69	191.09	215.27	252.19	281.45	320.67	356.98	395.70	12.9
NE1	42.74	48.33	55.71	64.91	71.30	76.19	95.57	117.95	138.55	154.03	169.37	17.3
NE2	20.41	26.71	31.26	37.97	44.55	51.19	69.82	71.78	98.04	107.46	120.88	18.7
NE3	38.87	46.01	56.85	66.21	74.27	79.23	95.01	115.44	126.97	147.48	156.26	14.5
SUB-TOTAL	102.02	121.05	143.81	169.08	190.12	206.62	260.40	305.17	363.56	408.97	446.51	16.7
C1	80.43	92.90	107.13	122.54	126.30	144.72	189.16	211.71	271.95	259.19	346.05	19.0
C2	50.83	61.48	75.45	95.94	103.10	112.36	131.34	143.19	169.37	197.07	215.83	13.9
C3	99.28	120.45	139.60	155.12	172.82	189.62	190.31	202.84	237.00	246.37	267.80	7.1
SUB-TOTAL	230.53	274.83	322.19	373.59	402.23	446.70	510.81	557.73	678.32	702.63	829.69	13.2
S1	41.25	46.60	58.96	65.04	65.93	66.60	82.72	90.61	93.30	109.17	111.08	10.8
S2	35.41	41.99	48.35	55.62	63.88	69.74	77.15	82.61	93.34	101.77	114.66	10.5
S3	18.06	30.02	37.25	46.43	57.02	63.67	77.91	90.23	109.01	111.32	120.22	13.6
SUB-TOTAL	94.71	118.61	144.56	167.09	186.82	200.01	237.78	263.44	295.65	322.26	345.96	11.6
GRAND TOTAL	513.67	629.04	759.49	880.45	970.26	1,068.60	1,261.19	1,407.79	1,658.20	1,790.84	2,017.86	13.6

REGION	FORECAST											GROWTH RATE (%/YEAR)
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995		
N1	164.17	180.60	195.62	214.04	234.75	258.46	282.01	304.62	325.66	346.48	366.48	8.3
N2	131.39	144.39	155.87	167.60	179.72	191.85	203.89	215.70	227.25	238.46	250.27	6.4
N3	120.98	132.93	141.69	150.72	160.20	169.65	178.99	188.12	197.00	205.60	214.11	6.3
SUB-TOTAL	416.54	457.92	493.18	532.36	574.66	619.96	664.89	708.44	749.91	790.54	829.85	7.2
NE1	172.13	188.02	202.19	216.48	231.17	245.74	260.06	273.88	287.20	299.89	311.89	5.9
NE2	140.17	139.50	152.29	165.48	179.14	192.95	207.31	221.65	235.93	250.27	264.66	7.5
NE3	158.08	171.45	182.85	194.21	205.85	217.27	228.43	239.14	249.40	259.10	268.44	5.2
SUB-TOTAL	470.38	498.97	537.33	576.17	616.16	655.96	695.79	734.67	772.53	809.26	846.95	6.1
C1	360.42	419.58	508.41	529.43	551.53	574.29	597.81	622.12	647.21	673.07	700.00	6.9
C2	235.68	259.15	289.99	388.75	413.10	442.18	464.51	486.92	509.36	531.67	554.00	9.4
C3	302.14	314.30	338.75	363.92	390.46	417.58	445.25	473.15	501.26	529.42	557.70	7.1
SUB-TOTAL	898.23	993.03	1,137.16	1,282.10	1,355.09	1,434.05	1,507.57	1,582.19	1,657.83	1,734.16	1,810.37	7.7
S1	116.08	127.81	148.38	159.40	170.89	182.69	194.68	206.75	218.82	230.77	242.66	7.6
S2	122.96	132.34	142.98	153.36	164.22	175.18	186.16	197.00	207.67	218.09	228.29	6.6
S3	154.13	151.39	165.51	184.07	203.31	222.92	237.86	252.99	268.29	283.65	299.11	9.0
SUB-TOTAL	393.17	411.54	456.87	496.83	538.43	580.79	618.69	656.75	694.78	732.50	770.26	7.8
GRAND TOTAL	2,178.32	2,361.46	2,624.53	2,887.45	3,084.34	3,290.76	3,486.95	3,682.05	3,875.04	4,066.46	4,257.86	7.3

SUBSTATION	POWER TRANSFORMER CAPACITY (MVA)	VOLTAGE (KV)	NO. OF SWITCHGEAR		NO. OF CONTROL ROOM								NO. OF STAFF AT CONTROL STATION		NO. OF FEEDER	NO. OF RECLOSER ON DISTRIBUTION LINE									
			C	B	EXISTING				UNDER CONST.				PRESENT	FUTURE PLAN		HYDRAULIC	ELECTRONIC								
					1	2	3	4	1	2	3	4			1			2	3	4					
1. CHIANG MAI 1	1 x 13.3	11																3							
2. CHIANG MAI 2	2 x 25 3 x 3.3	11 & 22	B 5		1													4	4						
3. CHIANG MAI 3	1 x 50	22																4	4						
4. CHIANG RAI	2 x 25	33	B 7		1												4	7	10						
5. LANPHUN 1	1 x 6.5 1 x 4	22																1	3	3					
6. LANPHUN 2	1 x 13.3	22	B 8															1	3	3					
7. LANPANG 1	3 x 6.5 1 x 5	22	M 5															1	3	5					
8. LANPANG 2	1 x 25	22	B 4															1	3	4					
9. FANG	1 x 4 2 x 2	22																2		2	1	1			
10. MAE HONG SON	2 x 1	22	M 1																	2	2				
11. MAE NHAO 2 (EGAT)	1 x 4	11																			1	1			
12. MAE SARING (NEA)	1 x 2 2 x 0.8	22	M 2																		2	2			
13. PHAYAO	1 x 25 1 x 16.7	33	B 4																			3	4	5	
14. THOEN	2 x 2.5	22																					3		
TOTAL	14 30 310.8		36	9	10	5	0	0	0	0	0	0	0	0	0	0	0	4	0	0	17	13	56	27	9

SUBSTATION	POWER TRANSFORMER CAPACITY (MVA)	VOLTAGE (KV)	NO. OF SWITCHGEAR		NO. OF CONTROL ROOM												NO. OF STAFF AT CONTROL STATION		NO. OF RECLOSER ON DISTRIBUTION LINE				
			C	B	EXISTING			UNDER CONST.			FUTURE PLAN			PRESENT	FUTURE PLAN	FEEDER	HYDRAULIC	ELECTRONIC					
					1	2	3	4	1	2	3	4	1							2	3	4	
1. BHUMIBOL	1 x 2.5	22		1														1					
2. KAMPHAENG PHET	2 x 12.5	22	V	4	1										3			4	4				
3. NAN	1 x 4	22	M	3						1								3	4				
4. PHARE	2 x 25	22	B	5	1										4			5	4				
5. PHICHIT	1 x 25	22	B	3	1										4			3	7				
6. PHITSANULOK 1	2 x 25	22	B	6	1										4			7	5				
7. PHITSANULOK 2	1 x 12.5	22								1								2	2				
8. SIRIKIT	1 x 5	22																1					
9. SUKHO THAI	1 x 25	22	B	4	1										3			5	4				
10. TAK	1 x 12.5	22	M	2												1		4	2				
11. UTTARADIT	1 x 25	22	B	4	1										4			4	4				
12.																							
13.																							
14.																							
TOTAL	11 14 236.5		31	3	3	6	0	0	0	0	0	0	0	0	1	1	0	1	22	9	39	34	3



SUBSTATION	POWER TRANSFORMER CAPACITY (MVA)	VOLTAGE (KV)	NO. OF SWITCHGEAR		NO. OF CONTROL ROOM								NO. OF STAFF AT CONTROL STATION		NO. OF RECLOSER ON DISTRIBUTION LINE						
			C	B	EXISTING		UNDER CONST.		FUTURE PLAN				PRESENT	FUTURE PLAN							
					1	2	3	4	1	2	3	4				1	2	3	4		
1. LOP BURI 1	1 x 25 2 x 6.25	22			1										3		5	2			
2. LOP BURI 2	1 x 25	22									1					3	6	5			
3. MANOROM	2 x 12.5	22	V	3	1										3		4	6			
4. NAKHON SAWA	2 x 40	22	M	6					1							4	6	9			
5. PHETCHABUN	1 x 25	22	M	4	1										3		7	4			
6. SING BURI	1 x 25	22	B	3	1										4	3	3	3			
7. TAKHLI 2	1 x 6.25	22												1			3	3			
8.																					
9.																					
10.																					
11.																					
12.																					
13.																					
14.																					
TOTAL	7 11 223.75		22	2	3	4	0	0	0	1	0	0	0	2	0	0	13	10	34	32	1

SUBSTATION	POWER TRANSFORMER CAPACITY (MVA)	VOLTAGE (kV)	NO. OF SWITCHGEAR			NO. OF CONTROL ROOM												NO. OF STAFF AT CONTROL STATION		NO. OF RECLOSER ON DISTRIBUTION LINE		
			C	B	RECLUSER	EXISTING			UNDER CONST.			FUTURE PLAN			PRESENT	FUTURE PLAN	HYDRAULIC	ELECTRONIC				
						1	2	3	4	1	2	3	4	1					2	3	4	
1. CRUN PHAE	3 x 6.25	22																	3	5	10	
2. KHON KHAEN 1	2 x 25	22	V 6			1									4					6	7	
3. LOEI	1 x 25	22	V 4 B 1			1									3					5	9	
4. NAKHON PHANOM	1 x 12.5	22	M 1														1			3	3	
5. NAM PHONG	1 x 12.5	22	V 4			1									3					2	4	
6. NAM PHUNG	1 x 3.6	22	B 1																	1	1	
7. NONG KHAI	1 x 31.5	22	B 5											1						5	7	
8. PHANG KHON	2 x 13	22	V 4			1														4	4	
9. SAKON NAKHON	1 x 25	22	B 4			1									3					4	6	
10. THAT PHANOM	1 x 6.3	22																	1	2	4	
11. UDON THANI 1	1 x 31.5	22	B 5											1						3	4	11
12. UDON THANI 2	2 x 25	22	B 4 V 2			1									4					6	7	
13.																						
14.																						
TOTAL	12 17 292.65		41		4	3	6	0	0	0	2	0	0	0	20	15	47	73		0	0	

SUBSTATION	POWER TRANSFORMER CAPACITY (MVA)	VOLTAGE (kV)	NO. OF SWITCHGEAR		NO. OF CONTROL ROOM								NO. OF STAFF AT CONTROL STATION		NO. OF RECLOSER ON DISTRIBUTION LINE						
			C	B	EXISTING		UNDER CONST.		FUTURE PLAN		PRESENT	FUTURE PLAN	FEEDER	HYDRAULIC ELECTRONIC							
					1	2	3	4	1	2				3	4	1	2	3	4		
1. KALASIN	1 x 25	22	V	4												3		4	6	1	
2. MAHA SARAKHAM	2 x 25	22	B	6						1								4	6	7	
3. MUKDAHAN	1 x 13	22	M	1											1			3	3	5	
4. ROJET	1 x 25	22												1				3	2	6	
5. SIRINDHON	1 x 6	22	B	2															2	5	
6. SISAKET	1 x 25 2 x 10	22	V	4											1			3	4	7	
7. SOMDET	1 x 12.5	22																	3	3	
8. UBON RATCHATHANI	1 2 x 31.5	22	B	6														4	6	12	
9. YOSOTHON	2 x 25	22	V	3											1			4	6	7	
10.																					
11.																					
12.																					
13.																					
14.																					
TOTAL	9 14 289.5		26	3	3	4	0	0	0	1	0	0	0	1	0	1	14	10	36	58	1

