Republic of the Union of Myanmar

Department of Electric Power Planning
Ministry of Electricity and Energy

Republic of the Union of Myanmar

The Project for Capacity Development of Power Transmission and Distribution System (Phase I)

Work Completion Report

November 2018

Japan International Cooperation Agency (JICA)

JERA Co., Inc.
Nippon Koei Co., Ltd.

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ABREVIATIONS

Word	Original
AD	Assistant Director
ADB	Asian Development Bank
AE	Assistant Engineer
AM	Assistant Manager
CEO	Chief Executive Officer
C-GIS	Cubicle type Gas Insulated Switchgear
C/P, CP	Counterpart
DAC	Development Assistance Committee
DEPP	Department of Electric Power Planning
DG	Director General
DPTSC	Department of Power Transmission and System Control
EE	Executive Engineer
ESE	Electric Supply Enterprise
GIS	Gas Insulated Switchgear
GPS	Global Positioning System
HRD	Human Resource Development
JCC	Joint Coordinating Committee
JICA	Japan International Cooperation Agency
MD	Managing Director
MESC	Mandalay Electricity Supply Corporation
MOEE	Ministry of Electricity and Energy
M/M	Man-Month
M/P	Managing Person
NPT	Nay Pyi Taw
ODA	Official Development Assistance
OJT	On the Job Training
OW	Outdoor Weatherproof Polyvinyl Chloride Insulated Wire
PCB	Polychlorinated Biphenyl
PDCA	Plan – Do – Check – Act (Cycle)
PDM	Project Design Matrix
PJ	Parallel Joint
PMU	Project Management Unit
R/D	Record of Discussions
SAE	Sub Assistant Engineer
SE	Superintendent Engineer
SOG	Storage Over Current Ground
TC	Trainer Candidate
TCPC	Training Center Preparation Committee
TOT	Training of Trainers
T&D	Transmission and Distribution

VCB	Vacuum Circuit Breaker
WB	World Bank
WG	Working Group
YESC	Yangon Electricity Supply Corporation

Chapter 1 Outline of the Project

1.1 Background

In Myanmar, the power sector was selected as the top priority issue by the government for economic and social development, and a stable power supply in urban areas like Yangon and Mandalay, where industrialization is in progress, and promotion of electrification in all parts of the country are considered the most urgent matters. Generation capacity has gradually increased, but there are problems, like a high loss rate of around 20%, insufficient transmission capacity, aging equipment, and frequent accidental power outages caused by contact with birds, animals or trees. According to the proposed National Electricity Master Plan (2014), which JICA helped to prepare, power demand in Myanmar is expected to grow in line with economic growth from about 2,500 MW in 2015 to a maximum of 14,500 MW in 2030, and it is essential to strengthen transmission and distribution networks as well as power sources.

Under these circumstances, JICA has helped construct distribution networks through Japanese ODA loan projects, “Regional Development Project for Poverty Reduction Phase I (fiscal year 2013)” and “Yangon Power Distribution Network Improvement Project Phase I (fiscal year 2015)”, and also transmission networks through Japanese ODA projects, “National Power Transmission Network Development Project Phase I (fiscal year 2014)” and “National Power Transmission Network Development Project Phase II (fiscal year 2015)”. On the other hand, the Ministry of Electricity and Energy of Myanmar (hereinafter referred to as “MOEE”) does not have a systematic organization or plan for enhancing the ability of engineers to construct, operate and maintain the transmission networks, and has not fully standardized technical standards and specifications for constructing, operating and maintaining equipment, either. JICA, therefore, has dispatched a long-term expert to the Yangon Electricity Supply Corporation (hereinafter referred to as “YESC”) to serve from 2012 to 2015 to improve the ability of engineers and construct a training system. Continuous efforts are considered necessary for improving the ability of engineers who are engaged in nationwide distribution networks. The MOEE itself is also considering gradual construction and reinforcement of equipment under the assistance of development partners, as well as building the MOEE’s own training facilities for power transmission and distribution to improve the reliability and stability of equipment through the strengthened ability of engineers and their standardized technologies.

Under the aforementioned situations, it is very urgently needed to improve the ability of engineers who are involved in the planning, construction, operation and maintenance of the transmission and distribution networks, and the government of Myanmar asked the government of Japan for technical cooperation in regard to the Project for Capacity Development of Power Transmission and Distribution System (hereinafter referred to as “the Project”).

JICA conducted research for preparing a detailed plan in April 2015 in order to check the necessity and validity of the Project and study cooperation, and entered into a basic agreement with the government of Myanmar in January 2016, as written in the Record of Discussions (hereinafter referred to as “R/D”), on the framework of the Project.

The project is intended to enhance the ability of human resources who are engaged in the development, operation and maintenance of the transmission and distribution system through preparing a human resource development plan, a training program and training facilities in regard to the engineering of the MOEE's transmission and distribution system, and thereby contribute to improving the reliability and efficiency of the power supply and energy access.

The Project is to be implemented in two phases: in "Phase I", establish a human resource development system and implement a training program, and in "Phase II", evaluate and improve the human resource development system and training program.

In the first phase, as activities in "Phase I" out of aforementioned outputs, it was planned that human resource development framework would be established and suggestions on "Phase II" would be conducted with taking results obtained after completing one cycle of the training into consideration at the end of "Phase I".

1.2 Objective and Goal of the Project

1.2.1 Objective of the Project

Concerning the Project for Capacity Development of Power Transmission and Distribution System, the project team will, based on the R/D of the Project, identify institutional and financial issues, identify technical issues related to the transmission, substation and distribution system, assess the existing human resource development plan, policy and training system, study and plan a training program, prepare curriculums and texts for training, conduct training, and take action of the like, and thereby realize successful results in regard to improvement of capability of the power transmission and distribution system, and accomplish the project goal.

1.2.2 Project Purpose

Capacity for engineers and technicians engaged in Transmission and Distribution system is strengthened.

1.2.3 Overall Goal

Efficiency and reliability of electric power supply and energy access is improved through the reinforcement and improvement of power supply infrastructure in Myanmar.

1.2.4 Prospective Outputs

Output 1: The framework of human resource development planning is prepared. Output 2: Training programs are planned and implemented. Output 3: PDCA (Plan, Do, Check and Action) cycle for training system is established and practiced. The Project will be implemented in two phases: in "Phase I", establish a human resource development

system and implement a training program, and in “Phase II”, evaluate and improve the Project.
What is to be conducted this time (hereinafter referred to as the task) falls under “Phase I”, and of the aforementioned expected outputs, the framework of human resource development planning is expected to be prepared and the proposal for “Phase II” to be made based on the results obtained after completing one cycle of the training.

1.3 Areas for the Project

Nay Pyi Taw (main base for the Project), and all other areas in Myanmar

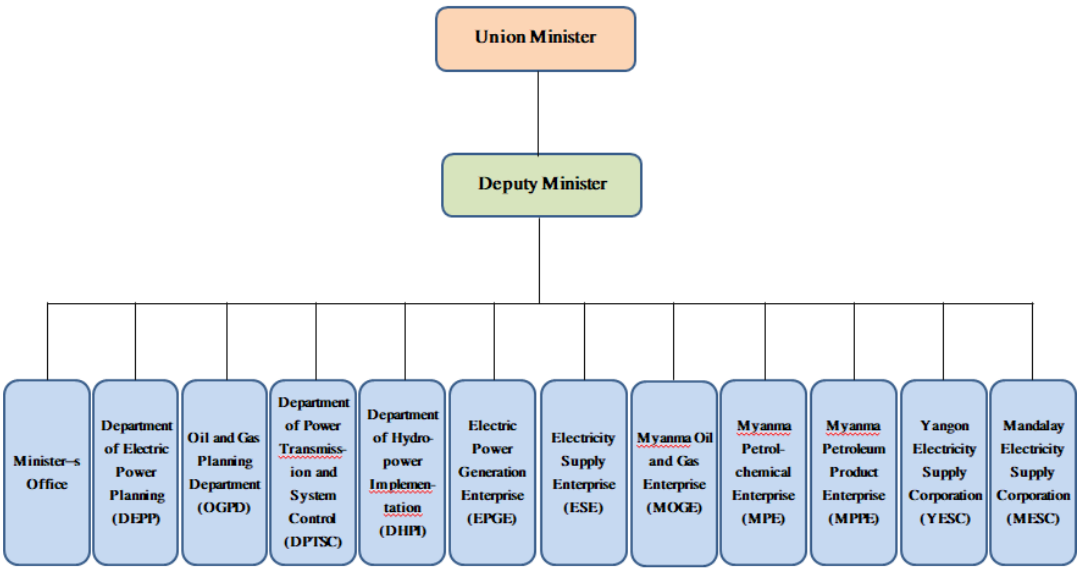
1.4 Implementing Ministry in Myanmar

Implementing organizations in Myanmar are as follows;

・Implementing ministry: Ministry of Electricity and Energy (MOEE)
・Related departments within the MOEE:
[Coordination of related departments]
- Department of Electric Power Planning (hereinafter referred to as “DEPP”)

[Related implementing departments]
- Electricity Supply Enterprise (hereinafter referred to as “ESE”)
- Department of Power Transmission and System Control (hereinafter referred to as “DPTSC”)
- Yangon Electricity Supply Corporation (YESC) and
- Mandalay Electricity Supply Corporation (hereinafter referred to as “MESC”).

The departments and organizations of MOEE are shown in Figure 1-1.



(Source: MOEE’s homepage)

Figure 1-1: Departments and Organizations of MOEE

1.5 Period of the Project

The cooperation period for the Project shall be five years (from May 2016 to April 2021, sixty months in total), and the Project will be implemented in two phases: system construction and implementation in phase I, and evaluation and improvement in phase II. Phase I of the Project was implemented from May 2016 to November 2018 (thirty months in total). Work flow and the contents of activities are shown in Annex 1.

1.6 Expert Team Members

The JICA expert team is formed by one (1) long-term expert and twelve (12) short-term experts as shown in Table 1-1.

Table 1-1: JICA Expert Team Members

Expert			Assigned Period (MM)	
Expert Title/ Responsibility	Name	Affiliation	Plan	Actual
1. JICA long-term expert, Training Program/ Coordinator	Ms. Kuri SHIBATA nee ORUI	Dispatched by JICA		
2. JICA short-term experts				
(1) Chief Advisor, Distribution System Technology	Mr. Tomohide KATO	JERA	14.00	14.63
(2) Deputy Chief Advisor, Distribution Technology (Operation and Maintenance)	Mr. Osamu TANIHATA	JERA	10.97	10.27
(3) Distribution Technology (Planning and Designing)	Dr. Koji SHIKIMACHI	JERA	10.97	11.30
(4) Distribution Technology (Construction)	Mr. Ikuo NAKAGAWA	JERA	5.97	5.80
(5) Transmission Technology	Mr. Toshitaka YOSHIDA	JERA	5.97	5.92
(6) Substation Technology	Mr. Mitsuhiro NAKAMURA	JERA	5.97	4.93
(7) Human Resource Development Planning 1 (Training System)	Ms. Mina KOBAYASHI	JERA	0.87	0.57
	Mr. Shinichi MITSUI	JERA	7.12	7.77
(8) Financial and Institutional Analysis	Mr. Koichi YAMASHITA	JERA	3.97	4.27
(9) Power development / Distribution Expansion Policy	Mr. Yoshitaka SAITO	JERA	1.03	1.12
(10) Power Technology 1 (Planning)	Mr. Takuji KATAOKA	Nippon Koei	1.03	1.05
(11) Power Technology 2 (Regional Cities)	Mr. Hoke Shein	Nippon Koei	6.00	5.53
(12) Human Resource Development Planning 2 (Regional Cities)	Ms. Wah Wah Han Su Yin	JERA	6.00	6.68
Total			79.86	79.83

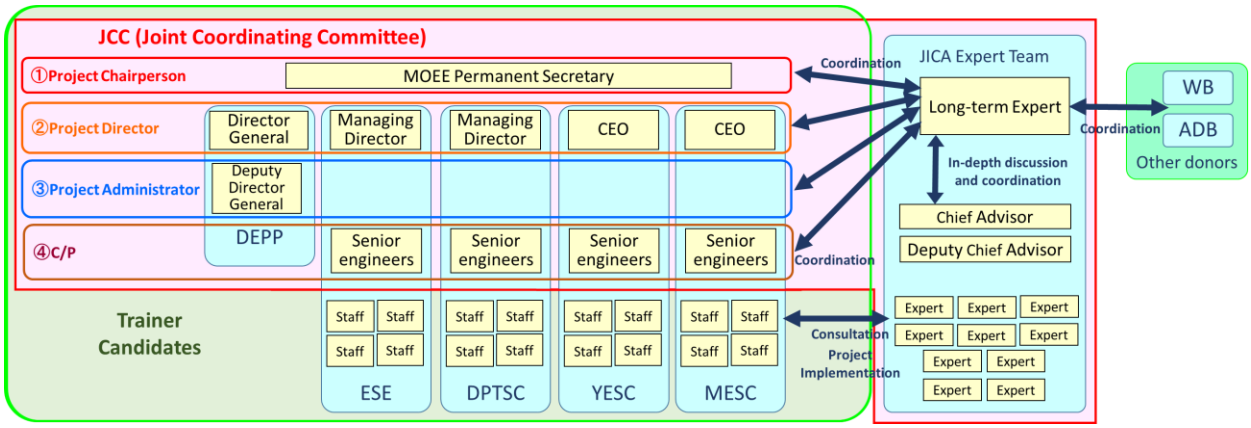
1.7 Implementation Structure of the Project

The implementation structure of the Project is shown in Figure 1-2.

On the JICA side, a long-term expert (Training Program/ Coordinator) was dispatched for two years from August 2016 to August 2018. The long-term expert and short-term experts jointly carried out the Project. Short-term experts conducted activities in each specialized field in Myanmar at required times while receiving advices from the long-term expert on overall activities.

On the MOEE side, DEPP coordinates the entire of the MOEE and engineers who belong to DEPP also participate in the activities of the Project. However, the Chief Engineer in ESE played an important role and practically managed the Project. (His position was changed to General Manager in the middle of the Project.)

The Joint Coordinating Committee (hereinafter referred to as "JCC") is to be held basically once in a year to discuss and approve matters, check the progress and accomplishments, and deliberate important matters in relation to the plans of the Project. The JCC members are shown in Table 1-2. The Permanent Secretary was in charge of Project Chairperson.



(Source: JICA expert team)

Figure 1-2: Implementation Structure of the Project

Table 1-2: JCC Members

Committee members	Relation with the Project
Permanent Secretary of MOEE	Project Chairperson
Head of DEPP (Director General) Managing Director or CEO of each department (ESE, YESC, MESC and DPTSC)	Project Director
Persons in charge of actual work in respective organizations (Senior engineers and higher-level engineers)	Project Manager
Deputy Director General of DEPP	Project Administrator (JCC meeting coordination on Myanmar side)
JICA long-term expert	JCC meeting coordination on JICA project team side
Chief Advisor / Deputy Chief Advisor in JICA project team	Representative of project team
Training candidates from respective organizations	Project members (Myanmar side)
JICA expert team	Project members (Japanese side)

(Source: JICA expert team)

Chapter 2 Activities in the Project

The dispatch period of the JICA short-term experts engaging in tasks in Myanmar is shown in Annex 2.

2.1 Selection of Trainer Candidates

Each organization (ESE, DPTSC, YESC and MESC) took the initiative in selecting trainer candidates to whom technologies would be transferred through the Project in August 2016 in accordance with the selection criteria shown in Table 2-1. The number to be selected as trainer candidates was originally about 20, but total 27 trainer candidates were selected including the participants from DEPP. (refer to Table 3-3) Every selected trainer candidate belongs to one of five (5) working groups as described below, and the working group activities were started.

Table 2-1: Selection Criteria of Trainer Candidates

Number to be selected	Twenty engineers in total (ten from ESE, three from DPTSC, four from YESC and three from MESC)
Conditions of selection	(1) Must have job experience at forefront workplaces and must have good understanding of the actual work at workplaces. (2) Can communicate in English with Japanese experts. (3) Can basically concentrate on the project work during the project period. (4) Can be expected to act as a future core trainer. (5) Do not select by equipment (transmission, substation, distribution) or by job (planning, designing, construction, operation, maintenance, etc.)

Table 2-2: Trainer Candidates

No.	Name	M/P and TC*	Designation	Organization
Working Group I (Distribution Planning & Design)				
1.	Mr. Naung Win Htoo	M/P and TC	Staff Officer	DPTSC
2.	Mr. Myo Min Aung	TC	AE	ESE (Magway)
3.	Mr. Aung Tun	TC	EE	ESE (Kachin)
4.	Mr. Bo Bo	TC	AE	ESE (Gangaw in Magway)
5.	Ms. Phyo Thiri Aung	TC	SAE	YESC
6.	Mr. Soe Ko Ko Aung	M/P and TC	EE	DEPP
Working Group II (Distribution Construction Work & Safety Technology)				
7.	Mr. Si Thu Aung	TC	EE	ESE (Ayeyarwaddy)
8.	Mr. San Myo Aung	TC	EE	ESE (Hakha in Chin)
9.	Mr. Min Thiha	TC	EE	ESE (Tanintharyi)
10.	Ms. Yi Mon Aye	TC	SAE	DEPP
11.	Mr. Zaw Htike	M/P and TC	AM	MESC
Working Group III (Distribution Operation & Maintenance)				
12.	Mr. Naing Lin	TC	EE	Minister Office
13.	Mr. Lin Ko Ko	TC	EE	ESE (Naypyitaw)
14.	Mr. Kyaw Soe Lin	M/P and TC	SAE	YESC
15.	Mr. Khun Saw Naung Htwe	TC	AE	ESE (Hpa An in Kayin)
16.	Mr. Kyaw Kyaw	M/P and TC	AM	MESC
Working Group IV (Transmission Line)				
17.	Mr. Than Naing Lin	M/P and TC	SE	DEPP
18.	Mr. Win Kyaw	M/P and TC	Staff Officer	DPTSC
19.	Mr. Myint Oo	TC	EE	ESE (Sittwe, Rakhine)

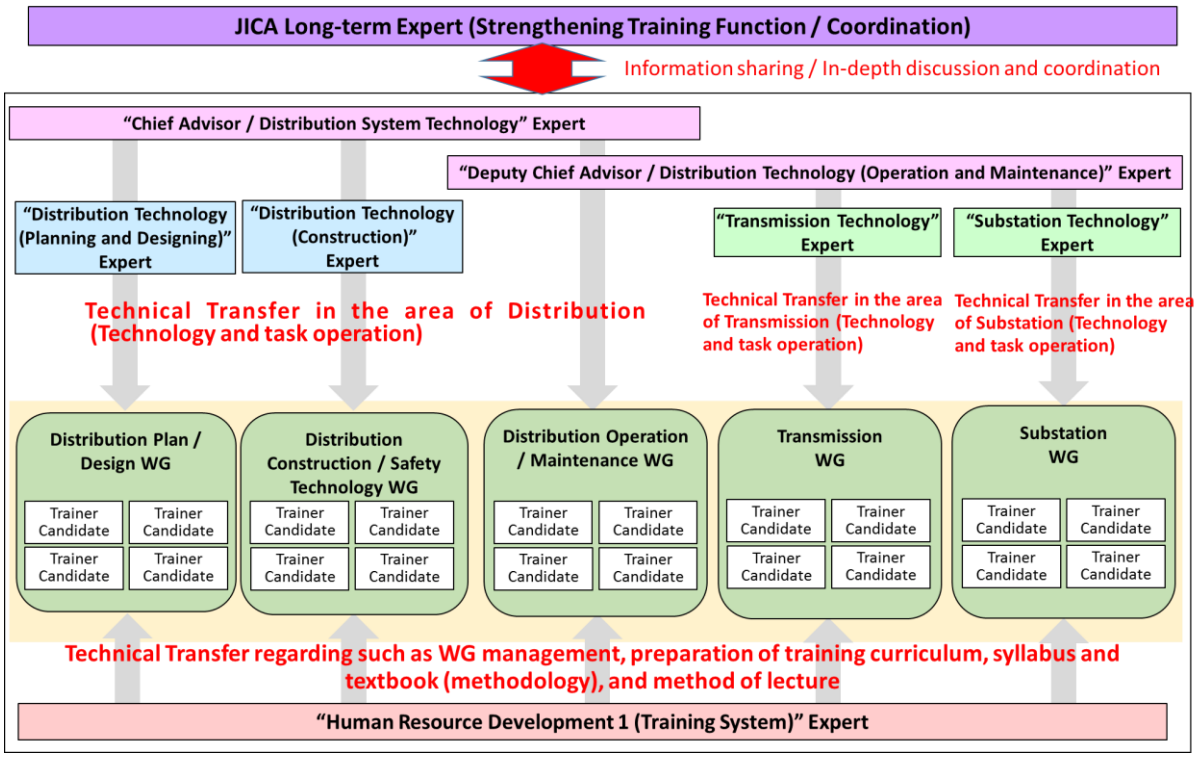
No.	Name	M/P and TC*	Designation	Organization
20.	Mr. San Yu Maw	TC	EE	ESE (Taunggyi)
21.	Ms. Shwe Yee Win	TC	SAE	ESE (Head Office)
22.	Ms. Kyawt Kyawt Hlaing	M/P and TC	AE	YESC
Working Group V (Substation)				
23.	Mr. Myo Thant Zin	M/P and TC	AD	DEPP
24.	Ms. Soe Yupar Thein	M/P and TC	Staff Officer	DPTSC
25.	Mr. Than Htike Oo	M/P and TC	EE	ESE (Head Office)
26.	Mr. Zaw Zaw Htet	M/P and TC	EE	ESE (Head Office)
27.	Dr. Tayzar Lin	M/P and TC	AE	YESC

*: "TC" means Trainer Candidate, M/P and TC means that the person doubles "Managing Person" and Trainer Candidate.

(Source: JICA Expert Team)

2.2 Organization of Working Groups (WGs)

Working groups (WGs) were organized for each technical field in order to proceed the Project effectively. Five WGs such as "Distribution Plan/ Design WG", "Distribution Construction / Safety Technology WG", "Distribution Operation / Maintenance WG", "Transmission WG" and "Substation WG" were organized as shown in Figure 2-1, and the system under which each JICA short-term expert transfers technologies in each WG. 27 trainer candidates were divided into five WGs and it was decided that each of five WGs would proceed the project activities.



(Source: JICA expert team)

Figure 2-1: Structure of Working Groups

As the initial WG activity policy, the JICA expert team aimed at not only technology transfer in terms of expertises and business operation skills in each technical field, but also cooperative work with trainer candidates for preparing training curricula, syllabus and textbooks in order to foster ownership of Myanmar side. Through these activities, the JICA expert team expected that Myanmar side would acquire knowhow of managing WG and how to prepare training curricula, syllabus and textbooks.

2.3 Managing Meeting

Managing Meetings[1] were held from time to time to discuss the matters related to implementation of the Project with MOEE side. The records of holding Managing Meeting are shown in Table 2-3. All Managing Meetings were held in MOEE (Main building or Training Center) in Nay Pyi Taw. The meeting memos of Managing Meeting are shown in Annex 3.

Table 2-3: Records of Managing Meetings

Managing Meeting	Date	Items to be discussed
1st	21st July 2016	The policy and outline of the Project
2nd	26th July 2016	Overall schedule, outline of Baseline Survey and Survey for Assessment, the JICA expert team system
3rd	11th August 2016	Selection of trainer candidates, progress of Baseline Survey and Survey for Assessment, outline of workshops in Japan on January of February 2017
4th	24th August 2016	Explanation of the outline of working groups and the contents of working group activities.
5th	9th September 2016	Report of working group activities, schedule on workshop in Japan, explanation of the 1st JCC, explanation of PDM and monitoring sheet
6th	5th October 2016	Progress of Baseline Survey and Survey for Assessment, draft agenda of the 1st JCC, plan of working group activities
7th	17th October 2016	Discussion about project indicators, discussion about the content of presentation materials at the 1st JCC
8th	27th October 2016	Discussion about how to make a presentation on the 1st JCC, Discussion about training program
9th	29th October 2016	Discussion about schedule on the Project, discussion about project indicators
10th	20th December 2016	Change of the project schedule after the instruction of Deputy Minister, discussion about the details of project indicator, progress of Baseline Survey and Survey for Assessment
11th	9th March 2017	Training schedule on March to April 2017, Explanation of the details of Seminar in Japan for manager class Explanation of and Discussion about draft procurement plan for materials and equipment for training
13th	Oct. 9th 2017	- Change of the project work plan after the instruction by Deputy Minister - Plan of working group activities - Explanation of the outline of Workshop in Japan for engineer class
14th	Dec. 14th 2017	- Explanation of the work plan - Explanation of the outline of regional seminar - Explanation of the schedule of Workshop in Japan for engineer class
15th	Jan. 16th 2018	- Explanation of monitoring sheet and indicator for project evaluation - Discussion about regional seminar - Equipment to be installed to actual site

[1] The JICA expert team called "C/P meeting" at the beginning of the Project, but it was decided that "C/P" would be called as "Managing Person", the meeting to discuss the matters of the Project called as "Managing Meeting" to make Myanmar side have a sense of ownership. In addition, Managing Persons are concurrently serving as trainer candidates except one member ESE Chief Engineer.

		- Procurement plan for materials and equipment for training
16th	Mar. 9th 2018	- Discussion about regional seminar - Installation schedule of equipment to actual site - Progress of training system institutional development - Explanation of the outline and schedule of Workshop in Japan for manager class
17th	May 2nd 2018	- Discussion about regional seminar - Evaluation method of switch gear installed to actual site - Installation site selection of single-phase transformer procured by JICA

(Source: JICA expert team)

2.4 Baseline Survey

(1) Purpose of Baseline Survey

Several concrete numerical targets of the Project should be reflected on "Project Design Matrix (hereinafter referred to as "PDM") to evaluate the degree of improvement of each of the indexes related to "safety", "efficiency" and "quality" in the power sector of Myanmar by virtue of technologies, skills and knowledge which will be acquired through the Project. Therefore, the baseline survey was conducted in main cities in Myanmar to grasp the level of these indexes at starting the Project.

(2) Outline of Baseline Survey

The direction of the baseline survey was discussed between the JICA expert team and MOEE members and the details of the survey were confirmed in the "managing meeting" which was the meeting system for discussing the matters of the Project. After the determination of the direction and the details, the JICA expert team conducted the survey. The outline of the baseline survey is shown in Table 2-4.

Table 2-4: Outline of the baseline survey

Purpose of survey	To check the present level in regard to safety, efficiency and quality in the power sector of Myanmar when starting the Project
Persons conducting survey	Organize a survey team composed of a Myanmar expert as the leader and five other local staff members (select two in charge of ESE, two in charge of YESC and one in charge of MESC), and employ Myanmar person for actual survey.
Scope of survey	Main offices, regional city offices, regional and provincial offices of ESE, YESC and MESC. Also DPTSC.
Method of survey	Collect data after the explanation by the survey team. (Questionnaires are prepared by the survey team.)
Survey period	From July to Dec. 2016 (Visit and explain in July, collect data from July to Oct., summarize data in Nov.)

(Source: JICA expert team)

(3) Scope of Baseline Survey

The baseline indexes and survey items are shown in Table 2-5.

Table 2-5: Baseline Indexes and Survey Items

Index	Survey items	Notes
Work disaster	・Number of work disasters (in fiscal year 2015 and from July to September 2016) ・With or without knowledge of accident prevention and safety measures	Classify the types of disasters (electric shock, traffic accident, falling, etc.) and degree of casualties
Public disaster	・Number of work disasters (in fiscal year 2015 and from July to September 2016)	Classify the types of disasters and degree of casualties
Number of blackouts	・Number of blackouts and duration of distribution substations (in fiscal year 2015 and from July to September 2016) ・With or without knowledge of blackout reduction measures	By the type of blackout (accidental or planned) and cause
Supply voltage	・Transmission voltage from a substation and receiving voltage by consumers(from July to September 2016) ・With or without knowledge of voltage drop reduction measures	Sampling research
Transmission and distribution losses	・Total power of distribution substations and total power consumed by consumers (in fiscal year 2015 and from July to September 2016) ・With or without knowledge of transmission and distribution loss reduction measures	―
Working time	・Number of equipment facilities and workers (from July to September 2016)	Compare the number of facilities/working time x number of men
Construction	・With or without knowledge of process control that is necessary for construction ・Number of times of using work vehicles	―
Construction costs	・Equipment and labor costs (in fiscal year 2015 and from July to September 2016)	Worker's employment (own personnel or assigned outside)
Maintenance	・With or without equipment book, details of the equipment book and how to use it ・Whether or not equipment check has been conducted, number of checks conducted ・Where or not failures and checked results are recorded, whether or not failures were utilized ・With or without knowledge of protection relay setting (setting value, setting method) (in fiscal year 2015 and from July to September 2016)	Check the actual equipment maintenance and actual usage Check how the failure results are maintained and utilized

(Source: JICA expert team)

(4) Main survey results

The results of baseline survey were summarized as a report, the baseline survey report was submitted to JICA in December 2016.

The data collection rule and the data storage rule as for facility data, actual record on power blackout and so on are not unified in-house in each of organizations. And there were many data which could not be confirmed or collected because past data could not be found, one of the reasons is that in many cases data are managed on a hand-writing basis in Myanmar language. And there are many data by which quantitative comparison cannot be conducted because the measuring reference is not unified in each office of MOEE organizations even though they could be collected.

The outline of main survey result is as follows.

(a) Work disaster and public disaster

Many people lose their lives every year due to work disasters such as electric shocks, falls etc. or

public disasters. The reduction of the number of work disasters and public disasters is one of the most important issues for MOEE.

Especially public disaster accidents occur in all states and regions of Myanmar. To reduce the number of accidents, it will be necessary not only to take distribution facility measures but also to conduct activities to deepen public understanding concerning the danger of electricity. In some regional cities, activities aimed at improving basic knowledge about electricity are conducted, such as holding briefing sessions to ordinary people to widely disseminate knowledge of electric safety.

(b) Number and duration of power blackouts

Each regional office records the number and the duration of blackouts. But the records are basically managed on a hand-writing basis and the methods of counting the number of blackouts and measuring the duration of blackouts are not unified. In these reasons, the data collection was very difficult. And in some areas, it was impossible to collect data.

Some collected data show that there were many power failures the duration of which was more than half a day.

On the other hand, the activities aimed at improving technologies and knowledge are conducted to reduce power failure blackouts. Some regional offices conduct a training on protective devices or equipment of distribution lines for engineers.

(c) Voltage drop

MOEE engineers recognize the necessity of improving voltage drop in distribution lines and they grasp knowledge about main improvement measures. But the education concerning the knowledge about voltage drop improvement measures has hardly been implemented.

(d) Distribution losses

Transmission line losses were out of the scope of the baseline survey. It is generally said that the transmission loss ratio is approximately 5%. And distribution losses in off-grid electrified areas were also out of the scope. The rate of distribution loss is about 10% in some area, but many areas in Myanmar has around 20% in distribution losses.

The reduction of distribution losses is the main issue of MOEE, but the education for engineers aimed at reducing distribution losses has hardly been implemented.

2.5 Assessment of existing Human Resource Development Policy, Plan and Training System in Myanmar

(1) Purpose of the Assessment

The project aims at an assistance in formulating human resource development frameworks in the power sector in Myanmar while referring to human resource development systems in Japan. For this purpose, the JICA expert team conducted the Assessment of existing human resource development policy, plan and training system (hereinafter referred to as "the Assessment") in Myanmar. The survey for Assessment was conducted in each of DEPP, DPTSC, ESE, YESC and MESC.

Organizations to be assessed

DEPP | DPTSC | ESE | YESC | MESC

Major assessment items (proposal)

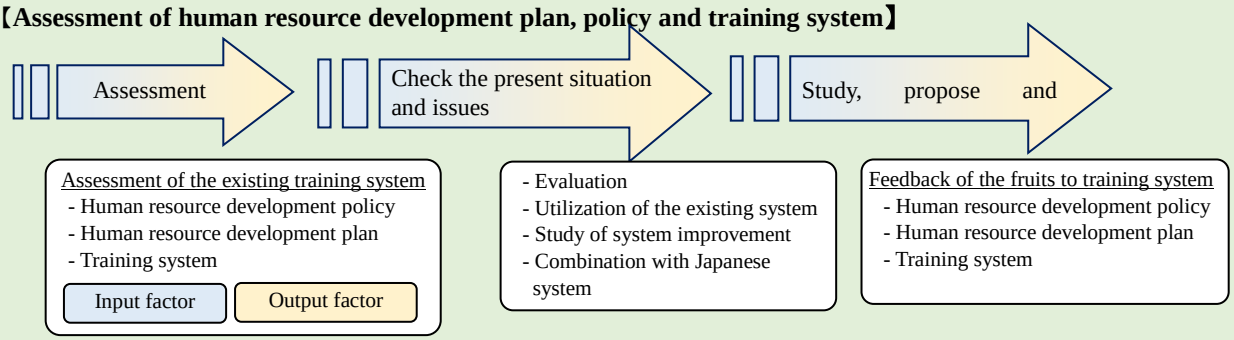
【Input factors】

Organizations in charge of training & human resource development (name of organization, number of staff members, titles)	Job assignment of engineers for each section or department (technology area, OJT, safety control)
Training policy (yes or no, details)	Transfer policy for engineers (transfer interval, policy on considering job experience history)
Training plan (yes or no, details, period, preparation, arrangements for local regions)	Training facility (yes or no, location, number of facilities, details of facility, plan, accommodations)
Budget for human resource development (amount, source of budget, actual usage, travel expenses, daily allowances)	Training textbook (yes or no, technology details, curriculum)
External training (yes or no, details, actual records)	Trainer (possibility of full-time work, number of trainers, titles, type of job, how to nominate)
Overseas training (yes or no, details, actual records)	Linkage between training and job performance assessment (yes or no)

【Output factors】

Trainees (company, type of job, number of trainees, how to select, titles, training assessment)	Assessment of trainees (yes or no, method, test, reflection of results)
Training effects (type of job, details of effects, how to check the effects)	Assessment of training (yes or no, method, details of assessment, how to improve)

【Assessment of human resource development plan, policy and training system】



(Source: JICA expert team)

Figure 2-2: Items and procedures of the survey for Assessment

(2) Outline of the Assessment

The items and procedures of the survey for Assessment are shown in Figure 2-2. The survey for Assessment was conducted by interviewing MOEE persons in charge by specialized staff for the Project.

The main themes of the survey for Assessment were organizations, training policy and plan, budget for human resource development, external training and training in a third country.

(3) Assessment Results

Assessment report was submitted to JICA in December 2016 (Annex 4). Human Resources Development (HRD) plan of MOEE is not unified and each organization have different training policy. Framework of systematic and sustainable training system needs to be established. Therefore, JICA expert team supported to establish the Training Center Preparation Committee (TCPC) to consider the framework. Assessment results are shown below.

(a) Organization and Policy of HRD

Current condition	Each organization has HRD department and understands the necessity of systematic and sustainable training system.
Issue	Since HRD policy of MOEE is not unified, systematic and sustainable training system is not conducted.
Support policy by JICA expert team	Working group related to HRD will be supported to establish a framework of systematic and sustainable training system.

(b) Training Program

Current condition	- After the training program for the next fiscal year is proposed, high officials decide a training program based on budget and importance of program. - There are overseas training programs - There are training programs lectured by trainer from other institutions. - The contents of training program have been reviewed after it finishes.
Issue	- Ad-hoc trainings have been conducted and training programs are different in each year due to budget limitation. - Each organization has the experiences of cancellation of training program due to the shortage of budget in the end of fiscal year.
Support policy by JICA expert team	Working group related to HRD will be supported to establish a framework of systematic and sustainable training system.

(c) HRD budget

Current condition	- Each organization applies HRD budget every year. - 1,000 kyats / day allocated to each organization as food cost (this situation is common throughout all ministries and government offices).
Issue	- The amount of HRD budget is different every year. - Each organization compensates food cost. - Travel expenses and daily allowance is mainly allocated as HRD budget and the remain of budget is not enough to install facility for new training.
Support policy by JICA expert team	Working group related to HRD will be supported to establish a framework of systematic and sustainable training system to secure the budget.

(d) Personnel Evaluation

Current condition	- Each organization has an evaluation system for trainee in training. - Trainees who got excellent result in examination of the training have a chance to be promoted and to take overseas training.
Issue	Criteria are not unified.
Support policy by JICA expert team	Example of HRD system in other ministries and Japan will be introduced.

(e) Training Center and Facilities

Current condition	- There are training facilities in Yangon and Nay Pyi Taw and group training for all MOEE employees is conducted in Nay Pyi Taw. - There are substation and distribution line for training in YESC training center.
Issue	There are no training facilities in Nay Pyi Taw central training center.
Support policy by JICA expert team	Training facilities will be installed in Nay Pyi Taw central training center.

(f) Textbook and Trainer

Current condition	- There are textbooks in specific fields. - There are no trainers who work for full-time and some engineers work as trainer for part-time.
Issue	Textbooks are not organized systematically, some of them includes copies of the catalog.
Support policy by JICA expert team	Example of HRD system in other ministries and Japan will be introduced.

(g) Personnel Transfer Policy

Current condition	Employees normally transfer after 3-5 years and are sometimes in charge of quite different work after transfer (for example, from power generation department to distribution department).
Issue	It is difficult to establish a long-term plan to educate an expert in specific department.
Support policy by JICA expert team	Framework for establishment of effective short-term training system will be discussed.

2.6 Working group activities (September to November 2016)

In addition to the lectures given by JICA experts, group discussion was held to discuss and choose the main contents of textbooks by each of organized five working groups. Additionally, the result of discussion was made presentation on by a trainer candidate to others for the purpose of sharing information each other and capacity building as a trainer.

The JICA expert team understand that these activities could contribute to the improvement of both the discussion ability and presentation skills (preparing materials and speech) of trainer candidates. And this approach was a good opportunity for JICA experts to grasp English skill and level of basic knowledge on electric power engineering of trainer candidates.

Main periods and the contents of WG activities are as follows.

No.	Periods	Main contents of activities
1st	5th September – 9th September 2016	- Lecture on electric power technologies in Japan (Training system, construction work and maintenance work) - Discussion to prepare training programs and textbooks
2nd	17th October – 4th November 2016	

2.7 The 1st Joint Coordinating Committee (JCC)

The 1st Joint Coordinating Committee was held on the 3rd November 2016.
The JICA expert team had conducted prior explanation of the contents of JCC to executive members on MOEE and CEO or Managing Director of related department within the MOEE so that the JCC meeting could be proceeded smoothly. But the permanent secretary and some executive members who scheduled to attend the JCC were absent from the meeting due to business schedule (agenda and attendance list: Annex 5).
In the JCC, two representatives from the trainer candidates as shown above made a presentation to executives of MOEE. After practicing preliminary presentation exercises by presenters several times with JICA experts, they could explain appropriately, from project outline to PDM, explanation of monitoring sheet, according to conference materials. In the JCC, the implementation structure of the Project and the indicators for PDM were approved.

After JCC was finished, a brief discussion was held between Director General of DEPP and trainer candidates.

(Source: JICA expert team)

Figure 2-3: 1st JCC meeting
(Left: meeting scene, Right: discussion between DG of DEPP and trainer candidates)

2.8 Work Plan and Instruction to change the project Policy by Deputy Minister of Electricity and Energy

2.8.1 Past activities for preparing work plan

The work plan for the Project is expected to be prepared mainly not by JICA side but by MOEE side.

The JICA expert team prepared draft work plan at the beginning of the Project. The contents of draft work plan were explained to MOEE from July 2016 and the JICA expert team asked MOEE to provide their comments on draft work plan after explanation. There were no comments from MOEE and it was decided that the work plan would be finalized in December 2016 after the contents of draft work plan were confirmed in the 1st JCC.

After the 1st JCC, Deputy Minister of Electricity and Energy (hereinafter referred to as "Deputy Minister") instructed the Project team to change the policy of the work plan as described in Section 2.8.2. Once, the JICA expert team submitted the work plan as of the 1st JCC to JICA in December 2016 and decided that the policy on the revision of work plan would be discussed with MOEE side.

2.8.2 Instruction to change the project policy by Deputy Minister of Electricity and Energy

Deputy Minister who had been newly assigned in September 2016 told JICA side to change the policy of technical transfer activity in the JICA project and stop the WG activities including cooperation work which intends to transfer technical skill from JICA experts to MOEE engineers. The intentions of Deputy Minister were as follows;

- Myanmar engineers cannot endure a high-level training course in which the trainee actively discusses or presents his or her opinion. It is difficult for them to establish training system based on creative ideas generated through an active discussion. The study style and manner of Myanmar people is basically different from that of Japanese people. Japanese trainers should

teach them not knowhow but knowledge thoroughly;

- Training textbooks should be prepared not by cooperation work between JICA experts and MOEE engineers. JICA experts should prepare them without MOEE engineers. MOEE engineers do not have enough knowledge to prepare training textbooks;
- Trainer candidates should continue to stay in Nay Pyi Taw at least continuous three (3) months and training course should be intensively conducted.

The work plan after January 2017 was revised based on the instruction by Deputy Minister.

2.9 1st Workshop / Seminar in Japan

2.9.1 Workshop in Japan for engineer class (January – February 2017)

(1) Period

1st batch: 15th January – 28th January 2017

2nd batch: 29th January – 11th February 2017

(2) No. of participants

1st batch: 14 engineers from MOEE

2nd batch: 13 engineers from MOEE

Total : 27 engineers from MOEE (all of 27 trainer candidates)

(3) Outline of Workshop

Target of Workshop: Learning the outline of power industry in Japan and power facilities and technologies of Japanese manufacturers to develop capacities of transmission and distribution system engineers of Myanmar

Target 1 Understanding power industry in Japan	Target 2 Understanding the history and the outline of systems of power transmission, substation and distribution	Target 3 Knowing equipment or construction technologies of power transmission, substation and distribution through seminar for introducing technologies by Japanese manufactures
[Lecture] (1st and 2nd batches) - Outline of power industry in Japan	[Lecture] (1st and 2nd batches) - Outline of substation - Outline of Distribution line [Site visits] (1st and 2nd batches) - Human Resource Training Center of Chubu Electric Power Co, Inc. - Substations of Chubu Electric Power Co, Inc. -- Customer Service Office of Chubu Electric Power Co,	[Site visits] (1st and 2nd batches) - Fuji Electric Co., Ltd. - Meidensha Corporation - TAKAOKA TOKO CO., LTD. - NIPPON CONCRETE INDUSTRIES CO., LTD. - Fujikura Ltd. - Education & Training center of TOENEC CORPORATION (1st batch) - NGK INSULATORS, LTD. - ENERGY SUPPORT CORPORATION (2nd batch) - AICHI ELECTRIC CO., LTD. -Nippon Kouatsu Electric Co., Ltd. [Seminar] (1st and 2nd batches) - Seminar for introducing technologies by Japanese manufactures (Ten (10) manufactures for each batch)

(4) Results and Remarks of Workshop

i) Lectures

The outline of Chubu Electric Power Co., Inc. (hereinafter referred to as “CEPCO”), which is one of parent companies of JERA Co., Inc., was explained so that participants could understand the efforts for stable power supply in The Chubu Region where there are many manufacturers. And tasks and/or outline of facilities of substations, customer service offices and human resource development center were explained so that participants could understand operation and maintenance work for power facilities and human resource development framework.

ii) Discussion/ Practice/ Exercise/ Presentation

All participants were the trainer candidates who were and would be trained through the Project. Therefore, the contents of site visits and lectures were selected so as to achieve the outputs for a limited period in consideration of the technical level of participants.

The wrap-up meeting was held on the final day and the review of the workshop was discussed comprehensively between JICA side and participants. The impressions and comments of participants are follows;

- They could acquire practical knowledge through seminar for introducing technologies by Japanese manufactures. And they could know a lot of Japanese products that are expected to be effectively used in Myanmar.
- They felt disappointed that there were many restrictions in provision of detailed specifications and taking photos during site visits to manufactures’ factories or power facility sites.
- If the practical demonstration about the construction method was shown, they could have gained deeper understanding.

iii) Site visits and seminar

Site visits to factories or training center of Japanese companies were conducted in consideration of power facilities and technologies that can be introduced in Myanmar.

- Fuji Electric Co., Ltd. (Transformers and switchgears for substations etc.)
- Meidensha Corporation (Transformers and switchgears for substations, mobile substations etc.)
- TAKAOKA TOKO CO., LTD. (Transformers and switchgears for substations, step-voltage regulators etc.)
- NIPPON CONCRETE INDUSTRIES CO., LTD. (Concrete poles etc.)
- Fujikura Ltd. (Conductors for overhead transmission and distribution lines, cables for underground transmission and distribution lines etc.)
- Education & Training center of TOENEC CORPORATION (Training system, training facilities etc.)
- NGK INSULATORS, LTD. (Insulators for transmission and distribution lines etc.)
- ENERGY SUPPORT CORPORATION (Switchgears for distribution, cutouts etc.)

- AICHI ELECTRIC CO., LTD. (Transformers for substations, distribution transformers, step-voltage regulators etc.)
- Nippon Kouatsu Electric Co., Ltd. (Switchgears for distribution, cutouts, fuses etc.)

In addition to the site tour in the factories as mentioned above, seminar for introducing Japanese technologies was held in order to introduce Japanese technologies which were not introduced during site visits.
The contents that participants understood and the impression of them about the technologies of Japanese manufacturers are as follows;

- They could learn the excellent technologies of Japanese manufacturers and know what products would be effectively used in Myanmar,
- They had a chance to see and touch some actual distribution materials during seminar and it contributes their deep understanding,
- Through the explanation by each manufacturer or observation of manufacturing processes, they could understand the reasons why the lifecycle of Japanese products is more excellent,
- The fulfillment of not only OJT in site-work offices but also Off-JT in a training center contributes to the enhancement of the general technical level in the whole of a company, and it is quite effective for maintaining high level of construction work technologies,
- Training system in Japanese is integrally and systematically configurated in a long-term sustainable manner. They hoped that this system would be introduced in Myanmar someday.
- They understood that a mobile substation is effective for the reduction of power outage duration. And they were surprised at the scale of the Japanese mobile substation is very compact.
- The site visit to the substation of CEPCO gave them much knowledge. They could learn the measures for the prevention of power failures and the measures in case of occurrence of power failures, and understand how the Japanese power company can maintain high electric power quality.

(5) Texts/ Materials/ Facilities

Since the participants were trainer candidates, the opportunities that they could see and touch the training materials and facilities were emphasized in this workshop. The participants made a site visits to the Transmission/ Substation training center and Distribution training center of the power company and training center of the power facility construction work company. Many participants had an impression that they could learn the training facilities and educational framework based on the accumulated knowhow, which would be referred to when they establish the human resource development plan, therefore the JICA expert team thinks that this curriculum was quite effective for them.

(Source: JICA expert team)

Figure 2-4: Scenes of Workshop in Japan for Engineer Class

(Left: site visit to a customer service office of CEPCO; Right: site visit to the concrete pole factory)

2.9.2 Seminar in Japan for Manager Class (May 2017)

(1) Period

21st May – 27th May 2017

(2) No. of participants

1 executive-class participant, 9 ordinary participants; Total 10 participants

(3) Outline of Seminar

Target of Seminar: Learning the outline of power industry in Japan and power facilities and technologies of Japanese manufactures to understand main points of the project "The Project for Capacity Development of Power Transmission and Distribution System"

Target 1 Understanding the history of power industry in Japan and outline of power transmission, substation and distribution	Target 2 Understanding the outline of human resource development framework and training system in an electric power company in Japan	Target 3 Knowing transmission, substation and distribution equipment that can be introduced in Myanmar by introducing technologies by Japanese manufactures
[Lecture] - Outline of power industry in Japan - Trails of Electricity Business in Japan - Outline of substation - Outline of Distribution line	[Site visits] - Chubu Electric Power Co, Inc. (1) Transmission/ Substation Training Center (2) Distribution Training Center (3) Nagoya Regional Dispatching Center (4) Historical Records Museum - Education & Training center of TOENEC CORPORATION	[Seminar] - Fuji Electric Co., Ltd. - Meidensha Corporation - Nissin Electric Co, Ltd - Mitsubishi Electric Corporation - Nippon Kouatsu Electric Co., Ltd.

(4) Results and Remarks of Seminar

i) Lectures

As with the case of Workshop for engineer class, the outline of power industry in Japan and the history of the development of the power industry in Japan were explained. And the contents of facilities and technologies of transmission, substation, distribution etc. of CEPCO.

ii) Discussion/ Practice/ Exercise/ Presentation

JERA staff always accompanied participants and timely corresponded to Questions & Answers and exchange of opinions. And the wrap-up meeting was held on the final day and the review of the workshop was discussed comprehensively between JICA side and participants.

All participants seemed to be satisfied at the seminar by site survey to a training site using actual power facilities and transferring knowledge by lectures, but there were many opinions that they hoped that they would learn power technologies. They had a longing for Japanese-style training system and power equipment manufactured in Japan, and there were many opinions that Japanese-style training system and the latest power equipment manufactured in Japan should be introduced in Myanmar someday.

iii) Site visits and seminar

Participants observed the scene of actual training in transmission / substation training center and distribution training center, and they gained deeper understanding of human resource development framework and training system in the electric power company in Japan. And they also visited to training center of the power facility construction work company in order that they could understand construction quality and work safety system for construction works in Japan. There seemed to be few chances that they visited to the actual construction sites, and participants eagerly observed training of construction work.

Seminar for introducing Japanese products and technologies was conducted by the following five (5) representative electric power equipment manufacturers of Japan. Participants had much interest in all Japanese products and technologies and they eagerly listened to the explanation about high-level Japanese technologies. They also reflected their opinions in the questionnaire for seminar that they would like to introduce Japanese product of each manufacturer.

- Fuji Electric Co., Ltd. (GIS, Compact-type GIS etc.)
- Meidensha Corporation (Transformers for substations, mobile substations etc.)
- Nissin Electric Co, Ltd (Can-type or tank-type phase modifying facilities for substations etc.)
- Mitsubishi Electric Corporation (Protection relays for power systems etc.)
- Nippon Kouatsu Electric Co., Ltd. (Switchgears for distribution, cutouts switch, low-voltage fuses etc.)

(5) Period/ Order of curricula/ Contents

All participants are high-class electric engineers who belong to counterpart organizations of the project "The Project for Capacity Development of Power Transmission and Distribution System." Since they were busy on their daily works as the person in charge of each section, the effective contents of site visits and lectures were selected so that participants would understand advantages of Japanese products and technologies for a short period of one week.

Some participants said their opinions that the period for the seminar should be longer so that participants could learn more about knowledge and technologies. But the JICA expert team thinks that curricula for

practical purpose should be conducted in workshop for engineers, and seminar for manager class should focus mainly on the introduction of Japanese technologies and products.

(6) Texts/ Materials/ Facilities

As for the curricula of the seminar, the JICA expert team placed importance on as many opportunities as possible to see and touch to actual Japanese materials and facilities. For this reason, transmission / substation training center and distribution training center of the power company and the training center of the power facility construction work company were selected as the sites for visiting. And the schedule on visiting the training centers was considered so that participants could visit there just when a training course or practice was conducted and they could observe the scene of actual training or practice. As the result of site visit to these training centers, they could see the situation of training in Japan with their own eyes, and there was an opinion that entire Japanese-style training system should be transferred just as it is to training centers in Myanmar.

(Source: JICA expert team)

Figure 2-5: Scenes of Seminar in Japan for manager class

(Left: site visit to Transmission/ Substation Training Center of CEPCO
Right: site visit to Nagoya Regional Dispatching Center of CEPCO)

2.9.3 Utilization of Workshop/ Seminar Results

(1) Workshop / Seminar Results

Participants eagerly listened to the explanation and actively asked questions during both lectures and site visits. They could understand Japanese technologies and products and their expectations to and confidence in the Project could be deepened. They expressed their opinion that they would like to introduce Japanese technologies related to the latest products or training system in Myanmar near future.

After they returned to Myanmar, a debriefing session was held by participants. Some key members of MOEE took part in the debriefing session and the information about advantages of Japanese products and

technologies could be reported to them.

(2) Utilization of Results

The JICA expert team understands that the interest in Japanese products and technologies could be disseminated in Myanmar and the motivation of high-class MOEE engineers to actively introduce Japanese products and technologies could be deepened. The JICA expert team will make a proposal in light of long-term reliability and cost-benefit performance and follow up the proposal so that Japanese products and technologies may be introduced in Myanmar and contribute to the improvement of power facilities in Myanmar.

(Source: JICA expert team)

Figure 2-6: Scene of Debriefing session after participants' return from Japan

2.10 WG activities (after December 2016)

As described above, after the instruction of Deputy Minister, it was decided that the discussion by each WG should be suspended and JICA experts would give a lecture to trainer candidate for the time being at least.

JICA experts would give trainer candidate a lecture after workshops in Japan in January to February and before water festival in Myanmar in April. In this lecture, technologies for distribution loss reduction and practical exercise of distribution line designing work on site using GPS position measuring apparatus, and these training contents got a favorable comment from trainer candidates. And after new laptop computers were purchased, practical exercise of data treatment of GPS position measuring apparatus and preparation

of design drawing were also conducted.

(Source: JICA expert team)

Figure 2-7: Scene of a lecture in Nay Pyi Taw central training center

2.11 Textbook Preparation and Lecture by JICA Expert Team

2.11.1 Textbook preparation by JICA Expert Team

As project policy regarding textbook preparation, textbooks are needed to be prepared under cooperation trainer candidates and JICA experts to achieve technical transfer efficiently. However, in Dec. 2016, Deputy Minister instructed the change of the policy and ordered that the first edition of textbooks should be prepared by the JICA expert team only. After discussion with JICA Headquarters and JICA Myanmar office, the JICA expert team decided to change the policy and to prepare the first edition of textbooks.

However, it is important that trainer candidates can modify the textbooks by themselves in line with the actual situation of Myanmar. JICA experts have explained that trainer candidates shall modify the textbooks through discussion with JICA experts, when trainer candidates notify that there are some contents to be revised or different technologies between Myanmar and Japan in the first edition of textbooks.

As mentioned above, in accordance with the instructions from the Deputy Minister, JICA experts prepared and submitted to MOEE the first edition of more than fifty sets of textbooks based on technologies of Japanese electric power company as shown in Annex. Textbooks have been prepared in line with the themes for the five WGs, Distribution Planning and Design (WG1), Distribution Construction Work and Safety Technologies (WG2), Distribution Operation and Maintenance (WG3),

Transmission Line (WG4) and Distribution Substation (WG5). Textbooks were checked by high-class persons of MOEE appointed by Deputy Minister. After check by them, textbooks of five themes were distributed to high-class persons of MOEE, all trainer candidates, libraries of each institution.

