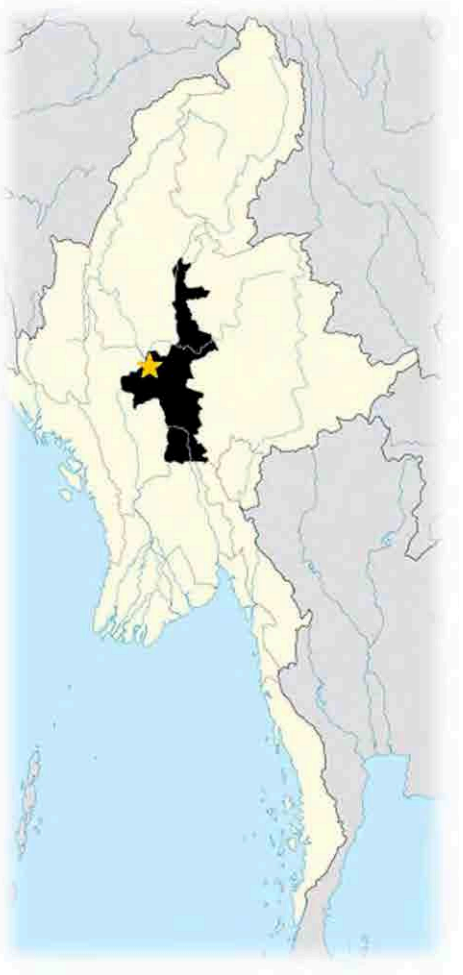
Appendix 1

Myingyan City (Township)

Country	Myanmar
Region / State	Mandalay
District	Myingyan
Township	Myingyan, Taungtha, Natogyi, Kyaukpadaung, Ngazun

No Photo



Appendix 1

Myingyan City (Township)

General information

(1) Area	30 km^2
(2) Population	170 Thousand People
(3) Household	271 Thousand house holds
(4) Village	186 Villages

Industry/Facilities

(5) Main Industry	Sightseeing
(6) Industrial Zone	2 Industrial zone
(7) Special Economic Zone	1 Special Economic Zone
(8) Important Facilities	1 hospital, 3 markets

Transportation Infrastructure

(9) Airport	―
(10) Railway	To Thazi, Bagan, Mandalay
(11) Main Road	To Meikhtila, Mandalay, Naungoo, Myothar

Power demand

(12) Customer	19,622	customers	Nov.2014
(13) Electrified village	37	villages	Nov.2014
(14) Number of fixing meter	20,164	Nos.	Nov.2014
(15) Electricity Sales	77,278	MWh	Jul.2013 - Jun.2014
(16) Peak demand	60	MW	Nov.2012
	65	MW	Oct.2013
	63	MW	Nov.2014
(17) Capacity utilization rate*	117	%	Nov.2014

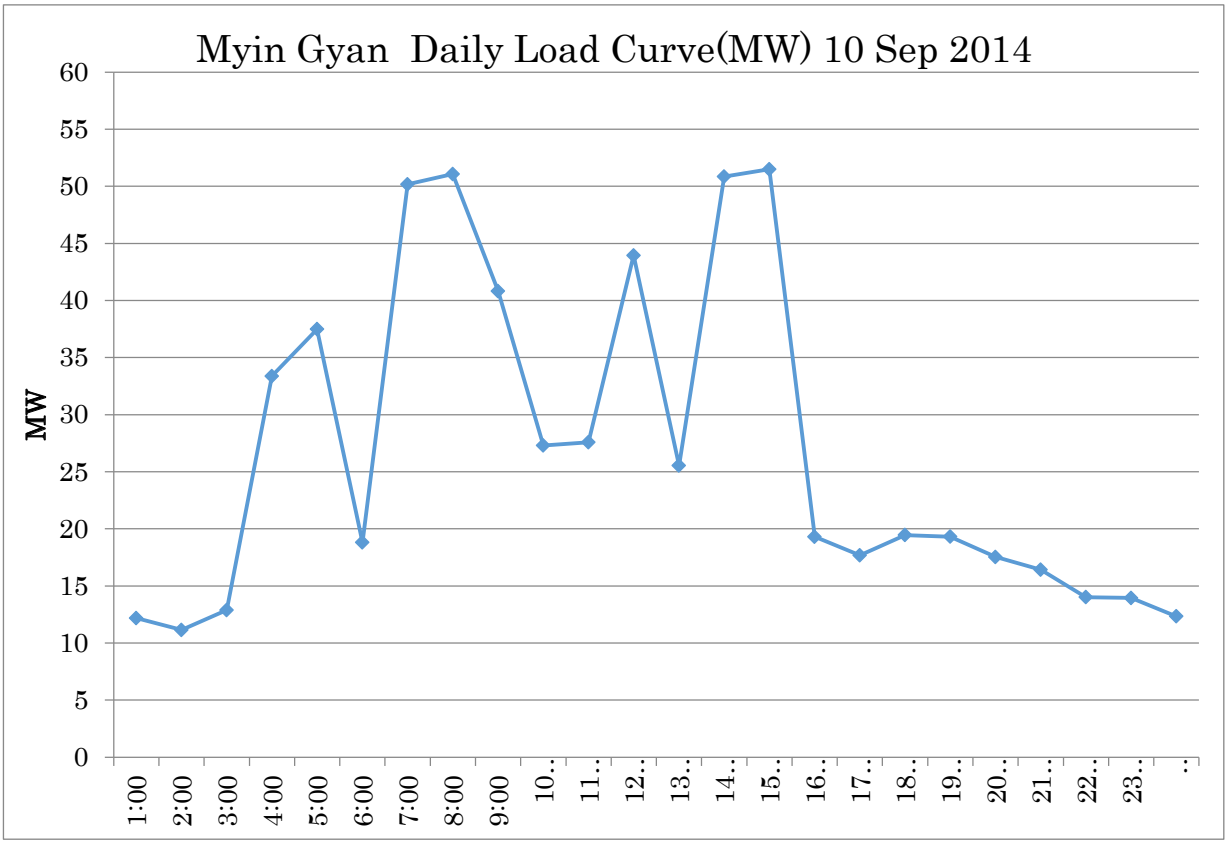
*Capacity utilization rate (%)

= [Peak Demand (MW) / [Power Transformer Capacity (MVA) * 0.9(Power Factor)]]*100

Myingyan City (Township)

Appendix 1

(18) Daily Load curve



Power Facilities

(19) Power Transformer (66/11kV)	45	MVA	5	Nos.	Nov.2014
(20) Power Transformer (33/11kV)	15	MVA	2	Nos.	Nov.2014
(21) Power Transformer (11/0.4kV)	54	MVA	172	Nos.	Nov.2014
(22) Distribution Line (33kV)	21	km	391	Poles	Nov.2014
(23) Distribution Line (11kV)	136	km	3324	Poles	Nov.2014
(24) Distribution Line (0.4kV)	126	km	3235	Poles	Nov.2014
(25) Small Hydropower Generator	-	MW	-	Nos.	-
(26) Diesel Power Generator	-	MW	-	Nos.	-

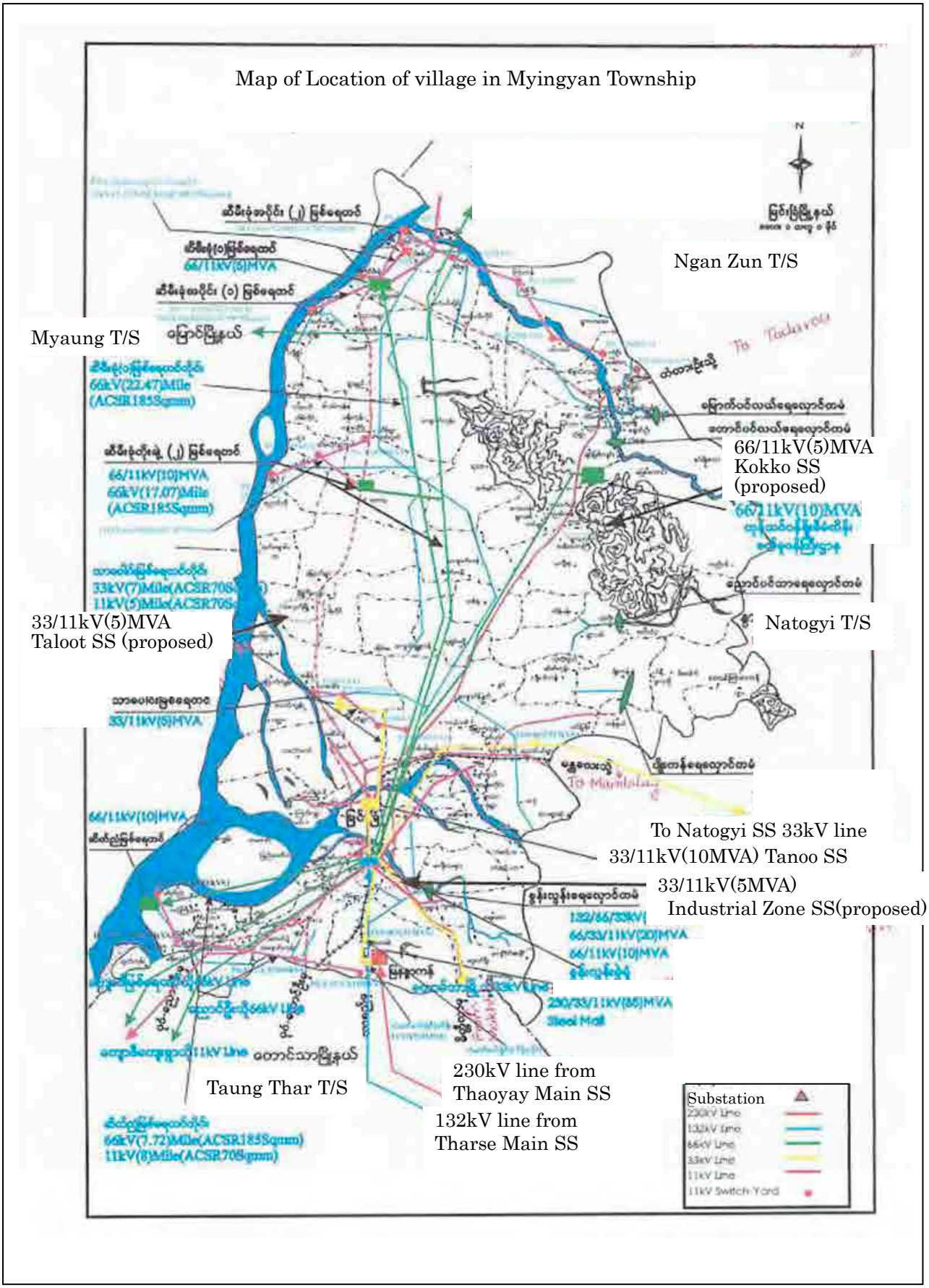
Distribution Loss Rate

(27) Distribution Loss Rate	29.3%	Jun.2014

Myingyan City (Township)

Appendix 1

(28) 33kV System Diagram (Location Map)

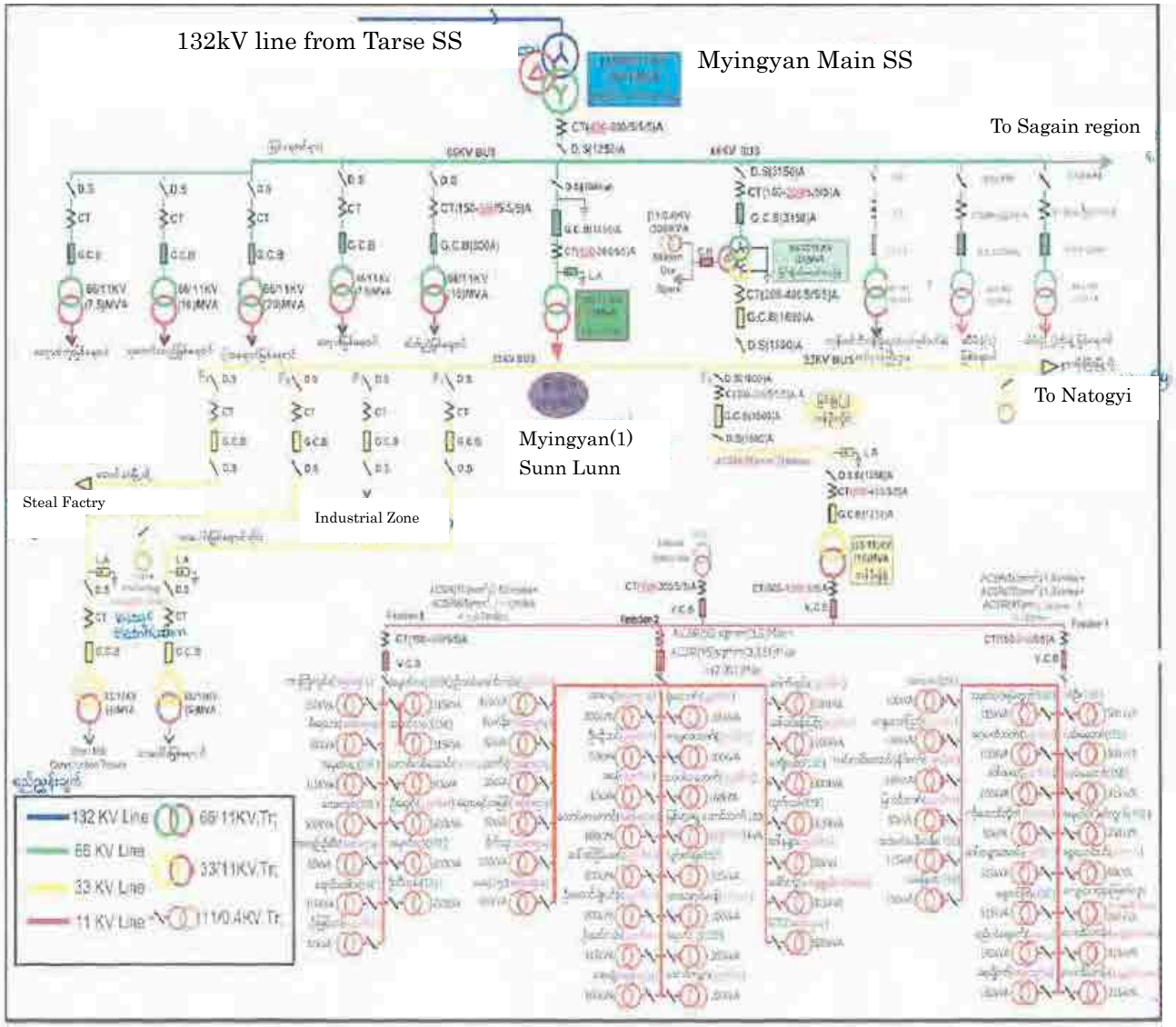


Myingyan City (Townsip)

(29) 33kV System Single Line Diagram

Appendix 1

Single line diagram of power distribution from 33kV Myingyan(2) line in Myingyan Township



Myingyan City (Townsip)

(30) Power Facilities

No photo

Appendix 1

Pyinmana City (Township)

Country	Myanmar
Region / State	Mandalay
District	Nay Pyi Taw
Township	Pyinmana, Tatkon, Lewe

Photo

Pyinmana Street

Pyinmana Street

Appendix 1

Pyinmana City (Township)

General information

(1) Area	35 km^2
(2) Population	190 Thousand People
(3) Household	39,524 Thousand house holds
(4) Village	140 Villages

Industry/Facilities

(5) Main Industry	-
(6) Industrial Zone	-
(7) Special Economic Zone	-
(8) Important Facilities	1 hospitals, 3 markets

Transportation Infrastructure

(9) Airport	Nay Pyi Taw airport
(10) Railway	Pyinmana station
(11) Main Road	To Yangon, Mandalay(National Road)

Power demand

(12) Customer	19,734	customers	2014
(13) Electrified village	52	villages	2014
(14) Number of fixing meter	19,734	Nos.	2014
(15) Electricity Sales	66.6	MWh	2013 - 2014
(16) Peak demand	8.0	MW	2012
	10.1	MW	2013
	12.4	MW	2014
(17) Capacity utilization rate*	37.2	%	2014

*Capacity utilization rate (%)

= [Peak Demand (MW) / [Power Transformer Capacity (MVA) * 0.9(Power Factor)]]*100

Pyinmana City (Township)

Appendix 1

(18) Daily Load curve

No information

Power Facilities

(19) Power Transformer (66/11kV)	-	MVA	-	Nos.	-
(20) Power Transformer (33/11kV)	37	MVA	4	Nos.	2014
(21) Power Transformer (11/0.4kV)	45.525	MVA	212	Nos.	2014
(22) Distribution Line (33kV)	9.0	km	231	Poles	2014
(23) Distribution Line (11kV)	125	km	3,376	Poles	2014
(24) Distribution Line (0.4kV)	113	km	3,656	Poles	2014
(25) Small Hydropower Generator	-	MW	-	Nos.	-
(26) Diesel Power Generator	-	MW	-	Nos.	-

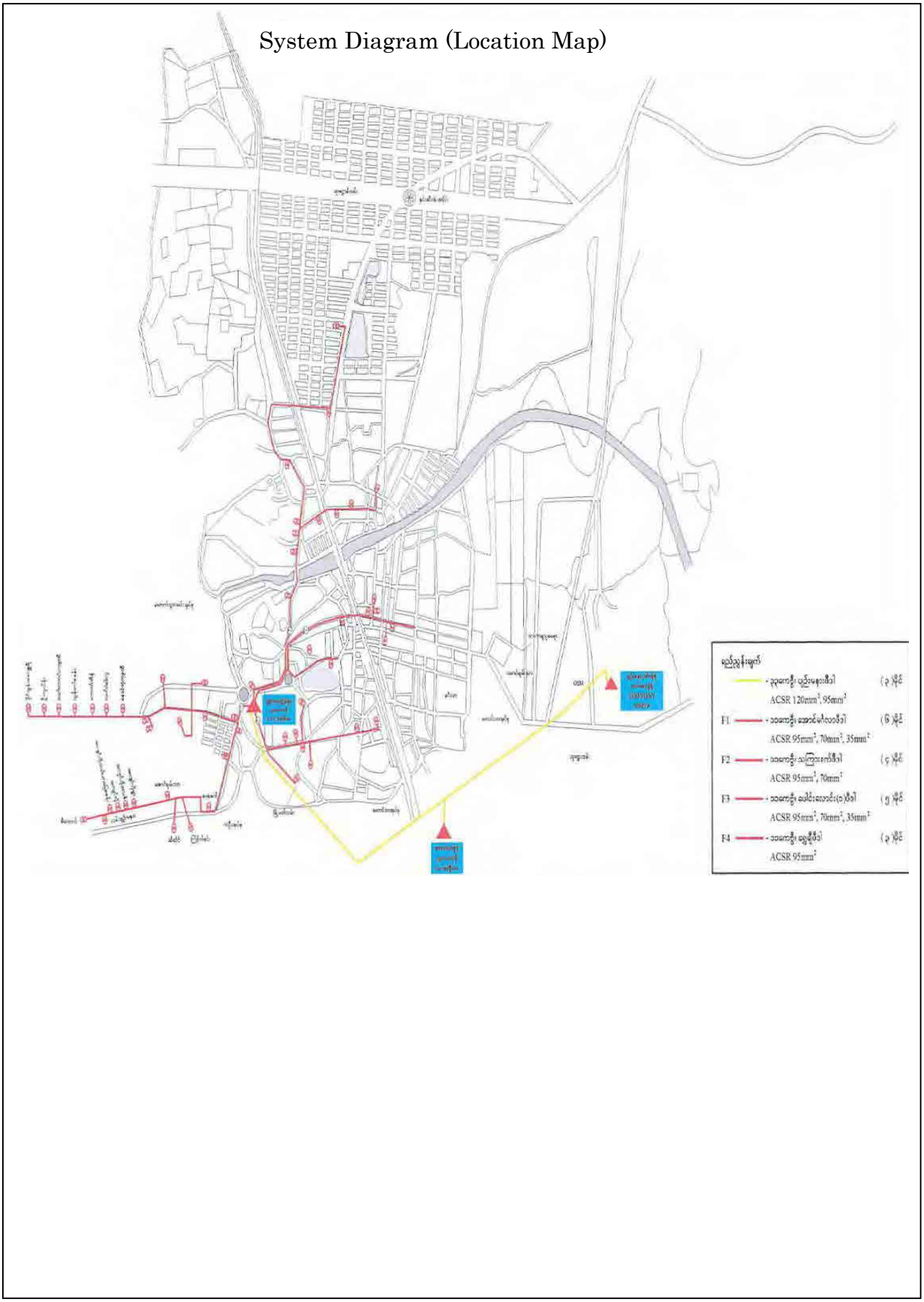
Distribution Loss Rate

(27) Distribution Loss Rate	13.1 %	2014

Pyinmana City (Township)

Appendix 1

(28-1) 11kV System Diagram （Location Map)

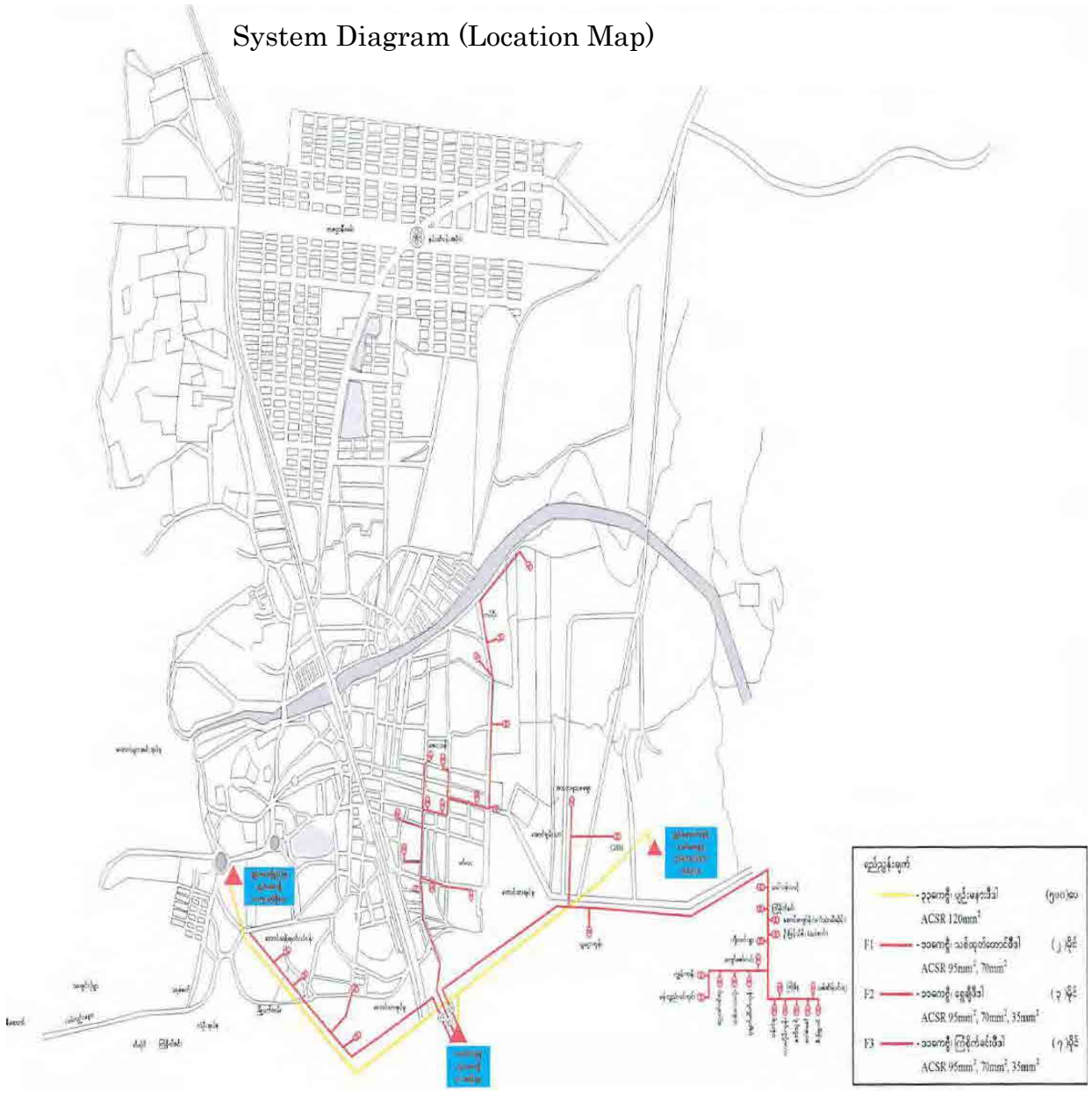


Pyinmana City (Township)

Appendix 1

(28-2) 11kV System Diagram (Location Map)

System Diagram (Location Map)

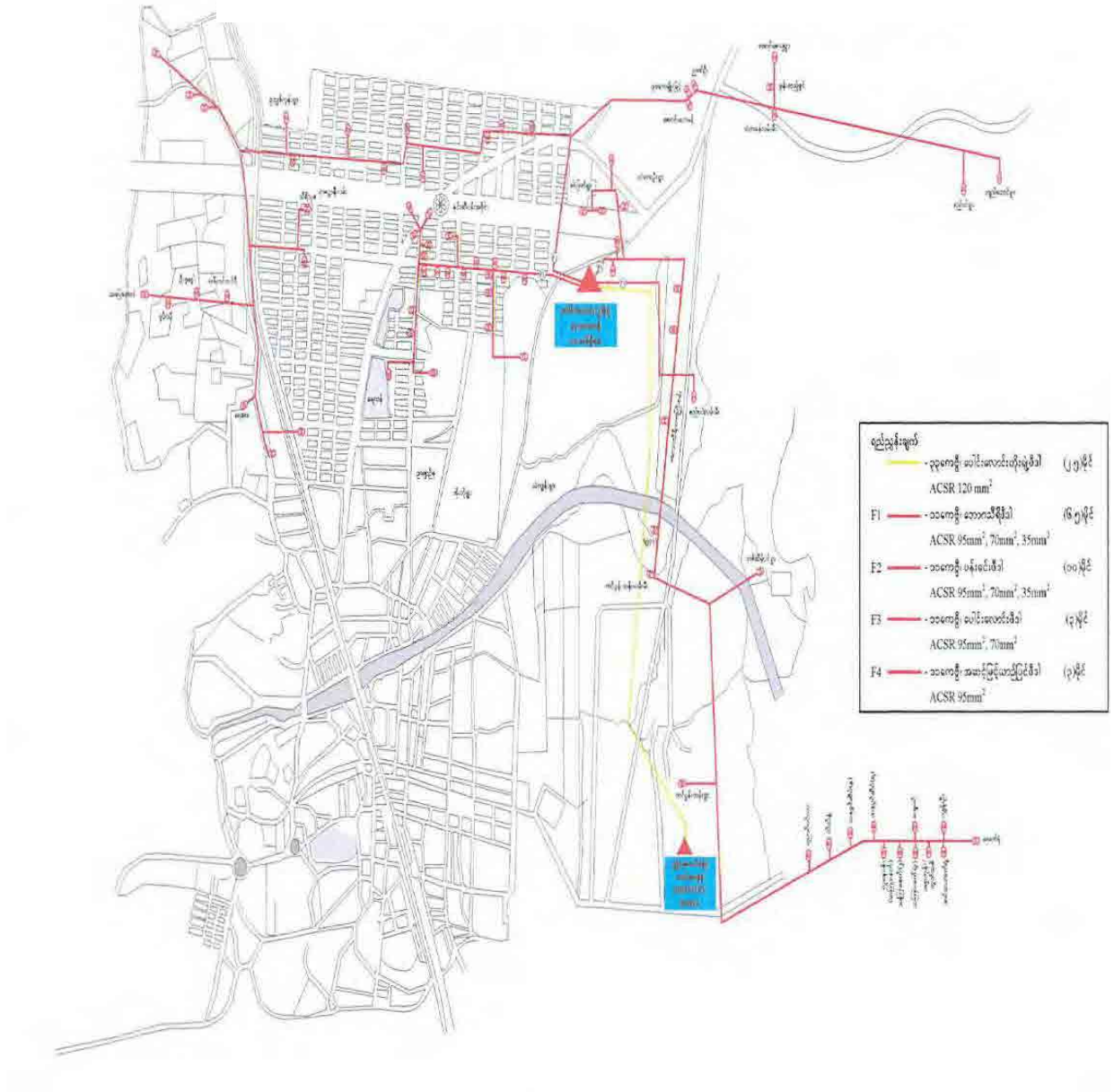


Pyinmana City (Township)