SUBSTATION	POWER TRANSFORMER CAPACITY (MVA)	VOLTAGE (kV)	NO. OF SWITCHGEAR		NO. OF CONTROL ROOM								NO. OF STAFF AT CONTROL STATION		NO. OF RECLOSER ON DISTRIBUTION LINE			
			C	B	EXISTING				UNDER CONST.				PRESENT	FUTURE PLAN	FEEDER	HYDRAULIC ELECTRONIC		
					1	2	3	4	1	2	3	4				1	2	
1. BURI RAM	2 x 12.5	22	V	4	1									4		5	6	
2. CHIYA PHUM	2 x 13	22	V	4										3		5	3	
3. NAKHON RATCHASIMA 1	2 x 31.5	22	M	10										4		10	12	
4. NAKHON RATCHASIMA 2	1 x 25	22	V	10										4		10	2	
5. PAK CHONG	1 x 25	22	V	4										3		4	2	
6. PHON	1 x 25	22	V	5										4		5	7	
7. SHIKHUI	1 x 31.5	22	V	6										3		6	2	
8. SURIN	2 x 25	22	M	4										4		5	6	
9.																		
10.																		
11.																		
12.																		
13.																		
14.																		
TOTAL	8	12	48	1	0	8	0	0	0	0	0	0	0	29	0	50	40	2

SUBSTATION	POWER TRANSFORMER CAPACITY (MVA)	VOLTAGE (kV)	NO. OF SWITCHGEAR				NO. OF CONTROL ROOM								NO. OF STAFF AT CONTROL STATION		NO. OF RECLOSER ON DISTRIBUTION LINE														
			C	B	REGLER	ELECTRONIC	EXISTING UNDER CONST.				FUTURE PLAN				PRESENT	FUTURE PLAN	FEEDER	HYDRAULIC	ELECTRONIC												
			1	2	3	4	1	2	3	4	1	2	3	4																	
1. ANG THONG 1	1 x 10	22												1								3									
2. ANG THONG 2	1 x 25	22												1								3									
3. AYUTHAYA 1	1 x 40	22												1								3									
4. BANG KHAN	2 x 40	69 22	M 2 B 10				1															4								1	1
5. BAM MAI	2 x 40	115 69 22	SF6 11 SF6 2 V 11				1															8								2	1
6. BAM PA IN	2 x 25	22	B 7				1															4								2	
7. PRACHIN BURI	2 x 25	22	B 9				1															3								10	8
8. PATHOM THANI	1 x 40	115 22	SF6 3 V 7				1															4								8	
9. SARABURI 1	2 x 40	22	M 7																											5	3
10. SARABURI 2	1 x 25	115 22	SF6 3 M 5				1															4								5	
11. SARABURI 3	1 x 25	22	M 4								1												4							3	
12. SARABURI 4	1 x 25	22	M 5				1															3								5	2
13. THALAN	1 x 25 1 x 6	22 11	V 6				1															3								7	
14.																															
TOTAL	13 19	546	92	6	3	5	0	2	1	0	1	0	0	3	0	0	0	0	33	13	75	20	2								

SUBSTATION	POWER TRANSFORMER CAPACITY (MVA)	VOLTAGE (KV)	NO. OF SWITCHGEAR		NO. OF CONTROL ROOM				NO. OF STAFF AT CONTROL STATION		NO. OF FEEDER	NO. OF RECLOSER ON DISTRIBUTION LINE									
			C	B	EXISTING		FUTURE PLAN		PRESENT	FUTURE PLAN		HYDRAULIC	ELECTRONIC								
					1	2	3	4						1	2	3	4				
1. AO PHAI	1 x 40	22									2										
2. BANG BUNG	1 x 25	22	V 6		1					3	5		3								
3. BANG LAMU G	2 x 25	22	V 9		1					4	8		2								
4. CHON BURI	1 x 40 2 x 25	22	V 10		1					4	8		2								
5. CHACHONGSAO	2 x 25	22	V 7		1					4	7		4								
6. CHANTHABURI	2 x 25	22	M 7		1					4	7		6 3								
7. KLAENG	1 x 25	22	V 5				1				5	3	1								
8. RAYONG 1	2 x 25	22	M 4				1				5	4	2								
9. RAYONG 2	1 x 25	22									2										
10. RAYONG 3	2 x 40	22	B 4		1					4	4										
11. SRIRACHA	2 x 12.5	22	M 4				1				5	3	1								
12.																					
13.																					
14.																					
TOTAL	11 19 510		56 3	2	5	1	0	0	2	1	0	0	0	1	0	0	23	13	58	21	3

SUBSTATION	POWER TRANSFORMER CAPACITY (MVA)	VOLTAGE (KV)	NO. OF SWITCHGEAR		NO. OF CONTROL ROOM												NO. OF STAFF AT CONTROL STATION		NO. OF FEEDER	NO. OF RECLOSER ON DISTRIBUTION LINE		
			C	B	EXISTING				UNDER CONST.				FUTURE PLAN				PRESENT	FUTURE PLAN		HYDRAULIC	ELECTRONIC	
					1	2	3	4	1	2	3	4	1	2	3	4			1			2
			RECYCLOSER	RECYCLOSER	RECYCLOSER	RECYCLOSER	RECYCLOSER	RECYCLOSER	RECYCLOSER	RECYCLOSER	RECYCLOSER	RECYCLOSER	RECYCLOSER	RECYCLOSER	RECYCLOSER	RECYCLOSER	RECYCLOSER					
1. BAN PONG 1	2 x 25	22	V 7													4				7		2
2. BAN PONG 2	2 x 25	22	B 8													4				9		1
3. KANCHANA BURI	1 x 25	22	V 7								1									3		6
4. KAMPHAENG SAE	1 x 25	22																		3		2
5. NAKHON CHAISRI	1 x 40 2 x 25	22	B 7													4				6		1
6. SAM PHRAN 1	2 x 40	22	B 8													4				8		1
7. SAMUT SAKHON 1	2 x 25	22	M 1 B 9													4				10		
8. SAMUT SAKHON 2	1 x 25	22																	1	3		2
9. SUPHAN BURI	2 x 25	22	V 4																	4		4
10. THAMUANG	1 x 25	22	B 4																	3		4
11.																						
12.																						
13.																						
14.																						
TOTAL	10 17 470		55	1	5	7	0	0	0	1	0	0	2	0	0	27	9			67	18	1

SUBSTATION	POWER TRANSFORMER CAPACITY (MVA)	VOLTAGE (kV)	NO. OF SWITCHGEAR		NO. OF CONTROL ROOM								NO. OF STAFF AT CONTROL STATION		NO. OF RECLOSER ON DISTRIBUTION LINE									
			C	B	EXISTING		UNDER CONST.		FUTURE PLAN				PRESENT	FUTURE PLAN										
					1	2	3	4	1	2	3	4				1	2	3	4					
1. CHA AM	2 x 25	22	B 1												4		5	2						
2. CHUM PHON	1 x 25	22	V 5												3		5	7						
3. PHETCHABURI	2 x 12.5	22	B 4												3		4	4						
4. PRACHOAPKHIRI KHAN	1 x 25	22	V 4												3		3	2						
5. PRAN BURI	1 x 25	22	M 4												3		4	3						
6. RANONG	1 x 25	22	M 2 B 1													1	3	2						
7. RATCHABURI 1	2 x 12.5	22	M 3														4	1						
8. RATCHABURI 2	1 x 25	22															2	1						
9. SAMUT SONGKHRAM	1 x 25	22	M 4														4	4						
10.																								
11.																								
12.																								
13.																								
14.																								
TOTAL	9 12 250		33	2	6	0	0	0	0	0	0	0	0	0	2	0	0	0	0	19	6	34	26	0



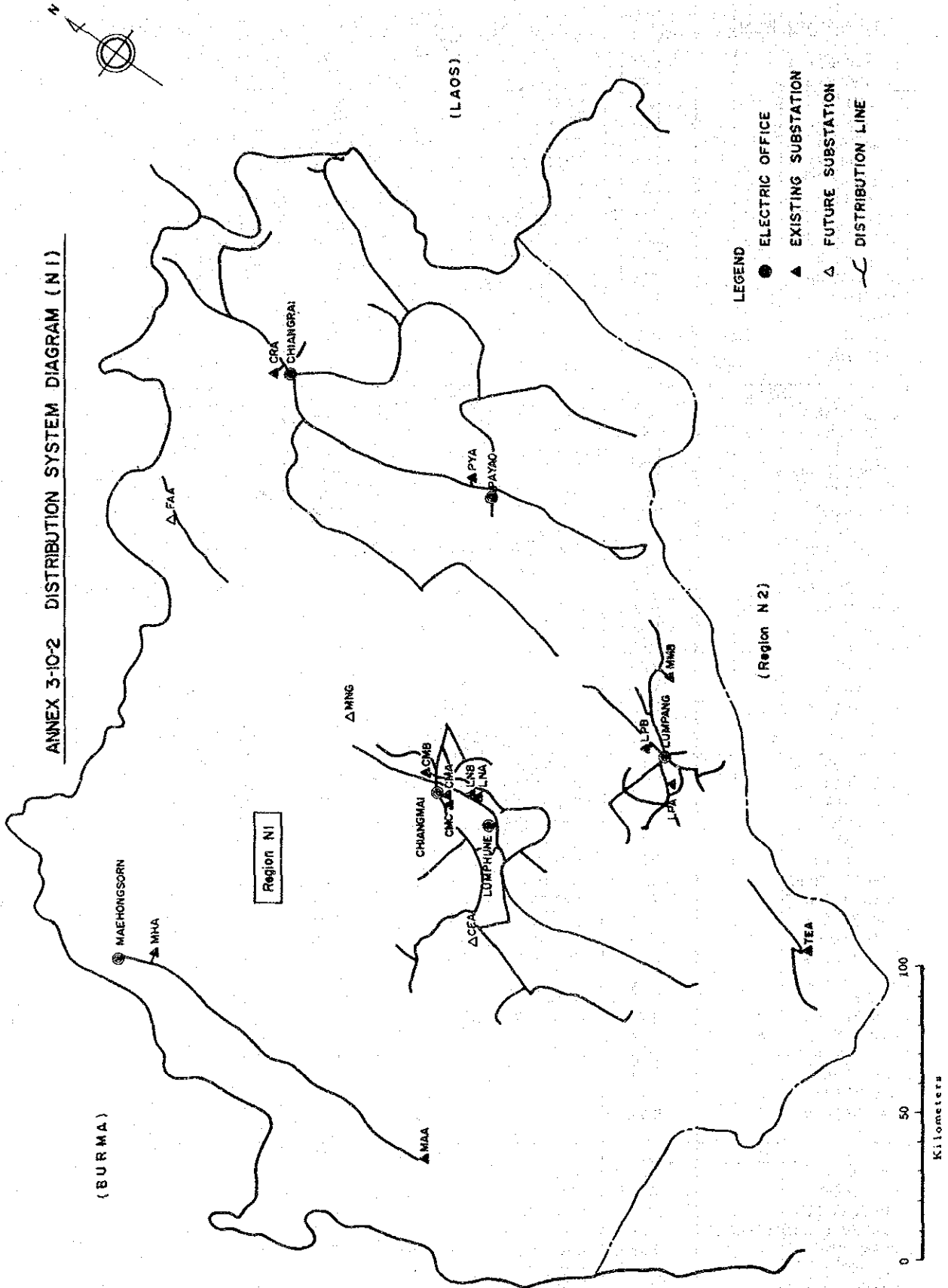
SUBSTATION	POWER TRANSFORMER CAPACITY (MVA)	VOLTAGE (kV)	NO. OF SWITCHGEAR		NO. OF CONTROL ROOM												NO. OF STAFF AT CONTROL STATION		NO. OF FEEDER	NO. OF RECLOSER ON DISTRIBUTION LINE		
			C	B	EXISTING			UNDER CONST.			FUTURE PLAN			PRESENT	FUTURE PLAN	HYDRAULIC	ELECTRONIC					
					1	2	3	4	1	2	3	4	1					2		3	4	
1. CHIEW LAN	1 x 7.5	33		B 1														1				
2. KRABI	1 x 25	33		B 2														2	1			
3. KENOM	1 x 25	33		B 2								1						1	2			
4. LAPOORA	4 x 7.5	33		M 2						1								4	3			
5. NAKHON SI THAMMARAT	2 x 25	33		B 6														6	3			
6. PHANG NGA	1 x 13	33																2				
7. PHUKET 1	2 x 25	33		M 2 B 6														7	1			
8. PHUKET 2	1 x 25	33																3	1			
9. PHUNPHIN	1 x 31.5 1 x 25	33		B 5						1								4	4			
10. TAKUA PA	1 x 6	33		B 2														2	1			
11. THUNG SONG	2 x 13	33		B 3														3	2			
12.																						
13.																						
14.																						
TOTAL	11 18 314			31						3	0	0	0	2	0	0	0	11	13	35	16	6