2.11.2 Lectures by JICA Expert Team

After textbook preparation, textbooks were mainly used in lectures by JICA experts. JICA experts have lectured using figures and photos as supplementary item so that trainer candidates can understand lecture deeply and easily. Lectures for five themes by JICA experts were completed by Dec. 2017. After Dec., the JICA expert team has supported to conduct regional seminar by trainer candidates from the viewpoint of technical aspects. In addition, the JICA expert team has lectured detail technologies required for Myanmar system, and conducted OJT to introduce the multi-transformer system which contributes to reduce distribution loss were conducted by trainer candidates.

2.12 Presentation of the achievement of lectures by trainer candidates

2.12.1 Background, plan and preparation of the presentation of the achievement

Since MOEE executives had a request to confirm the knowledge acquired by trainer candidates and the degree of their growth as a prospective trainer which were outcome of this Project, the Project team planed trainer candidates' presentation to Deputy Minister and senior-level persons of each organization. Considering the restrictions on participating time by Deputy Minister etc. and the situation that it would be the first time for trainer candidates to be lecturers, it was decided that one representative would be selected from each WG, and each representative would make a presentation on each of five themes.

Since the trainer candidate is required to have various skills of planning and preparing the implementation of training courses in the future, trainer candidates basically carried out necessary coordination and preparation necessary for the presentation for MOEE high-class persons by themselves, and JICA experts supported to them only in case of inadequate planning and progress management. At first, the project team intended to prepare the presentation material early and ensure the time for the practice of the presentation. But, as a result, most of the time was spent on preparation of presentation materials because the preparation period was only about one week.

2.12.2 Presentation Results

Presentations of the achievement of attending lectures were given to the Deputy Minister and the representatives of each MOEE organization by trainer candidates on Jan. 23rd, 2018. After the Deputy Minister told his own experience of taking training courses in the past and addressed an opening speech to encourage trainer candidates, the representative of each WG (refer to the table below) make a presentation on the achievement obtained by taking the training for 40 minutes including question and answer.

Table 2-6: Representative presenters of each Working Group

WG	Theme of Presentation	Presenter
WG 1	Distribution Planning and Design	Mr. Soe Ko Ko Aung
WG 2	Distribution Construction Work and Safety Technologies	Mr. Zaw Htike
WG 3	Distribution Operation and Maintenance	Mr. Kyaw Soe Lin
WG 4	Transmission Line	Mr. Myint Oo
WG 5	Distribution Substation	Mr. Tayzar Lin

(Source: JICA expert team)

Although the Deputy Minister left the venue after the presentation by WG1 and WG2, the Deputy Minister and high-class persons of each MOEE organization commented on the contents of the presentation of each WG.

In several WG presentation, MOEE high-class persons asked questions about the outline and the contents of checklists used in Japan, requested JICA experts to provide the checklists used in Japan. It is felt that MOEE wants to improve power supply system by adopting Japanese technical standards and operation rules. In response to this request, JICA experts provided as many checklists as possible. JICA experts advised trainer candidates to make use of them after revising in accordance with the situation in Myanmar because the power facilities and surroundings in Myanmar are different from those in Japan. In addition, since as there were technical questions that the trainer candidates could not answer to high-class persons, JICA experts explained the contents of them again, which had been already explained in the lectures, so that trainer candidates can understand them easily and deeply. As for the contents which had been not lectured, JICA experts explained the contents in detail in response to MOEE needs, and JICA experts in charge of each WG followed up.

The trainer candidates took lectures for a long time so far, but this presentation session was their first experience to make presentation to the high-class persons of MOEE such as the Deputy Minister. There seemed to be level difference in the contents of the presentation by each WG. As a reason of level difference, it was thought that existence of leader in each WG had influenced on the performance of the presentation, since the presentations were conducted by one person among each WG member.

Some contents were almost the same as the presentation materials which were lectured by JICA experts. Other contents were partly extracted from the material of other countries. By presenting them without understanding sufficiently, unsatisfactory items were pointed out by high-class persons.

However, it is thought that trainer candidates could learn a way of thinking and attitude required as trainers by several experiences such as preparation of the presentation material, observation of the presentations of other WGs, answer to the comments from the high-class persons and change of their situation their situation from trainees to trainers. The trainer candidates make use of these experiences to prepare presentation material of regional seminars.

2.13 Activities for Training Center Institutional Development of MOEE

Proposal of support for training center institutional development of MOEE has been approved through the explanation to Deputy Minister which was done on Dec. 19, 2018, and 2nd JCC which was held on Dec. 20th, 2018. Deputy Minister intends to establish Working Group (WG) for training center institutional development. Therefore, the JICA expert team will support MOEE activities through our advice. Since Deputy Minister is interested in training system of other ministry in Myanmar, the JICA expert team shared the information about site survey of other ministry such as Ministry of Construction (MOC) and Ministry of Transportation and Communication (MOTC).

2.13.1 Workshop about Training Center Institutional Development

Workshop about Training Center Institutional Development was held on Feb. 1st. Deputy Minister and Permanent Secretary had a plan to participate in the workshop, but they were absent unfortunately. On the other hand, DG and MD of DEPP, DPTSC, ESE, EPGE and DHPI participated. Recommendation of Training Center Preparation Committee (TCPC) establishment has applied by workshop. On Feb. 2nd, official letter to propose TCPC was submitted to Deputy Minister and he approved establishment of TCPC. The JICA expert team developed draft TCPC discussion materials including the key issues for the establishment of training center.

2.13.2 Working Group Activity of Training Center Preparation Committee

Kick-off meeting of WG was held on Jun. 4th, 2018 by utilizing the discussion material prepared by the JICA expert team. Organizational structure of training center was mainly discussed.

2.13.3 Preparation and Submission of Discussion Material for Central Training Center Institutional Development

After the 1st WG, it became clear that the establishment of new organization for training center is difficult due to budget constraint. However, it is still important to enhance training system of MOEE even without establishing a new organization in order to maximize the impact of training with limited budget as a short-term. As a long-term, it is important to establish training center as an institution to provide necessary training programs systematically and sustainably to the large number of officers/staffs of MOEE. Discussion material for central training center institutional development was submitted to DEPP in November 2018 (Annex 8).

2.14 The 2nd Joint Coordinating Committee (JCC)

The 2nd Joint Coordinating Committee (JCC) was held on the 20th Dec. 2017. Prior to the 2nd JCC, on Dec. 19th, the previous day of JCC, the JICA expert team explained the work plan after Jan. 2018 to the Deputy Minister. There was no particular objective opinion given by the Deputy Minister, and approval was given on Jan. 2018 to support the training activities of candidate instructors and the framework of human resource development system. Approval was obtained regarding the efforts to support the training

activities by trainer candidates and establishment of human resource development framework will be started after Jan. 2018.

In the JCC, executives from each MOEE organization attended, including the JCC Chairperson, MOEE permanent secretary, U Tin Maung Oo (agenda and attendance list: Annex 5).

(Source: JICA expert team)

Figure 2-8: The 2nd JCC Meeting

In the JCC, after explaining the text preparation and lectures to trainer candidates by the JICA experts, the JICA expert team explained the draft work plan after Jan. 2018 and got the approval. And the plan of the seminars in regional cities was explained which would be scheduled from Jun. to Jul. 2018.

In the question and answer session in JCC, MOEE executives requested that trainer candidates should make presentations about their achievements of lectures that they participated until Dec. 2017. As a result of the coordination, it was decided that the JICA expert team would invite trainer candidates to Nay Pyi Taw in Jan. 2018 and the trainer candidates would present their achievement to MOEE executives by each of the five WG themes on Jan. 23rd (Tuesday, scheduled).

After the end of JCC, U Thin Maung Oo, MOEE Permanent Secretary instructed trainer candidates to learn the technologies firmly in the training course in Japan.

2.15 2nd Workshop / Seminar in Japan

2.15.1 Workshop in Japan for engineer class (February – March 2018)

(1) Period

1st batch: Feb. 4th – Feb. 17th 2018

2nd batch: Feb. 18th – Mar. 3rd 2018

(2) Number of participants

1st batch: 14 engineers from MOEE

2nd batch: 13 engineers from MOEE

Total : 27 engineers from MOEE (all of 27 trainer candidates)

(3) Outline of Workshop

Target of Workshop: Learning the outline of power industry in Japan, power facilities and technologies of Japanese manufacturers and measures for environment to develop capacities of transmission and distribution system engineers of Myanmar

Target 1	Target 2	Target 3
Understanding the outline of human resource development and training system in Japan	Learning the technologies of power supply systems measures for environment	Knowing equipment of power transmission, substation and distribution by the introduction of technologies of Japanese manufactures
[Site visits] - Education & Training Center (training facility) of TOENEC Corporation - Training Center of C-Tech Corporation	[Site visits] - Chubu Electric Power Co, Inc. -- Power system dispatching center -- Higashi-Shimizu Frequency Converter Substation -- 275/77kV Substation and ultra-high voltage transmission line -- Underground Substation -- Insulating-oil recycle center -- Handa customer service office - Odaka customer service office of TOENEC Corporation (construction work of distribution line)	[Site visits] - Fuji Electric Co., Ltd. - Nissin Electric Co., Ltd. - Yazaki Energy System Corporation - Hitachi IE systems Co., Ltd. - Furukawa Electric Works Co., Ltd. - NGK Insulators, Ltd. - Chubu Seiki Co. Ltd.

(4) Results and Remarks of Workshop

i) Site visits

(a) Training center

Site visits to training center of Japanese companies were conducted to acquire the knowledge of training system.

- Education & Training Center of TOENEC Corporation (Facility for creating safety awareness, experience of actual work, experience of safety training, etc.)

- Training Center of C-Tech Corporation (Inspection method of substation protection relay, etc.)

(b) Electric power company

In the workshop of Jan. 2017, site visits to the power system equipment under 77kV were conducted. Therefore, in this workshop, site visits to the facilities of the 275kV system, which will be useful for the Myanmar electric power system in the future, was applied.

- Chubu Electric Power Co., Inc.
  -- Power system dispatch center (Supervision and operation of ultra-high voltage substation and transmission line, etc.)
  -- Higashi-Shimizu Frequency Converter Substation (275kV GIS, equipment of frequency converter between 50 Hz and 60 Hz, etc.)

-- 275/77kV Substation and ultra-high voltage transmission line (275kV air insulation substation, 275kV overhead and underground transmission line, etc.)
-- Underground Substation (Underground substation in city area)
-- Insulating-oil recycle center (Recycle method of insulating-oil with PCB, etc.)
-- Handa customer service office (Distribution automation system, 33kV distribution line, 33kV/6.6kV compact substation, etc.)

- Odaka customer service office of TOENEC Corporation (Construction work of distribution line, management of construction work, etc.)

(c) Manufacturer of electric power equipment

Manufacturer are different from the manufacturers which accepted to conduct the site visit or seminar in 2017. High quality and reliability were realized by observing products, operation verification of software and inspection of reliability.

- Fuji Electric Co., Ltd. (Software design and simulation of distribution automation system, etc.)

- Nissin Electric Co., Ltd. (Transformers and switchgears for substations, etc.)

- Yazaki Energy System Corporation (Conductors, etc.)

- Hitachi IE systems Co., Ltd. (Protection relay of distribution substation, etc.)

- Furukawa Electric Works Co., Ltd. (Connector of distribution wire, etc.)

- NGK Insulators, Ltd. (Insulators, etc.)

- Chubu Seiki Co. Ltd. (Smart meter, electroscope, etc.)

ii) Discussion

The wrap-up meeting was held on the final day and the review of the workshop was discussed comprehensively between JICA side and participants. The impressions and comments of participants are follows;

- They could acquire practical knowledge through site visits. And they could know a lot of Japanese products that are expected to be effectively used in Myanmar.
- They could have gained deeper understanding by the practical demonstration about the construction method.
- The fulfillment of not only OJT in site-work offices but also Off-JT in a training center contributes to the enhancement of the general technical level in the whole of a company, and it is quite effective for maintaining high level of construction work technologies.

(5) Texts/ Materials/ Facilities

Translator between Myanmar language and Japanese accompanied all programs. The participants could deeply understand Japanese technology and know-how by explaining it in Myanmar language. The opportunities that the participants can experience practical work, see product test, learn training system and study countermeasure of environment issue, were emphasized in response to the request from them.

(Source: JICA expert team)

Figure 2-9: Scenes of Workshop in Japan for engineer class
(Left: site visit to load dispatch center of CEPCO; Right: site of distribution line construction work)

2.15.2 Utilization of Workshop Results

(1) Workshop results

The participants eagerly listened to the explanation and actively asked questions during the site visits. They could deeply understand Japanese products and technologies. They expressed their opinion that they would like to introduce Japanese technologies related to the latest products or training system in Myanmar near future. After they returned to Myanmar, a debriefing session to Deputy Minister and some key members of MOEE was held. Advantages of Japanese products and technologies could be reported to them. Therefore, the JICA expert team thinks that this curriculum was quite effective for MOEE.

(2) Utilization of results

The JICA expert team understands that the key members of MOEE are interested in Japanese products and technologies through the debriefing session. The JICA expert team will continue to conduct technical transfer so that Japanese products and technologies may be introduced in Myanmar and contribute the improvement of power facilities in Myanmar.

2.15.3 Seminar in Japan for manager class (May 2018)

(1) Period

May 13th –May 23th 2018

(2) Number of participants

6 manager class participants

(3) Outline of Seminar

Target of Seminar: Learning the outline of power industry in Japan, power facilities and technologies of Japanese manufacturers and measures for environment to develop capacities of transmission and distribution system engineers of Myanmar.

Target 1 Understanding the history of power industry in Japan and outline of power transmission, substation and distribution Learning countermeasures of environment issue	Target 2 Understanding the outline of human resource development framework and training system in an electric power company in Japan	Target 3 Knowing transmission, substation and distribution equipment that can be introduced in Myanmar by introducing technologies of Japanese manufactures
[Lecture] - Outline of power industry in Japan - Trails of Electricity Business in Japan [Site visits] - Chubu Electric Power Co, Inc. -- Nagoya load dispatching control center -- Higashi-Shimizu Frequency Converter Substation -- 275/77kV Substation and ultra-high voltage transmission line -- Kita customer service office -- Historical museum	[Lecture] - Outline of human resource development and training system in electric power company [Site visits] - Chubu Electric Power Co, Inc. -- Transmission/ substation training center -- Distribution training center -- Distribution training center of Nagoya branch office - Education & Training center of TOENEC Corporation	[Site visits] - Yazaki Energy System Corporation - Meidensha Corporation

(4) Results and Remarks of Seminar

i) Lectures

The JICA expert team introduced three topics such as outline of power industry in Japan, trails of electricity business in Japan, outline of human resource development and training system in Chubu Electric Power Co., Inc. The participants could understand the common point and the difference between Myanmar and Japan, and the high reliability and safety based on the technologies of transmission, substation and distribution.

ii) Site visits

(a) Training center

Site visits to training center of Japanese companies were conducted to acquire the knowledge of training system.

- Chubu Electric Power Co., Inc.

-- Transmission and substation training center (Training facilities and equipment of transmission and substation, protection relay for training, etc.)
-- Distribution training center (Training facilities and equipment of overhead and underground distribution line, etc.)
-- Distribution training center of Nagoya branch office (Training facilities and equipment of overhead and underground distribution line, etc.)

- Education & Training Center of TOENEC Corporation (Facility for creating safety awareness, experience of actual work, experience of wearing insulation clothes, etc.)

(b) Electric power company

Site visits to the facilities electric power company, which will be useful for the Myanmar electric power system in the future, was applied.

- Chubu Electric Power Co., Inc.
-- Nagoya load dispatching center (Simulator for training, supervision and operation of ultra-high voltage substation and transmission line, etc.)
-- Higashi-Shimizu Frequency Converter Substation of Chubu Electric Power Co, Inc. (275kV GIS, equipment of frequency converter between 50 Hz and 60 Hz, etc.)
-- 275/77kV Substation and ultra-high voltage transmission line of Chubu Electric Power Co, Inc. (275kV air insulation substation, 275kV overhead and underground transmission line, etc.)
-- Kita customer service office (Distribution automation system, operation and maintenance method of distribution facilities, etc.)
-- Historical museum (Trails of electricity business and technology development, etc.)

(c) Manufacturer of electric power equipment

High quality and reliability of Japanese products were realized by observing products and inspection of reliability. The participants had much interest in all Japanese products and technologies and they eagerly listened to the explanation about high-level Japanese technologies.

- Yazaki Energy System Corporation (Conductors, etc.)

- Meidensha Corporation (GIS, transformers of substations, lightning arrester, etc.)

iii) Discussion

The wrap-up meeting was held on the final day and the review of the workshop was discussed comprehensively between JICA side and participants. All participants seemed to be satisfied at the seminar by site survey to a training site using actual power facilities and transferring knowledge by lectures. In addition, there were many opinions that Japanese-style training system and the latest power equipment manufactured in Japan should be introduced in Myanmar in the future.

(5) Texts/ Materials/ Facilities

Translator between Myanmar language and Japanese accompanied all programs. The participants could deeply understand Japanese technology and know-how by explaining it in Myanmar language. The opportunities that the participants can see product test, learn training system and study countermeasure of environment issue, were emphasized in response to the request from them.

(Source: JICA expert team)

Figure 2-10: Scenes of Seminar in Japan for manager class

(Left: site visit to Training Center of TOENEC, Right: site visit to Meidensha Corporation)

2.15.4 Utilization of Seminar Results

The participants eagerly listened to the explanation and actively asked questions during both lectures and site visits, so they could understand Japanese technologies and products. In addition, their expectation and confidence in the Project could be deepened. They expressed their opinion that they would like to introduce Japanese technologies to improve the power system in Myanmar, and training system to establish a training center in Myanmar.

2.16 Procured Training Materials and Equipment

Equipment for safety (safety belt, electroscope, etc.) and equipment for power facilities (transformer, conductor, etc.) are selected and procured based on the following policy.

- Considering utilization of Japanese technologies which are expected to be effectively used in Myanmar.
- Selecting materials and equipment which Myanmar engineers can deal with and train how to use in the future

- Considering the long-run use performance and the maintenance performance of Japanese products
- Introducing equipment that JICA experts are familiar with how to deal with to implement training and guidance effectively
- Introducing materials and equipment that meet with MOEE organizations' wish so that they will be introduced to actual power facility sites

Some of equipment and materials to be procured have been introduced as actual operation equipment at the pilot site with the introduction to the training center in Nay Pyi Taw. Japanese products with high quality can contribute to improve the electricity supply capability and Myanmar engineers can learn the function and handling of the equipment through the actual operation. In addition, it can be expected that the effectiveness and maintenance technology of Japanese products will be spread to the whole of Myanmar.

2.16.1 Procured Training Equipment for Safety

There are many disasters in distribution work, such as fall disasters and electric shock disasters. Therefore, countermeasures are important. Safety awareness will be created through mastery of know-how in group training at training center and dissemination of know-how to workers of local areas. Then, it is possible to prevent many disasters beforehand. It can be expected that safety equipment and materials will be spread to whole of Myanmar by realizing the disaster prevention effect. Table 2-7 shows procured equipment in the Project. These equipment for safety was stored in NPT training center.

Table 2-7: Procured Equipment for Safety

Equipment for safety	Overview and prospective effect	Purchase Quantity
Safety Belt and Safety Rope	[Overview] Fall prevention equipment that a worker wears when engaging in a high place work [Effect] - Prevention of fall disasters on workplaces	10
11kV Electroscope (Warning sound type)	[Overview] Checking whether the line is energized or not before starting a work with power outage (When voltage is detected, the electroscope gives a warning sound.) [Effect] - Prevention of electric shock disasters of workers	10
33-66kV Electroscope (Pinwheel type)	[Overview] Checking whether the line is energized or not before starting a work with power outage (When voltage is detected, the electroscope gives a warning sound or a visual message) [Effect] - Prevention of electric shock disasters of workers	10
Grounding tool for work	[Overview] After confirming the power outage with a voltage detector, a ground tools for work is installed to connect the power outage area to the ground electrically. [Effect] - Prevention of danger of electric shocks due to erroneous turning on the electricity, confusion with other circuits or induction from other circuits.	10 sets
Separation distance measuring instrument	[Overview] Measuring the separation distance of an energized part by means of insulated rods with ruler [Effect] - Prevention of electric shock disasters of workers - Work efficiency for designing transmission lines or distribution lines	5
Laser-type distance measurer	[Overview] Measuring the distance to an object in a non-contact state.by means of laser [Effect] - Prevention of electric shock disasters of workers - Work efficiency for designing transmission lines or distribution lines	5

2.16.2 Procured Training Materials and Equipment for Power Facilities

Distribution loss and failure will be reduced by introducing Japanese products which have the effect such as reduction of loss and voltage drop by wire connector, prevention of wire disconnection, minimization of power outage area by rapidly isolating failed sections at section switch and so on. Therefore, it is possible to achieve the project indicators in this project. In addition, measures for reduction of distribution loss and the number of failures can be effectively spread to the whole of Myanmar. Procured training materials and equipment for power facilities are shown in Table 2-8 and Table 2-9. These materials and equipment for power facilities were installed to NPT training center and actual pilot distribution lines.

Table 2-8: Procured Training Materials and Equipment for Power Facilities (1/2)

Equipment for power facilities	Overview and prospective effect	Purchase Quantity
11kV line switchgear with overcurrent breaking function	[Overview] Switchgear which can break load current and interrupt fault current due to short-circuit fault or ground fault on a distribution line [Effect] - Reducing a power outage range by the appropriate separation of a fault point - Early discovery and recovery of the fault point	3 Nos (Rated current is around 600A)
Small-capacity pole-mounted transformer (three phase & single phase)	[Overview] Small-capacity distribution transformer whose size is so small as to be installed on a distribution pole [Effect] -Distribution loss reduction by introducing multi-transformer system - Improvement of voltage drop	Single-phase 25kVA: 6Nos 50KVA: 5Nos Three-phase 100kVA: 4Nos 200kVA: 3Nos Total 18Nos
Insulators for 11kV distribution line	[Overview] 11kV specification insulator which satisfies technical standard and requirements in Japan [Effect] - Reducing the number of faults by virtue of higher dielectric strength - Facility damage prevention	Pin insulator: 9 Nos Strain insulator: 100 Nos
Current Limiting Arcing Horn	[Overview] Arc horn for a medium-voltage insulator with ZnO (zinc oxide) element on the ground side of the horn, through which lightning surge current flows, and following current can be broken promptly as same as a lightning arrester. [Effect] - Preventing breakage of an insulator due to following current and disconnection of medium-voltage overhead wires due to spot arc caused by a lightning stroke	60 Nos
Reinforced concrete pole	[Overview] Concrete pole manufactured by pre-stressed method based on Japanese Industrial Standards (JIS) [Effect] - Reducing the number of breakage accidents of distribution poles - Enabling introduction of larger-size conductors, pole-mounted transformer and so on by virtue of reinforced mechanical strength	12m (*1) pole: 10 Nos Length: 12m End diameter: 19cm Cracking Test Load: 500kgf

Table 2-9: Procured Training Materials and Equipment for Power Facilities (2/2)

Equipment for power facilities	Overview and prospective effect	Purchase Quantity
Enclosed cutout switch	[Overview] Cutout switch installed to the primary side of 11/0.4kV distribution transformer, an energized part is completely covered [Effect] - Suppressing deterioration of fuses (improving reliability of distribution system) - Preventing open arc and a fault due to touch to another object	50 Nos Fuse (20A): 80Nos Fuse (6A): 8 Nos
Parallel Joint Connector (PJ Connector) and Cover for connector	[Overview] Distribution medium voltage wires or low voltage wires are connected strongly by PJ connectors [Effect] - Preventing heat and reducing distribution losses because the resistance on connection point is not increased - Preventing disconnection of conductors	- For connecting 5mm Copper wire and 5mm Copper wire: 300 sets - For connecting 5mm Copper wire and 60mm^2 Copper wire: 50 sets - For connecting 60mm^2 Copper wire and 60mm^2 Copper wire: 150 sets
Middle voltage insulated wire (SAC cable)	[Overview] Middle voltage conductor covered with insulation layer [Effect] - Preventing distribution fault due to touch to another object - Preventing public electric shock disaster - Preventing electricity theft (Reducing non-technical loss)	500 m
Low voltage insulated wire	[Overview] Low voltage conductor covered with insulation layer [Effect] - Preventing distribution fault due to touch to another object - Preventing public electric shock disaster - Preventing electricity theft (Reducing non-technical loss)	4mm OW wire: 200m 5mm OW wire: 200m 60mm^2 OW wire: 300m [OW wire: Outdoor Weatherproof]
Insulation-resistance Measuring Apparatus	[Overview] Used to judge whether an insulation performance of a distribution line or equipment is good or defective [Effect] - Detecting defective points after completion of construction work - Early discovery and an early recovery of the fault point when a ground fault occurs on a distribution line or power facility	5
GPS Position Measuring Apparatus	[Overview] Site position locating when conducting a site survey for designing transmission or distribution line [Effect] - Improving work efficiency of design work	10
Infrared Thermograph	[Overview] Investigating defective or deteriorated points of a power facility by touchless measuring the temperature of parts of a power facility (Making use of infrared radiation phenomenon) [Effect] - Early discovery of defective or deteriorated points of a power facility without the necessity of power outage for inspection	5

2.16.3 Equipment Installed to Actual Distribution Lines and OJT for Installation

Two SOG circuit breakers (line switchgear with overcurrent breaking function) and one 3-phase 100kV transformer were installed to the actual distribution lines to confirm the effectiveness with MOEE engineers. (SOGs were installed in Tatkon and Kyaukpadaung, 3-phase 100kV transformer was installed in Tatkon.) These equipment are expected to be contributed for reduction of distribution loss and improvement of reliability. JICA expert team conducted OJT regarding installation of these facilities as shown in Table 2-10, Table 2-11. The location of SOG and transformer was decided based on discussion among trainer candidates, township engineers and JICA expert team. Township engineers has monitored SOGs every month to evaluate the effectiveness of saving time and area of blackout.

Table 2-10: OJT for Installation of 3-Phase Transformer

Date	Place	Contents of OJT
4th April 2018	Dala Township, YESC	Design of distribution network using Multi Transformer Systems (Evaluation of effect of loss reduction by the system)
16th May 2018	Bagan Township, MESC*	
17th May 2018	Takton Township, ESE	
1st August 2018	Kyaukpadaung Township, MESC	

*: At first, Bagan was selected as pilot site. However, Kyaukpadaung was selected as pilot site based on the site survey and evaluation of distribution loss to enhance the effect of loss reduction.

(Source: JICA Expert Team)

Table 2-11: OJT for Installation of SOG

Date	Place	Contents of OJT
19th March 2018	Takton Township, ESE	Supervision of construction work Operation methods Data collection methods Facility inspection before installation
15th May 2018	Kyaukpadaung Township, MESC	Site survey of pilot site Selection methods of pilot site Facility inspection before installation
1st August 2018		Operation methods Data collection methods

(Source: JICA Expert Team)

Table 2-12: Pilot Sites of SOGs

Township	District	Organization
Tatkon	Nay Pyi Taw	ESE
Kyaukpadaung	Nyaung Oo	MESC

(Source: JICA Expert Team)

Table 2-13: Pilot Sites of 3-Phase Transformers

Capacity	Voltage	Phase	Township	District	Organization
200kVA	11-6.6/0.4kV	3-phase	Dala	Yangon	YESC
200kVA	11-6.6/0.4kV	3-phase			
200kVA	11-6.6/0.4kV	3-phase			
100kVA	11/0.4kV	3-phase	Kyaukpadaung	Nyaung Oo	MESC
100kVA	11/0.4kV	3-phase			
100kVA	11/0.4kV	3-phase	Tatkon	Nay Pyi Taw	ESE

(Source: JICA Expert Team)

Table 2-14: Pilot Sites of 1-Phase Transformers

Capacity	Voltage	Phase	Township	District	Organization
25kVA	11/0.4kV	1-phase	Pyinmana	Nay Pyi Taw	ESE
50kVA	11/0.4kV	1-phase			
25kVA	11/0.4kV	1-phase	Pathein	Ayeyarwaddy	
50kVA	11/0.4kV	1-phase			
25kVA	11/0.4kV	1-phase	Magway	Magway	
50kVA	11/0.4kV	1-phase			
25kVA	11/0.4kV	1-phase	Taunggyi	Taunggyi	
50kVA	11/0.4kV	1-phase			
25kVA	11/0.4kV	1-phase	Kyaukpadaung	Nyaung Oo	MESC
50kVA	11/0.4kV	1-phase			

(Source: JICA Expert Team)

(Source: JICA Expert Team)

Figure 2-11: Switch Gear and Transformer Installed to the Actual Distribution Line
(Left: Switch Gear in Tatkon, Right: 3-Phase Transformer in Tatkon)

2.16.4 Distribution Line for Training in Nay Pyi Taw Central Training Center

Concrete poles, middle voltage lines, switch gears, transformers, low voltage lines and guy wires were installed as training facilities on Nay Pyi Taw central training center. These facilities allow engineers to

conduct trainings to acquire the knowledges and skills of operation and maintenance because training center has same facilities as facilities installed to actual distribution line.

(Source: JICA Expert Team)

Figure 2-12: Distribution Line for Training in Nay Pyi Taw Central Training Center

2.17 Plan, Preparation and Implementation for Seminar at Major Cities

2.17.1 Planning for Seminar at Major Cities

It is necessary that the objectives of the project shall be understood not only in Nay Pyi Taw but in regional areas and that training shall be conducted effectively in regional areas. Therefore, the project team are going to holding a seminar at some regional cities.

Training at regional cities are conducting by TCs not only for transfer the skills acquired in the training in Nay Pyi Taw but for development of capacity on TCs as a trainer. The JICA expert team will participate in the seminar as advisor and follow up on raising opinions from trainees and regional staffs. Regional cities to conduct the training are following six (6) cities.

YESC area: Yangon
MESC area: Mandalay
ESE area: Bago, Magway, Taunggyi, Monywa

JICA experts discussed schedule of the seminar with MOEE and TCs, and MOEE. It was decided that the seminar will be held from Jun. to Jul. 2018, and periods of seminar at each city be one week. Schedule of regional city seminar is shown in Annex 6.

JICA experts also discuss degree of difficulty of lecture material with TCs. As a result, it was decided that target of trainee be Assistant Engineer and Sub Assistant Engineer class.

2.17.2 Preparation for Seminar at Major Cities

TCs are gathered to Nay Pyi Taw from beginning of March to April and they start preparation of lecture materials for regional seminar by five working groups. JICA experts indicated that the lecture materials should include not only textbook's contents but also knowledge on Japanese technologies which were acquired during training in NPT and Japanese workshops. JICA experts assisted to the preparation of teaching materials.

By using the prepared teaching material, each trainer candidate conducted preparatory exercise of teaching in WG activities held from 2nd May 2018 at Nay Pyi Taw. (Other members of the same WG take training as role of Trainee, and point out each other about teaching skills, and improve the training skill.) TCs prepared and revised lecture materials at NPT not only for regional city seminar but as useful textbook for Myanmar power sector.

Rehearsal of lecture by TCs was conducted in three steps.

In first stage of rehearsal, TCs put out their opinions each other to contents of lecture materials and brushed up by each working group.

In second and third stage of rehearsal, every TCs repeated the trainings of lecture and other TCs and JICA experts point out revision of the prepared lecture materials.

In 28th May 2018, TCs made presentation to high-officials of MOEE for final preparation for training at regional cities. TCs has revised and finalized the teaching materials based on the comments by high-officials of MOEE.

2.17.3 Implementation for Seminar at Major Cities

Total 30 sessions were implemented (five themes in six cities) by 26 trainer candidates. All trainer candidates were in charge of lecture at least once. All trainer candidates successfully conducted their lecture by careful preparation and lecture exercises in WG activities and they could answer the technical questions from trainees (JICA expert team partly followed the questions). On the final day of each seminar, trainees received certificate.

After seminar, trainer candidates and JICA expert team reviewed the attitude of trainer, the contents of presentation material and so on.

Table 2-15: City, Period and the Number of Trainees in Seminar

No.	City	Period	The maximum number of trainees
1	Magway	6th to 8th June 2018	24
	Monywa	11th to 13th June 2018	16
2	Taunggyi	27th to 29th June 2018	20
	Mandalay	2nd to 4th July 2018	29
3	Bago	16th to 18th July 2018	15
	Yangon	20th, 23th and 24th 2018	36

(Source: JICA Expert Team)

2.18 Examination of Confirming Understanding of Trainer Candidates

Examinations were implemented in three stages in order to confirm the understanding of trainer candidates, the improvement of their capability and to proceed the lecture by JICA expert team effectively.

Stage 1: Confirmation of their understanding for lectures in each WG activity

Stage 2: Confirmation of their level in one theme that each of them is in charge of after seminar in major cities

Stage 3: Confirmation of their level in five themes after all WG activities

2.18.1 Confirmation of Understanding for Lectures in each WG Activity

Table 2-16 shows the results of the examination to confirm their understanding for lectures in each WG activity from June to December 2017. The examination score for safety is relatively high. On the other hand, the score for fundamental knowledges is relatively low, which are basic theory of electricity and drawing of the power vector. Regarding the fundamental knowledges, JICA expert team followed their study by lectures.

Table 2-16: Results of the Examination in each WG Activity

Date	Average score / Full score	Test scope (main)
10th July 2017	44.7 / 60	Technical standards in Japan, Calculation for transformer, Design of distribution network, Safety of construction work for distribution line and basic knowledge of finance
25th August 2017	52.3 / 100	Sag calculation of distribution line, calculation of voltage improvement, distribution automation system, drawing of power vector and impedance calculation
1st November 2017	81.2 / 100	Distribution planning and design, safety of construction work for distribution line and calculation of reactive power
5th December 2017	43.5 / 100	Basic knowledge of transmission line, sag and tension calculation of transmission line and measures of lightning fault
21st December 2017	74.4 / 100	Safety of construction work for distribution line, facilities in substation, current transformer
Average of all examinations	65.2	

(Source: JICA Expert Team)

2.18.2 Confirmation of the Level related to One Theme after Seminar in Major Cities

Trainer candidates took the examination to confirm of their level related to one theme that each trainer candidate is in charge of. The purpose is to confirm the effect of improvement of their understanding through the lecture in seminar. Table 2-17 shows the results of the examination.

Table 2-17: Results of the Examination after Seminar in Major Cities

WG / Theme	Average score / Full score	Contents with low score
WG 1 / Distribution Planning and Design	65.0 / 100	Calculation applying basic theory
WG 2 / Distribution Construction and Safety Technologies	90.0 / 100	Not applicable
WG 3 / Distribution Operation and Maintenance	60.0 / 100	Protection relay setting, calculation related to voltage management
WG 4 / Transmission	64.0 / 100	Calculation applying basic theory
WG 5 / Distribution Substation	61.6 / 100	Calculation applying basic theory

(Source: JICA Expert Team)

As a result of raising the difficulty level of the examination to confirm their understanding, the score decreased as compared with the test in 2017. However, it is commendable result because they could answer the problems which can not be solved under the previous understanding. After the examination, JICA expert team followed their study to improve further understanding.

2.18.3 Confirmation of the Level related to Five Themes after all WG Activities

Trainer candidates took the examination to confirm of their level related to five themes after all WG activities. The purpose is to confirm the improvement of their understanding and capacity through the project and to confirm whether they have ability and capacity as a trainer. Table 2-18 shows the results of the examination.

Although the examination results related to the basic theory improved, there was a difference in understanding level for distribution planning and design. The reason is considered that they are whether the members accompanying the site survey for application of the multi-transformer system or not. Although there is the content with low score, they can be evaluated that comprehensive understanding of them has deepened because they can answer theoretically.

Table 2-18: Results of the Examination after All WG Activities

WG / Theme	Average score / Full score	Contents with low score
WG 1 / Distribution Planning and Design	74.6 / 100	Application for actual work (planning, design)
WG 2 / Distribution Construction and Safety Technologies	97.0 / 100	Not applicable
WG 3 / Distribution Operation and Maintenance	95.2 / 100	Not applicable
WG 4 / Transmission	97.7 / 100	Not applicable
WG 5 / Distribution Substation	97.1 / 100	Not applicable

(Source: JICA Expert Team)

2.19 Trainer Certification Ceremony

Trainer certification ceremony was held on 27th September 2018. All 26 trainer candidates were certified as having the qualities and the abilities as a trainer of MOEE. Union Minister, Deputy Minister, DG, MD, CEO, Director of MOEE participated the ceremony.

(Source: MOEE)

Figure 2-13: The Scene of Trainer Certification Ceremony

2.20 The 3rd Joint Coordinating Committee (JCC)

The 3rd Joint Coordinating Committee (JCC) was held on the 6th November 2018. Mr. Soe Ko Ko Aung as representative of C/P reported their achievements in the project. MOEE approved the monitoring sheet, the activities for training system development and the draft work plan for Phase II reported by JICA expert team (agenda and attendance list: Annex 5).

Chapter 3 Issues, Ingenuities and Lessons concerning management and implementation of the Projects

3.1 Issues, Ingenuities and Lessons concerning Management and Implementation of the Projects

(1) Facilitation of the Process related to Decision-making on Myanmar Side

Convocation of WG activities, implementation of regional seminars, holding JCC, etc. require prior approval by the MOEE side, and in many cases, it must be approved by the Deputy Minister or the Director General of DEPP. Therefore, the JICA expert team arranged the schedule early and adjusted it with the MOEE side. The confirmation / approval to the senior officials of MOEE is made based on the contents of a letter addressed to MOEE that the JICA expert team submits. Two Myanmar experts were arranged in the JICA expert team of the Project so that the preparation time on the JICA expert team side could be shortened, and communication with the MOEE side could be facilitated.

(2) Introduction of training materials and equipment / Transferring operation technologies

In the Project, training materials and equipment were selected from the Japanese technologies that are practically applied in actual sites in Japan with the view of introducing equipment and technologies suitable for Myanmar. These materials and equipment were introduced not only in MOEE Training Center but also in pilot sites selected from actual distribution line so that MOEE engineers could realize usability and introduction effect. As pilot sites, JICA expert team and C/Ps selected sites for the areas near MOEE Training Center, or sites among the areas near the workplaces of trainer candidates where the introduction effect should be expected. The operations of introduced equipment were periodically monitored after introduction. Technical guidance targeted to both trainer candidates and local engineers on equipment installation techniques, site examination methods and operating methods were conducted at the pilot sites in addition to a lecture in advance at MOEE Training Center.

In addition, in order to deepen understanding of trainer candidates, training and technical seminars on Japanese technologies and products were conducted at MOEE in cooperation with manufacturers of introduced products.

On installing products to MOEE Training Center and pilot sites, the JICA expert team used installation materials, accessories and parts that are easily procured in Myanmar as much as possible so that MOEE can follow its existing installation method. As a result, it is expected that MOEE engineers will promote the introduction of equipment and materials with Japanese technologies while utilizing existing technology.

(3) Selection of Trainer Candidates and Accreditation of Trainers

At first, the number of trainer candidates was planned to be twenty, but because of high interest of MOEE side, twenty-seven (27) MOEE engineers were convened as a trainer candidate in the beginning of the Project. The trainer candidates were convened from all over the country in anticipation of conducting training activities

throughout Myanmar in the future.

Although it is undeniable that there was variation in the ability of the trainer candidates, all of the trainer candidates were eventually certified as a MOEE trainer by virtue of JICA experts' guidance on training themes according to periodical capability confirmation examination and the result of questionnaires to ask their requests to technologies to be taught, and self-help efforts of trainer candidates themselves in addition to continuous technology transfers by JICA experts.

Some trainer candidates were unwilling to become a MOEE trainer at the beginning of the Project, because only the condition “A trainee can learn the latest technologies of Japan” was informed of them. However, through the training of two years, their awareness as a MOEE trainer had been grown by receiving the instruction of a senior official of MOEE etc. And finally, all of trainer candidates could grow up to be able to teach as a trainer at the regional seminars held in June and July 2018.

However, MOEE is not familiar with the training system utilizing the PDCA cycle aimed at introduction in the Project. In order to establish sustainable training system, MOEE needs to further understand the purpose of the PDCA cycle and proceed its own training activities.

(4) Preparation of Training Tools

At the beginning of the Project, JICA expert team planned to prepare training handouts and materials with the trainer candidates after examining training curriculums and syllabi during WG activities based on the result of identifying the technologies and training needs directly linked to the existing transmission and distribution works. However, the Deputy Minister designated a policy change in December 2016 that the JICA expert team should prepare the training materials in which Japanese technologies and methods are reflected and conduct trainings on them to trainer candidates

In addition, the training materials prepared by JICA experts were initially PowerPoint format that are easy to understand, but in July 2017, there was an instruction from the Deputy Minister that the training materials should be textbooks in a booklet form. So, the JICA expert team recreated textbooks in a booklet form by December 2017.

In order to effectively advance technology transfer in the Project, MOEE engineers including trainer candidates who could understand the situation and issues related to power transmission and distribution in Myanmar should have selected Japanese technologies and created their own textbooks with the contents of the practical technologies made use of in Myanmar after JICA experts finished all training menus. But the method, style, contents of the textbooks were not revised and are quite different from those the JICA expert team supposed at first. In order to establish sustainable training system, the JICA expert team believes that MOEE should adopt good points of the Japan's training system and experience, and try training in light of the custom of Myanmar.

In order to make use of the contents learned from the training in the fields of transmission and distribution work and to realize the outcomes, efforts to incorporate Japanese experience into Myanmar is important. In addition, although Phase I activity was limited to the formulation of only textbooks, textbooks should

be created in which only the necessary items are selected and reflected after preparing training programs, curriculum and syllabus from the viewpoint of current situation analysis and solving problems.

(5) Promoting understanding of technologies and products through training in Japan

Regarding Japanese technologies such as equipment used in substations which are difficult to be introduced at MOEE Training Center in Nay Pyi Taw, the JICA expert team set up a curriculum such as technical explanation by the equipment manufacturers in Japan and inspection of manufacturers' factories as training in Japan.

Since trainer candidates are human resources who are expected to play important roles in MOEE in the future, application technologies in the field of power transmission and distribution such as Ultra-High Voltage DC transmission (Frequency Converter Station) and neutral grounding system, etc. were introduced from the viewpoint of the future demand and possibility of introducing technologies to Myanmar.

Furthermore, in addition to training in Japan for targeting trainer candidates (called "Workshop" in MOEE), JICA held training in Japan for manager class officers of MOEE (called "Seminar" in MOEE) so that understanding and cooperation on the Project could be improved and they could understand the necessity of training and human resource development.

(6) Support for efforts to establish human resource development framework

Since the policy change order from the Deputy Minister in December 2016, the JICA side could not obtain the understanding of MOEE about the significance of the activity of the Project. For approximately one year from January 2017, the activities related to establishing human resource development framework had been stopped, and for this period, the activities that the JICA expert team could do in Myanmar were only preparation of textbooks and conducting trainings to trainer candidates. The JICA expert team could resume the effort to establish human resource development framework in January 2018 and had been promoting support such as proposing draft human resource development system for MOEE until the end of Phase I.

The Deputy Minister instructed that efforts to establish human resource development framework should be proceeded by MOEE on its own initiative, but efforts are being stopped at the end of phase I. It seems to be the factor of it that both the electric power side departments and the energy side departments inside the MOEE cannot successfully coordinate the establishment of the training organization and the policy.

The JICA expert team advised and supported MOEE on efforts to establish human resource development framework during Phase I and identified what items should be examined in the future and presented it to the MOEE side. In order to promote the establishment of human resource development framework, it is necessary to confirm the status of progress of examination and activities of MOEE side and continue to advise through the phase II.

(7) Budget allowance for training

Currently, since there is no human resource development system established at MOEE, sufficient budget for training is not secured. The training period in the Project is about three (3) months at maximum, during which time trainer candidates from local areas stayed at the dormitory of MOEE Training Center in Nay Pyi Taw. Voices of dissatisfaction were raised by some trainer candidates, and the reasons of their dissatisfaction were no provision of transportation expenses for returning to the area in the middle of the period, few daily allowances and delay in the payment of them. In consideration of the initial agreement between JICA and MOEE, these expenses should be borne by MOEE, however taking into consideration the importance of implementation of the Project, JICA took measures such as the burden of meal fee at the time of training.

It was desirable that many trainer candidates could have experienced lecturers as much as possible at the seminar. However, in order to save the budget for training the selected regional cities could be moved by bus within one day from the Nay Pyi Taw, and due to the constraints of the bus that JICA hired, each trainer candidate participated one or two regional seminars.

In addition, it was decided that JICA would bear the cost of materials for grounding work and materials for installation of equipment for MOEE Training Center in Nay Pyi Taw.

At present, there is concern that the training daily for trainees from MOEE, transportation expenses etc. are not sufficiently handled and the motivation for training may be adversely affected. If JICA gives ample budget in Phase II of the Project, MOEE's own training program after the Project completion cannot secure sufficient budget. Under this situation, there will be possibility of stopping sustainable training system because shortage of training budget may have an adverse effect on the sound management of the training system. Regarding training budget allowance by MOEE, it is necessary for both the JICA side and the MOEE side to fully discuss and MOEE should recognize and deal with it.

3.2 Lessons concerning management and implementation of the Projects

(1) Decision Making Process by MOEE

The chief administrator on MOEE side of the Project is the permanent secretary who is the JCC Chairperson, but the decision of the MOEE depends largely on the instruction of the Deputy Minister of MOEE. In the Project, the Work Plan was formulated based on the content of R / D, but the important policy had been changed by the instructions of the Deputy Minister in the middle of Phase I. Therefore, as for important policies and activities, it is necessary to ask for instructions from MOEE senior officials or the Deputy Minister without deciding only by JICA experts and C/Ps consultation. When MOEE instructs change of important policies and activities, it is necessary for the JICA expert team to promptly consult with JICA, and decide the response policy.

(2) Differences between Myanmar’s and Japan's View on Training

There is a difference in the concept of training between Japan, where trainees themselves are required to

learn with doubts and task consciousness, and Myanmar, where trainees learn by one-way listening to the training from lecturers. When conducting training activities at MOEE, this point should be paid attention to, and it is necessary to take measures so that the trainee can acquire what he / she learned. In addition, the person's training attendance history is evaluated by the accumulation of "the theme of training course", "the number of times of attendance" and "the length of attendance period" rather than by what he / she learned and acquired. This point should be taken into consideration when formulating evaluation criteria for trainees.

Although the trainee absolutely obeys instructions from the upper level officers of MOEE, there is a tendency that trainee will not do action unless instructed from upper level, and he / she does not have a habit of analyzing the situation on his/ her own and trying to improve by devising creativity and ingenuity. This is a decisive concern in terms of reliable implementation of the PDCA cycle, which is necessary for sustainable progress of the training system and improvement according to the situation. In order to overcome such a situation, it is necessary to train skills such as current situation analysis, problem discovery and problem solving not only in training but also in normal business performance and to establish them.

(3) Difficulty in technical data acquisition and information disclosure

In order to create training curriculum, syllabus and textbook, it is essential to obtain technical materials and information from the MOEE side to grasp the work methods and technical situation in power transmission and distribution in Myanmar. However, even if asking MOEE for provision of materials or information, the material or information is not provided in most cases. There may be cases where the information is confidential and cannot be disclosed externally, or the information / data itself is not maintained / retained. Therefore, it is necessary to proceed with the Project on the premise that such materials or information and data are difficult to obtain.

(4) Procurement of Japanese products

When importing Japanese products to Myanmar, there seems to be complex rules unique to Myanmar in its importation procedures and others. Therefore, in many cases it takes more time to transport and proceed importation procedures to Myanmar (import custom declaration etc.) than the manufacturing process of products. One should be careful that it may take more delivery times than usual in case of procuring Japanese products, especially if the manufacture's transactions in Myanmar are shallow and it does not have agents or import know-how. However, the domestic rules of Myanmar have been often changed recently, and regulation may be relaxed.

Chapter 4 Achievement Level of Project Purpose

4.1 Overall Goal and Project Purpose

4.1.1 Outline of Project Indicators

Project Indicators were established to check the achievement of the Project. Project Indicators established after discussion with MOEE are as follows.

Item	Contents of Indicators
Overall Goal	-Distribution loss rate in the whole of Myanmar -Total number and duration of faults (minutes per fault) in distribution system in the whole of Myanmar
Project Purposes	- Number of training conducted by a certificated trainer - Number of work accidents at distribution line work sites - Distribution loss rate at pilot sites - Total number and duration of faults (minutes per fault) in distribution system at pilot sites

These indicators were approved in the 1st JCC held on the 3rd November 2016. As the Project was subsequently progressed including the finish of the baseline survey, it became clear that the data necessary for these indicators were not recorded and that the definition of the data or the data acquisition method was not unified in MOEE. It is difficult to evaluate the achievements by using unified indicators across Myanmar in a whole. For this reason, distribution loss rate as the indicator for overall goal was taken as the transmission / distribution loss rate of MOEE that could be aggregated throughout the country.

The JICA expert team explained the necessity of data acquisition and requested MOEE the data collection and compilation of statistics on total number of faults and total duration of faults in distribution system for many times during Phase I. But the actual records of Myanmar country as a whole were not presented by MOEE. For this reason, the target value for this indicator has yet to be set. It was decided that this item would remain as the indicator for overall goal because it can show the effect of the Project itself appropriately even though the target value has yet to be set. In other Southeast Asian countries, data on the actual annual records on faults in distribution system are collected and statistics is compilated and disclosed. So, keeping statistic based on collected data is not so difficult also for Myanmar in particular.

Also, in Phase II of the Project, continuous appealing to MOEE to tackle statistic treatment regarding actual records on power faults in distribution system and support for it should be necessary, and this effort should be subject to technology transfer in Phase II. The target value should be determined with reference to actual values of other Southeast Asian countries (See table below).

[Reference] Total duration of power outages in other South East Asian countries (FY 2016) [Excerpt]

Country	Total duration of power outages (minutes/customer/year)
Indonesia	1,532
Viet Nam	1,651
Cambodia	1,370

(Reference) Electric Power Industry Statistics in Asia (FY2016) (Japan Electric Power Information Center)

The indicators and actual value/target value of them related overall goal and project purpose are shown in Table 4-1 and Table 4-3 respectively. In addition, the indicator related to power fault in Table 4-1 indicates actual records in areas where past data were obtained throughout the year as a reference value.

Table 4-1: Indicators related to overall goal

Indicators	Actual Value at the time of starting the Project (FY 2015 to 2016)	Actual Value at the time of the end of Phase I (FY 2017 to 2018)	Target Value when 3 years have passed since the end of Phase II (FY 2024 to 2025)
Distribution loss rate (%) (Whole Myanmar)	15%	14%	11%
Total number of Power Faults in distribution system (Whole Myanmar) (No. / year)	Only actual records in areas where past data were obtained throughout the year are shown in Table 4-2as a reference value.		
Total number of Power Faults in distribution system (Whole Myanmar) (minutes / year)	Only actual records in areas where past data were obtained throughout the year are shown in Table 4-2 as a reference value.		

Table 4-2: Total number and total duration of power faults in distribution system per year [Reference]

Area	Actual Value at the time of starting the Project (FY 2015 to 2016)	
	Total number and of power faults in distribution system (No./ year)	Total duration of power faults in distribution system (minutes/ year)
Ayeyarwady	355	1,414
Bago West	95	1,210
Kayar	324	929
Mon	269	904
Nay Pyi Taw	389	1,014

Table 4-3: Indicators related to project purpose

<table>
<tr><th>Indicators</th><th>Actual Value at the time of starting the Project
(FY 2015 to 2016)</th><th>Actual Value at the time of the end of Phase I (FY 2018)</th><th>Target Value at the end of Phase II
(FY 2021)</th></tr>
<tr><td>No. of trainings conducted by certificated trainers</td><td>0 times</td><td>0 times</td><td>More than ten (10) times</td></tr>
<tr><td>No. of victims of work accidents at distribution line work
(in Whole Myanmar, per year)</td><td>12 persons
(Year 2016)</td><td>11 persons
(Year 2017)</td><td>Less than 7 persons</td></tr>
<tr><td>Distribution loss rate at pilot sites (%)</td><td colspan="3"><table>
<tr><td>Pilot site</td><td>Actual value
(FY 2015-2016)</td><td>Actual value
(FY 2017-2018)</td><td>Target value
(FY 2021-2022)</td></tr>
<tr><td>Dala Township (YESC)</td><td>25.5%</td><td>22.5%</td><td>16%</td></tr>
<tr><td>Tatkon Township (ESE)</td><td>11.7%</td><td>14.3%</td><td>9%</td></tr>
<tr><td>Kyaukpadaung Township (MESC)</td><td>27.4%</td><td>24.3%</td><td>18%</td></tr>
</table></td></tr>
<tr><td>Total Number (No./year) & Total Duration (hours/ year) of power faults in substations at pilot sites</td><td colspan="3"><table>
<tr><td rowspan="2">Pilot site</td><td colspan="3">Total number / Total duration of power faults in substations</td></tr>
<tr><td>Actual value
(FY 2016)</td><td>Actual value
(FY 2017)</td><td>Target value
(FY 2021)</td></tr>
<tr><td>11kV distribution feeders in TatkonTownship (ESE)</td><td>37 Nos./
9 hours</td><td>27 Nos./
6 hours</td><td>16 Nos./
3.5 hours</td></tr>
<tr><td>11kV distribution feeders in Kyaukpadaung Township (MESC)</td><td>23 Nos./
100 hours</td><td>140 Nos./
57 hours</td><td>74 Nos./
30 hours</td></tr>
</table></td></tr>
</table>

4.1.2 Achievement of overall goal / project purpose

With regard to the indicators related to the overall goal shown in Table 4-1, target value when three (3) years have passed since the end of Phase I was determined based on the actual value at the time of starting the Project.

The distribution loss rate of 15% at the time of starting the project (2016 to 2017) has decreased to 14% at the end of Phase I (2017 to 2018), and the effect of the Project is limited to the range directly related to the Project in the present situation. But it is thought that the effect on the overall goal will appear with the development of Japanese ODA loan projects by ESE, YESC and MESC in the near future. Each of indicators related to project purpose shown in Table 4-3 is described below.

With regard to the number of trainings conducted by certificated trainers, C/P himself or herself conducted trainings as a lecturer at regional seminar in June to July 2018. But C/Ps were certified as MOEE trainers in September 2018. Therefore, the actual value of this indicator is “zero (0) times”. YESC independently are planning seminars lectured by certified trainers in December 2018, and the senior officials of MOEE are also thinking to make full use of certified trainers in MOEE original trainings onward. The JICA expert team expects that the achievement on this project purpose will be gradually progressed after the end of Phase I.

With regard to the number of victims of work accidents at distribution line work in MOEE, the target value throughout the whole of Myanmar could be set, because the actual records in the whole country were reported from MOEE. The JICA expert team intensively transferred technologies related to work safety in the Project to achieve this purpose. As a result, the number of victims was decreased from 12 persons (year 2016) to 11 persons (year 2017).