Appendix 1

(28-3) 11kV System Diagram (Location Map)

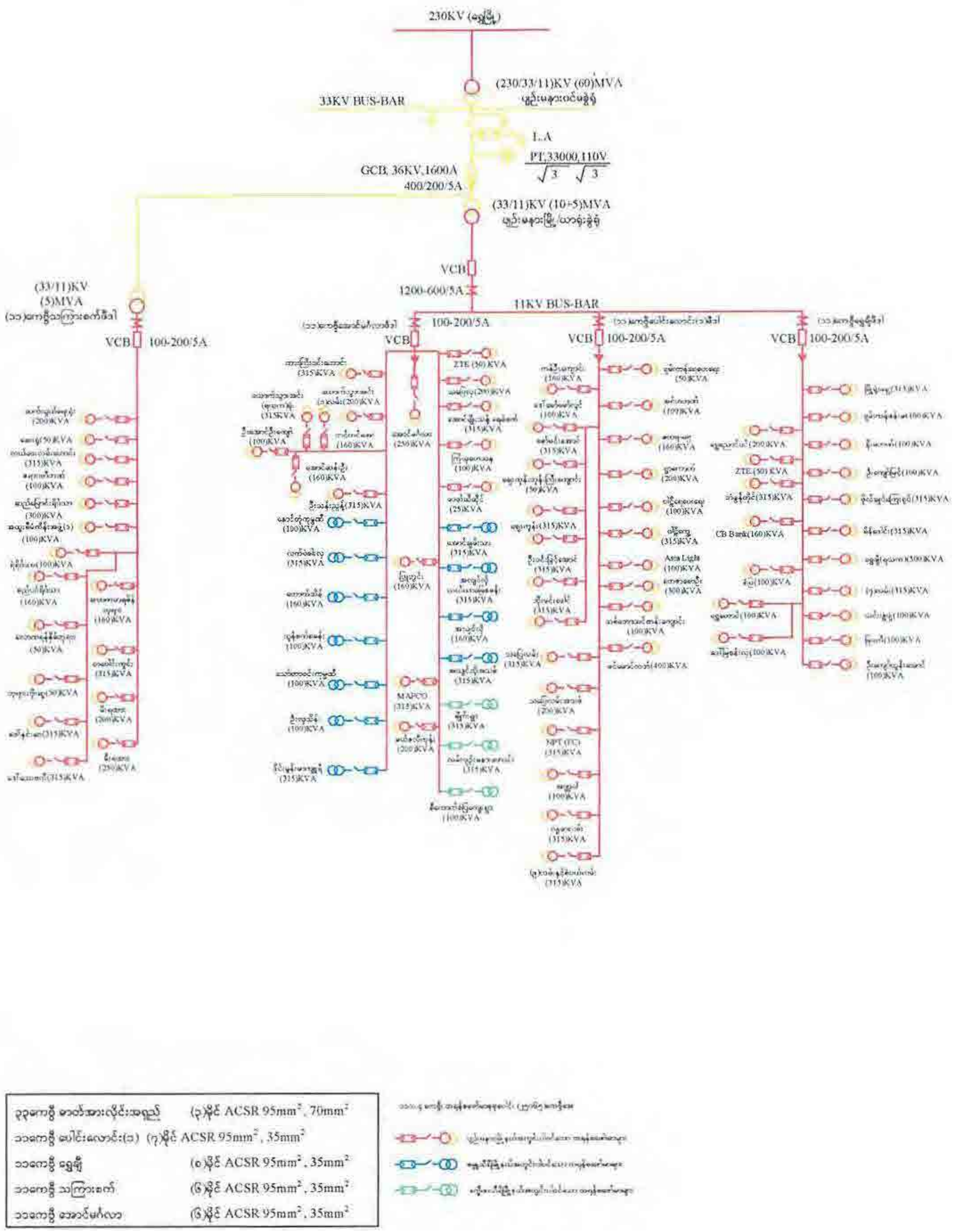
System Diagram (Location Map)



Pyinmana City (Township)

(29-1) 33kV and 11kV System Single Line Diagram

Single line diagram of Pyinmana Township

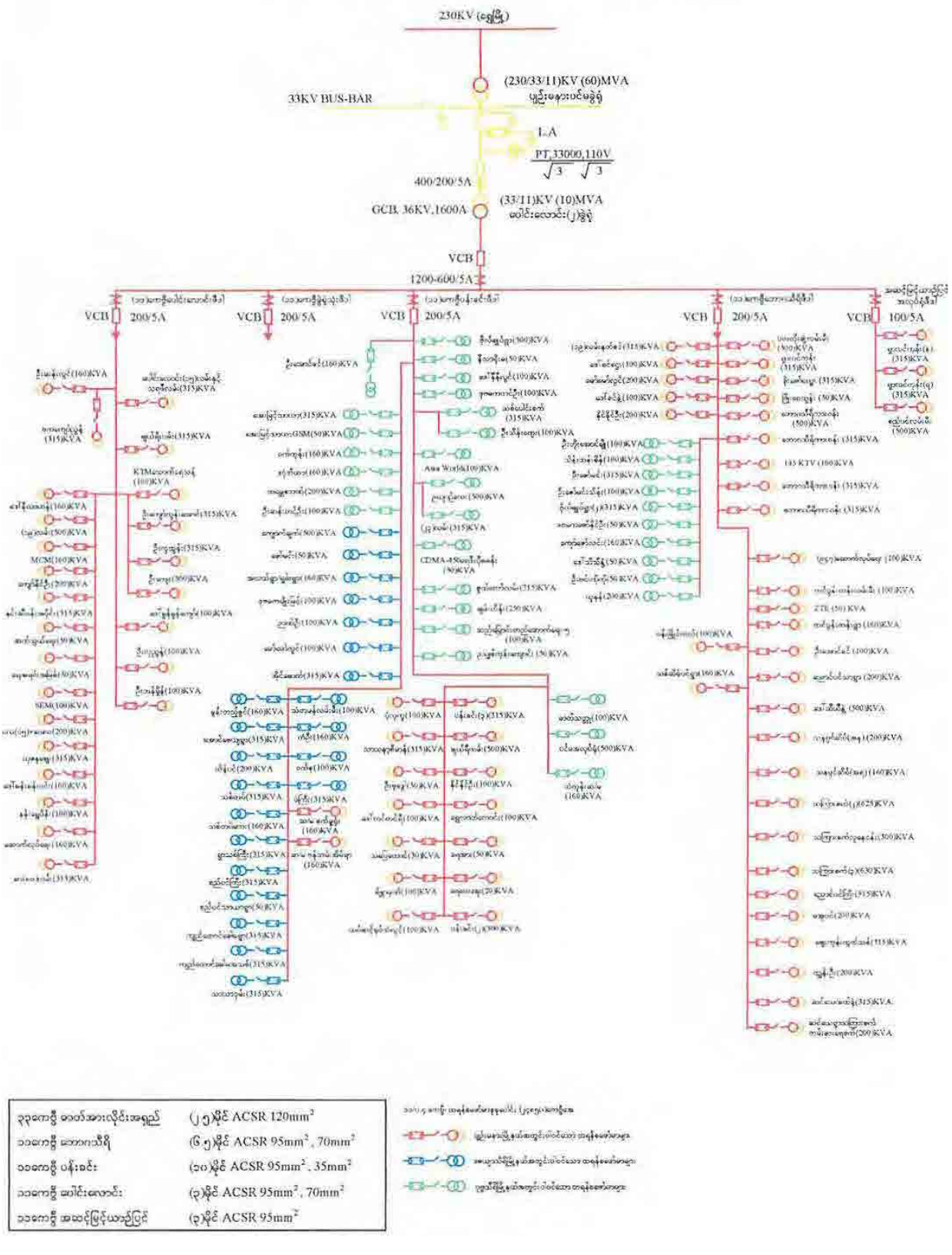


Pyinmana City (Township)

Appendix 1

(29-2) 33kV System Single Line Diagram

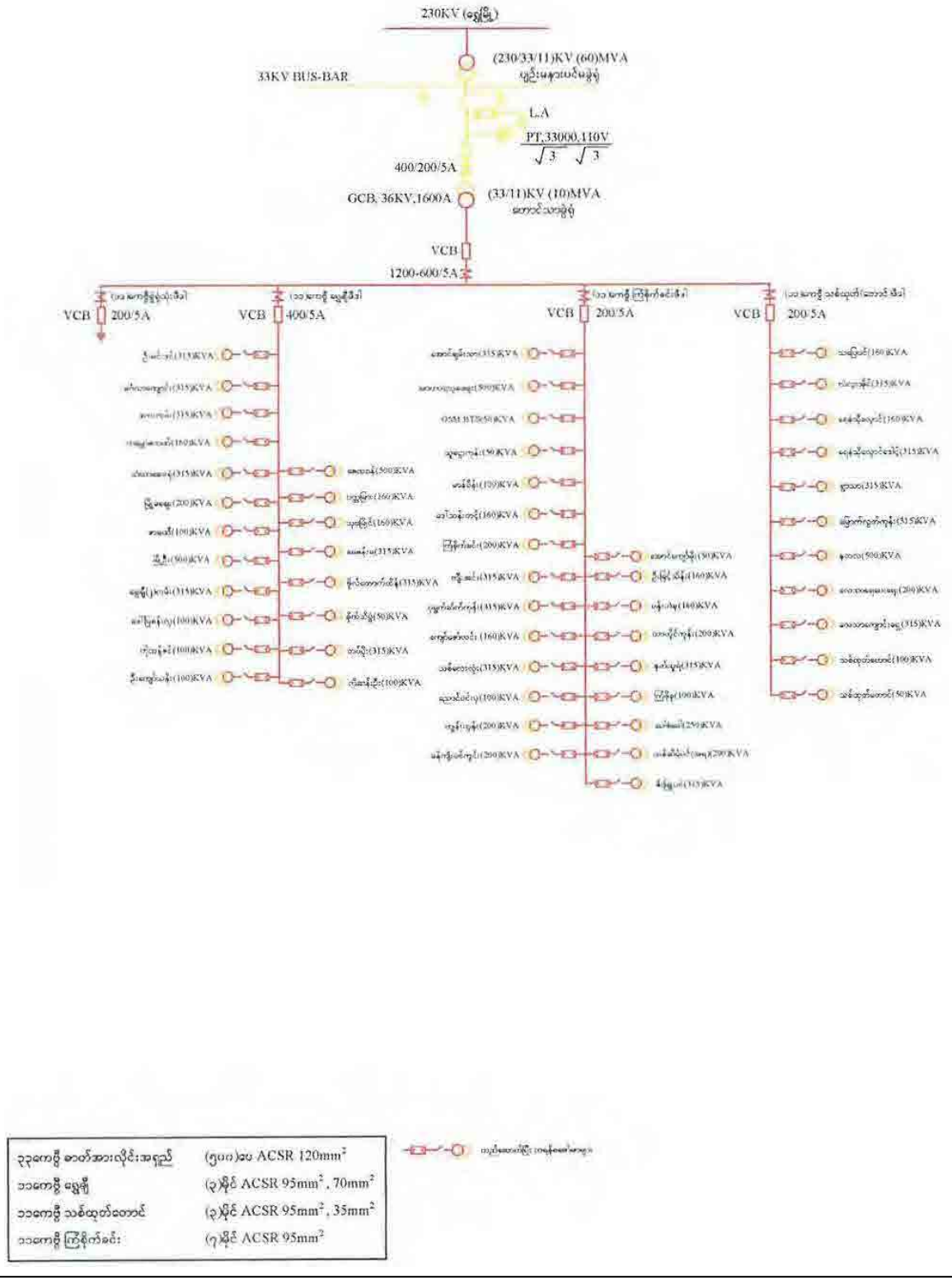
Single line diagram of Pyinmana Township



Pyinmana City (Township)

(29-3) 33kV System Single Line Diagram

Single line diagram of Pyinmana Township



၃၃ကေဗွီ စာတ်အားလိုင်းအရှည်	(၅၀)မိုင် ACSR 120mm²
၃၃ကေဗွီ ရွှေဘို	(၃)မိုင် ACSR 95mm², 70mm²
၃၃ကေဗွီ သစ်ထုတ်ဝေတောင်	(၃)မိုင် ACSR 95mm², 35mm²
၃၃ကေဗွီ ကြိုစိုက်ခင်း	(၇)မိုင် ACSR 95mm²

Pyinmana City (Township)

(30) Power Facilities

33kV transmission line

Branch off point of 33kV line

11/0.4kV Distribution transformer

400V line and Watt hour meters on pole

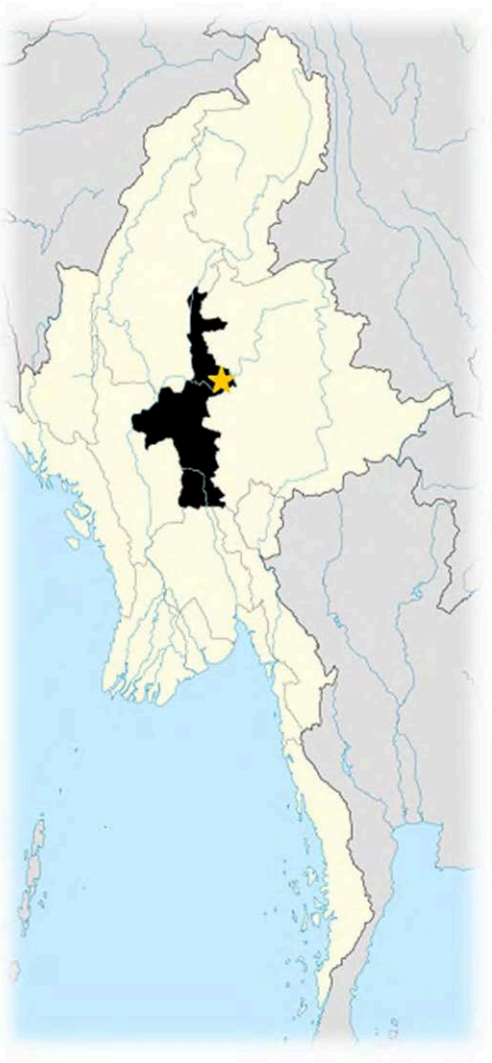
Distribution line on main street

Street lights without overhead service wire

Appendix 1

Pyinoolwin City (Township)

Country	Myanmar
Region / State	Mandalay
District	Pyinoolwin
Township	Pyinoolwin, Madaya, Singu Mogoke, Thabeikkyin



Photo

Downtown

Downtown

Appendix 1

Pyinoolwin City (Township)

General information

(1) Area	94 km^2
(2) Population	28 Thousand People
(3) Household	34 Thousand house holds
(4) Village	116 Villages

Industry/Facilities

(5) Main Industry	―
(6) Industrial Zone	―
(7) Special Economic Zone	―
(8) Important Facilities	5 Facilities(Hospitals, Markets, etc.)

Transportation Infrastructure

(9) Airport	Anisakhan airport
(10) Railway	Pyinoolwin
(11) Main Road	Pyinoolwin-Lashio

Power demand

(12) Customer	28,902	customers	Oct.2014
(13) Electrified village	38	villages	Oct.2014
(14) Number of fixing meter	28,902	Nos.	Oct.2014
(15) Electricity Sales	90,168	MWh	Oct.2013 -Sep.2014
(16) Peak demand	35	MW	Dec.2012-
	39	MW	Dec.2013
	51	MW	Oct.2014
(17) Capacity utilization rate*	92	%	Oct.2014

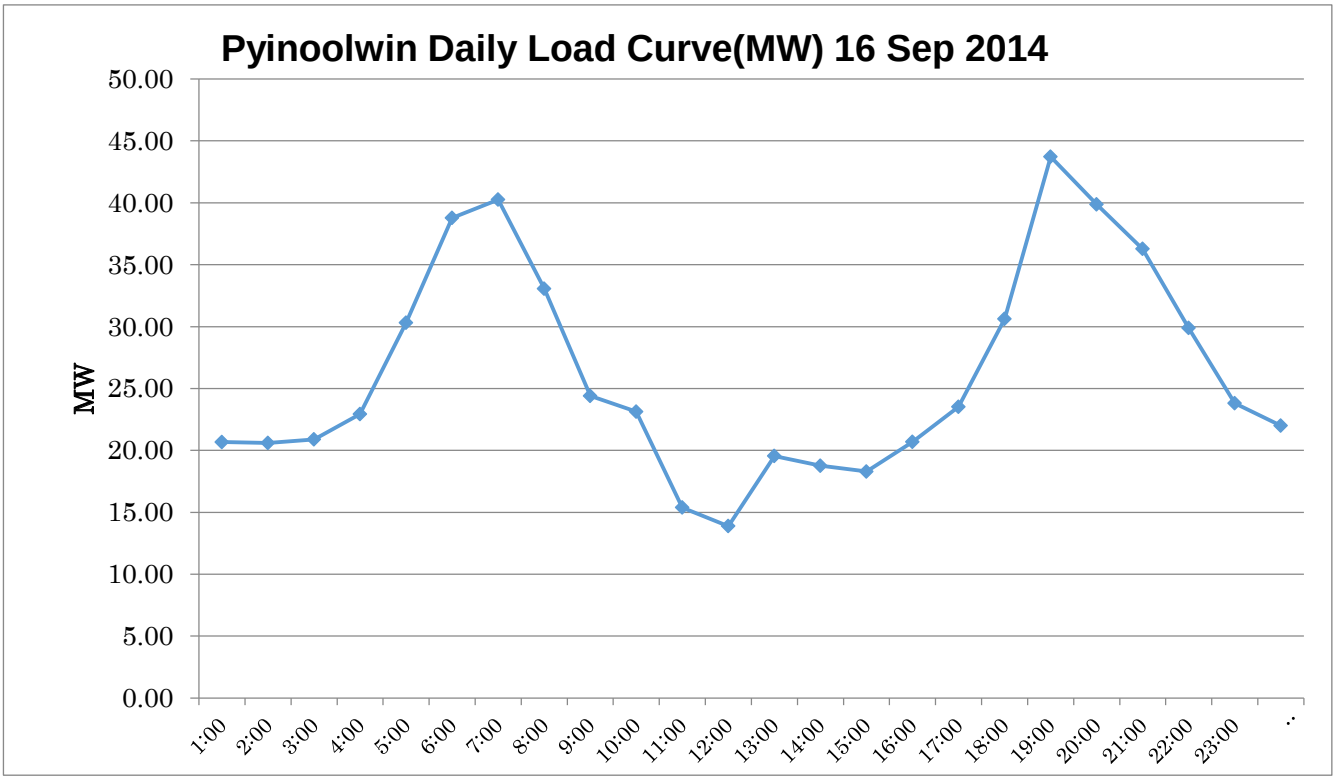
*Capacity utilization rate (%)

= [Peak Demand (MW) / [Power Transformer Capacity (MVA) * 0.9(Power Factor)]]*100

Pyinoolwin City (Township)

Appendix 1

(18) Daily Load curve



Power Facilities

(19) Power Transformer (66/11kV)	-	MVA	-	Nos.	-
(20) Power Transformer (33/11kV)	61.25	MVA	9	Nos.	-
(21) Power Transformer (11/0.4kV)	99	MVA	485	Nos.	Oct.2014
(22) Distribution Line (33kV)	166	km	2,742	Poles	Oct.2014
(23) Distribution Line (11kV)	181	km	6,308	Poles	Oct.2014
(24) Distribution Line (0.4kV)	260	km	7,138	Poles	Oct.2014
(25) Small Hydropower Generator	-	MW	-	Nos.	-
(26) Diesel Power Generator	-	MW	-	Nos.	-

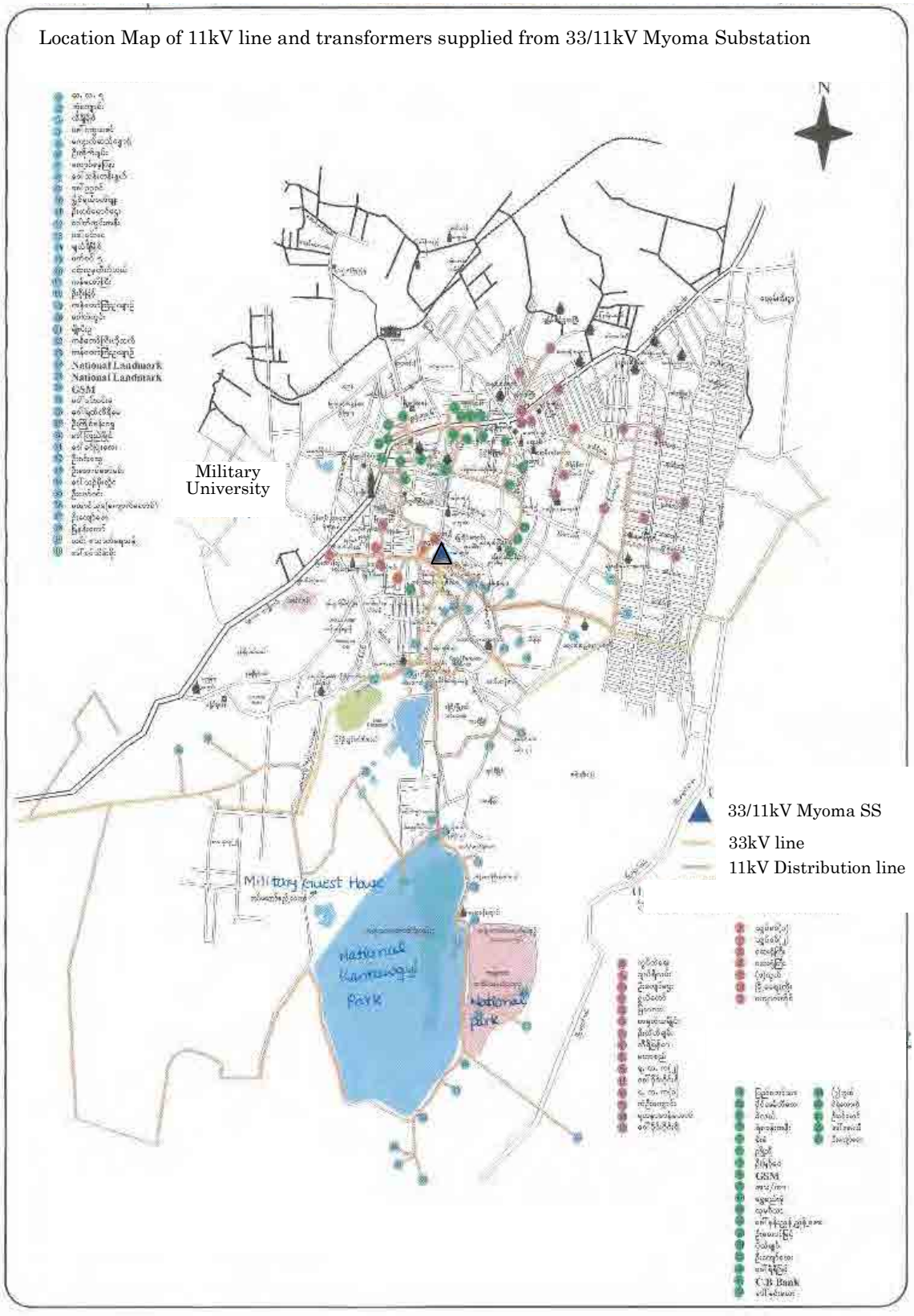
Distribution Loss Rate

(27) Distribution Loss Rate	21.1%	2014

Pyinoolwin City (Township)

Appendix 1

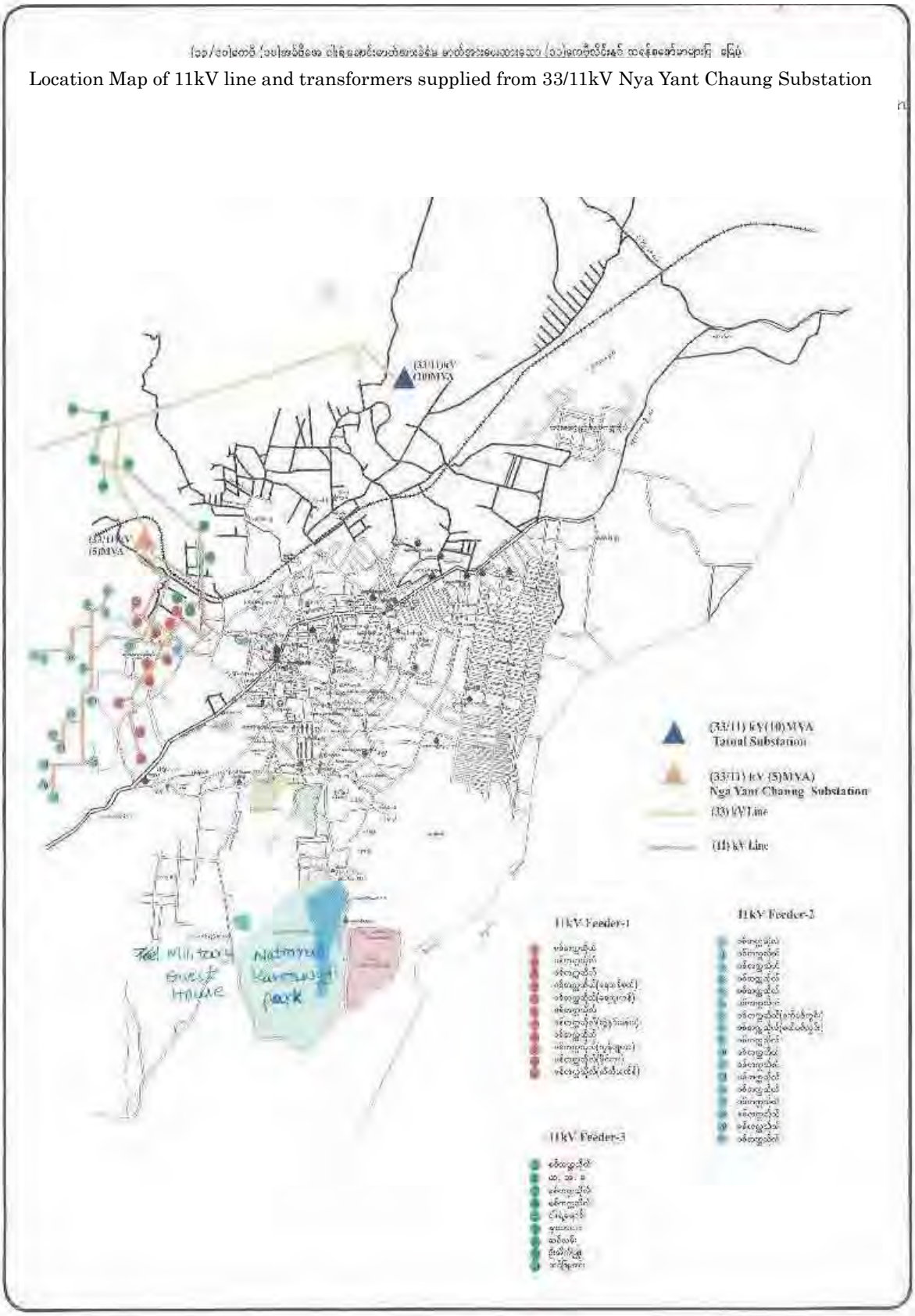
(28) System Diagram （Location Map)