SUBSTATION	POWER TRANSFORMER CAPACITY (MVA)	VOLTAGE (kV)	NO. OF SWITCHGEAR		NO. OF CONTROL ROOM												NO. OF STAFF AT CONTROL STATION		NO. OF RECLOSER ON DISTRIBUTION LINE			
			C	B	EXISTING				UNDER CONST.				FUTURE PLAN				PRESENT	FUTURE PLAN				
					1	2	3	4	1	2	3	4	1	2	3	4						
1. BANG LANG	1 x 7.5	33		B 1														1	5			
2. HAT YAI 1	1 x 40 1 x 25	33		B 8	1												4	8	2			
3. HAT YAI 2	1 x 25	33		B 2											1			3	1			
4. HARATHIWAT	1 x 25	33		B 4	1												3	4	7			
5. PHATHALUNG	1 x 25	33		B 4					1									3	4	3		
6. SADAQ	1 x 7.5	33		B 4	1												3	3	1			
7. SONG KHLA	2 x 25	33													1			4	5			
8. YALA	1 x 31.5 1 x 25	33		B 5	1												4	5	5	6		
9.																						
10.																						
11.																						
12.																						
13.																						
14.																						
TOTAL	8 11 261.5		28	0	5	4	0	0	0	1	0	0	0	0	2	0	0	14	10	33	23	7

ANNEX 3-10-1. SUBSTATION SYMBOL LIST

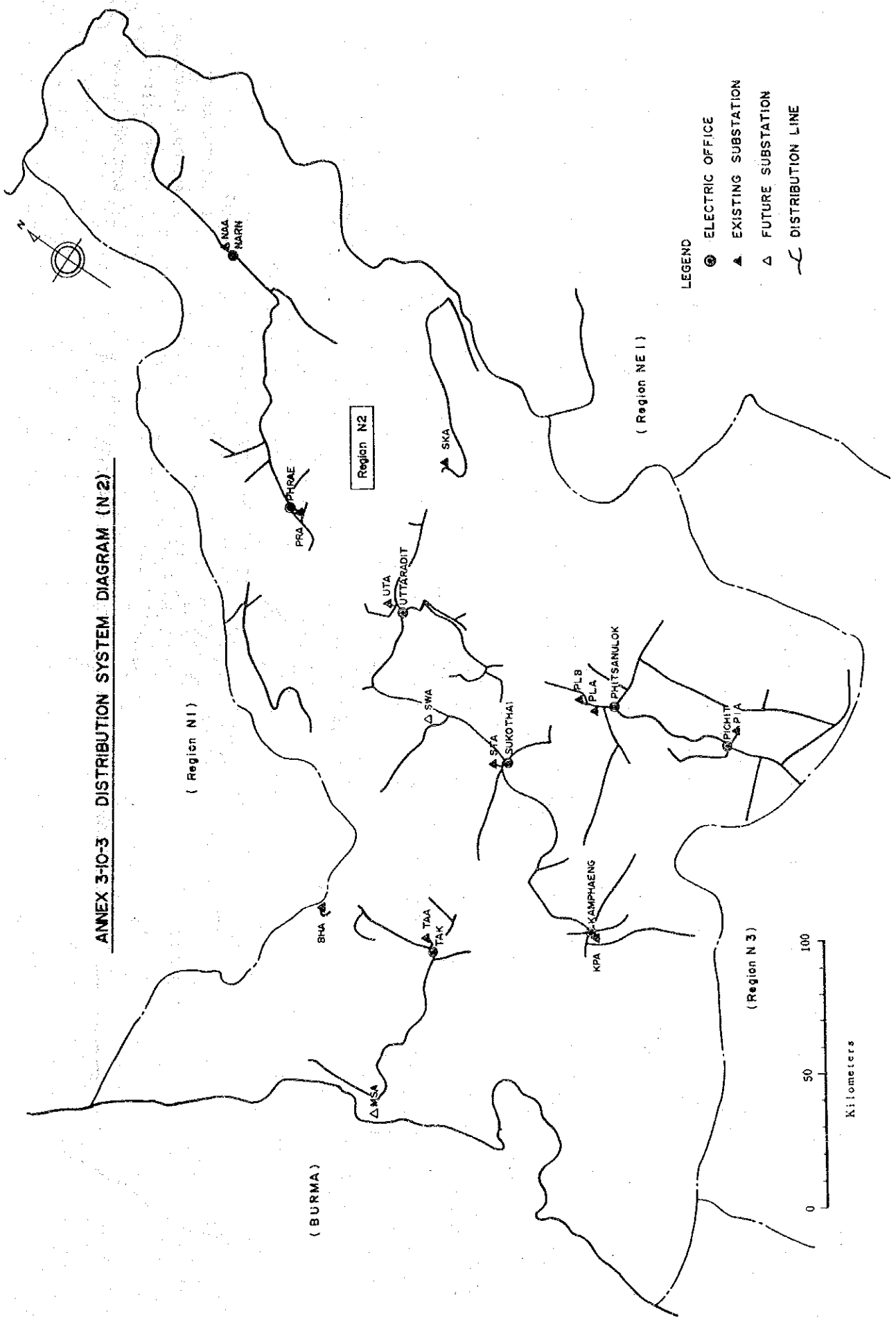
Substation Name	Symbol	Substation Name	Symbol	Substation Name	Symbol
N1		N2		N3	
CHIANG MAI 1	CMA	BHUMIBOL	BHA	LOP BURI 1	LBA
CHIANG MAI 2	CMB	KAMPHAENG PHET	KPA	LOP BURI 2	LBB
CHIANG MAI 3	CMC	NAN	NAA	MANOROM	MRA
CHIANG RAI	CRA	PHRAE	PRA	NAKHON SAWAN	NSA
LAMPHUN 1	LNA	PHICHIT	PIA	PHECHABUN	PEA
LAMPHUN 2	LNB	PHITSANULOK 1	PLA	SING BURI	SBA
LAMPANG 1	LPA	PHITSANULOK 2	PLB	TAKHLI 2	TKB
LAMPANG 2	LPB	SIRIKIT	SKA	LOMSAK	LOA
FANG	FAA	SUKHO THAI	STA	CHAI BADAN	CDA
MAE HONG SON	MHA	TAK	TAA	THATAKO	TCA
MAE MHO 2	MMB	UTTARADIT	UTA	SALOKBAT	SZA
MAE SARING	MAA	SAWAN KHALOK	SWA	BANG MUN NAK	BNA
PHAYAO	PYA	MAE SOT	MSA		
THOEN	TEA				
MAE NGAT	MNG				
CHOM THONG	CEA				
NE1		NE2		NE3	
CHUM PHAE	CHA	KALASIN	KLA	BURIRAM	BRA
KHON KAEN 1	KKA	MAHA SARAKHAM	MKA	CHAIYAPHUM	CYA
LOEI	LEA	MUKDAHAN	MDA	NAKHON RATCHASIMA 1	NRA
NAKHON PHANOM	NNA	ROIET	REA	NAKHON RATCHASIMA 2	NRB
NAM PHONG	NQA	SIRINDHORN	SIA	PAK CHONG	PCA
NAM PHUNG	NPA	SI SA KET	SJA	PHON	POA
NONG KHAI	NKA	SOMDET	SDA	SHIKHUI	SFA
PHANG KHON	PFA	UBON RATCHATHANI 1	UBA	SURIN	SUA
SAKON NAKHON	SOA	YASOTHON	YTA	PHIMAI	PMA
THAT PHANOM	THA	AMNAT CHARDEN	ANA	PRAKHONCHAI	PVA
UDON THANI 1	UDA				
UDON THANI 2	UDB				
BUNG KAN	BKA				
KHON KAEN 2	KKB				
BAN PHAI	BCA				
CHULARHORN	CUA				
C1		C2		C3	
ANG THONG 1	ATA	AO PHAI	APA	BAN PONG 1	BPA
ANG THONG 2	ATB	BAN BUNG	BBA	BAN PONG 2	BPB
AYUTTHAYA 1	AYA	BANG LAMUNG	BLA	KANCHANA BURI	KCA
BANG KHAN	BKA	CHON BURI	CBA	KAMPHAENG SAEN	KSA
BAN MAI	BMA	CHACHOENG SAO	CCA	NAKHON CHAISI	NCA
BAN PA IN	BIA	CHANTHABURI	CTA	SAM PHRAN 1	SAA
PRACHIN BURI	PAA	KLAENG	KAA	SAMUT SAKHON 1	SMA
PATHUM THANI	PQA	RAYONG 1	RAA	SAMUT SAKHON 2	SMB
SARABURI 1	SRA	RAYONG 2	RAB	SUPHAN BURI	SPA
SARABURI 2	SRB	RAYONG 3	RAC	THA MUANG	TMA
SARABURI 3	SRC	SRIRACHA	SCA	SAM PHRAN 2	SAB
SARABURI 4	SRD	TRAT	TTA	DOEMBANG NANGBUAT	DBA
THALAN	TLA	PHANOM SARAKHAM	PSA	SRINAGARIND	SVA
THANYA BURI	TYA	PHANUTNIKHOM		KHAO LAEM	KHA
WATTHANA NAKHON	WNA				
PRAPHUTTHABAT	PJA				
NAKHONNAYOK	NYA				
AYUTTHAYA 2	AYB				
NAVANAKHON	NVA				
S1		S2		S3	
CHA AM	CAA	CHIEW LARN	CLA	BANG LANG	BAA
CHUMPHON	CPA	KRABI	KBA	HAT YAI 1	HYA
PHETCHA BURI	PBA	KHANOM	KNA	HAT YAI 2	HYB
PRACHUAP KHIRI KHAN	PDA	LAMPOORA	LRA	NARATHIWAT	NWA
PRAN BURI	PNA	NAKHON SI THAMMARAT	NTA	PHATTHALUNG	PUA
RANONG	RNA	PHANGNGA	PGA	SADAO	SQA
RATCHABURI 1	RBA	PHUKET 1	PKA	SONGKHLA	SLA
RATCHABURI 2	RBB	PHUKET 2	PKB	YALA	YLA
SAMUT SONG KHRAM	SSA	PHUNPHIN	PPA	PATTANI	PTA
HUA HIN	HUA	TAKUA PA	TPA	SATUN	SEA
THAPSAKAE	TBA	THUNG SONG	TSA	RANOT	ROA
LANG SUAN	LSA	SURAT THANI	SNA		

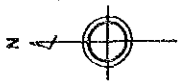
ANNEX 3-10-2 DISTRIBUTION SYSTEM DIAGRAM (N1)