With regard to the distribution loss rate at the pilot site, since dissemination of loss reduction technologies to the whole area of Myanmar is difficult in a short period of time, the JICA expert team aimed at supporting the reduction of distribution loss in the pilot sites which were selected from the areas C/Ps were in charge of and expected that loss reduction technologies would be spread to other areas after technology transfer by JICA experts. The project team selected Takton, Dala and Kyaukpadaung Township in ESE, YESC and MESC because they were appropriate sites where OJT activities could be easily conducted and high reduction effected was expected. The pilot sites were determined after discussion with C/Ps (trainer candidates) in the managing meeting and consultation with ESE, YESC and MESC. The actual values of FY 2015 - 2016 and FY 2017 - 2018 are shown in Table 4-3. The distribution loss rates in Dala Township and Kyaukpadaung Township have been decreased by 3% by two years.

As mentioned above, regarding total number of power faults per year and total duration of power faults per year, the definition of the data, recording method and scope of data acquisition are not unified in MOEE and it is impossible to evaluate the achievement by using unified indicator of the whole of Myanmar. Therefore, as in the case of distribution loss, pilot sites were selected, and the effect of the Project was confirmed in limited areas. Two feeders, 11 kV Agri Farm feeder from Tatkon Ngwe Taung Substation and 11kV Feeder (1) feeder from Chauk Main Substation, were selected as the pilot feeders where SOG-VCB with the function of reducing fault section would be installed on a trial basis, because there were important loads such as a hospital on the power supply side from SOG-VCB installation point, and there were many faults that occurred on the load side in these feeders. The actual values in 2016 and 2017 are as shown in Table 4-3, and both the number of power faults and the duration have been dramatically reduced. After SOG-VCB installation, the number of power faults in the power supply side area is reduced, and the power supply reliability to important loads and so on has been improved.

For the monitoring in the pilot sites, a method of reporting periodically the actual results to the JICA expert team by a person in charge assigned among C/Ps (trainer candidates) was adopted.

4.2 Achievement of Project Outputs

Achievement related to each project output is as follows.

4.2.1 Achievement of Output 1

The indicators related to **Output 1 "The framework of human resource development planning is prepared"** and achievement of them are shown in Table 4-4.

Table 4-4: Indicators related to Output 1 and achievement of them

Indicator	Achievement (as of the end of Phase I)
1) More than one recommendation is applied in MOEE for improvements of financial and institutional challenges.	- Establishment of Training Center Preparation Committee (TCPC) was recommended and has been approved by Deputy Minister, it was decided that MOEE would tackle this effort to establishing human resource development framework initiatively.
2) More than one recommendation is applied in MOEE for improvements of technical challenges of transmission and distribution system including standardization.	- Introduction of multi-transformer system using small capacity transformers into medium voltage distribution lines was recommended and have been actually applied in townships over Myanmar. - Introduction of switchgears (SOG-VCB) with the load breaking function to protect a distribution line into medium voltage distribution lines was recommended and have been actually applied in townships over Myanmar. - There have been no attempts and actions toward technical standardization till now.
3) Human resource development plan / policy is proposed	- The direction of human resource development plan / policy was suggested

(Source: JICA Expert Team)

4.2.2 Achievement of Output 2

The indicators related to **Output 2 "Training programs are planned and implemented"** and achievement of them are shown in Table 4-5.

Table 4-5: Indicators related to Output 2 and achievement of them

Indicator	Achievement (as of the end of Phase I)
1) More than one training program is authorized.	- Regional Seminars for engineers in six major cities (Yangon, Mandalay, Taunggyi, Bago, Magway and Monywa) were authorized in MOEE and conducted in June and July 2018.
2) More than one syllabus, curriculum and textbook are prepared for each of trainings	- JICA experts prepared five themes of textbooks in English by December 2017. (Five themes were as Distribution Planning & Design, Distribution Construction Work & Safety Technologies, Distribution Operation & Maintenance, Transmission Line and Distribution Substation.) - Trainer Candidates have prepared materials for regional seminars, which were held in June and July 2018, based on above-mentioned textbooks - Any syllabus, curriculum and textbook were not prepared which were based on the systematized training program.
3) Training of Trainers (TOT) is implemented more than one time	- The JICA expert team conducted the intensive training as the part of TOT from March to December 2017 in total seven (7) months. - Regional seminars were conducted in June to July 2018 for the purpose of brushing up training skills of trainer candidates
4) More than twenty-six (26) trainers are 1certified	- Certificate Awarding Ceremony of Trainers was held on the 27th September 2018 and twenty-six (26) trainers candidates were certified as a new trainer by MOEE. (Of the 27 trainer candidates initially assigned, one was not certified because he quitted the activities of the Project due to personnel changes in MOEE.)
5) The trainer's accreditation system is authorized.	-Trainer's accreditation system has not been considered and reviewed yet because the activities of MOEE related to the establishment of human resource development framework is stopped.
6) Necessary equipment and materials for trainings are introduced.	- Equipment and materials for power distribution facilities (concrete pole, transformer, switchgear, electric wire, etc.) and safety equipment (safety belt, voltage detector, etc.) had been procured and were installed on MOEE Training Center.
7) More than one textbook related to technical standardization activity is prepared.	- JICA expert team inputted information about technical standardization into prepared textbooks and provided the information through TOT to trainer candidates.

4.2.3 Achievement of Output 3

The indicators related to **Output 3 "PDCA (Plan, Do, Check and Action) cycle for training system is established and practiced"** and achievement of them are shown in Table 4-6

Table 4-6: Indicators related to Output 3 and achievement of them

Indicator	Achievement (as of the end of Phase I)
1) Evaluation for trainings at least one (1) time.	- JICA experts and trainer candidates reflected on the training at regional seminars in June to July 2018 in WG activity in August 2018 and evaluated the implementation situation.
2) Feedback for next training plan at least one (1) time	- JICA experts and trainer candidates discussed how to utilize the evaluation results on implementation of regional seminars for the next training. - JICA experts and trainer candidates proposed improvement points and methods on the training planned for the future based on the evaluation results. - However, the timing, place, period, etc. of the next training have not been determined in MOEE yet.
3) Continuous practices of PDCA cycle	- In the course of reviewing and evaluating regional seminars, JICA experts explained to C/Ps (trainer candidates) and MOEE about the importance of practicing the PDCA cycle and they understood it. - Through the series of activities – planning/preparing, implementing, reviewing/evaluating regional seminar trainings, trainer candidates were sure to acquire the habit of conducting "PDCA" cycle. - In the period of Phase I, training by C/Ps could be conducted only one time and the Project is not at the stage for conducting continuous practice of PDCA cycle yet.

4.3 Project Evaluation

Joint monitoring activities with the C/Ps by using Monitoring Sheets were conducted periodically. In this part, based on the results of the Monitoring, Phase I of the Project (May 2016 to November 2018) is evaluated in accordance with the five criteria set by the DAC (Development Assistance Committee) Evaluation Criteria, namely (i) relevance, (ii) effectiveness, (iii) impact, (iv) efficiency and (v) sustainability.

4.3.1 Relevance

Relevance is considered “high” for the following reasons.

Priority	・In Myanmar, improvement of the capacity of human resources (engineers, technicians) engaged in electric power business is an urgent task as further expansion of electric power facilities is required, which is consistent with the goal of the Project.
Development Policy/ Goals	・In the economic policy (July 2016) of the new administration of Myanmar. "Rapid development of basic economic infrastructure such as electric power, roads and ports" is regarded as an important policy, and improvement of power supply capacity is positioned as an important issue for Myanmar. The Project is tackling human resource development to solve the various problems of the electric power

	sector, and it is consistent with the policy and goal of the Myanmar government. ・The Japanese Government has set "High Quality Infrastructure Partnership Initiative" and focuses on assistance for infrastructure in Asia. Efforts to human resource development in the Project can greatly contribute to the smooth implementation of power infrastructure development (transmission and distribution) and high development effect, so the Project is greatly conducive to the policy of the Japanese Government.
Strategy	・The approach of the Project aiming at Training of Trainers (TOT) and establishment of the PDCA cycle towards sustainable institution building of human resources development that MOEE does not realize is appropriate.
Division of roles between the Project and JICA other projects or other donors	・Projects relating to power transmission and distribution of the Myanmar power sector, implemented by JICA other projects, the World Bank or the Asian Development Bank, aim at equipment expansion plans or equipment formation (design, material procurement, construction etc.). Activities of efforts to human resources development in the Project can be expected to bring about the effect of facility introduction by smooth implementation of these projects and enhancement of operation and maintenance skills, so the relevance of the Project is high.

4.3.2 Effectiveness

Effectiveness is considered “low” for the following reasons. However, it is too early to evaluate “effectiveness” fully because the Project has just completed its first half “Phase I”.

- It cannot be said that the project purposes were sufficiently attained at the end of Phase I.

- At the end of Phase I, Outputs 1 and 3 out of the "expected outputs" have not been achieved. With regard to Output 2, prepared textbooks created by JICA experts specialize in Japanese technologies and need to be revised so as to meet the actual situation in Myanmar. So, it cannot be said that the achievement was satisfactory.

4.3.3 Impact

Impact is considered “relatively low” for the following reasons.

Prospect of achieving overall goal	・At the end of Phase I, the outlook for achieving the overall goal has not been set yet. However, training activities were conducted that will contribute to strengthening power facilities, improving the reliability of electricity supply, and reducing electricity loss, it is believed that approaches toward achieving the overall goal have been made. ・Japanese ODA loan projects " Power Distribution Improvement Project in Yangon (Phase I)" and "Power Distribution System Improvement Project in Major Cities"

	are included as external factors contributing to achievement of the overall goal. The former is less than one year from the start, the latter is not yet started. Although the effect is not present at the present stage, these two projects will have a big impact on achieving the overall goal by improving the facility improvement along with the completion of the Japanese ODA loan project in the future. ・It was confirmed during the project activities that trainer candidates in Phase I made effort to develop their capabilities based on Japanese technologies. The larger improvement effect on overall goals can be expected by efforts to develop transmission and distribution technologies made not only in Nay Pyi Taw but also in regional areas by dispatching newly-certified trainers to regional areas.
Ripple effects	< Ripple effect on policies and institutions > None in Particular < Ripple effect on target areas > As the expansion or the reinforcement of power facilities progresses in Myanmar, industrial development by virtue of improving the social infrastructure of the region, and improvement of the living level of the local residents are expected. < Other ripple effects> The Project introduced at the introduction of training facilities and set training themes that aimed at forming high-quality electric power facilities by introducing appropriate Japanese technologies. Such efforts may bring about technological transformation of power facilities in Myanmar.

4.3.4 Efficiency

Efficiency is considered “relatively low” for the following reasons.

Prospect of achieving outputs	<Output 1> Efforts to establish human resource development framework were stopped in the middle of Phase I of the Project and were restarted in January 2018. Since the WG activities on TCPC in MOEE side has not advanced yet and there is no plan to resume now, there is no prospect of achieving output 1 at the present time. <Output 2> Preparation of training textbooks by JICA experts, holding regional seminars, installation of training facilities on MOEE training center and so on were conducted as the activities of Phase I. But the textbook preparation and conducting trainings were not based on training curricula and syllabi in systematized training programs, which was targeted in the Project at first. Therefore, it is impossible to estimate at the present stage whether the initially expected level on Output 2 can be achieved at the

	end of the Project. <Output 3> The concept of PDCA cycle was explained to C/Ps in the Phase I activity and they understood it. But it is impossible to estimate at the present stage whether the concept and implementation of PDCA cycle will be established in the training system of MOEE in an organized manner after the Project is ended.
Input	<Project period, project cost> ・Phase I was promoted with the project period substantially as planned. However, the starting time of the phase II is undecided as of November 2018, and concerns remain in terms of the continuity of the activities of Phase I and Phase II. ・Since it became necessary for the JICA expert team to efficiently prepare training textbooks in a short period according to the request from MOEE, the project cost was increased by approximately thirteen (13) million yen as English translation expense for existing technical books on electric power engineering. <Experts, C/Ps of Myanmar and input of project materials and equipment> ・The original plan to create training tools (programs, curriculums, syllabi and textbooks) by collaborative work of JICA experts and C/Ps in activities was changed and it was decided to prepare training textbooks only by JICA experts. Therefore, 10 M/M of input of experts was transferred from “Activities in Myanmar” to “Work in Japan”. (The amount of total M/M was unchanged.) ・The numbers of JICA experts’ trips from Japan was increased by dividing the originally scheduled traveling period within the budget range (initially 56 times → 80 times after changed) so that more detailed and effective training activities could be done in a timely manner. As a result, it seemed that activities of each expert's each trip became more intensive and the schedule allocation became clearer. This ingenuity enabled JICA experts’ activities in Myanmar more efficient.

4.3.5 Sustainability

Sustainability is considered “relatively low” for the following reasons. However, it is too early to evaluate “Sustainability” fully because the Project has just completed its first half “Phase I”.

Persistence of effects	As an outcome of Phase I, it was mentioned that twenty-six (26) trainer candidates were trained by JICA experts, received technology transfers and all of them were finally certified as MOEE trainers. However, since human resource development framework has not been established inside MOEE yet, it is unlikely that the effect of certifying twenty-six trainers can be sustained. Furthermore, the following factors can be considered. ・Since the training programs have not been constructed in MOEE yet, there are a possibility that an effective training theme may not be arranged and a possibility that the training may not be conducted periodically. ・Since there is no rule of securing training budget in MOEE, the possibility of conducting a training largely depends on whether the budget on the training can be secured or not. Various issues related to the training budget have not been improved at all and it is unknown whether a regular training course will be held annually or not. ・Since trainers’ accreditation system has not been considered and authorized in MOEE yet, there is a possibility that the mechanism to train up trainer candidates, evaluate their capabilities and certify them as trainers after twenty-six trainers certified during Phase I. ・The implementation of PDCA cycle has not been established in the training system of MOEE in an organized manner yet. It cannot be said that a sense of ownership was sufficiently developed in MOEE and the actions of MOEE to analyze the present situation, evaluate it and make effort to improve it are not seen.

Chapter 5 Recommendations to Achieve Overall Goal

5.1 Approaches to achieving overall goal

The overall goal of the Project is

“Efficiency and reliability of electric power supply and energy access is improved through the reinforcement and improvement of power supply infrastructure in Myanmar.”

And two items, **"Reduction of transmission and distribution losses"** and **"Reduction of power outage time / number of power outages"** are set as objectively verifiable indicators of the overall goal.

The Project does not directly construct power facilities but improves the skills of engineers and technicians engaged in transmission and distribution systems. Therefore, in order to achieve the overall goal, it is necessary for MOEE to appropriately form transmission and distribution facilities and operate and maintain them as well as to develop the skills the workers. In order to improve the above two indicators, the following efforts are specifically required.

Reduction of transmission and distribution losses	[Reduction of technical losses] - Using conductors with appropriate size when newly constructing and replacing transmission lines and medium voltage/low voltage distribution lines - Installation of a transformer with appropriate capacity when newly constructed or replaced / Shortening length of low voltage lines, Using larger size conductor for low voltage line (Multi-Transformer System) [Reduction of non-technical losses (Prevention of electricity theft)] - Replacement of bare conductors with covered (insulated) conductors - Detecting electricity theft by strengthening distribution line patrol - Expanding digital watthour meters and securing the accuracy of meters in order to measure electric power consumption without fail - Strengthening penalty by regulations for electricity theft and strict application
Reduction of power outage time / number of power outages	[Suppressing occurrence of power outages] - Reinforcement of the reliability of transmission and distribution facilities (Adoption of insulated conductors when newly constructing or replacing distribution lines / Adoption of materials or equipment with high reliability) - Early detecting and early repairing defective points by strengthening transmission/ distribution line patrol [Reducing power outage area] - Installation of a transformer with appropriate capacity when newly constructed or replaced so that distribution banks will be distributed dispersedly

	(Multi-Transformer System) - Continuing power supply to sound areas by introducing equipment/ technologies such as time-sequential system and switchgears with the function of protecting a part of a distribution line - Reducing power outage area when power failure occurs by introducing several switchgears (They do not necessarily have to have fault-detection function or open/close, shut function by a relay.) into distribution lines. - System switching by enhancing network interconnection of transmission lines or distribution lines [Reduction of power outage time] - Reliable operation of substation relays, immediate disconnecting a fault area at a failure for allowing continuous power supply to sound areas - Early response and early recovery at a failure by strengthening maintenance system in each township office (Establishing failure recovery team, and emergency contact system) - Periodical implementation of failure recovery training as above mentioned

5.2 Recommendations to Achieve Overall Goal

The matters in policy and institutional aspects to be implemented by MOEE are summarized as follows.

(1) Enhancement of human resource development system

As mentioned above, the efforts to establish human resource development framework is still suspended as of November 2018. Under such circumstances, the JICA expert team recommended the following matters to be formulated at the 3rd JCC. It is important for MOEE to examine and execute these matters promptly.

[Step 1] Development of Human Resource Development/ Training Policy

[Step 2] Setting Capacity Development Target

[Step 3] Examining position classification-based training programs (Life-cycle training programs)

[Step 4] Scheduling annual training program

[Step 5] Selecting a trainer and preparing training textbooks for each training

[Step 6] Budget planning/ allocation

The improvement of the skills of MOEE engineers and technicians by sure implementation of higher-quality trainings by virtue of MOEE's efforts will enable reliable formation and operation/ maintenance of transmission / distribution facilities.

(2) Formulation of technical standards

To ensure the security of power facilities, it is necessary to formulate technical standards for power facilities and to form and maintain facilities based on the regulations in the standards. However, at present, technical standards have not been formulated in Myanmar, so it cannot be said that the security of power facilities is adequately secured. In the technical standards, regulations need to be not types and specifications of equipment or materials to be used in power facilities, but the concrete numerical provisions of electrical strength, mechanical strength, clearance from other objects, height from the ground, grounding resistance and so on as the requirements of power facilities. Technical standards are extremely important from the viewpoint of improving supply reliability and securing public security, and urgent formulation of them is necessary for MOEE.

(3) Development of guidelines / manuals for each work related to power transmission and distribution

In order to realize high-quality electric power supply by conducting highly accurate tasks by transmission and distribution engineers and technicians in Myanmar as a whole, it is desirable to set uniform rules on how to conduct daily work and to prepare guidelines / manuals to reflect how to conduct the works. The contents from the guidelines / manuals for actual work should be reflected in training textbooks and engineers and technicians should be encouraged to understand them through internal training and so on. Development of guidelines / manuals is an urgent issue for MOEE, and it is also indispensable for penetrating the performance of high quality work deeply into the country as a whole.

(4) Collaboration with Japanese ODA loan projects

In Myanmar, Japanese ODA loan projects “Power Distribution Improvement Project in Yangon Phase I” and “Power Distribution System Improvement Project in Major Cities” with the following contents are under way, and next Japanese ODA loan project aimed at the development / improvement of power distribution system is also planned.

Japanese ODA loan project	Contents
Power Distribution Improvement Project in Yangon Phase I	Component 1: Installation of 66kV substations (C-GIS type) Component 2: Introduction of multi-transformer system Component 3: Replacement of distribution line, including time-sequential auto-sectionalizers Component 4: Introduction of utility vehicles
Power Distribution System Improvement Project in Major Cities	Component 1: Construction and Reinforcement of 33/11kV Substations and 66/11kV Substations Component 2: Construction and Replacement of 66kV and 33kV Transmission Line Component 3: Procurement of Reliability Improvement Equipment for Distribution Line Component 4: Introduction of utility vehicles

The contents of the trainings in the Project are directly linked to the technologies developed in these Japanese ODA loan projects. Improvement of power distribution system achieved by these Japanese ODA loan projects promotes the reinforcement of power supply infrastructure in Myanmar and will improve efficiency and reliability of electric power supply and energy access. Therefore, MOEE and executing agencies of Japanese ODA loan projects (YESC, ESE and MESC) should also take various actions to ensure the implementation of Japanese ODA loan projects by utilizing the technical capabilities improved in the Project to achieve the overall goal.

Also, in order to achieve synergistic effects between these Japanese ODA loan projects and the Project, the following efforts are suggested.

(i) Participation of Project Management Unit (hereinafter referred to as "PMU") members to the Training

It will be effective to invite PMU members in Japanese ODA loan projects to the Phase II activities of the Project

(ii) Assignment of trainers certified in Phase I to PMU to participate in Japanese ODA load projects

MOEE trainers who were trained and certified in Phase I took effective OJT at actual sites in Myanmar and their technical level necessary for conducting works has been improved. It is possible to promote Japanese ODA loan project implementation by assigning the trainer as a person in charge of the Japanese ODA loan project.

(iii) Digging deep into technologies to be introduced by Japanese ODA loan projects

The technologies to be introduced by Japanese ODA loan projects will be effectively transferred to Myanmar by adopting them as a Phase II training theme and digging deep into the operation and maintenance methods and so on.

Flow and Activities of Project

Year	2016								2017												2018										
Month	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11
Activity in Myanmar			1st Activity			2nd Activity				3rd Activity		Water Festival	4th Activity					5th Activity			6th Activity			Water Festival	7th Activity					8th Activity	
Domestic work	Preparation in Japan				1st Work				2nd Work			3rd Work				4th Work					5th Work			6th Work				7th Work			8th Work	
Domestic work Items	**Preparation in Japan** Preparation of a work plan			**1st Work** 1) Preparation of draft PDM 2) Studies regarding financial and institutional issues 3) Formulation of draft plans for training to be conducted in the early stages and for procurement of training equipment and supplies 4) Studies of human resource development frameworks and roadmaps					**2nd Work** 1) Implementation of the 1st workshop for engineers 2) Preparation of lecture materials for WG activities 3) Preparation of draft procurement plan of equipment and materials for power supply			**3rd Work** 1) Studies of training system development issues 2) Preparation of lecture materials for WG activities 3) Submission of work progress report (completion of 1st year) 4) Implementation of the 1st seminar for managers 5) Establishment of procurement plan of equipment and materials for power supply				**4th Work** 1) Preparation of textbooks for 5 themes by JICA Expert Team based on instruction from MOEE Deputy Minister 2) Preparation of lecture materials for WG activities 3) Finalization of textbooks by reflecting comments from MOEE high officials				**5th Work** 1) Implementation of the 2nd workshop for engineers 2) Investigation of trainer certification system			**6th Work** 1) Support of development of lecture material for seminar in major cities 2) Implementation of the 2nd seminar for managers			**7th Work** 1) Preparation of lecture materials for WG activities 2) Submission of work progress report (completion of 2nd year)			**8th Work** 1) Preparation and submission of video material for public information 2) Submission of work completion report	
Activity in Myanmar Items	**1st Activity** 1) Establish of project implementation system 2) Explanation and discussion on the draft work plan 3) Discussion about the baseline survey and start of it 4) Selection of trainer candidates 5) Check of the existing plan, policy and training system for human resource development (Assessment) 6) Discussion of policy, details and schedule of the Workshop / Seminar in Japan 7) Discussion of policy, details and schedule of the seminars in regional cities 8) Studies of the training system for the major cities and regional cities 8) Discussion about PDM 9) Discussion about draft of monitoring items 10) Preparation of project office			**2nd Activity** 1) Organizing working groups (WGs) 2) Discussion about PDM 3) Holding the 1st JCC 4) Analysis of financial and institutional issues 5) Discussion about framework and roadmap of human resource development plan 6) Review of WG activity by trainer candidates and set of self-imposed goals 7) Wrap-up of baseline survey results, and preparation and submission of the survey report 8) Consultation on, and preparation of, plans for training to be conducted in early stages and plans for procurement of training equipment and supplies 9) Submission of monitoring sheet ver.1 10) Submission of work plan 11) Submission of assessment report				**3rd Activity** 1) Lecture to trainer candidates on WG activity (including practical training) 2) Discussion about draft of revised work plan 3) Discussion about draft procurement plan of equipment and materials for power supply			**4th Activity** 1) Discussion about draft of work plan based on instruction of MOEE Deputy Minister 2) Lecture to trainer candidates on WG activity and implementation of examination 3) Discussion about training system development and collecting information of other ministries 4) Procurement of equipment and materials for power supply 5) Preparation and discussion of distribution line layout for training at Nay Pyi Taw (NPT) central training center 6) Hearing of financial and institutional issues of each organization 7) Submission of monitoring sheet ver.2					**5th Activity** 1) Lecture to trainer candidates using 5 themes textbooks and implementation of examination 2) Textbooks review by MOEE high officials 3) Distribution of finalized textbooks to MOEE person concerned 4) Practical training for safety using procured equipment and materials, and technical transfer of how to use them 5) Discussion about draft of revised work plan 6) Installation of concrete poles and switch gear for NPT central training center 7) Discussion of details and schedule of the Workshop / Seminar in Japan 8) Discussion of details and schedule of the seminars in major cities 9) Holding the 2nd JCC 10) Submission of monitoring sheet ver.3				**6th Activity** 1) Presentation of the achievement of lectures from trainer candidates to MOEE high officials 2) Support of development of lecture material for seminar in major cities 3) Holding the workshop regarding training system development of MOEE 4) Establishment of training system preparation committee of MOEE 5) Collecting information about training system of other ministries 6) Installation of transformers and low voltage lines for NPT central training center 7) Installation and monitoring of switch gear on pilot site				**7th Activity** 1) OJT regarding equipment installation for actual distribution lines 2) Installation and monitoring of switch gears and transformers on pilot sites 3) Rehearsal of seminar in major cities from trainer candidates to MOEE high officials and review of it 4) Holding the seminar in 6 major cities 5) Review of seminar in major cities during WG activity at NPT central training center 6) Holding the kick-off meeting of training center preparation committee 7) Discussion about activities in phase II 8) Submission of monitoring sheet ver.4				**8th Activity** 1) Lecture to trainer candidates and implementation of examination 2) Support of development of explanation material of achievement in project by a trainer candidate for 3rd JCC 3) Holding the trainer certification award 4) Completion of distribution line for training at NPT central training center 5) Submission of proposal regarding training system development 6) Discussion about activities in phase II 7) Holding the 3rd JCC 8) Submission of monitoring sheet final version	
Activity in Myanmar			1st Activity			2nd Activity				3rd Activity			4th Activity					5th Activity			6th Activity				7th Activity					8th Activity	
Domestic work	Preparation in Japan				1st Work				2nd Work			3rd Work				4th Work					5th Work			6th Work				7th Work			8th Work	
Month	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11
Joint Coordination Committee (JCC)							△ 1st JCC													△ 2nd JCC										△ 3rd JCC
Workshop/ Seminar in Japan									1st Workshop for Engineer (No.1) (No.2)				1st Seminar for Manager												2nd Workshop for Engineer (No.1) (No.2)			2nd Seminar for Manager			
Submission Report							△ Work Plan Report Baseline Survey Report Monitoring Sheet (ver.1)						△ Draft of procurement plan of equipment and materials for power supply					△ Monitoring Sheet (ver.2) △ Work Progress Report (Completion of 1st year)						Monitoring Sheet (ver.3) △					△ Monitoring Sheet (ver.4) Work Progress Report (Completion of 2nd year)				△ Work Completion Report

Source: JICA Expert Team

Record of Dispatched JICA Short-term Experts

JICA Short-term experts who engaged in this Project, their dispatch periods and assigned period (MM) (Activity in Myanmar / Domestic Work) are as follows.

Expert Title/ Responsibility	Name	Dispatch periods to Myanmar (Travelling days to/from Myanmar are included.)	Assigned period (MM)		
			Activity in Myanmar	Domestic Work	Total
(1) Chief Advisor /Distribution System Technology	Tomohide KATO (Mr.)	18th Jul. - 13th Aug. 2016 (27 days) 25th Sep. - 5th Nov. 2016 (42 days) 18th Dec. - 24th Dec. 2016 (7 days) 26th Feb. - 18th Mar. 2017 (21 days) 14th May - 10th Jun. 2017(28 days) 9th Jul. - 12th Aug. 2017 (35 days) 13th Nov. - 9th Dec. 2017 (27 days) 18th Dec. - 23rd Dec. 2017 (6 days) 30th Jan. - 3rd Feb. 2018 (5 days) 1st Apr. - 13th Apr. 2018 (13 days) 2nd Jun. - 23rd Jun. 2018 (22 days) 22nd Jul. - 18th Aug. 2018 (28 days) 2nd Sep. - 22nd Sep. 2018 (21 days) 7th Oct. - 20th Oct. 2018 (14 days) 28th Oct. - 10th Nov. 2018 (14 days)	10.33	4.30	14.63
(2) Deputy Chief Advisor /Distribution Technology (Operation and Maintenance)	Osamu TANIHATA (Mr.)	18th Jul. - 30th Jul. 2016 (13 days) 6th Sep. - 17th Sep. 2016 (12 days) 23rd Oct. - 1st Dec. 2016 (40 days) 19th Mar. - 5th Apr. 2017 (18 days) 25th Jun. - 15th Jul. 2017 (21 days) 13th Aug. - 29th Aug. 2017 (17 days) 22nd Oct. - 11th Nov. 2017 (21 days) 10th Dec. - 23rd Dec. 2017 (14 days) 4th Mar. - 13th Mar. 2018 (10 days) 4th Nov. - 10th Nov. 2018(7 days)	5.77	4.50	10.27
(3) Distribution Technology (Planning and Designing)	Koji SHIKIMACHI (Dr.)	7th Oct. - 10th Sep. 2016 (35 days) 4th Dec. - 24th Dec. 2016 (21 days) 19th Mar. - 8th Apr. 2017 (21 days) 11th Jun. - 8th Jul. 2017 (28 days) 13th Aug. - 26th Aug. 2017 (14 days) 8th Oct. - 28th Oct. 2017 (21 days) 14th Jan. - 27th Jan. 2018 (14 days) 11th Mar. - 31st Mar. 2018 (21 days) 29th Apr. - 18th May 2018 (20 days) 29th Jul. - 11th Aug. 2018 (14 days) 4th Nov. - 10th Nov. 2018 (7days)	7.20	4.10	11.30
(4) Distribution Technology (Construction)	Ikuo NAKAGAWA (Mr.)	15th Oct. - 5th Nov. 2016 (21 days) 25th Jun. - 15th Jul. 2017 (21 days) 8th Oct. - 21st Oct. 2017 (14 days) 26th Nov. - 9th Dec. 2017 (14 days) 11th Mar. - 24th Mar. 2018 (14 days) 27th May - 16th Jun. 2018 (21 days)	3.50	2.30	5.80
(5) Transmission Technology	Toshitaka YOSHIDA (Mr.)	9th Jul. - 29th Jul. 2017 (21 days) 5th Nov. - 11th Nov. 2017 (7 days) 24th Jun. - 7th Jul. 2018 (14 days) 15th Jul. - 4th Aug. 2018 (21 days) 9th Sep. - 22nd Sep. 2018 (14 days)	2.57	3.35	5.92

Expert Title/ Responsibility	Name	Dispatch periods to Myanmar (Travelling days to/from Myanmar are included.)	Assigned period (MM)		
			Activity in Myanmar	Domestic Work	Total
(6) Substation Technology	Mitsuhiro NAKAMURA (Mr.)	15th Oct. - 5th Nov. 2016 (21 days) 23rd Jul. - 19th Aug. 2017 (28 days) 13th Nov. - 23rd Nov. 2017 (11 days) 10th Dec. - 16th Dec. 2017 (7 days) 11th Mar. - 24th Mar. 2018 (14 days) 15th Jul. - 4th Aug. 2018 (21 days) 2nd Sep. - 8th Sep. 2018 (7days)	3.63	1.30	4.93
(7) Human Resource Development Planning 1 (Training System)	Mina KOBAYASHI (Ms.)	21st Aug. - 3rd Sep. 2016 (14 days)	0.47	0.10	0.57
	Shinichi MITSUI (Mr.)	15th Oct. - 12th Nov. 2016 (28 days) 30th Jul. - 26th Aug. 2017 (28 days) 18th Dec. - 23rd Dec. 2017 (6 days) 14th Jan. - 27th Jan. 2018 (14 days) 4th Mar. - 24th Mar. 2018 (21 days) 13th May - 27th May 2018 (15 days) 15th Jul. - 28th Jul. 2018 (14 days) 26th Aug. - 8th Sep. 2018 (14 days) 23rd Sep. - 6th Oct. 2018 (14 days) 28th Oct. - 10th Nov. 2018 (14 days)	5.57	2.20	7.77
(8) Financial and Institutional Analysis	Koichi YAMASHITA (Mr.)	28th Aug. - 10th Sep. 2016 (14 days) 6th Nov. - 12th Nov. 2016 (7 days) 11th Jun. - 24th Jun. 2017 (14 days) 21st Jan. - 3rd Feb. 2018 (14 days) 4th Mar. - 17th Mar. 2018 (14 days) 20th May - 26th May 2018 (7 days) 3rd Jun. - 5th Jun. 2018 (3 days) 2nd Sep. - 8th Sep. 2018 (7 days) 23rd Sep. - 6th Oct. 2018 (14 days) 14th Oct. - 18th Oct. 2018 (5 days) 28th Oct. - 10th Nov. 2018 (14 days)	3.77	0.50	4.27
(9) Power Development /Distribution expansion Policy	Yoshitaka SAITO (Mr.)	23rd Oct. - 4th Nov. 2016 (13 days) 9th Sep. - 21st Sep. 2018 (13 days) 4th Nov. - 9th Nov. 2018 (6 days)	1.07	0.05	1.12
(10) Power Technology 1 (Planning)	Takuji KATAOKA (Mr.)	9th Aug. - 12th Aug. 2016 (4 days) 23rd Oct. - 4th Nov. 2016 (13 days) 9th Sep. - 21st Sep. 2018 (13 days)	1.00	0.05	1.05
(11) Power Technology 2 (Regional Cities)	Hoke Shein (Mr.)	1st Aug. - 5th Aug., 9th Aug. - 19th Aug, and 22nd Aug. - 26th Aug. 2016 (Total 21 days) 17th Oct. - 11th Nov. 2016 (26 days) 13th Mar. - 17th Mar. 2017 (5 days) 15th Jan. - 26th Jan. 2018 (12 days) 2nd Apr. - 12th Apr. 2018 (11 days) 4th Jun. - 15th Jun. 2018 (12 days) 25th Jun. - 6th Jul. 2018 (12 days) 15th Jul. - 18th Jul. 2018 (4 days) 13th Aug. - 17th Aug. 2018 (5 days) 3rd Sep. - 10th Sep. and 13th Sep. – 21st Sep. 2018 (Total 17 days) 1st Oct. - 4th Oct. and 8th Oct. - 19th Oct. 2018 (Total 16 days) 31st Oct. - 9th Nov. 2018 (10 days)	5.03	0.50	5.53

Expert Title/ Responsibility	Name	Dispatch periods to Myanmar (Travelling days to/from Myanmar are included.)	Assigned period (MM)		
			Activity in Myanmar	Domestic Work	Total
(12) Human Resource Development Planning 2 (Regional Cities)	Wah Wah Han Su Yin (Ms.)	20th Jul. - 22nd Jul., 25th Jul.- 28th Jul., 9th Aug. - 12th Aug., 15th Aug. - 19th Aug. and 22nd Aug. - 26th Aug. 2016 (Total 22 days) 17th Oct. - 21st Oct., 24th Oct. - 28th Oct., 31st Oct. - 4th Nov. and 7th Nov. - 8th Nov. 2016 (Total 17 days) 12th Jun. - 22nd Jun. 2017 (11days) 10th Jul. - 14th Jul. 2017 (5 days) 4th Dec. - 22nd Dec. 2017 (19 days) 5th Mar. - 16th Mar. 2018 (12 days) 14th May - 25th May 2018 (12 days) 4th Jun. - 15th Jun. 2018 (12 days) 25th Jun. - 6th Jul. 2018 (12 days) 15th, 16th and 18th Jul. 2018 (3 days) 30th Jul. - 3rd Aug. 2018 (5 days) 27th Aug. - 7th Sep. 2018 (12 days) 17th Sep. - 21st Sep. 2018 (5 days) 1st Oct. - 4th Oct. and 8th Oct. - 19th Oct. 2018 (16 days) 29th Oct. – 9th Nov. 2018 (12 days)	5.83	0.85	6.68
		Total	**55.73**	**24.10**	**79.83**

(*) “Activities in Yangon” by Mr. Hoke Shein and Ms. Wah Wah Han Su Yin is regarded as “Domestic Work”.

The Project for Capacity Development of Power Transmission and Distribution System in The Republic of The Union of Myanmar (Phase I)

Meeting Record

Date:	2016/07/22	Time:	10:00 – 11:00
Meeting with	Project C/Ps of Ministry of Electricity and Energy (MOEE)		
Participants:	**JICA Expert Team** Mr. Tomohide KATO (Chief Advisor, Distribution System Technology) Mr. Osamu TANIHATA (Deputy Chief Advisor, Distribution Technology (Operation and Maintenance)) Ms. Wah Wah Han Su Yin (Human resource development planning 2 (Regional Cities)) **Counterpart Team** Mr. Thar Soe (DyCE, ESE) Mr. Zaw Zaw Htet (EE, ESE) Mr. Than Htike Oo (EE, ESE)		
Purpose:	▪ To discuss on the Project		

Main Discussion Points:

※How to proceed the Project was discussed between JICA experts and ESE members in Mr. Thar Soe's room. (Ms. Wah Wah interviewed with ESE members, and Chief Advisor and Deputy Chief Advisor answered.)

1. Formulation of WG organizations

(Managing Person;MP) Taking into account the opinion of ESE that "Transmission WG" and "Substation WG" should be combined to Distribution, and the Project should consist of 3 WGs.

JICA expert teams and MOEE members will continue to discuss the formulation of WG organizations so that WGs would become suitable for MOEE's situation.

2. Preparation of training textbooks

(JICA Experts; JICA)It is suggested that trainer candidates prepare textbooks for trainings by themselves, because one of the Project's purposes is that each trainer candidate plays main role so that MOEE can establish its sustainably manageable training system.

3. Training on sites

(JICA)It is suggested that training on sites be adopted in training program because the comments and discussions based on training on sites are very useful for trainer candidates.

4. Trainer Certification

(JICA)In future, MOEE will certificate trainers by themselves. As the first step, trainer certification system will be discussed and established in cooperation with JICA expert team, but the system will be managed by MOEE after the second step.

5. Basic policy on "Design"
(MP)We understand that the theme of "Design" includes the specific standardization for conductors or transformers that are frequently ordered for distribution facilities.
(JICA)JICA expert team is thinking that it would be difficult to deal with the specific standardization for substation equipment because the scopes of the Project are very wide.

6. Proposal of training themes
- "Measures for voltage stabilization" and "Measures for power outage reduction" should be included.
- How to formulate WG organization effective for training "Safety" should be discussed later.
- Technologies for "methods of acceptance inspection in substation" and "measuring equipment" should be transferred as an effort of training.
  → JICA expert team is thinking that what kind of training is appropriate to Myanmar's situation should be considered based on the information about Myanmar's current contents or methods, and that it is necessary to conduct training for measurement work by means of measuring equipment that MOEE can deploy.

7. How to progress with WG activities
(MP)Presentations should be made between WGs so that WG members can confirm other members' ideas, technologies and progress that are very useful for upskilling of WG members.
(JICA)We agree.

8. Assignment of trainer candidates from each organization on MOEE
(MP)YESC is thinking that three staffs will be assigned to trainer candidates, two of the three staffs are engaging in a trunk transmission line construction project in Nay Pyi Taw and one is working in Yangon.
ESE would like to assign trainer candidates from each region or division, 2 staffs from headquarters (Nay Pyi Taw) and 15 staffs from regions and divisions, total 17 staffs.

9. Reference
(MP)MOEE and MOI (Ministry of Industry) members are now receiving vocational training with support from NSSC (National Skill Standard Council) of German. The vocational training courses includes technical transfer about distribution conductor installation. Technical transfers in the Project should be conducted while obtaining other donors' information so that Myanmar sides may not become confused.

end

The Project for Capacity Development of Power Transmission and Distribution System in The Republic of The Union of Myanmar (Phase I)

Meeting Record

Date:	July 26, 2016	Time:	10:00 – 13:30
Meeting with	Managing Persons of Ministry of Electricity and Energy (MOEE)		
Participants:	**Managing Persons of Ministry of Electricity and Energy** Refer to Contacts List below **JICA Expert Team** Mr. Tomohide KATO (Chief Advisor, Distribution System Technology) Mr. Osamu TANIHATA (Deputy Chief Advisor, Distribution Technology (Operation and Maintenance)) Ms. Wah Wah Han Su Yin (Human resource development planning 2 (Regional Cities))		
Purpose:	▪ To explain about the Project ▪ To discuss on the details of the Project		
Main Agenda	▪ Tentative schedule of the Project ▪ Request for nomination of Trainer Candidates ▪ Contents of Baseline survey and Assessment. ▪ Request for preparing Work Plan by C/Ps		

Main Discussion Points:

Remarks (MOEE : Managing Persons, JICA: JICA experts)

JICA Chief Advisor explained the Schedule of the Project based on this attached document.

[Overall schedule of the Project]

（JICA） This draft overall schedule is prepared because the Director General of DEPP (Ms. Mi Mi Khaing) made a request at the Kick-Off meeting that the image of activity schedule of trainer candidates be indicated. Each activity schedule can be adjusted as needed according to the progress of the Project.

Each trainer candidate doesn't necessarily have to attend all WG activities. The work content, schedule and the allocation of the roles will be managed in each WG.

[The contents of training textbooks]

（JICA/MP） Trainer candidates will understand present situation in Myanmar, list up necessary items and content of training textbooks and prepare them in cooperation with JICA experts through WG activities.

(MP) MOEE members are eager to learn new technologies from JICA experts, because Myanmar engineers cannot prepare textbooks in which new technologies are reflected.

(JICA) JICA experts will provide Train Candidates with new technologies. But JICA experts are considering that the contents of textbooks should be prepared on the basis of actual use and what technologies are necessary to be reflected in textbooks should be deeply discussed in WG activities. One of the purposes of the Project is “Training of Trainers” and the preparation of textbooks is also one step of “Training of Trainers” process.

As one of the policies of the Project, the contents of training textbooks are mainly fundamental technologies that Myanmar should introduce now in order to improve the situation. It is important to unify and to deploy fundamental technologies in Myanmar. And project team should consider the time restriction in the Project and carefully choose the contents of textbooks.

JICA experts are willing to introduce new technologies to Myanmar side, but new technologies will not be necessarily reflected in training textbooks.

[WG activities in Nay Pyi Taw]

(MP) How long is one WG activity in Nay Pyi Taw?

(JICA) JICA expert team is thinking that trainer candidates will gather together in Nay Pyi Taw once or twice a month, and work for one week or two weeks. In the other period, they will conduct their ordinary tasks in their offices and consider the issues of next activity and prepare documents.

(MP) It is quite difficult for trainer candidates to conduct their ordinary tasks and activity related to WG simultaneously after going back to their offices. We propose that WG activities be limited to the collective activities in Nay Pyi Taw. And we propose that several WG activities be conducted continuously in one month for the purpose of reducing transportation expense for trainer candidates.

(JICA) JICA expert team understood that trainer candidates cannot conduct WG activities in their offices. We would like to consider that they will conduct WG activities only in collective activities in Nay Pyi Taw. We think that it is possible to concentrate WG activities period in one month. Later let us adjust activities schedule.

(MP) Who will train trainer candidates?

(JICA) They will learn fundamental knowledge and training skills for themselves through WG activities.

(MP) Who will train whom in collective training in main cities?

(JICA) In collective training in main cities, trainer candidates will train engineers in ESE, YESC or MESC. JICA experts will also visit main cities for the purpose of improving trainer candidates' training skills.

Trainings in regional cities are also planned in which trainer candidates will perform technical guidance to engineers and technicians in regional cities through training activities. And a seminar in each regional city will be also planned during the first half of the Project so that MOEE members can understand main purposes and significance of the Project. We cannot conduct trainings and seminars in all cities. We would like to decide by discussion later.

(MP) Who bears training expenses?

(JICA) According to the decision in R/D (Record of Discussion), we ask MOEE to bear transportation expense and accommodation fee for trainer candidates. And also we ask MOEE to decide who of trainer candidates goes to each regional city, to reserve training place and to conduct logistics such as the invitation of trainees.

(MP) Certainly.

[Other requests related to WG]

(MP) We would like to learn effective utilization, operation method of software such as CAD.

(JICA) JICA expert team hope that MOEE side will understand that the main activity in the Project is not utilization of software, but transferring fundamental technologies necessary

on sites.

(MP) Please inform us of concrete schedule of future WG activities.

(JICA) The concrete schedule of future WG activities will be decided while managing WG activities. Therefore we cannot decide the concrete schedule at this time.

[JICA expert allocation]

(MP) What tasks does Mr. Yamashita dispatched as a JICA short-term expert "Financial and Institutional Analysis" do in Myanmar? Does he tell us "IRR" as of the completion of the Project?

(JICA) Mr. Yamashita will not directly conduct technical transfer activities to trainer candidates. He will make a discussion with MOEE members and make a suggestion about improvement of institutional framework and budget allocation related to training system. For these purposes, he will investigate and grasp the present situation about institution and organization, budget allocation and budget application procedure to perform engineer training in MOEE.

[Baseline survey and Assessment]

(MP) Many of proposed survey items for "Baseline survey" or "Assessment" are managed not by local offices of each MOEE organization, but by DEPP.

(JICA) JICA expert team would like to discuss with MOEE to confirm what survey items can be collected and whether there are other collectable values or not. After that, we will prepare questionnaire sheets and ask related organization to answer.

In this Project, it is necessary to set value of each evaluation indicator based on the result of baseline survey. The values of an evaluation item before commencement and after completion of the Project are compared to check how degree by the Project to evaluate how degree the situation has been improved. We would like you to provide us with other ideas about evaluation indicators.

(MP) Certainly.

[Next Managing Meeting]

Next managing meeting will be scheduled as follows;

- Date / Time : August 11th (Thu) 10:00 –
- Place : JICA expert room on the 3rd floor of No.27 building
- Agenda :
  (1) Selection of trainer candidates
  (2) Formulation of Working Groups
  (3) Discussion about the contents of baseline survey

  and others

[Meeting Materials]

- Tentative Work Schedule
- Nomination Sheet for Trainer Candidates
- Draft survey items for baseline survey and assessment
- Draft Work Plan

(end of document)

The Project for Capacity Development of Power Transmission and Distribution System (Phase I)

Meeting Record

Date:	11/08/2016	Time:	10:30 – 12:00
Meeting with	DEPP, YESC,ESE, DPTSC (MESC was absent.)		
Participants:	(DEPP) : Please see the meeting attendance list below. (JICA Expert Team) : Mr. Tomohide Kato (Chief Advisor), Mr. Koji Shikimachi (Distribution Technology, Planning and Designing), Mr. Takuji Kataoka (Power Technology 1 (Planning)), Mr. Hoke Shein (Power Technology (2) Regional Cities), Mrs. Wah Wah Han Su Yin (Human Resource Development Planning 2 (Regional Cities))		
Agenda:	▪ Opening remarks by Kato, Chief advisor ▪ Introduction of project members (JICA experts, Counterparts and Trainer Candidates) ▪ Presentation of outline of project activities for new members ▪ Discussion for necessary baseline survey in electric field ▪ Discussion for necessary assessment of training system		

Main Discussion Points:

（DEPP） A list of Trainer Candidates from each organizations have been just received and they are requested to fill nomination form for Trainer Candidates from now on.
A list of Counterparts, Trainer Candidates and nomination form for Trainer Candidates will be given to JICA expert team by next Friday (12 Aug).

（ESE） Does it takes two and a half years to become a trainer?

（Expert） No, it does not. After implementation of the first collective training, trainer candidates are assessed to certify or not. If he/she is certified, he/she becomes a trainer and he/she will go to regional cities together with JICA experts to conduct a training by a certified trainer. We will foster his/her skills of teaching. And a trainer leaves this project, and he or she will train other engineers and technicians for himself or herself.

（DEPP） In Myanmar, it takes two years and three years to get Master degree and PhD degree respectively. The period of the Project is two and a half years and Certificates like a Certificate approved by ASEAN instead of a paper certificate should be given to motivate Trainer Candidates to work hard.

（Expert） In the future, Certificates of this training program shall be prepared by the Ministry of Electricity and Energy (MOEE). This time, JICA expert team will present a Certificate by monitoring the performance of Trainer Candidates carefully. We will discuss with DEPP the trainer certification system in detail later.

（ESE） There are four Senior Assistant Engineers (SAE) from YESC as Trainer Candidates and it is not suitable to teach their senior engineers such as AE or EE when they become trainers in the future.

（DEPP） Mr. Than Naing Lin told SAE from YESC that they should have confidence to become Trainers in the future. Inside the training class room, they can teach their senior engineers of AE and EE with confidence regardless of their position.

（Expert） The expert explained the purpose of Baseline Survey, which is to know the present condition of safety, efficiency and quality in MOEE, how to conduct it and who will conduct it.

（ESE） It may be difficult to compare indicators at the beginning of the training and at the end of the training since there are some indicators which are not improved significantly due to this Project.

（Expert） Please give your opinion on the draft questionnaires which JICA expert team prepared. After getting opinion, questionnaire will be finalized and submitted to DEPP. DEPP then delivered them to related offices in each organization to give information requested. Surveyors who will be employed by JICA expert team will go and collect data after that.

（Expert） How do you think extending the stay of Trainer Candidates in Naypyitaw from one week to two weeks instead of giving homework when they go back to their work place.
（DEPP） It is better to extend the stay to two weeks in Naypyitaw. At their work place, they cannot do homework for this project. They will stay at the Training Center in Naypyitaw during their stay in Naypyitaw for the training. They will do their homework at the Training Center even JICA expert team is not at the Training Center.

（DEPP） Are there any plan to provide personal computers to Counterparts and Trainer Candidates?
（Expert） Yes, there is a plan.
（DEPP） We would like to request to provide personal computers with reasonable price of USD 600 for Counterparts and Trainer Candidates as a part of training facilities. Only hardware is necessary and software for personal computers is not necessary to provide.
（Expert） The reason of providing computers can be that computers are necessary to prepare textbook, syllabus and curriculum.

【Delivered Documents】
- Agenda of the Managing Meeting (3)
- Modified Working Group
- Outline of the Project (Presentation File)
- Draft Contents of Baseline Survey
- Draft Contents of Assessment of a Training System
- Questionnaire for Baseline survey regarding Human Resource Development in MOEE (Draft)
- Assessment sheet regarding Human Resource Development in MOEE

-end-

The Project for Capacity Development of Power Transmission and Distribution System (Phase I)

Meeting Record

Date:	24/08/2016	Time:	10:00 – 15:15
Meeting with	Department of Electric Power Planning (DEPP)		
Participants:	(DEPP)：Mr. Than Naing Lin (DyD), Mr. Myo Thant Zin (AD) (DPTSC)： Mr. Naung Win Htoo (AE), Ms. Soe Yupar Thein (Staff Officer) (ESE)：Mr. Tha Soe (DyCE), Mr. Zaw Zaw Htet (EE) (MESC)：Mr. Soe Ko Ko Aung (EE), Mr. Zaw Htike (Assit. Manager), Mr. Aung Nay Oo (AE) (YESC)：Mr. Kyaw Kyaw (EE), Mr.Kyaw Soe Lin (SAE), Ms. Kyawt Kyawt Hlaing (SAE) (JICA Study Team)：Ms. Kuri Orui (JICA long-term expert), Mr. Koji Shikimachi (Distribution Technology, Planning and Designing), Ms. Mina Kobayashi (Human Resource Development Planning 1 (training system)),Mr. Shinichi Mitsui (same as Ms. Kobayashi), Mr. Hoke Shein (Power Technology 2 (Regional Cities)), Ms. Wah Wah Han Su Yin (Human Resource Development Planning 2 (Regional Cities))		
Purpose:	・ To organize WGs ・ To make sure the different roles and responsibility of Managing Persons and Trainer Candidates ・ To understand the project deeply ・ To modify the questionnaire of baseline survey based on opinion from Managing Persons ・ To discuss the topic of # 1 Working Group activities		

Main Discussion Points:

The meeting was held according to the agenda as follows. (Refer to Attachment I)

1. Opening Remark

Mr. Than Naing Lin, Deputy Director of DEPP and a delegate of Mr. Myint Oo, Deputy Director General of DEPP, who could not attend the meeting as he had to attend another meeting of a JICA loan project, gave his opening remarks including that each trainer candidate was assigned to one of the five WGs considering his/her request as far as possible.

2. New managing persons of each organization (Refer to Attachment II)

All organizations: DEPP, DPTSC, ESE, YESC and MESC participated the managing meeting. MESC participated the meeting for the first time. All of the Managing Persons (or) the Counterparts in this project, were fixed this time. (Only a managing person from DPTSC, Mr. Win Kyaw never attended the managing meetings yet but will attend from next time.) The representative managing persons in each organization were selected; Mr. Than Naing Lin for DEPP, Mr. Tha Soe for ESE, Ms. Soe Yupar Thein for DPTSC, Ms. Kyaw Kyaw Hlaing for YESC and Mr. Soe Ko Ko Aung for MESC.

3. Project outline (Refer to Attachment III)

Mr. Than Naing Lin of the counterpart of Myanmar explained the outline of the tentative work plan briefly, so that MESC would understand it and other Managing Persons understand it deeply.

4. Roles of managing persons and trainer candidates (refer to Attachment IV)

Each role of Managing Persons and Trainer Candidates was explained and agreed. It was explained that one of the main roles of managing persons was reviewing and revising a draft Work Plan and finalizing it by the end of this year 2016.

5. Formation of five Working Groups (WG-1, 2, 3, 4 and 5) (Refer to Attachment V)

The draft Trainer Candidates in each WGs were introduced with the explanation of each role and each JICA expert in WG-1, 2, 3, 4 and 5. Three pairs of trainer candidates were exchanged respectively, according to Managing Persons' opinions. The revised five WGs composing the twenty-seven Trainer Candidates were approved as the fixed one. (Refer to Attachment VI)

6. Questionnaires of Baseline survey revised by Managing persons

Additional questionnaires are proposed by ESE, DEPP, DPTSC and YESC. They will be reflected in the questionnaire and the modified questionnaire will be distributed to each organization. (Refer to Attachment VII)

7. Schedule for support answering Questionnaire (Refer to Attachment VIII)

The schedule for dispatching surveyors to support answering the Questionnaire was explained, and the responsible and contact person(s) in each regional/ state office were confirmed, caring the trainer candidates and managing persons will be absent from their offices from 5th to 9th SEP when #1 WG activities and #5 managing meeting will be held.

8. Agenda for #1 WG Activities

The agenda for the first WG activities was discussed after the presentation of an education system in CEPCO (Refer to Attachment IX). A draft schedule of the first WG activities were proposed. JICA experts will present the distribution power system, the detailed training system in Japan, target management system, etc. on the first and the second days of # 1 WG activities. The Trainer Candidates will discuss how to create Myanmar style training system in the following two days.