Pyinoolwin City (Township)

Appendix 1

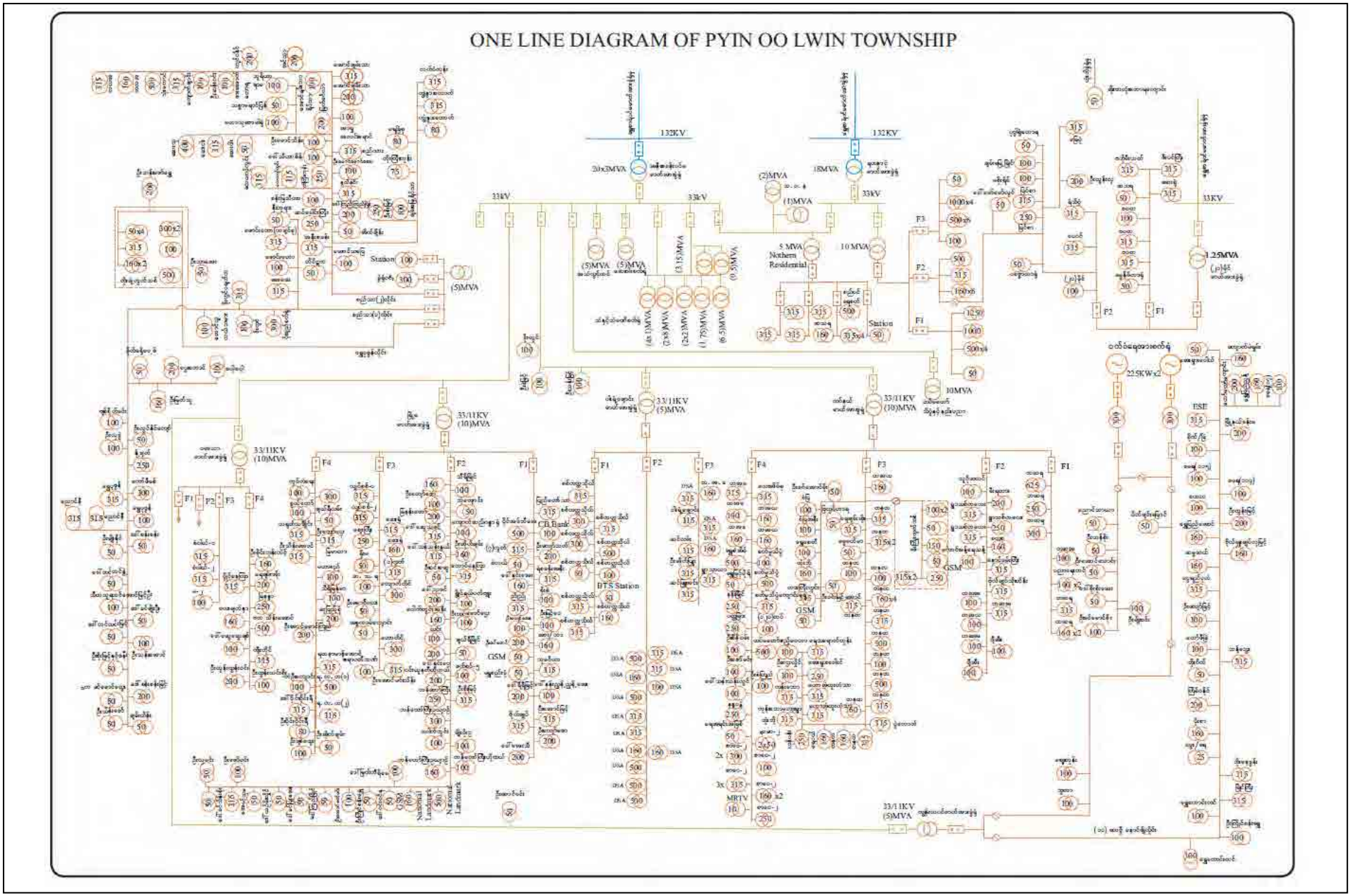
Location Map of 11kV line and transformers supplied from 33/11kV Nya Yant Chaung Substation



Appendix 1

Pyinoolwin City (Township)

(29) Single Line Diagram



Pyinoolwin City (Township)

(30) Power Facilities

11/0.4kV transformer

11/0.4kV transformer

Appendix 1

Mawlamyine City (Township)

Country	Myanmar
Region / State	Mon state
District	Mawlamyine
Township	Mawlamyine, Kyaikmaraw, Ye, Chaungzon, Thanbyuzayat, Mudon,

Photo

Mawlamyine Bridge & City View from Hill

Sunset View from Mawlamyine City

ESE Office in Mawlamyine, Mon

Appendix 1

Mawlamyine City (Township)

General information

(1) Area	218.85 km^2
(2) Population	288 Thousand People
(3) Household	58 Thousand households
(4) Village	32 Villages

Industry/Facilities

(5) Main Industry	Rubber plantation
(6) Industrial Zone	Nil ([Kyauttari IZ] planned with new SS of 5MW)
(7) Special Economic Zone	－
(8) Important Facilities	4 markets, 11 hotels, Local government, Military

Transportation Infrastructure

(9) Airport	Mawlamyine airport
(10) Railway	Mawlamyine railway
(11) Main Road	Asian Highway 12

Social Environment (search for only candidate cities)

(a) Schools (No.)	148	Primary	Secondary	High	Monastery
		111	14	16	7
(b) University and Colleges (No.)	4	Representative School			
		Mawlamyine University, Education College			
(c) Health Care facilities (No)	126	Government Hospital	Private Hospital	Government dispensary	Private dispensary
		4	6	18	98

Power demand

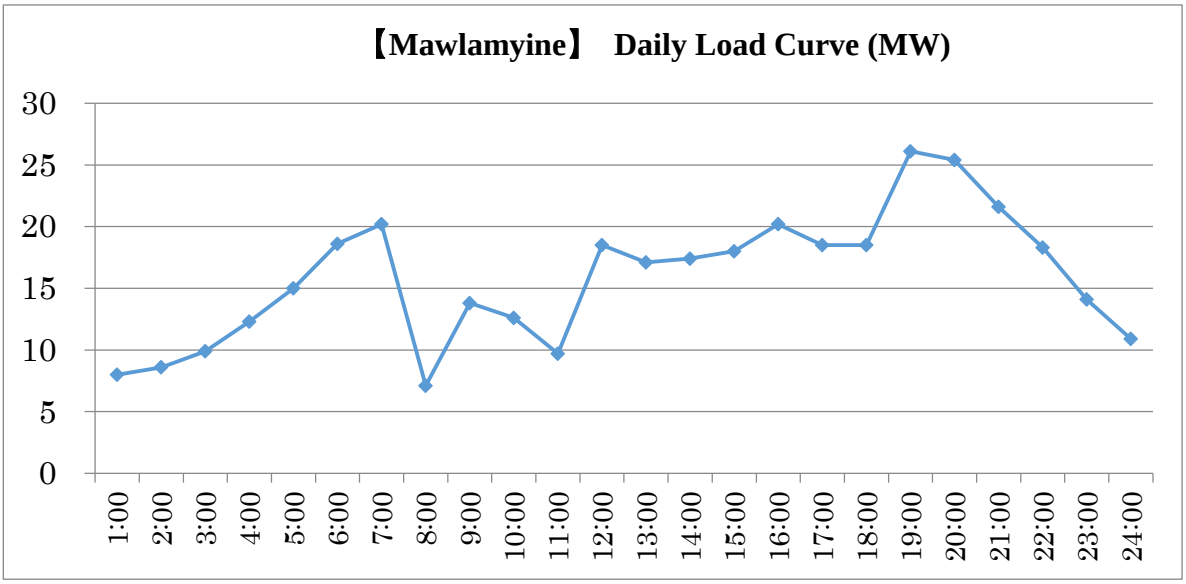
(12) Customer	44,728	customers	DEC. 2014
(13) Electrified village	19	villages	DEC. 2014
(14) Number of fixing meter	44,728	Nos.	DEC. 2014
(15) Electricity Sales	84,161	MWh	Apr.2013 - Mar.2014
(16) Peak demand	17.74	MW	3rd MAY 2012
	21.07	MW	2nd MAY 2013
	26.12	MW	24th APR. 2014
(17) Capacity utilization rate*	50.8	%	2014

*Capacity utilization rate (%)
= [Peak Demand (MW) / [Power Transformer Capacity (MVA) * 0.9(Power Factor)]]*100

Mawlamyine City (Township)

Appendix 1

(18) Daily Load curve



Power Facilities

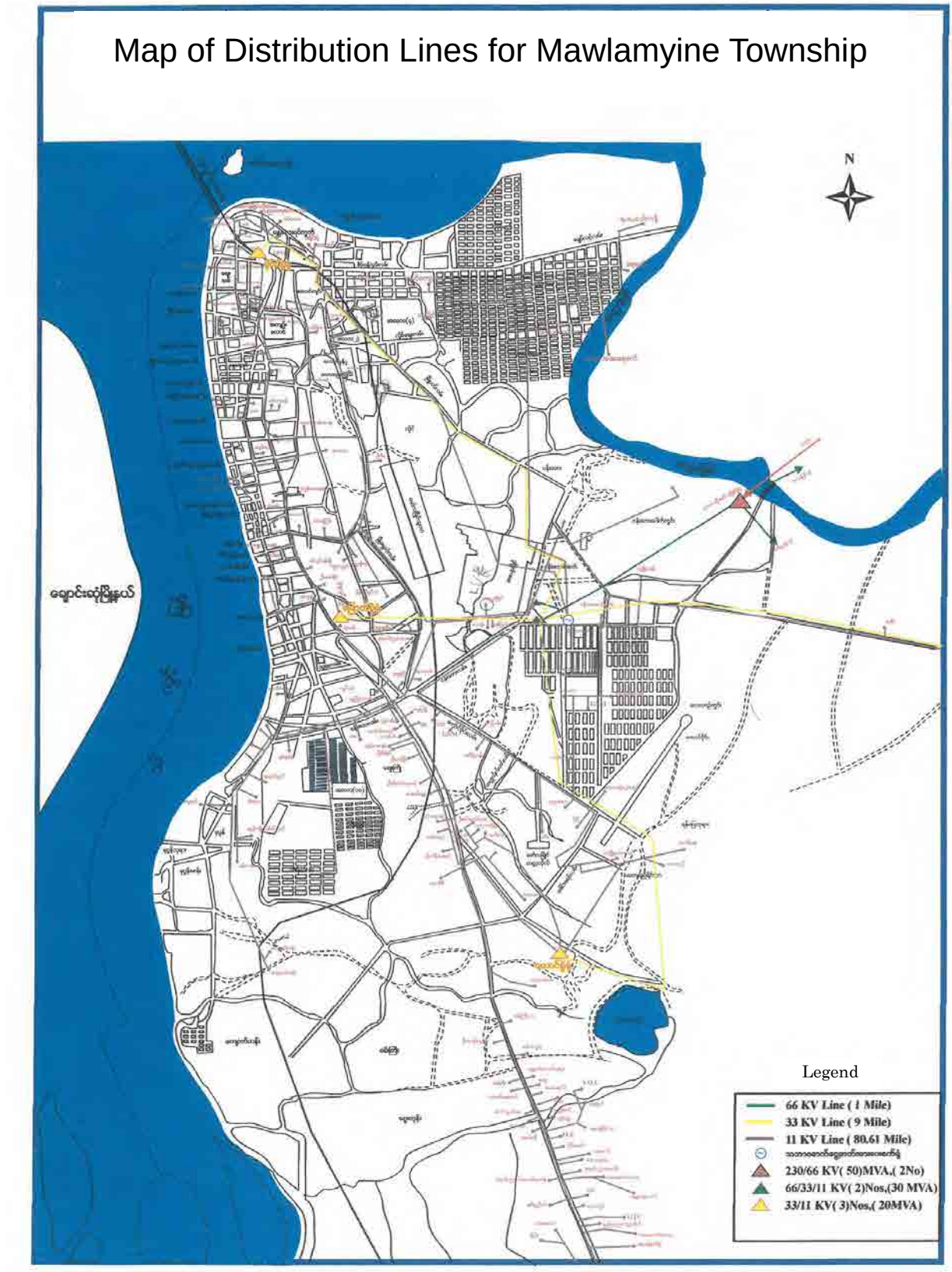
(19) Power Transformer (66/11kV)	34	MVA	2	Nos.	Oct.2014
(20) Power Transformer (33/11kV)	23.15	MVA	7	Nos.	Oct.2014
(21) Power Transformer (11/0.4kV)	59.51	MVA	246	Nos.	Oct.2014
(22) Distribution Line (33kV)	15	km	366	Poles	Oct.2014
(23) Distribution Line (11kV)	135	km	3,417	Poles	Oct.2014
(24) Distribution Line (0.4kV)	176	km	4,452	Poles	Oct.2014
(25) Small Hydropower Generator	0	MW	0	Nos.	Oct.2014
(26) Diesel Power Generator	0.1	MW	1	Nos.	Oct.2014

Distribution Loss Rate

(27) Distribution Loss Rate	33.5 %	2014

Mawlamyine City (Township)

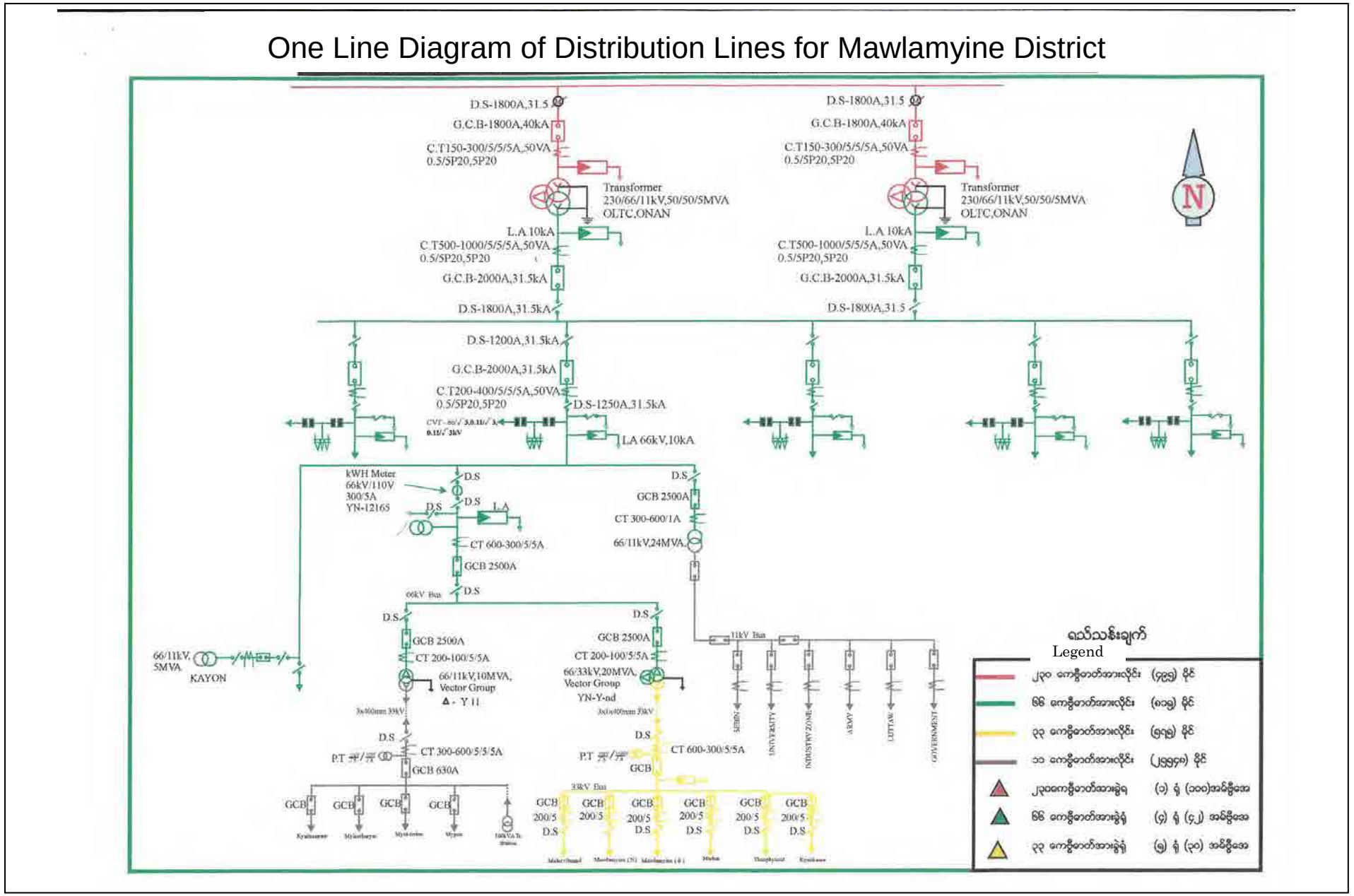
(28) 66,11kV System Diagram (Location Map)



Appendix 1

Mawlamyine City (Township)

(29) 66,11kV System Single Line Diagram



Mawlamyine City (Township)

(30) Power Facilities

230kV Mawlamyine Primary SS

66/11kV 24MVA Nyande SS

66/33kV 30MVA and 66/11kV 10MVA
in Mawlamyine SS

33/11kV 10MVA South SS

Land for Kyauttari Industrial Park

11kV feeders from Nyande SS

Appendix 1

Sittwe City (Township)

Country	Myanmar
Region / State	Rakhine
District	Sittwe
Township	Sittwe, Ponnagyun, Mrauk-U Kyauktaw, Minbya, Myebon, Pauktaw, Rathedaung

Photo

Sittwe Shwe Zedi Kyaung

View Point Beach, Sittwe

Appendix 1

Sittwe City (Township)

General information

(1) Area	50 km^2
(2) Population	135 Thousand People
(3) Household	11 Thousand house holds
(4) Village	96 Villages

Industry/Facilities

(5) Main Industry	Sightseeing, Fishery industry, Shrimp culture
(6) Industrial Zone	—
(7) Special Economic Zone	—
(8) Important Facilities	1 hospital, 1 market

Transportation Infrastructure

(9) Airport	—
(10) Railway	[Planned] Minbu - Ann-Sittwe line
(11) Main Road	Minbu - Ann-Sittwe Road

Power demand

(12) Customer	9,354	customers	2014
(13) Electrified village	40	villages	2014
(14) Number of fixing meter	9,354	Nos.	2014
(15) Electricity Sales	8,283	MWh	2013 - 2014
(16) Peak demand	2.5	MW	2012
	3	MW	2013
	3	MW	2014
(17) Capacity operating rate*		%	2014

*Capacity operating rate(%)

= Power Transformer Capacity (MVA) / (Peak Demand (MW)* 0.9(Power Factor))

Sittwe City (Township)

Appendix 1

(18) Daily Load curve

No Data & Figure

Power Facilities

(19) Power Transformer (66/11kV)	—	MVA	—	Nos.	—
(20) Power Transformer (33/11kV)	No Data	MVA	No Data	Nos.	—
(21) Power Transformer (11/0.4kV)	9.15	MVA	43	Nos.	2014
(22) Distribution Line (33kV)	—	km	—	Poles	—
(23) Distribution Line (11kV)	63	km	301	Poles	Oct.2014
(24) Distribution Line (0.4kV)	77	km	312	Poles	Oct.2014
(25) Small Hydropower Generator	—	MW	—	Nos.	—
(26) Diesel Power Generator	—	MW	—	Nos.	—

Distribution Loss Rate

(27) Distribution Loss Rate	No Data %	Oct.2014

Sittwe City (Township)

(28) 11kV System Diagram（Location Map)

No Figure

(29) 66kV/11kV System Single Line Diagram

No Figure

(30) Power Facilities

No Photos

Appendix 1

Thandwe City (Township)

Country	Myanmar
Region / State	Rakhine
District	Thandwe
Township	Thandwe, Tounup, Gwa

Photo

Thandwe City Street

Ngapali Beach

Thandwe City (Township)

Appendix 1

General information

(1) Area	23 km^2
(2) Population	64 Thousand People
(3) Household	No Data Thousand house holds
(4) Village	No Data Villages

Industry/Facilities

(5) Main Industry	Sightseeing (Ngapali Beach), Fishery industry
(6) Industrial Zone	—
(7) Special Economic Zone	—
(8) Important Facilities	No Data

Transportation Infrastructure

(9) Airport	Thandwe Airport
(10) Railway	—
(11) Main Road	Thandwe – Gwa - Ngathaingchaung Road

Power demand

(12) Customer	No Data customers	2014
(13) Electrified village	No Data villages	2014
(14) Number of fixing meter	No Data Nos.	2014
(15) Electricity Sales	No Data MWh	2013 - 2014
(16) Peak demand	No Data MW	2012
	No Data MW	2013
	No Data MW	2014
(17) Capacity utilization rate*	No Data %	2014

*Capacity utilization rate (%)

= [Peak Demand (MW) / [Power Transformer Capacity (MVA) * 0.9(Power Factor)]]*100

Thandwe City (Township)

Appendix 1

(18) Daily Load curve

No Data & Figure

Power Facilities

(19) Power Transformer (66/11kV)	—	MVA	—	Nos.	—
(20) Power Transformer (33/11kV)	No Data	MVA	No Data	Nos.	—
(21) Power Transformer (11/0.4kV)	No Data	MVA	No Data	Nos.	—
(22) Distribution Line (33kV)	—	km	—	Poles	—
(23) Distribution Line (11kV)	—	km	—	Poles	—
(24) Distribution Line (0.4kV)	—	km	—	Poles	—
(25) Small Hydropower Generator	—	MW	—	Nos.	—
(26) Diesel Power Generator	—	MW	—	Nos.	—

Distribution Loss Rate

(27) Distribution Loss Rate	No Data %	Oct.2014

Thandwe City (Township)

(28) 11kV System Diagram（Location Map)

No Figure

(29) 66kV/11kV System Single Line Diagram

No Figure

(30) Power Facilities

No Photos

Appendix 1

Monywa City (Township)

Country	Myanmar
Region / State	Sagain
District	Monywa
Township	Monywa, Budalin, Ayadaw, Chaung-U, Yinmabin, Kani, Salingyi, Pale

Photo

Monywa downtown

Monywa Hospital

Appendix 1

Monywa City (Township)

General information

(1) Area	35 km^2
(2) Population	630 Thousand People
(3) Household	69 Thousand house holds
(4) Village	194 Villages

Industry/Facilities

(5) Main Industry	Sightseeing, Agriculture
(6) Industrial Zone	Monywa Industrial Zone
(7) Special Economic Zone	－
(8) Important Facilities	8 hospitals, 3 markets, 4Universities, 1 Regional government office

Transportation Infrastructure

(9) Airport	Ahlone airport
(10) Railway	Monywa Railway station
(11) Main Road	Monywa-Mondalay Road

Social Environment (search for only candidate cities)

(a) Schools (No.)	131	Primary	Secondary	High	Monastery
		106	8	10	7
(b) University and Colleges (No.)	6	Representative School			
		Monywa University, Economic University			
(c) Health Care facilities (No)	130	Government Hospital	Private Hospital	Government dispensary	Private dispensary
		2	10	38	80

Power demand

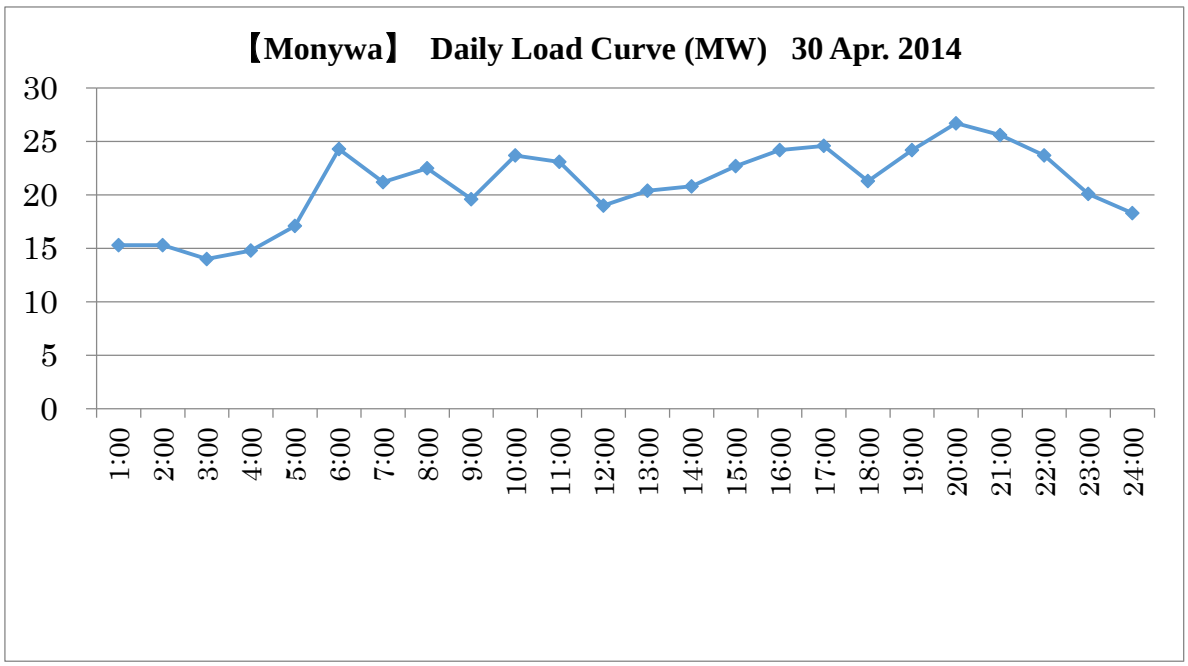
(12) Customer	49,695	customers	Dec.2014
(13) Electrified village	194	villages	Sep.2014
(14) Number of fixing meter	49,695	Nos.	Dec.2014
(15) Electricity Sales	9,376	MWh	Nov.2013 - Oct.2014
(16) Peak demand	19	MW	Apr.2012
	22	MW	Jun.2013
	27	MW	Apr.2014
(17) Capacity utilization rate*	43.1	%	Apr.2014

*Capacity utilization rate(%)
= [Peak Demand (MW) / [Power Transformer Capacity (MVA) * 0.9(Power Factor)]]*100

Monywa City (Township)

Appendix 1

(18) Daily Load curve



Power Facilities

(19) Power Transformer (66/11kV)	-	MVA	-	Nos.	-
(20) Power Transformer (33/11kV)	67	MVA	16	Nos.	Nov.2014
(21) Power Transformer (11/0.4kV)	81,680	MVA	384	Nos.	Nov.2014
(22) Distribution Line (33kV)	57	km	871	Poles	Nov.2014
(23) Distribution Line (11kV)	240	km	5314	Poles	Nov.2014
(24) Distribution Line (0.4kV)	296	km	8,889	Poles	Nov.2014
(25) Small Hydropower Generator	-	MW	-	Nos.	Nov.2014
(26) Diesel Power Generator	-	MW	-	Nos.	Nov.2014