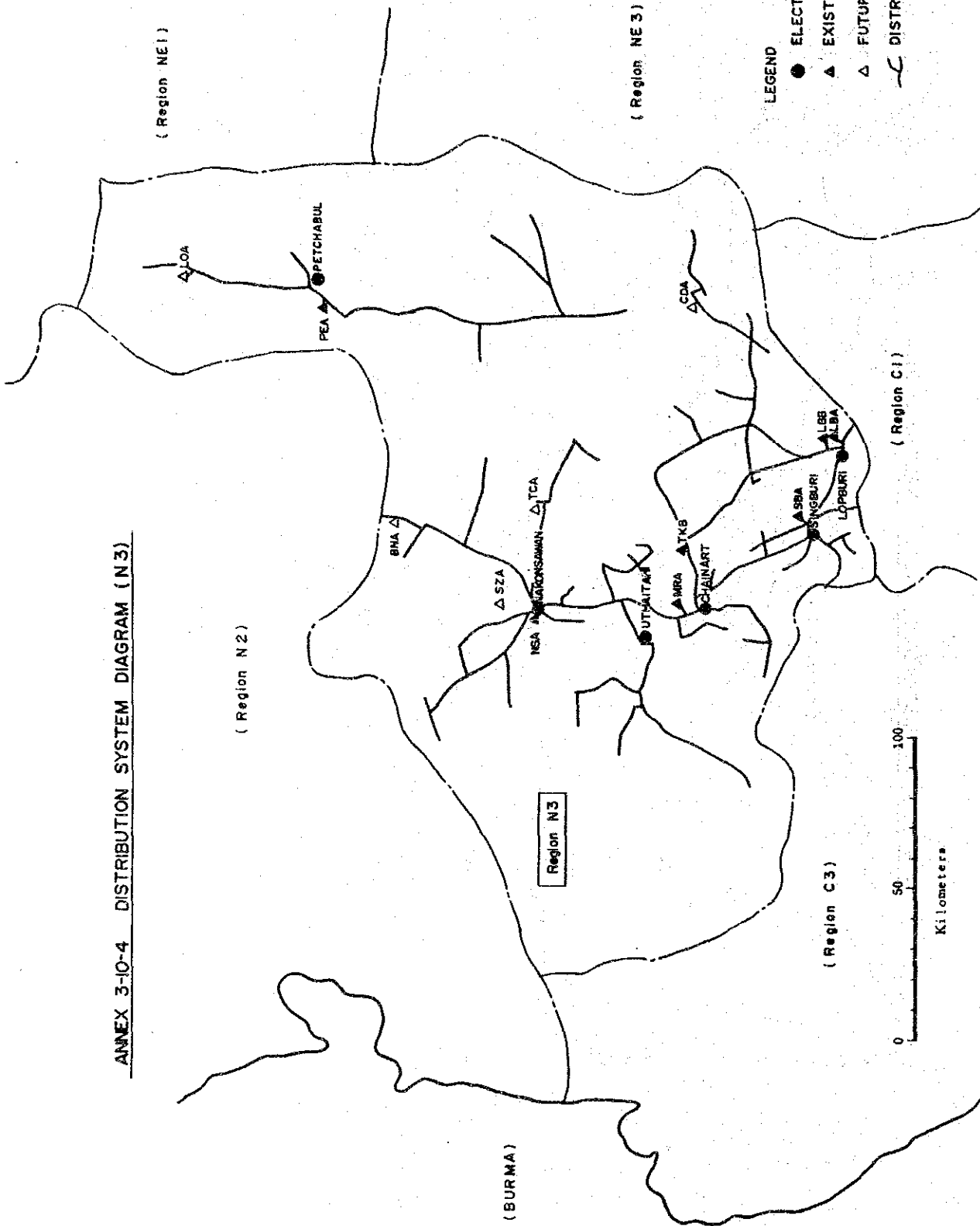
- LEGEND
- ELECTRIC OFFICE
  - ▲ EXISTING SUBSTATION
  - △ FUTURE SUBSTATION
  - DISTRIBUTION LINE

**ANEX 3-10-3 DISTRIBUTION SYSTEM DIAGRAM (N.2)**

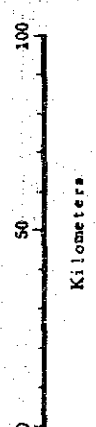




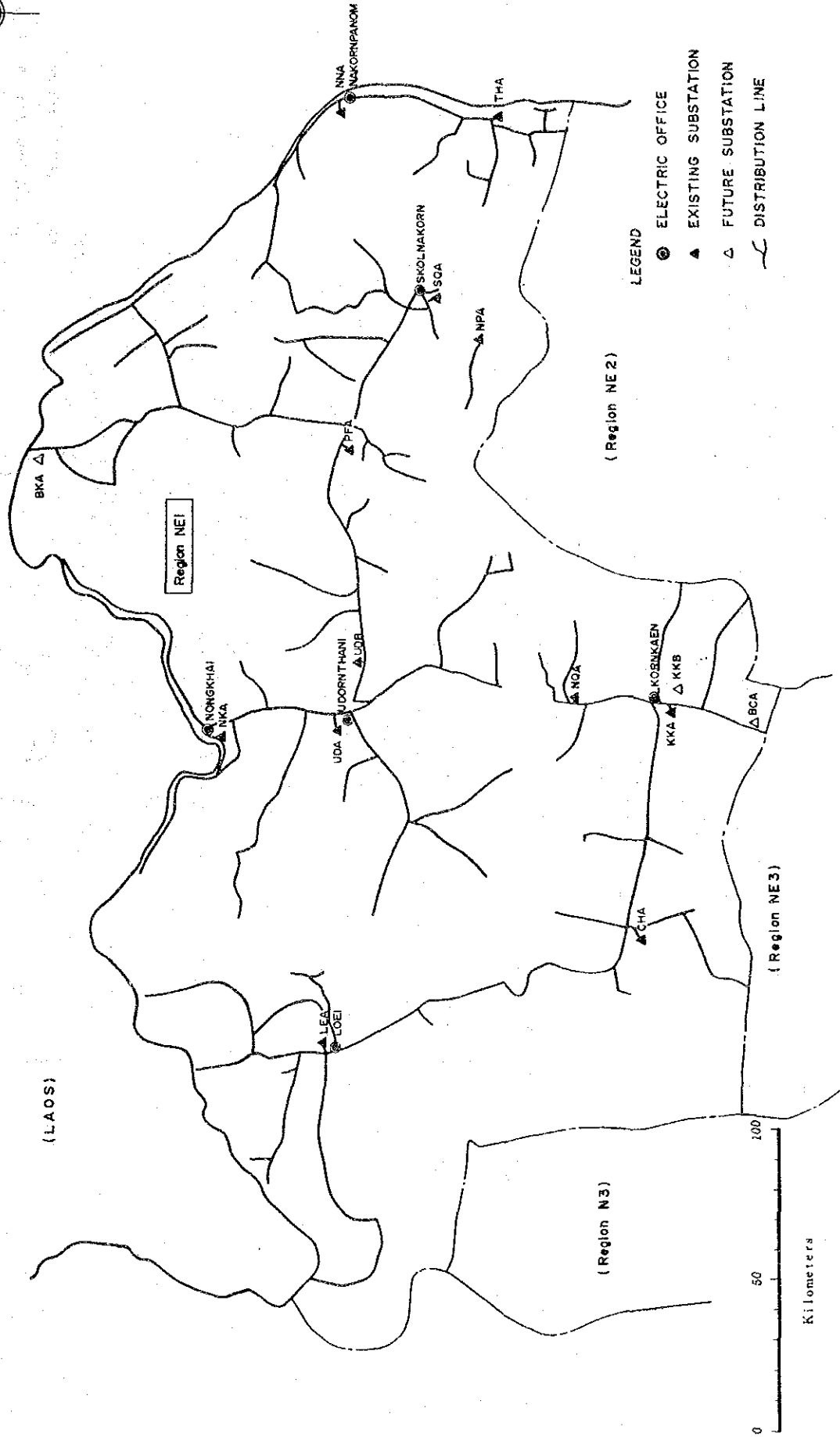
ANNEX 3-10-4 DISTRIBUTION SYSTEM DIAGRAM (N3)



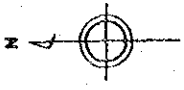
- LEGEND
- ELECTRIC OFFICE
  - ▲ EXISTING SUBSTATION
  - △ FUTURE SUBSTATION
  - ~ DISTRIBUTION LINE



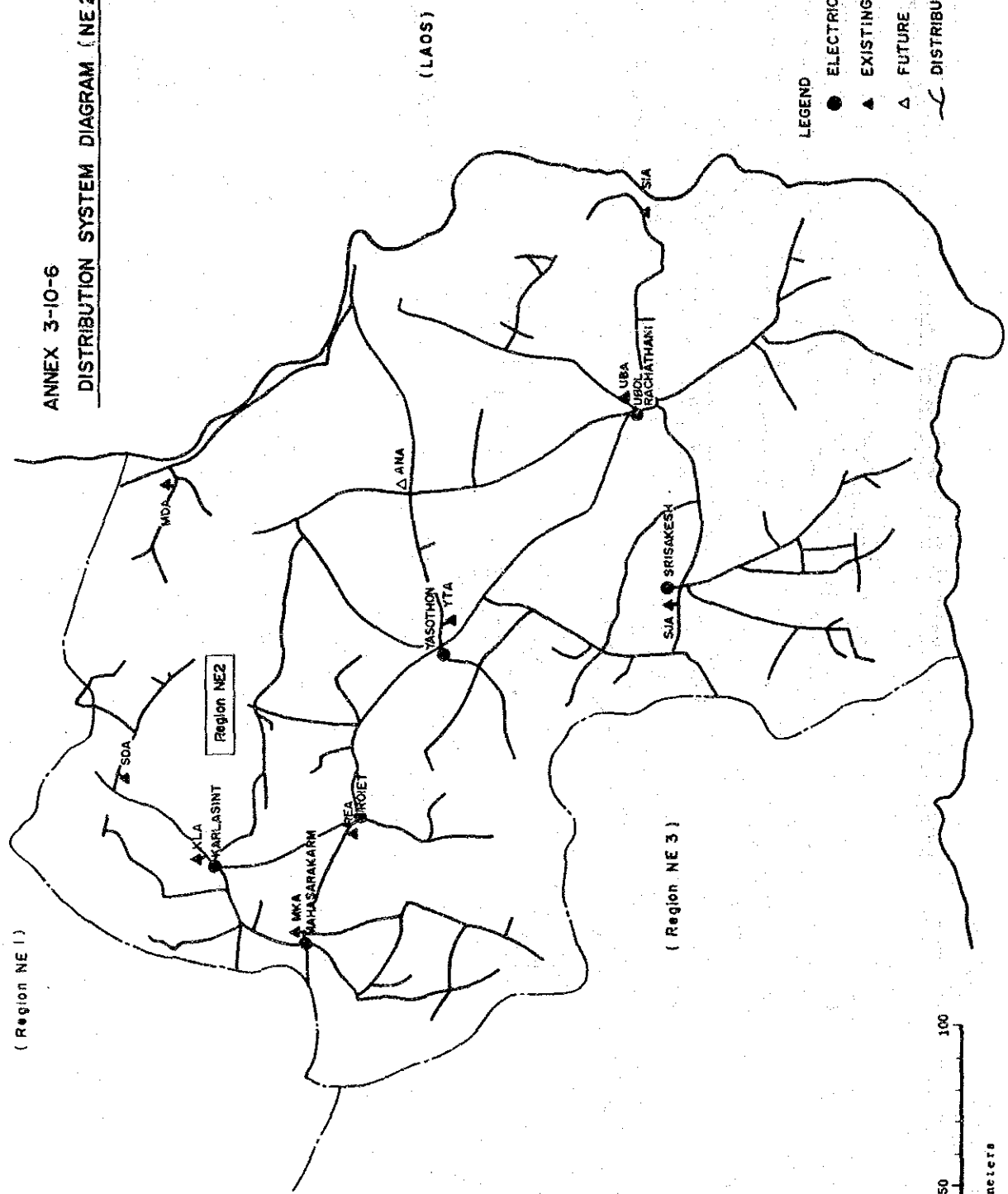
ANNEX 3-10-5 DISTRIBUTION SYSTEM DIAGRAM (NE1)



- LEGEND
- ELECTRIC OFFICE
  - ▲ EXISTING SUBSTATION
  - △ FUTURE SUBSTATION
  - DISTRIBUTION LINE



ANNEX 3-10-6  
DISTRIBUTION SYSTEM DIAGRAM (NE 2)



- LEGEND
- ELECTRIC OFFICE
  - ▲ EXISTING SUBSTATION
  - △ FUTURE SUBSTATION
  - DISTRIBUTION LINE



ANNEX 3-10-7 DISTRIBUTION SYSTEM DIAGRAM (NE3)