The first WG activities was scheduled from 5th to 8th SEP, and the next fifth managing meeting was scheduled on 9th SEP instead of 8th SEP scheduled previously. (Attachment X)

< Managing Persons' opinions >

- Managing persons expressed their willingness that the Trainer Candidates will have WG activities such as discussing among different WGs for one week for example in addition to the training schedule by JICA Expert Team.
- Furthermore, Managing Persons requested to include showing video as one of the media for training in order to learn Japanese technology visually.
- According to the training schedule prepared by JICA Expert Team, there are meetings with Managing Persons when there are Working Group activities in Naypyitaw. The schedule should be revised as most of the Managing Persons are also Trainer Candidates.

9. Closing remarks

Deputy Chief Engineer Mr. Tha Soe gave his closing remarks with the importance of Trainer Candidates' initiative.

The long-term expert, Ms. Orui gave her closing remarks with her thanks that there is a progress of this training due to Managing Persons, comparing to the last meeting she attended.

*After the meeting

JICA experts requested YESC and MESC to answer the Assessment sheet as far as they can in a short time after the managing meeting. But they will answer the sheet by 26th SEP as they will require some survey.

*Group photo

A group photo of attended managing persons and JICA experts were taken in front of a Building of No.27.

The Project for Capacity Development of Power Transmission and Distribution System (Phase I)

Meeting Record

Attachment

I: Agenda for the Managing Meeting (4) [Delivered]
II: List of Managing Persons (Counterparts) [Delivered]
III: Outline of the Tentative Work Plan of the Project [Delivered]
IV: (Draft) Roles of Counterparts (Managing Persons) and Trainer Candidates [Delivered]
V: List of Trainer Candidates [Delivered]
VI: Revised list of Trainer Candidates
VII: Revised Questionnaire of Baseline Survey
VIII: Schedule of surveyor team (1), (2), (3) [Delivered]
IX: Education system in CEPCO [Delivered]
X: Work schedule of project [Delivered]

-end-

The Project for Capacity Development of Power Transmission and Distribution System (Phase I)

Meeting Record

Date:	09/09/2016	Time:	10:20 – 14:30
Meeting with	5th Managing Meeting		
Venue	Training Center in Nay Pyi Taw		
Participants:	(DEPP)：Mr. Than Naing Lin (DyD), Mr. Myo Thant Zin (AD) (DPTSC)：Mr. Naung Win Htoo (AE), Mr. Win Kyaw(AE), Ms. Soe Yupar Thein (Staff Officer) (ESE)：Mr. Tha Soe (DyCE), Mr. Than Htike Oo(EE) (MESC)：Mr. Soe Ko Ko Aung (EE), Mr. Zaw Htike (AE), Mr. Kyaw Kyaw(AE) (YESC)：Mr. Tayzar Lin(AE), Mr.Kyaw Soe Lin (SAE), Ms. Kyawt Kyawt Hlaing (SAE) (JICA Study Team)：Ms. Kuri Orui (JICA long-term expert), Mr. Osamu Tanihata (Distribution Technology, Operation & Maintenance)		
Purpose:	・To discuss about management of the Project		

Main Discussion Points:

1. Opening Remarks by Mr. Tha Soe (DyCE of ESE)

2. Review of the 1st Working Group Activity

(Managing Person(MP)) We would like to conduct 3 weeks per Working Group instead of 2 weeks. We also would like to gather all 5 WGs in Nay Pyi Taw at the same time. We want to conduct work activities 2 weeks out of 3 weeks for working with experts and another one week for working activities by ourselves.

(Expert) We provide revised project schedule which extend WG activities from 2 weeks to 3 weeks instead in next managing meeting.

(MP) We consider to develop our skill and knowledge not only technical skill but English and presentation skill.

(Expert) Skill up of your knowledge and technology needs small step for big step up.

(MP) Opinion from WG 4 (Transmission line)

We would like to know how to select appropriate conductor (specifications, size etc.) in transmission and distribution line.

(Expert) It's not easy to select proper specification of conductor, because it has deep relationship between specification of conductor and power flow forecast, protective relay, operation policy etc.

(MP) Opinion from WG5 (substation)

We, WG 5 , will conduct self-survey on data base of substation facilities.

(Expert) We will make some comments and assist on your activity and prepared sheet。

(MP) We would like to know initial inspection for transformer, circuit breaker, CT, VT etc. which are needed at the time of installation

(Expert) We would provide with basic information

(MP) We have so many electrical accidents. We would like to learn connection technology of conductor and treatment of underground cable.

(Expert) We have no working skill because we work only in desk work, so we cannot teach that skill to you. We would like to consider the way to transfer that skill by joining other JICA project etc.

(MP) We want to introduce the design that transformer mounted upper of concrete poles. We want to learn Japanese specification of transformer and concrete pole and so on.

(Expert) We would like to provide you about specification later.

(MP) We would like to proceed introduction of un-maned substation. Please teach us how to proceed from manned-substation into un-maned substation.

(Expert) So many consideration will be needed to proceed into un-maned substation.

(MP) We would like to know what kind of facilities will be installed into new training center.

(Expert) We plan to prepare the design of installation facilities into training center by the end of March 2017 by discussing with MOEE Person.

We ask you to procure Myanmar manufactured facilities such as concrete poles etc. by MOEE in local tender.

(MP) We agree.

3. Progress and next action of Baseline Survey

(Expert) We would like to share you progress of baseline survey and would like to decide indicators of the Project which stated in PDM(Project Design Matrix).

Contents of indicators of the Project will be explained at 1st JCC.

(MP) We will provide by 15th September.

4. Schedule and preparation for Training in Japan

(Expert) We would like you to decide concrete term of training in Japan which will be held in January and February.

(MP) We would like to visit construction site and some manufactures of power facility.

(Expert) We have few construction site, we believe it's difficult to visit construction sites. We would like to make effort to seek distribution construction site.

5. Planning 1st Joint Coordination Committee

(Expert) We want to hold 1st JCC on 3rd November, 2016 for explanation of progress of the Project and indicators of the Project etc.

(MP) We agree. We would like to make arrangement.

6. Project Design Matrix

(Expert) Ms.Orui explained about PDM.

7. Discussion about Monitoring Sheet

(Expert) This project need to be monitored at every 6 months. It start from July 2016, and 1st monitoring will be done at December 2016.

Please prepare monitoring sheet by MOEE person with reference to JICA form.

Target matters to be achieved are set into the monitoring sheet by MOEE and experts.

(MP) We have no experiences about monitoring sheet. Please show us examples.

(Expert) We share you example of monitoring sheet at 12 September, 2016.

(MP) We understand.

8. Introduction of purchasing power electrical engineering technical books

(Expert) We plan to purchase technical books on power sector. Please select some text books from our recommendations.

Since budget is limited, please make priority to book list. And we cannot purchase soft data because of copy right consderation and so on.

9. Next Managing Meeting

(Expert) Next Managing Meeting will be held on 4th October 2016 at training center in Nay Pyi Taw.

10. Providing information of Institution and financial matters

（Expert）Please provide us with financial and institutional data.

（MP）Now we are arranging. Contract of franchise has NDA, so we cannot provide it.

（Expert）Please provide us as possible as you can.

In financial data, please share us past 3 year's data.

（MP）We try it.

【Delivered Documents】

- Agenda for the Managing Meeting (5)
- Time Table of 1st Working Group Activity
- Work Schedule
- Introduction of Target Management
- Monitoring Sheet(tentative)
- Project Design Matrix
- Draft purchasing power electrical engineering technical books

-end-

The Project for Capacity Development of Power Transmission and Distribution System (Phase I)

Meeting Record

Date:	05/10/2016	Time:	10:00 – 11:40
Meeting with	6th Managing Meeting		
Venue	JICA Expert Room in Nay Pyi Taw No.27 Building		
Participants:	(DEPP)：Mr. Than Naing Lin (DyD), Mr. Myo Thant Zin (AD) (DPTSC)：Mr. Naung Win Htoo (AE), Mr. Win Kyaw(AE), Ms. Soe Yupar Thein (Staff Officer) (ESE)：Mr. Tha Soe (※)(CE), Mr. Than Htike Oo(EE) (MESC)：Mr. Soe Ko Ko Aung (EE), Mr. Zaw Htike (AE), Mr. Kyaw Kyaw(AE) (YESC)：Mr. Tayzar Lin(AE), Mr.Kyaw Soe Lin (SAE), Ms. Kyawt Kyawt Hlaing (SAE) (JICA Study Team)：Ms. Kuri Orui (JICA long-term expert), Mr. Tomohide Kato (Chief Advisor, Distribution System Technology) (※)He promoted from Deputy Chief Engineer to Chief Engineer on 30 Sep, 2016		
Purpose:	・To discuss about management of the Project		

Main Discussion Points:

1. Opening Remarks by Mr. Than Naing Lin (DyD, DEPP)
Mr. Kato (JICA short-term expert)

2. Progress and next action of Baseline Survey

（Expert） We appreciated your cooperation in conducting Baseline Survey. We are preparing report now. And if we need additional information regarding Baseline Survey, please assist us.

（MOEE） We want to see results of Base Line survey.

（Expert） We would show you the results of Baseline survey after preparing report.

3. Draft Contents of Monitoring Sheet

Ms. Orui explained about Monitoring Sheet to Managing Person.

（Expert） Monitoring Sheet will be prepared every 6 months by MOEE person with assistance of JICA Experts. “Monitoring Sheet” includes “Target” relating the project in every 6 months.

（MOEE） We agree it.

4. Discussion about the evaluation items reflected in Project Design Matrix (PDM)

（Expert） We would like you to discuss about preparing PDM sheet.

（MOEE） We will discuss with our member.

5. Tentative agenda of the 1st Joint Coordinating Committee (JCC) / Deciding presentation speakers

(Expert) Expert explained to MOEE person about agenda of JCC.

（Expert）JCC will take about 2 hours.

Managing person of the Project should make all presentation in JCC to main person of MOEE.

Expert will follow you in Answer to Question.

（MOEE）Mr. Than Naing Lin (DEPP) and Mr. Tayzar Lin(YESC) will male presentation at JCC.

（Expert）Please make practice before presentation on 3rd November.

（Expert）We would like to confirm you that JCC should be meeting for approval by main person of MOEE not for discussion the related matters.

6. Contents of 2nd Working Group Activities

（Expert）In 1st week of WG, we plan to make presentation on Safety Technology, Facility Maintenance. And we also would like to give trainer candidates discussion time and presentation time in order to develop their trainer's skill.

7. Next schedule of Working Group

・As trainer candidates requested us, 3 weeks for one WG activities instead of 2 weeks activities until end of December 2016.

8. Closing remarks by Mr, Tha Soe (CE, ESE)

Ms. Kuri Orui(JICA long-term expert)

【Delivered Documents】

(1) Work schedule
(2) Monitoring Sheet (Draft)
(3) Project Design Matrix (PDM) (Draft)
(4) Tentative Agenda of the 1st Joint Coordination Committee
(5) Draft Time schedule of the 2nd Working Group

-end-

The Project for Capacity Development of Power Transmission and Distribution System (Phase I)

Meeting Record

Date:	17/10/2016	Time:	15:50 – 16:00
Meeting with	Managing Persons		
Participants:	(DEPP) : Mr. Than Naing Lin (DyD) (DPTSC) : Mr. Win Kyaw (AE), Mr. Naung Win Htoo (AE), Ms. Soe Yupar Thein (Staff Officer) (ESE) : Mr. Zaw Zaw Htet (EE), Mr. Than Htike Oo (EE) (MESC) : Mr. Soe Ko Ko Aung (EE), Mr. Zaw Htike (Assit. Manager), Mr. Aung Nay Oo (AE) (YESC) : Mr. Tay Zar Lin (AE), Mr. Kyaw Soe Lin (SAE), Ms. Kyawt Kyawt Hlaing (SAE) (JICA Study Team) : Ms. Kuri Orui (JICA long-term expert), Mr. Tomohide Kato (Chief Advisor), Mr. Shinichi Mitsui ((Human Resource Development Planning 1 (training system), Mr. Hoke Shein (Power Technology 2 (Regional Cities)), Ms. Wah Wah Han Su Yin (Human Resource Development Planning 2 (Regional Cities))		
Purpose:	・ To confirm indicators to set up ・ Discussion about the first draft Presentation for the first JCC meeting ・ Appointment with CEO of YESC and MESC to explain about the first JCC meeting ・ To request DEPP for a site visit to two substations on 20 Oct		

Main Discussion Points:

1. Confirming Indicators to set up

Ms. Orui explained that the purpose of setting Indicators is to evaluate the effectiveness of this Project. In addition, she explained that the meaning of verification is the source of data and Important Assumption is some conditions to meet the goals.

JICA expert team will prepare the table of indicators first by selecting indicators and putting target value for each indicator based on the result of Baseline Survey and Managing Persons will finalize it.

2. Discussion about the first draft presentation for the first JCC

(i) Invitation to JICA Myanmar Office

JICA expert team will prepare an invitation to JICA Myanmar Office and DEPP will send the invitation to JICA Myanmar Office. The name of attention is not necessary for invitation.

(ii) Presentation from Project Team

Managing Persons will do the presentation. Slide about indicators will be prepared by JICA expert team first and Managing Persons will finalize it.

3. Appointment with CEO of YESC and MESC to explain about the first JCC meeting

Managing Persons from YESC and MESC recommends to go to YESC and MESC to explain about the first JCC meeting to CEO of YESC and MESC. Ms. Orui plans to go to YESC on 31 Oct and Mr. Tay Zar Lin will make an appointment with CEO of YESC through Ms. Yee Mon Mon.

4. Site visit to Substations

Mr. Than Naing Lin, will arrange a site visit to Substations near Naypyitaw including a mini bus for all Trainer Candidates on 20 Oct. JICA expert team will go there by their project cars. Two numbers of old Substations are planned to visit.

[Delivered Documents]
I. The first draft Presentation for the first JCC meeting
II. What is indicators and what kind of indicators.

-end-

The Project for Capacity Development of Power Transmission and Distribution System (Phase I)

Meeting Record

Date:	27/10/2016 (additional confirmation was made at 28/10/2016)	Time:	9:00 – 11:30
Meeting with	DEPP, YESC, MESC, ESE, DPTSC		
Participants:	(DEPP) : Please see the meeting attendance list as attached. (JICA Study Team) : Ms. Kuri Orui (Training Program/Coordinator), Mr. Tomohide Kato (Chief Advisor), Mr. Osamu Tanihata (Distribution Technology (Operation and Maintenance), Mr. Shinichi Mitsui (Human Resource Developing Planning 1 (Training System)), Mrs. Wah Wah Han Su Yin (Human Resource Development Planning 2 (Regional Cities))		
Agenda:	▪ To discuss about the presentation of JCC ▪ To discuss about training program		

Main Discussion Points:

(Expert) Presentation of JCC is explained. Type of indicators such as distribution loss ratio, number of accidents, outage number and duration to be set target value in this Project are discussed. The target value is set based on the result of Baseline survey.

(MOEE) ESE wants to set up the target value of the number of outage with 300 instead of 350 in Mandalay pilot area.

(Expert) This figure is based on Baseline Survey and yearly total number.
If you set less figure of target, we can change the figure.

(MOEE) We understand. We agree to set 350 Nos of outage as target.

(MOEE) What is the meaning that the target number of certified trainers is 20? How to evaluate to give certification to certified candidates? Could you change the target 27 certified trainer instead of 20?

(Expert) It is possible that all 27 numbers of Trainer Candidates get certification, the number of certified trainers was targeted to 20 due to the possibility of change of Trainer Candidates due to various reasons for eg;
But we agree to set target as 27 instead of 20.

(MOEE) We want to change the title of Group V to "33 kV and 66 kV (Operation, Maintenance, Design and Construction)". Substation design knowledge is necessary in Myanmar.

(Expert) Basic design of a substation can be included in the working group V as the scope of substation design is very wide. Deciding regulation in power sector is not include in this project.

(MOEE) According to the schedule, there is no JICA expert for Group V in the next Working Group Activities. We would like to request JICA expert together with us during Working Group Activities.

(Expert) Mr. Tanihata will be at the next Working Group Activities and he can discuss about substation with Group V although there is no JICA expert at that time.

(MOEE) What percentage is planned to do for theory and practical work. Practical work is necessary to do so that we have confidence when we become trainers. We want to learn 50 % and 50 % or 60% and 40 % for theory and practical work respectively.

(Expert) By going to Japan, Trainer Candidates can also learn practical work.

(MOEE) The period of stay in Japan for each Trainer Candidate is only 10 days and it is not enough. DEPP will arrange a site visit to five numbers of substations which are under construction. At that time, JICA expert is requested to show practical works such as how to connect cable with control panel, how to keep the cables neatly, etc…

(Expert) In Japan, Engineers usually do design, desktop work and management. We are not used to do practical work. We don't have much experience about practical work and the schedule of practical works is not considered. But we can give advice and discuss about substations when we visit substations.

(MOEE) In such case, you are requested to show a lot of videos to show how to do practical works in reality.

(Expert) We will try to find it in Japan.

(MOEE) When showing video, you are requested not only to show but also to give it to us.

(MOEE) What is the schedule of purchasing training facilities?

(Expert) We need to prepare the design of training facilities by discussing in detail. We are planning to finish the design of training facilities until March, 2017. After finishing it, it is submitted to JICA to get approval. After getting an approval from JICA, they are planned to purchase.

(MOEE) When can training facilities be arrived to the training center? We are worried that they will arrive at the end of this Program and there is no JICA expert to show us how to operate and apply it.

(Expert) The duration of time necessary for delivery depends on the type of facilities. We cannot say anything about the timing now. But we will try to purchase as early as possible before finishing Phase I but we need to discuss in detail to prepare design of training facilities. We should not be hurry to prepare it as it needs time to discuss.

(MOEE) We asked JICA Expert five numbers of books and only three numbers of books were received. What happened to other two books?

(Expert) We already ordered them but there is no stock at the book shop for these two books and we need to wait.

(MOEE) We cannot wait for such long time. We will cancel them and we will buy another books instead of these books.

(Expert) We already ordered and we cannot cancel them. If you want to buy another books, they will be ordered in addition.

(MOEE) We will give book titles to buy in addition.

(MOEE) Regarding explanation method, JICA experts are requested to explain the concept and theory with exact calculation. For example, when explaining about Step Voltage Transformer in the presentation, where to install and how many numbers should be installed with which distance, etc… by clear explanation. Another example is when explaining about Mutli-transformers, you are requested to explain how much loss can be reduced by showing calculation. It includes calculation about Ω and it was not clear calculation. We know that it is difficult to calculate Ω but it would be appreciated if certain explanation is given. We need to know concept in detail and new technology so that we can apply them when we become trainers.

(Expert) The concept of the program is the Capacity Development. The establishment of training program such as preparing textbooks, management method of training, teaching method, etc… as there is no training program in MOEE recently. At the same time, technical transfer is also carried out.

(MOEE) We are engineers and we want to concentrate on technology.
(Expert) In Japan, engineers prepare training program for capacity development of junior engineers, preparing training schedule.
(MOEE) When we conduct trainings in the future, we will explain in Myanmar language to Engineers and Linemen by using power-point in English. We have knowledge how to teach to be understandable in Myanmar language. Therefore you do not need about our teaching methods. JICA experts are requested to concentrate on technical transfer.
(Expert) We understand your request but establishment of training program is also very important. We will transfer our technology when preparing the training program in parallel.

(MOEE) When we asked questions, JICA expert replied that he will reply later. But there is no reply from him after that if we did not ask him again.
(Expert) JICA expert is not expert for all fields. We need to find information to answer your questions. Please give us some time and we will try our best to answer your questions.
-end-

Minutes of Meeting

Managing Meeting (9)

On the Project for Capacity Development of Power Transmission and Distribution System (Phase I) in the Republic of the Union of Myanmar

1. Date: 29th November (Tuesday), 2016

2. Time: 10:00 Am to 12 Noon

3. Venue: Building No. 27, Nay Pyi Daw

4. The attended participants are as follows:

Sr. No.	Name	Designation	Department
1	U Tha Soe	CE	ESE
2	Osamu Tanihata	Deputy Chief Officer	JICA
3	Kuri ORUI	Coordinator	JICA
4	Mrs. Soe Yupar Thein	Staff Officer	DPTSC
5	Mr. Myo Thant Zin	Assistant Director	DEPP
6	Mr. Than Naing Lin	Deputy Director	DEPP
7	Mr. Tayzar Lin	Assistant Manager	YESC
8	Mr. Naung Win Htoo	Staff Officer	DPTSC
9	Mr. Soe Ko Ko Aung	Manager	MESC
10	Mr. Zaw Zaw Htet	Executive Engineer	ESE
11	Mr. Aung Tun	Executive Engineer	ESE

5. The tasks were taken by the meeting are as follows:

(a) The revised tentative work schedule of the project for capacity development of power transmission and distribution system Phase (I) is explained by JICA team and discussed the progress between the counterparts.

(b) Data of Kachin, Rhakain & Chin concerned with total number of faults and average duration of faults in distribution system is needed to supply by MOEE.

(c) Five or more number of Pilot areas choosing are to be proposed by ESE, YESC and MESC and have to submit on coming working group.

(d) The two session schedule for the workshop in Japan for engineers are explained by JICA team.

(e) The date for the next counterpart meeting (10th) is assigned as December 9, 2016.

Prepared by
Mr. Tayzar Lin
Assistant Manager (YESC)

Minutes of Meeting

Managing Meeting (10)

On the Project for Capacity Development of Power Transmission and Distribution System (Phase I) in the Republic of the Union of Myanmar

1. Date: 20th December (Tuesday), 2016
2. Time: 10:00 Am to 4 Pm
3. Venue: Building No. 27, Nay Pyi Daw
4. The attended participants are as follows:

Sr. No.	Name	Designation	Department
1	U Tha Soe	CE	ESE
2	Mr. Kato	Chief Advisor	JICA
3	Mr. Shikimachi		JICA
4	Ms. Kuri ORUI	Coordinator	JICA
5	Mr. Kyaw Soe Lin	SAE	YESC
6	Mr. Than Htike Oo	Executive Engineer	ESE
7	Mrs. Soe Yupar Thein	Staff Officer	DPTSC
8	Mr. Myo Thant Zin	Assistant Director	DEPP
9	Mr. Than Naing Lin	Deputy Director	DPTSC
10	Mr. Tayzar Lin	Assistant Manager	YESC
11	Mr. Naung Win Htoo	Staff Officer	DPTSC
12	Mr. Soe Ko Ko Aung	Manager	MESC
13	Mr. Zaw Htike	Assistant Manager	MESC
14	Mr. Kyaw Kyaw	Assistant Manager	MESC
15	Mr. Zaw Zaw Htet	Executive Engineer	ESE
16	Ms. Kyawt Kyawt Hlaing	SAE	YESC

5. The tasks were taken by the meeting are as follows:

(a) As the representative of DEPP, Mr. Than Naing Lin gave the opening remark and told that Deputy Minister agreed to continue the project by revised schedule and syllabus procedure in accordance with his instruction. After that, Mr. Kato gave the opening remark as the representative of JICA Expert team.

(b) The instructions for the project by Deputy Minister were explained by Mr. Than Naing Lin are as follows:

- The time schedule for coming working group must be continuously and not to be separate as the few weeks.

-The working group for November was postponed by Deputy Minister decision for the letter of complaint from one candidate concerned with daily allowance (2500 kyats) for everyone and would like to get a support from MINISTRY arrangement. And then, need to change the responsibility to prepare the syllabus for training and wish to JICA for making it and thought that candidates have low experience to do it.

Regarding to JICA TEAM opinion, the responsibility ratio or task to do syllabus will be discussed directly with Deputy Minister.

On the other hand, a TV meeting have to hold between JICA Headquarters and MOEE.

(c) According to the tentative revised schedule, 3rd working group will open for the period between 22 February to 11 April and 4th Working group will open for the period between 15 May to 14 July.

Regarding to schedule, actively discussed about the function of coming working group. The intended tasks for doing within 3rd working group period are

-Bring the too much questions by JICA for making the syllabus to be compatible with the Myanmar Situation

-Will give the lecture in relation with SAFETY

-Will discuss the things what we have learned from workshop in JAPAN

-Will discuss about the indicators and target value identification for selected pilot areas depend on the available data based

-will make countermeasure that how to reduce the losses and how to considerate for getting the improvement

According to the highly changes (such as responsibility to make syllabus) to project, **2nd JCC will hold on coming February or March** to make confirmation for changes.

(d) At the end of this year 2016, JERA have to submit Baseline survey and assessment sheet reports to JICA and distributed the draft report to the attended participants for reading it.

(e) After that, discussed about the project monitoring sheet and made the confirmation what we have done for last 6 months targets and what we have to set targets for next 6 months.

(f) As the next agenda, revised schedule for the workshop in JAPAN for engineers (1st session and 2nd session) was explained by Mr. Shikimachi and discussed the items of schedule. Also, Mr. Than Naing Lin was chosen by the U THA SOE decision (CE) as the leader of 1st session and Mr. Myo Thant Zin was chosen as the leader of 2nd session of the workshop in JAPAN. Moreover, distributed the duty to Mr. Myo Thant Zin for collecting the information concerned with food uneatable or intolerance condition of everyone to be flexible in Japan .

(g) As the last item of meeting, discussed and confirmed for the transportation and daily allowance of candidates. Regarding to meeting result, JICA will give daily allowance (3000 kyats) to candidates come from outside of the NAYPYITAW area (more than 100 km from Naypyitaw) and which will include for weekends and holidays. However, the candidates from Naypyidaw have to be supplied only for lunch and will have no allowance for weekends and holidays. For the transportation allowance (later will use TA), every candidate who come from outside of Naypyitaw have to submit the air tickets (Kachin, Sittwe, Dawei) or express tickets (other regions) and receipts to JICA. A format to fill the starting site and destination for TA was distributed to everyone and meeting was successfully concluded.

Prepared by
Mr. Tayzar Lin
Assistant Manager (YESC)

The Project for Capacity Development of Power Transmission and Distribution System (Phase I)

Meeting Record

Date:	09/03/2017	Time:	11:50 – 13:40
Meeting with	11th Managing Meeting		
Venue	JICA Expert room in No.27 building		
Participants:	(DEPP)：Mr. Myo Thant Zin (AD) (DPTSC)：Mr. Naung Win Htoo (AE), Mr. Win Kyaw(AE), Ms. Soe Yupar Thein (Staff Officer) (ESE)：Mr. Tha Soe (CE), Mr. Than Htike Oo(EE), Mr. Zaw Zaw Htet(EE), Ms. Than Than Aye (EE) (MESC)：Mr. Soe Ko Ko Aung (EE), Mr. Kyaw Kyaw(AE) (YESC)：Mr. Tayzar Lin(AE), Ms. Kyawt Kyawt Hlaing (SAE) (JICA Study Team)：Ms. Kuri Orui (JICA long-term expert), Mr. Tomohide Kato (Chief Adviser, Distribution System Technology) ※Mr. Than Naing Lin was absent because of attendance to another meeting		
Purpose:	・To discuss how to proceed training		

Main Discussion Points:

U Tha Soe:

（From U Tha Soe, DEPP showed alternative schedule to Expert Team, instead of time table of Working Activity (from Mar 13 to Apr 7) shown by Expert Team.）

・MOEE cannot accept Expert's concept which shows transfer leadership in managing and operating training activities including preparing textbooks. Expert team must transfer only Japanese flagship knowledge and technologies. MOEE don't need basic electric power technologies.

・MOEE want JICA to introduce Japanese latest technology and facilities into new training center, we don't need existing technology and facility.

・MOEE want Expert Team to conduct MOEE's proposed schedule.（Expert Team express the time schedule cannot accept because of shot periods for preparing training materials.）

・MOEE want Expert Team to launch next training from beginning of May. (Expert Team explained that it is not acceptable because Japanese calendar has holiday week in May and JERA Expert Team need to invite MOEE managing person to Seminar in Japan in middle/end of May.)

・These comment is not request but command from Deputy Minister.

＜U Tha Soe left the meeting＞

【WG in March and April】

（C/P）We don't need review of Workshop in Japan for several days, one day will be enough.

（Expert Team(ET)）We did not answer to your questions enough in Japan, so we would like to make additional explanation about Japanese technology.

（C/P）We have no questions. We already studied about Japanese technologies obtained in Seminar in Japan.

（C/P）Since we already deeply understood about previous lectures, we don't need review of

previous lecture. We need new knowledges.

（ET）It's difficult for us, because we have not enough time for preparing training materials. And review of previous lecture is very important for well understanding for you.

（C/P）We need theory and examination with calculation. Expert Team can conduct a lecture using Purchased technical books.

（ET）Expert Team should transfer practical use knowledge based on Japanese power sector to you. We did not come here to teach about general knowledge in purchased technical books.

（C/P）・・・・・

（C/P）Deputy Minister want to know about contents of lecture. We have to report the contents of lecture at the time of receiving request from Deputy Minister.

【Next schedule】

（C/P）When start next training? We want you to start training earlier as possible.

（ET）Since we need to prepare and invite for your training in Japan, we will start next training from early June.

（C/P）Is it expected 3 months continuous training?

（ET）Expert Team will make a lecture for 3 months by several Experts.

【Training facilities in Nay Pyi Taw training center】

（C/P）We don't need existing distribution power facilities such as concrete pole and conductor wire. Who talk about the installation the general facilities into new training center?

（ET）Daw Mi Mi Khaing expressed us that some power facility need to new training center by April 2017 (Training center will be open). And she also express us the opening ceremony will be held at new training center.

（C/P）・・・・

（ET）We understand your intention. If you don't need general facilities in new training center, we can withdraw the propose to install concrete pole into new training center.

【Procurement of training facilities】

（ET）It takes long time to procure the training facilities, because procurement procedure will take longtime.

（C/P）How long does it take to install the facilities?

（ET）We think it takes several Months.

-end-

13th Counterpart Meeting Memo
On the Project for Capacity Development of Power Transmission and Distribution System Phase – I

Date - 9th October, 2017

Time - 13:00 – 14:30

Venue - Training Center (Naypyitaw)

Participants - U Tha Soe, U Myint Oo
Managing Persons from DEPP, DPTSC, ESE, YESC and MESC
JICA Experts (Ms. Shibata, Dr. Shikimachi, Mr. Nakagawa)

Comment to Textbook

- Each organization will give the comment
- DyDG, Mr. Myint Oo commented no problem.
- JICA side requested the deadline to the textbook is the end of OCT.

Request by U Tha Soe

- The Revision of textbook and development of syllabi, curricula through WG activities should be started earlier.
- -> These preparations should be started after consideration of the deliberation about institutional and financial challenges related HRD framework. Therefore, the schedule cannot be shortened.
- Installation of Equipment should be started earlier.
- -> Considering your opinion, we are trying to procure them as soon as possible. Some of the OJT trainings in the field of the training center will be conducted during this training period.
- When will all the equipment procured?
- -> Probably, MAR 2018.

Scheme of Human Resource Development

- JICA team needs to submit a proposal letter by the end of this month to decide a member of working group for the framework of human resource development. It may take several months to get approval because establishment of new organization should be approved by parliament.
- In phase 2, new engineers will be selected as trainer candidates. Trainer candidates in phase 1 will have a lecture as main teacher in local cities after completion of phase 1.

2nd JCC

- 2nd JCC will be held around 20th December. Detailed will be discussed.
- Establishment of organization for human resource development will be added to agenda.

Facilities of training center in NPT

- MOEE would like JICA to pay cost of concrete basement for pole, if possible.
- -> We confirm whether we pay cost of it, but the construction should be done by ESE.

Workshop in Japan

- Workshop for engineer class will be held after January because some SAEs will take an examination to promote in January.

(end)

14th Counterpart Meeting Memo
On the Project for Capacity Development of Power Transmission and Distribution System Phase – I

Date - 14th December (Thursday), 2017
Time - 13:00 – 15:00
Venue - Training Center (Naypyitaw)
Participants - Managing Persons from DEPP, DPTSC, ESE, YESC and MESC and JICA Experts (***Attended list will be attached by JICA***)

In this meeting, the following topics were discussed with the name of

(a) Revised Work Plan (From Jan 2018-Nov 2018)
(b) Holding Regional Seminar and Training in regional and main cities
(c) Tentative Schedule of Workshop 1 and 2 in Japan for Engineers
(d) JCC Holding Date

(A) Regarding to revised work plan discussion for coming year - 2018,

- From ***3rd to 17th February***, have to attend for 1st workshop in Japan for **13** Engineers (trainer candidates) of MOEE and have to attend for 2nd workshop in Japan for **14** Engineers (trainer candidates) of MOEE within the period of ***17th February to 3rd March***.
- From ***5th March to April 1st week***, all trainer candidates have to gather again at training center (Naypyitaw) and start to conduct for preparation and discussion for training in Main Cities. The same task has to conduct continuously again in May, 2018.

  (a) Through the working group activities (5 WGs), the extracted items of each are aggregated and teaching materials for each field are prepared for each 5 themes in Myanmar Language.

  (b) For the working group period, JICA is going to provide meals (breakfast, lunch and dinner for weekdays) for all candidates as usual.

(B) Regarding to discussion for holding Regional Seminar and Training in regional and main cities,

- Seminar and Training in Major Cities will be started in ***June, 2018***. At the moment, following (6) cities are roughly selected to hold from the view point of travel expenses and shortening of travel time from Naypyitaw.

  YESC Area - Yangon

  MESC Area - Mandalay

  ESE Area - Bago, Magway, Taunggyi, Monywa (or Sagaing)

  (a) From the view point of saving accommodation cost, respective trainers from YESC and MESC have to take the responsibility for holding training or regional seminar in these two places and 2 or 3 JICA Experts will take part with the team. For going to ESE areas, the member of teams from respective city are selected one from each working group (WG) and JICA is going to arrange for providing transportation cost and daily allowances for meals.

(C) Regarding to discussion for tentative schedule of Workshop 1 and 2 in Japan for Engineers,

- Have to stay 3 days in Tokyo and 9 days in Nagoya and then the following places will be visited (*by tentative schedule draft*)

  (FUJI Electric Co., Ltd, Nissin Electric Co., Ltd, Maebashi Works, GIS system, Substations, CHUBU SEIKI Co., Ltd, Furukawa Electric Works Co., Ltd, NGK insulators, TOENEC corporation, CEPCO)

  (a) The counterparts from MOEE proposed at the last counterpart meeting to get the chance for visiting to coal fired power plant and railway power supply substation. However, JICA replied that it couldn't be arranged with the reason of not relating with project title for first option and didn't get the permission to see and observe form respective company for the last one though they tried it.

(D) Regarding to JCC Holding date discussion, it is going to hold on 20th December 2017 at Office No. (27) Naypyitaw.

15th Counterpart Meeting Memo
On the Project for Capacity Development of Power Transmission and Distribution System Phase – I

Date - 16th January (Tuesday), 2018
Time - 10:00 – 12:00
Venue - Training Center (Naypyitaw)
Participants - Managing Persons from DEPP, DPTSC, ESE, YESC and MESC and JICA Experts (***Attended list will be attached by JICA***)

In this meeting, the following topics were discussed with the name of

(a) Explanation about the third monitoring sheet
(b) Explanation about the activities till March 2018
(c) Explanation about proposed training organization and system formation
(d) Explanation about seminar and training in regional and main cities
(e) Explanation about discussion about the site installation of SOG switchgears
(f) Explanation about the second trainings in Japan

At the beginning of the meeting, U Tha Soe (CE from ESE) gave the opening remarks. According to his remarks, Deputy Minister instructed to all responsible persons including trainer candidates to conduct effectively for getting project progress improvement. Also, it is needed to be efficient and the best for 2018 work plan. Every responsible managing person has to submit and inform to respective higher officials (GM or CEO) about the discussed issues and resultant outcome of the meeting after the task.

(A) Regarding to Project Monitoring Sheet, the facts were expressed as follows;

- The procurement condition of safety equipment and power distribution materials, the titles of lecture given by JICA Experts through 2017 working group activities, the measurement of working group activities progress by the average score of each exam, Achievement of Output 1, 2 and 3 set up my JCC meeting. According to the expression of indicator No.1 for project purpose achievement, the number of accidents will change to appropriate number instead of described digit (28) based on actual work condition. (***the soft copy of monitoring sheet will be***

distributed by JICA side)

JICA: Switchgear has been already arrived and one has been already used at training center (Nay Pyi Taw) and another one might be installed at training center but the remaining two should be installed at actual sites to be supportive for project progress improvement.

MOEE: When all facilities arrive at training center, try to install as soon as possible. After the installation had finished, JICA experts need to give practical training to trainer candidates about one or two weeks.

JICA: Accepted the idea for practical training.

(B) Regarding to activities till March 2018 plan discussion, 5 working groups have to prepare presentation material for 23rd Seminar will hold at Office No. 27 with higher officials of MOEE. After that, candidates have to go Japan for Workshop in Japan No.2 by dividing two groups from 3rd February to 3rd March 2018. From 5th March to 6th April 2018, all trainer candidates have to come to NPT training center and need to conduct continuously for presentation material preparation for regional seminar.

(C) Regarding to training organization and system formation discussion, JICA side proposed a structure of Training Center preparation Committee (TCPC) and asked how they have to continue for proceeding. MOEE side replied that this issue should be discussed by DG or DDG of DEPP.

(D) Regarding to seminar and training in regional and main cities discussion, six pilot sites has been already selected with the name of Yangon, Mandalay, Bago, Magway, Taunggyi and Monywa. Each trainer candidate has to go two regional cities and one time is for teaching and one time is for getting teaching knowledge of others. Training candidate and regional city to be gone will allocated by JICA and proposed to DEPP with a list. Seminar dates are fitted as follows:

Trip No.	Date	Regional Cities
1st	4th June to 15th June	Yangon & Bago
2nd	25th June to 7th July	Mandalay & Taunggyi
3rd	16th July to 28th July	Magway & Monywa

Each training should be about 3 hours including a break. Activities at each day shall be on weekly basis and shall be as follows.

Date	Monday	Tuesday	Wednesday	Thursday	Friday
AM	Moving from NPT to regional city by car	Regional seminar	Training 2 (Distribution Construction and Safety technologies)	Training 4 (Transmission Technologies)	Moving from the regional city to NPT by car
PM		Training 1 (Distribution Plan and Design)	Training 3 (Distribution Operation & Maintenance)	Training 5 (Substation Technologies)	

JICA will provide for transportation cost and will be discussed later with DEPP for accommodation and daily allowance.

(E) Regarding to site selection and installation of SOG switchgear discussion, JICA side explained about the function of SOG switchgear as a load break switch. For getting the reflection of project indicators, pilot sites to be installed will be selected later based on frequently/mostly fault occurrence distribution line at the moment.

(F) Regarding to second training in Japan, JICA distributed the edited tentative schedule of workshop 1 and 2 in Japan for engineers and explained about the changes from the previous one. (***JICA will be distributed later soft copy of tentative schedule for second workshop in Japan)***

(G) As the last discussion title, JICA side requested to provide Statistics 2017 of each department (MESC, YESC, ESE and so on) to be supportive for consideration of training organization and formation. MOEE side replied that request is needed to respective departments by official letter (JICA) for getting the data.

Prepared by

Dr. Tayzar Lin

Assistant Manager (YESC)

The Project for Capacity Development of Power Transmission and Distribution System (Phase I)

Meeting Record

Date:	2018/3/9	Time:	9:00 – 11:30
Meeting with	DEPP, YESC, MESC, ESE, DPTSC		
Participants:	(MOEE) : Please see the meeting attendance list as attached. (JICA Study Team) : Mrs. Kuri Orui Shibata (Training Program/Coordinator), Mr.Osamu Tanihata(Distribution Technology (Operation and Maintenance)), Mr. Shinichi Mitsui (Human Resource Developing Planning 1 (Training System)), Mr. Koichi Yamashita (Financial and Institutional Analysis), Mrs. Wah Wah Han Su Yin (Human Resource Development Planning 2 (Regional Cities))		
Agenda:	▪ To discuss about the installation of SOG (Storage Overcurrent and Grounding Type) at Tatkone Township ▪ To discuss about the installation of SOG at Kyaukpadaung Township ▪ To discuss about training program in regional cities ▪ To inform the progress of preparation of Training Center's institutional organization ▪ To discuss about the second workshop for Managers in Japan		

Main Discussion Points:

(MOEE) U Thar Soe, Chief Engineer made the opening address.

(JICA) Expert explained to install to SOG to one feeder at Tatkon Township on 19th March 2018. The starting time will be from 9:00 am and blackout for two hours shall be informed. A Japanese technician from NKE, the company where SOG has been bought, will come to the site to instruct the installation. Workers are requested at Tatkon Township on that day for installation. All Trainer Candidates (TCs) will also go to Tatkon Township on that day.
Another SOG will be installed at Kyaukpadaung Township in Nyaung Oo district and Township Engineer from Kyaukpadaung Township is requested to come to Tatkon Township to learn this installation on 19 March so that he can instruct SOG in Kyaukpadaung Township.

(MOEE) Mr. Zaw Zaw Htet informed Tatkon Township Engineer about the schedule of installation of SOG on 19 March.
In order to invite Township Engineer from Kyaukpadaung Township, please send email to CEO of MESC.

(JICA) Yes, we will send email for permission of installation of SOG in Kyaukpadaung Township and to send Kyaukpadaung Township Engineer to Tatkon Township on 19 March.

(JICA) Mr. Tanihata discussed about the main purpose of Major Cities Seminar. Expert explained to conduct the training materials and handout preparation by TCs in May in Naypyitaw. The starting date of training activities in Naypyitaw is from 7 May. Training program in regional cities is in June and July. Presentation materials should be arranged and printed by MOEE side.

(MOEE) Please submit a letter about the training program in regional cities to DEPP. DEPP then issues a letter to all organization to inform the training program in regional cities so that each organization can have time to select trainees and logistic.

How many number of trainees are expected for these training in regional cities?

(JICA) We would like to request TC to prepare a detailed training program for each group and it will be attached to the letter to DEPP before the water festival.
In terms of the number of trainees, each organization shall decide by itself.

(MOEE) How about the food and accommodation for TCs when they go to regional cities. Cost for Trainees in regional cities will be provided by related Township or Organization.

(JICA) Transportation will be provided by JICA and if possible we would like MOEE to bear cost for them.

(MOEE) It would be grateful if JICA will bear the food and accommodation for TCs.

(JICA) We will consider giving allowance to TCs. Please arrange the accommodation by yourself. The main important thing is to concentrate to conduct trainings in the regional cities.

(JICA) JICA explained about a visit to AGE Co., Ltd to study Factory Test with one person from each WGs including two experts from JICA on 12 March.

(JICA) JICA explained to install Low voltage line, Transformer Installation, Pin insulators and Guy Wires at the Training Center in Naypyitaw during 21st to 23rd March, 2018.

(MOEE) Regarding installation of remaining facilities in the Training Center, it should be done after all training facilities such as middle voltage facilities are arrived.

(JICA) As Mr. Nakagawa, Line Expert will come to Myanmar coming week, we would like to conduct the installation according to his instructions.

(MOEE) We accepted this point. Vice Minister said that he wanted to check the practical training conducted in the training center. Please let U Thar Soe know when the date of installation is confirmed.

(JICA) Regarding the institutional arrangement of our training center, Mr. Yamashita explained about the presentation made by JICA in February to DG of DEPP, DG of DPTSC, MD of ESE, CEO of YESC and CEO of MESC. The committee is proposed to establish the preparation committee and PS is now considering to establish the preparation committee including the energy sector and it seems that it takes some time to establish it.

(MOEE) Today meeting, the training institution is the main point. We need to make further discussion how to operate the training center. U Thar Soe will also remind PS to consider for establishment of a preparation committee.

(JICA) Thank you very much.

(JICA) JICA explained tentative schedule of the second workshop for Managers in Japan. JICA did not receive the application forms from MOEE although the deadline is over. The procedure is MOEE submits a list of participants to JICA Myanmar Office which then issues an invitation letter for these participants to MOEE. MOEE then continues to get permission from MOFA. We would like to request MOEE to explain MOFA not to reduce the number of participants and to reduce the length of stay in Japan. It the length of stay in Japan is shortened, the schedule will be changed.

(MOEE) We will explain to MOFA regarding the length of stay in Japan to prevent the change of schedule.

-end-

17th Counterpart Meeting Memo
On the Project for Capacity Development of Power Transmission and Distribution System Phase – I

Date - 2-5- 2018

Time - 11:30 – 13:30

Venue - Training Center (Naypyitaw)

Participants - Managing Persons from DEPP, DPTSC, ESE, YESC and MESC and JICA Experts (***Attended list will be attached by JICA***)

In this meeting, the following topics were discussed with the name of

(a) Explanation and discussion about the activities and preparation of regional seminar/ training
(b) Explanation and discussion about the working schedule toward the regional seminar
(c) Explanation about verification of SOG-VCB installation effect
(d) Explanation about the site selection for the single-phase transformer installation in the five cities
(e) Explanation about discussion about the second workshop for managers class in japan

(A) Regarding to the activities and preparation of regional seminar/ training, it is going to conduct as proposed schedule for Training Trip (Plan 1, 2 and 3) and the first trip will start from 5th June 2018 and last trip will finish on 25th July and training will be proceed as expressed in detailed schedule. JICA has already submitted the invitation letter to DEPP, and DEPP will distribute it again to respective departments and then to the state/ regional.

(B) Regarding to Activities of working schedule, have to continue for presentation material preparation in first week, and will make a rehearsal for teaching practice on second week and have to submit finalized version of teaching material on 18th June 2018 and have to make the presentation to CE and higher official of respective departments under MOEE on 28th June at Naypyitaw Training Center. Besides, the questionnaire proposed by JICA to evaluate the trainer and trainees in regional seminar has to be edited for required items or used in the program. After that, U Tha Soe (CE- ESE) told to remove

the program of presentation to Deputy Minister from schedule of this working group activity.

(C) Regarding to verification of SOG Installation effect, provided the data format by JICA and it is needed to modify to be compatible with probable data collectable situation and then collect the data by modified one and also compare the effect between before and after installation.

(D) Regarding to site selection of Single Phase Transformer discussion, ESE Head office (Naypyitaw) instructed to respective Division Engineer to choose the suitable location and the selected location point will be presented to JICA on coming week. Like the same to Dala, somemembers (a few from each organization) will go to Bagan for the OJT of designing MXrS.

(E) Regarding to Manager workshop in Japan discussion, it will be conducted as tentative schedule of JICA from May 12th to 23rd 2018. It is noted that 6 members for Manager were proposed and arranged by JICA and Deputy Minister reduced two members from them due the FAPC objection.

(F) As the last discussion title, JICA will be supported the daily allowance to each trainer candidate for regional seminar trip with the range of 23 US$ per day for staying at the region and 5 US$ for staying at Naypyitaw and the cost for three meals (breakfast, lunch and dinner) will be included in this amount.

Prepared by
Mr. Than Htike Oo
Executive Engineer (ESE)

Ministry of Electricity and Energy
Department of Electric Power Planning
Republic of the Union of Myanmar

Republic of the Union of Myanmar

The Project for Capacity Development of Power Transmission and Distribution System (Phase I)

Assessment Report of Existing Human Resource Development Policy, Plan and Training System in Myanmar

December 2016

Japan International Cooperation Agency (JICA)

JERA Co., Inc.
Nippon Koei Co., Ltd.

Jera
Energy for a New Era

NIPPON KOEI

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Appendix

Figures and Tables

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ABREVIATIONS

Word	Original
ADB	Asian Development Bank
ADE	Assistant District Engineer
ASEAN	Association of South East Asian Nations
AE, A.E	Assistant Engineer
CE, C.E	Chief Engineer
CNG	Compressed Natural Gas
CT	Current Transformer
DE	District Engineer
DEPP	Department of Electric Power Planning
DG	Director General
DHPI	Department of Hydro Power Implementation
DPTSC	Department of Power Transmission and System Control
DyCE	Deputy Chief Engineer
EE	Exective Engineer
EPGE	Electric Power Generation Enterprise
ESE	Electric Supply Enterprise
GE	General Manager
GMS	Greater Mekong Sub-region
IFC	International Finance Corporation
JEPIC	Japan Electric Power Information Center
JICA	Japan International Cooperation Agency
MD	Managing Director
MEPE	(Former) Myanma Electric Power Enterprise
MESC	Mandalay Electricity Supply Corporation
MMK	Myanmar Kyat
MOEE	Ministry of Electricity and Energy
MOEP	(Former) Ministry of Electric Power
NEDA	Neighboring Countries Economic Development Cooperation Agency (Thailand)
NEP	National Electrification Plan
OJT	On the Job Training
SAE	Sub Assistant Engineer
YESC	Yangon Electricity Supply Corporation

Chapter 1 Overall of the Assessment

1.1 Purpose of the Assessment

"The Project for Capacity Development of Power Transmission and Distribution System" (hereinafter referred to as "the Project") has been implemented by JICA since July 2016 and the Project will be implemented for 5 years.

In the Project, the Project team will prepare draft of future human resource development frameworks and draft roadmaps (human resource development policies, and development plans) in Myanmar in light of existing human resource development policies, plans and training system in Myanmar and training system in Japan. For this purpose, the project team conducted the assessment of existing human resource development policy, plan and training system (hereinafter referred to as "the Assessment") in Myanmar. The Assessment was conducted by interviewing MOEE staff who was in charge of human resource development in each of MOEE, ESE, YESC, MESC and DPTSC.

1.2 Outline of the Assessment

The items and procedures of the Assessment are shown in Figure 1-1.

Organizations to be assessed

MOEE | ESE | YESC | MESC | DPTSC

Major assessment items (proposal)

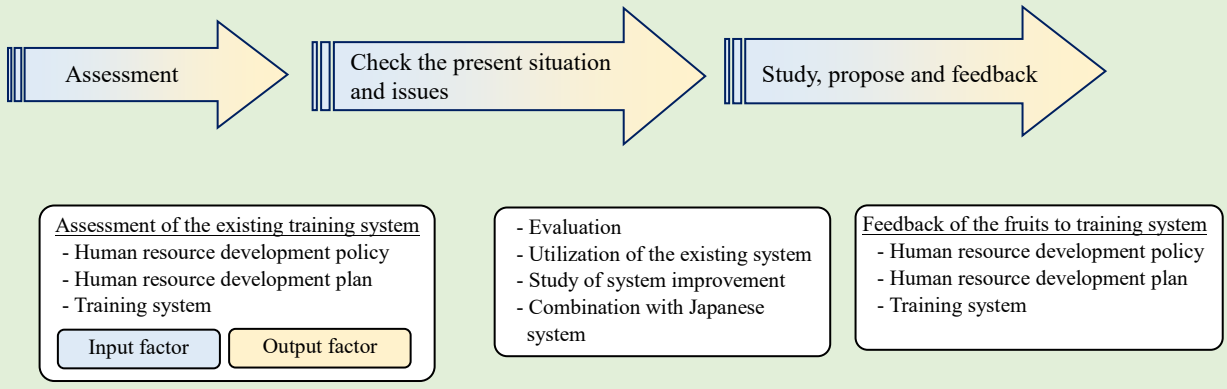
【Input factors】

Organizations in charge of training & human resource development (name of organization, number of staff members, titles)	Job assignment of engineers for each section or department (technology area, OJT, safety control)
Training policy (yes or no, details)	Transfer policy for engineers (transfer interval, policy on considering job experience history)
Training plan (yes or no, details, period, preparation, arrangements for local regions)	Training facility (yes or no, location, number of facilities, details of facility, plan, accommodations)
Budget for human resource development (amount, source of budget, actual usage, travel expenses, daily allowances)	Training textbook (yes or no, technology details, curriculum)
External training (yes or no, details, actual records)	Trainer (possibility of full-time work, number of trainers, titles, type of job, how to nominate)
Training in a third country (yes or no, details, actual records)	Linkage between training and job performance assessment (yes or no)

【Output factors】

Trainees (company, type of job, number of trainees, how to select, titles, training assessment)	Assessment of trainees (yes or no, method, test, reflection of results)
Training effects (type of job, details of effects, how to check the effects)	Assessment of training (yes or no, method, details of assessment, how to improve)

【Assessment of human resource development plan, policy and training system】



(Source: JICA Expert Team)

Figure 1-1 Assessment items and procedures

Chapter 2 Results of the Assessment

2.1 Human Resource Development Framework

(1)Training Organization, Policy and Priority Work Category

Table 2-1: Results of hearings of each MOEE organization about Training Organization and Policy

MOEE organization	Organization in charge of Training and Human Resource Development	Training Policy and/or Priority Work Category to be trained
DEPP	DG of DEPP	(No Answer)
DPTSC	DG of DEPP	(No Answer)
ESE	Administration Department 93 Numbers of Employees in Administration Department (Permanent: 78, Daily: 15) 40 Numbers of Employees are responsible for a training and human resource development.	Training is held as necessary according to the proposal by departments in ESE. Training for distribution is the priority one.
YESC	Engineering Planning Deparment 8 Staffs (1 section Head (GM), 2 Assistant GMs, 1 Assistant Manager, 1 Senior Assistant Manager, 3 Office staffs)	- To become a skillful employees and to be familiar with advanced tools and equipment and to apply and perform it technically and systematically in the field area. - To become ASEAN level competency standard. Engineering training is the first priority in YESC training plan. Others departments (admin, finance and material planning) has also respective training as usual.
MESC	(No Answer)	(No Answer)

(2)Training Plan/Program

Table 2-2: Results of hearings of each MOEE organization about Training Plan/Program in fiscal year 2016-2017

MOEE organization	Training Plan/Program in fiscal year 2016-2017
DEPP	There is no plan and training program in 2016-2017. (Training course is implemented by proposal based.)
DPTSC	There is no plan and training program in 2016-2017. (Training course is implemented by proposal based.)
ESE	For the time being, there is no plan/program for training program conducted by ESE in 2016-17 fiscal year. There was three numbers of trainings in 2015-2016 fiscal year because of budget limitation. But there is a plan to send employees from ESE to Central Civil Service University conducted by the Union Civil Service Board and to oversee training conducted by international donors and private companies in 2015-2016 fiscal years.
YESC	In 2016-2017 fiscal year, 5 training programs are planned for 4 different level position who do not conduct with training as for engineering planning department. There are Grade 1 to 5 (Grade 1 is the highest). Technicians are qualified by the exam, performance of their technical skills, experiences and interview.
MESC	(No Plan)

(3)Training Budget

Table 2-3: Results of hearings of each MOEE organization about the amount and content of training budget information (in each of fiscal year 2013-2014, fiscal year 2014-2015 and fiscal year 2015-2016)

MOEE organization	The amount and content of training budget information (fiscal year 2013-2014, fiscal year 2014-2015 and fiscal year 2015-2016)
DEPP	**2016-2017 fiscal year: MMK about 30 million** 1. Almost the cost is food for trainees. Small accessories and lecture room maintenance fee is also include but very few. 2. Accommodation, dormitory is provided by MOEE, so it's not included in budget. 3. Transportation fee is paid by each organization's budget. The transportation fee is included all the fee for work, so it is difficult to distinguish the fee which is only used for training. 4. There are no daily allowance for training. 5. It's is not enough to conduct the all proposed trainings.
DPTSC	**No budget for human resource development for DPTSC, but DEPP has budget for DPTSC.** All the training is proposed base. Even the budget is not enough for training courses, some training course is implemented. At that time trainee have to pay the food and transportation.
ESE	**2015-16 fiscal year: MMK 12,711,184** (Example in 2015-16 fiscal year: 1. 2.5 months long training for 50 trainees, the budget used is MMK 8,023,334 including food for trainees, refreshment for guests who come to ceremonies, arrangement for ceremonies, block stamps, etc… 2. 9 months long training, the budget MMK 320,000 is used only for food. 3. 21 days long training, the budget used is MMK 674,950.) **2016-17 fiscal year: MMK 9, 500,000** Mostly, the budget for trainings is used for food and transportation charges is not included in it. The unit price of food per person for a day approved by Myanmar Government is 500 kyats. There is Travelling Allowance in ESE and transportation charges by bus to attend a training can be claimed by trainees from ESE. There is no daily allowance in MOEE.
YESC	**Budget sharing for training is 50% for Engineering Training and the rest 50% is for the other 3 departments.** Finance department have allocated the budget for training.
MESC	(No answer)

Table 2-4: Results of hearings of each MOEE organization about the procedure for acquiring training budget

MOEE organization	Procedure for acquiring training budget
DEPP	MOEE allocate the budget to each organization. Budgetary request is not done annually. Private companies or other donor such as JEPIC or ADB proposed to some trainings courses to MOEE. Almost all the cost including equipment and facilities is covered by them.
DPTSC	Anyone who wants to hold a training programs can propose the training course. And if ministry office of MOEE or DG of DEPP permit it, the training cost is allocated from the budget. The permission authority is depend on the size of training courses.
ESE(*1)	Regarding budget for a training in ESE, there are only two types of budget: transportation for trainees and trainers allowance including catering for trainers. As far as transportation for trainees and trainers in a training is concerned, it is included in the budget for all transportation charges. Administration department in the Head Office of ESE is responsible to request the budget allocation of all transportation charges including that of training to Revenue and Budget Department, which then submits request of all budget to the Union Government, in ESE. Administration Department estimated transportation budget based on the actual cost for transportation in the previous year. Actual transportation for a training is requested to Revenue and Budget Department by Administration Department in the Head Office of ESE to provide to trainees and trainers. Moving onto allowance for trainers, it is included in the subject of catering of guests. Administration Department in ESE estimated allowance budget based on actual cost in the previous year. When food expense for Trainees in a training is concerned, there is no budget provided by ESE Head Office. Regional and State Offices have to provide food expense by themselves for their respective trainees from corresponding Regional and State Offices in response to invoice from Administration Department in the Head Office of ESE. Administration Department pay first for food expense for trainees in a training. In addition, expenses of food for Trainees from the Head Office of ESE is provided by Regional and State Offices.
YESC	Head of Training Department and Head of Engineering Budget Department are the person in charge in YESC.
MESC	No answer

(*1) Remark: Based on an interview to Mr. Tin Bote San (Deputy Director, Revenue and Budget Department in ESE Head Office) on 31 Oct, 2016.The person in charge of in ESE for budget in a training is Mr. Myint Oo (Deputy Director) from Administration Department.