Distribution Loss Rate

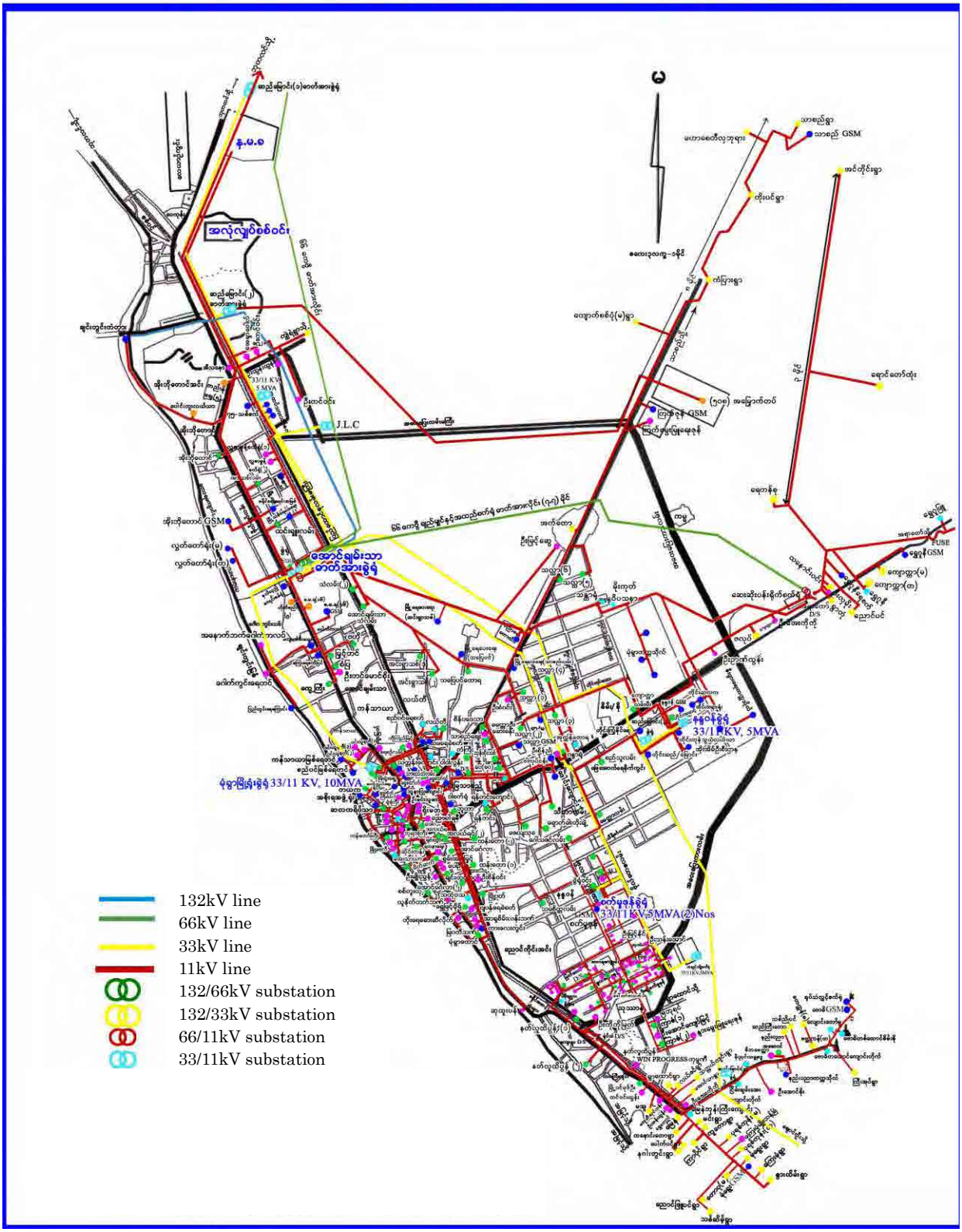
(27) Distribution Loss Rate	23.5 %	Nov.2014

Monywa City (Township)

Appendix 1

(28) 33kV System Diagram （Location Map）

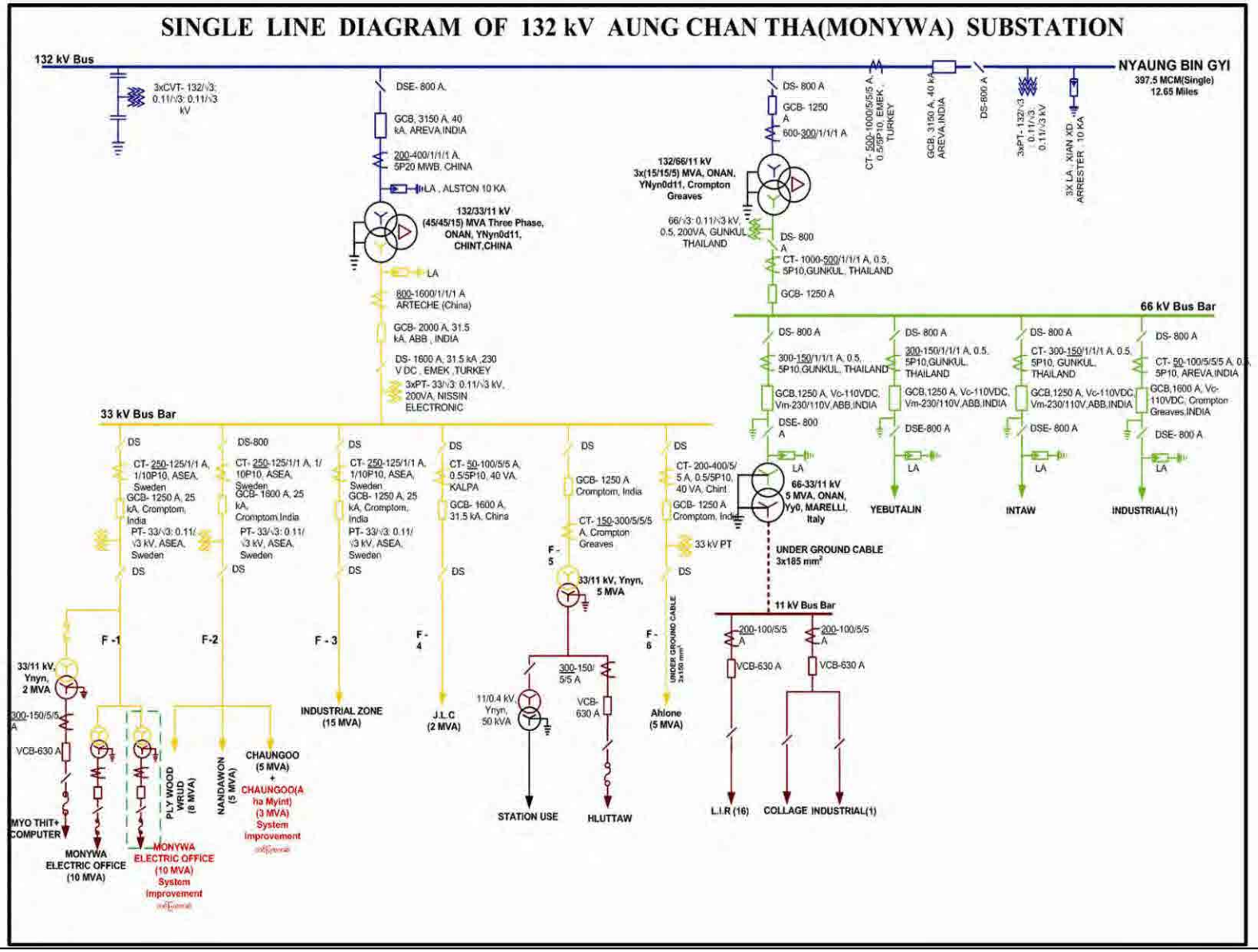
33kV and 11kV System route map in Monywa township



Monywa City (Township)

(29) 33kV System Single Line Diagram

Appendix 1



Monywa City (Township)

(31) Power Facilities

33/11kV Monywa SS (10MVA×1No.)

33/11kV Monywa SS Extension Area

33/11kV Nunda wun SS

33/11kV Nunda wun SS Extension Area

Sagain City (Township)

Appendix 1

Country	Myanmar
Region / State	Sagain
District	Sagain
Township	Sagain, Myinmu, Myaung

Photo

Sagain downtown

Sagain Hoapital

Sagain Market Building

Appendix 1

Sagain City (Township)

General information

(1) Area	105 km^2
(2) Population	11 Thousand People
(3) Household	43 Thousand house holds
(4) Village	99 Villages

Industry/Facilities

(5) Main Industry	Sightseeing
(6) Industrial Zone	－
(7) Special Economic Zone	－
(8) Important Facilities	4 hospitals, 1 market

Transportation Infrastructure

(9) Airport	－
(10) Railway	－
(11) Main Road	To Mandalay, Myingyan, Monywa

Power demand

(12) Customer	25,937	customers	Oct.2014
(13) Electrified village	66	villages	Oct.2014
(14) Number of fixing meter	25,937	Nos.	Oct.2014
(15) Electricity Sales	87,228	MWh	Oct.2013 - Sep.2014
(16) Peak demand	18	MW	Jun.2012
	18	MW	Feb.2013
	21	MW	Jun.2014
(17) Capacity utilization rate*	57	%	Jun.2014

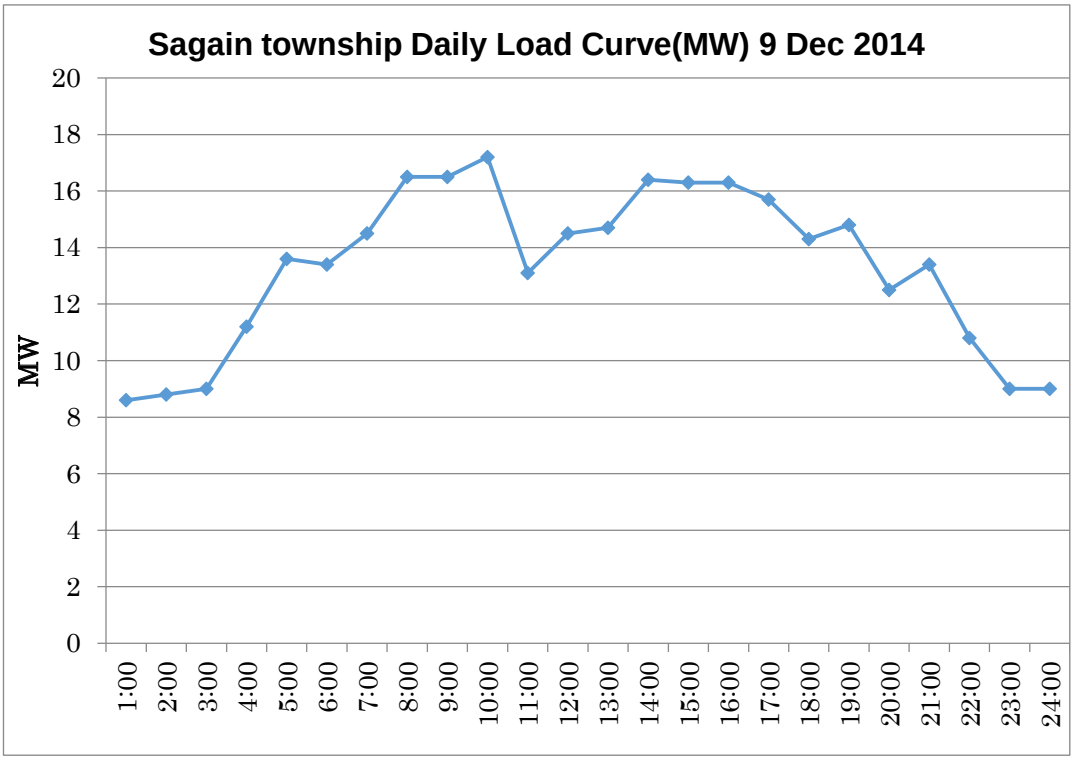
*Capacity utilization rate(%)

= [Peak Demand (MW) / [Power Transformer Capacity (MVA) * 0.9(Power Factor)]]*100

Sagain City (Township)

Appendix 1

(18) Daily Load curve



Power Facilities

(19) Power Transformer (66/11kV)	-	MVA	-	Nos.	-
(20) Power Transformer (33/11kV)	40	MVA	5	Nos.	-
(21) Power Transformer (11/0.4kV)	71,732	MVA	302	Nos.	-
(22) Distribution Line (33kV)	32	km	470	Poles	-
(23) Distribution Line (11kV)	229	km	3,400	Poles	-
(24) Distribution Line (0.4kV)	215	km	5,615	Poles	-
(25) Small Hydropower Generator	-	MW	-	Nos.	-
(26) Diesel Power Generator	-	MW	-	Nos.	-

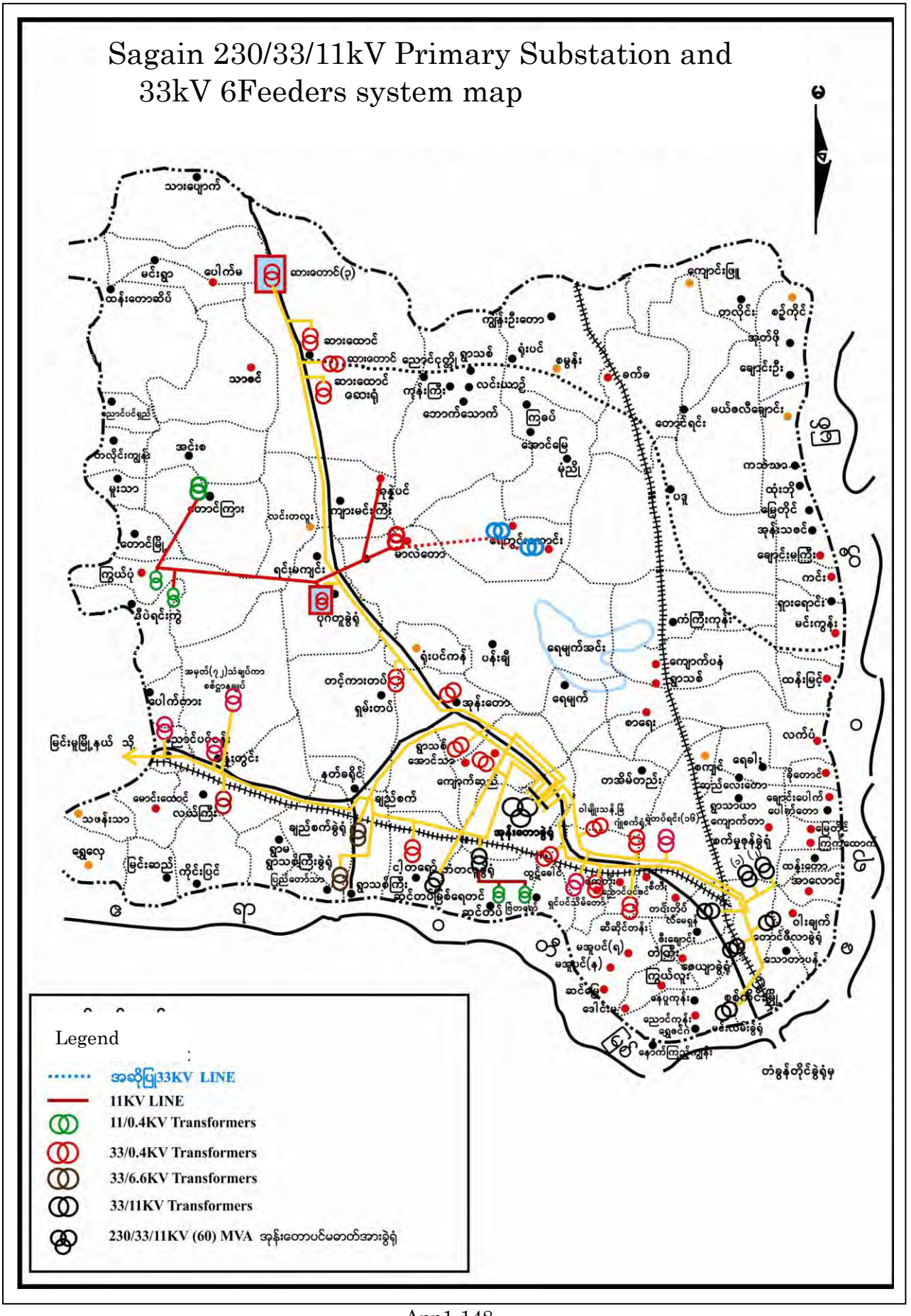
Distribution Loss Rate

(27) Distribution Loss Rate	25.0 %	2014

Sagain City (Township)

Appendix 1

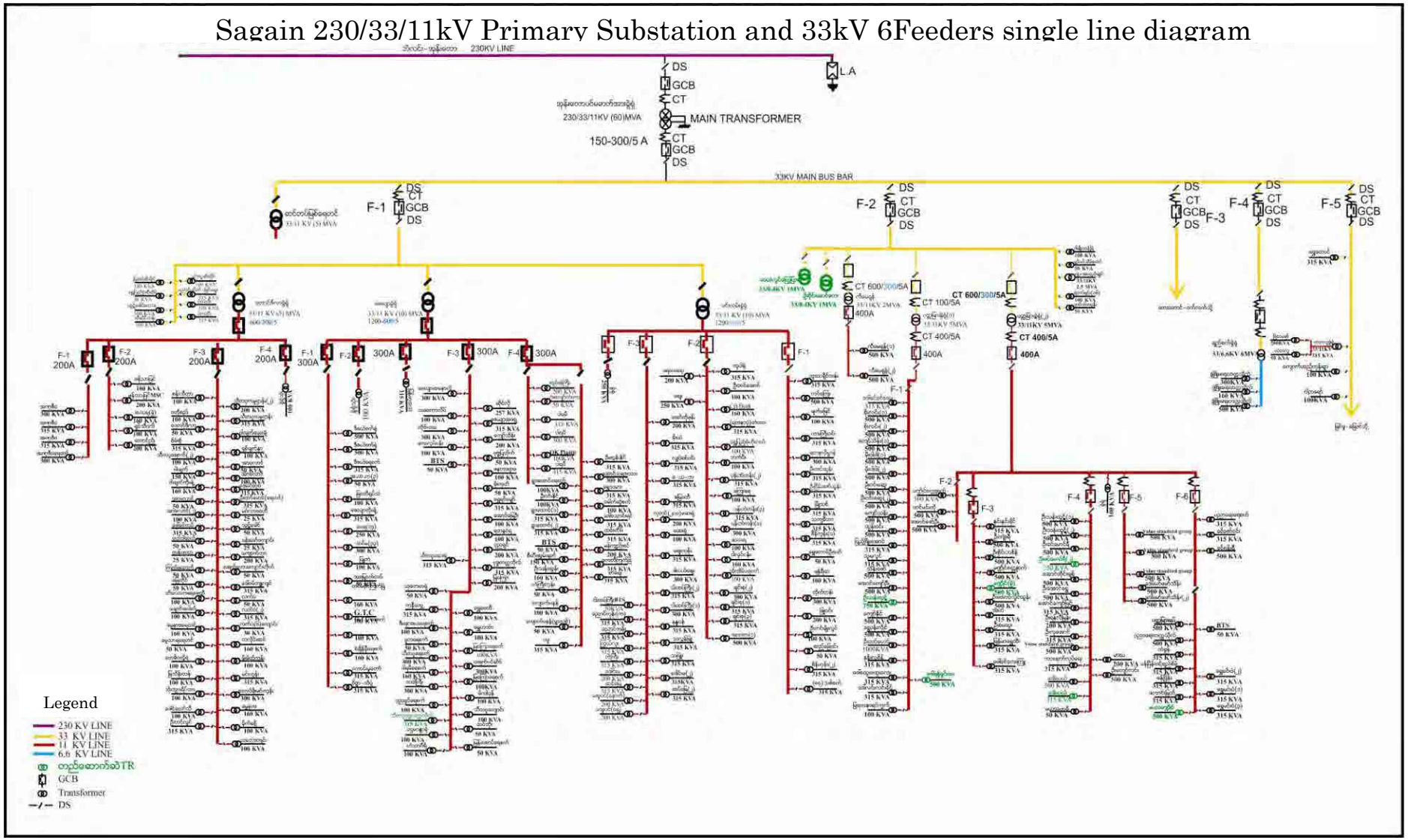
(28) 33kV System Diagram (Location Map)



Sagain City (Township)

(29) 33kV System Single Line Diagram

Appendix 1



Sagain City (Township)

(30) Power Facilities

11kV Transformer

Appendix 1

Shwebo City (Township)

Country	Myanmar
Region / State	Sagain
District	Shwebo
Township	Shwebo, Khin-U, Wetlet, Kanbalu, Kyunhla, Ye-U, Tabayin, Taze

No Photo

Appendix 1

Shwebo City (Township)

General information

(1) Area	30 km^2
(2) Population	180 Thousand People
(3) Household	44 Thousand house holds
(4) Village	150 Villages

Industry/Facilities

(5) Main Industry	Agriculture
(6) Industrial Zone	1 Industrial zone
(7) Special Economic Zone	-
(8) Important Facilities	1 hospital, 1 market

Transportation Infrastructure

(9) Airport	―
(10) Railway	Shwebo
(11) Main Road	To Sagain, Mandalay

Power demand

(12) Customer	21,559	customers	Nov.2014
(13) Electrified village	77	villages	Nov.2014
(14) Number of fixing meter	21,559	Nos.	Nov.2014
(15) Electricity Sales	2,886	MWh	Apr2013 - Mar.2014
(16) Peak demand	9.6	MW	2012
	10.4	MW	2013
	12.0	MW	2014
(17) Capacity utilization rate*	53	%	2014

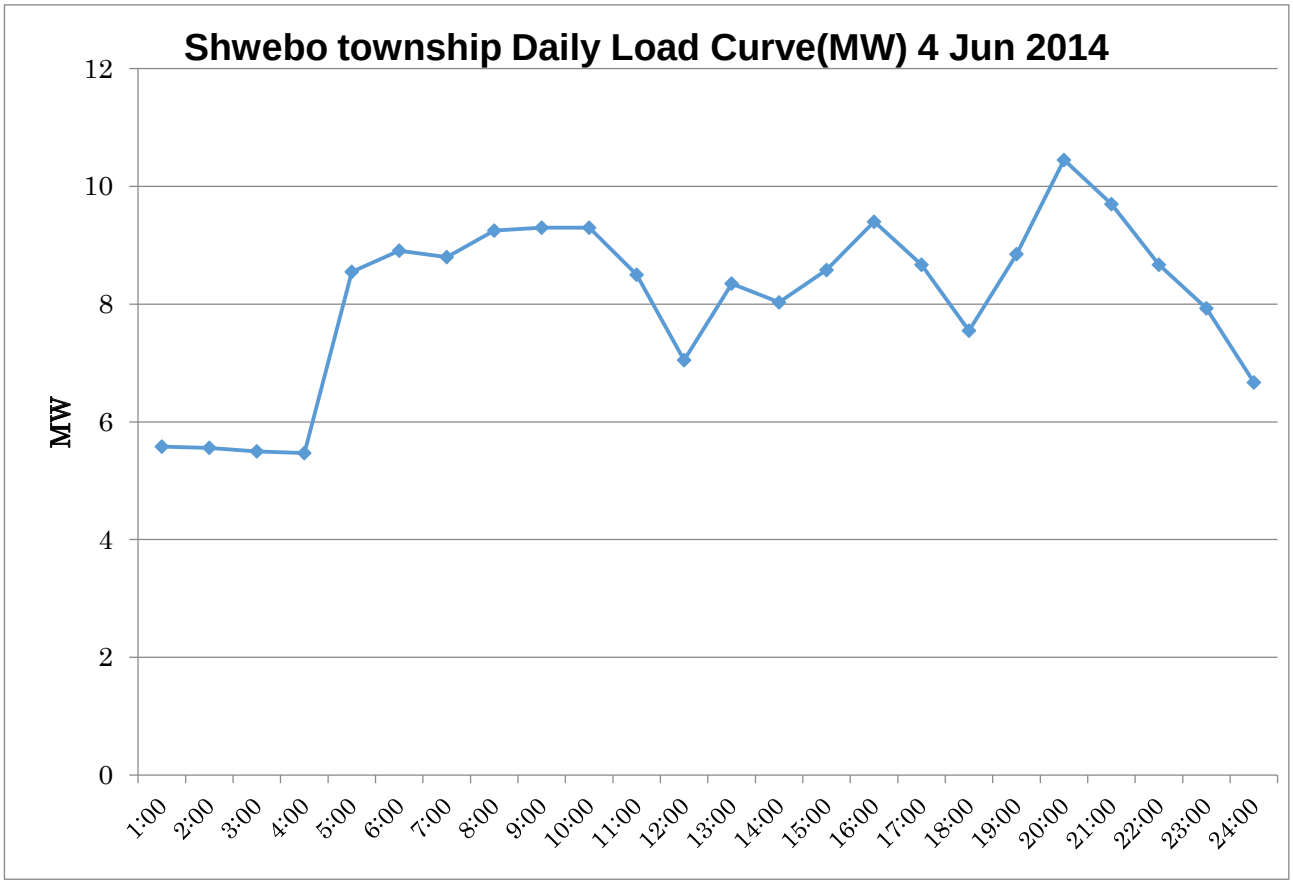
*Capacity utilization rate (%)

= [Peak Demand (MW) / [Power Transformer Capacity (MVA) * 0.9(Power Factor)]]*100

Shwebo City (Township)

Appendix 1

(18) Daily Load curve



Power Facilities

(19) Power Transformer (66/11kV)	-	MVA	-	Nos.	-
(20) Power Transformer (33/11kV)	25	MVA	4	Nos.	Nov.2014
(21) Power Transformer (11/0.4kV)	37	MVA	214	Nos.	Nov.2014
(22) Distribution Line (33kV)	28	km	977	Poles	Nov.2014
(23) Distribution Line (11kV)	232	km	5,100	Poles	Nov.2014
(24) Distribution Line (0.4kV)	213	km	5,848	Poles	Nov.2014
(25) Small Hydropower Generator	-	MW	-	Nos.	-
(26) Diesel Power Generator	-	MW	-	Nos.	-

Distribution Loss Rate

(27) Distribution Loss Rate	29%	2014

Shwebo City (Township)

(28) System Diagram（Location Map)

No information

(29) System Single Line Diagram

No information

(30) Power Facilities

No Photo

Appendix 1

Aungpan City (Town)

Country	Myanmar
Region / State	Shan
District	Taunggyi
Township	Taunggyi, Nyaungshwe, Hopong, Hsihseng, Kalaw, Pindaya, Pekon, Ywangan, Lawksawk, Pinlaung
Town	Kalaw, Aungpan

Photo

Market in Aungpan

Appendix 1

Aungpan City (Town)

General information

(1) Area	6.8 km^2
(2) Population	28 Thousand People
(3) Household	11 Thousand house holds
(4) Village	83 Villages

Industry/Facilities

(5) Main Industry	Agriculture(potato, fruit), distribution of goods
(6) Industrial Zone	—
(7) Special Economic Zone	—
(8) Important Facilities	2 hospitals, 2 markets

Transportation Infrastructure

(9) Airport	—
(10) Railway	Nay Phi Taw – Yamethin －Taunggyi Line Aungban – Loikaw Line (Aungpan Railway Station)
(11) Main Road	Pyi Htaung SuRoad

Power demand

(12) Customer	8,508	customers	Oct.2014
(13) Electrified village	7	villages	Oct.2014
(14) Number of fixing meter	8,105	Nos.	Oct.2014
(15) Electricity Sales	14,523	MWh	Apr.2013 － Mar.2014
(16) Peak demand	3.2	MW	2012
	3.6	MW	2013
	3.8	MW	2014
(17) Capacity utilization rate*	68	%	2014