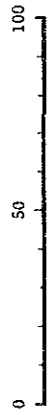
(Region NE1)

(Region NE2)

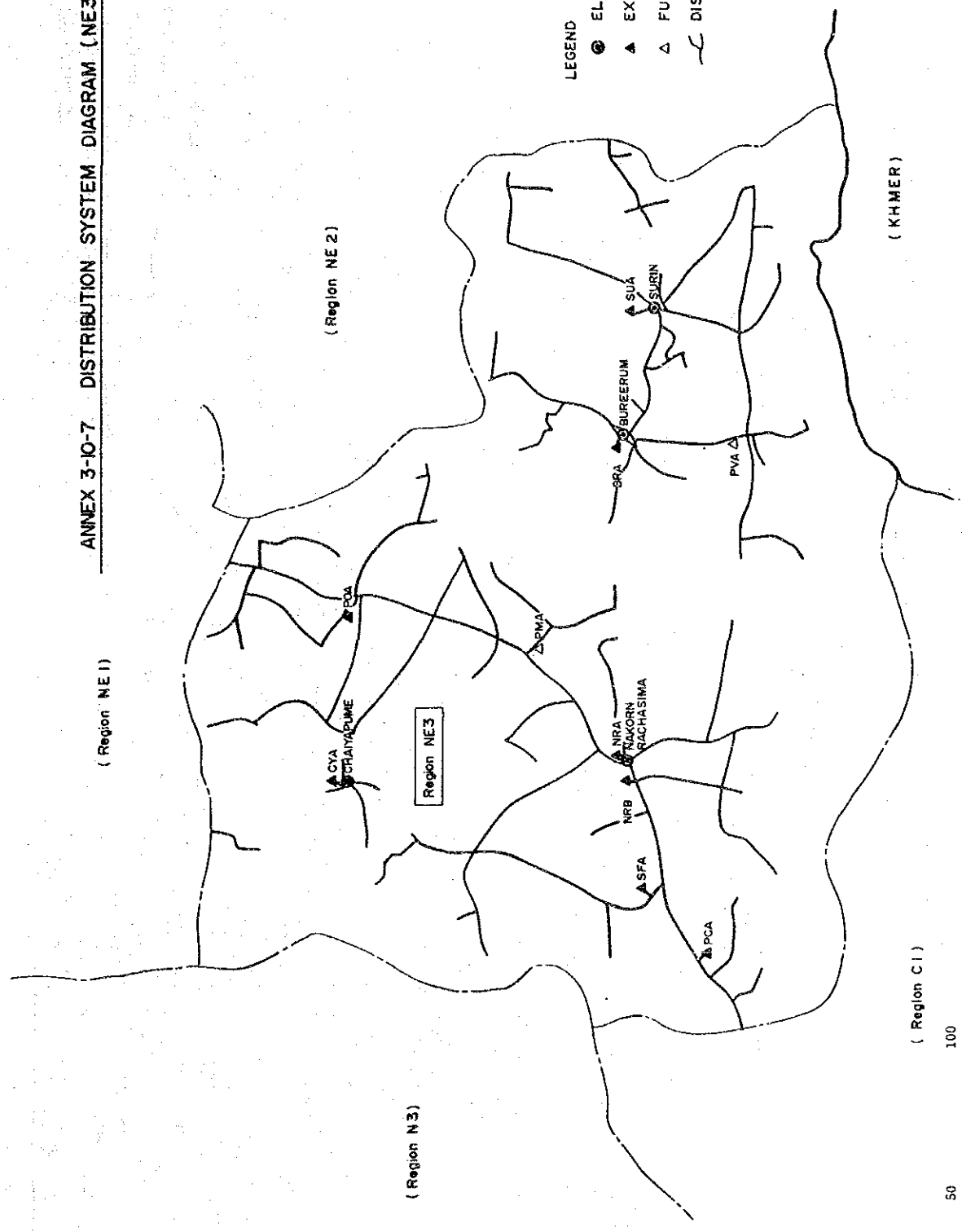
(Region N3)

(KHMER)

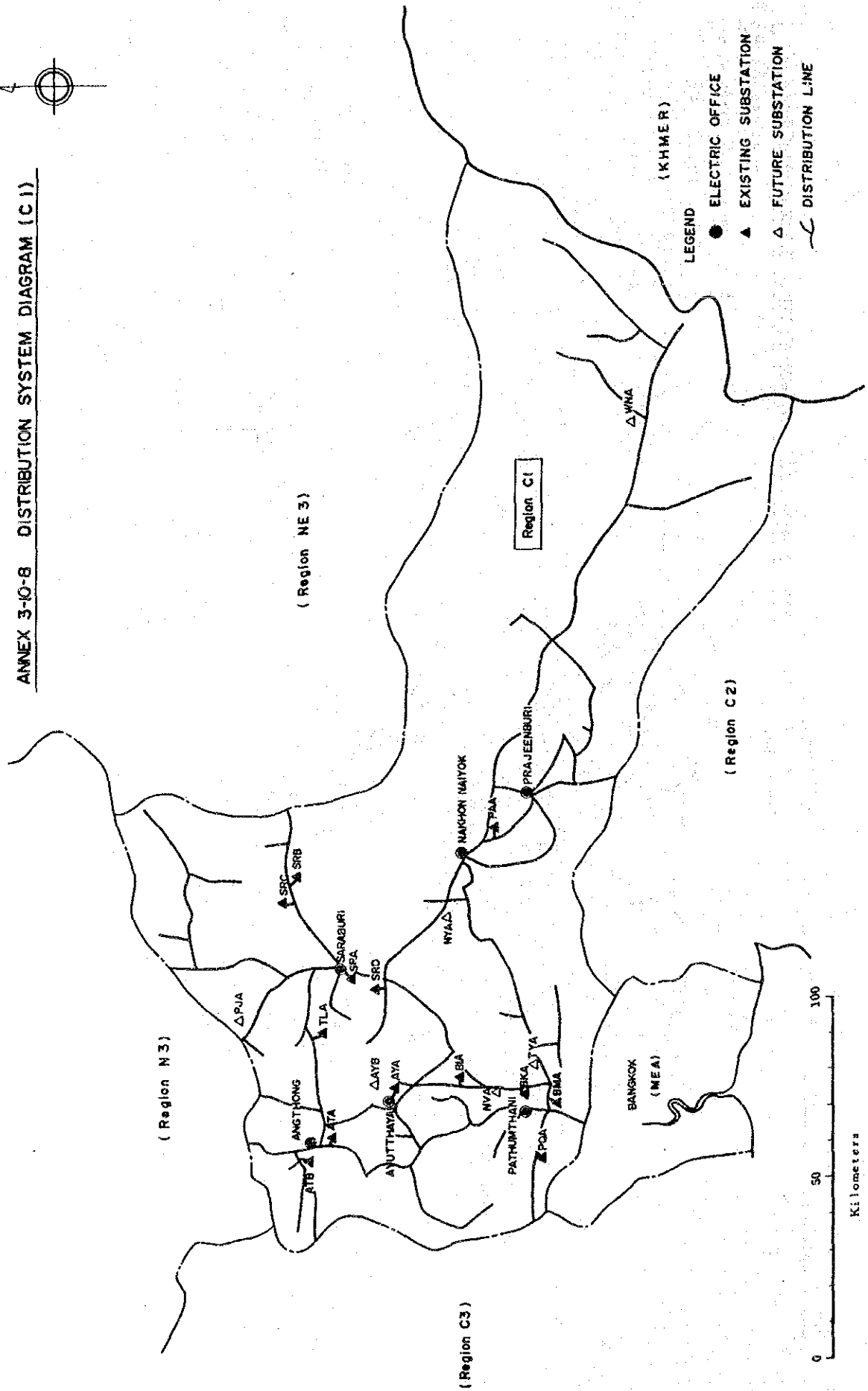
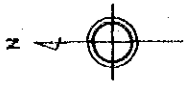
(Region C1)



- LEGEND
- ELECTRIC OFFICE
  - ▲ EXISTING SUBSTATION
  - △ FUTURE SUBSTATION
  - DISTRIBUTION LINE



ANNEX 3-10-8 DISTRIBUTION SYSTEM DIAGRAM (C1)

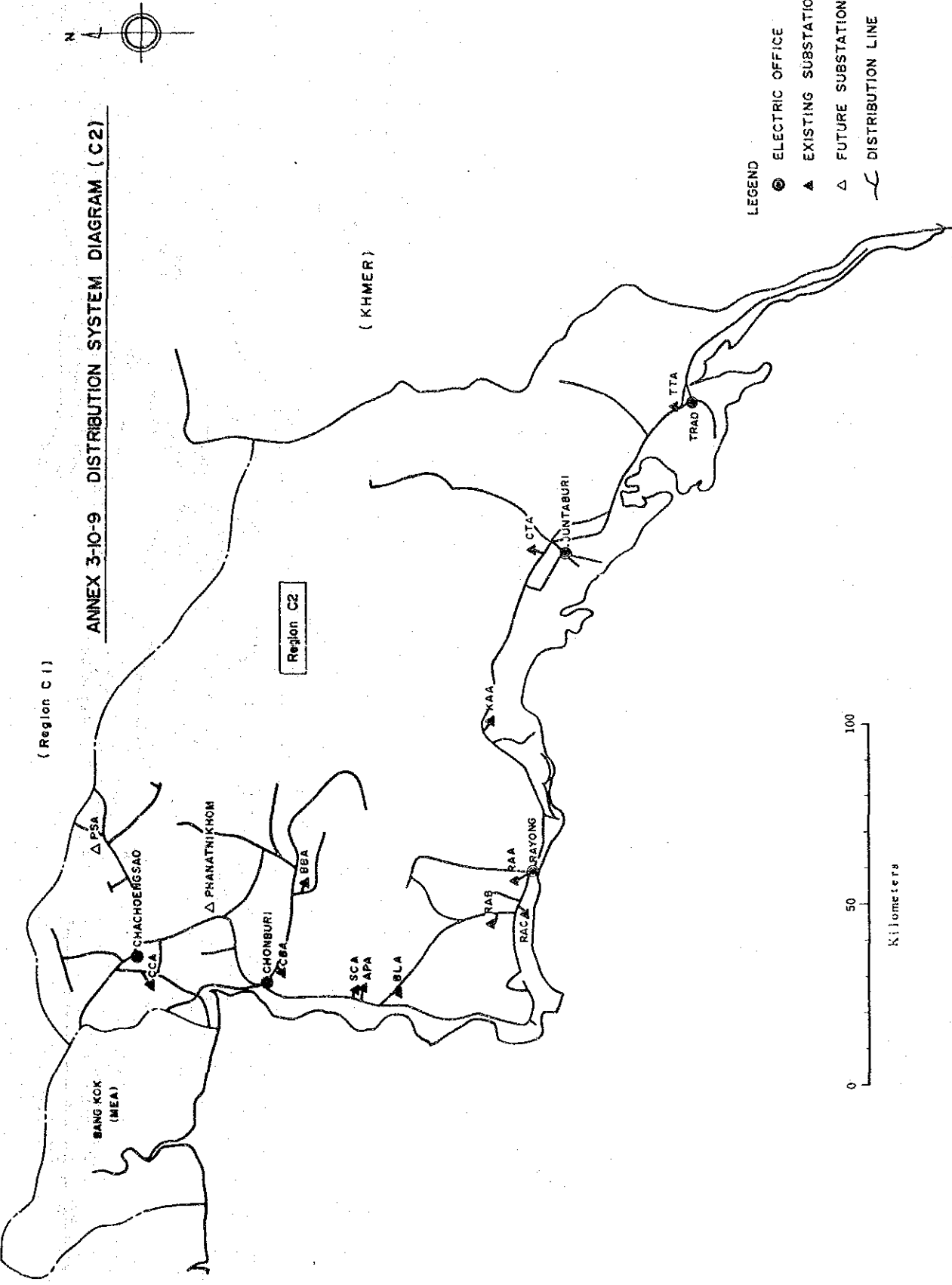


ANNEX 3-10-9 DISTRIBUTION SYSTEM DIAGRAM ( C2 )