(4)External Training Course

Table 2-5: Results of hearings of each MOEE organization about external training courses

MOEE organization	External training courses in Myanmar	External training course in overseas countries
DEPP	Astron, Siemens, ADB, JEPIC, Fujikura Siemens: circuit breaker (equipment is also provided by Siemens) ABB: Previous Deputy Minister requested the training courses, Relay setting (1-2 days lecture) JEPIC: 40-50person every 2 years in Yangon, 4 days lecture and 5-10 person go to Japan for 2-3 weeks.	Please See Attachment 2 "Overseas Training List".
DPTSC	-	
ESE	Yes. For example: Fujikura, JICA. (Please See Attachment 1 "Fujikura")	
YESC	Linemen who work at local and foreign companies are assigned the training and are trained and participated practical and demonstration how to use line equipment and tools.	Mostly China, Vietnam, Japan, Thailand and India, etc. invite to conduct the training program at their countries. Not regularly.
MESC	(No answer)	(No answer)

2.2 Personnel management system

(1) Assignment of engineers

Table 2-6: Results of hearings of each MOEE organization about how to assign engineers to each work

MOEE organization	Method for assigning engineers in regional offices (For example; technical area (design, planning, construction, maintenance, distribution, etc…), On Job Training (OJT), safety management, etc…) or Criteria for designation of engineers to each work
DEPP	No.
DPTSC	No.
ESE	Engineers are assigned according to their experience. There is no position of safety management. Engineers work for their main work together with safety management. Engineers instruct linemen. [Criteria for designation of engineer] Years of experience, educational qualification and competence at work. Daily contract employees, Assistant Engineers (AE) and Executive Engineers (EE) are promoted periodically by making an interview by a board composed of responsible persons from each department. Above EE position, Executive committee decide them.
YESC	Engineers are only assigned to each work in regional offices and depend on the allocation of workforce from the Head of Office in Nay Pyi Taw. According to the rules and regulations, engineers are assigned to each work in different area. However they already have been trained since they start to work in this ministry. Generally, engineers from the whole ministry have to transfer after 2 years later in one place by the assignment of the ministry. According to the organizational structure of YESC, there is a difference of total number of engineers, admin staffs, finance staffs and office staffs in each regional offices depends on the land area, population and consumers of that regions. [Criteria for designation of engineer] Engineers are evaluated by the performance of their technical skills, competency and how much they can effort and how they can apply the technical knowledge at their work.
MESC	Engineers to each work in regional offices Two Staff Officers – (1) Engineers (EE, AE, SAE) (2) Admin (Staff Officer) Engineers (EE, AE, SAE)_ (design, construction, maintenance, distribution, etc…), Admin (Staff Officer) - (_planning,) On Job Training (OJT), We don't have. Safety management – Distribute to the Public or consumers as a safety note sheet. We Have criteria for designation of engineers to each work experienced years, career history, qualifications,

Table 2-7: Results of hearings of each MOEE organization about No. of assigned engineers to each work

MOEE organization	No. of engineers assigned to each work in regional offices (For example; technical area (design, planning, construction, maintenance, distribution, etc…), safety management, etc…)
DEPP	No. There are no work for safety management, because safety is included in each works.
DPTSC	MOEE has criteria. (Ex. First 3year Sub A.E -> 5year A.E -> E.E) The speed of promotion is different.by certification which employee has. Interview is held by senior person included C.E. the number of interviewer is around 10. Senior person nominates employees as promotion candidate referring their willingness, experience, certification and some qualification.
ESE	The numbers of engineers assigned in each regional office depend on the size of the office; how big or how small. There is one District Engineer (DE), Deputy Chief Engineer and one Assistant District Engineer (ADE), Senior Engineer are in each State/Regional office. There are enough engineers under DE and ADE in each State/Region.
YESC	-----
MESC	-----

Table 2-8: Results of hearings of each MOEE organization about evaluation system for engineers

MOEE organization	Whether the evaluation system for engineers from the view point of technical skill exists or not (Yes: exists, No: not exist)
DEPP	Yes
DPTSC	----
ESE	Yes
YESC	Yes
MESC	Yes

(2) Personnel transfer policy

Table 2-9: Results of hearings of each MOEE organization about transfer policy for engineers

MOEE organization	Transfer policy for engineers (frequency of personnel transfer, consideration of work experience)
DEPP	Employees have to work at same workplace at least 3 years. Normally 3-5 year, we work at same workplace. If employee get a punishment, it shall not be applied to.
DPTSC	-----
ESE	Yes. Every two years, transfer request can be submitted to a committee. Working experience is included when considering transfer.
YESC	Have different circumstances; (a) Promotion (if one of Engineers get promotion, they have to transfer) (b) After 2 years serving in one place (c) Working experience (if he/she have appropriate and skillful at one subjets) (d) Work requirements
MESC	Transfer policy for engineers in MESC is depend on technical skill , experienced years, career history, qualifications.

2.3 Resources for training

(1) Training facilities

Table 2-10: Results of hearings of each MOEE organization about training facilities

MOEE organization	Training facilities (Information about such as location, number of facilities, plan and accommodation)
DEPP	Yes. MOEE training center. There are concrete poles, lineman installation.
DPTSC	Yes. In Nay Pyi Taw, previous MOEP2 training facilities -> MEPE -> DPTSC
ESE	Yes. There is an existing Training Center in Nay Pyi Taw including accommodation for 30 trainees, a seminar room, a dining room and a new three-storey building is under construction for all employees in MOEE.
YESC	Yes. Hlaing Thar Yar Training center Tools and equipment to practice and demonstrate to the trainees. Line installation equipment Safety equipment Transformer and substations equipment and so but not much more.
MESC	There is no Training facilities in MESC.

(2) Training textbooks

Table 2-11: Results of hearings of each MOEE organization about training textbooks

MOEE organization	Training textbooks (Information about technologies, curriculum)
DEPP	Yes.
DPTSC	Yes. Trainees has the textbook, we some time photocopy to share the knowledge. No library for training text book.
ESE	Yes. Please see the email sent from Mr. Zaw Zaw Htet about the presentation file of one the trainings Please see Attachment 3 "Training Schedule of a Training in ESE" as a sample of training schedule in ESE. There are some training text book for Generating, Underground, Distribution standard, and Siemens training. When a training course is proposed, a schedule is mentioned on it.
YESC	Technical textbooks for different engineering sections such as underground, overhead line, substation construction and maintenance, 24 hours maintenance and repairing (safety, line fault and breakdown), metering and testing, street lighting and distribution line. However, above textbooks cannot support for all level of engineering positions. These textbooks only compile from the experienced old service senior Engineers from related session. There is no syllabus and format for textbooks systematically in detailed.
MESC	There is no Training textbook in MESC.

(3) Trainers

Table 2-12: Results of hearings of each MOEE organization about trainers

MOEE organization	Trainers (Full-time / Part-time) (No. of trainers, trainer's designation and type of job (For example; design, planning, construction, operation, maintenance, etc…) and method for nomination of trainers.
DEPP	There are some temporary trainers. No full-time trainers. Normally, trainers come from other office to provide lectures.
DPTSC	No full-time trainers. Normally, trainers come from other office or DEPP to provide lectures.
ESE	They are temporary trainers; DyCE, CE, EE, do as trainers by doing together with their actual work based on instruction by MD and DG of each organization.
YESC	Section Heads from different sections and technical experts are giving lecture as part time trainers. To become assigned training is now planning but not yet complete.
MESC	(No answer)

Table 2-13: Results of hearings of each MOEE organization about linkage between training and job performance assessment

MOEE organization	Linkage between training and job performance assessment
DEPP	Yes. Trainees can apply their knowledge to their work in practical.
DPTSC	Yes. Some of training certifications are reflected to promotion.
ESE	Yes. If he/she is outstanding in the training, he has a chance to be promoted.
YESC	Training for new employees and On-Job Training for experienced workers. All of the new Engineers (including linemen and Grade 3 or 4) have to be given training after assigned to work in different offices. For experienced workers, OJT is assigned.
MESC	There is no linkage between a training and job performance assessment in MESC.

2.4 Evaluation of a Training and Evaluation to Trainees

(1) Trainees/Training Result

Table 2-14: Results of hearings of each MOEE organization about Trainees

MOEE organization	Trainees (organization they are from, their job type (for eg; design, planning, construction, operation, maintenance, etc…), their designation, the number of trainees, the method of selection and assessment/evaluation of a training by trainees.)
DEPP	Depend on each training course. Not standard matters. Criteria for a training is mentioned on that training program.
DPTSC	Criteria for a training is mentioned on that training program.
ESE	Employees from ESE attend the training conducted not only by ESE but also by other Ministries such as Union Civil Service Board, etc…
YESC	Trainees Linemen, Grade 3 or 4 from different township offices of YESC. All of the employees who work at YESC have to be trained. When one of the training program is planned to start, training department select the employee to conduct from all of the townships. Therefore, department choose the trainees according to their service. Training center cannot train all of the new employees in one time because of the size and space of training center. So, by selecting the workers from different townships according to their service and plan to train.
MESC	Mandalay Electricity Supply Coporation Planning (Engineer work section)

Table 2-15: Results of hearings of each MOEE organization about Training Result

MOEE organization	Training result (effect of training to trainees) Job type (for eg; design, planning, construction, operation, maintenance, etc…), actual training results and method of confirmation of training result.
DEPP	Presentation or progress report submits to DEPP
DPTSC	Criteria for a training is mentioned on that training program.
ESE	There is no specific follow up in the performance of trainees in their actual work after a training.
YESC	Construction, operation and maintenance sections, trainees get more technical and safety knowledge to apply.
MESC	(No answer)

(2) Evaluation to trainees

Table 2-16: Results of hearings of each MOEE organization about evaluation to trainees

MOEE organization	Whether evaluation to trainees is conducted or not.(Yes: conducted, No:Not conducted) (If yes, evaluation method, examination and feedback method of results to trainees)
DEPP	Yes Sharing the knowledge which trainees get from a training course, they submit report. In the report they mentioned how to apply the knowledge to their works. There are no typical format. (It's not for all training courses) At the end of training courses, trainees have examination and have to pass it to get certification. (It's not for all training courses and normally all the trainee pass it). Some training courses give a prize to a trainee who got highest result.
DPTSC	Yes. At the end of training courses, trainees have examination and have to pass it to get certification. (It's not for all training courses and normally all the trainee pass it). Some of training course evaluate by attendance
ESE	Yes. There is an evaluation sheet on each Trainee in ESE. Please See attachment 4 "Evaluation Sheet of Training"
YESC	After the training period, trainees need to answer the written exam and practical skills. Prizes are given for qualified trainees.
MESC	(No answer)

(3) Evaluation to trainees

Table 2-17: Results of hearings of each MOEE organization about evaluation to trainees

MOEE organization	Whether assessment/evaluation of a training is conductted or not. (Yes: conducted, No:Not conducted) (If yes, evaluation method, evaluation subjects, improvement method of a training, etc…)
DEPP	Yes. There is a comment sheet on a training to be filled by trainees to improve the training courses. The suggestion are submitted to MOEE.
DPTSC	Yes. Some training has questionnaire for a training
ESE	Yes. There is a comment sheet on a training to be filled by trainees in ESE. Please see attachment 5 "Evaluation by Trainee (Example)" Based on the comments on a training by trainees, evaluation of a training is conducted. Based on these comments, the next training is improved.
YESC	Daily workers are assigned to become permanent workers when they reach limited service. But before assigned them as permanent, YESC assign that workers to conduct the relevant training.
MESC	No answer

MOEE has form for evaluation of trainees and form for receiving comments from attended trainees. Table 2-18 shows the form for evaluation of trainees and Table 2-19 shows the form for squeezing comments from trainees respectively.

Table 2-18 Form for evaluation of trainees

Confidential

Ministry of Electricity and Energy

No.(5) upgrading Electrical Engineering Training

Evaluation on each Trainee

1. Name: _____
2. Designation: _____
3. Department: _____

4. Evaluated Marks: _____

Mark		
Dutiful and Taking responsibility of assignment work	(	)marks
Competence at work	(	)marks
Reliable	(	)marks
Study skill	(	)marks
Hardworking	(	)marks
Creative skill	(	)marks
Comply with Training rules and regulation	(	)marks
Volunteering	(	)marks
Communication	(	)marks
Leadership	(	)marks
Total	(	)marks

Training Supervisor:

Sign:

Name:

Designation:

Department:

Date:

Confidential

Table 2-19 Form for squeezing comments from trainees

Ministry of Electricity and Energy

Comment on Training by Each Trainee

Training Seminar Room

1. ---

Accommodation

2. ---

Food and Dining Room

3. ---

Among Trainers, the best trainer and the best subject

4. ---

Evaluation on the best Trainer and training subject

5. ---

The weak Trainer and Training Subject

6. ---

Evaluation on the Trainer who is weak in teaching and Training Subject

7. ---

Training Subject which should be included in the Training Schedule

8. ----------

The best site visit which you like the most

9. ----------

Evaluation on the best site visit you like the most

10. ----------

General suggestion

11. ----------

Signature ----------

Name ----------

Department ----------

2.5 Structure and cycle related budget

(1) Budget cycle

Budget cycle in MOEE is shown in Fig.2-1 according to interview.

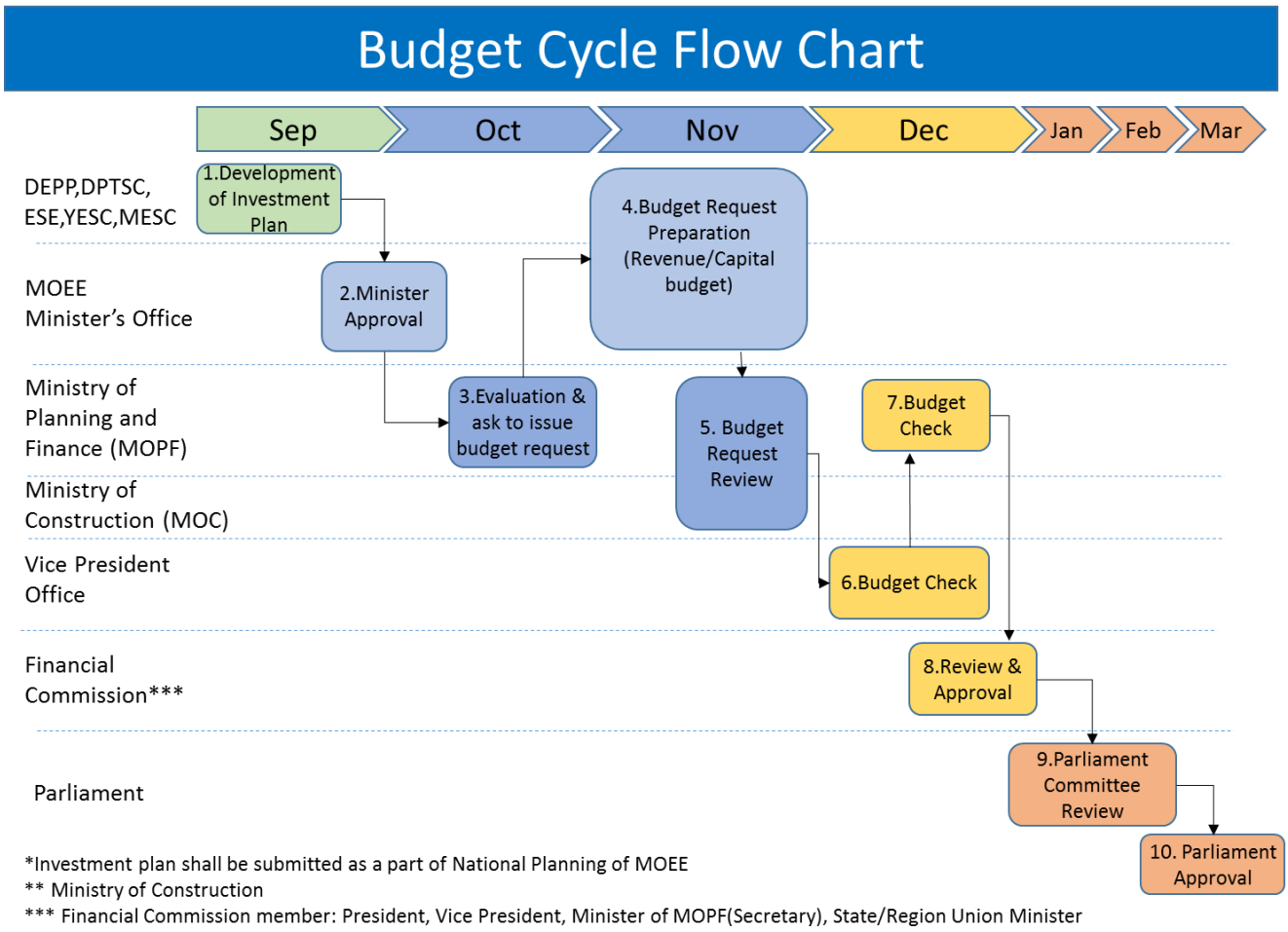


Figure 2-1 Budget Cycle flow chart

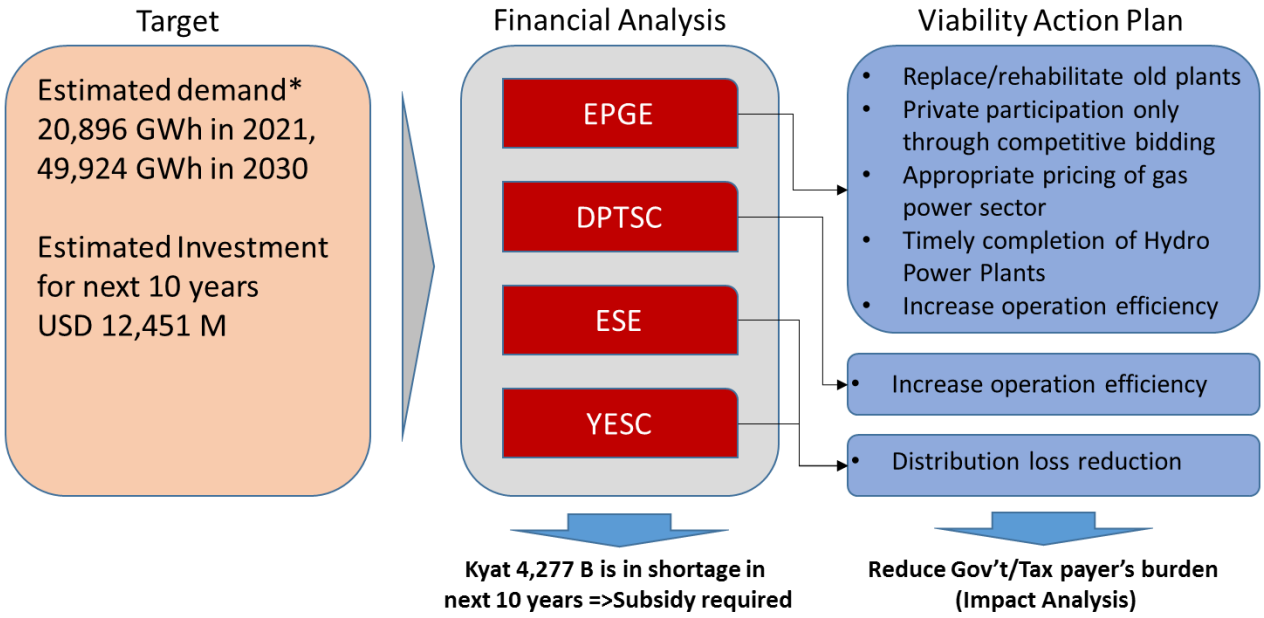
Description of above budget flow is as below.

1. Each organization in MOEE prepares Investment Plan (The plan is prepared by based on 5-year plan under 20-year plan staring from 2010-2011 fiscal year). Each plan includes three parts: the policy, objectives and implementation. Each organization in MOEE submit National Planning of MOEE including Investment Plan to the Minister's office.
2. Minister review and approve the National Planning of MOEE including Investment Plan. Minister's office submits National Planning of MEE including Investment Plan to the Ministry of Planning and Finance (MOPF).

3. Revenue department of MOPF asks to issue budget request with prioritized list under budget ceiling considering actual cost of last year, current year budget and next year plan to each Ministry.
4. Each Ministry submits budget including revenue budget and capital budget request by giving priority to each plan as there are a lot of plans submitted and there is not enough budget to implement all plans. Capital budget includes construction, machines and other expenditure such as machine installation, expense.
5. Ministry of Construction (MOC) checks construction plan, ECC (Equipment) in MOPF checks investment plan and Planning DThe items and procedures of the Assessment are shown in Figure 1-1.epartment in MOPF checks other expenditure submitted by each Ministry. And Revenue Department in MOPF reviews the budget.
6. Vice President (1) and (2) check the Union budget and State/Region budget respectively.
7. Budget is checked by MOPF.
8. Budget is then approved by Financial Commission where the President is the Chairman, the secretary is the Minister of MOPF, members include Vice President (1) and (2) and State/Region Union Minsters.
9. Parliament Committee reviews and checks the budget.

(2) Action Plan designated in Deloitte report

Recently Financial Analysis has been done by MOEE through Deloitte. Based on the Financial Analysis result, the following Action Plan was proposed.



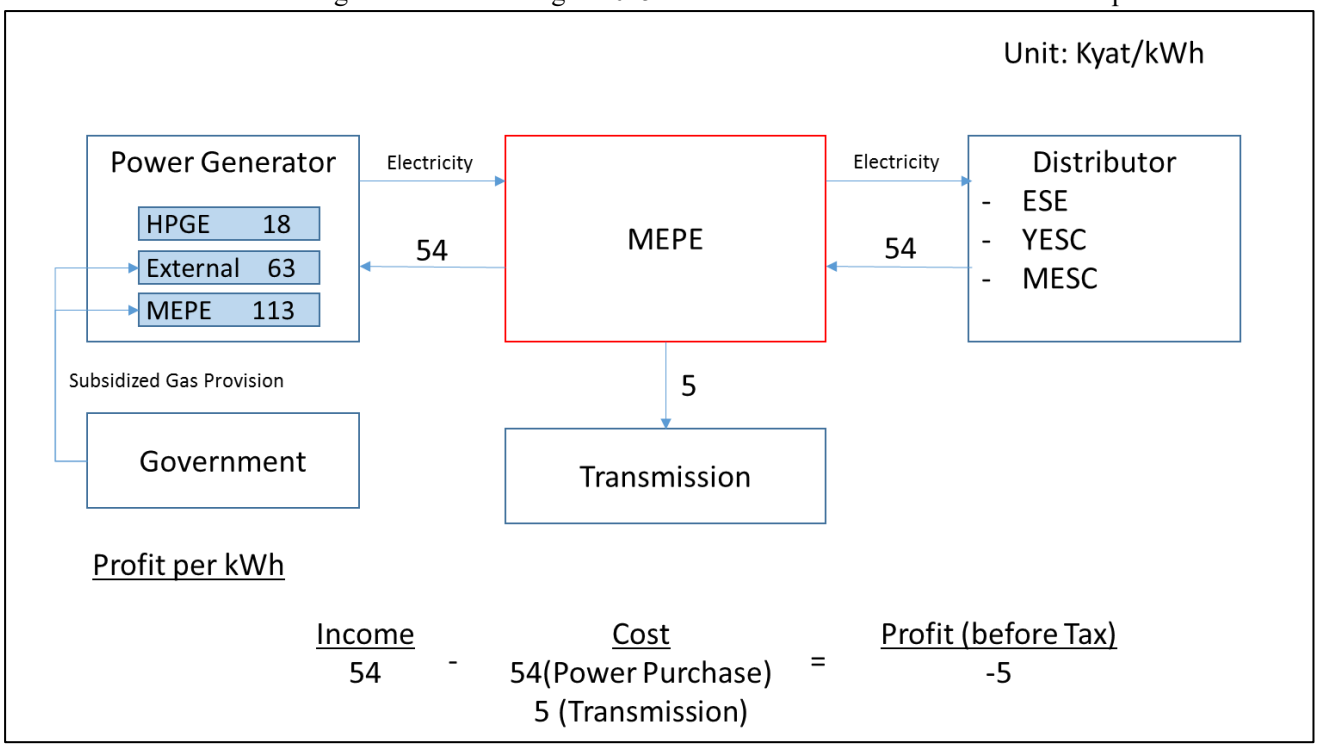
*"Myanmar Energy Master Plan" prepared under ADB support in 2016

(Source) "Myanmar Power Sector Financial Analysis and Viability Action Plan – Third Financial Viability Action Plan", Deloitte, March.2016

Figure 2-2 Action plan in MOEE

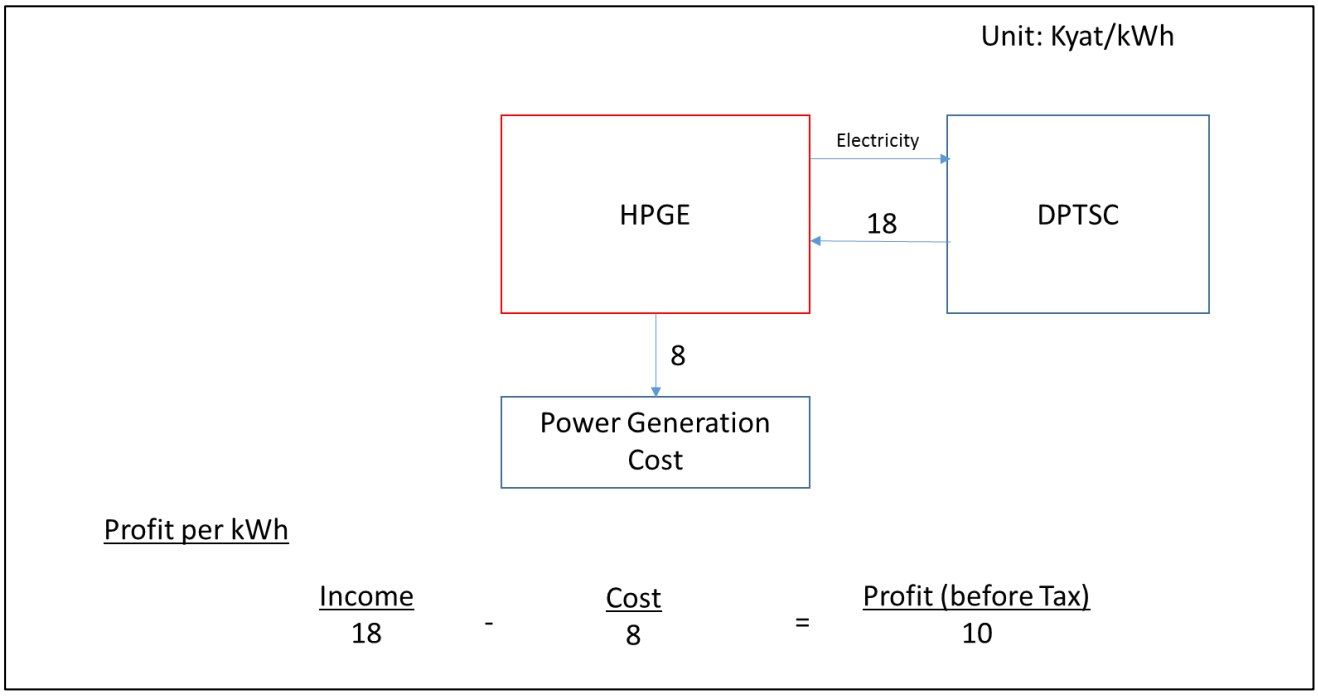
(3) Financial Outlook

Financial outlook in each organization as of Augist 2015 are shown in below based on Deloitte report.



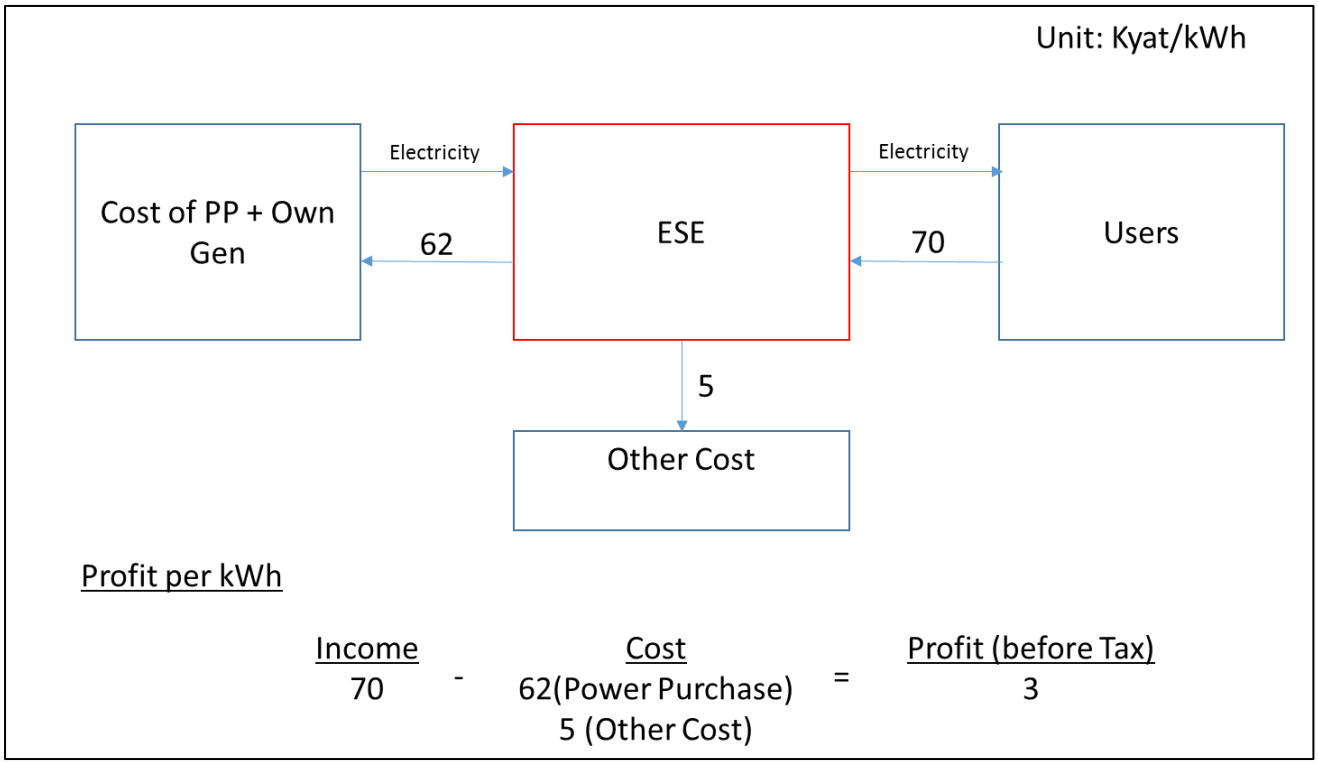
Source: JICA Expert Team
(Data in "Myanmar Power Sector Financial Analysis and Viability Action Plan – Inception Report", Deloitte, Aug.2015 was used)

Figure 2-3 Financial outlook in MEPE



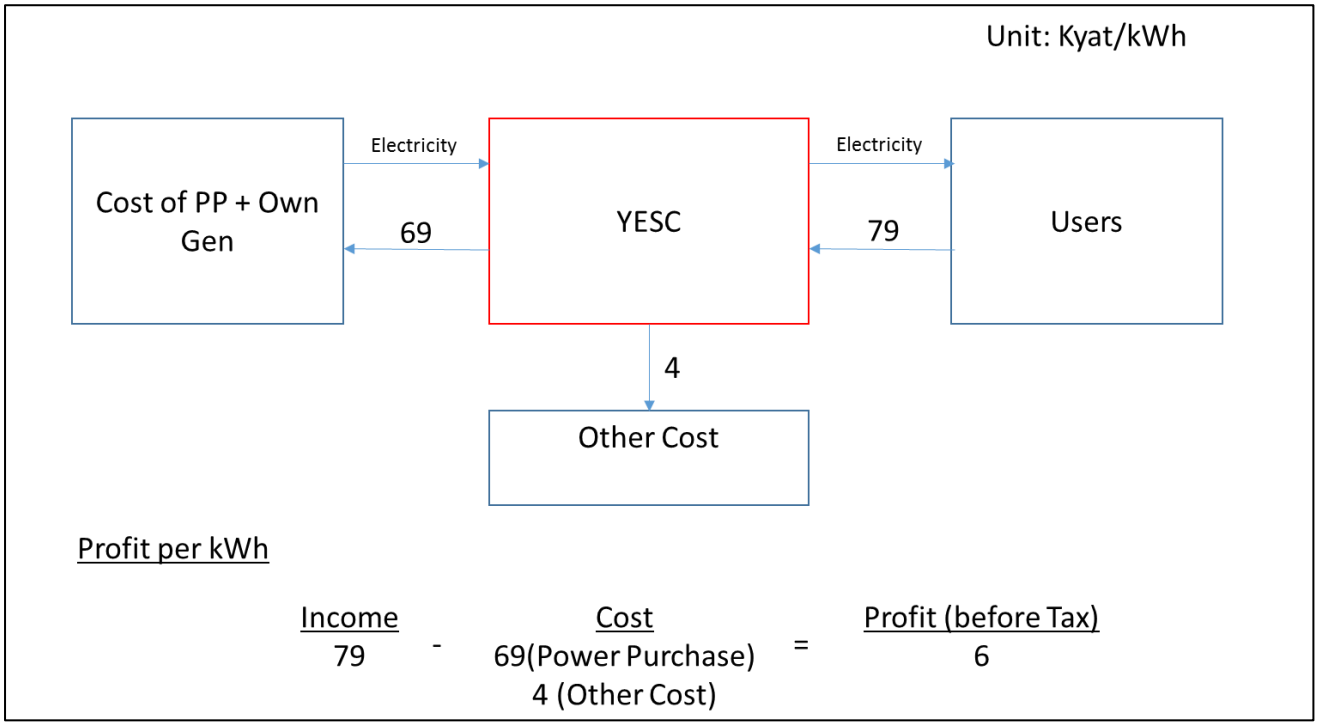
Source: JICA Expert Team
(Data in "Myanmar Power Sector Financial Analysis and Viability Action Plan – Inception Report", Deloitte, Aug.2015 was used)

Figure 2-4 Financial outlook in HPGE



Source: JICA Expert Team
(Data in "Myanmar Power Sector Financial Analysis and Viability Action Plan – Inception Report", Deloitte, Aug.2015 was used)

Figure 2-5 Financial outlook in ESE



Source: JICA Expert Team
(Data in "Myanmar Power Sector Financial Analysis and Viability Action Plan – Inception Report", Deloitte, Aug.2015 was used)

Figure 2-6 Financial outlook in YESC

Appendix

(1) Assessment sheet regarding Human Resource Development in MOEE
(2) Organization Chart
(3) Responsibilities of each organization

JICA Project Team
August 2016

(1) Assessment sheet regarding Human Resource Development in MOEE

Please kindly provide us with information regarding Human Resources Development in MOEE.

Your cooperation in this matter would be highly appreciated.

Please tick and write your office's information in right cell	DEPP of MOEE, DPTSC, ESE, YESC, MESC
Contact person in charge	Name:_____, e-mail:_____, phone:_____,
	Name:_____, e-mail:_____, phone:_____,

The Project for Capacity Development of Power Transmission and Distribution System (Phase I) (Assessment)

JICA Project Team
August 2016

I. Training Experience

No.	Contents of Assessment	Current Situation in MOEE
1.	Name of Organization which is in charge of a training and human resource development in MOEE, ESE, YESC, MESC and DPTSC. Please provide the name of an above organization, number of staff and designation of each staff.	
2.	Are there any Training policy and/or priority work category to be trained in MOEE, ESE, YESC, MESC and DPTSC? If yes, please provide detailed information about training policy and /or priority work category.	
3.	Are there any Training plan/program in this 2016-2017 fiscal year for engineers in MOEE, ESE, YESC, MESC and DPTSC? If yes, please provide detailed information, plan period, preparation, contents, program of training and arrangement for regional area outside of Yangon and Mandalay.	

No.	Contents of Assessment	Current Situation in MOEE
4.	Budget for human resource development in MOEE, ESE, YESC, MESC and DPTSC Please provide Budget amount, source of budget, actual utilization of budget, travel expenses and daily allowances in each 2013-2014 fiscal year, 2014-2015 fiscal year, 2015-2016 fiscal year.	
	Please explain the procedure of acquiring budget for training, and a person in charge in MOEE, ESE, YESC, MESC and DPTSC.	----------
5.	Are there any external trainings conducted by others other than MOEE in Myanmar? If yes, please provide detailed information such as when, where, who conducted, who participated, what is the main subject of training, etc…	

No.	Contents of Assessment	Current Situation in MOEE
6.	Are there any Trainings conducted in oversea countries? If yes, please provide detailed information such as when, where, who conducted, who participated, what is the main subject of training, etc…	
7	How to assign engineers to each work in regional offices (for eg; technical area (design, planning, construction, maintenance, distribution, etc…), On Job Training (OJT), safety management, etc…) Do you have any criteria for designation of engineers to each work (for eg; experienced years, career history, qualifications, etc.)?	
	How many engineers are assigned to each work in regional offices (for eg; technical area (design, planning, construction, maintenance, distribution, etc…), safety management, etc…)	
	Do you have any evaluation system for engineers from the view point of technical skill?	

The Project for Capacity Development of Power Transmission and Distribution System (Phase I) (Assessment)

JICA Project Team
August 2016

No.	Contents of Assessment	Current Situation in MOEE
8.	Transfer policy for engineers in MOEE, ESE, YESC, MESC and DPTSC How often engineers are transferred? Are there any policy on consideration of work experience?	
9.	Are there any Training facilities in MOEE, ESE, YESC, MESC and DPTSC? If yes, please provide detailed information about training facility such as location, number of facilities, plan and accommodation.	
10.	Are there any Training textbook in MOEE, ESE, YESC, MESC and DPTSC? If yes, please provide information about technology, curriculum.	

No.	Contents of Assessment	Current Situation in MOEE
11.	Are there any Trainers in MOEE? Are they full-time trainers (or) part time trainers working at site and working as trainers? Please provide the number of trainers, his/her designation and his/her type of job (for eg; design, planning, construction, operation, maintenance, etc…) and how to nominate trainers.	
12.	Are there any linkage between a training and job performance assessment in MOEE, ESE, YESC, MESC and DPTSC?	

II. Evaluation of a Training and Evaluation to Trainees

No.	Contents of Assessment	Current Situation in MOEE
1.	Trainees Please describe which organization they are from, their job type (for eg; design, planning, construction, operation, maintenance, etc…), their designation, the number of trainees, the method of selection and assessment/evaluation of a training by trainees.	
2.	Training result (effect of training to trainees) Please describe job type (for eg; design, planning, construction, operation, maintenance, etc…), actual training results and method of confirmation of training result.	

No.	Contents of Assessment	Current Situation in MOEE
3.	Conducting evaluation to trainees? If yes, please provide evaluation method, exam and feedback method of results to trainees.	
4.	Conducting assessment/evaluation of a training? If yes, please provide evaluation method, evaluation subjects, improvement method of a training, etc…	

(End of sheet)

Appendix 2

(2) Organization Chart

(a) Organization chart of Department of Electric Power Planning (DEPP)

Department of Electric Power Planning

DG: Director General
DDG: Deputy Director General
DD: Dupty Director
AD: Assisstant Director
(No): Number of persons

DG	
Ms. Mi Mi Khine	
88	190

Particular	Proposal	Present	Balance
Officer	88	56	32
Staff	190	91	99
Total	278	147	131

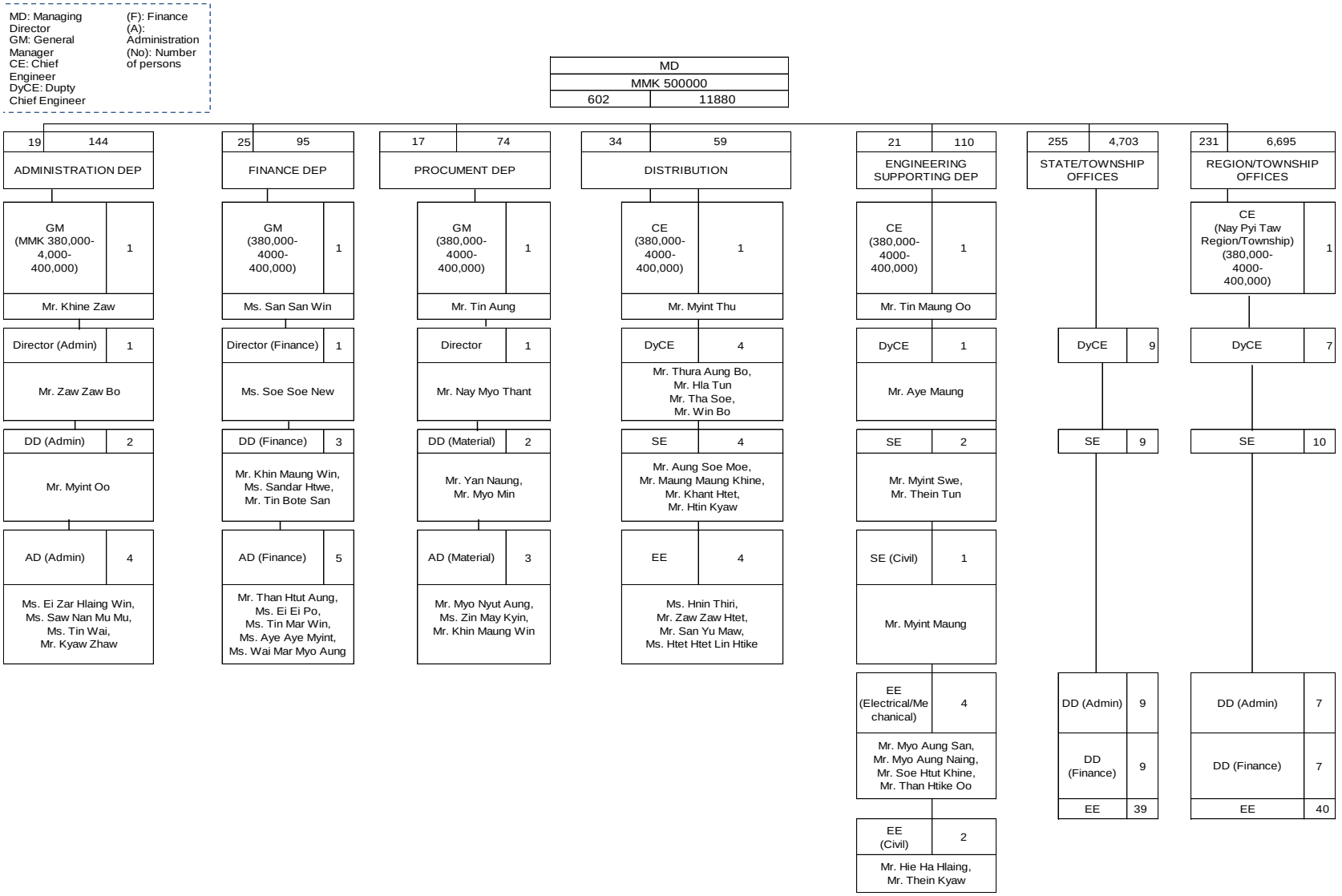
DDG	
Mr. Myint Oo	

DDG	
Mr. Hein Htet	

Human Resource Planning		Electricity Development Planning		Economic Planning Department		Thermal Energy Planning		Hydro and Renewable Energy Planning	
12	65	22	35	21	32	15	24	15	31
Director Mr. San Lwin		Director Mr. Saw Sithu Hlaing		Director Ms. Sandar Win		Director Ms. Myint Myint Kyi Swe		Director Mr. Aung Ko Ko	
DD (3 No.) Mr. Tin Myo Win, Ms. Su Khin Lay Oo		DD (3 No.) Mr. Kyaw Swa, Mr. Than Naing Lin, Mr. Tin Aung Lwin		DD (2 No.) Ms. Thwe Thwe, Mr. San Htya		DD (2 No.) Mr. Aye Min, Ms. Thida Khine		DD (2 No.) Mr. Tint Lwin Oo, Ms. Su Su Hlaing	
AD (4 No.) Mr. Aung Thein, Ms. Cho The New, Mr. Myo Lwin Nyein, Mr. San Oo		AD (6 No.) Ms. Phyu Phyu Khin, Ms. Tin Le Kyaw, Ms. Chaw Thandar Soe, Ms. Ye, Mr. Aung Kyaw Swa, Ms. Mar Lar Aung		AD (6 No.) Mr. Tun Lin Soe, Ms. Mya Thae Lwin, Ms. Kyu Kyu Win, Ms. Ei Ei Swe, Mr. Tun Ko Ko, Ms. Yi Mon Win		AD (4 No.) Mr. Aung Myo Win, Ms. Nan Han Na, Ms. Yin Mar Soe, Mr. Myo Thant Zin		AD (4 No.) Mr. Kyaw Aung Win, Mr. Kyaw Myat Htoo, Mr. Thet Htwe, Mr. Soe Thiha	
4	65	12	35	12	35	8	24	8	31

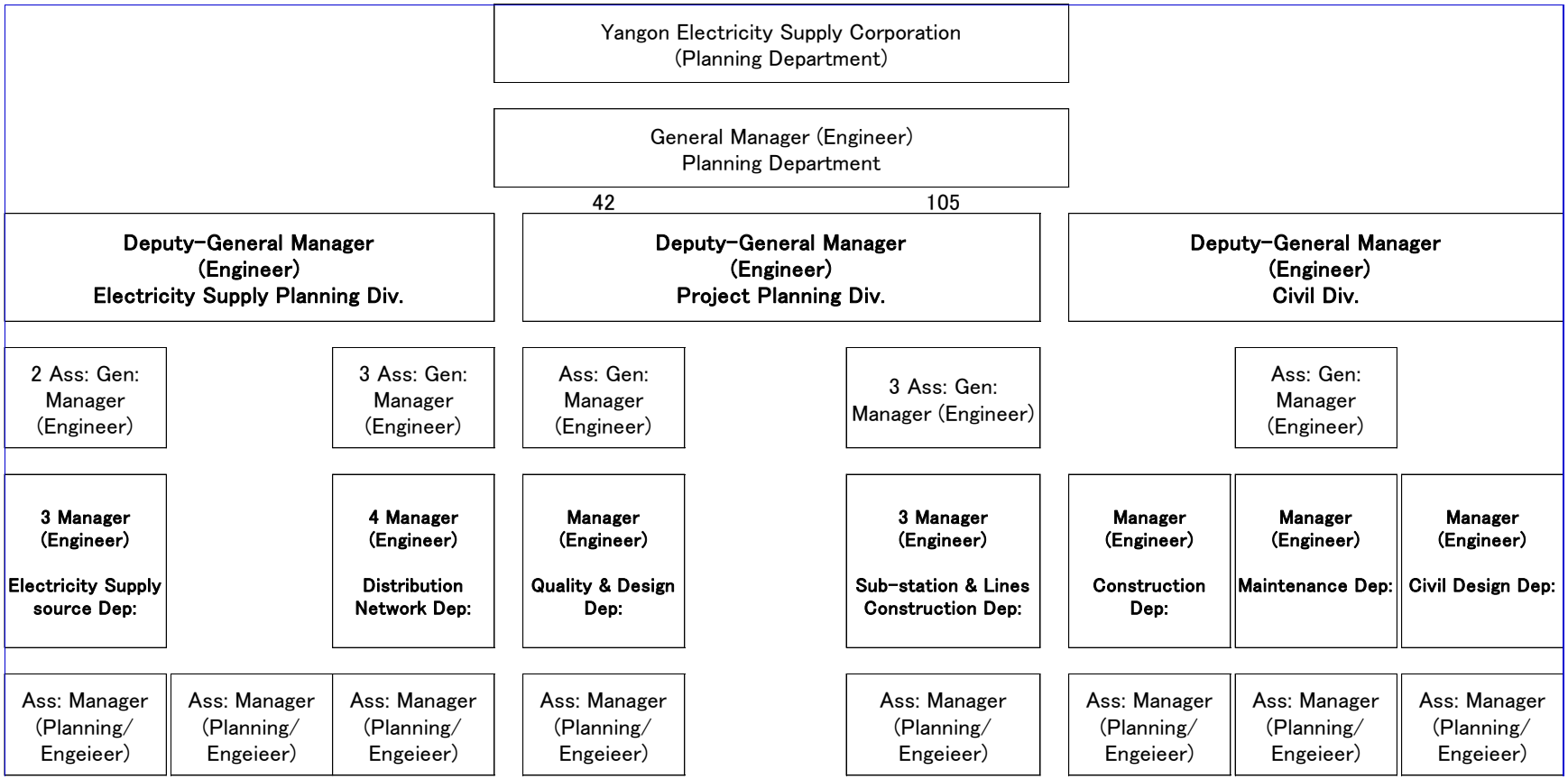
Source: ESE (Aug 2016)

(b) Organization chart of Eelectricity Supply Enterprise (ESE)



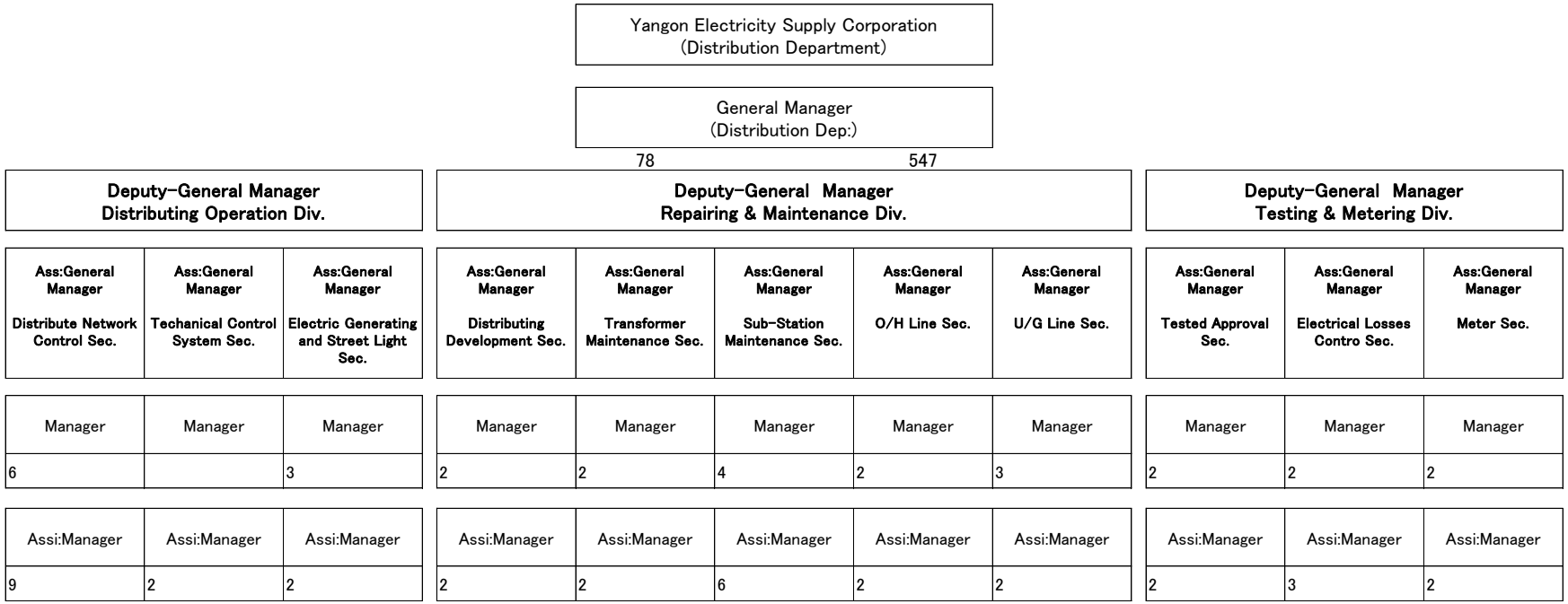
(c) Organization chart of Yangon Elctricity Supply Corporation (YESC)

i) Planning Department



(c) Organization chart of Yangon Elctricity Supply Corporation (YESC)

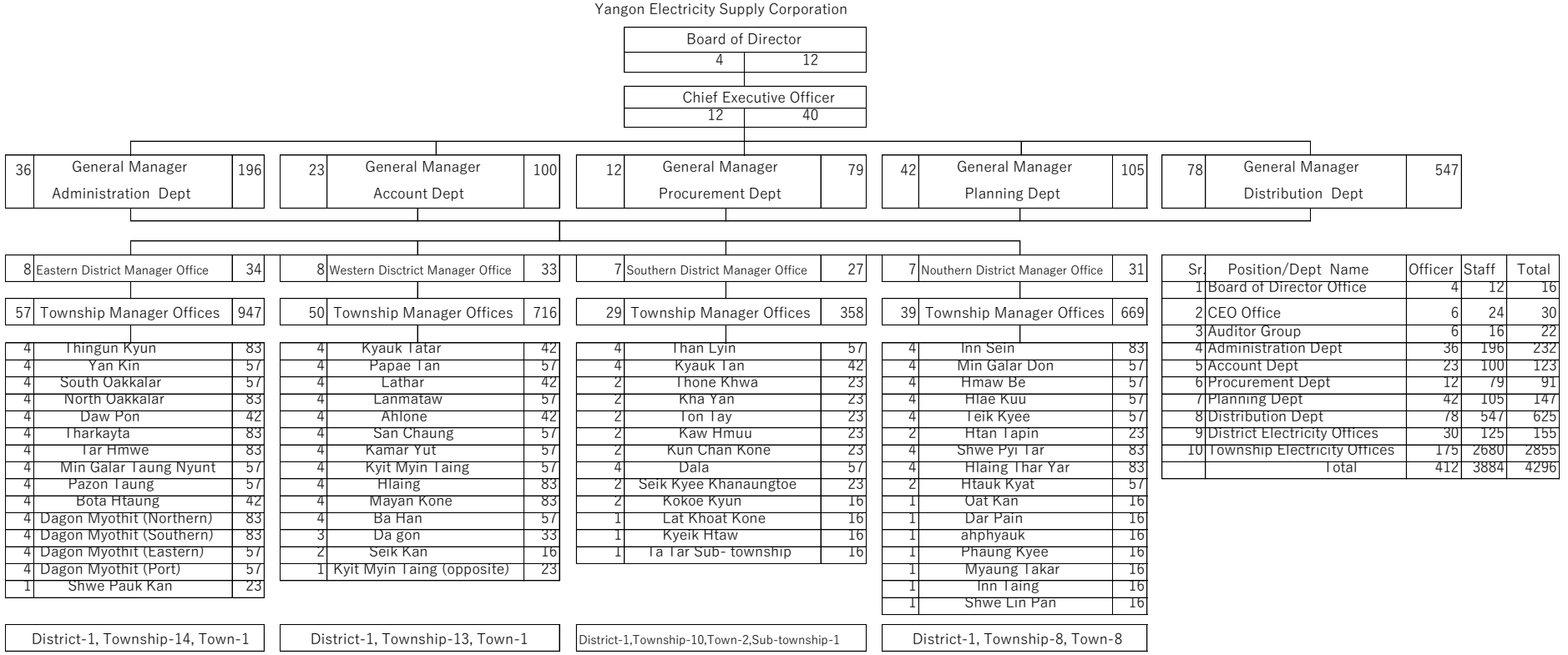
ii) Distribution Department



No	Position/Department	Officer	Staff	Total
1	General Manager(Engineer)	1	-	1
2	Deputy General Manager(Engineer)	3	-	3
3	Assistance General Manager(Engineer)	11	-	11
4	Manager(Manager)	29	-	29
5	Assistance Manager(Engineer)	34	-	34
6	Distributing Operator	-	165	165
7	Maintenance	-	325	325
8	Testing & Metering	-	57	57
Total		78	547	625

(c) Organization chart of Yangon Elctricity Supply Corporation (YESC)

iii) Whole organization



Sr.	Position/Dept Name	Officer	Staff	Total
1	Board of Director Office	4	12	16
2	CEO Office	6	24	30
3	Auditor Group	6	16	22
4	Administration Dept	36	196	232
5	Account Dept	23	100	123
6	Procurement Dept	12	79	91
7	Planning Dept	42	105	147
8	Distribution Dept	78	547	625
9	District Electricity Offices	30	125	155
10	Township Electricity Offices	175	2680	2855
	Total	412	3884	4296

(d) Organization chart of Mandalay Elctricity Supply Corporation (MESC)

Mandalay Electricity Supply Corporation

There are 9 No. of Directors and for the first stage, it will be established with 7 No.