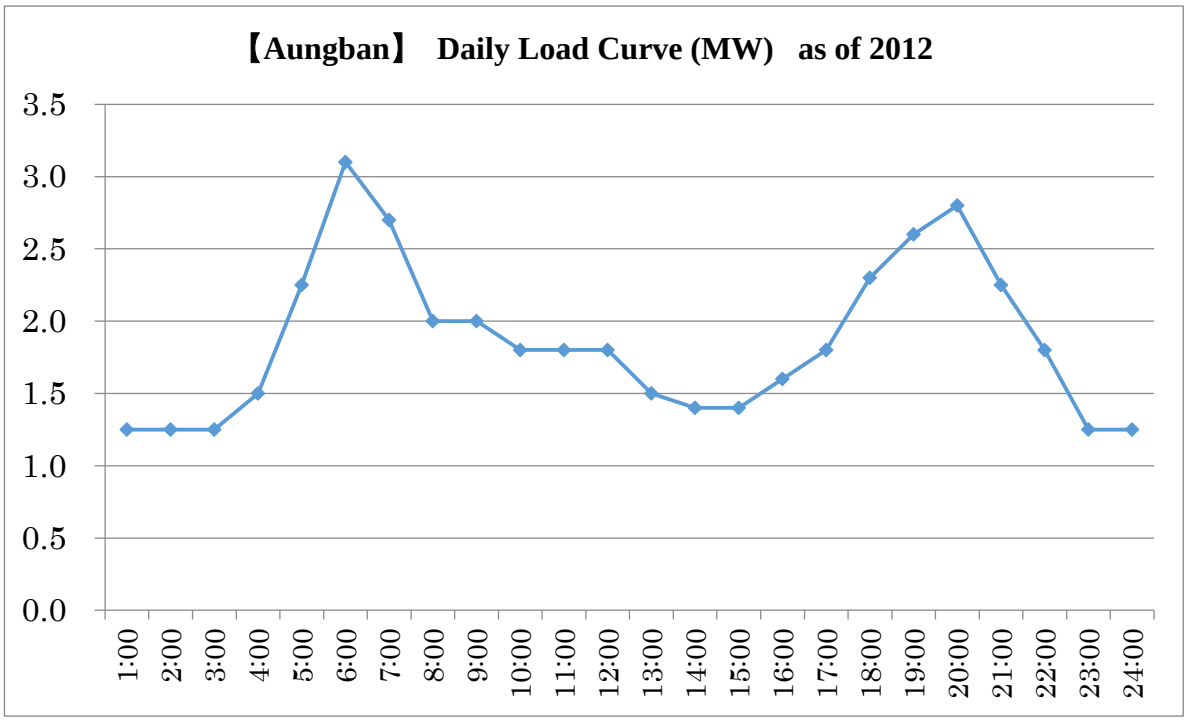
*Capacity utilization rate (%)

= [Peak Demand (MW) / [Power Transformer Capacity (MVA) * 0.9(Power Factor)]]*100

Aungpan City (Town)

Appendix 1

(18) Daily Load curve



Power Facilities

(19) Power Transformer (66/11kV)	5	MVA	1	Nos.	2014
(20) Power Transformer (33/11kV)	—	MVA	—	Nos.	—
(21) Power Transformer (11/0.4kV)	11.19	MVA	71	Nos.	2014
(22) Distribution Line (33kV)	0.5	km	6	Poles	2014
(23) Distribution Line (11kV)	45	km	750	Poles	2014
(24) Distribution Line (0.4kV)	53	km	1,459	Poles	2014
(25) Small Hydropower Generator	—	MW	—	Nos.	—
(26) Diesel Power Generator	—	MW	—	Nos.	—

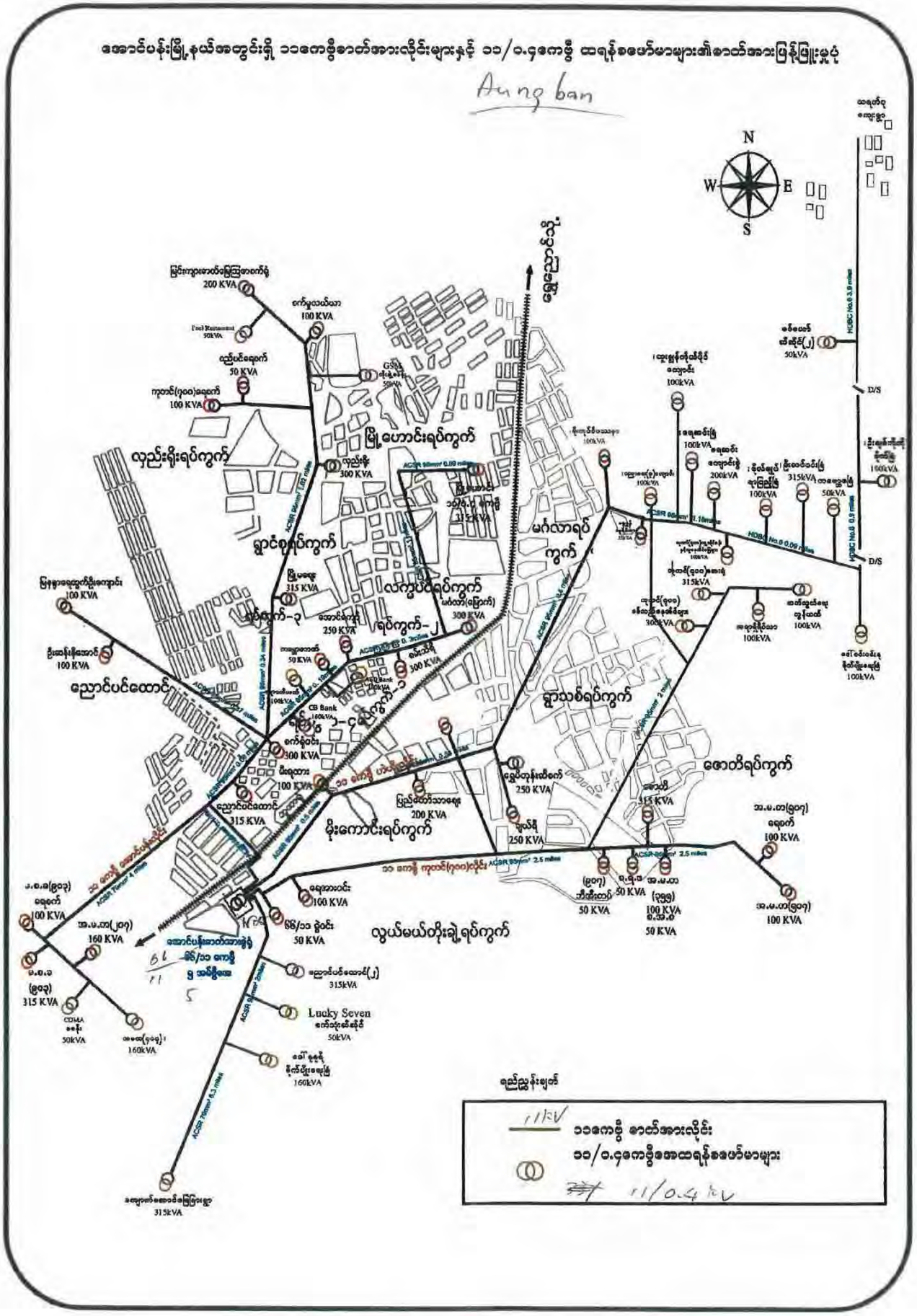
Distribution Loss Rate

(27) Distribution Loss Rate	26.9%	Jul.2014

Appendix 1

Aungpan City (Town)

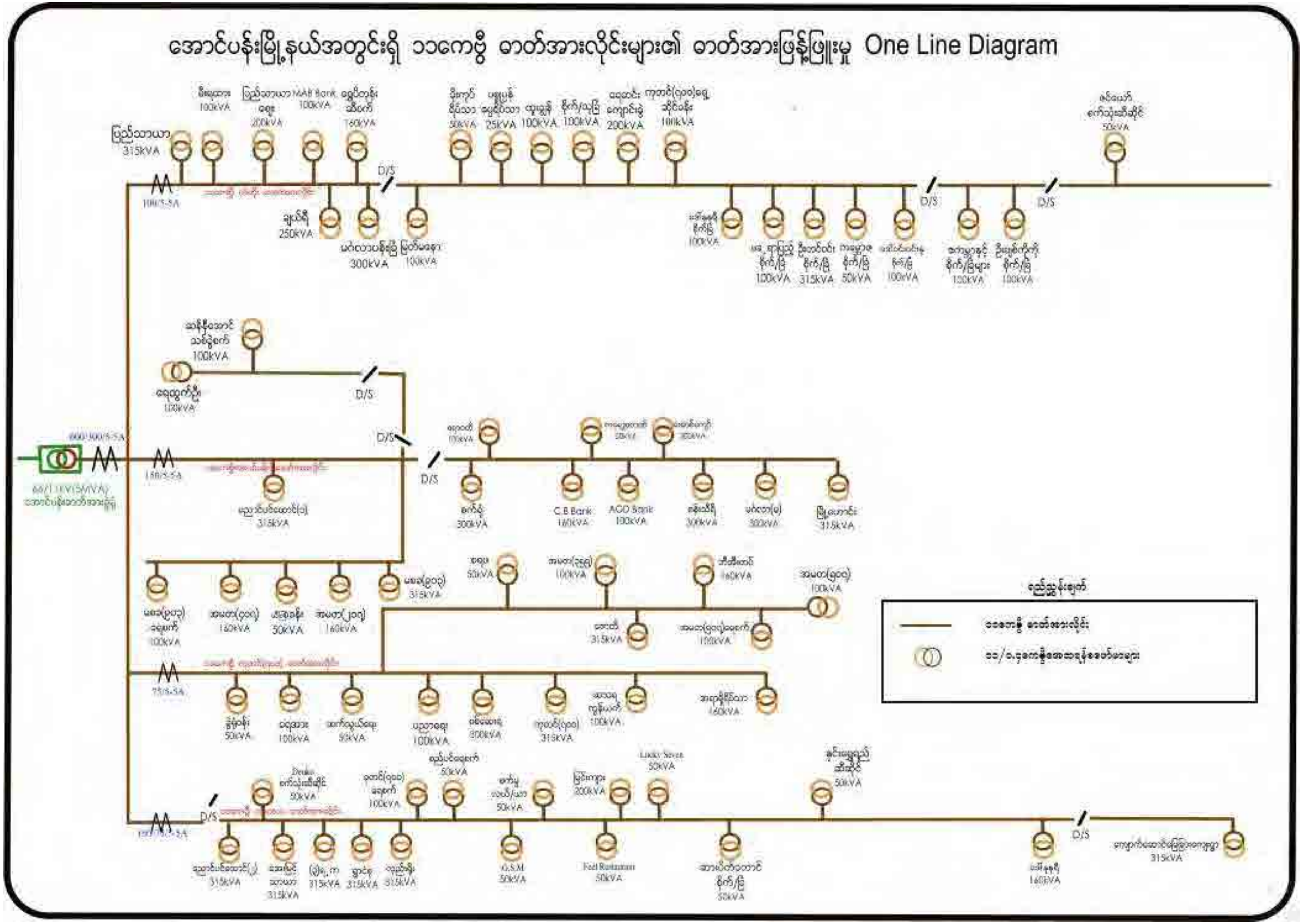
(28) 11kV System Diagram （Location Map)



Appendix 1

Aungpan City (Town)

(29) 11kV System Single Line Diagram



Aungpan City (Town)

(30) Power Facilities

No Photos

Appendix 1

Kengtung City (Township)

Country	Myanmar
Region / State	Shan
District	Kengtung
Township	Kengtung, Mongkhet, Mongyang, Mongla

Photo

Kengtung City Landscape

Appendix 1

Kengtung City (Township)

General information

(1) Area	52 km^2
(2) Population	50 Thousand People
(3) Household	9.8 Thousand house holds
(4) Village	641 Villages

Industry/Facilities

(5) Main Industry	Sightseeing, Forestry industry, Agriculture(rice, sugarcane, cotton), shoemaking
(6) Industrial Zone	—
(7) Special Economic Zone	—
(8) Important Facilities	2 hospitals, 2 markets

Transportation Infrastructure

(9) Airport	Kengtung Airport
(10) Railway	—
(11) Main Road	Tachileik－Kengtung – Taunggyi Road (National Road No.4, Asian Highway 2),Kengtung – Mailar Road(Asian Highway 3)

Power demand

(12) Customer	No data	customers	Oct.2014
(13) Electrified village	179	villages	Oct.2014
(14) Number of fixing meter	9,108	Nos.	Oct.2014
(15) Electricity Sales	13,925	MWh	Apr.2013 － Mar.2014
(16) Peak demand	3.97	MW	2012
	4.50	MW	2013
	5.60	MW	2014
(17) Capacity utilization rate*	77.5	%	2014

* Capacity utilization rate (%)

= [Peak Demand (MW) / [Power Transformer Capacity (MVA) * 0.9(Power Factor)]]*100

Kengtung City (Township)

Appendix 1

(18) Daily Load curve

No DATA

Power Facilities

(19) Power Transformer (66/11kV)	—	MVA	—	Nos.	2014
(20) Power Transformer (33/11kV)	6.5	MVA	6	Nos.	—
(21) Power Transformer (11/0.4kV)	20.4	MVA	121	Nos.	2014
(22) Distribution Line (33kV)	21	km	249	Poles	2014
(23) Distribution Line (11kV)	93	km	1,844	Poles	2014
(24) Distribution Line (0.4kV)	350	km	4,227	Poles	2014
(25) Small Hydropower Generator	—	MW	—	Nos.	—
(26) Diesel Power Generator	—	MW	—	Nos.	—

Distribution Loss Rate

(27) Distribution Loss Rate	19.5%	Oct.2014

Kengtung City (Township)

(28) 11kV System Diagram（Location Map)

No Figure

(29) 11kV System Single Line Diagram

No Figure

(30) Power Facilities

No Photos

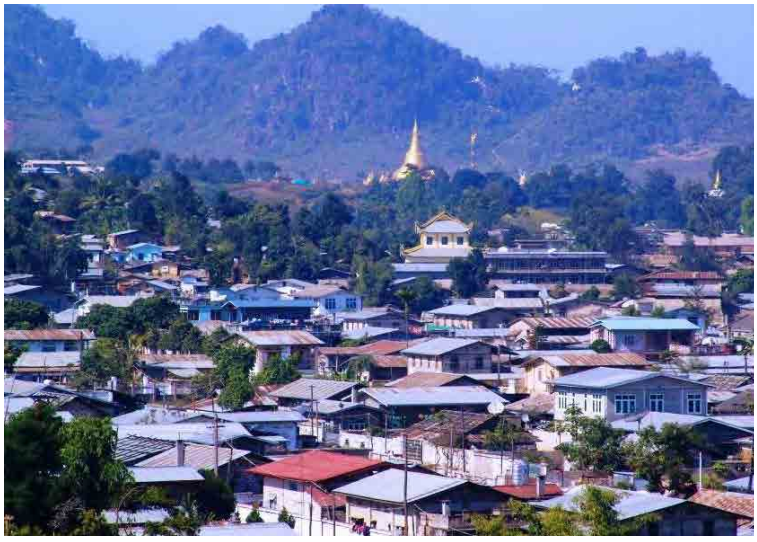
Lashio City (Township)

Appendix 1

Country	Myanmar
Region / State	Shan
District	Lashio
Township	Lashio, Hseni, Mongyai, Tangyan

Photo

Lashio City Landscape



Yan Tine Aung Pagoda in Lashio

Appendix 1

Lashio City (Township)

General information

(1) Area	58 km^2
(2) Population	150 Thousand People
(3) Household	24 Thousand house holds
(4) Village	490 Villages

Industry/Facilities

(5) Main Industry	Border trade (to China), Coal mining
(6) Industrial Zone	—
(7) Special Economic Zone	—
(8) Important Facilities	1 hospital, 1 market

Transportation Infrastructure

(9) Airport	—
(10) Railway	Mandalay－Pyin Oo Lyin － Lashio Line
(11) Main Road	Mandalay－Pyin Oo Lyin –Lashio－Muse Road (National Road No.3)

Power demand

(12) Customer	27,176	customers	.2014
(13) Electrified village	21	villages	Oct.2014
(14) Number of fixing meter	26,376	Nos.	Oct.2014
(15) Electricity Sales	77,178	MWh	Apr.2013 － Mar.2014
(16) Peak demand	16.1	MW	2012
	17.5	MW	2013
	20.0	MW	2014
(17) Capacity utilization rate*	60	%	2014

*Capacity utilization rate (%)

= [Peak Demand (MW) / [Power Transformer Capacity (MVA) * 0.9(Power Factor)]]*100

Appendix 1

Lashio City (Township)

(18) Daily Load curve

No data

Power Facilities

(19) Power Transformer (66/11kV)	5	MVA	1	Nos.	Oct.2014
(20) Power Transformer (33/11kV)	25	MVA	5	Nos.	Oct.2014
(21) Power Transformer (11/0.4kV)	48.76	MVA	256	Nos.	Oct.2014
(22) Distribution Line (33kV)	85	km	1,040	Poles	Oct.2014
(23) Distribution Line (11kV)	95	km	2,534	Poles	Oct.2014
(24) Distribution Line (0.4kV)	350	km	4,227	Poles	Oct.2014
(25) Small Hydropower Generator	—	MW	—	Nos.	—
(26) Diesel Power Generator	—	MW	—	Nos.	—

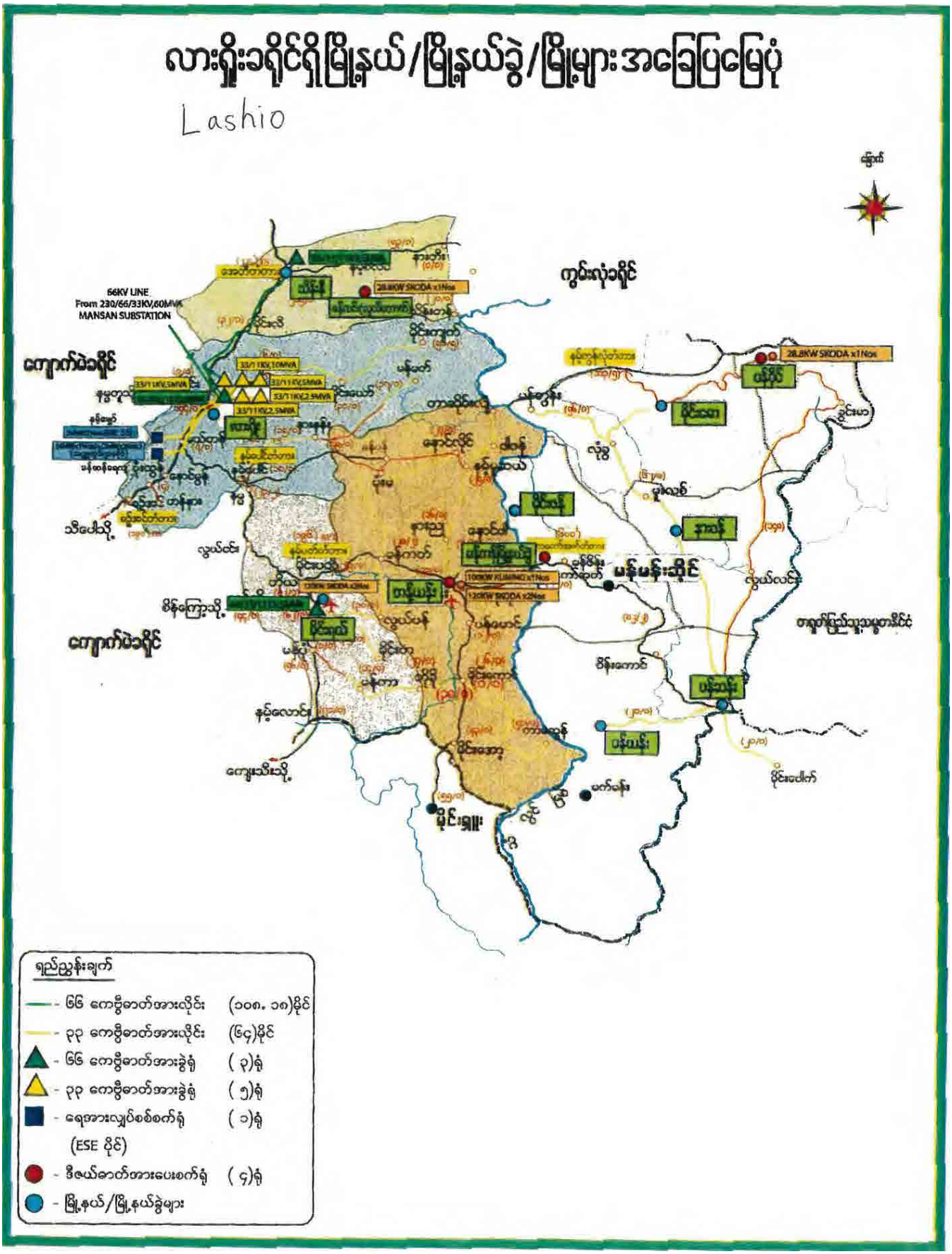
Distribution Loss Rate

(27) Distribution Loss Rate	25.1%	Aug.2014

Appendix 1

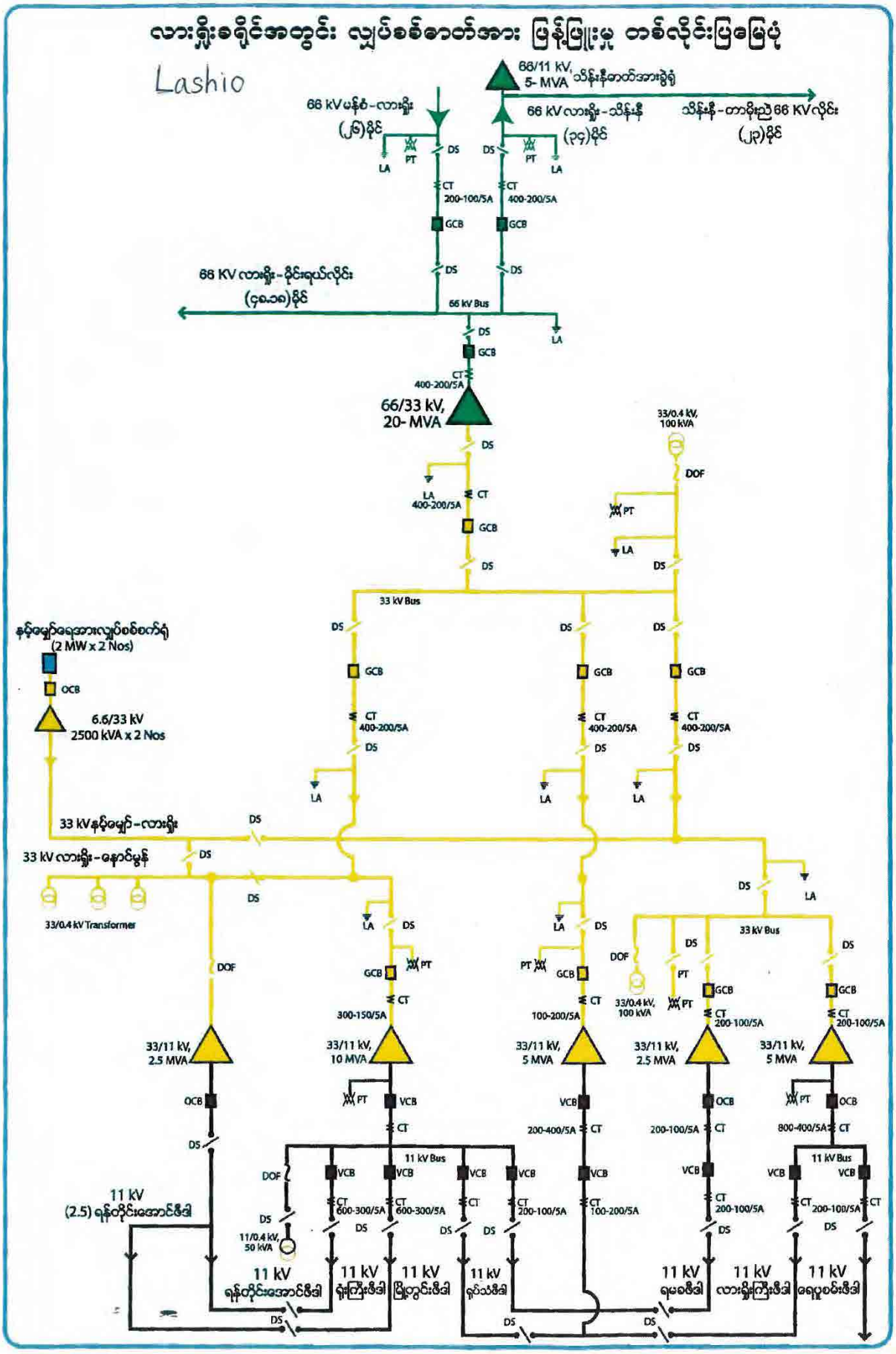
Lashio City (Township)

(28) 11kV System Diagram (Location Map)



Lashio City (Township)

(29) 11kV System Single Line Diagram



Lashio City (Township)

(30) Power Facilities

No Photos

Appendix 1

Taunggyi City (Township)

Country	Myanmar
Region / State	Shan
District	Taunggyi
Township	Taunggyi, Nyaungshwe, Hopong, Hsihseng, Kalaw, Pindaya, Pekon, Ywangan, Lawksawk, Pinlaung

Photo

Taunggyi City Landscape

St. Joseph's Cathedral in Taunggyi

Appendix 1

Taunggyi City (Township)

General information

(1) Area	36 km^2
(2) Population	135 Thousand People
(3) Household	29 Thousand house holds
(4) Village	11 Villages

Industry/Facilities

(5) Main Industry	Automobile Industry, Distribution of agricultural products, ruby, Winery, Sightseeing
(6) Industrial Zone	[Taunggyi IZ] 505 factories, area 3.7 km^2
(7) Special Economic Zone	—
(8) Important Facilities	2 markets

Transportation Infrastructure

(9) Airport	—
(10) Railway	Nay Pyi Taw – Yamethin －Taunggyi Line
(11) Main Road	Tachileik－Kengtung – Taunggyi Road (National Road No.4, Asian Highway 2), Bo Gyoke Aung San Road, Ashae Myo Pet Road, Anout Myo Pet Road

Social Environment (search for only candidate cities)

(a) Schools (No.)	309	Primary	Secondary	High	Monastery
		227	42	30	10
(b) University and Colleges (No.)	8	Representative School			
		Taunggyi University, Computer University			
(c) Health Care facilities (No)	93	Government Hospital	Private Health center	Government dispensary	Private dispensary
		7	5	36	45

Power demand

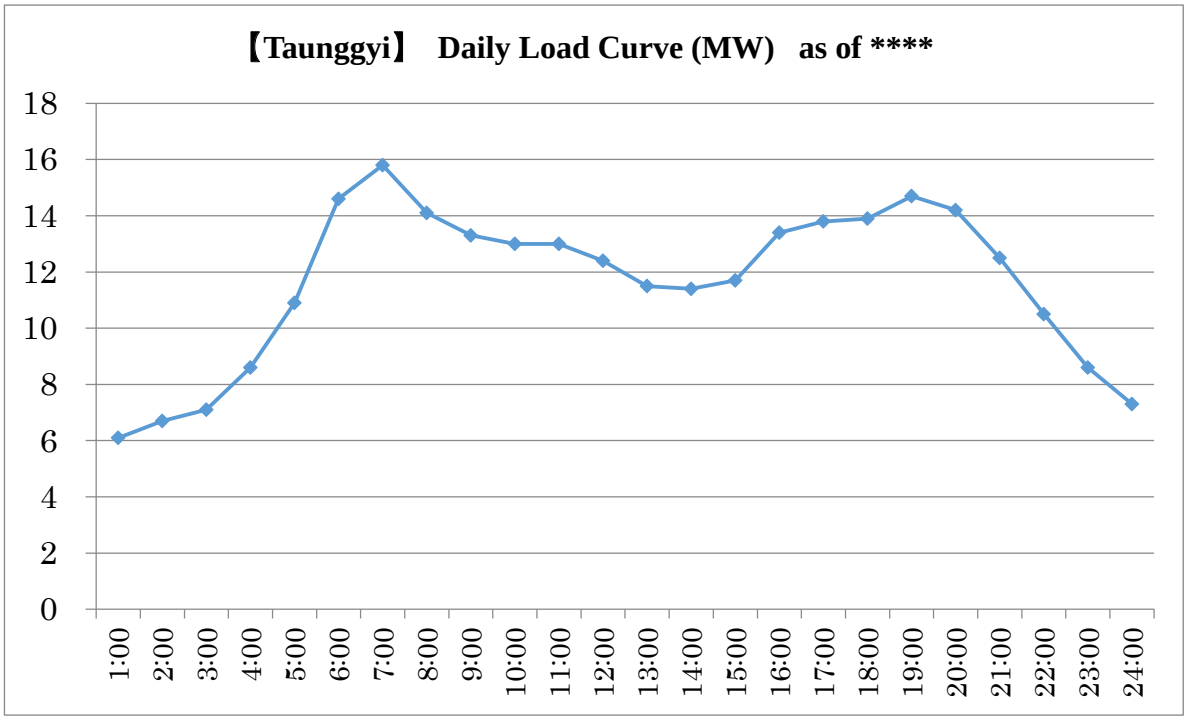
(12) Customer	30,583	customers	Oct.2014
(13) Electrified village	6	villages	Oct.2014
(14) Number of fixing meter	30,583	Nos.	Oct.2014
(15) Electricity Sales	67,942	MWh	Apr.2013 － Mar.2014
(16) Peak demand	16.0	MW	2012
	18.0	MW	2013
	20.0	MW	2014
(17) Capacity utilization rate*	45	%	2014