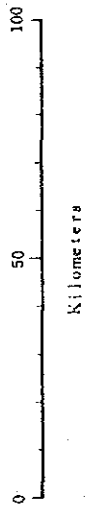
( Region C 1 )

Region C2

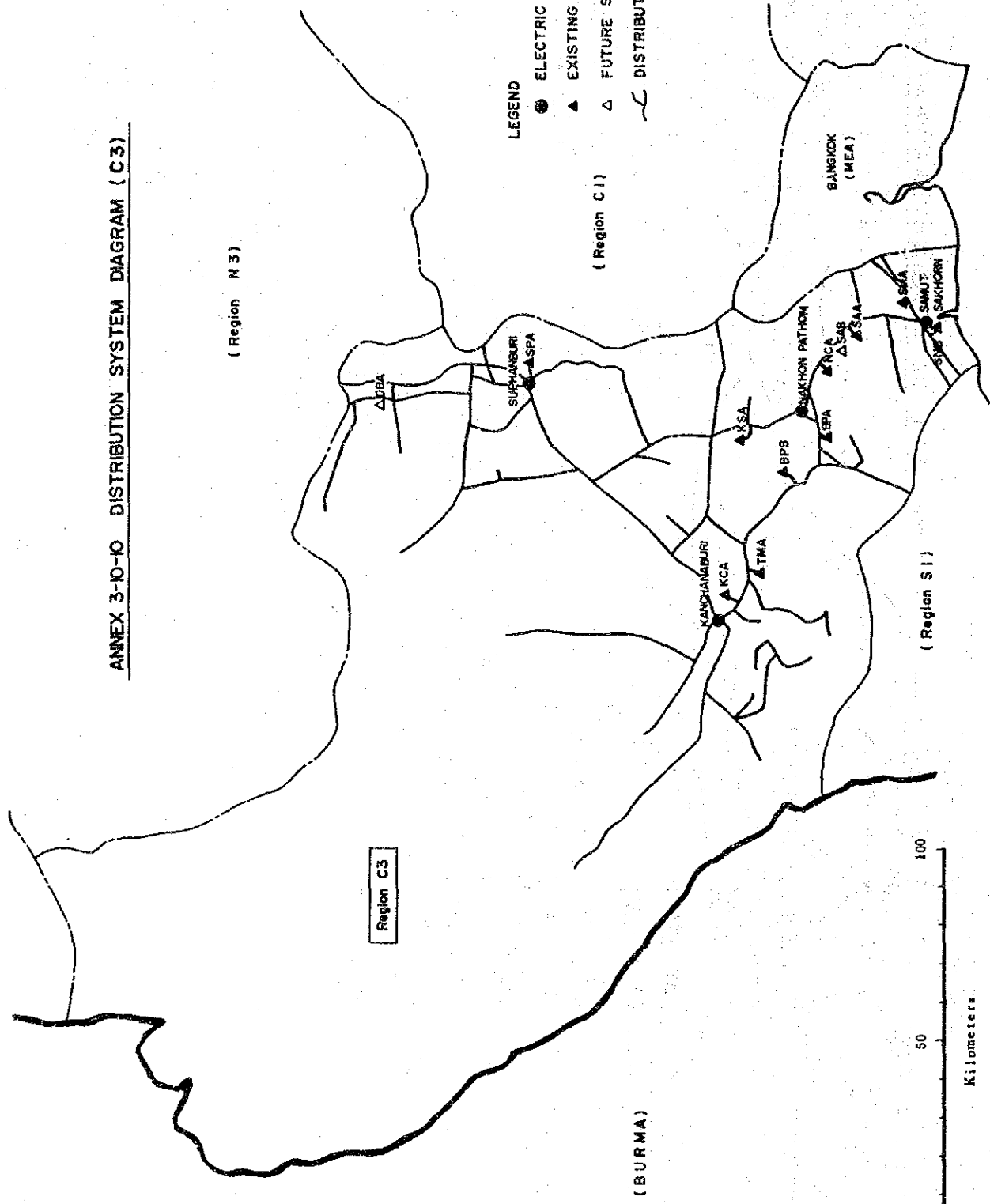
( KHMER )



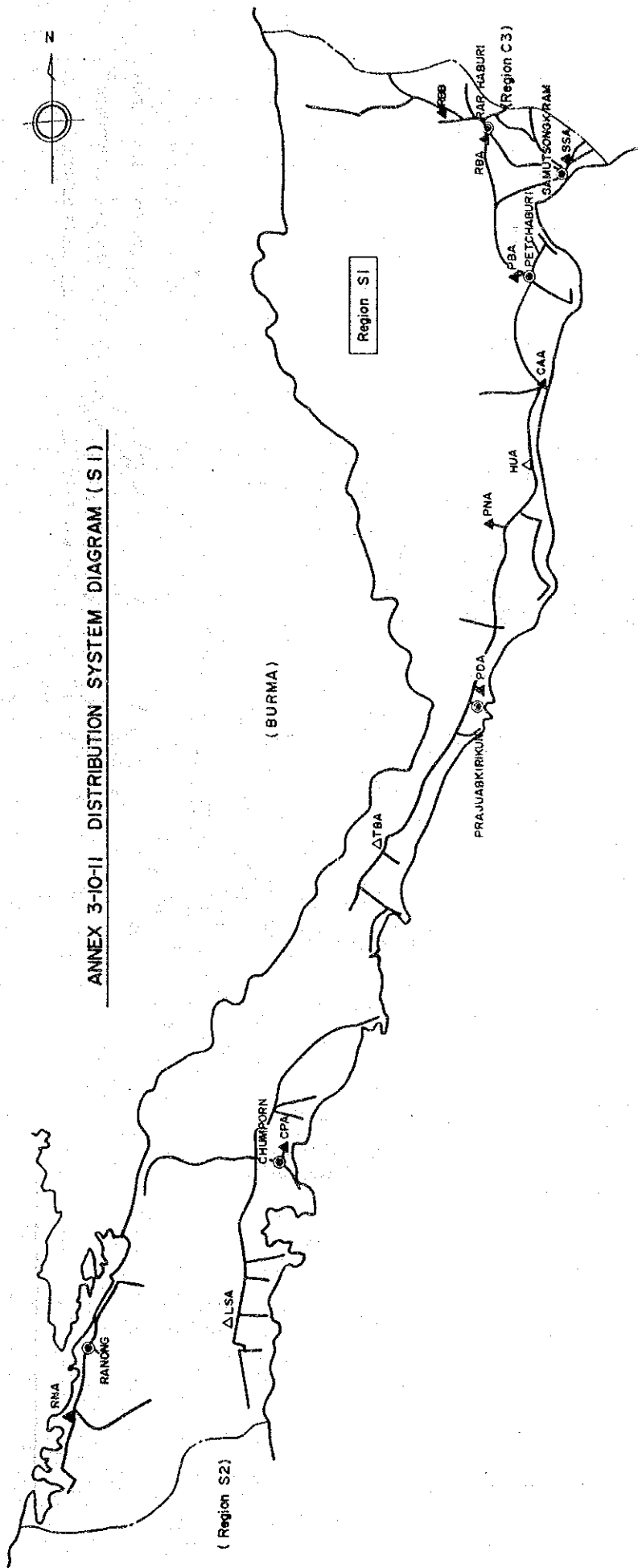
- LEGEND
- ELECTRIC OFFICE
  - ▲ EXISTING SUBSTATION
  - △ FUTURE SUBSTATION
  - DISTRIBUTION LINE



ANNEX 3-10-10 DISTRIBUTION SYSTEM DIAGRAM (C3)

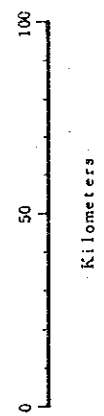


- LEGEND
- ELECTRIC OFFICE
  - ▲ EXISTING SUBSTATION
  - △ FUTURE SUBSTATION
  - DISTRIBUTION LINE
- (Region C1)



ANNEX 3-10-11 DISTRIBUTION SYSTEM DIAGRAM (S I)

- LEGEND
- ELECTRIC OFFICE
  - ▲ EXISTING SUBSTATION
  - △ FUTURE SUBSTATION
  - DISTRIBUTION LINE

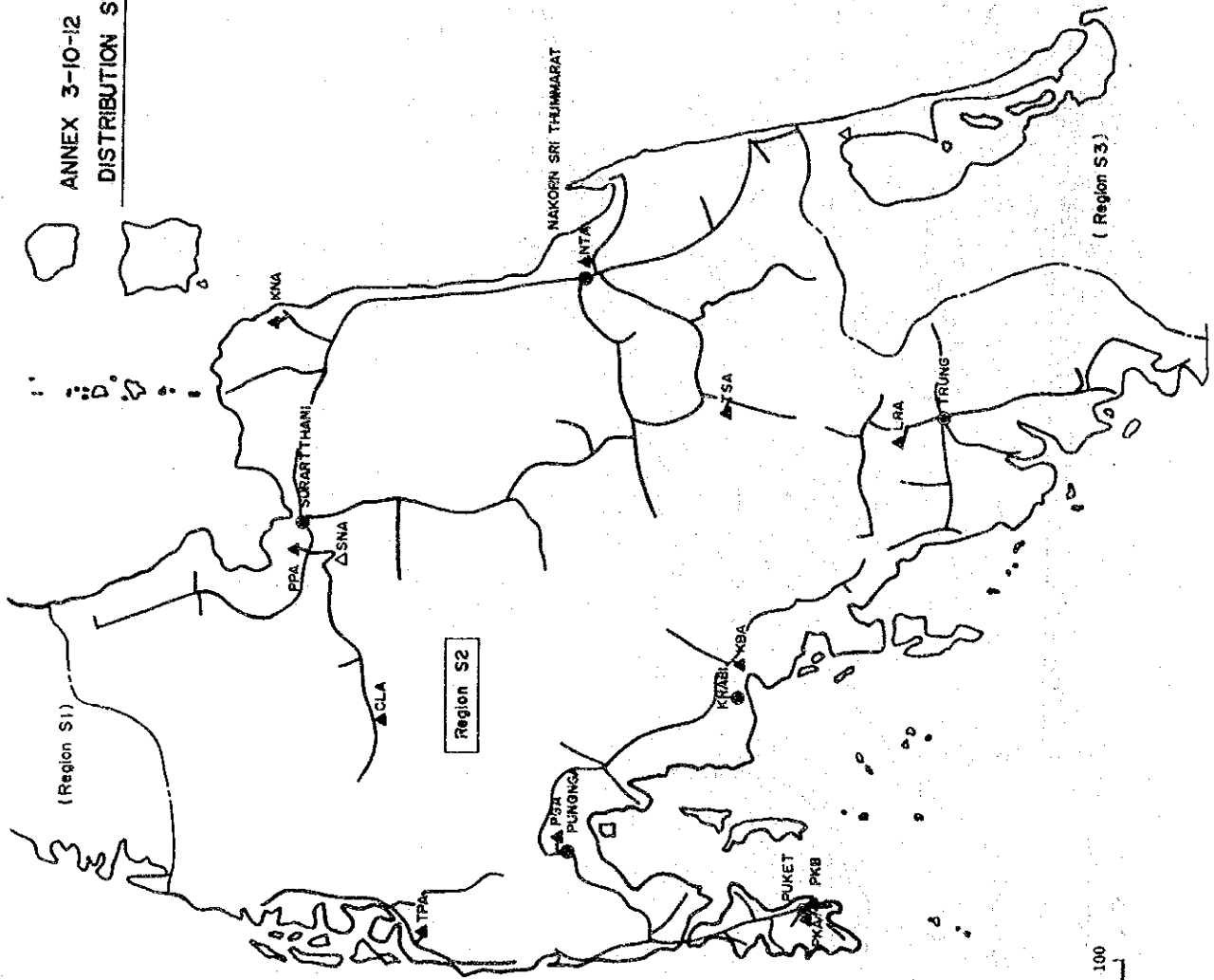


ANNEX 3-10-12

DISTRIBUTION SYSTEM DIAGRAM (S2)