Content	Current	Proposed	Balance
Officer	199	126	73
Staff	2287	1402	885
Total	2406	1528	958

BOD

1 Director Office 6

1 Chief Executive Officer

2 Internal Inspection Department 11

3 CEO Office 10

16 Administration Department General Manager 80

9 Financial Department General Manager 43

6 Material Planning Department General Manager 28

16 Planning Department General Manager 40

15 Distribution Department General Manager 48

Employee Management Division	Business and Investment Division	Material Planning Division	Electricity Planning Division	Project Planning Division	Distributing Operation Division	Repairing and Maintenance Division	Testing and Metering Division
Deputy General Manager	Deputy General Manager	Deputy General Manager	Deputy General Manager	Deputy General Manager	Deputy General Manager	Deputy General Manager	Deputy General Manager

5 Mandalay District Manager Office 39	5 Pyinoolwin District Manager Office 25	5 Kyaukse District Manager Office 25	5 Myingyan District Manager Office 25	5 Meiktila District Manager Office 25	5 Yamethin District Manager Office 15	5 Nyaung-U District Manager Office 15
21 Township Manager Offices 533	16 Township Manager Offices 208	14 Township Manager Offices 165	12 Township Manager Offices 135	12 Township Manager Offices 135	7 Township Manager Offices 123	8 Township Manager Offices 138

3 Aungmyaythazan 85	3 Pyinoolwin 85	3 Kyaukse 54	3 Myingyan 54	3 Meiktila 54	3 Yamethin 54	3 Nyaung-U 54
3 Chanayethazan 85	3 Mogoke 27	3 Sintgaing 27	3 Taungtha 27	3 Wundwin 27	3 Pyawbwe 54	3 Kyaukpadaung 54
3 Mahaaungmyay 85	3 Madaya 27	3 Myintttha 27	3 Natogyi 27	3 Thazi 27	1 Yanaung 15	1 Ngathayauk 15
3 Chanmyathazi 85	3 Singu 27	3 Tada-U 27	3 Ngazun 27	3 Mahlaing 27		1 Bagan 15
3 Pyigyitagon 85	3 Thabeikkyin 27	1 Ku Me 15				
3 Amarapura 54	1 Takaung 15	1 Pa Leik 15				
3 Patheingyi 54						

33 kV Sub-Station 110	33 kV Sub-Station 90 66 kV Sub-Station 17	33 kV Sub-Station 40	33 kV Sub-Station 25	33 kV Sub-Station 35	33 kV Sub-Station 25	33 kV Sub-Station 5 66 kV Sub-Station 68
District: 1 No., Township: 7 No. 22 No. of 33 kV Sub-Station	District: 1, Township: 5, Sub-Township: 1 18 No. of 33 kV Sub-Station 1 No. of 66 kV Sub-Station	District: 1, Township: 4, Sub-Township: 1, Town Office: 1 8 No. of 33 kV Sub-Station	District: 1, Township: 4 5 No. of 33 kV Sub-Station	District: 1, Township: 4 7 No. of 33 kV Sub-Station	District: 1, Township: 2, Town Office: 1 5 No. of 33 kV Sub-Station	District: 1, Township: 2, Sub-Township: 1, Town Office: 1 1 No. of 33 kV Sub-Station 4 No. of 66 kV Sub-Station

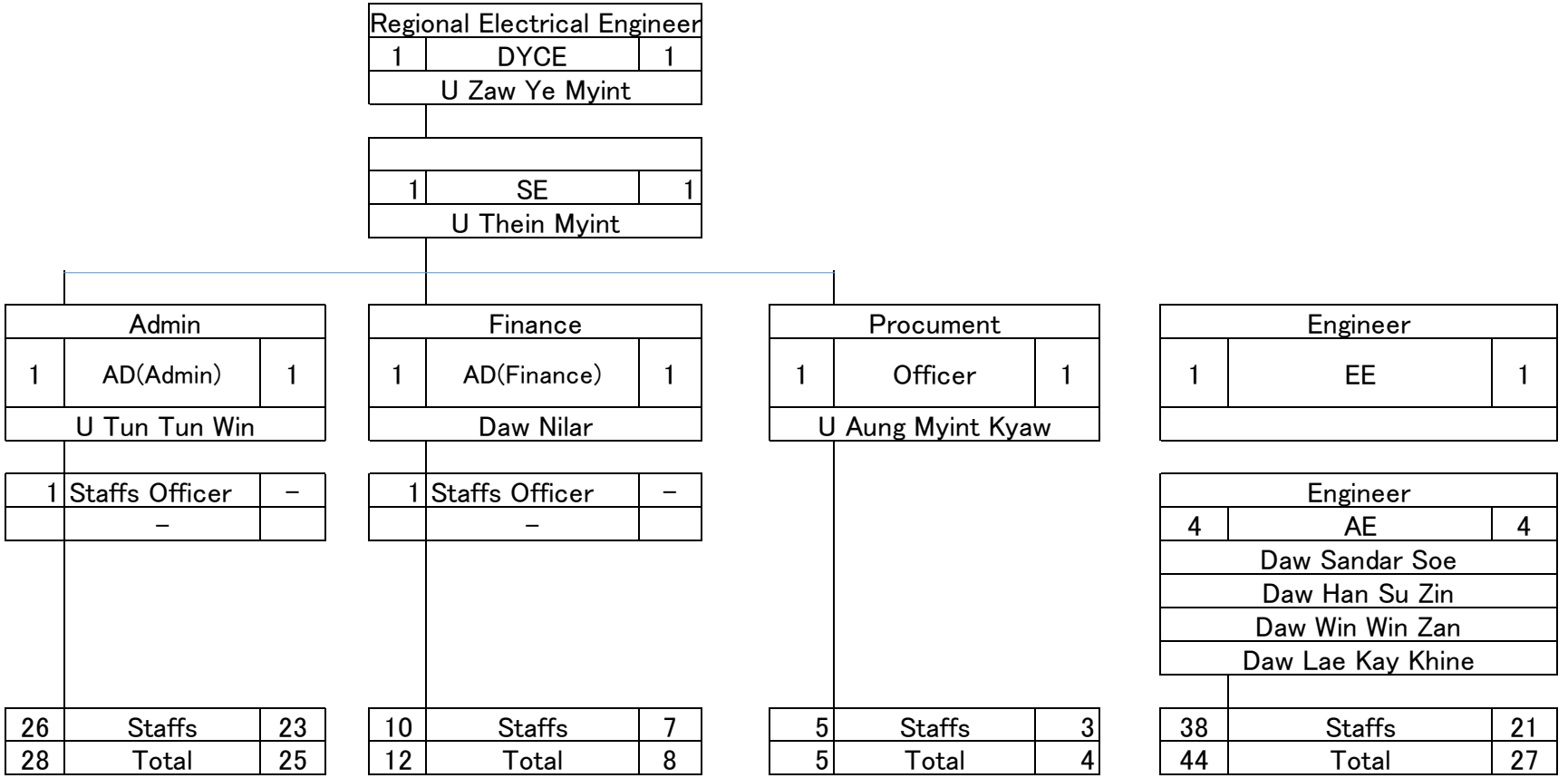
33 kV Substation: 66 No. 66 kV Substation: 5 No.

Received: 29 August, 2016

App.2-6

(e) Organization chart of Regional City (Example of Bago west)

Organization Chart of Electrical Engineer Office of Bago Division (Wastern)



Appendix 3

(3) Responsibility of each organization

(a) Responsibiliy of DEPP

DEPP must implement the following responsibilities.

(a)Participating as a leader for commenting to a feasible study, primary surveying which is possible or not.

(b)Participating in discussion of long term and short term program of Hydropower and Renewable Energy Projects.

(c) Studying in detail regarding new power generation plant project.

(d)Managing yearly generation to get fully amount of generation forecast.

(e)Submitting and advising with the computing of power demand and to construct power generation plant extension according to the increasing of power demand.

(f)Submitting master plan for the whole country to get electricity with considering Power generation, Transmission and Distribution System extension plan.

(g)Inspecting the contracts which following or not following to the Law and Regulation.

(h)Inspecting budget of each project and make decision proper used or not.

(i)Studying power tariff rate and submitting new tariff rate.

(j)Inspecting and commenting on the Loan and Grand Aid.

(k)Case of cooperation between the two countries which can be conducted in the power sector.

(b) Responsibiliy of ESE

Responsibility of Distribution Department

Distribution Department, Northern Department and Southern Department have conducted the following items for the Public from each State and Division of the whole country so that they can use more electricity smoothly and extensively.

a) Distributing electricity to public for lighting and industrial usage
b) Extension of electricity distribution in response to the increase in demand
c) Data collection and making improvement for extension of electricity distribution system.
d) Computing material (equipment) necessary for distribution of electricity
e) Conducting safety from danger of electricity
f) Electrification in villages by NEP
g) Extension of electricity distribution with foreign loan and grant aid
h) Computing and submitting estimated budget account
i) Reporting progress report of electricity distribution for every 3 month and every 4 month
j) Distributing electricity to water pumping stations, Industrial Zones and government industries
k) Damage and fault in transformers
l) Load Shed issues
m) Reducing electricity blackout
n) Electricity black-out issues
o) Reducing electricity losses
p) Getting more income
q) Electricity lines and substations
r) Electric shock issues
s) Matter about procurement and quality checking
t) Matter about management
u) Matter about National planning data

.

(c) Responsibiliy of YESC in each department

Duties and Responsibilities of Staff-Affair Branch, Administration Department

1. Have to serve the management and administration jobs of Yangon Electric Supply Corporation (later called YESC) with Executive officer.
2. Have to work collection, maintaining and announcement function for rules, operational rules and instructions in relation with administration.
3. Have to work for making rules, announcement and giving punishment for the rule violated staff.
4. Have to work the function of recruitment, giving duties allocation, posting transfer, promotion consideration, giving pension, giving the rights of staffs, and compensational cases for staffs.
5. Have to work for the function of leave, service year and transportation cases of the staffs.
6. Have to work the affair of management, making meetings and maintaining cases in concerned with YESC.
7. Have to work collection of staff curriculum vitae, addition information and making maintenance.
8. Have to work personal affair and necessary supporting to staffs.
9. Have to work for telecommunication, trying to get required landscape and infrastructure for corporation.
10. Have to work for making proposal and planning for local/Foreign training to be skillful and development of staffs.
11. Have to make the plan for very important person (later called VIP)'s trip.
12. Have to work for the visa and regional accommodation cases for foreigners.
13. Have to work for making cancel items, ruined by burning, from document and making auction for the items not necessary for department and corporation.
14. Have to work for making and maintaining of corporation logo and flags.
15. Have to work for planning, collection, maintaining, repairing and allocation of corporation's vehicles.
16. Have to fully serve for public serving cases.
17. Have to make report for staffs ability and dutiful condition by making continuously assessment.
18. Have to work for making announcement and expressing corporation's information and activities on News channel, Journal, Television and Web Site and so on.

Responsibilities of General Manager (Admin Department)

1. General Manager (Admin) has to take the administrative tasks as Executive officer also has to work the administrative tasks instructed by Executive officer of Yangon Electricity Supply Corporation (YESC).
2. Has to work the collection, maintaining and announcement of rules, laws, working rules and operational norm in concerned with administration.
3. Has to work the tasks of rules, making rules, announcement and taking action who violate the rule for getting staffs' obedience to law.

Responsibilities of Administration, public relation and Announcement Department

1. Have to work the task of inspection and giving advice concerned with (complaints) letters to the department.
2. Have to work to present the condition by taking information in relation with respective department for giving answer to public-parliament committees questions.
3. Have to answer softly and politely to public complaints in relation to electricity distribution.
4. Have to work for taking photo records and videos records to broadcast and express at Radio, Television, Newspaper and Journal concerned with electricity distribution.
5. Have to try to establish a frequency modulation (FM) radio broadcasting branch to give the information in time to public concerned with electricity distribution.
6. Have to work the data collection, making rules draft and proposing concerned with rules, operational rules of YESC/Corporation.
7. Have to work the proposed function of Announcement, Order and instruction required to announce for corporation.
8. Have to corporate with respective police station and courts for the cases of criminal and (civil case).
9. Have to work the assessment and revise of decisions and commands of the court whether consistent or inconsistent with law by watching continuously for the cases at the court. Moreover, have to decide to be appeal or not for the decision.
10. Have to work for making draft and proposing the commercial contrasts were operated by the members of agreement or contrast as corporation.

Responsibilities of Deputy General Manager (Admin)

1. Have to supervise as representative of department to the superiors and staffs to success department's tasks.
2. Have to propose with recommendation on the complaint letter, anonymous letter and instructions of upper level officer which are received by Administration Department after investigated in the site.
3. Have to submit after getting data from the concerning department to answer for the questionnaire of Parliament Public Affair Committee.
4. Have to conduct keeping and taking video record, photo record and to broadcast on the radio, television and to express newspapers, journals for electricity distribution news concerned.
5. Have to supervise to reply politely by the duty staff to public who have communicated with complaint.
6. Have to supervise the announcement of power distribution news and to inform the case of power blackout, power line repairing and power shutdown to the public.
7. Have to supervise draft legislation of law, regulation, procedure concerning with corporation drown by Law Department and communicating to police station, law office and judicial court for the police case.
8. Have to supervise compiling of Law Department’s draft treaty document which will be signed by the corporation.

Responsibility of Account Department

1. Have to submit compiling of yearly budget report of Yangon Electricity Supply Corporation.
2. Have to register and file for daily receipt and payment.
3. Have to submit of monthly/yearly report.
4. Have to supervise income and expenditure.
5. Have to supervise for increasing and correcting power sale unit to get more income of corporation.
6. Have to conduct bank all income receipt of corporation and other banking work.
7. Have to conduct for the staff and officer's salary, work charge and pension.
8. Have to conduct concerning the account of purchasing materials from inland and abroad.
9. Have to supervise according to the account instruction for the case of work with separate account.
10. Have to conduct supervise and take responsibility on account staff affair of account department.

Responsibility of General Manager (Account)

1. General Manager (Account) has to take responsibility to Chief Executive Officer and have to take responsibility to conduct relation with respect to the account and budget of corporation.
2. Have to lay down method needed and to conduct smoothly with respect to the account and budget works and to supervise for discipline to the account and budget works of district, township, power plant and substations under corporation.

Responsibilities of Planning Department

1. Planning Department is divided into 8 departments such as 1) Statistic Section, 2) Information Technology Section, 3) Inspection of Electricity network, 4) Design and Drawing section, 5) Construction of substations section, 6) Overseas procurement and local procurement, 7) Material selection section and Administration and Material accounting section and 8) Store, Security and Supporting section to operate distribution of electricity sufficiently with high quality to Yangon City and Yangon Region.

1) Statistic Section

Statistic Section is divided into two sub-sections.

a) Finance Planning Sub-Section

- Taking a record of data about substations and transformers
- Taking a record of new construction of substations, transformers and electric lines
- Collecting and including engineering data in the quarterly and three times a year reports
- Collecting statistical data for implementation of economic project
- Collecting, submitting, negotiation and requesting materials necessity for sections under Planning department
- Collecting statistical data

b) Computer Sub-Section

- Taking a record of data about substations and transformers
- Taking a record of new construction of substations, transformers and electric lines
- Taking a record of daily electricity generation and electricity usage data
- Taking a record of receiving electricity unit and sold unit.
- Calculating and submitting losses
- Taking a record of and evaluating voltage and load of substations and transformers
- Taking a record of connection of electrical network in Yangon Region

2) Information Technology Section

There are two sub-sections in it.

a) Information Sub-Section

- Giving comments on and scrutinizing various reports submitted by DP about loan projects and Technical Assistance Grant Aid projects in cooperation with Development Partners such as ADB, World Bank, JICA and NEDA.
- Providing data to projects implemented in collaboration with them.
- Arranging discussion meetings
- Answering questionnaires
- Preparing Agreement
- Preparing Progress Report for each matter and project
- Preparing Contracts with International company for asking service
- Projects implemented in collaboration with ASEAN GMS in local countries
- Changing from YESB to YESC, communication with IFC during appraisal period
- Report to Technical Committee from Planning Department

b) Technology Sub-Section

- Conducting occupational trainings for engineers
- Conducting occupational trainings for other levels.
- Arranging to prepare presentation
- Carrying out administration and managing works

3) Inspection of Electricity network Section

- Taking a record of electrocution
- Evaluate electrocution
- Reporting to issue instruction about electrocution
- Taking a record and evaluate daily electricity generation, electricity usage
- Taking a record and evaluate voltage and load of substations and transformers

4) Design and Drawing Section

- Drawing electricity connection network design in Yangon region
- Study and evaluate on expansion of construction of substations and electricity lines
- Drawing design for expansion construction of substations and electricity lines
- Taking a record of data about main substations and main electricity lines
- Submitting reports about substations and electrical lines materials to Specification Technical Committee

5) Construction of substations Section

There are three sub-sections.

a) Construction of substation sub-section

Study, Evaluate, planning and construction for implementing construction of new substations

b) Underground line sub-section

Carrying out new construction of underground lines related to new constructed substations

c) Overhead line sub-section

Carrying out new construction of underground lines related to new constructed substations

6) Overseas procurement and local procurement section

Arrange to fulfil for purchasing materials from oversea, call a tender price, open the tender, submit for permission to purchase step by step, contract with the company which success to import materials, compile purchasing order, compile contract, open money order, ask for bank guarantee, check in detail to the arrived materials, close the case after payment have already paid for the purchase order materials received.

Submit purchasing order to the related department of government owned factories, workshop for purchasing materials from local, after purchasing permission was get, give the payment;

ask for quotation for the materials to purchase from cooperative societies, cooperative production societies and joint venture, signed contract for purchasing;

ask for quotation from the private business owner when can not purchase materials from government owned factory or workshop, compile price comparison table, get permission to purchase; purchase for emergency requirement of department, close the account after receiving section of Procurement Department received purchasing materials, give payment for the purchasing materials and ask for budget demand for the related department.

7) Material Selection Section, Administration and Material Account Section

According to purchasing order, purchasing treaty, conduct to take out materials which have arrived at airport, port and boarder trade from abroad;

After got invoice sheet, conduct to get permission to take out materials with paying tax, commercial tax;

conduct to take out materials with paying port dues after got permission;

conduct to check arrived materials as the same or not to data of treaty;

conduct to get compensation to the departments for the materials damage, loose and shortage; Export to oversea country for repairing machinery equipment, if needed to get special order to submit to custom department;

conduct to handover to receiving section of procurement department for the selected materials; conduct to register with expenditure in the ledger after received materials according to the purchasing treaty.

Conduct staff affair;

ask for staff salary;

proclaim instruction;

draw up safety plan and proclaim;

open the training class;

give duty for duty officer;

conduct government's special title;

conduct to ask for miscellaneous expenditure;

register the official letters in/out and distribute.

8) Store, Security and Supporting Section

Conduct materials store, preserve, florid and materials for taking out ;

answer to auditory from central audit office and audit department;

delete old material from list;

arrived materials to board on ship

Responsibilities of Distribution Department

Distribution Department of Yangon City Electricity Supply Corporation conduct main responsibility of electricity supply and distribution works to fulfil standard as same as modern capital city of other countries. To implement the job smoothly, quickly and conveniently, divide into (12) sections :-

- Power System Control Section
- Street Lighting Section
- Emergency Diesel Generator Section
- (24) hour Maintenance Section
- Substations Section
- Substation Maintenance Section
- Overhead Power Line Section
- Underground Cable Section
- Laboratory Test and Approve Section
- Electricity Losses Control Section
- Communication Section
- KWh meter Section

1) Power System Control Section

Conduct to get power quickly if power break down occur, and conduct line maintenance; Investigate and allow permission for new transformer applicant; Check and approve system improvement job for the power system development; collect electricity break down list of government owned factories, universities and colleges, embassies, staff houses, CNG filling stations, river water pumping stations; collect reports and register electricity shut down of townships.

2) Street Lighting Section

Conduct to check and repair street lighting regularly for always in good condition including main road of Yangon City; conduct to install extension job at some area if needed.

3) Emergency Diesel Generator Section

Conduct to generate, to assemble and to transport emergency diesel generator to the important ceremonies and programs for no electricity cut.

4) (24) hour Maintenance Section

Conduct to repair and ready for (24) hour duty if electricity lines and substations occur damage in Yangon City power system.

5) Substations Section

Conduct maintenance works for continuous electricity distribution and conduct electricity distribution works regularly.

6) Substation Maintenance Section

Conduct maintenance works and investigate check item of substations monthly, weekly and daily for continuous electricity distribution; conduct to construct substation extension works for Yangon City power system development.

7) Overhead Power Line Section

Conduct maintenance works for the finished overhead power lines.

8) Underground Cable Section

Conduct maintenance works for the finished underground cable lines.

9) Laboratory Test and Approve Section.

Conduct to supply testing equipment and supporting equipment to township offices; conduct to check old kWh meters, new kWh meter, stop/damage kWh meter and site check kWh meters.

10) Electricity Losses Control Section

Conduct to replace stop/damage kWh meter, lock seal and to investigate electricity losses reducing works; check to get receiving unit correctly to install kWh meter needed at substations; investigate illegally use of electricity; investigate different unit between check meter unit and total house used meter unit of high layer condo housing by calculation; check for existing staff electricity allowance unit; disclose no increasing kWh unit due to little electricity usage although install big CT meter.

11) Communication Section

Conduct computer works and communication works smoothly, conveniently.

12) KWh meter Section

Conduct check and give permission for the application of single phase-double wire home used meter, three phase-four wires home used power meter, three phase-four wires industrial used power meter, business used power meter; check and give permission for the temporary meter installation; check and give permission for the application of temporary meter to permanent meter; check and give permission for advertising sign board lighting.

Responsibilities of General Manager (Engineer) (Electricity Distribution)

1. Conduct electricity distribution works in Yangon City and to supervise control operation to power system systematically to development to the international level,
2. Conduct to supervise maintain, operate, transmit electricity and distribution works of electricity lines, substations under Yangon Electricity Supply Corporation regularly.

(d) Responsibiliy of MESC

The Chiarman of Board of Directors shall be responsible for, within theterritory of Mandalay Region,

(a) Managing all kinds of works concerned with electricity to be accordance with the Policy of Union Government.

(b) Managing the implementation processes to distribute good quality electricity to get sufficient electricity and to get 100 percent access to electricity.

(c) Managing to reduce electricity losses.

(d) Managing to increase the income of the Corporation.

(e) Managing to extend the investment in electricity industry.

(f) Managing the human resource development of all Corporation Services Personnel.

(g) Managing to boost the capacity of all Corporation Services Personnel.

(h) Managing the Corporation to become a fully public owned from State Owned Enterprise within five years.

Duties and Responsibilities of Board of Directors

The Board of Directors shall be responsibible for,

(a) Appointing a Chief Executive Officer (CEO)

(b) Determining the plans for type and style of administrative of Corporation to be proper and highly effective.

(c) Determining the plans for enhancing administrative, financial and engineering services of all Services Personnel of the Corporation.

(d) Determining the plans of public relation and releasing news to be more transparent.

(e) Determining the implementation processes to distribute good quality electricit, to get sufficient electricity and to get 100 percent access to electricity.

(f) Determining the staff training plans for the purpose of human resource development and capacity enhancing.

(g) Determining the schemes of wages and salary, compensation, pension and allowances for Corporation Services Personnel.

(h) Determining the plans for the Corporation to make a successful commercial organization.

(i) Determining the plans for the plans for the Corporation to become a fully public owned from State Owned Enterprise wiyhin five years.

(j) Organization the committees for the purpose of implementating the duties and functions of the Corporation.

(k) Scrutinize and guide the short and long terms work plans, investments plans, incomes and expenditures of the Corporation.

(l) Determining the plans to protect frm being wasteful, loss and missing of fixed assets and finance of the Corporation.

(m) Being responsible for the success and loss the Corporation.

Duties and Responsibilities of Chief Executive Officer

The Chief Executive Officer shall be responsible for,

(a) Exercising administration and managing in accordance with the policy of Union Government and be responsible to the Board of Directors, tasks and functions of the Corporation.

(b) Managing to promote the electricity sector of Mandalay City to be accordance with international level, as it is being implemented to become on international standard city.

(c) Managing of all branches and divisions of the Corporation so that their duties and responsibilities to be successful.

(d) Implementing the policy decided by the Board of Directors.

(e) Implementing to distribute good quality electricity, to get sufficient electricity and to get 100 percent access to electricity, within the territory of Mandalay Region.

(f) Planning electricity related industry and development projects in Mandalay City and Mandalay Region.

(g) Sining the contract with the approval of the Board of Directors, of domestic and international electricity related industry.

(h) Implementing to promote the capacity, work related skilled and to be disciplined of all service personnel of the Corporation.

(i) Manaing to plan annual budget and expenditures to be accordance with budget plan

Duties and Responcinilities of Administration Departmant

The Administration Department shall be responsible for,

(a) Administrating all service personnel of the Corporation to abide enacted Laws, By-laws, Procedures, Rules and Regulations.

(b) Administration service personnel affair in accordance with the laws.

(c) Administrating land and building related matters of the Corporation.

(d) Administrating for training course, excursion trip and holding conference for the purpose of promoting human resource development and work related skills of all service personnel of the Corporation.

(e) Administratingassessment and reward-punishment matters of all service personnel with the purpose of promoting their abilities.

(f) Administrating the actionof unnecessary assets of the Corporation and write-off and deletion of the loss.

(g) Administrating the action of unnecessary assets of the Corporation and write-off and deletion of the loss.

(h) Administrating for Defining Seal, Flag and Uniform of the Corporation.

(i) Administrating operation and maintenance of moter vehicles and machinery.

(j) Administrating for all public relation matters upon services of the Corporation.

(k) Administrating for disclosing, with all round efforts, the information of the Corporation to public in time.

(l) Administratinhg the legislature and advising upon laws and Contracts related to the Corporation.

Duties and Responsibilities of the General Manager (Admin)

The General Manager (Admin) shall be responsible for,

(a) Managing all service personnel of the Corporation to abide enacted Laws, By-laws, Procedures, Rules and Regulations.

(b) Managing service personnel affair in accordance with the Laws.

(c) Managin land and building related matters of the Corporation.

(d) Managing for training course, excursion trip and holding conference for the purpose of promoting human resource development and work related skilled of all service personnel of the Corporation.

(e) Managing assessment and reward-punishment matters of all service personnel with the purpose of promoting their abilities.

(f) Managing foreign trip of all service personnel of the Corporation, stay in the country visa related affair and domestic trip of the Foreigner who are working with the Corporation.

(g) Managing the action of unnecessary assets of the Corporation and write-off and deletion of the loss.

(h) Managing to define Seal, Flag and Uniform of the Corporation.

(i) Managing the operation and maintenance of moter vehicles and machinery.

(j) Managing all public relation matters upon services of the Corporation.

(k) Managing for disclosing of, with all round efforts, the information of the Corporation to public in time.

(l) Managing the legislature and advising upon Laws and Contracts related to the Corporation.

Duties and Responsibilities of Finance Department

The Finence Department shall be responsible for,

(a) Draw and Summit the annual budget plan of the Corporation.

(b) Data Entry and Record the daily income and expenditure.

(c) Draw and Summit the monthly and annual Accounting Report.

(d) Controlling the income and expenditure.

(e) Managing to improve the income of the Corporation.

(f) Supervising not to wastage the incme of the Corporation.

(g) Managing to give the privileges of Board of Directors, Chief Executive Officer and Service Personnel.

(h) In accordance with the Myamar Accounting Standard as well as international Accounting Standard, making effort to maintain the financial accounts of the Corporation.

(i) Trying necessary financial management with the purpose of the Corporation to be successful, according to market Economy.

(j) Managing financial matters of local and Foreign procurement.

(k) Managing the expenditures of the Corporation to be in accordance with the financial rules.

(l) Based on the financial statement of the Corporation, Managing for analyzing of investments, revolving funds and other funds.

(m) Managing the Accounts and works of the Corporation to be auditable.

(n) Managing to propose changing the electricity tariff by analyzing income and expenditure of the Corporation.

Duties and Responsibilities of the General Manager (Finence)

The General Manager (Finance) shall be responsible for,

(a) Draw and Summit the annual budget plan of the Corporation.

(b) Data Entry and Record the daily income and expenditure.

(c) Draw and Summit the monthly and annually Accounting Report.

(d) Controlling the income and expenditure.

(e) Managing to improve the income of the Corporation.

(f) Supervising not to wastage the income of the Corporation.

(g) Managing to give the privileges of Board of Directors, Chief Executive Officer and Service Personnel.

(h) In accordance with the Myanmar Accounting Standard as well as International Accounting Standard, making effort to maintain the financial accounts of the Corporation.

(i) Trying necessary financial management with the purpose of the Corporation to be successful, according to market Economy.

(j) Managing financial matters of local ad Foreign procurements.

(k) Managing the expenditures of the Corporation to be in accordance with the financial rules.

(l) Based on the financial statement of the Corporation, Managing for analyzing of investments, revolving funds and other funds.

(m) Managing the Accounts and works of the Corporation to be auditable.

(n) Managing to propose changing theelectricity tariff by analyzing income and expenditures of the Corporation

Duties and Responsibilities of Procurement Department

The Procurement Department shall be responsible for,

(a) Managing domestic and international procurement, storage and issuing of materials are to be in accordance with Directives and Procedures.

(b) Managing for machines, vehicles, heavy machineries, tools and equipment that have to carry back to the country of contractor according to the contract.

(c) Managing for electrical equipment that has to transport to abroad for reparing purposes.

(d) From procurement to issuing processes of the materials, managing not to get wastage.

Duties and Responsibilities of General Manager (Procurement)

The General Manager (Procurement) shall be responsible for,

(a) Managing domestic and international procurement, storage and issuing of materials are to be in accordance with Directives and Procedures.

(b) Managing f that have or machines, vehicles, heavy machineries, tools and equipment that have to carry back to the country of contractor according to the contract.

(c) Managing for electrical equipment that has to transport to abroad for repairing purposes.

(d) From procurement to issuing processes of the materials, managing not to get wastage.

Duties and Responsibilities of Planning Department

The Planning Department shall be responsible for,

(a) Performing recording, analyzing, reporting and proposing the plans for substations, transformers, electric power lines.

(b) Managing to report analyzing future power demand, planning and design for works expansions, estimationg future investments.

(c) Supervising the loans, grants and technical assistances related matters by relation with international monetary organizations, development partners and regional rganizations.

(d) Spervising the implementation works of substations, power lines and related infrastructures for the purpose of electricity distribution.

(e) Supervising the qualitycontrol of electricity related works to be accordance with predefined standards.

(f) Managing for training cources and workshops for the purpose of promoting abilities of engineers, techniciansand skilled workers.

(g) Record and analyze the electric hazard incidents, to circulate the directives for avoiding such an incident and to reduce electricity related hazard.

Duties and Responsibilities of General Mnager (Engineering Planning)

The General Manager (Engineering Planning) shall be responsible for,

(a) Performing recording, analyzing, reporting and proposing the plans for substations, transformers, electric power lines.

(b) Managing to report analyzing future power demand, planning and design for works expansions, estimating and future investments.

(c) Supervising the loans, grants and technical assistances related matters be relation with international monetary organizations, development partners and regional organizations.

(d) Supervising the implementation works of substation, power lines and related infrastructures for the purpose of electricity distribution.

(e) Supervising the quality control of electricity related works to be accordance with predefined standards.

(f) Managing for training courses and workshops for the purpose of promoting abilities of engineers, technicians and skilled workers.

(g) Record and analyze the electric hazard incidents, to circulate the directives for avoiding such an incident and to reduce electricity related hazard.

Duties and Responsibilities of Power Distribution Department

The Power Distribution Department shall be responsible for,

(a) Negotiating amount of electricity receiving for purpose of sustainable distribution of good quality electricity, supervising the operation and control of substations and power lines in the power system.

(b) Testing, regular maintenance and expansion of constructed substations, power lines and transformers.

(c) Supervising the processes for reduction of electricity losses and collecting necessary information and data.

(d) For special circumstances and events, preparing to provide dedicated power distribution plan.

(e) Making efforts to from the high technology power control systems with the domestic and international technical assistance.

(f) Planning systematically to get back to normal as soon as possible if power failure occurs be the unforeseen event.

Duties and Responsibilities of General Mnager (Power DIstribution)

The General Manager (Power Distribution) shall be responsible for,

(a) Negotiating amount of electricity receiving for the purpose of sustainable distribution of good quality electricity, supervising the operation and control of substations and power lines in the power system.

(b) Testing regular maintenance and expansion of constructed substations, power lines and transformers.

(c) Supervising the processes for reduction of electricity losses and collecting necessary information and data

(d) For special circumstances and events, preparing to provide dedicated power distributon plan.

(e) Making efforts to form the hingh technology power control system with the domestic and international technical assistance.

(f) Planning systematically to get back to normal as soon as possible if power failure occurs by the unforeseen event.

(e) Work allocation in each organization of MOEE

66kV(D/L)	ESE, YESC, MESC	ESE, YESC, MESC	ESE, YESC, MESC	ESE, YESC, MESC	ESE, YESC, MESC	ESE, YESC, MESC
66kV(T/L)	DPTSC(PS)	DEPP	DPTSC(PTP)	DPTSC(PTP)	DPTSC(PTP)	DPTSC(PS)
132kV, 230kV, 500kV	DPTSC(PS)	DEPP	DPTSC(PTP)	DPTSC(PTP)	DPTSC(PTP)	DPTSC(PS)

* The 66kV line is categorized as T/L. in case of that it connect Power Plant with National Grid, or S/S with other S/S.

* The design of 66kV Distribution Line is made by ESE, YESC and MESC with technical review by DPTSC(PTP).

Responsible Allocation related with Management of Power Generation Project

	Power Source	Overall Planning	F/S	Design	Procurement	Constructino Superviison	O & M
ODA Project	Hydropower	DEPP	DHPI	DHPI	DHPI	DHPI	EPGE/DHPI
	Coal Fire, Gas Turbine, Wind	DEPP	DEPP	DEPP/EPGE	DEPP	DEPP/EPGE	EPGE
Private Investment	Hydropower	DEPP	DHPI	DHPI	DHPI	DHPI	EPGE/DHPI
	Coal Fire, Gas Turbine, Wind	DEPP	DEPP	DEPP/EPGE	DEPP	DEPP/EPGE	EPGE

* F/S report for hydropower project is submitted to DEPP by Consltant or Invester, and those report is transferred to DHPI for technical evluation and comments.

* O&M of civil structure of hydropower project is managed by the DHPI.

MINUTES OF MEETING
BETWEEN
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
AND
MINISTRY OF ELECTRICITY AND ENERGY (MOEE)
FOR
THE FIRST JOINT COORDINATING COMMITTEE (JCC)
ON
THE PROJECT FOR CAPACITY DEVELOPMENT OF
POWER TRANSMISSION AND DISTRIBUTION SYSTEMS (PHASE I)

Japan International Cooperation Agency (hereinafter referred to as "JICA") and Ministry of Electricity and Energy (hereinafter referred to as "MOEE") established a Joint Coordinating Committee (hereinafter referred to as "JCC") for the effective and successful implementation of the Project for Capacity Development of Power Transmission and Distribution Systems (hereinafter referred to as "the Project").

The first JCC on the Project was held on 3rd November 2016 at the conference hall of MOEE, Nay Pyi Taw, chaired by Daw Mi Mi Khaing, Director General, Department of Electric Power Planning, Ministry of Electricity and Energy.

As a result, JICA and MOEE agreed on the matters referred to in the documents attached hereto.

Nay Pyi Taw, 16 November 2016

加藤 友英

Mr. Tomohide Kato
JICA Expert / Chief Advisor

Daw Mi Mi Khaing
Director General
Department of Electric Power Planning

坂井 晃

Mr. Mamoru Sakai
Senior Representative
JICA Myanmar Office

U Myint Oo
Deputy Director General
Department of Electric Power Planning

ATTACHMENT

JICA and MOEE 1) reviewed the progress of the Project, 2) confirmed the contents of Project Design Matrix (PDM) and Monitoring Sheet and 3) approved the Project schedule for the effective and successful implementation of the Project, based on the Agenda. (Refer to the ANNEX I and III)

The main points confirmed are stated as below.

1. Project Organization

The Project organization was confirmed as follows.

(1) MOEE

Project Chairperson: Permanent Secretary, MOEE

Project Directors:

- Director General of Department of Electric Power Planning (DEPP)
- Director General of Department of Power Transmission and System Control (DPTSC)
- Managing Director of Electricity Supply Enterprise (ESE)
- Chief Executive Officer of Yangon Electricity Supply Corporation (YESC)
- Chief Executive Officer of Mandalay Electricity Supply Corporation (MESC)

Project Administration: Deputy Director General of DEPP

Counterpart Personnel: Members from DEPP, DPTSC, ESE, YESC and MESC

(2) JICA

Long-term Expert

- Training Program /Coordinator

Short-term Expert (Visiting)

- Chief Advisor / Distribution System Technology
- Deputy Chief Advisor /Distribution Technology (Operation and Maintenance)
- Distribution Technology (Planning and Designing)
- Distribution Technology (Construction)
- Transmission Technology
- Substation Technology
- Human Resource Development Planning 1 (Training system)
- Financial and Institutional Analysis
- Power Development/ Distribution Expansion Policy
- Power Technology1 (Planning)
- Power Technology2 (Regional cities)
- Human Resource Development Planning 2 (Regional Cities)

2. Indicators

The objectively verifiable indicators are described in the revised PDM Ver. 2. (Refer to the ANNEX III 2))

The following points shall be reflected to the PDM Ver.2 and confirmed at the first monitoring.

(1) Overall Goal

The figures of the following indicators will be identified based on the additional data for the baseline survey by the end of December 2016.

- ✓ Distribution loss of seventeen percent (17%) in 2016 will be decreased to more than (xx) percent (xx%) by 2024.
- ✓ Total number (xx) and average duration of faults (xx minutes per fault) in distribution system in Myanmar in 2016 will be decreased to less than (xx) by 2024.

(2) Project Purpose

Pilot sites for the indicators of "faults" and "distribution loss" will be indentified and each target value will be set by the end of December 2016.

ANNEXES:

I. The first JCC Agenda
II. Participant List
III. Presentation Materials
   1) Power Point
   2) Revised PDM (Ver.2)
   3) Monitoring Sheet (Ver.1)
   4) Work Schedule

November 3, 2016

Participant list at the 1st Coordinating Committee

on

The Project for Capacity Development of
Power Transmission and Distribution Systems (Phase I)

	Name	Position, Organization	Signature
1			
2	U Thein Hlaing	CEO, MESC, Mandalay	
3	Daw Mi Mi Khaing	DG, DEPP	
4	U Myint Thu	CE GSE	
5	U Myint Oo	ဒေါက်တာ	
6	Daw Ei Ei Khin	GM.(M.P.) YESC	
7	Li Yin Htun Lwin	Dy Gm YESC	
8	U Ye Wunna	DyGM, MESC	
9	Dr. Tint Soe Win	Dy Director, PSD	
10			
11			
12			
13			
14			
15			

November 3, 2016

Participant list at the 1st Coordinating Committee

on

The Project for Capacity Development of
Power Transmission and Distribution Systems (Phase I)

	Name	Position, Organization	Signature
16	Tomohide Kato	Chief Advisor, JICA Expert	加藤友英
17	KURI OFU I	JICA Expert	大鈩ス里.
18	OSAMU TANIHATA	JICA Expere	谷畑 治
19	IKUO NAKAGAWA	JICA Expert	中川郁雄
20	MITSUHIRO NAKAMURA	JICA Expert	中村光宏
21	MINA KOBAYASHI	JICA Expert	小林美奈.
22	SHINICHI MITSUI	JICA Expert	三井真一
23	YOSHITAKA SAITO	JICA Expert	斎藤芳敬
24	TAKUJI KATAOKA	JICA Expert	
25	HOKE SHEIN	MKI., GM.	
26	Wah Wah Han Su Yin	JICA Expert	Wahh.
27	Mamoru SAIGAI	JICA Myanmar Senior Rep	
28	Kyosuke INADA	=	
29			
30			

November 3, 2016

Participant list at the 1st Coordinating Committee

on

The Project for Capacity Development of
Power Transmission and Distribution Systems (Phase I)

	Name	Position, Organization	Signature
31	Khun Saw Naung Htwe	AE. (ESE)	3.11.16
32	Win Kyaw	AE (DPTSC)	3.11.16
33	Mr. Kyaw Kyaw	AE (MESC)	3.11.16
34	Mr. Min Thiha	EE (ESE)	
35	Naung Win Htoo	AE (DPTSC)	
36	Than Htike Oo.	EE (ESE)	
37	Shwe Yee Win	SAE (ESE)	Shweyee
38	Mr. Tayzar Lin	A.E (YESC)	3/11/16
39	Li San Yu Maw	EE. (ESE)	
40	Ms. Kyawt Kyawt Hlaing	SAE (YESC)	
41	Ms. Yi Mon Aye	SAE (YESC)	
42	Ms. Soe Yupar Thein	SO (DPTSC)	
43	Mr. Myo Thant Zin	AD (DEPP)	
44	Mr. Soe Ko Ko Aung	EE (MESC)	
45	Ms. Phyo Thiri Aung	S.A.E (YESC)	

November 3, 2016

Participant list at the 1st Coordinating Committee

on

The Project for Capacity Development of
Power Transmission and Distribution Systems (Phase I)

	Name	Position, Organization	Signature
46	U Kyaw Soe Lin	SAE (YESC)	
47	U BO BO	SAE (ESE)	
48	U Myo Min Aung	AE (ESE)	
49	U Aung Tun	EE (ESE)	
50	U Si Thu Aung	EE (ESE)	
51	U Lin Ko Ko	EE (ESE)	
52	U San Myo Aung	E.E (ESE)	
53	U Myint Oo	E.E (ESE)	
54	U Zaw Htike	AE (MESC)	
55	U Than Naing Lin	SE (DEPP)	
56	U Maung Lin.	EE (ESE)	
57	~~U Zaw~~		
58	U Zaw Zaw Htet	EE (ESE)	
59			
60			

(end of document)

MINUTES OF MEETING
OF
THE SECOND JOINT COORDINATING COMMITTEE
ON
THE PROJECT FOR CAPACITY DEVELOPMENT OF
POWER TRANSMISSION AND DISTRIBUTION SYSTEMS
IN THE REPUBLIC OF THE UNION OF MYANMAR

In accordance with Article II. 2. (3) of the Record of Discussions dated 30th January 2016 (hereinafter referred to as "RD"), the Second Joint Coordinating Committee (hereinafter referred to as "JCC") was held on 20th December, 2017.

At JCC, JICA side and Myanmar side exchanged views for the smooth implementation of the Project for Capacity Development of Power Sector Development Planning (hereinafter referred to as "the Project")

As a result of the discussions, both sides agreed on the matters referred to in the document annexed hereto.

Nay Pyi Taw, 20th December, 2017

Mr. Mamoru Sakai
Senior Representative
JICA Myanmar Office

U Tin Maung Oo
Permanent Secretary
Ministry of Electricity and Energy

Mr. Tomohide Kato
JICA Expert/Chief Advisor

U Myint Oo
Deputy Director General
Department of Electric Power Planning
Ministry of Electricity and Energy

ANNEX

1. Progress of the Project

The JICA Expert Team explained the recent achievement of the Project based on the Attachment 2. The both sides confirmed the solid progress in technical transfer from the JICA Expert Team to the trainer candidates, including preparation of text books by the JICA Expert Team.

2. Future Work Plan and Training in Main Cities by Trainer Candidates

In accordance with the progress of the Project confirmed above, the JICA Expert Team explained the contents of the revised Work Plan based on the Attachment 3. The Myanmar side agreed the plan in principle. The JICA Expert Team explained further the detail of the Training in Main Cities by Trainer Candidates which was referred in the confirmed Work Plan, based on the Attachment 4.

3. Main Points Confirmed

✧ Textbook

Textbooks on five themes, Distribution Planning & Design, Distribution Construction Work & Safety Technologies, Distribution Operation & Maintenance, Transmission Line and Distribution Substation, prepared by JICA Expert Team will be distributed to related organizations in MOEE by the end of December 2017.

✧ Intensive Training

Intensive training has been conducted since March 2017 for seven months in total and will be completed on 22nd December 2017. Based on the textbooks, important contents on all five themes have been taught by JICA Expert Team. In addition to the intensive training, Trainer Candidates are requested to read textbooks to learn theory by themselves.

✧ Evaluation

The results of examinations will be shared with MOEE senior managers to evaluate the improvement of each Trainer Candidate by the end of December 2017.

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✧ Presentation by Trainer Candidates

Each Working Group will make a presentation to MOEE senior managers in the third week of January 2018 after the preparation with the support of JICA Expert Team what Trainer Candidates have learnt through the intensive training. MOEE senior managers will evaluate the improvement and suitability of Trainer Candidates. Based on the suitability of each Trainer Candidates, Working Group members will be rearranged.

✧ Regional training in main cities

Regional training in main cities will be conducted by Trainer Candidates. It will be mainly lecture due to limitation of training facilities in regional areas, but It is possible to use portable training equipment such as safety belts when conducting the regional training.

Textbooks for regional training will be prepared under the Working Group Activities in March and May 2018. Textbooks for linemen shall be prepared in Myanmar language but technical terms shall be in English, and those for engineers are not necessary to prepare in Myanmar language.

✧ Support to the Framework of Human Resource Development

The JICA side emphasized the importance of establishing human resource development (hereinafter referred to as "HRD") framework for the implementation of training and for sustainable HRD in power sector in Myanmar. The both sides agreed to consult on future action on this issue.

Attachment 1: Agenda
Attachment 2: Overview of the Project Activities
Attachment 3: Revised Work Plan
Attachment 4: Holding regional seminar and Training in regional and main cities
Attachment 5: Participants List

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2nd JCC of the Project for Capacity Development of Power Transmission and Distribution system

Date 20-12-2017

Place Office-27

Serial No	Name	Responsibility/ Department	Contact PhoneNumber	Signature
1.	U Tha Ng Oo	PS MD	[redacted]	
2	Daw Yee Myint	DPTSC		
3.	U. Sawwin Maung	CE - ESE		20.12.2017
4	U Nyein Oo	DDG, DEPP		
5	U Tin Aung	CE (TSE)		
6	U Sein Win Myint	DGM (MESC)		
7	Saw Si Thu Hlaing	Dir (DEPP)		
8	Daw Zar Zar Tun	EE (YESC)		
9	Kyaw Kyaw.	DG (DPTSC)		
10	Tha Sue	GM ESE		

2nd JCC of the Project for Capacity Development of Power Transmission and Distribution system

Date 20-12-2017

Place Office-27

Serial No	Name	Responsibility/ Department	Contact PhoneNumber	Signature
	Mamoru AKAI	JICA	[redacted]	
	Kaori Omi Shibata	JICA / MOEE		
	Tomohide Kato	JICA Short-term expert		
	Osamu Tanihata	JICA Short-term Expert		
	Shinichi Mitsui	JICA short-term expert		
	Wah Wah Han Su Yin	JICA Short-term expert		
	Htet Nandar Win	JICA Project Asst		

2nd JCC of the Project for Capacity Development of Power Transmission and Distribution system

Date --20-12-2017

Place --Office-27

Serial No	Name	Responsibility/ Department	Contact PhoneNumber	Signature
၁	U Kyaw Soe Lin	YESC	[redacted]	
၂	Daw Phyo Thiri Aung	YESC		
၃	U Zaw Htike	MESC		
၄	Daw Soe Yupar Thein	DPTSC		
၅	U Than Htike Oo	E.E ESE		
6	U Lin Ko Ko	EE ESE		
7	U Aung Tun	EE ESE		
8	U SANYU MAW	ESE, EE		
9.	U Naing Lin.	ESE, EE		
10	U Khun Sai Naing Htwe	ESE, AE		

PCJ/Attached File/Meeting attended

2nd JCC of the Project for Capacity Development of Power Transmission and Distribution system

Date 20-12-2017

Place Office-27

Serial No	Name	Responsibility/ Department	Contact PhoneNumber	Signature
11	U Win Kyaw	AE, DPTSC	[redacted]	
12	U Soe Ko Ko Aung	AD, DEPP		
13	Dr. Tay Zar Hlaw	AE, YESC		
14.	U Naung Win Htoo	Staff Officer DPTSC		
15.	Daw Yi Mon Aye	SAE, YESC		
16.	Daw Kyawt Hlaing	SAE, YESC		20.12.17
17.	U Kyaw Kyaw	AE, MESC		20.12.17
18.	U Si Thu Aung	E.E. (E.S.E)		2017
19.	U Bo Bo	SAE, (E.S.E)		2017
20.	U Myo Min Aung	A.E (E.S.E)		20.12.17

2nd JCC of the Project for Capacity Development of Power Transmission and Distribution system

Date 20-12-2017

Place Office-27

Serial No	Name	Responsibility/ Department	Contact PhoneNumber	Signature
11.	U San Myo Aung	E.E (E.S.E)	[redacted]	20/12/17
12.	U Myo Thant Zin	A.D (DEPP)		20/12/17
13	U Myint Oo	EE (ESE)		20.12.17
14	Daw Shwe Yee Win	SAE (ESE)		Shweyee 20.12.17
15	U Min Thiha	EE (E.S.E)		20.12.17
16	U Zaw Zaw Htet	EE (E.S.E)		20.12.17

MINUTES OF MEETING
OF
THE THIRD JOINT COORDINATING COMMITTEE
ON
THE PROJECT FOR CAPACITY DEVELOPMENT OF
POWER TRANSMISSION AND DISTRIBUTION SYSTEMS
IN THE REPUBLIC OF THE UNION OF MYANMAR

In accordance with Article II. 2. (3) of the Record of Discussions dated 30th January 2016 (hereinafter referred to as "RD"), the Third Joint Coordinating Committee (hereinafter referred to as "JCC") was held on 6th November, 2018.

At JCC, The Japan International Cooperation Agency (hereinafter referred to as "JICA") and relevant officers of Ministry of Electricity and Energy (hereinafter referred to as "MOEE") discussed on the Project for Capacity Development of Power Sector Development Planning (hereinafter referred to as "the Project"). JICA and MOEE sides summarized the achievements of the Phase I, and agreed on the scope of the Phase II.

As a result of the discussions, both sides agreed on the issues referred to in the document annexed hereto.