*Capacity utilization rate (%)
= [Peak Demand (MW) / [Power Transformer Capacity (MVA) * 0.9(Power Factor)]]*100

Taunggyi City (Township)

Appendix 1

(18) Daily Load curve



Power Facilities

(19) Power Transformer (66/11kV)	10	MVA	1	Nos.	—
(20) Power Transformer (33/11kV)	30	MVA	3	Nos.	Oct.2014
(21) Power Transformer (11/0.4kV)	46.575	MVA	208	Nos.	Oct.2014
(22) Distribution Line (33kV)	23	km	292	Poles	Oct.2014
(23) Distribution Line (11kV)	102	km	2,517	Poles	Oct.2014
(24) Distribution Line (0.4kV)	321	km	2,100	Poles	Oct.2014
(25) Small Hydropower Generator	—	MW	—	Nos.	—
(26) Diesel Power Generator	—	MW	—	Nos.	—

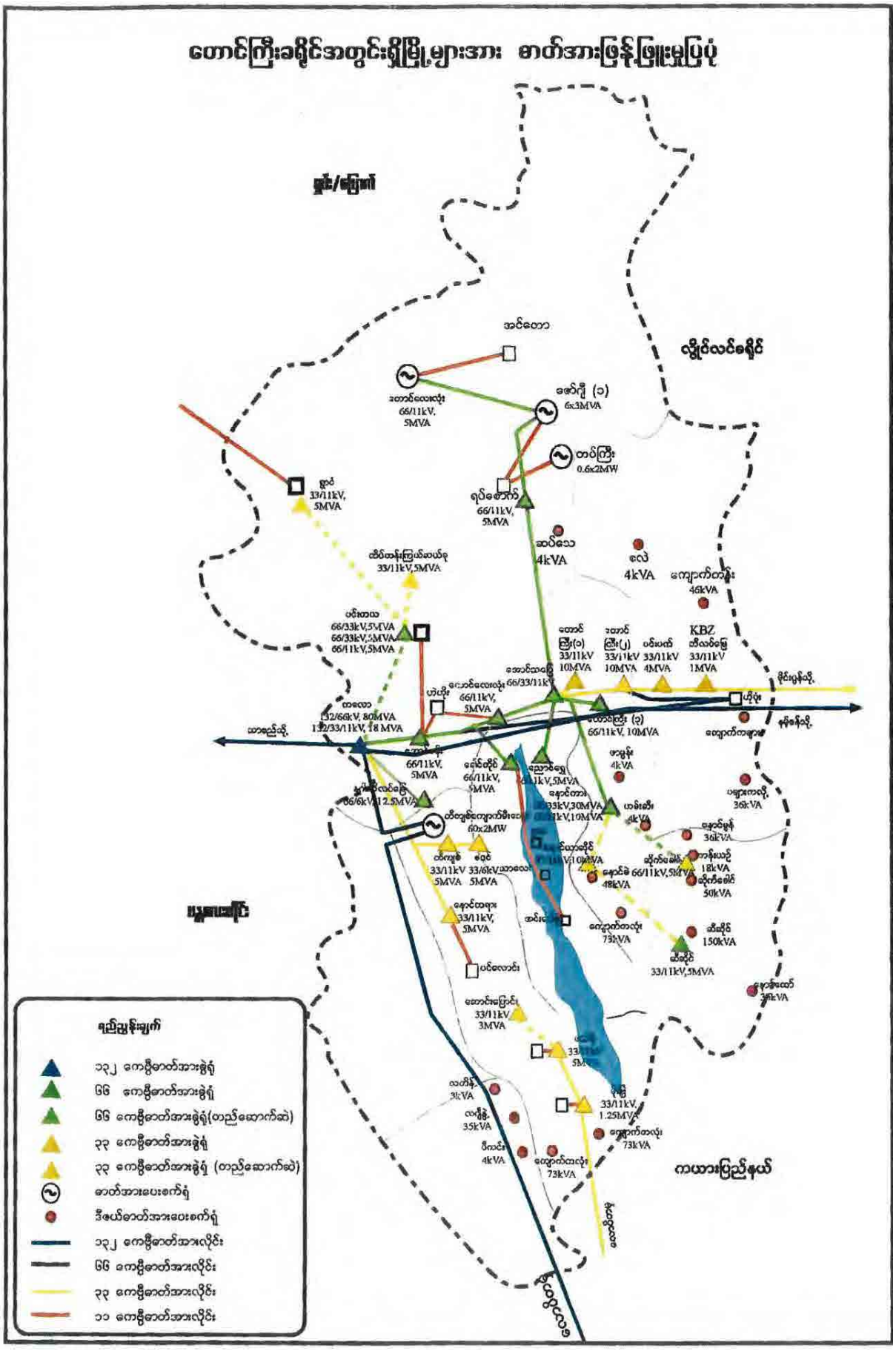
Distribution Loss Rate

(27) Distribution Loss Rate	24.7%	Sep.2014

Appendix 1

Taunggyi City (Township)

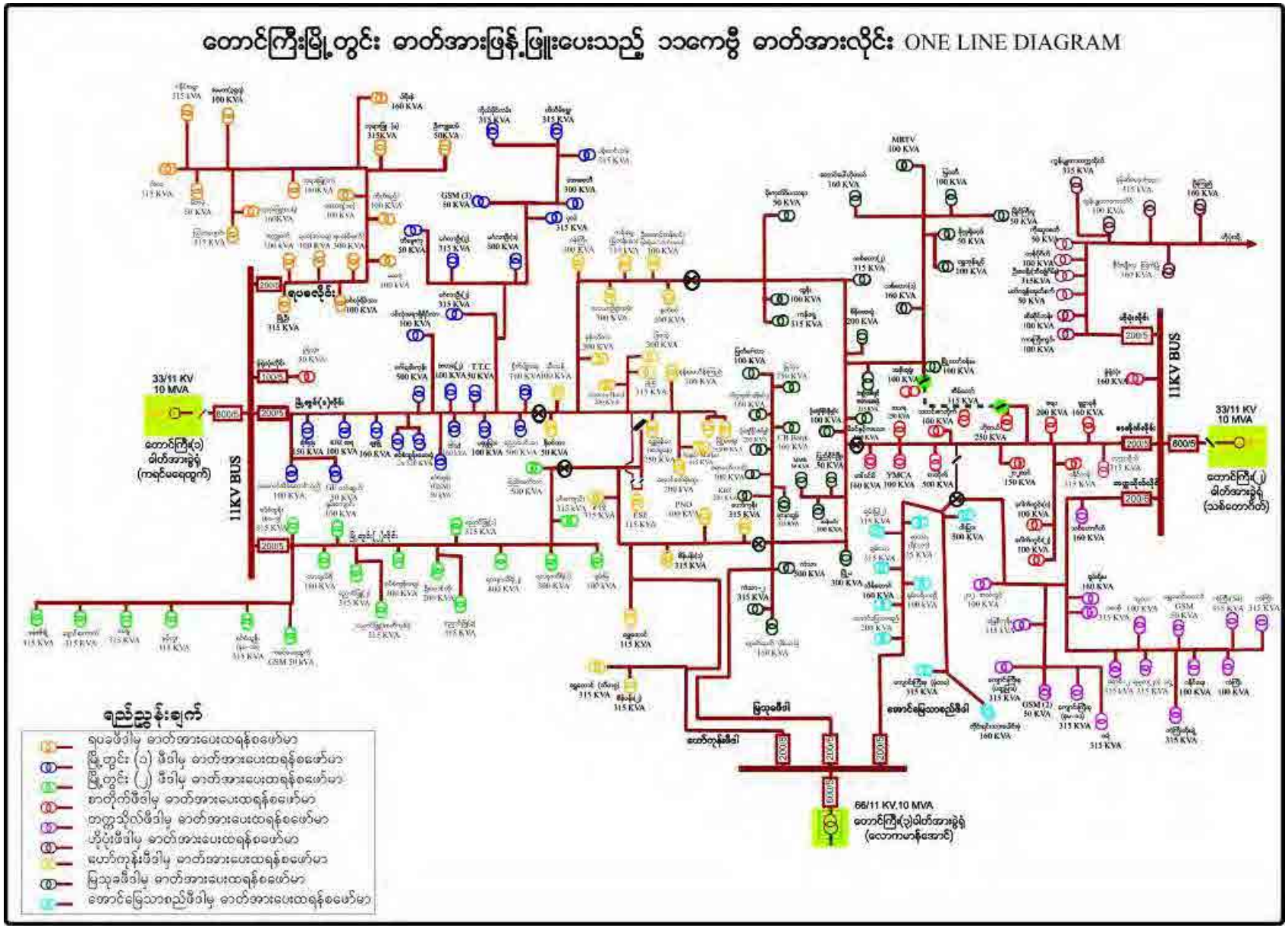
(28) 11kV System Diagram （Location Map)



Appendix 1

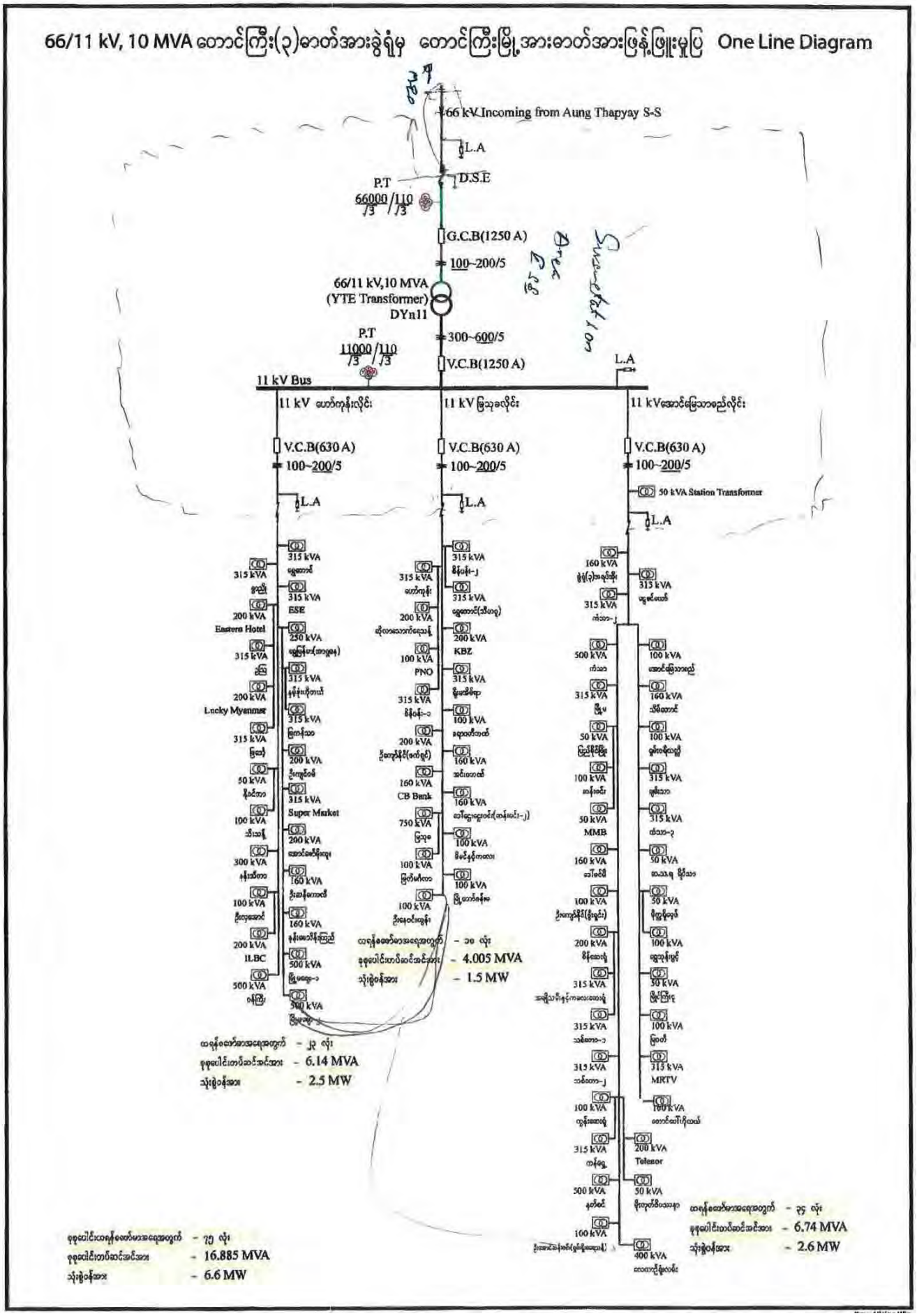
Taunggyi City (Township)

(29) 11kV System Single Line Diagram



Taunggyi City (Township)

Appendix 1



Taunggyi City (Township)

(30) Power Facilities

66kV/33kV Aung Sa Pye Substation

Taunggyi No.1 Substation (33/11kV, 10MVA)

Taunggyi No.2 Substation (33/11kV, 12MVA)

Hopone Substation (33/11kV, 5MVA)

Taunggyi No.3 Substation (66/11kV, 10MVA)

11/0.4kV Transformer in Taunggyi City

Dawei City (Township)

Appendix 1

Country	Myanmar
Region / State	Tanintharyi
District	Dawei
Township	Dawei, Launglon, Thayetchaung Yebyu

Photo

Dawei Airport

Maungmagan Beach

Dawei City Landscape

Dawei City (Township)

Appendix 1

General information

(1) Area	18 km^2
(2) Population	120 Thousand People
(3) Household	19 Thousand house holds
(4) Village	57 Villages

Industry/Facilities

(5) Main Industry	Agriculture (rice, coconut, durian, areca), Fishery
(6) Industrial Zone	—
(7) Special Economic Zone	[Planned] Dawei SEZ
(8) Important Facilities	1 local government, 1 military

Transportation Infrastructure

(9) Airport	Dawei Airport
(10) Railway	Yangon-Mawlamyaing-Dawei Line (Dawei station)
(11) Main Road	Yangon-Dawei-Myeik Road (National Road No.8)

Social Environment (search for only candidate cities)

(a) Schools (No.)	104	Primary	Secondary	High	Monastery
		90	3	7	4
(b) University and Colleges (No.)	3	Representative School			
		Dawei University, Dawei Education College			
(c) Health Care facilities (No)	26	Government Hospital	Private Hospital	Government dispensary	Private dispensary
		2	2	22	-

Power demand

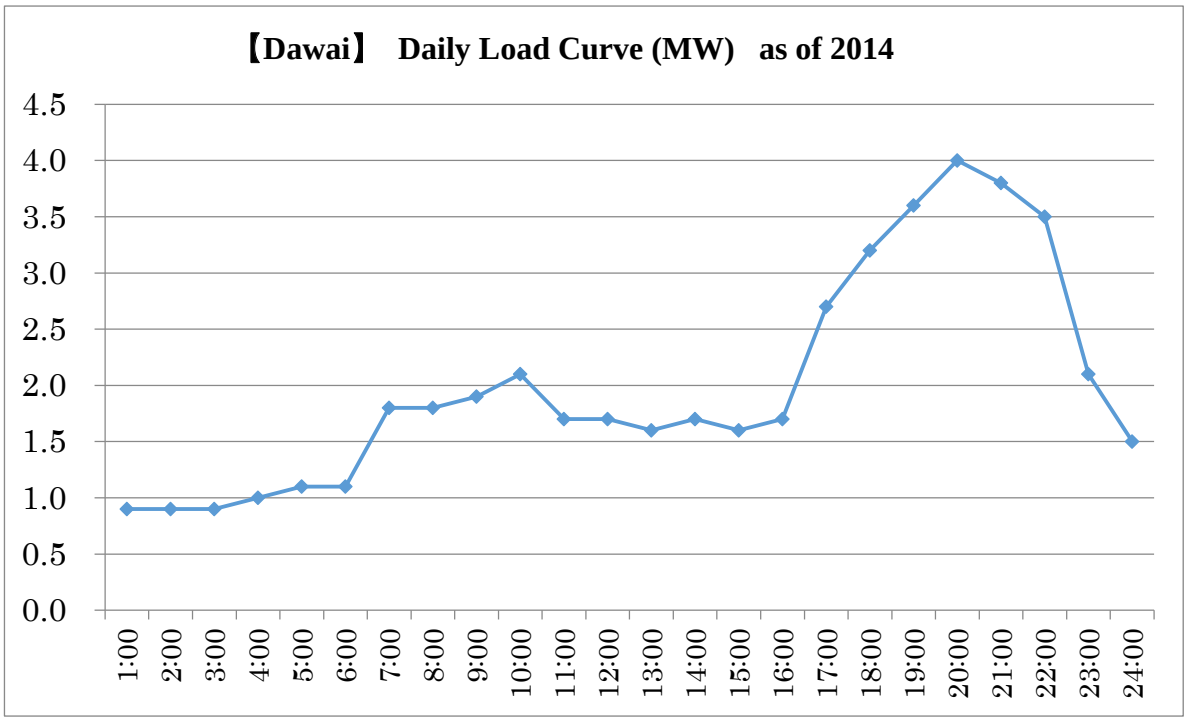
(12) Customer	11,512	customers	2014
(13) Electrified village	19	villages	2014
(14) Number of fixing meter	11,512	Nos.	2014
(15) Electricity Sales	12,603	MWh	APR.2013 - MAR.2014
(16) Peak demand	3.1	MW	2012
	3.5	MW	2013
	4.5	MW	8th NOV.2014
(17) Capacity utilization rate*	44.7	%	Nov.2014

*Capacity utilization rate (%)
= [Peak Demand (MW) / [Power Transformer Capacity (MVA) * 0.9(Power Factor)]]*100

Dawei City (Township)

Appendix 1

(18) Daily Load curve



Power Facilities

(19) Power Transformer (66/11kV)	—	MVA	—	Nos.	—
(20) Power Transformer (33/11kV)	—	MVA	—	Nos.	—
(21) Power Transformer (11/0.4kV)	11.2	MVA	40	Nos.	2014
(22) Distribution Line (33kV)	—	km	—	Poles	—
(23) Distribution Line (11kV)	45	km	625	Poles	2014
(24) Distribution Line (0.4kV)	76	km	1,946	Poles	2014
(25) Small Hydropower Generator	0	MW	0	Nos.	—
(26) Diesel Power Generator	0	MW	0	Nos.	—

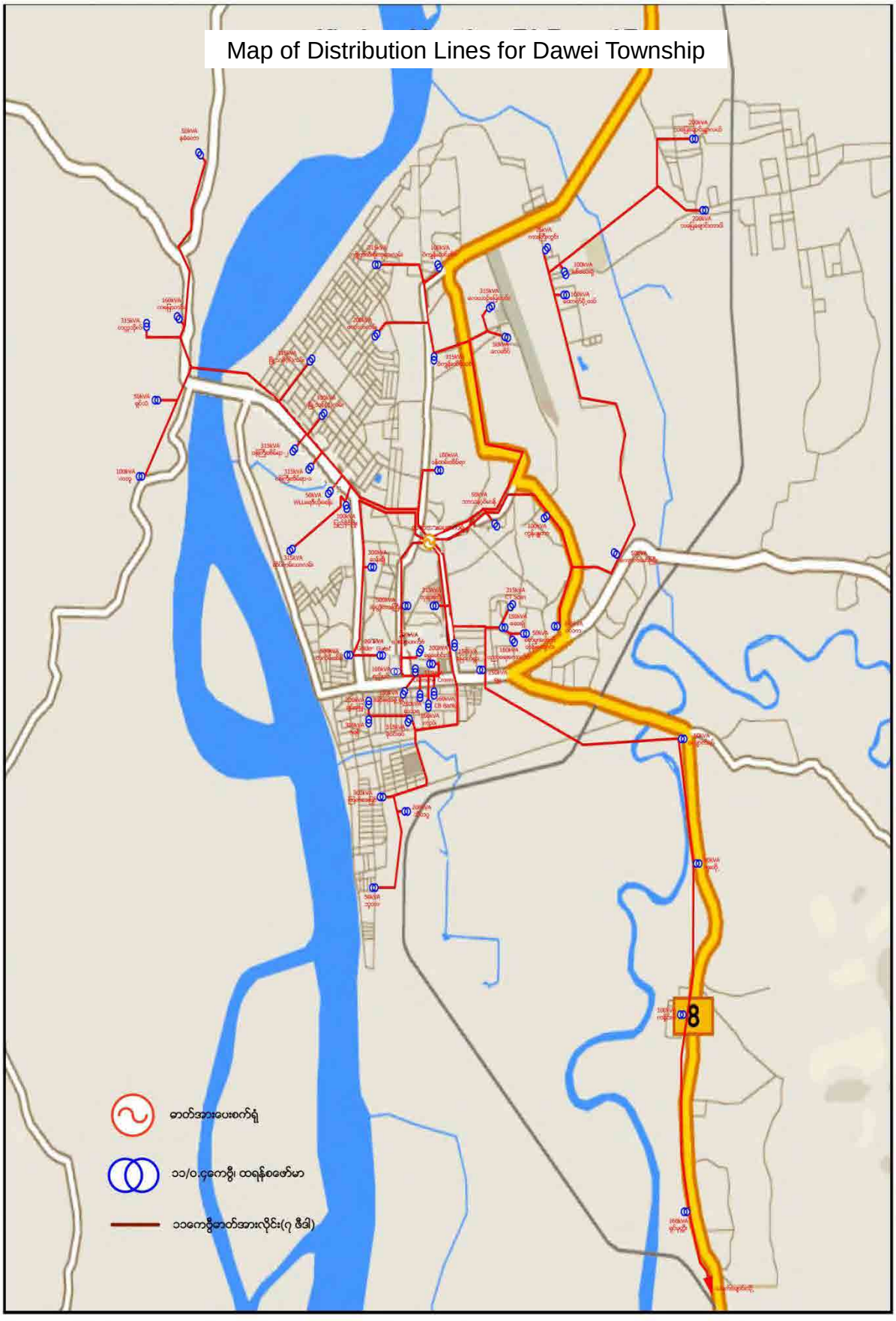
Distribution Loss Rate

(27) Distribution Loss Rate	19 %	2014

Dawei City (Township)

Appendix 1

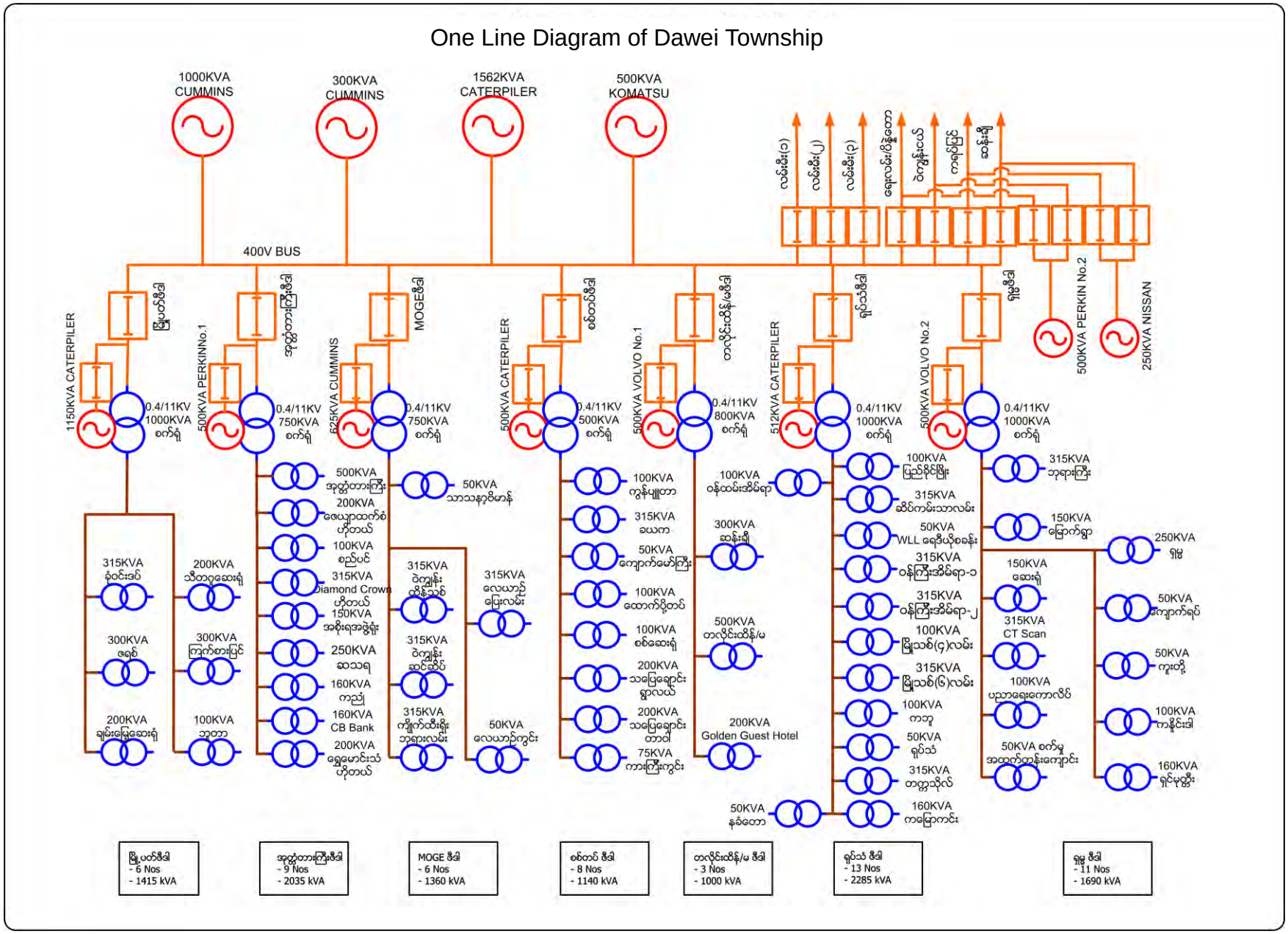
(28) 11kV System Diagram （Location Map)



Appendix 1

Dawei City (Township)

(29) Diesel Generators and 11kV System Single Line Diagram



Dawei City (Township)

(30) Power Facilities

Generator Building

Stocked transformers in ESE Division Office

Diesel Generators near ESE Division Office

0.4/11kV Transformers & 11kV Outgoing Lines

Distribution Lines on a Street

Aged 11/0.4kV Transformer on H-Style Pole

Appendix 1

Myeik City (Township)