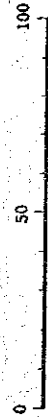
N

4



LEGEND

- ELECTRIC OFFICE
- ▲ EXISTING SUBSTATION
- △ FUTURE SUBSTATION
- DISTRIBUTION LINE

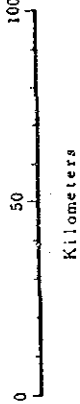
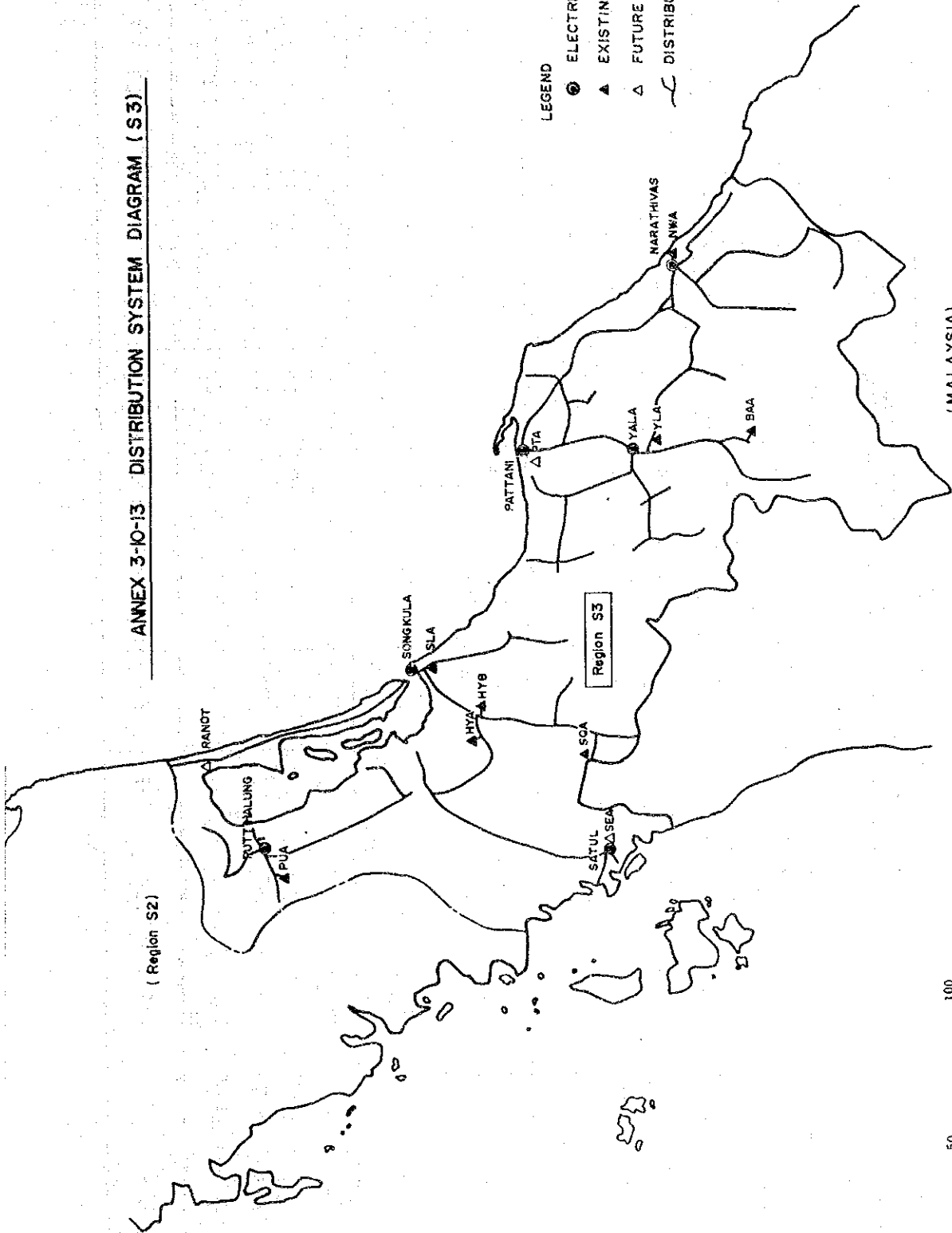


Kilometers

ANNEX 3-10-13 DISTRIBUTION SYSTEM DIAGRAM ( S3 )



- LEGEND
- ⊙ ELECTRIC OFFICE
  - ▲ EXISTING SUBSTATION
  - △ FUTURE SUBSTATION
  - DISTRIBUTION LINE



(MALAYSIA)

## FREQUENCY OF FAULTS

(UNIT: TIMES)

ITEMS	1985												1986												TOTAL	AVE/MON
	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL		
N1	46	73	46	30	13	21	32	43	142	50	80	59	635	52.9												
N2	26	40	33	30	10	17	38	42	124	42	43	26	471	39.3												
N3	15	26	34	42	24	27	27	36	84	67	39	39	460	38.3												
SUB-TOTAL	87	139	113	102	47	65	97	121	350	159	162	124	1,566	130.5												
NE1	70	56	46	32	34	27	26	59	137	97	99	60	743	61.9												
NE2	43	37	47	29	22	16	22	54	62	55	30	51	468	39.0												
NE3	93	91	40	39	33	24	29	41	111	55	26	47	629	52.4												
SUB-TOTAL	206	184	133	100	89	67	77	154	310	207	155	158	1,840	153.3												
C1	88	108	53	50	30	43	34	39	141	70	69	81	806	67.2												
C2	74	62	53	40	33	18	19	35	64	90	59	55	602	50.2												
C3	65	105	79	67	56	42	42	56	79	106	62	47	807	67.3												
SUB-TOTAL	228	275	185	157	119	103	95	130	284	266	190	183	2,215	184.7												
S1	68	41	52	64	36	49	23	44	74	116	65	72	704	58.7												
S2	42	40	34	56	39	46	34	60	74	83	88	81	677	56.4												
S3	97	61	35	59	67	41	60	114	61	101	78	70	844	70.3												
SUB-TOTAL	207	142	121	179	142	136	117	218	209	300	231	223	2,225	185.4												
GRAND TOTAL	728	740	552	538	397	371	386	623	1,153	932	738	688	7,846	653.9												



## DURATION OF FAULTS

(UNIT: HOUR. MIN.)

ITEMS	1985					1986					TOTAL	AVE./MON		
	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY			JUN	JUL
N1	84.59	121.49	63.48	41.05	42.09	44.28	50.38	73.26	238.41	166.60	94.04	139.27	1,161.34	96.48
N2	62.39	83.01	55.44	47.09	14.50	17.27	23.59	69.58	474.13	106.31	66.45	39.32	1,061.48	88.29
N3	26.53	33.25	67.15	33.45	31.21	48.18	27.17	87.39	155.52	121.18	84.35	65.52	783.30	65.18
SUB-TOTAL	174.31	238.15	186.47	121.59	88.20	110.13	101.54	231.03	868.46	394.49	245.24	244.51	3,006.52	250.34
NE1	323.06	235.39	134.17	55.06	152.41	107.22	54.55	232.15	670.36	527.50	424.07	214.34	3,132.28	261.02
NE2	165.19	72.54	181.01	52.20	36.53	23.58	54.59	184.22	195.52	114.26	86.46	97.33	1,286.23	105.32
NE3	71.17	93.32	56.25	34.38	55.03	79.57	26.38	58.32	186.52	129.13	55.10	63.56	911.13	75.56
SUB-TOTAL	559.42	402.05	371.43	142.04	244.37	211.17	136.32	475.09	1,053.20	771.29	566.03	376.03	5,310.04	442.30
C1	77.45	131.06	37.42	58.07	56.53	56.26	45.56	73.55	241.28	119.37	98.12	135.03	1,132.10	94.21
C2	188.03	76.27	86.58	54.58	30.35	15.27	37.44	38.44	59.30	156.16	91.25	92.06	928.13	77.21
C3	62.40	155.52	112.05	68.12	48.54	32.33	62.53	96.16	106.19	130.18	68.35	76.33	1,021.10	85.06
SUB-TOTAL	328.28	363.25	236.45	181.17	136.22	104.26	146.33	208.55	407.17	406.11	258.12	303.42	3,081.33	256.48
S1	155.51	51.46	60.39	128.08	104.36	72.59	98.52	126.47	161.38	310.16	185.42	95.45	1,552.59	129.25
S2	99.54	91.40	79.22	100.21	82.41	101.30	146.05	161.58	208.01	346.55	173.49	338.46	1,931.02	160.55
S3	270.37	116.18	75.48	119.32	182.49	66.41	141.26	306.30	116.53	168.31	208.23	262.21	2,035.49	169.39
SUB-TOTAL	526.22	259.44	215.49	348.01	370.06	241.10	386.23	595.15	486.32	825.42	567.54	696.52	5,519.50	459.59
GRAND TOTAL	1,589.03	1,263.29	1,011.04	793.21	839.25	667.06	771.22	1,510.22	2,815.55	2,398.11	1,637.33	1,621.28	16,918.19	1,409.52

## FREQUENCY OF FAULTS BY CAUSE (1)

(UNIT: TIMES)

ITEMS	CAUSE BY					TOTAL
	TREE	HUMAN/ANIMAL	EQUIPMENT	UNKNOWN	OTHERS	
N1	95	37	88	234	181	635
N2	88	35	88	88	172	471
N3	49	46	101	46	218	460
SUB-TOTAL	232	118	277	368	571	1,566
NE1	145	58	213	221	106	743
NE2	134	48	96	143	47	468
NE3	38	46	123	143	279	629
SUB-TOTAL	317	152	432	507	432	1,840
C1	46	72	290	240	158	806
C2	49	66	144	157	186	602
C3	50	76	223	115	343	807
SUB-TOTAL	145	214	657	512	687	2,215
S1	209	58	133	193	111	704
S2	195	91	125	183	83	677
S3	210	81	162	195	196	844
SUB-TOTAL	614	230	420	571	390	2,225
GRAND TOTAL	1,308	714	1,786	1,958	2,080	7,846

## DURATION OF FAULTS BY CAUSE (2)

(UNIT: HOUR.MIN.)

ITEMS	CAUSE BY					TOTAL
	TREE	HUMAN/ANIMAL	EQUIPMENT	UNKNOWN	OTHERS	
N1	414.31	88.21	271.56	191.04	195.42	1,161.34
N2	448.03	52.13	261.46	134.55	164.51	1,061.48
N3	152.50	87.16	342.45	55.39	145.00	783.30
SUB-TOTAL	1,015.24	227.50	876.27	381.38	505.33	3,006.52
NE1	882.38	230.11	1,247.01	529.03	243.35	3,132.28
NE2	436.39	98.35	388.42	269.17	73.10	1,266.23
NE3	113.15	63.00	396.07	170.41	168.10	911.13
SUB-TOTAL	1,432.32	391.46	2,031.50	969.01	484.55	5,310.04
C1	66.35	75.56	706.51	164.36	118.12	1,132.10
C2	75.08	130.02	318.28	178.10	226.25	928.13
C3	98.14	109.18	481.46	131.23	200.29	1,021.10
SUB-TOTAL	239.57	315.16	1,507.05	474.09	545.06	3,081.33
S1	585.06	150.28	494.45	217.10	105.30	1,552.59
S2	880.26	213.55	430.04	290.39	115.58	1,931.02
S3	900.26	115.23	489.26	265.03	265.31	2,035.49
SUB-TOTAL	2,365.58	479.46	1,414.15	772.52	486.59	5,519.50
GRAND TOTAL	5,053.51	1,414.38	5,829.37	2,597.40	2,022.33	16,918.19

DISTRIBUTION SYSTEMS OPERATION AND MAINTENANCE TRAINING COURSE

1. Objective

To promote working knowledge of PEA personnel concerning distribution systems operation and maintenance