Nay Pyi Taw, 6th November, 2018

Mr. Mamoru Sakai
Senior Representative
Myanmar Office
JICA

Daw Mi Mi Khaing
Director General
Department of Electric Power Planning
MOEE

Mr. Tomohide Kato
Leader
JICA Expert Team

ANNEX

1. Achievement of the Phase I of the Project

JICA Expert Team explained the achievement of the Phase I of the Project. Both sides confirmed the substantial achievement in technical transfer from JICA Expert Team to the trainer candidates.

2. HRD Framework

- HRD Policy and Plan

  Japanese side emphasized the importance of establishing the framework for Human Resource Development (hereinafter referred to as "HRD") for ensuring the sustainable capacity development in Transmission and Distribution (hereinafter referred to as "T&D") sector.

  Japanese side explained that, if the training program is implemented as planned, around 30 new accredited trainers would be made every year. These trainers would be expected to contribute to systematically enhancing fundamental technical capacity in T&D operation and maintenance in MOEE by providing trainings. However, hierarchical HRD system as well as training programs is necessary because MOEE needs to develop advanced level engineers.

- Accreditation System

  Both sides confirmed that HRD framework should include accreditation system for engineers and linemen based on their competency and experiences. Japanese side recommended to accredit the trainers who participated in training of trainers (hereinafter referred to as "TOT") in this project, as a pilot to establish a comprehensive accreditation system.

- Responsibility of the Work

  Both sides appreciated that Myanmar side established the working group (WG) for this purpose and agreed to expedite its activities to formulate proper HRD policy and plan in a timely manner. Both sides agreed that Myanmar side would take responsibility of the activities, and Japanese Expert Team would support them by providing advices.

3. Training Center Institutional Development

Japanese side also emphasized the importance of developing institutional framework to operate and manage the training center in Nay Pyi Taw, as this leads to maximum utilization of the benefit of training facilities purchased during Phase I, and also the training program, syllabi, curricula, and textbooks to be formulated by the Project

In this regard, Japanese side welcomed the effort of Myanmar side to develop the framework by establishing WG, and requested to accelerate the process. Both sides confirmed that

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Myanmar side will work on this issue during Phase II with necessary advisory and recommendation from Japanese Experts.

4. Implementation of Training (PDCA Cycle)

Japanese side explained the concept in implementing Phase II of the Project shown in the Attachment 1, and Myanmar side agreed to the concept in general. Both sides confirmed to continue discussion on the detail of the training. The main points confirmed are as follow;

(1) Trainers and Trainees

In Phase I, 26 trainers received TOT under the support from Japanese Experts. Then, some of the trainer candidates trained in the Phase I will be expected to train another trainee of MOEE. In Phase II, MOEE will provide maximum 30 numbers of trainer candidates to receive the TOT in the field of new theme (recent technology) under the support of Japanese Experts.

It is expected that trainer candidates who participated in TOT will be accredited properly according to their competence as trainers.

(2) Scope of Training

There were 5 themes (Distribution Planning & Design / Distribution Work & Safety Technologies /Distribution Operation & Maintenance / Transmission Line /Distribution Substation), whose textbook were prepared during Phase I.

MOEE will propose new themes of the course/syllabus for the phase II and Japanese Experts will prepare the textbooks. Detail contents of the training would be continuously reviewed and updated to meet the training needs, and the textbooks prepared in Phase I would be revised to reflect actual situation in Myanmar. It was agreed that MOEE staffs (some of the 26 trainer candidates trained in Phase I) would take leading role in modifying the text books to meet Myanmar situation in collaboration with senior engineers from MOEE with a support from JICA Experts, if necessary.

(3) Intensive Training at Nay Pyi Taw and Regional Seminar

For utilizing skills and knowledge as trainers acquired through TOT, the trainers would carry out intensive training at Nay Pyi Taw and regional seminars through which they can develop teaching skills as well as deepen technical understanding on each topic. Details of the seminars such as number of participants, topics and places shall be discussed and confirmed after commencement of Phase II.

(4) Evaluation of Training

For grasping the outcome of training properly, effective method for training evaluation should be considered.

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5. Realization of Project Outcome with Trained Human Resource

To achieve the overall goal of the Project, which shall be measured by reduction of electricity loss and enhancement of reliability and safety, knowledge enhanced through the Project needs to be utilized in MOEE's daily operations.

In this regard, Japanese side pointed out that there are number of on-going Japanese ODA Loan projects in distribution sub-sector (e.g. Yangon distribution, Major city distribution), and proposed to make Japanese ODA Loan projects as pilots for establishing a model in which enhanced staff capacity lead to tangible improvement in electricity service; actual loss reduction / enhanced reliability and safety.

Both sides confirmed that the following activities shall be implemented during Phase II to utilize the output of the Project for actual service improvement. Both sides also agreed to discuss the method to monitor contribution of these activities for the outcome of the Project (loss reduction / enhanced reliability and safety).

(1) Participation of Project Management Unit(PMU) member to the Training

PMU Members for Japanese ODA Loan Projects will be invited to the Phase II activity.

(2) Assignment of trainers to PMU

Trainer candidates trained in Phase I can get effective OJT as PMU member for on-going Japanese ODA Loan projects. At the same time, PMU can also benefit from staffs with enhanced knowledge.

(3) Data Collection and Management

In addition to the 5 themes of which training from Japanese Experts to trainer candidates has been already done in Phase I, Japanese Experts will make technical transfer on Data Collection and Management to several trainers in Phase II, for implementing data management on the pilot sites.

(4) Support on Technical Standard Specification

Japanese Experts will support technical standard specification of some equipment, mainly one which will be installed at Japanese ODA Loan Projects.

End

Attachment 1: Work Plan for The Project for Capacity Development of Power Transmission and Distribution System (Record of Phase I and scope of Phase II)

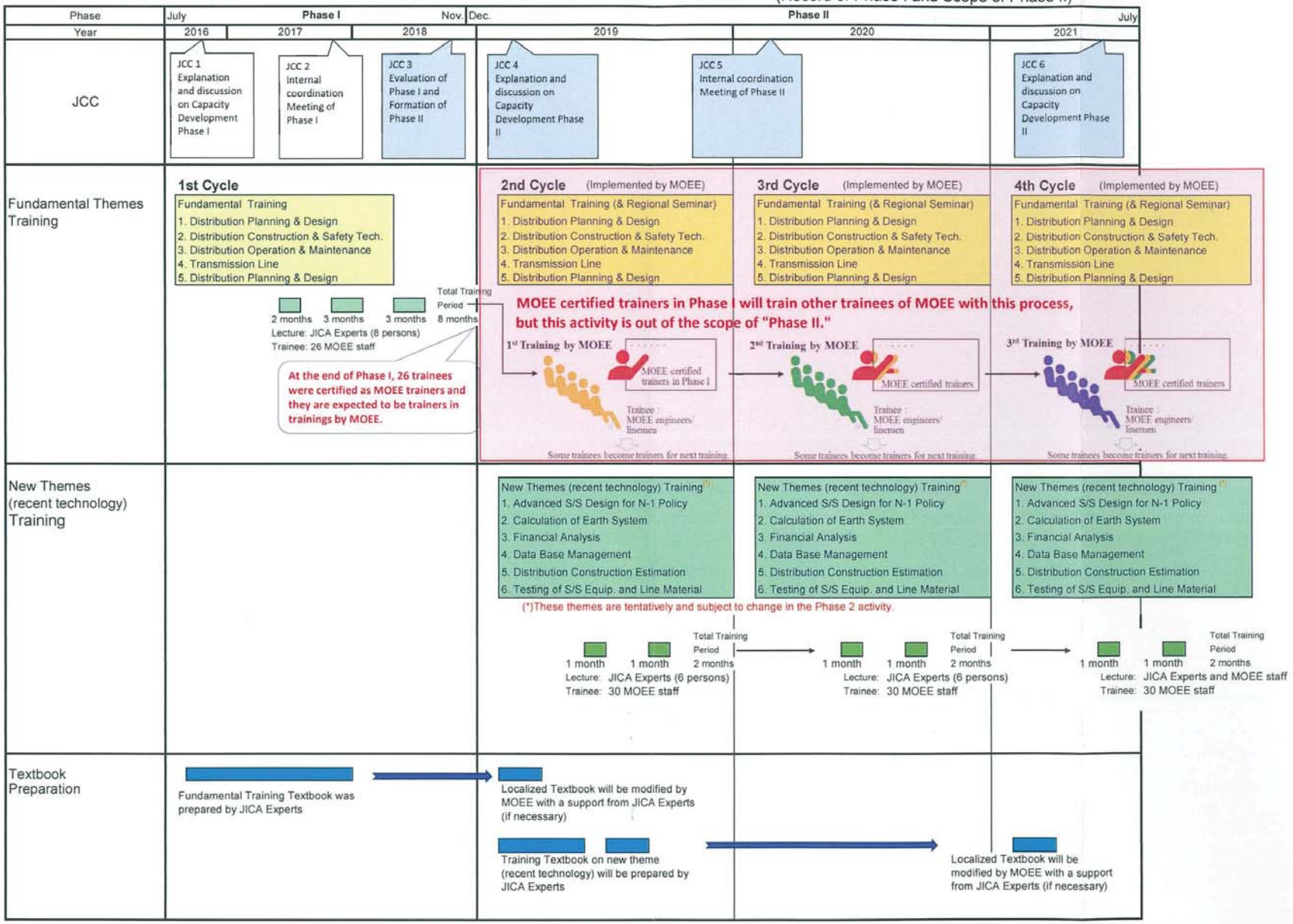
Attachment 2: Participants List

加藤 9

Attachment 1

Work Plan for The Project for Capacity Development of Power Transmission and Distribution System in the Republic of the Union of Myanmar

(Record of Phase I and Scope of Phase II)



Attachment-1

Participants list of the thrid Joint Coordinating Committee Meeting

Pentative Agenda for 3rd Joint Coordinating Committee Meeting

6 Nov, 2018

Date- ၆-၁၁-၂၀၁၈

Yadanar Hall

Place- ရတနာစန္ဒာ

Serial No	Name	Responsibility/ Department	Email/ Phone Number	Signature
	Daw Mi Mi Khaing	DG DEPP	[redacted]	
	Aye Kyaw	DG / DPTSC		
	Han Zaw	DDG / DEPP		
	Myint Thu	GM / YESC		
	Hlaing Naing	Dir / DEPP		
	Myo Lwin Nyein	DD / DEPP		
	U Sein Win Myint	DGM (MES)		
	Tha Soe	GM (ERE)		
	U Saw Si Tha Hlaing	Director (DEP		
	U Zay Yar Myint	Staff Officer (DEPP)		
	Daw Yo	Assistant Direct (DEPP)		
	Daw Lwin Lwin Aung	UD (DEPP)		
	Daw Hnin Wai Lwin	LD (DEPP)		

Pentative Agenda for 3rd Joint Coordinations Committee Meeting

6 Nov, 2018

Date- ၆.၁၁.၁၈

Yadanar Hall

Place- ရတနာဆိုင်းခန်း

Serial No	Name	Responsibility/ Department	Email/ Phone Number	Signature
1. ၁.	Daw Kyawt Kyawt Hlaing ဒေါ်ကျော့ကျော့လှိုင်	AE (YESC)	[redacted]	
2. ၂။	Daw Soe Yupar Thein ဒေါ်စိုးယုပါသိန်း	ဦးစီးကာကွယ်ရေး DPTSC		
3. ၃။	Dr. Tayzar Lin ဒေါက်တာတေးဇာလင်း	AE (YESC)		
4. ၄။	U Soe Ko Ko Aung ဦးစိုးကိုကိုအောင်	ADC (DEPP)		
5. ၅။	U Zaw Zaw Htet ဦးဇော်ဇော်ထက်	EE (ESE)		
6. ၆။	U Myint Oo ဦးမြင့်ဦး	EE (ESE)		
7. ၇။	U Bo Bo ဦးဘိုးဘိုး	SAE (ESE)		
8. ၈။	U Zaw Htike ဦးဇော်ထိုက်	AE (MESC)		
9. ၉။	U Than Htike Oo ဦးသန်းထိုက်ဦး	E.E (ESE)		
10. ၁၀။	U Kyaw Kyaw ဦးကျော်ကျော်	BE (MESC)		
11. ၁၁။	Daw Cho The Nwe ဒေါ်ချိုသဲနွယ်	A.D (DEPP)		
12. ၁၂။	U Naing Lin ဦးနိုင်လင်း	E.E. (FSE)		

Participants List of the third Joint Coordinating Committee Meeting

Pentative Agenda for 3rd Joint Coordinating Committee Meeting

6 Nov, 2018

Date- ၆.၁၁.၂၀၁၈

Yadanar Hall

Place- ရတနာဆိပ်ခံ

Serial No	Name	Responsibility/ Department	Email/ Phone Number	Signature
1.	Mamoru SAKAI	JICA	[redacted]	
2.	Kojun Nakashima	JICA		
3.	Tomohide Kato	JICA Expert Team		
4.	Osamu Tanihata	JICA Expert Tea		
5.	Koji Shikimachi	JICA Expert Team		
6.	Yoshitaka Saito	JICA Expert Team		
7.	Koichi Yamashita	JICA Expert Team		
8.	Hoke Shein	JICA Expert Team		
9.	Shinichi Mitsui	JICA Expert Team		
10.	Wah Wah Han Su Yin	JICA Expert Team		

Record of Trainings in Myanmar

1. Trainings to trainer candidates conducted by JICA Experts in MOEE Training Center in Nay Pyi Taw

Actual Records of trainings and other activities that were carried out at WG activities after the instruction of Deputy Minister on December 2016 are shown below.

(Red color: Activity other than lecture, Green color: On-site training, Others: In-house training)

Actual Records of Training / Other Activities from March to April, 2017>

Date (Day)	Mar 13 (Mon)	May 14 (Tue)	May 15 (Wed)	May 16 (Thu)	May 17 (Fri)	Mar 18 (Sat)	Mar 19 (Sun)
Trainings / Other Activities	Preparation for review of Workshop in Japan assisted by JICA experts Review of Workshop in Japan (supplementary explanation, discussion about applying new technologies to each workplace)				Calculation Method of Wind Pressure Load	Day off	
JICA Expert	Mr. Kato (Lecturer)						

Date (Day)	Mar 20 (Mon)	Mar 21 (Tue)	Mar 22 (Wed)	Mar 23 (Thu)	Mar 24 (Fri)	Mar 25 (Sat)	Mar 26 (Sun)
Trainings / Other Activities	Lecture on Voltage Drop and Loss Reduction Calculation in 11, 0.4kV Distribution Systems Exercise of technical matters about the above lectures					Day off	
JICA Expert	Mr. Tanihata, Dr. Shikimachi (Lecturers)						

Date (Day)	Mar 27 (Mon)	Mar 28 (Tue)	Mar 29 (Wed)	Mar 30 (Thu)	Mar 31 (Fri)	Apr 1 (Sat)	Apr 2 (Sun)
Trainings / Other Activities	Day-off National Holiday in Myanmar	Lecture and Site Survey on actual distribution facilities for Voltage Drop and Loss Reduction Calculation in 11, 0.4kV Distribution Systems				Day off	
JICA Expert	Mr. Tanihata, Dr. Shikimachi (Lecturers)						

Date (Day)	Apr 3 (Mon)	Apr 4 (Tue)	Apr 5 (Wed)	Apr 6 (Thu)	Apr 7 (Fri)
Trainings / Other Activities	Basic theory on power distribution	Lecture and Excise for Practical use of Loss Reduction in 11, 0.4kV Distribution Systems Ditto above	Workshop on conductor cable by Manufacturer	Wrap up	Wrap-up meeting Breaking up
JICA Expert	Mr. Tanihata, Dr. Shikimachi (Lecturers)				

Actual Records of Training / Other Activities from June to August, 2017>

Date (Day)		Jun 5 (Mon)	Jun 6 (Tue)	Jun 7 (Wed)	Jun 8 (Thu)	Jun 9(Fri)	Jun 10 (Sat)	Jun 11 (Sun)
Trainings / Other Activities	AM	Opening remarks by MOEE Distribution Automation system	Distribution Automation system	Regulations for Distribution Lines		Regulations for Distribution Lines	Day off	
	PM	Debriefing session after seminar in Japan				Self-study time		
JICA Expert		Mr. Kato (Lecturer)						

Date (Day)		Jun 12 (Mon)	Jun 13 (Tue)	Jun 14 (Wed)	Jun 15 (Thu)	Jun 16(Fri)	Jun 17 (Sat)	Jun 18 (Sun)
Trainings / Other Activities	AM	Distribution Design				Basic Financial Analysis (1) - Financial Analysis of Project	Day off	
	PM							
JICA Expert		Dr. Shikimachi (Lecturer), Ms.Wah Wah				Mr. Yamashita (Lecturer), Ms.Wah Wah		

Date (Day)		Jun 19 (Mon)	Jun 20 (Tue)	Jun 21 (Wed)	Jun 22 (Thu)	Jun 23(Fri)	Jun 24 (Sat)	Jun 25 (Sun)
Trainings / Other Activities	AM	Basic Financial Analysis (2) - Financial Analysis of Business Entity	Basic Financial Analysis (3) - Case Study: Financial Projection of Institution	Distribution Design		Distribution Design	Day off	
	PM					Exercise of Distribution Design		
JICA Expert		Mr. Yamashita (Lecturer), Ms.Wah Wah		Dr. Shikimachi (Lecturer), Ms.Wah Wah				

Date (Day)		Jun 26 (Mon)	Jun 27 (Tue)	Jun 28 (Wed)	Jun 29 (Thu)	Jun 30 (Fri)	Jul 1 (Sat)	Jul 2 (Sun)
Trainings / Other Activities	AM	Discussion about procurement plan of training facilities	Safety in Distribution Work	Explanation of Concrete Pole (NC & MaGa Co., Ltd.)	Danger foreseeability training by case study	Distribution Substation	Day off	
	PM	Exercise and review of distribution design		Safety in Distribution Work				
JICA Expert		Mr. Tanihata Dr. Shikimachi (Lecturer)	Mr. Nakagawa (Lecturer)		Dr. Shikimachi (Lecturer)	Mr. Tanihata (Lecturer)		

Date (Day)		Jul 3 (Mon)	Jul 4 (Tue)	Jul 5 (Wed)	Jul 6 (Thu)	Jul 7 (Fri)	Jul 8 (Sat)	Jul 9 (Sun)
Trainings / Other Activities	AM	Distribution Substation	Basic theory on power Capacitor	Distribution facility management	5S Activity	Distribution Line Design (using PC)	Day off	
	PM							
JICA Expert		Mr. Tanihata (Lecturer)		Dr. Shikimachi (Lecturer)	Mr. Nakagawa (Lecturer)	Dr. Shikimachi (Lecturer)		

Date (Day)		Jul 10 (Mon)	Jul 11 (Tue)	Jul 12 (Wed)	Jul 13 (Thu)	Jul 14 (Fri)	Jul 15 (Sat)	Jul 16 (Sun)
Trainings / Other Activities	AM	Examination on lecture contents on June	Basic theory on Power Capacitor	Human Error	Outline of overhead transmission line	Outline of overhead transmission line	Day off	
	PM	Self-Check on June Lecture	Human Error	Outline of overhead transmission line		Investigation and insulation design of overhead transmission line		
JICA Expert		Mr. Kato Mr. Tanihata Mr. Nakagawa Mr. Yoshida	Mr. Tanihata Mr. Nakagawa (Lecturer)	Mr. Nakagawa Mr.Yoshida (Lecturer)	Mr.Yoshida (Lecturer)			

Date (Day)		Jul 17 (Mon)	Jul 18 (Tue)	Jul 19 (Wed)	Jul 20 (Thu)	Jul 21 (Fri)	Jul 22 (Sat)	Jul 23 (Sun)
Trainings / Other Activities	AM	Investigation and insulation design of overhead transmission line		Day-off National Holiday in Myanmar	Investigation and insulation design of overhead transmission line	Grounding (Earthing) System	Day off	
	PM							
JICA Expert		Mr.Yoshida (Lecturer)			Mr.Yoshida (Lecturer)	Mr.Kato (Lecturer)		

Date (Day)		Jul 24 (Mon)	Jul 25 (Tue)	Jul 26 (Wed)	Jul 27 (Thu)	Jul 28 (Fri)	Jul 29 (Sat)	Jul 30 (Sun)
Trainings / Other Activities	AM	Distribution System Protection		Distribution System Protection	Abstract of grounding system		Day off	
	PM			Abstract of grounding system				
JICA Expert		Mr.Kato (Lecturer)		Mr.Kato Mr. Nakamura (Lecturer)	Mr. Nakamura (Lecturer)			

Date (Day)		Jul 31 (Mon)	Aug 1 (Tue)	Aug 2 (Wed)	Aug 3 (Thu)	Aug 4 (Fri)	Aug 5 (Sat)	Aug 6 (Sun)
Trainings / Other Activities	AM	Basic practice for fault calculation		Distribution System Protection	Solving exercise problem for distribution operation and maintenance	Class Cancellation (due to MOEE side situation)	Day off	
	PM							
JICA Expert		Mr. Nakamura (Lecturer)		Mr.Kato (Lecturer)				

Date (Day)		Aug 7 (Mon)	Aug 8 (Tue)	Aug 9 (Wed)	Aug 10 (Thu)	Aug 11 (Fri)	Aug 12 (Sat)	Aug 13 (Sun)
Trainings / Other Activities	AM	Meeting with U Tha Soe and others	Relay Setting	Voltage and power factor control	Solving exercise problem for distribution operation and maintenance	Voltage and power factor control	Day off	
	PM	Solving exercise problem for distribution operation and maintenance		Discussion session with Chuo University students coming from Japan		Solving exercise problem for voltage and power factor control		
JICA Expert		Mr.Mitsui (Lecturer)	Mr.Nakamura (Lecturer)	Mr. Kato Mr. Nakamura Mr.Mitsui	Mr. Kato (Lecturer)	Mr. Kato Mr. Mitsui (Lecturer)		

Date (Day)		Aug 14 (Mon)	Aug 15 (Tue)	Aug 16 (Wed)	Aug 17 (Thu)	Aug 18 (Fri)	Aug 19 (Sat)	Aug 20 (Sun)
Trainings / Other Activities	AM	Distribution line design (using PC)	Distribution line constant calculation and Multi Transformer System design	AM: Workshop on concrete pole (3 days) (Mr. Kobayashi of NC & Maga Co., Ltd.)			Day off	
	PM			Power System Design				
JICA Expert		Dr.Shikimachi (Lecturer)		Mr.Tanihata (Lecturer)				

Date (Day)		Aug 21 (Mon)	Aug 22 (Tue)	Aug 23 (Wed)	Aug 24 (Thu)	Aug 25 (Fri)
Trainings / Other Activities	AM	Workshop on Conductor (Day1) (Mr. Terabe and Mr. Koike of Fujikura Ltd.) [Venue: MOEE]			Power System Design	Examination on lecture contents on July and August
	PM				Lecture by U Saw Win Maung (MOEE Chief Engineer) Distribution Planning	Self-Check on July and August lecture
JICA Expert		Mr. Tanihata, Dr. Shikimachi and Mr. Mitsui			Dr.Shikimachi (Lecturer)	Mr. Tanihata Dr. Shikimachi Mr. Mitsui

Actual Records of Training / Other Activities from October to December, 2017>

Date (Day)		Oct 9 (Mon)	Oct 10 (Tue)	Oct 11 (Wed)	Oct 12 (Thu)	Oct 13 (Fri)	Oct 14 (Sat)	Oct 15 (Sun)
Trainings / Other Activities	AM	Managing Meeting	Distribution Planning&Design - Concrete footing for poles at training center	Distribution Planning&Design - Load type and bending moment of pole	Distribution Construction - Safety in Distribution Works	Distribution Construction - Safety in Distribution Works	Day off	
	PM					Discussion on the training in Japan		
JICA Expert		Ms. Orui Dr. Shikimachi Mr. Nakagawa	Dr.Shikimachi (Lecturer)		Mr. Nakagawa (Lecturer)	Dr. Shikimachi Mr. Nakagawa (Lecturer)		

Date (Day)		Oct 16 (Mon)	Oct 17 (Tue)	Oct 18 (Wed)	Oct 19 (Thu)	Oct 20 (Fri)	Oct 21 (Sat)	Oct 22 (Sun)
Trainings / Other Activities	AM	Distribution Planning&Design - Area loss estimation using statistics	Distribution Construction - Safety OJT using safety belt/ step bolts on site	Day off	Distribution Planning&Design -Area loss practice using statistics	Distribution Construction - Safety OJT using safety belt/ step bolts on site	Day off	
	PM				Distribution Planning&Design - Voltage drop calculation with graphs	Distribution Planning&Design - Voltage drop calculation with graphs		
JICA Expert		Dr. Shikimachi (Lecturer)	Mr. Nakagawa (Lecturer)		Dr. Shikimachi (Lecturer)	Mr. Nakagawa Dr. Shikimachi (Lecturer)		

Date (Day)		Oct 23 (Mon)	Oct 24 (Tue)	Oct 25 (Wed)	Oct 26 (Thu)	Oct 27 (Fri)	Oct 28 (Sat)	Oct 29 (Sun)
Trainings / Other Activities	AM	Distribution Planning&Design - Loss calculation using loss coefficient	Distribution Planning&Design - Loss calculation using load factor - Measuring OJT with Laser distance meter,etc.	Distribution Substation - Power Transformer	Distribution Substation - Power Capacitor, Lightning Arrester	Distribution Substation - Battery, Substation Planning	Day off	
	PM							
JICA Expert		Dr. Shikimachi (Lecturer)		Mr. Tanihata (Lecturer)				

Date (Day)		Oct 30 (Mon)	Oct 31 (Tue)	Nov 1 (Wed)	Nov 2 (Thu)	Nov 3 (Fri)	Nov 4 (Sat)	Nov 5 (Sun)
Trainings / Other Activities	AM	Distribution Substation - Substation planning and Design	Distribution Substation - Supervise and Field Test	Examination on lecture contents on October Distribution Substation - Power Transformer Test	Day-off National Holiday in Myanmar	Day-off National Holiday in Myanmar	Day off	
	PM							
JICA Expert		Mr. Tanihata (Lecturer)						

Date (Day)		Nov 6 (Mon)	Nov 7 (Tue)	Nov 8 (Wed)	Nov 9 (Thu)	Nov 10 (Fri)	Nov 11 (Sat)	Nov 12 (Sun)
Trainings / Other Activities	AM	Self-Check on October lecture	Transmission Line Planning& Design (Conductor)			Transmission Line Planning&Design (Tower and Foundation)	Day off	
	PM							
JICA Expert		Mr. Yoshida (Lecturer)						

Date (Day)		Nov 13 (Mon)	Nov 14 (Tue)	Nov 15 (Wed)	Nov 16 (Thu)	Nov 17 (Fri)	Nov 18 (Sat)	Nov 19 (Sun)
Trainings / Other Activities	AM	Day-off National Holiday in Myanmar	Substation Maintenance Protective Relay			Distribution Material and Equipment	Day off	
	PM							
JICA Expert			Mr. Nakamura (Lecturer)			Mr. Kato (Lecturer)		

Date (Day)		Nov 20 (Mon)	Nov 21 (Tue)	Nov 22 (Wed)	Nov 23 (Thu)	Nov 24 (Fri)	Nov 25 (Sat)	Nov 26 (Sun)
Trainings / Other Activities	AM	Substation Maintenance Protective Relay	Distribution Material and Equipment				Day off	
	PM							
JICA Expert		Mr. Nakamura (Lecturer)	Mr. Kato (Lecturer)					

Date (Day)		Nov 27 (Mon)	Nov 28 (Tue)	Nov 29 (Wed)	Nov 30 (Thu)	Dec 1 (Fri)	Dec 2 (Sat)	Dec 3 (Sun)
Trainings / Other Activities	AM	Distribution Material and Equipment	Distribution Construction	Distribution Maintenance	Distribution Construction	Distribution Maintenance	Day off	
	PM							
JICA Expert		Mr. Kato (Lecturer)	Mr. Nakagawa (Lecturer)	Mr. Kato (Lecturer)	Mr. Nakagawa (Lecturer)	Mr. Kato (Lecturer)		

Date (Day)		Dec 4 (Mon)	Dec 5 (Tue)	Dec 6 (Wed)	Dec 7 (Thu)	Dec 8 (Fri)	Dec 9 (Sat)	Dec 10 (Sun)
Trainings / Other Activities	AM	Distribution Construction	Distribution Maintenance Examination on lecture contents on November	Distribution Construction	Distribution Maintenance	Distribution Construction	Day off	
	PM							
JICA Expert		Mr. Nakagawa (Lecturer) Ms. Wah Wah	Mr. Kato (Lecturer) Ms. Wah Wah	Mr. Nakagawa (Lecturer) Ms. Wah Wah	Mr. Kato (Lecturer) Ms. Wah Wah	Mr. Nakagawa (Lecturer) Ms. Wah Wah		

Date (Day)		Dec 11 (Mon)	Dec 12 (Tue)	Dec 13 (Wed)	Dec 14 (Thu)	Dec 15 (Fri)	Dec 16 (Sat)	Dec 17 (Sun)
Trainings / Other Activities	AM	Substation Maintenance Circuit Breaker			Installation of switchgear on pole	Substation Maintenance Current Transformer	Day off	
	PM				Managing Meeting Substation Maintenance Current Transformer	Work Safety		
JICA Expert		Mr. Tanihata, Mr. Nakamura (Lecturer), Ms. Wah Wah						

Date (Day)		Dec 18 (Mon)	Dec 19 (Tue)	Dec 20 (Wed)	Dec 21 (Thu)	Dec 22 (Fri)
Trainings / Other Activities	AM	Day-off National Holiday in Myanmar	Substation Maintenance Disconnector	Site work management	Installation of Switchgear on pole	GW activity for preparation on January's presentation
	PM			2nd JCC GW activity for preparation on January's presentation	Examination on lecture contents on December	
JICA Expert			Mr. Tanihata, (Lecturer)	Mr. Tanihata Mr. Mitsui Ms. Wah Wah	Mr.Kato, Mr. Tanihata Mr. Mitsui, Ms. Wah Wah	

Actual Records of Training / Other Activities on September 2018>

Date (Day)		Sep 3 (Mon)	Sep 4 (Tue)	Sep 5 (Wed)	Sep 6 (Thu)	Sep 7 (Fri)	Sep 8 (Sat)	Sep 9 (Sun)
Trainings / Other Activities	AM	Lecture / Exercise on Financial Analysis		Lecture / Exercise on Substation Technologies		Lecture / Exercise on Financial Analysis	Day off	
	PM					Lecture / Exercise on Substation Technologies		
JICA Expert		Mr. Yamashita (Lecturer) Mr. Mitsui, Mr. Hoke Shein Ms. Wah Wah		Mr. Nakamura (Lecturer) Mr. Mitsui, Mr. Hoke Shein Ms. Wah Wah		Mr. Yamashita Mr. Nakamura (Lecturer) Mr. Mitsui		

Date (Day)		Sep 10 (Mon)	Sep 11 (Tue)	Sep 12 (Wed)	Sep 13 (Thu)	Sep 14 (Fri)	Sep 15 (Sat)	Sep 16 (Sun)
Trainings / Other Activities	AM	Examination on 5 themes to check Trainer Candidates' understanding	Lecture on Distribution line voltage control (SVR technology)			Watching Videos on Work Safety Technologies with JICA Expert's explanation	Day off	
	PM	Lecture on Distribution line voltage control (SVR technology)						
JICA Expert		Mr. Kato (Lecturer), Mr. Yoshida, Mr. Hoke Shein						

Date (Day)		Sep 17 (Mon)	Sep 18 (Tue)	Sep 19 (Wed)	Sep 20 (Thu)	Sep 21 (Fri)
Trainings / Other Activities	AM	[Discussion and Group Work] Reviewing overall activities conducted during Phase I and each trainer candidate's achievements in this Project, summarizing each's ambitions for the future as a certified trainer Preparing presentation material on the 3rd JCC to present above matters				
	PM					
JICA Expert		Mr. Kato (Lecturer), Mr. Yoshida, Mr. Hoke Shein				

2. Trainings to trainer candidates on actual distribution sites (OJT)

	Date	Place	JICA Expert	Content of Training (OJT)
1	29th March 2017	Suburbs of Nay Pyi Taw	Mr. Tanihata Dr. Shikimachi	Practice of site survey for distribution design using GPS and other equipment
2	19th March 2018	Takton Township, Nay Pyi Taw (ESE area)	Ms. Shibata Dr. Shikimachi Mr. Nakamura Mr. Nakagawa Mr. Mitsui	Installation work of switches on distribution line at site
3	30th April 2018	Dala Township, Yangon (YESC area)	Ms. Shibata Dr. Shikimachi	Method of designing multi-transformer system, and estimating the amount of distribution losses before and after the multi-transformer system is applied
4	15th May 2018	Kyaukpadaung, Mandalay Region (MESC area)	Ms. Shibata Dr. Shikimachi	Site survey on the place where SOG would be installed Withstand voltage test on the SOG-VCB before installation on the site
5	16th May 2018	Bagan, Mandalay Region (MESC area)	Ms. Shibata Dr. Shikimachi	Site survey on the place where the transformer procured by JICA would be installed
6	17th May 2018	Takton Towmship, Nay Pyi Taw (ESE area)	Ms. Shibata Dr. Shikimachi	Method of designing multi-transformer system Method of using measuring equipment (thermal imaging camera, a GPS device and a megger tester) on site where a SOG-VCB would be installed
7	1st, 2nd August 2018	Kyaukpadaung, Mandalay Region (MESC area)	Mr. Kato Dr. Shikimachi	Method of designing multi-transformer system (on Kyaukpadaung Township Office and on site) Site survey on the place where the SOG-VCB procured by JICA was installed, explaining the operation of SOG-VCB to protect part of a distribution feeder against an accident or fault, checking actual number of operations of SOG-VCB

3. Regional Seminar

3.1 1st Regional Seminar in Magway, Monywa (5th June to 14th June 2018)

(1) Trainer Candidates from each WG participating regional seminar

[WG1] Distribution Planning & Design (Training-1)	[WG2] Distribution Construction & Safety Technologies (Training-2)	[WG3] Distribution Operation & Maintenance (Training-3)	[WG4] Transmission Technologies Group (Training - 4)	[WG5] Substation Technologies (Training-5)
U Naung Win Htoo (AE – DPTSC)	U San Myo Aung (EE - ESE)	U Lin KoKo (EE - ESE)	U Myint Oo (EE - ESE)	U Zaw Zaw Htet (EE - ESE)
Daw Phyo Thiri Aung (SAE – YESC)	U Si Thu Aung (EE - ESE)	U Kyaw Kyaw (AE – MESC)	Daw Shwe Yee Win (SAE - ESE)	U Than Htike Oo (EE - ESE)

(2) Schedule (: Regional Seminar in Magway, : Regional Seminar in Monywa)

	Date (Day)	Seminar Program		Travelling or Staying
		9:00 – 12:00 am	13:00 – 16:00 pm	
1	5th June 2018 (Tue)	Travelling		NPT to Magway
2	6th June 2018 (Wed)	Introducing the JICA project	Training-1	Staying at Magway
3	7th June 2018 (Thu)	Training-2	Training-3	Staying at Magway
4	8th June 2018 (Fri)	Training-4	Training-5	Staying at Magway
5	9th June 2018 (Sat)	(Day-off) Travelling		Magway to Monywa
6	10th June 2018 (Sun)	(Day-off) Preparation for seminar next week		Staying at Monywa
7	11th June 2018 (Mon)	Introducing the JICA project	Training-1	Staying at Monywa
8	12th June 2018 (Tue)	Training-2	Training-3	Staying at Monywa
9	13th June 2018 (Wed)	Training-4	Training-5	Staying at Monywa
10	14th June 2018 (Thu)	Travelling		Monywa to NPT

(3) No. of Trainees

Magway: 24 persons

Monywa: 16 persons

(4) Participating JICA Experts

Ms. Shibata, Mr. Kato, Mr. Nakagawa, Mr. Hoke Shein and Ms. Wah Wah

3.2 Regional Seminar in Taunggyi, Mandalay (26th June to 5th July 2018)

(1) Trainer Candidates from each WG participating regional seminar

[WG1] Distribution Planning & Design (Training-1)	[WG2] Distribution Construction & Safety Technologies (Training-2)	[WG3] Distribution Operation & Maintenance (Training-3)	[WG4] Transmission Technologies Group (Training - 4)	[WG5] Substation Technologies (Training-5)
U Bo Bo (SAE - ESE) U Myo Min Aung (AE - ESE)	U Min Thiha (EE - ESE) U Zaw Htike (AE - MESC)	U Kyaw Kyaw (AE – MESC) U Naing Lin (EE - ESE)	U San Yu Maw (EE - ESE) Daw Shwe Yee Win (SAE - ESE)	U Myo Thant Zin (AD - DEPP) Dr Tayzar Lin (AE - YESC)

(2) Schedule (: Regional Seminar in Taunggyi, : Regional Seminar in Yangon)

	Date (Day)	Seminar Program		Travelling or Staying
		9:00 – 12:00 am	13:00 – 16:00 pm	
1	26th June 2018 (Tue)	Travelling		NPT to Taunggyi
2	27th June 2018 (Wed)	Introducing the JICA project	Training-1	Staying at Taunggyi
3	28th June 2018 (Thu)	Training-2	Training-3	Staying at Taunggyi
4	29th June 2018 (Fri)	Training-4	Training-5	Staying at Taunggyi
5	30th June 2018 (Sat)	(Day-off) Travelling		Taunggyi to Yangon
6	1st July 2018 (Sun)	(Day-off) Preparation for seminar next week		Staying at Yangon
7	2nd July 2018 (Mon)	Introducing the JICA project	Training-1	Staying at Yangon
8	3rd July 2018 (Tue)	Training-2	Training-3	Staying at Yangon
9	4th July 2018 (Wed)	Training-4	Training-5	Staying at Yangon
10	5th July 2018 (Thu)	Travelling		Yangon to NPT

(3) No. of Trainees

Taunggyi: 20 persons

Mandalay: 29 persons

(4) Participating JICA Experts

Ms. Shibata, Mr. Yoshida, Mr. Hoke Shein and Ms. Wah Wah

3.3 Regional Seminar in Bago, Yangon (15th July to 25th July 2018)

(1) Trainer Candidates from each WG participating regional seminar

[WG1] Distribution Planning & Design (Training-1)	[WG2] Distribution Construction & Safety Technologies (Training-2)	[WG3] Distribution Operation & Maintenance (Training-3)	[WG4] Transmission Technologies Group (Training - 4)	[WG5] Substation Technologies (Training-5)
U Soe Ko Ko Aung (AD - DEPP)	U Min Thiha (EE - ESE)	U Kun Saw Naung Htwe (AE - ESE)	U Win Kyaw (Staff Officer -DPTSC)	Daw Soe Yupar Thein (Staff Officer -DPTSC)
U Aung Tun (EE - ESE)	Daw Yi Mon Aye (Deputy Staff Officer - DEPP)	U Kyaw Soe Lin (SAE -YESC)	Daw Kyawt Kyawt Hlaing (AE - YESC)	Dr Tayzar Lin (AE - YESC)

(2) Schedule (: Regional Seminar in Bago, : Regional Seminar in Yangon)

	Date (Day)	Seminar Program		Travelling or Staying
		9:00 – 12:00 am	13:00 – 16:00 pm	
1	15th July 2018 (Sun)	Travelling		NPT to Bago
2	16th July 2018 (Mon)	Introducing the JICA project	Training-1	Staying at Bago
3	17th July 2018 (Tue)	Training-2	Training-3	Staying at Bago
4	18th July 2018 (Wed)	Training-4	Training-5	Staying at Bago
5	19th July 2018 (Thu)	Travelling		Bago to Yangon
6	20th July 2018 (Fri)	Introducing the JICA project	Training-1	Staying at Yangon
7	21st July 2018 (Sat)	(Day-off) Preparation for seminar next week		Staying at Yangon
8	22nd July 2018 (Sun)	(Day-off) Preparation for seminar next week		Staying at Yangon
9	23rd July 2018 (Mon)	Training-2	Training-3	Staying at Yangon
10	24th July 2018 (Tue)	Training-4	Training-5	Staying at Yangon
11	25th July 2018 (Wed)	Travelling		Yangon to NPT

(3) No. of Trainees

Bago: 15 persons

Yangon: 36 persons

(4) Participating JICA Experts

Ms. Shibata, Mr. Yoshida, Mr. Nakamura, Mr. Mitsui, Mr. Hoke Shein and Ms. Wah Wah

Textbook

for

Distribution Planning and Design

Ministry of Electricity and Energy

Republic of the Union of Myanmar

The Project for Capacity Development of Power Transmission and Distribution System
(Phase I)

Table of contents

Textbook

for

Distribution Construction Work and Safety Technologies

Ministry of Electricity and Energy

Republic of the Union of Myanmar

The Project for Capacity Development of Power Transmission and Distribution System (Phase I)

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Textbook

for

Distribution Operation and Maintenance

Ministry of Electricity and Energy

Republic of the Union of Myanmar

The Project for Capacity Development of Power Transmission and Distribution System
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Textbook

for

Transmission Line

Ministry of Electricity and Energy

Republic of the Union of Myanmar

The Project for Capacity Development of Power Transmission and Distribution System(Phase I)

Transmission Line

Chapter 1 Planing and Survey for transmission line

Chapter 2 Insulation design of overhead transmission line

Chapter 3 Conductor and ground wire

Chapter 4 Insulators

Textbook

for

Distribution Substation 1

Ministry of Electricity and Energy

Republic of the Union of Myanmar

The Project for Capacity Development of Power Transmission and Distribution System
(Phase I)

Distribution Substation 1

Chapter 1 Substation Overview

Chapter 2 Power Transformer

Textbook

for

Distribution Substation 2

Ministry of Electricity and Energy

Republic of the Union of Myanmar

The Project for Capacity Development of Power Transmission and Distribution System
(Phase I)

Distribution Substation 2

The Republic of The Union of Myanmar

The Project for Capacity Development
of Power Transmission and
Distribution Systems (Phase I)

Discussion Material for
MOEE Central Training Center
Institutional Development

November 2018

JICA Expert Team

Table of Contents

Abbreviation

AE	Assistant Engineer
A.G.T.I.	Associateship Government Technical Institute
B.A.	Bachelor of Arts
B.Com.	Bachelor of Commerce
B.E.	Bachelor of Engineering
B.Ecom.	Bachelor of Economic
B.Sc.	Bachelor of Science
B.Tech.	Bachelor of Technology
BOD	Board of Directors
CEPCO	Chubu Electric Power Co., Inc.
CITC	Central Institute of Transport and Communication
CSR	Corporate Social Responsibility
DEPP	Department of Electric Power Planning
DHPI	Department of Hydropower Implementation
Div.	Division
DOH	Department of Highway
DPTSC	Department of Power Transmission and System Control
DUHD	Department of Urban and Housing Development
E.T.E.C	Electrical Training Evening Classes
EC	Executive Committee
EE	Executive Engineer
EPGE	Electric Power Generation Enterprise
ESE	Electricity Supply Corporation
HR	Human Resource
HRD	Human Resource Development
HRDC	Human Resource Development Center
IDCS	Information Development and Cyber Security
JICA	Japan International Cooperation Agency
LPG	Liquefied Petroleum Gas
M.A	Master of Arts
M.B.B.S.	Bachelor of Medicine, Bachelor of Surgery
M.Sc.	Master of Science
MESC	Mandalay Electricity Supply Corporation
MOC	Ministry of Construction
MOEE	Ministry of Electricity and Energy
MOGE	Myanma Oil and Gas Enterprise
MOTC	Ministry of Transportation and Communication

MPE	Myanma Petrochemical Enterprise
MPPE	Myanma Petroleum Product Enterprise
MPT	Myanma Post and Telecommunication
NPT	Nay Pyi Taw
OGPD	Oil and Gas Planning Department
OJT	On the Job Training
PSC	Public Service Commission
SAE	Sub Assistant Engineer
SC	Steering Committee
TC	Training Center
TCPC	Training Center Preparation Committee
TPTC	Telecommunications and Postal Training Center
UNIDO	United Nations Industrial Development Organization
WG	Working Group
YESC	Yangon Electricity Supply Corporation

Chapter 1 Introduction

1.1 Background

JICA Expert Team has its mission for training center institutional development as a part of technical assistance "The Project for Capacity Development of Power Transmission and Distribution Systems (Phase I)". JICA Expert Team conducted Workshop on Training Center Institutional Development on Feb 1st, 2018 proposing the establishment of Training Center Preparation Committee (TCPC). Members of Steering Committee (SC) and Working Group (WG) of TCPC were selected by Minister's Office Order No. (068/2018) on March 12th, 2018. 1st WG of TCPC was conducted on June 4th, 2018 and discussed the following agendas.

- Basic Framework of TCPC (Objective and organizational structure of TCPC, scope of work for SC and WG, issues to be discussed in TCPC, schedule of TCPC)
- Basic Concept of Training Center Organization

Major opinions of 1st WG are the followings.

- Organizational structure of Training Center (TC) should be separated between Electricity and Energy. WG on TCPC also should be separated between Electricity and Energy since the training program is different.

After the 1st WG, it became clear that the establishment of new organization for TC is difficult due to budget constraint. However, it is still important to enhance training system of MOEE even without establishing a new organization in order to maximize the impact of training with limited budget as a short term. As a long-term, it is important to establish TC as an institution to provide necessary training programs systematically and sustainably to the large number of officers/staffs of MOEE.

1.2 Objective of Discussion Material

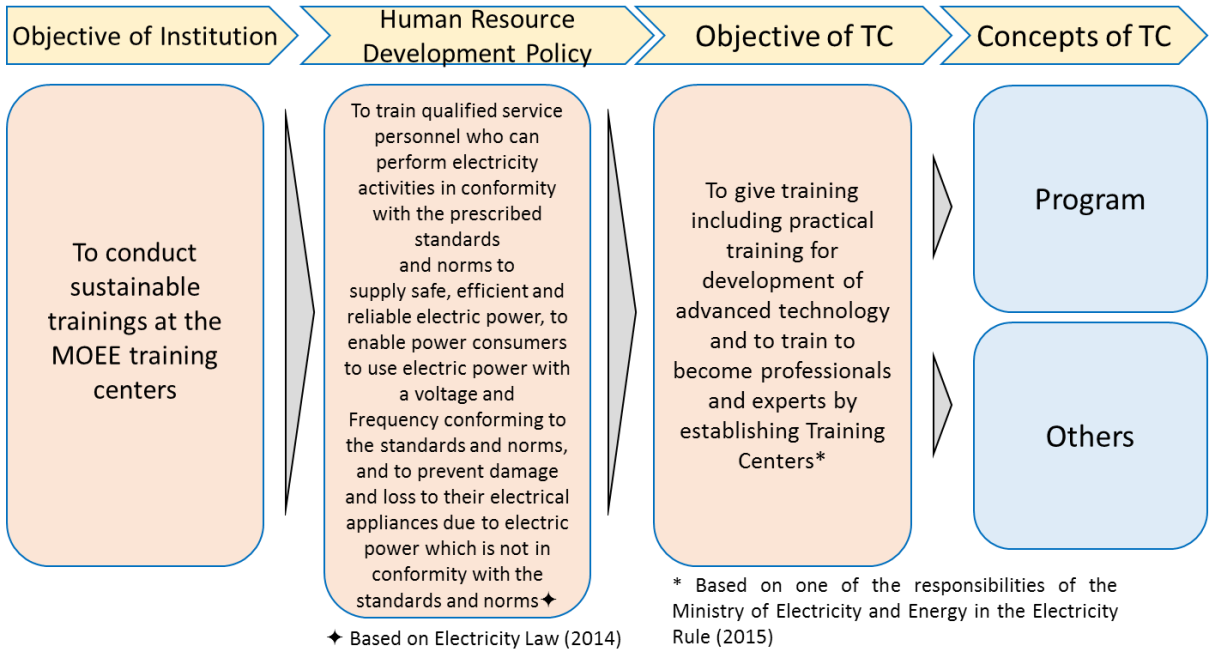
Objective of this discussion material is to provide the information/knowledge to MOEE officers/staffs regarding TC establishment and operation including human resource development policy, TC organizational development, training program, trainer selection, budget and others. JICA Expert team conducted series of interview to the following TCs and the most of information/knowledge described in this discussion material is based on the interview to those TCs.

1) MOEE Paung Laung Training Center (DHPI & EPGE)
2) MOEE No. (1) Refinery Plant (Thanlyin) Training Center (MPE)
3) Ministry of Construction (MOC) Central Training Center
4) Ministry of Transportation and Communication (MOTC) Central Institute of Transport and Communication (CITC)
5) MOTC Myanmar Post and Telecommunication (MPT) Training Center
6) MOTC Information Development and Cyber Security (IDCS) Training Center

Chapter 2 Human Resource Development Policy

2.1 Objective of Training Center

It is important to maximize the impact of training with limited budget for MOEE. In order to maximize the impact of training and development of systematic and sustainable training program, concept of Training Center (TC)) is inevitable. The concepts of Training Center (TC) shall be developed based on the objective of TC, which is levied from the Human Resource Development (HRD) policy in order to achieve the objective of institution. The example of conceptual flow to develop the concepts of TC is shown in Figure 2-1.



Source: JICA Expert Team

Figure 2-1 Example of Conceptual Flow to Develop the Concepts of TC

HRD policy, objective and procedure of some training centers in Myanmar and in Japan where JICA expert team have visited are described below as for references.

2.1.1 MOEE (Electricity Sector)

Currently Electricity Sector of MOEE does not have regulated HRD policy.

2.1.2 MOEE (No. (1) Refinery Plant (Thanlyin) TC Myanma Petrochemical Enterprise)

Training Center of Myanma Petrochemical Enterprise (MPE) of the MOEE is located in No. (1) Refinery Plant (Thanlyin) in Thanlyin Township in Yangon South District. It has been established in 1977. There are three objectives of the training center and they are as follow.

1) To perform duties skillfully and safely.

2) To upgrade technical skill and work efficiency.
3) To cooperate each other enthusiastically and to serve the development of the professional fields.

2.1.3 MOC

Central Training Center of the Ministry of Construction (MOC) is located in Thuwunna Township in East Yangon District. It has been established in 1966. Research and Development center, where test such as mechanical strength of concrete can be undertaken, is existed in the same compound of this training center. However, no regulated HRD policy was found.

2.1.4 MOTC (CITC)

The Central Institute of Transport and Communications (CITC) of the Ministry of Transport and Communications (MOTC) is located in Meiktila Township in Mandalay Region. It has been established in 1972.

The Policy of the CITC is to train the qualified service personnel who are moral, disciplined and capable for transport and communications service sectors of the state.

The long-term objective of CITC is to foster and train good government employees with high mindset, high disciplines, high capacity and enough quality for Myanmar's transportation service sector

There are three objectives of CITC and they are as follow.

1) To train the services personnel to be skillful in their trades in accordance with the procedures of working manual and to catch up advanced technologies.
2) To train the service personnel to undertake their duties successfully by combining, using and managing all of capacities in hand, effectively.
3) To train the service personnel to keep right perception on National Politic Process and to get better public relation.

The procedure of this Central Institute is shown below.

1) Conducting the training courses for instructors, staffs and trainees in order to develop their techniques and work-field skills, and try to keep understanding on civics moral and discipline.
2) Arranging excursions to work related factories, mills and training courses for the sake of exposure not only apart from theory but also to be skilled in their work- fields.
3) Conducting all of the training courses, under the guidance of Ministry, which are actually needed for the service personnel who are serving in the various departments of the Ministry of Transport and Communication.
4) Implementing the Operational Skill Training Courses for the service personnel such as Basic Training Courses, Skill Upgrading Training Courses and Refreshing Training Courses accordingly.
5) Arranging scholarship programs for services personnel in order to develop job-related skills and understand well on advanced technologies, and cooperating with international training institutes.
6) Bringing out the skillful Transporter Driver (Tailer Truck included 22 wheels) to support in Cross Border Transport Industry.
7) Conducting the training courses for Automotive Driver, Automotive Mechanics, Arc Welding and Basic electrical wire installation courses to get Job Opportunities for Local People.

8) Upgrading CITC capacity by conducting more courses, sending instructors abroad and locally to attend skill upgrading training courses.

2.1.5 MOTC (MPT)

Telecommunications and Postal Training Center (TPTC) of Myanma Post and Telecommunication (MPT), which was jointly operated with Sumitomo-KDDI in 2014, of the MOTC is located in Pazundaung Township in Yangon Region. It has been established since 1968 and Computer Skill training, English Language training, Soft-skill training and Technical Training have been recently conducted.

Firstly, Training Master Plan is developed and approval on budget and training plan is requested to Board of Directors (BOD) and approved training plan is announced to all departments every year. Secondly, training implementation plan is prepared to conduct trainings successfully and effectively. Finally, training implementation including training announcement, informing to join training after checking perquisite and their job, conducting training, surveying feedback and reporting bi-weekly is undertaken.

HRD policy has not been found.

2.1.6 MOTC (IDCS)

Information Development Cyber Security (IDCS) Training Center of MOTC is located at Office No. (2) in Nay Pyi Taw. It has been established since 2015 and technical and non-technical trainings such as English, Administration, Finance and Department Orientation have been conducted. In 2017-18 fiscal year, 22 training courses are planned to be implemented not only for employees in MOTC but also for all (22 Ministries and 14 State Organizations). The main purpose of the training center is to share knowledge of E-government and E-participants to reform from paper-based data management system to electronic-based data management system and to share cyber security knowledge and skills to all government employees.

HRD policy has not been found.

2.1.7 CEPCO

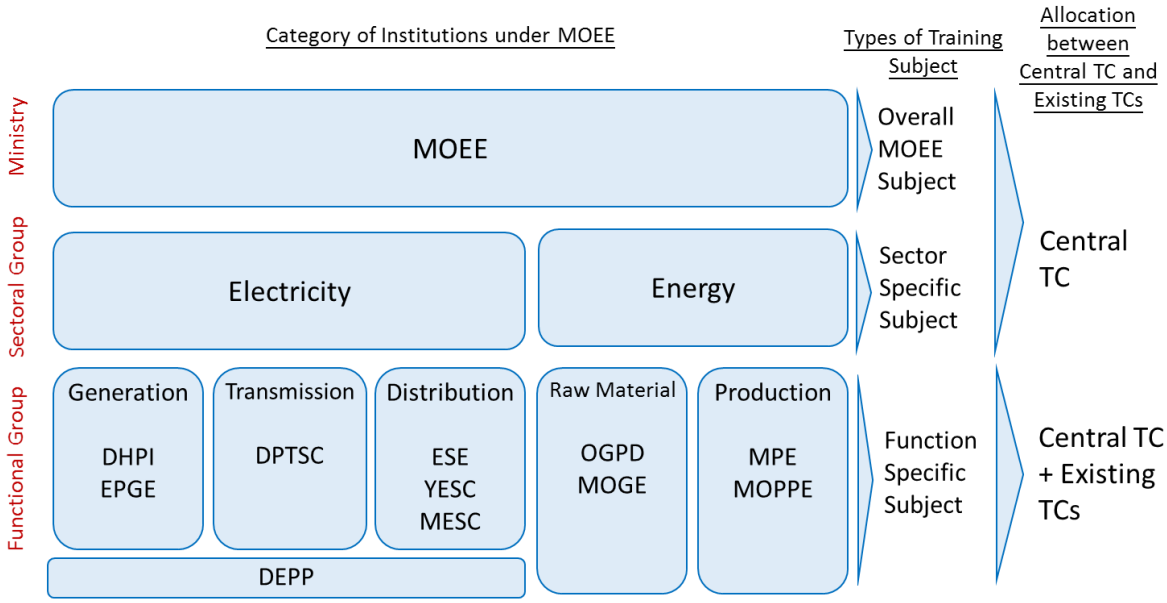
A Training Center of Chubu Electric Power Co., Inc. (CEPCO) is located in Nagoya in Japan. It has been established in 1969. The human resource development policies of this training center are as follow.