Country	Myanmar
Region / State	Tanintharyi
District	Myeik
Township	Myeik, Kyunsu, Palaw, Tanintharyi

Photo

Myeik City Landscape

Appendix 1

Myeik City (Township)

General information

(1) Area	52 km^2
(2) Population	230 Thousand People
(3) Household	43 Thousand house holds
(4) Village	140 Villages

Industry/Facilities

(5) Main Industry	Fishery, Fishery Processing, Agriculture(rubber, coconuts,etc.)
(6) Industrial Zone	—
(7) Special Economic Zone	—
(8) Important Facilities	2 hospitals, 1 local government, 1 military

Transportation Infrastructure

(9) Airport	Myeik Airport
(10) Railway	[Planed] Dawei – Myeik Line
(11) Main Road	Yangon-Dawei-Myeik Road (National Road No.8)

Power demand

(12) Customer	16,856	customers	2014
(13) Electrified village	27	villages	2014
(14) Number of fixing meter	16,856	Nos.	2014
(15) Electricity Sales	11,560	MWh	APR.2013 - MAR.2014
(16) Peak demand	2.8	MW	2012
	3.1	MW	2013
	3.8	MW	2014
(17) Capacity utilization rate*	42.2	%	Nov.2014

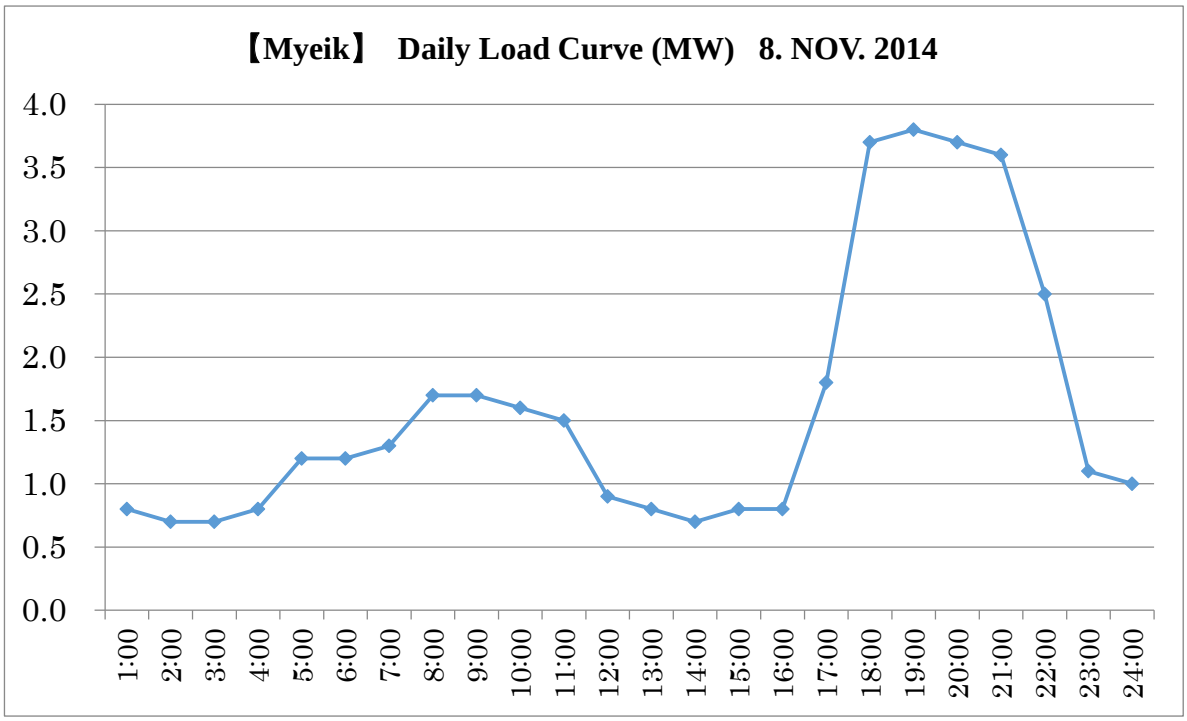
*Capacity utilization rate (%)

= [Peak Demand (MW) / [Power Transformer Capacity (MVA) * 0.9(Power Factor)]]*100

Myeik City (Township)

Appendix 1

(18) Daily Load curve



Power Facilities

(19) Power Transformer (66/11kV)	—	MVA	—	Nos.	—
(20) Power Transformer (33/11kV)	—	MVA	—	Nos.	—
(21) Power Transformer (11/0.4kV)	10.0	MVA	50	Nos.	2014
(22) Distribution Line (33kV)	—	km	—	Poles	—
(23) Distribution Line (11kV)	36	km	580	Poles	2014
(24) Distribution Line (0.4kV)	34	km	1,741	Poles	2014
(25) Small Hydropower Generator	0	MW	0	Nos.	—
(26) Diesel Power Generator	0	MW	0	Nos.	—

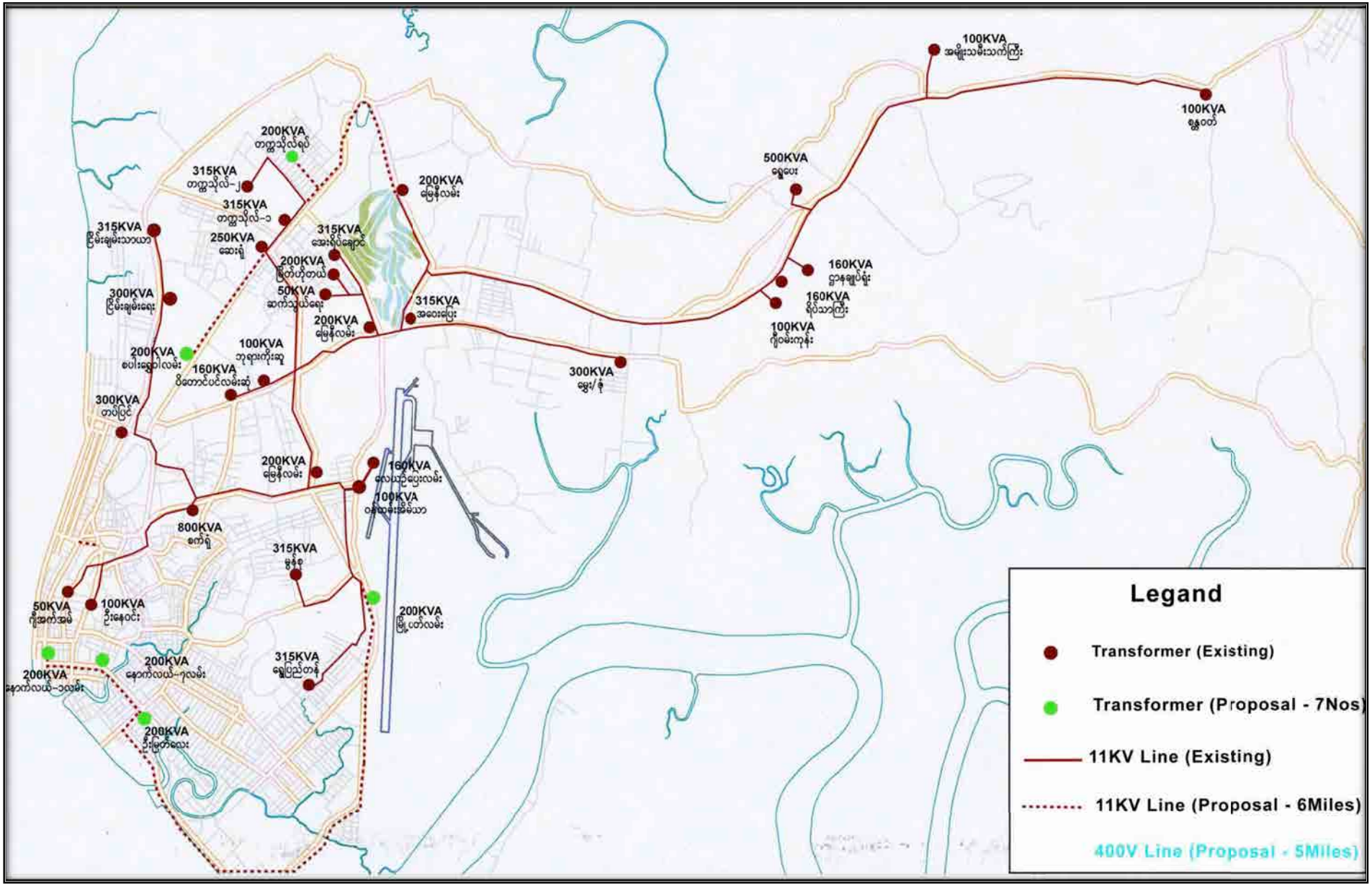
Distribution Loss Rate

(27) Distribution Loss Rate	19 %	2014

Appendix 1

Myeik City (Township)

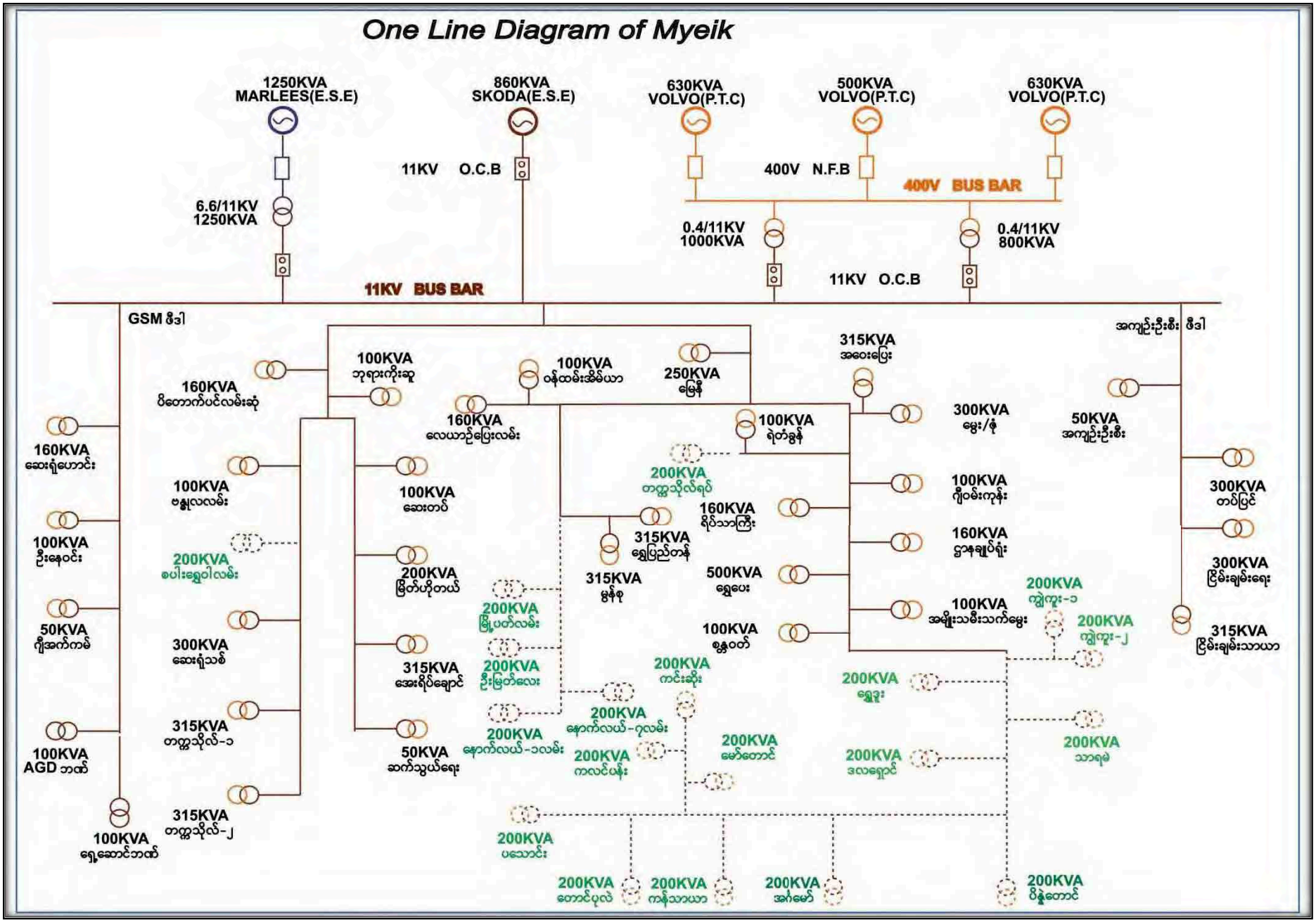
(28) 11kV System Diagram （Location Map)



Myeik City (Township)

Appendix 1

(29) Diesel Generators and 11kV System Single Line Diagram



Myeik City (Township)

(30) Power Facilities

No Photos

Appendix 2

Detailed Results of Demand Forecast

(1) Pathein (Ayeyarwady Region)

1) Power demand trend

In Pathein District, the capital of Ayeyarwady Region situated in the southwest part of Myanmar, the peak demand for power in 2014 was 31.9MW. The increase of power demand over the 5-year period from 2012 is as shown in Table 1. Power demand in this district is increasing every year, and the average increasing rate is 12.8% annually.

Table 1: The increasing rate in power demand over the 5-year period (Pathein)

Year	Peak demand	Increasing rate
2010	19.8 MW	-
2011	20.4 MW	3.0%
2012	23.2 MW	13.7%
2013	26.4 MW	13.8%
2014	31.9 MW /21.0MW(Pathein Township)	20.8%

Prepared by the Survey Team based on ESE information

2) Development plan

The port at the river mouth in Pathein District is a logistics hub, and its port development is at an advanced level. As a future plan, Pathein deep water port is planned. Construction of a special economic zone (Myanmar Super Axis SEZ) is planned for the district as well.

3) Power demand forecast

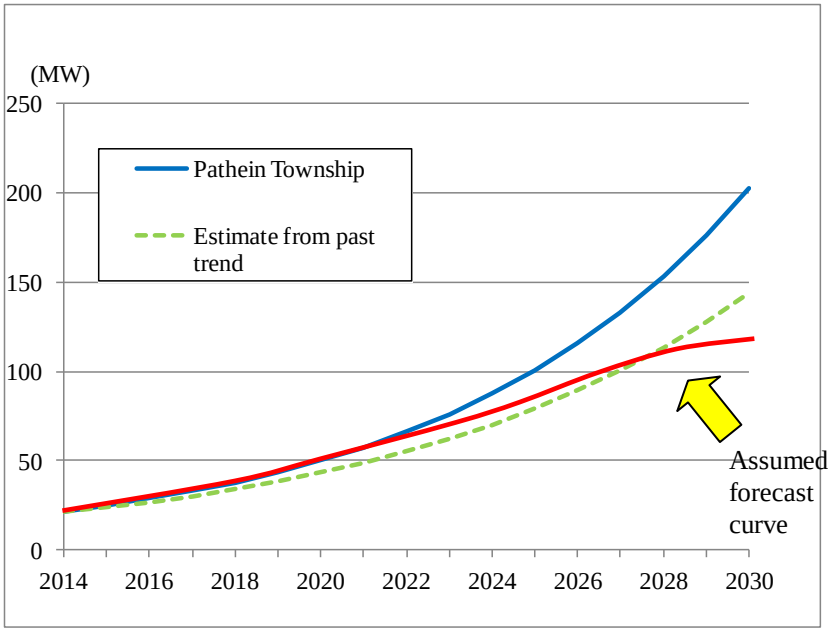
In the forecasting method used by ESE, power demand is forecast assuming the annual increase in power demand by 15%. According to the forecast, the maximum power demand as of 2020 is estimated to be about 50MW in Pathein Township. On the other hand, there is another estimate that the future demand growth keep increasing by 18.2% of past average growth ratio by 2020.

The Survey team assumes the demand is expected to saturate, which is shown in red because the power supply can not easily meet the huge demand after 2020 also there is no large scale demand enough to increase demand up to this level.

Table 2: Result of demand forecast from interview in each substation (Pathein)

Substation Name	Power Demand (MW)					
	2015	2016	2017	2018	2019	2020
Downtown (66/11kV)	11.3	13.0	14.9	14.6	16.8	11.4
Myat Toe (66/11kV)	9.6	11.0	12.7	17.1	19.6	18.6
Kanni (66/11kV)	3.1	3.5	3.0	3.4	3.9	3.5
Chaung Thar (66/11kV)	1.0	1.2	1.3	1.5	1.7	2.0
Ngwesaung (66/11kV)	-	-	1.0	1.2	1.3	1.5
New site (66/11kV)	-	-	-	-	-	6.0
New site (66/11kV)	-	-	-	-	-	7.0

Prepared by the Survey Team



Prepared by the Survey Team

Figure 1: Power Demand Forecast (2015-2030) (Pathein)

(2) Bago (Bago Region)

1) Power demand trend

In Bago Township, urban area of the capital of Bago Region situated in the central part of Myanmar, the peak demand for power in 2014 was 21.79MW, which was recorded on November 13, 2014. The increases in power demand over the 5-year period from 2010 are as shown in Table 3. Power demand in this Township is increasing every year, and the average increasing rate is 8.1% annually.

Table 3: The increasing rate in power demand over the 5-year period (Bago)

Year	Peak demand	Increasing rate
2010	16.00 MW	-
2011	16.70 MW	4.4%
2012	17.50 MW	4.8%
2013	19.70 MW	12.6%
2014	21.79 MW	10.6%

Prepared by the Survey Team based on ESE information

3) Development plan

The District is included in the Tourism Master Plan, and the demand for power is expected to increase in the future due to expansion of the tourism industry. Major development plans for the area include a plan for a highway between Yangon and Mandalay, a railway implementation plan, a new international airport implementation plan and an industrial zone development plan.

4) Power demand forecast

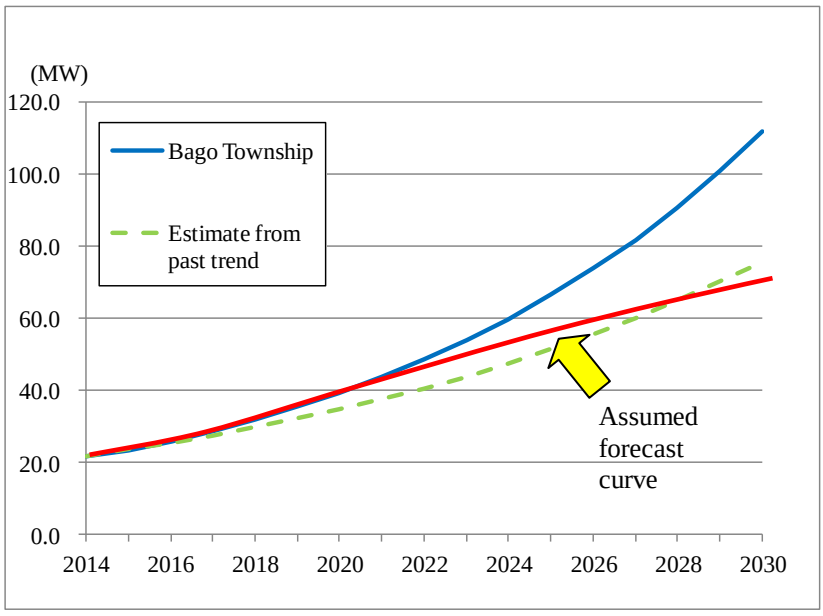
ESE has set its ratio as 11%, based on this value, future power demand is calculated as 39.4MW in 2020, 116MW in 2030 in Bago Township. On the other hand, power demands for 2020 and 2030 are estimated by calculation with 8.1% of past average growth ratio.

The Survey team assumes that the demand forecast curve after 2020 should approach to the curve estimated by the growth ratio of 8.1% in red and finally saturate because the huge demand is not expected to arise continuously after 2020.

Table 4: Result of demand forecast from interview in each substation (Bago)

Substation Name	Power Demand (MW)					
	2015	2016	2017	2018	2019	2020
Substation(1) (33/11kV)	12.7	14.0	18.1	20.1	22.3	16.3
Substation(2) (33/11kV)	5.8	6.4	7.1	7.9	8.8	9.8
Substation(3) (33/11kV)	2.4	2.7	3.0	3.3	3.7	4.1
Substation(4) (33/11kV)	2.5	2.8	3.1	3.4	3.8	4.2
Substation(5) (33/11kV)	-	-	-	-	-	5.0

Prepared by the Survey Team



Prepared by the Survey Team

Figure 2: Power Demand Forecast (2015-2030) (Bago)

(3) Pyay (Bago Region)

1) Power demand trend

In Pyay District, the one of major city of Bago Region situated in the central part of Myanmar, the peak demand for power in 2014 was 12.3MW. The increases in power demand over the 3-year period from 2012 are as shown in Table 5. Demand for power in this district is increasing every year, and the average increasing rate is 6.79 % annually.

Table 5: The increasing rate in power demand over the 3-year period (Pyay)

Year	Peak demand	Increasing rate
2012	9.60 MW	-
2013	10.00 MW	4.17 %
2014	12.30 MW	23.0 %

Prepared by the Survey Team based on ESE information

2) Development plan

As a large-scale facility whose demand for power is relatively large, the existing industrial zone (Pyay IZ) must be mentioned. The main development plan for this area includes a highway plan that connects Pyay to Nay Pyi Taw via Taungoo.

3) Power demand forecast

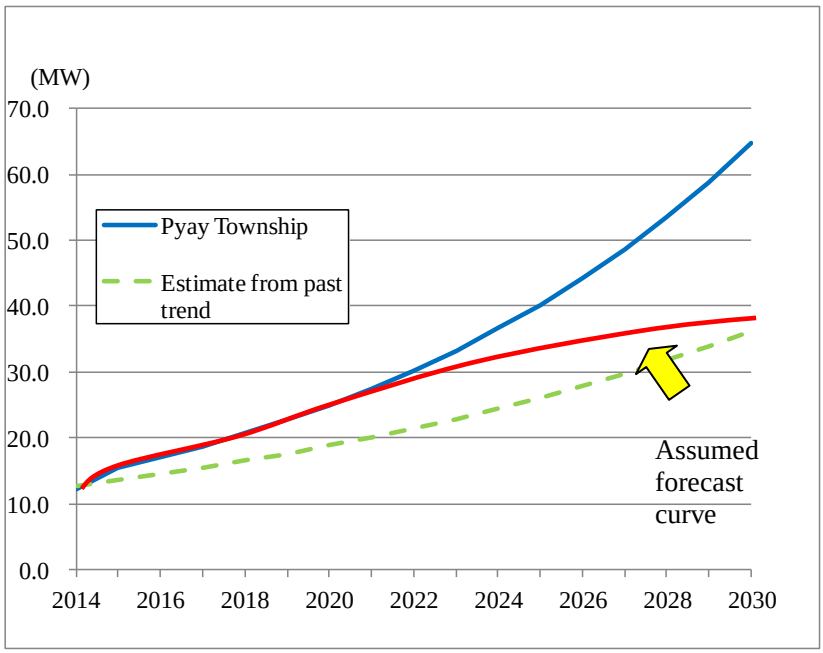
ESE has forecast power demand of 2020 and 2030 as 26.2MW and 64.7MW in Pyay Township by setting growth ratio of 11%. On the other hand, there is another demand forecast estimated by calculation with 6.8% of past average growth ratio.

The Survey team assumes that the demand forecast curve after 2020 should approach to the curve estimated by the growth ratio of 6.8% and finally saturate, which is shown in red because the huge demand is not expected to arise continuously after 2020.

Table 6: Result of demand forecast from interview in each substation (Pyay)

Substation Name	Power Demand (MW)					
	2015	2016	2017	2018	2019	2020
Pyay（66/11kV）	15.8	14.2	13.9	15.7	17.7	20.1
Wettigan (33/11kV)	-	4.0	4.7	5.3	6.0	6.8
Min Gyi Taung (66/11kV)	-	-	2.0	2.3	2.6	2.9

Prepared by the Survey Team



Prepared by the Survey Team

Figure 3: Power Demand Forecast (2015-2030) (Pyay)

(4) Bhamo (Kachin State)

1) Power demand trend

In the Township of Bhamo District in Kachin State situated in the Northern part of Myanmar, the peak demand for power in 2014 was 5.3MW. The increases in power demand over the 2-year period from 2013 are as shown in Table 7. The demand increasing rate is 29.0% from 2013 to 2014.

Table 7: The increasing rate in power demand over the 2-year period (Bhamo)

Year	Peak demand	Increasing rate
2013	4.1MW	-
2014	5.3MW	29.0%

Prepared by the Survey Team based on ESE information

2) Development plan

The following urban development plans can be listed as anticipating relatively large-scale future demand for power.

	Main development plans
a)	Development of the area as a logistics hub for China, India and Myanmar and construction of an industrial zone are planned.
b)	Implementation plan for Myitkyina-Bhamo-Momeik-Kyaukme-Thibaw-Laihka-Namhsan railway

3) Power demand forecast

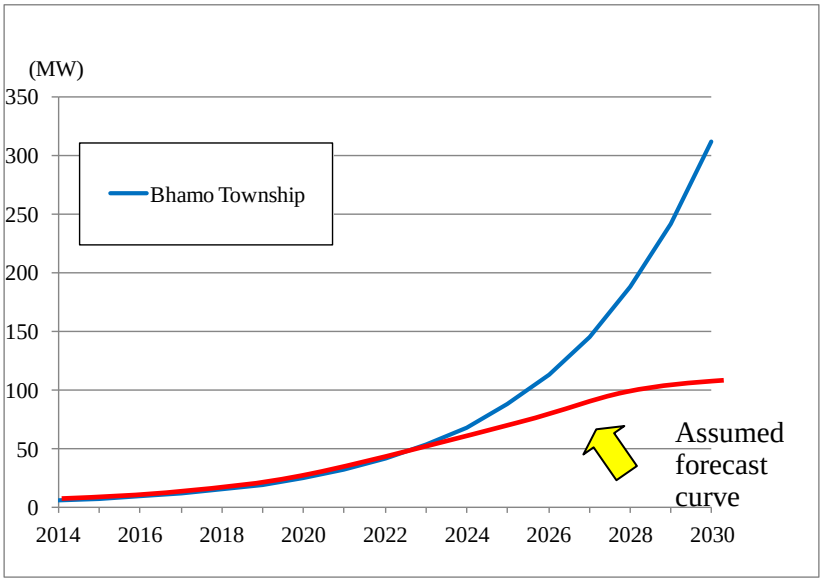
ESE has forecast power demand of 2020 and 2030 as 25.4MW and 312MW for Bhamo Township by assuming annual growth ratio by 29.0%.

The Survey team assumes that the demand forecast curve after 2020 should saturate shown in red even though this city is expected to be a hub for China and need large demand in the future.

Table 8: Result of demand forecast from interview in each substation (Bhamo)

Substation Name	Power Demand (MW)					
	2015	2016	2017	2018	2019	2020
Bhamo (66/11kV)	5.9	7.7	10.0	8.9	11.6	15.0
Sint Khan (66/11kV)	1.0	1.3	1.7	2.2	2.8	3.7
Hante (66/11kV)	-	-	-	4.0	5.2	6.7

Prepared by the Survey Team



Prepared by the Survey Team

Figure 4: Power Demand Forecast (2015-2030) (Bhamo)

(5) Loikaw (Kayah State)

1) Power demand trend

In Township of Loikaw District, the capital of Kayah State situated in the Eastern part of Myanmar, the peak demand for power in 2014 was 8.11MW, which was recorded on November 16, 2014. The increases in power demand over the 5-year period from 2010 are as shown in Table 9. Demand for power in this Township is increasing every year, and the average increasing rate is 11.5% annually.