2. Training Subjects

2.1 Lectures

- 2.1.1 Roles and responsibilities of distribution systems operation and maintenance work
- 2.1.2 PEA distribution systems
- 2.1.3 General problems concerning power distribution
- 2.1.4 Distribution systems protective equipment
- 2.1.5 Overcurrent protection coordination
- 2.1.6 Distribution systems maintenance
- 2.1.7 Distribution systems revamping
- 2.1.8 Street Lighting
- 2.1.9 Improvement of distribution systems efficiency
- 2.1.10 Use and maintenance of electrical measuring instruments
- 2.1.11 Use and maintenance of mechanical tools
- 2.1.12 General problems concerning daily-paid workers
- 2.1.13 Safety

2.2 Practices

- 2.2.1 Operate recloser
- 2.2.2 Operate oil switch
- 2.2.3 Operate load buster
- 2.2.4 Inspect and use hydraulic compression tool
- 2.2.5 Use electrical measuring instruments
- 2.2.6 First aids

DISTRIBUTION CONTROL STATION OPERATOR TRAINING COURSE

1. Objective

To promote working knowledge of PEA's distribution control station operators

2. Training Subjects

- 2.1 Structure and equipment in distribution control station
- 2.2 AC/DC power board
- 2.3 Circuit breaker
- 2.4 Recloser (Hydraulic & Electronic Controlled)
- 2.5 Protective relay
- 2.6 Control board
- 2.7 Overcurrent protection coordination
- 2.8 Battery charger
- 2.9 Battery
- 2.10 Radio communication

3. Training Methodologies

- 3.1 Lecture in the classroom with audio-visual aids such as
  - Overhead projector
  - Slide projector
  - Videogramme
- 3.2 Practice
  - At substation site

4. Type of Trainees

- Technicians

5. Number of Trainees per Course

- about 30 persons

6. Duration

- 8 days

7. Instructors from

- Research Division

- Transformer Division

- Distribution System Dispatching Center

- Training Center

ANNEX 3-12-3

DISTRIBUTION CONTROL STATION OPERATION (ON-SITE) TRAINING COURSE

1. Objective

To familiarize involving PEA technicians with the nature and functions of distribution control station operations

2. Training Subjects

- 2.1 General knowledge of switchgear
- 2.2 Overcurrent protection coordination
- 2.3 Power purchasing between EGAT and PEA
- 2.4 Operating directions for control board and circuit breaker
- 2.5 Daily load reporting and directions for substation operations

3. Training Methodologies

- 3.1 Lecture in the classroom with audio-visual aids such as
  - Overhead projector
  - Slide projector
- 3.2 Demonstrations
  - In substation control rooms
  - At substation switchyards

4. Type of Trainees

- Technicians

5. Number of Trainees per Course

- about 30 persons

6. Duration

- 2 days

7. Instructors from

- Research Division

- Transformer Division

- Distribution System Dispatching Center

- Training Center



SUBSTATION OPERATION TRAINING COURSE

1. Objective

To promote working knowledge of PEA personnel concerning substation operation

2. Training Subjects

- 2.1 Distribution systems and equipments
- 2.2 Substation equipments and installations
- 2.3 Power transformer operations
- 2.4 Circuit breaker operations
- 2.5 Substation protection
- 2.6 Substation protection
- 2.7 Principle of radio communication
- 2.8 Switching order of disconnecting equipment in substation
- 2.9 Principle of battery and battery charger
- 2.10 Operational regulations on substation operations and maintenance

3. Training Methodologies

- 3.1 Lecture in the classroom with audio-visual aids such as
  - Overhead projector
  - Slide projector
  - Videogramme
- 3.2 Practice
  - At substation site

4. Type of Trainees

- Technicians

5. Number of Trainees per Course

- about 30 persons

6. Duration

- 5 days

7. Instructors from

- Regional Electric Administration
- Distribution System Dispatching Center
- Research Division
- Electrical and Mechanical Engineering Division
- Training Center
- Transformer Division

DISTRIBUTION SYSTEM DISPATCHING CENTER OPERATION TRAINING COURSE

1. Objective

To promote working knowledge of PEA operators of distribution systems dispatching centers

2. Training Subjects

- 2.1 Structure and equipment in power substation
- 2.2 AC/DC power board
- 2.3 Power switches
- 2.4 Circuit breaker
- 2.5 Recloser (Hydraulic & Electronic controlled)
- 2.6 Voltage regulator
- 2.7 Protective relay
- 2.8 Control board
- 2.9 Overcurrent protection coordination
- 2.10 Battery charger
- 2.11 Battery

3. Training Methodologies

- 3.1 Lecture in the classroom with audio-visual aids such as
  - Overhead projector
  - Slide projector
  - Videogramme
- 3.2 Practice
  - At substation site
  - At distribution systems dispatching center

4. Type of Trainees

- Technicians

5. Number of Trainees per Course

- about 30 persons

6. Duration

- 8 days

7. Instructors from

- Research Division
- Transformer Division
- Electrical and Mechanical Engineering Division
- Distribution System Dispatching Center
- Training Center

DISTRIBUTION SYSTEM DISPATCHING CENTER OPERATIONS FOR  
ENGINEERS TRAINING COURSE

1. Objective

To promote working knowledge of PEA engineer concerning distribution system dispatching center operations

2. Training Subjects

- 2.1 Working psychology and human relationship
- 2.2 Problems on distribution system dispatching center operations
- 2.3 Load flow reports and data for electricity repair
- 2.4 Improvement of Reports on distribution system dispatching center operations
- 2.5 Group discussion

3. Training Methodologies

- 3.1 Lecture in the classroom with audio-visual aids such as
  - Overhead projector
  - Slide projector
- 3.2 Seminar session

4. Type of Trainees

- Engineers working as distribution system dispatching center supervisors

5. Number of Trainees per Course

- about 30 persons

6. Duration

- 4 days

7. Instructors from

- Transformer Division
- Research Division
- Power Economics Division
- Distribution System Dispatching Center
- Project and Planning Division
- Meter Division
- Electrical and Mechanical Engineering Division
- Training Center
- General Affairs Division
- Office of Deputy General Manager for Operations

(UNIT: kWh)

SUBSTATION	ACTUAL											GROWTH RATE (%/YEAR)
	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	
CHIANG MAI 1, 2 & 3	80.02	92.53	109.66	126.78	146.91	154.91	163.38	178.66	212.98	234.88	269.02	11.7
CHAIANG RAI	9.98	18.15	25.51	28.46	30.93	23.80	27.43	28.47	31.24	26.76	90.07	47.6
LANPHON 1						11.10	13.54	21.61	27.77	37.42	30.30	4.6
LANPHON 2	30.96	36.90	45.74	53.98	60.21	61.45	63.62	71.49	84.01	87.64	95.29	35.5
LANPANG 1 & 2			0.01	0.08	0.10	0.12	0.15	0.64	1.32	2.01	2.32	9.2
MAE MHAO 2		4.43	26.77	35.81	44.10	50.35	47.07	26.45	29.99	34.31	41.36	80.8
PHAYAO	0.48	0.73	1.06	1.97	1.98	2.15	2.43	5.34	6.65	7.46	8.97	(3.9)
THOEN												33.1
CHONTONG												0.0
BAN KHUN KLANG	0.06	0.19	0.15	0.08	0.29	0.33	0.33	0.35	0.34	0.56	1.09	2.9
BAN YANG	0.88	1.07	1.35	1.68	1.93	2.14	2.36	8.26	6.30	12.40	15.40	48.4
NEA												
TOTAL	122.38	154.00	210.25	248.84	285.73	306.35	339.30	391.72	467.31	524.88	583.94	13.8

SUBSTATION	FORECAST											GROWTH RATE (%/YEAR)
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995		
CHIANG MAI 1, 2 & 3	286.28	313.90	343.77	376.03	410.82	448.29	488.58	531.83	578.20	627.83		8.8
CHAIANG RAI	98.12	111.42	123.26	135.50	148.32	161.37	174.58	187.78	200.92	213.92		9.0
LANPHON 1 & 2	73.75	63.79	70.26	84.37	104.60	133.70	164.00	192.22	216.12	238.89		14.8
LANPANG 1 & 2	101.74	112.40	120.52	128.65	137.09	145.54	153.95	162.20	170.30	178.19		6.5
MAE MHAO 2	2.41	2.62	2.82	3.03	3.26	3.51	3.76	4.03	4.30	4.58		7.0
PHAYAO	44.76	51.27	57.53	63.98	70.74	77.65	84.65	91.67	98.66	105.59		9.8
THOEN	9.91	11.59	12.98	14.43	15.95	17.51	19.09	20.68	22.27	23.85		10.3
CHONTONG		17.08	18.42	19.80	21.25	22.72	24.21	25.68	27.15	28.58		6.6
BAN KHUN KLANG												
BAN YANG	19.00	23.70	24.00	24.30	24.70	25.00	25.30	25.70	26.10	26.50		5.6
NEA												
TOTAL	635.97	707.76	773.56	850.09	936.72	1,035.28	1,138.12	1,241.78	1,344.01	1,447.94		9.5

(UNIT: GWh)

SUBSTATION	ACTUAL										GROWTH RATE (%/YEAR)	
	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984		1985
BHUMIBOL	0.16	0.16	0.27	0.35	0.46	0.50	0.85	1.10	1.34	1.57	2.06	32.8
KAMPHAENG PHET							10.50	33.02	39.74	46.92	53.22	50.1
NAN												
PHARE	5.27	14.64	19.30	23.81	26.70	39.26	50.30	58.17	68.72	77.20	88.03	17.5
PHICHIT			10.35	19.55	25.96	35.19	43.29	51.08	60.70	67.61	75.81	16.6
PHITSANULOK 1	46.16	51.12	53.13	60.39	69.47	70.79	78.64	86.78	99.80	112.54	126.14	12.2
SIRIKIT				0.05	0.59	0.92	1.17	1.45	1.89	2.29	2.83	25.2
SUKHO THAI	15.11	19.10	28.18	37.21	44.58	54.90	56.30	43.09	48.64	53.82	60.35	1.9
TAK	8.14	9.54	11.34	12.81	14.48	19.20	24.82	28.02	34.30	38.40	41.86	16.9
UTTARADIT	14.09	17.94	22.28	24.94	28.21	32.02	36.55	40.26	49.77	59.23	68.87	16.6
PHITSANULOK 2											0.73	
TOTAL	88.92	112.49	144.84	179.10	210.45	252.77	302.42	342.97	404.90	459.57	519.89	15.5

SUBSTATION	FORECAST										GROWTH RATE (%/YEAR)	
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995		
BHUMIBOL	2.41	2.88	3.41	4.00	4.65	5.37	6.16	7.03	7.97	8.99	10.3	15.9
KAMPHAENG PHET	56.22	63.08	69.63	76.37	83.39	90.52	97.70	104.85	111.95	118.95	127.15	8.4
NAN												
PHARE	92.71	37.46	41.49	46.04	50.95	56.15	61.59	67.24	73.08	79.10	81.86	9.8
PHICHIT	78.41	65.07	69.57	74.46	79.48	84.45	89.35	94.12	98.76	103.24	103.97	1.6
PHITSANULOK 1	122.80	87.48	95.31	103.15	111.15	119.04	126.75	134.19	141.32	148.10	153.97	6.9
SIRIKIT	3.10	134.05	144.40	154.87	165.76	176.66	187.44	197.99	208.24	218.08	227.97	5.6
SUKHO THAI	63.99	3.45	3.83	4.24	4.69	5.18	5.71	6.28	6.90	7.56	8.23	10.3
TAK	44.42	71.66	78.43	85.24	92.26	99.37	106.47	113.48	120.39	127.15	133.97	7.7
UTTARADIT	72.03	49.10	53.20	57.18	61.32	65.49	69.66	73.79	77.86	81.86	85.97	6.9
PHITSANULOK 2	6.20	79.24	86.16	93.44	101.23	109.34	117.73	126.31	135.08	143.97	153.08	7.7
		6.92	7.60	8.29	9.00	9.71	10.42	11.12	11.81	12.48	13.19	32.9
TOTAL	542.30	600.39	653.02	707.28	763.89	821.28	879.00	936.40	993.35	1,049.47	1,108.89	7.3