Table 9: The increasing rate in power demand over the 5-year period (Loikaw)

Year	Peak demand	Increasing rate
2010	5.30 MW	-
2011	5.94 MW	12.1 %
2012	6.31 MW	6.2 %
2013	6.57 MW	4.1 %
2014	8.11 MW	23.4 %

Prepared by the Survey Team based on ESE information

2) Development plan

Loikaw District is targeted in the Tourism Master Plan, so demand for power in the tourism sector will increase in the future as well.

3) Power demand forecast

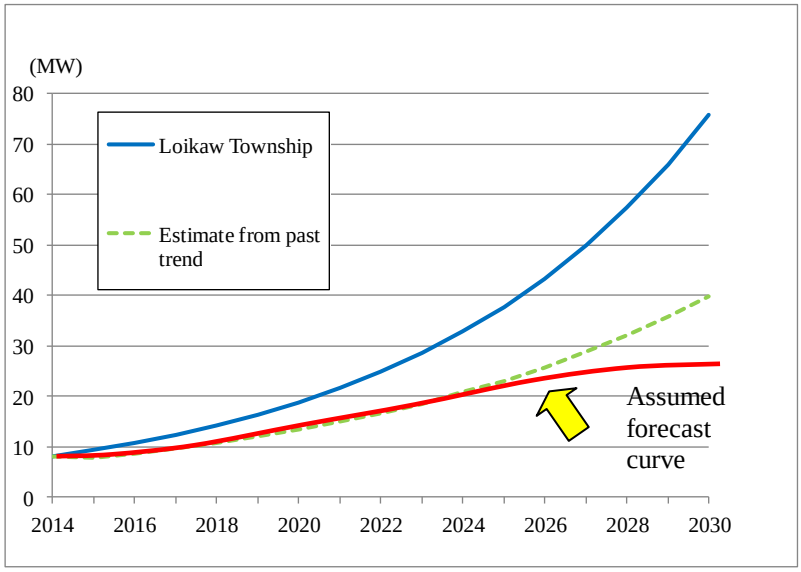
ESE has forecast power demand of 2020 and 2030 as 18.8MW and 75.9MW in Loikaw Township by the growth ratio of 15.0%. On the other hand, the Township office estimates future power demand by the growth ratio of 11.5% of past average increase.

The Survey team assumes that demand curve should saturate after around 2020 shown in red even though Loikaw Township will develop because the turmoil came to an end couple years ago.

Table 10: Result of demand forecast from interview in each substation (Loikaw)

Substation Name	Power Demand (MW)					
	2015	2016	2017	2018	2019	2020
Aka-500 (33/11kV)	3.6	4.0	4.4	4.9	5.5	6.1
Mai Ione (33/11kV)	0.2	0.2	0.3	0.3	0.3	0.4
Ywar Ton Shae (33/11kV)	4.0	4.5	5.0	5.6	6.2	6.9
Other substation	1.5	2.0	2.6	3.4	4.3	5,4

Prepared by the Survey Team



Prepared by the Survey Team

Figure 5: Power Demand Forecast (2015-2030) (Loikaw)

(6) Magway (Magway Region)

1) Power demand trend

In Township of Magway District, the capital of Magway Region situated in the central part of Myanmar, the peak demand for power in 2014 was 13.14MW. The increases in power demand over the 5-year period

from 2010 are as shown in Table 11. Demand for power in this Township is increasing, and the average increasing rate is 3.9% annually.

Table 11: The increasing rate in power demand over the 5-year period (Magway)

Year	Peak demand	Increasing rate
2010	11.8 MW	-
2011	10.50 MW	-11.0 %
2012	9.48 MW	-9.7 %
2013	12.10 MW	27.6 %
2014	13.14MW	8.60 %

Prepared by the Survey Team based on ESE information

2) Development plan

As a large-scale facility whose demand for power is relatively large, the existing industrial zone (Yanengyaung IZ) must be mentioned.

3) Power demand forecast

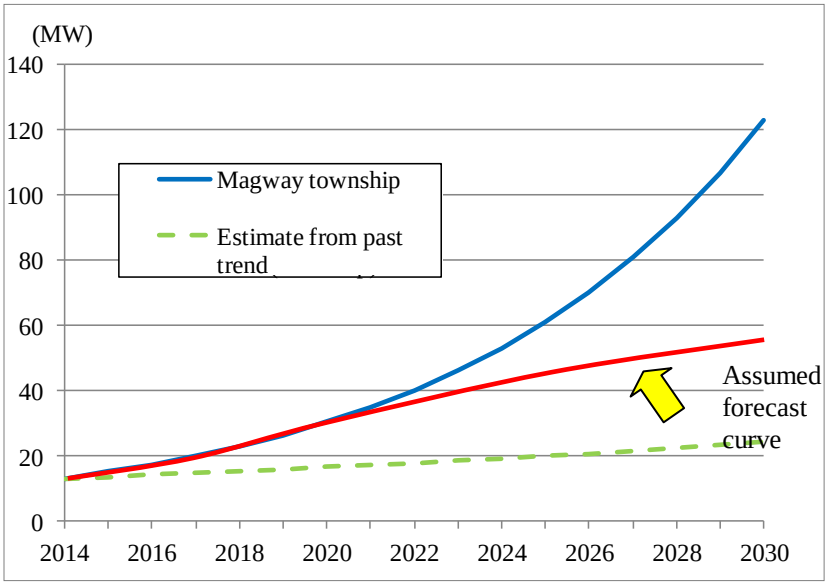
ESE has forecast power demand of 2020 and 2030 as 30.3MW and 123.0MW for Magway Township by setting growth ratio as 15% per year. On the otherhand, average past growth ratio records 3.9%.

The Survey team assumes that the future power demand of ESE seems overestimated and actual power demand should saturate and follow the curve shown in red even though large scale development is implemented in the future.

Table 12: Result of demand forecast from interview in each sybstation (Magway)

Substation Name	Power Demand (MW)					
	2015	2016	2017	2018	2019	2020
Makyikan (33/11kV)	5.6	5.0	5.8	4.6	5.3	6.1
Natmauk (33/11kV)	9.4	5.8	6.7	7.7	8.9	10.2
Myinkin (33/11kV)	-	5.0	5.8	4.6	5.3	6.1
Hluttaw (33/11kV)	-	1.5	1.7	2.0	2.3	2.6
Kanpyar (33/11kV)	-	-	-	4.0	4.6	5.3

Prepared by the Survey Team



Prepared by the Survey Team

Figure 6: Power Demand Forecast (2015-2020) (Magway)

(7) Mandalay (Mandalay Region)

1) Power demand trend

In Mandalay District, the capital of Mandalay Region situated in the Northern part of Myanmar, the peak demand for power in 2014 was 248.22MW. The increases in power demand over the 5-year period from 2010 are as shown in Table 13. Demand for power in this district is increasing every year, and the average increasing rate is 18.2% annually.

Table 13: The increasing rate in power demand over the 5-year period (Mandalay)

Year	Peak demand	Increasing rate
2010	127.70 MW	-
2011	153.22 MW	20.0 %
2012	173.60 MW	13.3 %
2013	196.66 MW	13.3 %
2014	248.22MW	26.2%

Prepared by the Survey Team based on ESE information

2) Development plans and large-scale demand

The population of Mandalay District is the largest among those of regional urban areas. Its economic scale is the second largest in Myanmar, and it is a logistics hub for the northern part of the country. The district is attracting attention in terms of tourism as evidenced by the fact that it is also included in the Tourism Master Plan. The following two plans can be listed as the main development plans for the area.

	Main development plans
a)	Highway and a railway between Yangon and Mandalay
b)	An existing industrial zone, Mandalay IZ, is in the area, and multiple Japanese companies are planning their business establishments there

3) Forecast power demand

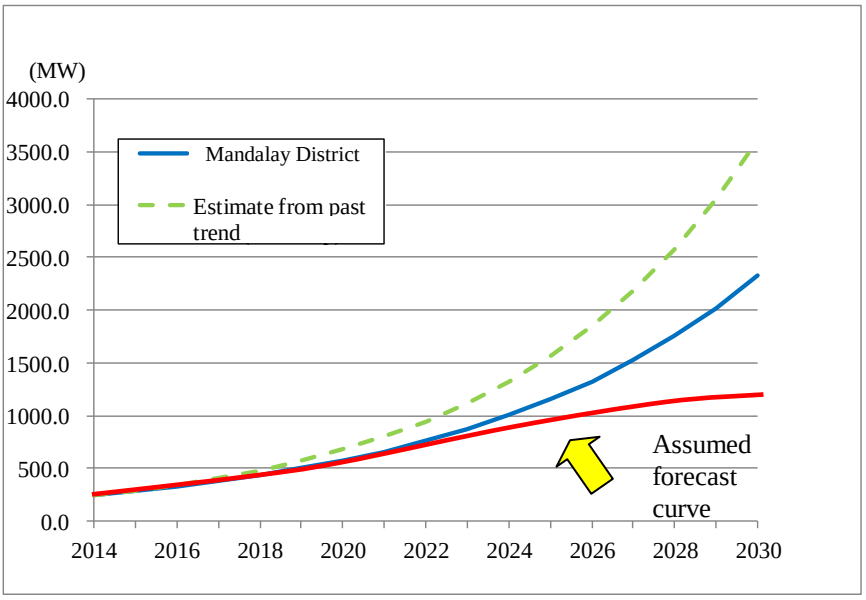
ESE has forecast power demand of 2020 and 2030 as 574.1MW and 2,322.7MW for Mandalay District by setting the growth ratio by 15%.

Given that power demands for 2020 and 2030 are estimated by calculation with 18.2% of past average growth ratio, the power demands in Mandalay District in 2020 and 2030 are 677MW and 3,603MW respectively. Survey team assumes that this result of forecast seems overestimated and the future demand should follow ESE forecast by around 2020 and gradually saturate for 2030.

Table 14: Result of demand forecast from interview in each substation (Mandalay)

Substation Name	Power Demand (MW)					
	2015	2016	2017	2018	2019	2020
OweBo (33/11kV)	13.2	9.2	10.6	12.2	14.0	16.0
NaungKwel (33/11kV)	6.4	9.4	10.8	12.4	10.3	11.9
Mayanchan (33/11kV)	14.6	9.8	11.3	13.0	16.4	18.9
DayWonn(W)(33/11kV)	0	12.0	10.8	12.4	22.8	26.2
ShweKyaungGyi(33/11kV)	18.1	15.8	21.1	20.7	23.8	27.3
HayMarZala(33/11kV)	20.0	23.0	26.5	30.4	29.0	33.3
TiteTaw(33/11kV)	6.1	11.0	12.7	14.6	16.7	19.3
WaKhinKone(33/11kV)	22.0	25.3	18.5	21.3	26.5	30.5
76th Street(33/11kV)	17.7	20.4	20.4	23.5	27.0	31.1
ShwePhyuKan(33/11kV)	0	0	11.5	13.2	15.2	17.5
AungPinLae (MEPE's)(132/11kV)	18.7	18.5	17.3	19.9	18.9	21.7
MyoMa(33/11kV)	4.4	5.0	5.8	6.6	11.6	13.4
YanKinTaung (33/11kV)	0	3.0	5.5	6.3	5.2	6.0
YetagonTaung (33/11kV)	0	0	4.0	4.6	5.3	6.1
HtunTone (33/11kV)	7.7	10.9	12.5	14.4	16.5	19.0
KyaukChaw (33/11kV)	3.6	4.1	4.7	5.4	6.2	7.2
KyaukMee (33/11kV)	1.8	2.1	2.4	2.8	3.2	3.7
59th Street (33/11kV)	7.7	4.9	5.6	6.4	7.4	8.5
TaGongTaing (MEPE's)(132/11kV)	10.6	0	0	0	0	0
65th Street(33/11kV)	7.2	8.3	9.6	11.0	12.7	14.6
NgweDawKyiKone(33/11kV)	0	10.2	11.7	13.4	18.5	21.2
ChiPar (33/11kV)	7.1	10.2	11.7	13.5	12.5	14.4
ThinPanKone (33/11kV)	4.0	6.6	7.6	8.8	10.1	11.6
VarGaYar (33/11kV)	10.7	7.3	8.4	9.7	11.1	12.8
DaNone (33/11kV)	7.1	9.2	6.6	7.6	8.7	10.0
SweDaw (33/11kV)	0	4.0	4.6	5.3	6.1	3.0
DaungYwae (33/11kV)	0	0	0	0	0	4.0
TaPinShweHtee (33/11kV)	0	0	4	4.6	5.3	6.1
Demand total for ESE substation	208.7	240.2	276.2	314.0	361.0	415.3
Demand total for Other substation	76.8	88.1	101.3	120.1	138.3	158.8

Prepared by the Survey Team



Prepared by the Survey Team

Figure 7: Power Demand Forecast (2015-2030) (Mandalay)

(8) Mawlamyine (Mon State)

1) Power demand trend

In Mawlamyine Township in the capital of Mon State situated in the southern part of Myanmar, the peak demand for power in 2014 was 26.12 MW. The increases in power demand over the 5-year period from 2012 are as shown in Table 15. Demand for power in this Township is increasing every year, and the average increasing rate is 19.5% annually.

Table 15: The increasing rate in power demand over the 5-year period (Mawlamyine)

Year	Peak demand	Increasing rate
2010	12.88 MW	-
2011	14.28 MW	10.9%
2012	17.74 MW	24.2%
2013	21.07 MW	18.8%
2014	26.12 MW	24.0%

Prepared by the Survey Team based on ESE information

2) Development plan and large-scale demand

Mawlamyine District attracts attention in terms of tourism as evidenced by the fact that it is included in the Tourism Master Plan. The main development plans include the implementation plan for a highway between Mawlamyine and Kawthoung and others.

3) Power demand forecast

ESE has forecast power demand up to 2020 and its demand of 2020 as 63.8 MW for Mawlamyine Township by setting annual growth ratio by 15.0%. On the other hand, past average annual growth ratio

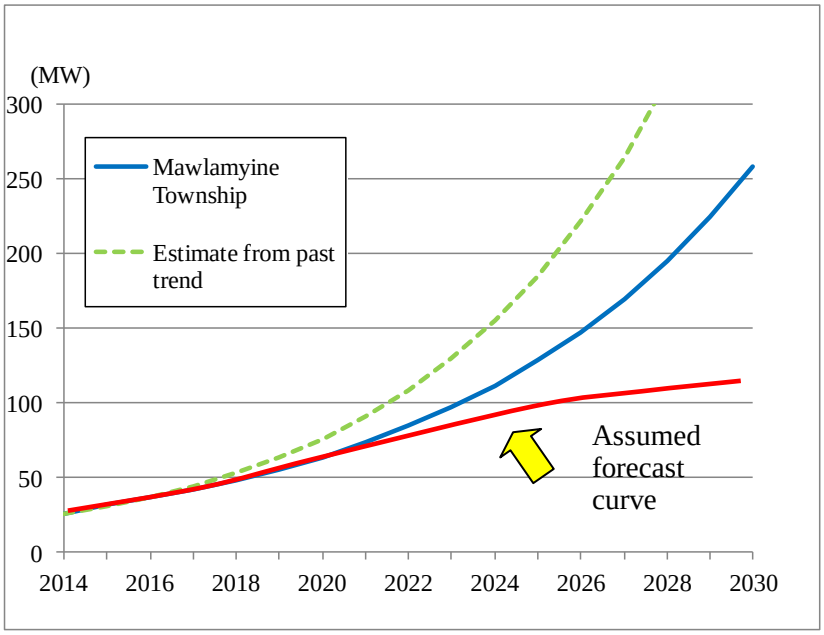
records 19.5%.

The Survey team assumes that the demand growth set value as 15% by ESE is even overestimated and the demand forecast curve after 2020 is expected to saturate, which is shown in red even though developments are implemented after 2020 as planned.

Table 16: Result of demand forecast from interview in each substation (Mawlamyine)

Substation Name	Power Demand (MW)					
	2015	2016	2017	2018	2019	2020
Mawlamyine(33/11kV)	5.6	4.0	4.6	5.2	6.0	6.9
Nyande(66/11kV)	0	-	-	-	-	-
South(66/11, 33/11kV)	5.2	6.0	6.8	7.9	6.1	7.0
North(66/11,33/11kV)	15.5	14.4	16.5	19.0	14.9	17.1
Minder(33/11kV)	3.8	4.4	5.0	5.8	6.6	7.6
Mupon(33/11kV)	1.6	1.8	2.1	2.4	2.8	3.2
Mawlamyine primary(66/11kV)	-	6.0	6.9	7.9	6.1	7.0
New site (North-East area)(66/11kV)	-	-	-	-	13.0	15.0

Prepared by the Survey Team



Prepared by the Survey Team

Figure 8: Power Demand Forecast (2015-2030) (Mawlamyine)

(9) Monywa (Sagaing Region)

1) Power demand trend

In Monywa Township of Monywa District in Sagaing Region situated in the Northern part of Myanmar, a peak demand for power of 27.0 MW was recorded in 2014. The increases in power demand over the 5-year period from 2010 are as shown in Table 17. Demand for power in this Township is increasing every year, and the average increasing rate is 18.9 % annually.

Table 17: The increasing rate in power demand over the 5-year period (Monywa)

Year	Peak demand	Increasing rate
2010	13.5 MW	-
2011	16.0 MW	18.5 %
2012	19.0 MW	18.8 %
2013	22.1 MW	16.3 %
2014	27.0 MW	18.9 %

Prepared by the Survey Team based on ESE information

2) Development plans and large-scale demand

There is an industrial zone at present, Monywa IZ, and industrial products and others are being produced in the area. As main development plans, the following lists in the below table can be mentioned.

	Main development plans
a)	Implementation plan for an international highway connecting India, Myanmar and Thailand
b)	Implementation plan for Monywa-Kalewa-Kale-Tamur railway
c)	Plan for East-West Corridor infrastructure implementation plan related to the above

3) Power demand forecast

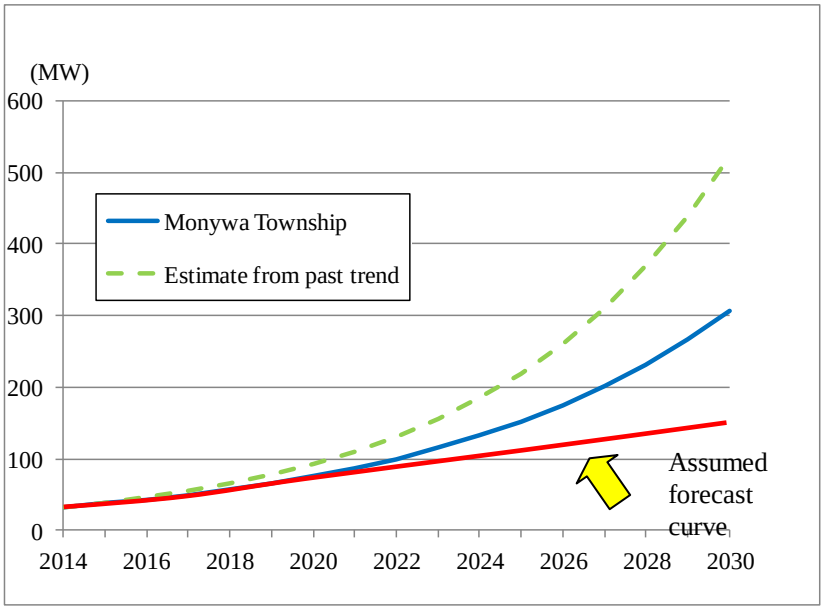
ESE has forecast power demand of 2020 and 2030 as 72MW and 365MW for Monywa Township by setting growth ratio as 15%.

On the other hand, according to the township, each of the targeted substations also duly set the future demand growth by 18.9% in their survey by 2020. However, the Survey team assumes that the power demand after 2020 should saturate even though large scaled developments are implemented as planned.

Table 18: Result of demand forecast from interview in each substation (Monywa)

Substation Name	Power Demand (MW)(Growth ratio 18.9%)					
	2015	2016	2017	2018	2019	2020
Monywa Township (33/11kV)	7.7	9.1	9.0	10.6	12.5	14.8
Monywa Taung (33/11kV)	-	2.3	2.7	3.2	3.8	4.5
Amyint (33/11kV)	-	-	3.8	4.5	5.3	6.2
Aungchanthar (33/11kV)	12.4	14.5	16.8	20.0	23.8	28.2
Industry Zone 1(33/11kV)	12.6	13.0	12.8	13.5	16.1	17..5
Nanda Wun (33/11kV)	3.9	4.4	6.2	9.0	10.7	14.3
NaMaKha (33/11)	0.9	1.1	1.3	1.7	1.7	1.8
New Mynnae(2015) (33/11)	1.2	1.7	2.0	2.4	3.4	4.2

Prepared by the Survey Team



Prepared by the Survey Team

Figure 9: Power Demand Forecast (2015-2030) (Monywa)

(10) Taunggyi (Shan State)

1) Power demand trend

In Township of Taunggyi District in the capital of Shan State situated in the eastern part of Myanmar, the peak demand for power in 2014 was 20.0MW. The increases in power demand over the 5-year period from 2010 are as shown in Table 19. Demand for power in this Township is increasing every year, and the average increasing rate is 13.6% annually.

Table 19: The increasing rate in power demand over the 5-year period (Taunggyi)

Year	Peak demand	Increasing rate
2010	12.0 MW	-
2011	14.0 MW	16.7 %
2012	16.0 MW	14.3 %
2013	18.0 MW	12.5 %
2014	20.0 MW	11.1 %

Prepared by the Survey Team based on ESE information

2) Development plans and large-scale demand

An existing industrial zone, Taunggyi IZ, is located in Taunggyi District, and industrial products are made there. As main development plans, an implementation plan for a highway between Taunggyi and Kengtung and an implementation plan for Asian highway 2 can be mentioned.

3) Power demand forecast

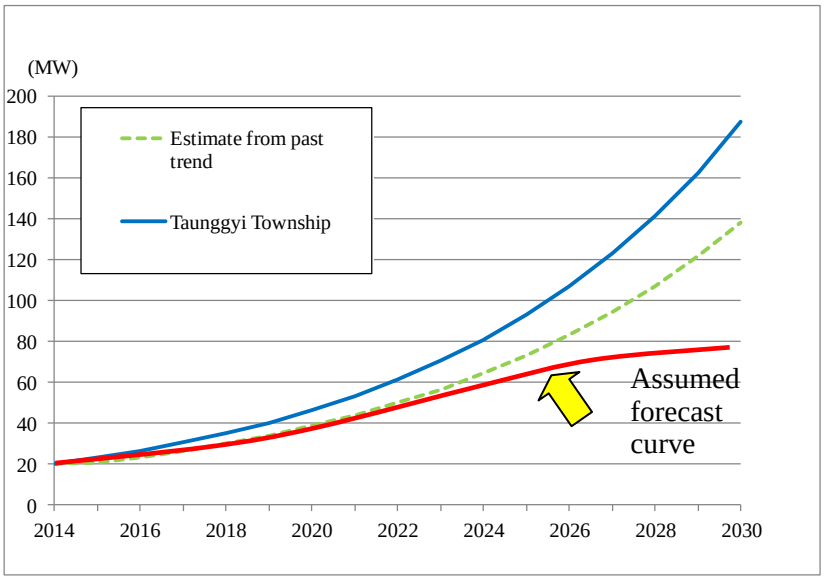
ESE has forecast power demand of 2020 and 2030 as 46.3MW and 187.1MW for Taunggyi Township by setting growth ratio as 15%.

On the otherhand, average past growth ratio records 13.6%. There is another estimate that the future demand growth keep increasing by 13.6% by 2020. However, the Survey team assumes that the demand forecast curve after 2020 should saturate even though large scale development is implemented as planned.

Table 20: Result of demand forecast from interview in each substation (Taunggyi)

Substation Name	Power Demand (MW)(Growth ratio:13.6%)					
	2015	2016	2017	2018	2019	2020
Taunggyi No.1 (33/11kV)	8.0	4.5	5.1	5.8	6.6	7.5
Taunggyi No.2 (33/11kV)	6.8	7.7	8.8	10.0	11.4	12.9
Taunggyi No.3 (33/11kV)	5.7	6.5	7.3	8.3	9.5	10.7
Taunggyi No.4 (33/11kV)	-	4.5	5.1	5.8	6.6	7.5

Prepared by the Survey Team



Prepared by the Survey Team

Figure 10: Power Demand Forecast (2015-2030) (Taunggyi)

(11) Dawei (Tanintharyi Region) South

1) Power demand trend

In the Township of Dawei District in Tanintharyi Region situated in the southern part of Myanmar, a peak demand for power of 5.55 MW was recorded in 2014. The increases in power demand over the 5-year period from 2010 are as shown in Table 21. Demand for power in this Township is increasing every year, and the average increasing rate is 14.0 % annually.

Table 21: The increasing rate in power demand over the 5-year period (Dawei)

Year	Peak demand	Increasing rate
2010	2.70 MW	-
2011	2.80 MW	3.7 %
2012	3.10 MW	10.7 %
2013	3.50 MW	12.9 %
2014	5.55 MW	58.6 %

Prepared by the Survey Team based on ESE information

2) Development plans and large-scale demand

The main development plans for Dawei District are as follows:

	Main development plans
a)	Special economic zone (Dawei SEZ)
b)	Highway between Mawlamyine and Kawthoung
c)	International highway between Dawei and Thailand
d)	Railway between Dawei and Myeik
e)	Dawei deep seaport development plan
f)	Dawei Airport

3) Power demand forecast

ESE has forecast peak demand of 2020 and 2030 as 10.4MW and 42.1MW in Dawei Township by setting growth ratio as 15.0%.

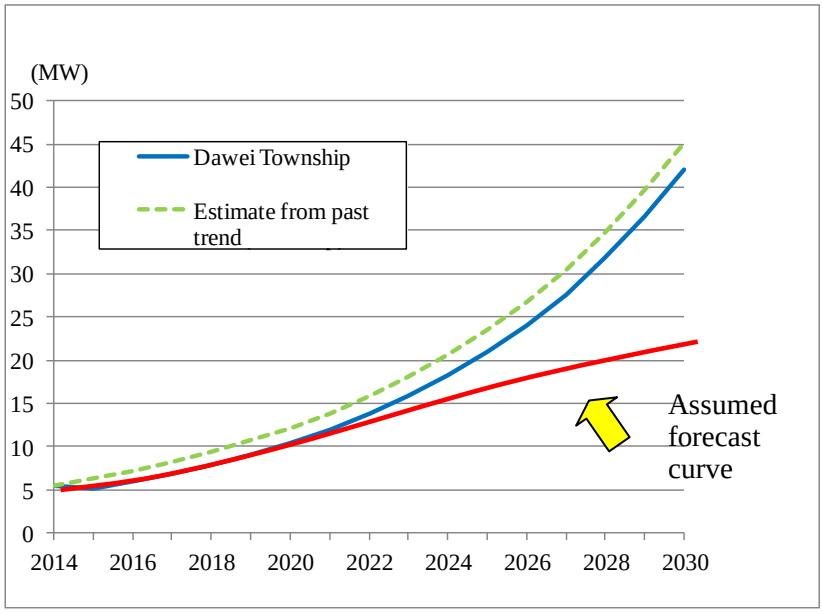
The future power demand seems to increase more rapidly compared to this result of forecast, because electricity rate is currently getting lower and electricity will be supplied by on-grid system in 2017. Therefore, it is deemed that the future demand will nearly follow the ESE forecast by 2020.

However, the Survey team assumes that the demand growth set value by ESE is overestimated and the demand forecast curve after 2020 is expected to saturate.

Table 22: Result of demand forecast from interview in each substation (Dawei)

Substation Name	Power Demand (MW)					
	2015	2016	2017	2018	2019	2020
Dawei Town (33/11kV)	5.2	6.0	6.8	7.9	9.1	10.4

Prepared by the Survey Team



Prepared by the Survey Team

Figure 11: Power Demand Forecast (2015-2030) (Dawei)