1) Pursuing stable supply of electricity and improvement of customer satisfaction
2) Accurate mastery and succession of knowledge and skills necessary for business execution
3) Accurate mastery and succession of knowledge and skills of service, negotiation and suggestion
4) Foster human resources who aggressively challenge new business with broad perspective and new ideas

2.2 Policy on Role Allocation between the Central TC and Existing TCs

Central TC has been established in April, 2018 in Nay Pyi Taw and there are existing TCs in MOEE such as Hlaing Thar Yar TC in Yangon, Paung Laung TC in Nay Pyi Taw, No. (1) Refinery Plant (Thanlyin) TC in Thanlyin Township in Yangon South District, etc… Role allocation policy between Central TC and existing TCs needs to be clarified in the Working Group (WG) and Steering Committee (SC) which was established in March, 2018. Details can be determined in each functional group of institution. An example of role allocation between the Central TC and exiting TCs based on types of training subject is shown in

Figure 2-2.



Source: JICA Expert Team

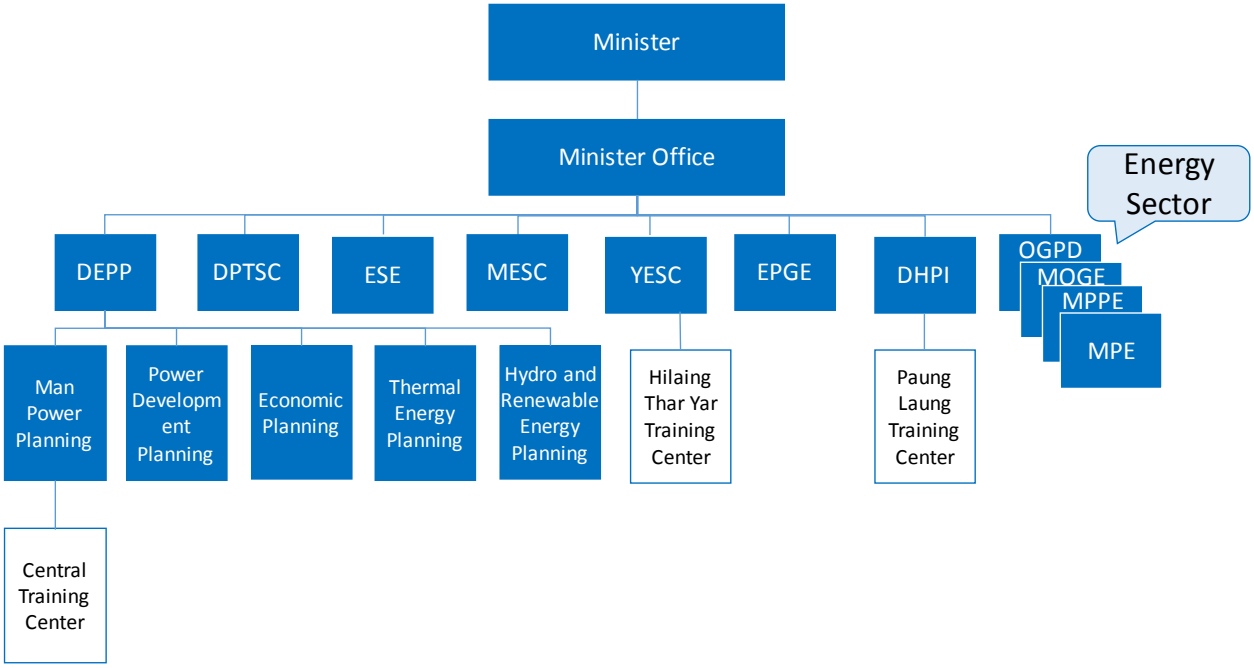
Figure 2-2 Examples of role allocation between Central TC and existing TCs

Chapter 3 Training Center Organizational Development (Long-Term)

3.1 Training Center's Positioning on the Organization

3.1.1 MOEE

Currently electricity sector of MOEE manages three Training Centers (TC), which is Central TC, Paung Laung TC and Hlaing Thar Yar TC (See Figure 3-1). Those TCs have not yet institutionalized; however, Man Power Planning Section of Department of Electric Power Planning (DEPP) manages the Central TC's facilities and logistics. Also, Department of Hydropower Implementation (DHPI) manages Paung Laung TC's facilities and logistics. Hlaing Thar Yar TC is managed by YESC independently.

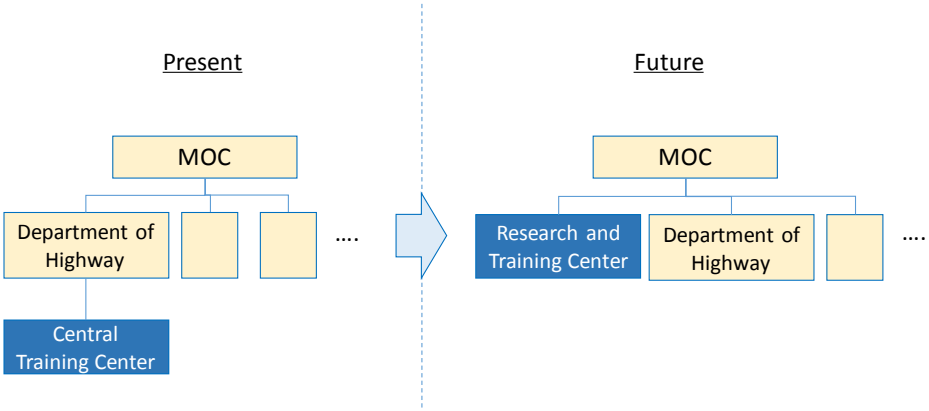


Source: JICA Expert Team based on Interview to MOEE

Figure 3-1 Organizational Structure of Training Centers of MOEE Electricity Sector

3.1.2 MOC

Ministry of Construction (MOC) Central Training Center (TC) which is located at Thuwunna in Yangon Region is currently attached to the Department of Highway of MOC while MOC have three other departments (i.e. Department of Building, Department of Bridge (DOB) and Department of Urban and Housing Development (DUHD)). However, MOC has the plan to upgrade the Central TC to department level as "Research and Training Center". (See Figure 3-2)

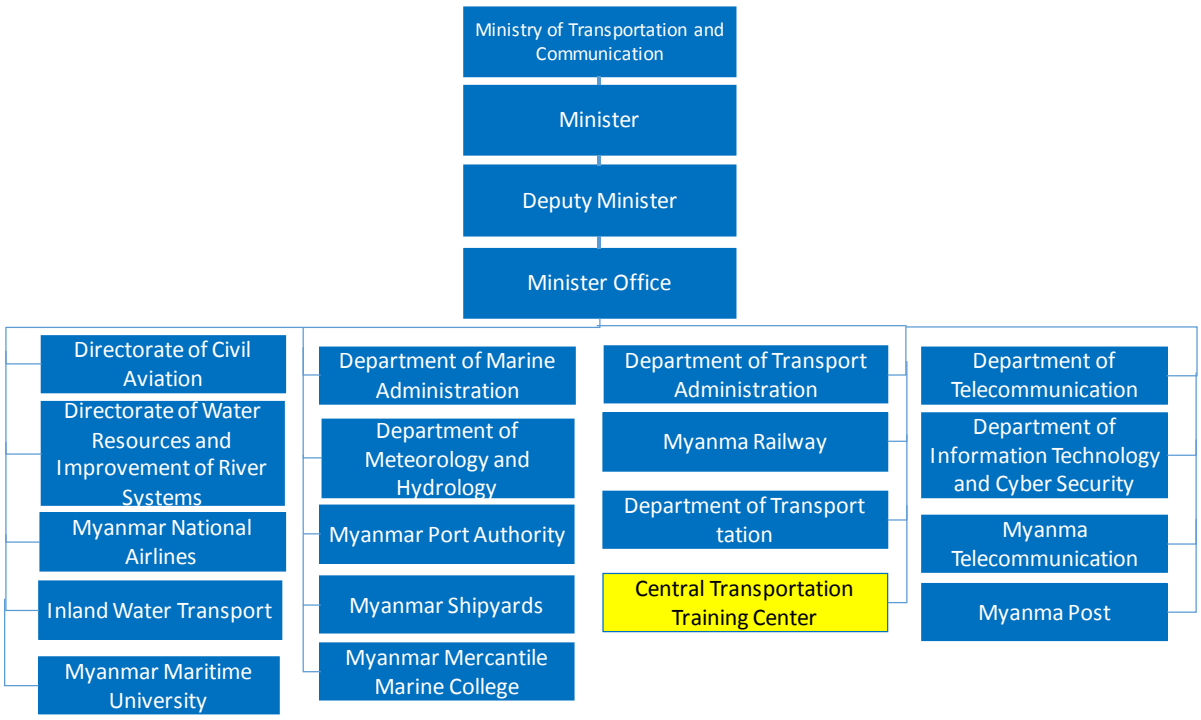


Source: JICA Expert Team based on Interview to MOC Central Training Center

Figure 3-2 Organizational Structure of Central Training Center of MOC

3.1.3 MOTC (CITC)

Central Institute of Transport and Communications (CITC) under Ministry of Transport and Communications (MOTC) which is located at Meiktila Township, Mandalay Region was officially established with other 17 departments in 1972. Based on the organizational chart below, CITC is given the same status of department. CITC mainly deals with the training of railway; however, CITC also provides the training on driving and machine maintenance.

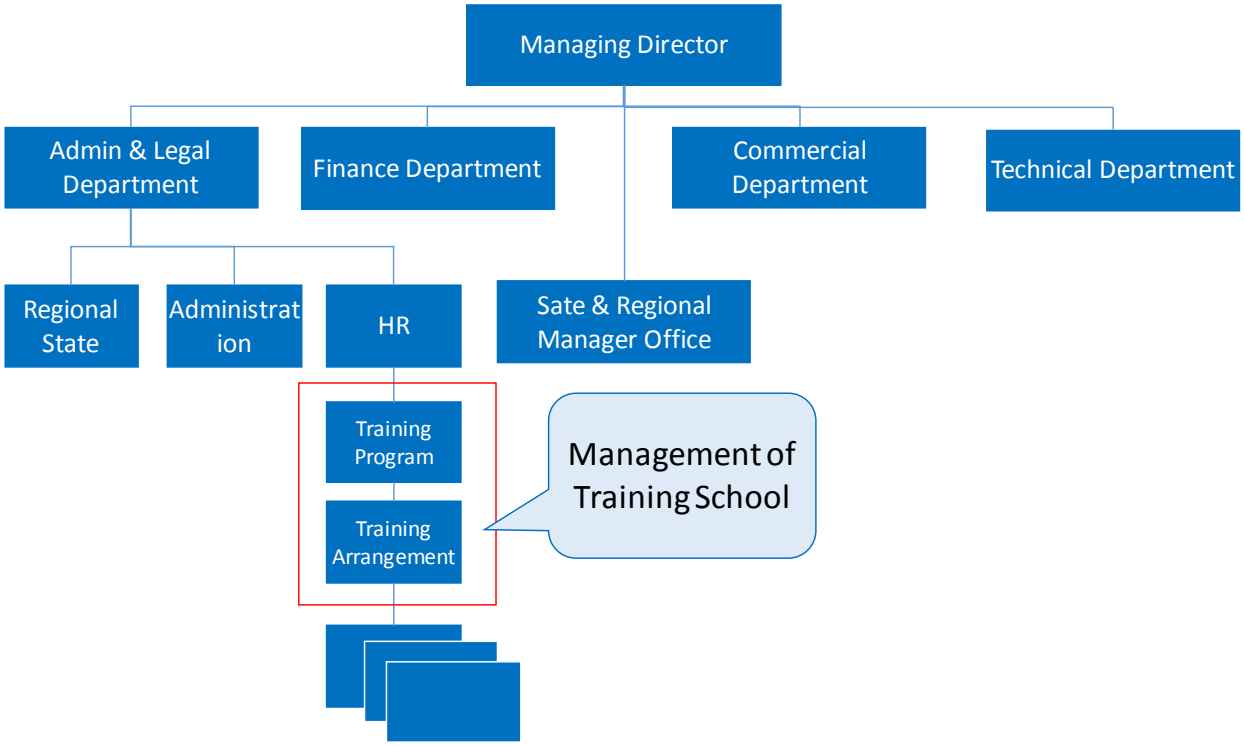


Source: MOTC Website

Figure 3-3 Organizational Structure of Central Training Center of MOTC

3.1.4 MOTC (MPT)

MOTC has another training facility for Myanmar Posts and Telecommunications (MPT) which consists of "Training Program Development Team" and "Training Arrangement & Execution Team" under HR of Administration & Legal Department. 32 trainers and 50 supporting staffs are working at the training center. MOTC (MPT) Training Center does not have a separate organization as training center but above-mentioned 2 teams are managing training.

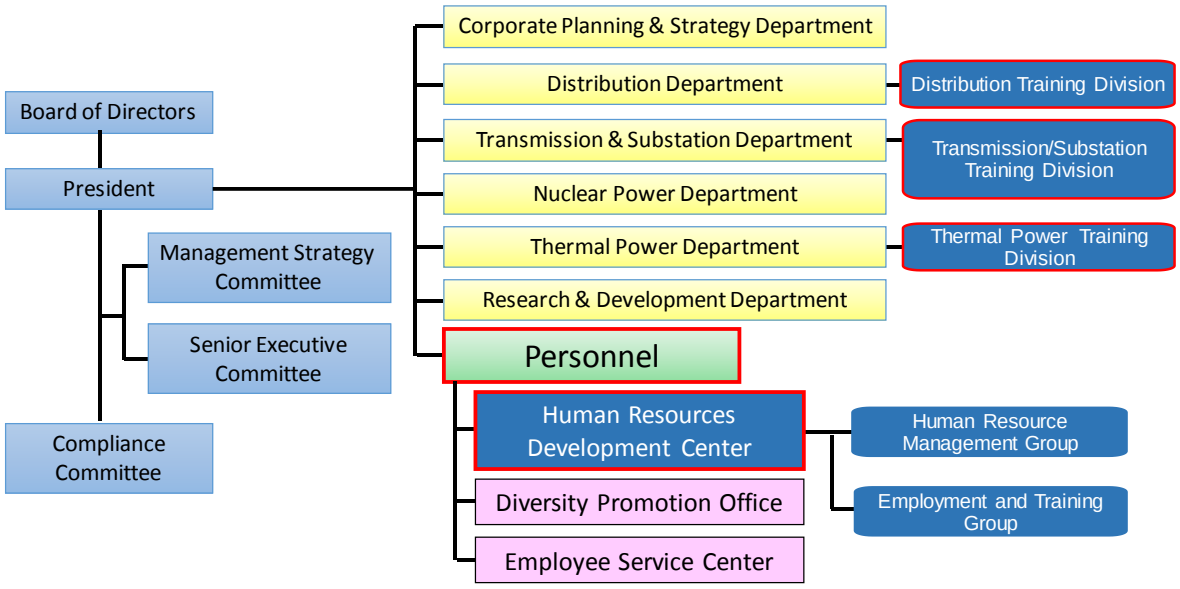


Source: JICA Expert Team based on Interview to MOTC (MPT)

Figure 3-4 Organizational Structure of Central Training Center of MOTC (MPT)

3.1.5 CEPCO

Chubu Electric Power Co., Inc. (CEPCO), which is one of the major electricity companies in Japan and have its electricity sales of 121,431 GWh and 16,461 employees (as of March 2018). CEPCO has its training division under each department. Trainings are conducted at Human Resource Development (HRD) Center which is attached to Personal Department. Logistics is conducted by HRD Center.



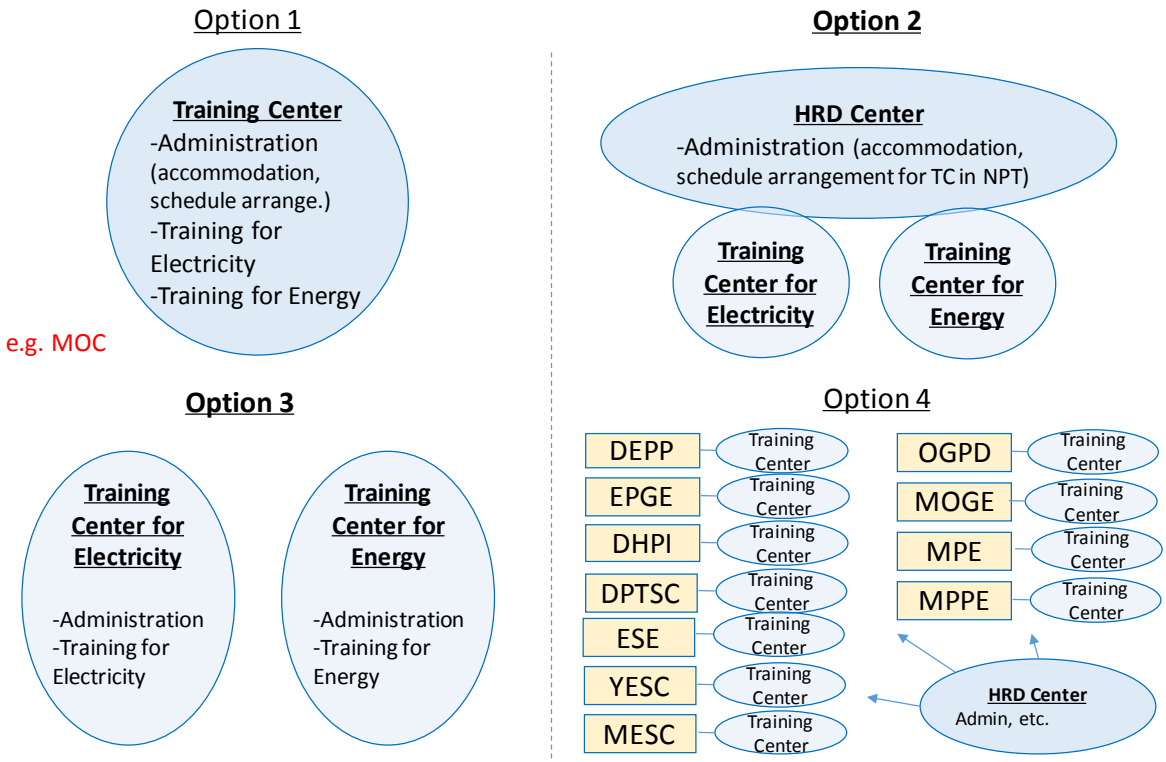
Source: JICA Expert Team based on information of CEPCO

Figure 3-5 Organizational Structure of HRD Center and Training Divisions of CEPCO

3.1.6 Possible Options of MOEE Central TC's Organizational Position

MOEE does not have TC as institution and DEPP is currently managing its facility and logistics. However, it is ideal to have TC as an institution to provide high quality training programs to large numbers of employees of MOEE.

Figure 3-6 shows the four options of organizational structure of MOEE central TC. Option 1 is the unified training center combing Electricity and Energy sector. All the training would be done in Central TC except department specific trainings. Option 2 is the two-separate training center under the Human Resource Development (HRD) Center. While each training center conducts trainings separately, HRD Center conducts administration including accommodation and schedule arrangement of Central Training Center. Option 3 is also two-separate training center. In case of Option 3, there is no HRD Center for administration. The administration shall be done by each training center. Option 4 is to establish eleven separate training centers under each department. HRD Center also would be established for administrative works. Based on the first Working Group for Training Center Preparation Committee (TCPC) conducted on June 4th, 2018, the comments from participants mainly supported Option 2 & 3.



Source: JICA Expert Team

Figure 3-6 Options for TC Institution

Table 3-1 shows the consideration points of options for TC institution. Regarding to the consistency for human resource development as MOEE, Option 1 and 2 would have advantage comparing to Option 3 and 4 since unified TC (Option 1) or two TCs under HR Development Center (Option2) can manage and develop the common program from the view point of MOEE. For administration point of view, Option 1 & 2 can be done by one stop service for the Central TC facility and accommodation management. From the point of the necessity of coordination between Electricity Sector and Energy Sector for the preparation of TC institutional development, Option 1 & 2 are required for the coordination but Option 3 & 4 are not required. Regarding to cost efficiency of TC operation, Option 1 and 2 have higher efficiency than Option 3 & 4 because some of the administrative works can be reduced by integration. Finally from the view point of interdepartmental relation development, Option 1 can expect high effect since Electricity Sector and Energy Sector need to work together for administrative works and program development. On the other hand, Option 4 would have low impact for interdepartmental relation development.

Table 3-1 Consideration Points of Options for TC Institution

No.	Points to be considered	Option 1	Option 2	Option 3	Option 4
1	Consistency for Human Resource Development as MOEE	Consistent	Consistent*	Not Consistent between E & P	Not Consistent among Dept.
2	Administration	One stop Arrangement	One stop Arrangement	One stop each in E & P	Separate Arrangement
3	Coordination between E & P for Preparation of TC	Necessary	Partially Necessary	Not Necessary	Not Necessary
4	Cost Efficiency	High	High(lower than option 1)	Middle	Low
5	Interdepartmental Relation Development	High	Middle	Middle	Low

*it depends on the degree of HR Development Center's involvement for each training center

Source: JICA Expert Team

3.2 Organizational Structure of Training Center

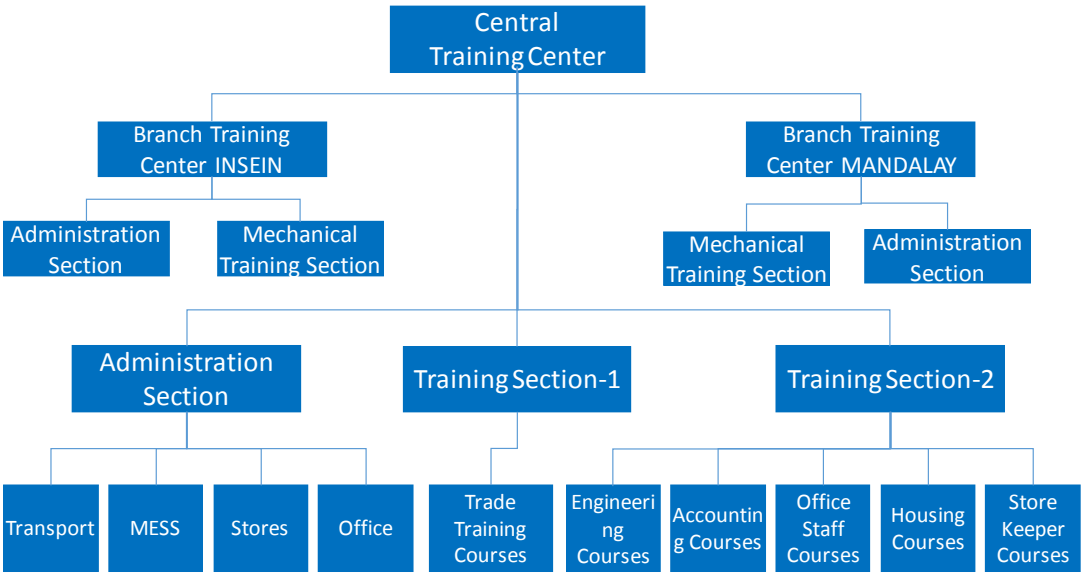
3.2.1 MOEE

MOEE currently does not have separate TC as institution. Man Power Division of DEPP has responsibility of overall management of MOEE Central Training Center.

3.2.2 MOC

MOC has Central Training Center as institution. Central TC has 2 branch training centers in Insein and Mandalay. Main TC is located in Thuwunna Township in East Yangon District and has 3 sections which are Administration Section, Training Section 1 and Training Section 2. Under the Administration Section, there are 4 divisions which includes Transport, MESS, Stores, and Office divisions. Under Training Section 1, there is one division which is trade training courses. Also under Training Section 2, there are 5 divisions including Engineering courses, accounting courses, office staff courses, housing courses, and store keeper courses.

20 staffs are assigned as full-time employee for Central TC (excluding branch TC). Each Department provide trainers. The trainers prepare the textbook(s) for their responsible class(es).

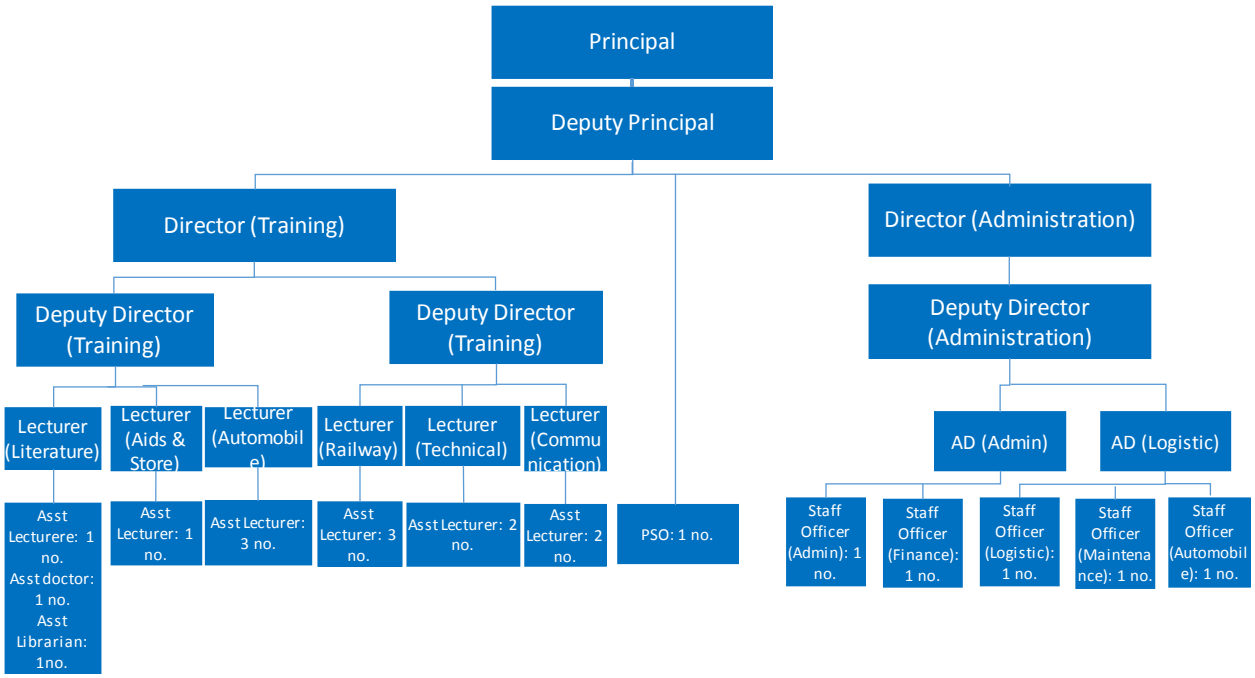


Source: MOC Central TC

Figure 3-7 Organizational Structure of MOC Central TC

3.2.3 MOTC (CITC)

MOTC has Central Institute of Transport and Communications (CITC) as an institution. Under the principal of the CITC, there is one deputy principal and 2 directors (one for administration and another for training). For administration section, there are staffs for administration, finance, logistics, maintenance, and automobile. For training section, there are lecturers (literature, aids & store, automobile, railway, technical, communication).



Source: MOTC CITC

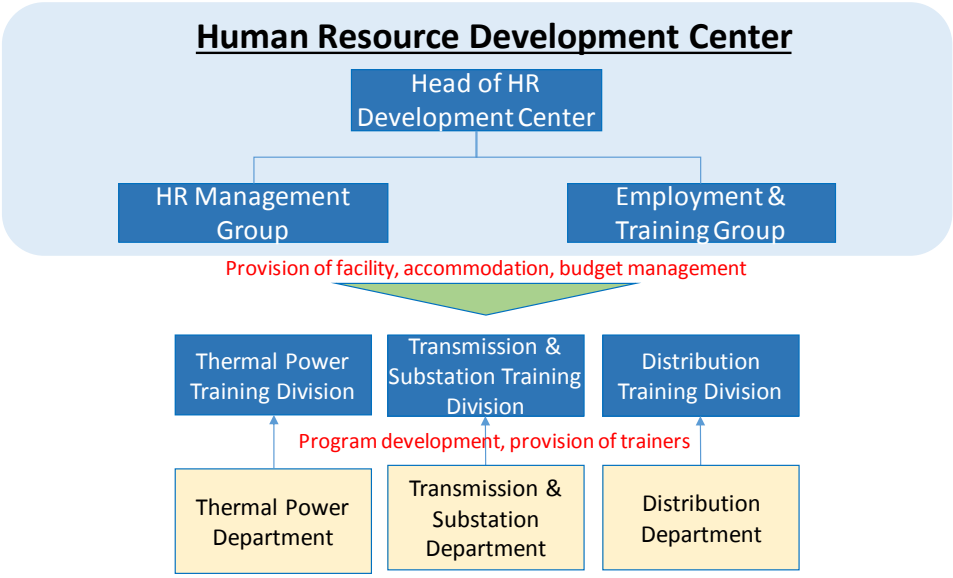
Figure 3-8 Organizational Structure of MOTC CITC

3.2.4 MOTC (MPT)

MOTC (MPT) Training Center does not have separate institution for the training center.

3.2.5 CEPCO

CEPCO has Human Resource Development Center (HRDC). HRDC consist of head of HRDC, HR Management Group and Employment & Training Group. HRDC has responsibility for provision of facility, accommodation, and budget management. The training by itself including program development, trainer selection, textbook preparation would be done by each training division.

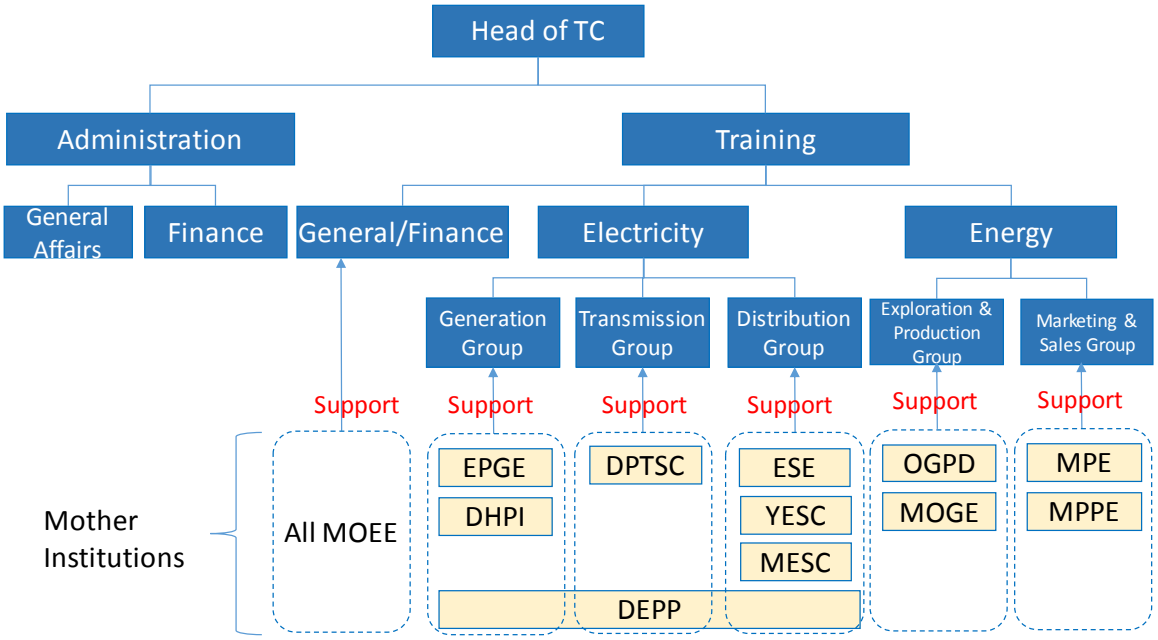


Source: CEPCO

Figure 3-9 Organizational Structure of CEPCO Training Division

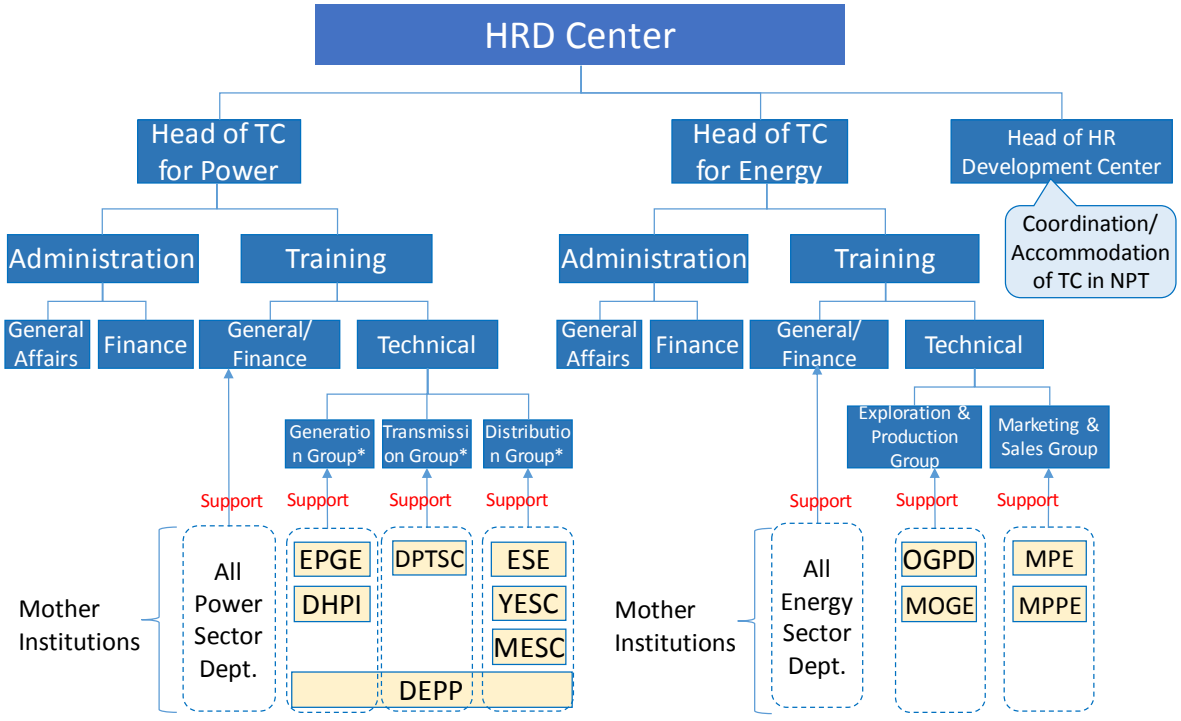
3.2.6 Possible Options of Organizational Structure of MOEE Central TC

The following four figures (See Figure 3-10, Figure 3-11, Figure 3-12and Figure 3-13) show examples of organizational structures for each option.



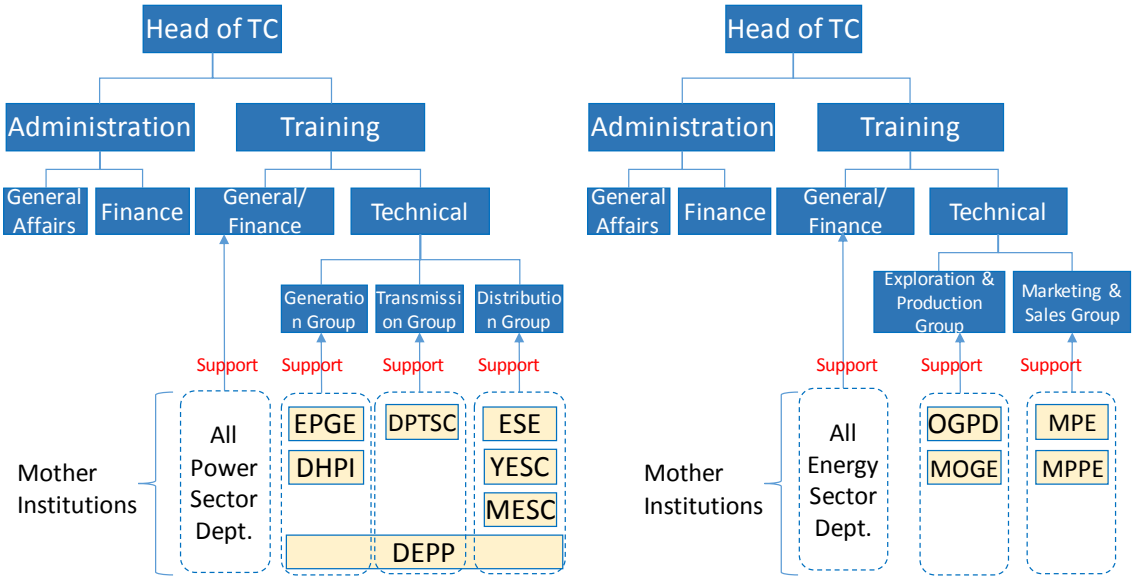
Source: JICA Expert Team

Figure 3-10 Example of Organizational Structure of TC for Option 1



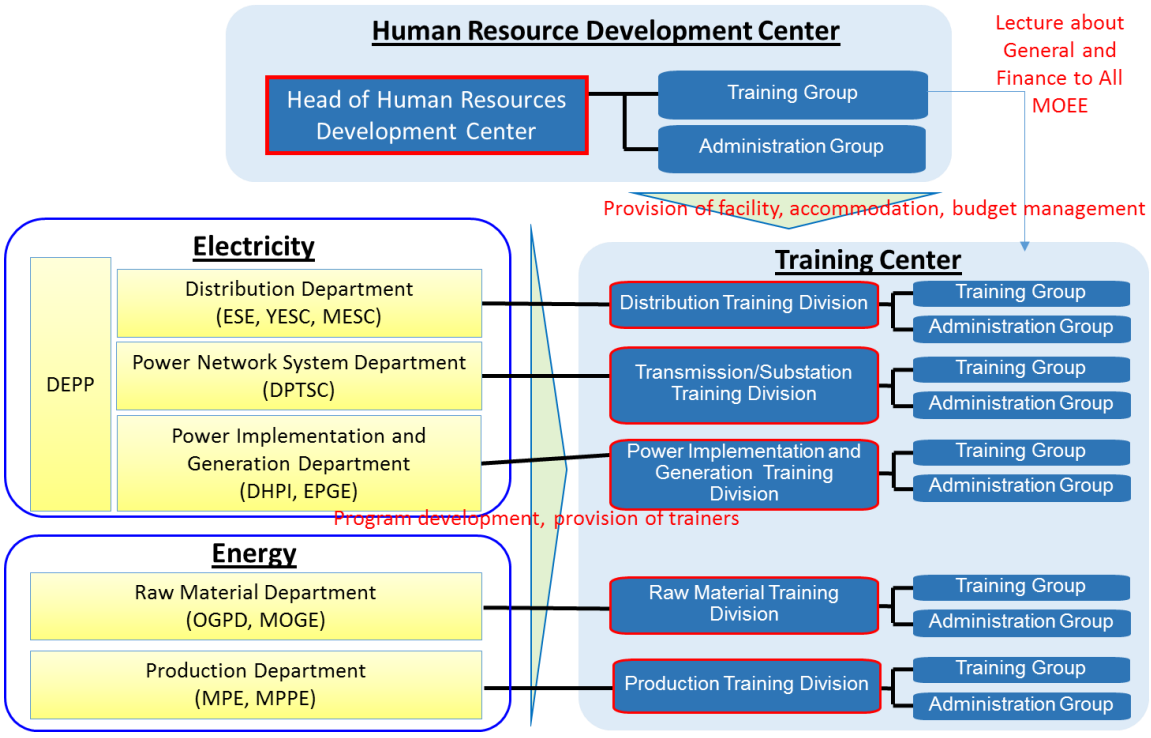
Source: JICA Expert Team

Figure 3-11 Example of Organizational Structure of TC for Option 2



Source: JICA Expert Team

Figure 3-12 Example of Organizational Structure of TC for Option 3



Source: JICA Expert Team

Figure 3-13 Example of Organizational Structure of TC for Option 4

3.3 Work allocation between TC and Department/Institutions

3.3.1 MOEE

MOEE does not have TC as separate institution. DEPP has responsibility of administration related activity for MOEE Central TC. On the other hand, DHPI has responsibility of administration for MOEE Paung Laung TC. Budget for logistics shall be borne by each Department. While DEPP develops the training program for MOEE common training, each Department prepares their own training program for department specific training. The following table shows the current work allocation among departments/Institutions of MOEE regarding TC.

Table 3-2 Current Work Allocation among departments/institutions of MOEE regarding TC

Respon sibility / Dept	Administration												Training Program	
	Central TC						Paung Laung TC						MOEE Common	Dept. Specific
	Bld. Mgmt.	Schedule Mgmt.	Logistics		Budgeting		Bld. Mgmt.	Schedule Mgmt.	Logistics		Budgeting			
			Accommodation	Other(printing etc.)	Bld. Mgmt.	Logistics			Accommodation	Other(printing etc.)	Bld. Mgmt.	Logistics		
DEPP	√	√	√	√	√	√							√	√
DHPI						√	√	√	√	√	√	√		√
EPGE						√						√		√
ESE,DPTSC,YESC,MESC						√								√

Source: JICA Expert Team based on the Interview to MOEE

3.3.2 MOC

MOC Central TC manages the administration works including building management, schedule management, logistics and budgeting. Also, training works including provision of program, trainers, textbooks preparation.

3.3.3 MOTC (CITC)

MOTC Central Institute of Transport and Communication (CITC) manages the administration works including building management, schedule management, logistics and budgeting. Also, CITC manages training works including provision of program, trainers and textbooks preparation.

3.3.4 MOTC (MPT)

MOTC (MPT) Training Center manages all the administration and training works.

3.3.5 CEPCO

HRDC manages administration works including accommodation. Each Department manages training works

including program development, provision of trainers and textbooks preparation.

3.3.6 Potential Option of Work Allocation between TC and Department/Institution

Table 3-3 shows an example of work allocation between TC and Department/Institution if Central TC is institutionalized.

Table 3-3 Example of Work Allocation for Central TC (If Central TC is institutionalized) for Option 1&3

Works		Training Center		Department/ Institution
		Admin	Training	
Management	Management of overall TC	√	√	
	Management of training group (e.g. Generation)		√	√
Administration	Training facility provision (including furniture, maintenance, cleaning)	√		
	Accommodation (e.g. dormitory, food provision)	√		
	Transportation of trainees	√		
Training	Life-cycle Training program preparation			√
	Detail training course development		√	
	Overall coordination of the detail training course prepared by each training group	√	√	
	Provision of trainers	(√)	(√)	√
	Training equipment procurement plan		√	
	Training equipment provision		√	
	Preparation of text book		√	
	Selection of trainees			√
	Evaluation of trainees		√	

Source: JICA Expert Team

3.4 Targeted Number of Central TC Staffs (Long-term)

If Central TC is institutionalized as separate organization in the future, the dedicated staffs need to be assigned. The following are the example of number of TC dedicated staffs in other institutions and possible number of TC staff of MOEE in the future.

3.4.1 Comparison of Number of TC Staffs in MOC, MOTC (CITC & MPT) and CEPCO

Table 3-4 shows "Number of staffs in the institution per one TC staff" for each institution to understand the standard staff number required for MOEE. Based on the interview to the institutions, number of staffs in the institution per one TC staff is between 100 to 200. If the number of CEPCO (140 staffs in the institution per one TC staff) is referred for MOEE, the necessary number of staffs in training center would be 300.

Table 3-4 Comparison of Number of TC Staffs in MOC, MOTC (CITC & MPT) and CEPCO

	MOC	MOTC(CITC*)	MOTC(MRT)	CEPCO	MOEE(Example)
(1) Number of staffs in the institution	11,122	23,000 *(Only Myanmar railway)*	8,300	15,700	*40,000+*
(2) Number of staffs in Training Center	55 (Full time: 20 Part time: 35)	195 (Trainers: 97)	82 (Trainers:32)	112 (Total trainer: 64 Generation:20 Transmission:24 Distribution:20)	***300?***
(3) Number of staffs in the institution /TC people = (1)/(2)	200	*117 (only Myanmar railway)*	100	140	*140*
(4) Number of trainee in one year	-	1,172 (2017-2018)	7,400 (2016-2017)	4,480 * (2016-2017)	*12,000* (based on CEPCO ratio)
(5) Number of trainee/TC staffs =(4)/(2)	-	6	90	40*	*40*

* Central Institution of Transport and Communication
**Estimation from the number of trainee in distribution TC (1,454)

Source: Estimation by JICA Expert Team based on Intewevew to MOC, MOTC, CEPCO

3.4.2 Possible Number of Central TC Staffs from the Capacity of Facility

Table 3-5 shows the estimated lecture room capacity of Central TC of MOEE. Estimated lecture room capacity is between 240 and 480 depending on the size of table used in the room.

Table 3-5 Estimated Lecture Room Capacity of Central TC of MOEE

No.	Lecture Room	No. of rooms	Estimated no. of trainees available per room	Total
1.	*Lecture Room on the ground floor*	2	40 ~ 80	80~160
2.	*Lecture Room on the first floor*	2	40 ~ 80	80~160
3.	*Hall room on the first floor*	1	80 ~ 160	80 ~ 160
	Total	4		240~480

Source: Estimation by JICA Expert Team

Table 3-6 shows the estimated dormitory capacity of Central Training Center. Estimated dormitory capacity is total 100 trainees.

Table 3-6 Estimated Dormitory Capacity of New Training Center

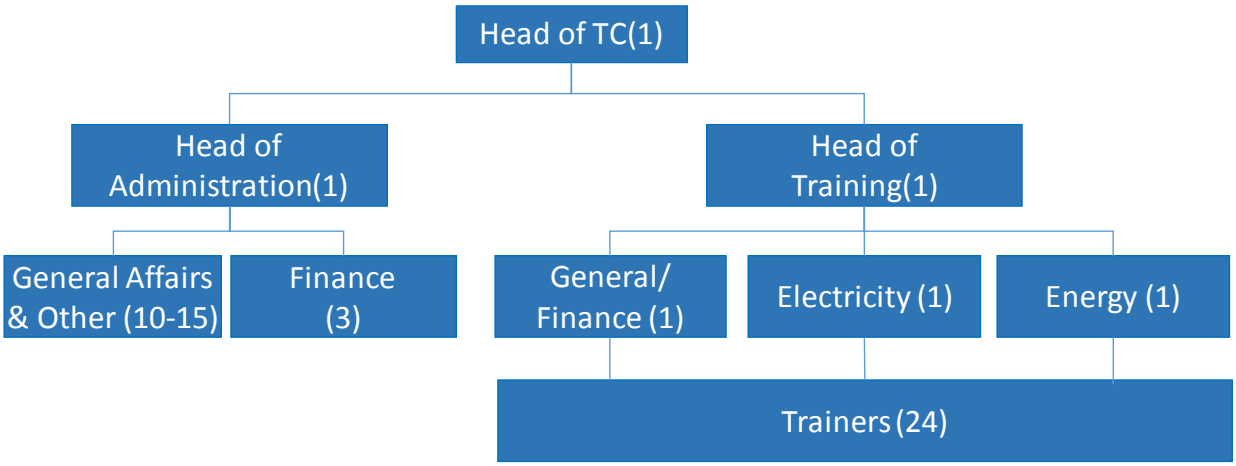
No.	Dormitory	Number of rooms	Capacity (Number of trainees)
1.	*New Male Dormitory*	25	50
2.	*New Female Dormitory*	25	50
	Total	50	100

Note: Existing dormitory(Capacity :32 trainees) would be utilized when the capacity of new dormitory is not enough.

Source: Estimation by JICA Expert Team

If trainings are conducted in 4 rooms with 190-230 trainees while 132 trainees can stay in the dormitory, the following number of trainers are required in case of Option 1.

Example of number of necessary trainers = 1 Team ((Senior Trainer (1 person) + Junior Trainer (1-2 persons)) x Lecture Room (4 rooms) x 2 Team =16-24 trainers.



Source: JICA Expert Team

Figure 3-14 Example of Necessary Number of Staffs and Trainers

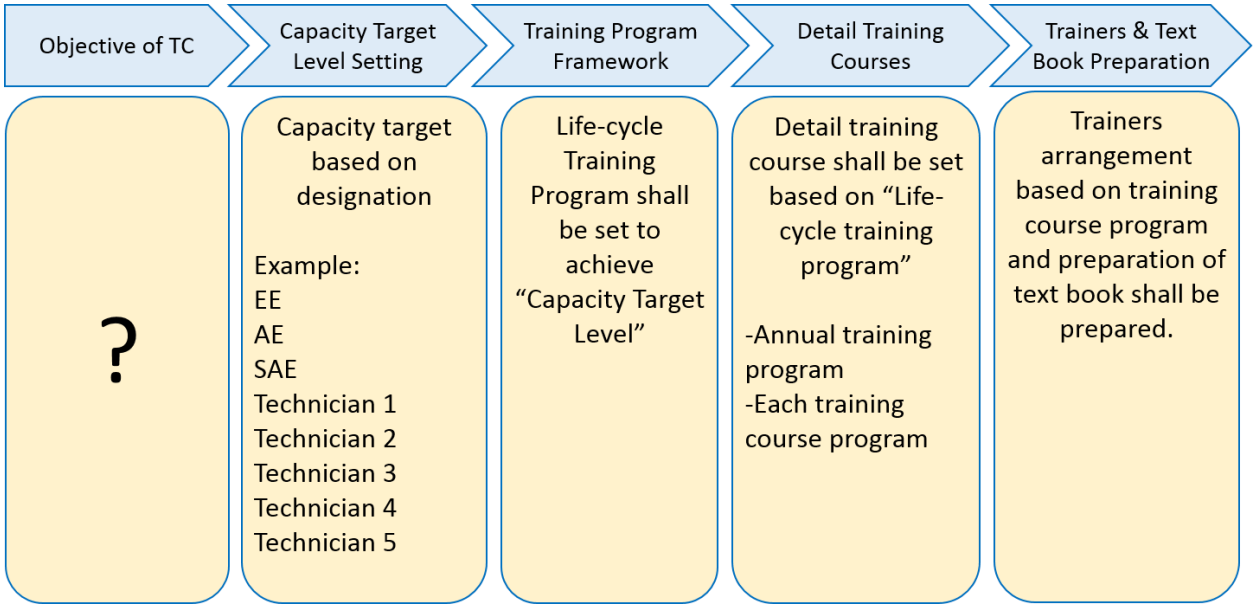
Based on the above-mentioned assumption, total staff number of Central TC would be required between 35-48 (including 16-24 trainers).

Chapter 4 Training Program

4.1 Concept of Training Program Development

Training program shall be developed based on the following procedures.

- The concepts of TC shall be developed based on the Objective of TC, which is based on the Human Resource Development (HRD) policy in order to achieve the objective of institution.
- Capacity target level shall be set based on designation.
- In order to achieve capacity target level, Training Program Framework (life-cycle training program) and detail training course shall be set.



Source: JICA Expert Team based on Interview to MOEE

Figure 4-1 Example of Training Program Development from the Objective of TC

4.2 Inter-Ministerial Training Program for New Employee

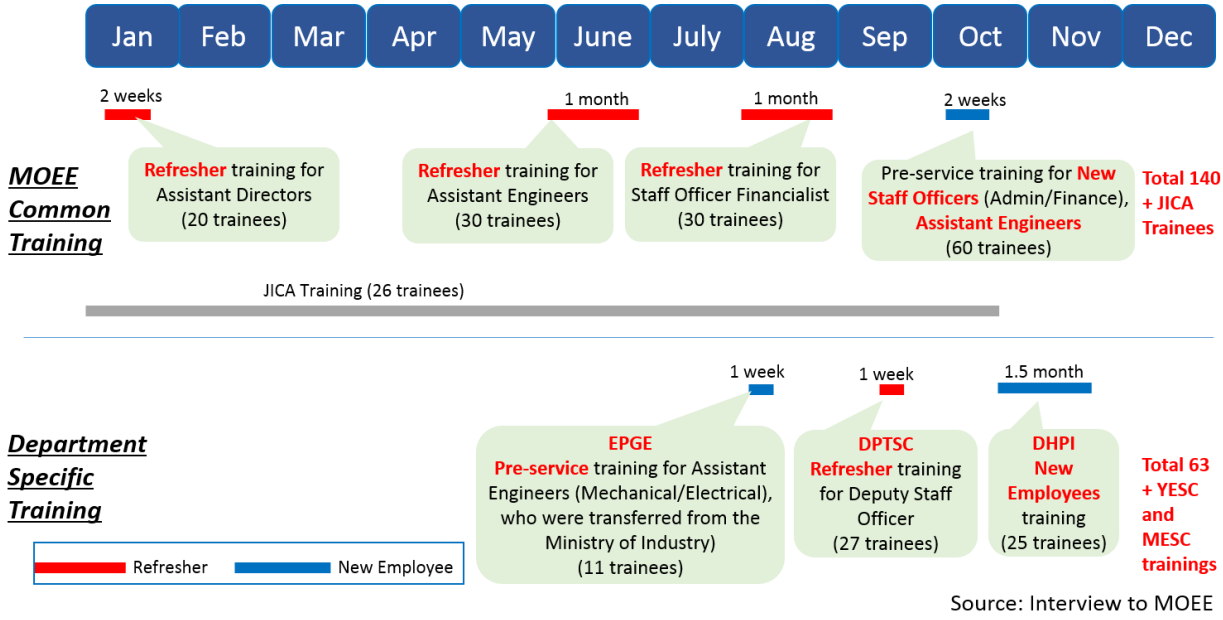
There is a training course "Basic Pre-Service Course for Civil Service Officers" which is common to all ministries. The Union Civil Service Board provides four months training to new employees who passed Public Service Commission (PSC) examination. The contents of the training mainly focus on the policy which is common to all ministries.

4.3 Training Program of Each Institution

4.3.1 MOEE

The trainings have not been conducted systematically due to budget limitation and others. The schedule and

contents of training program are provided based on necessity. basis. A part of MOEE training program of electricity sector in 2018 is shown in Figure 4-2. In October 2018, the staffs who were assigned to MOEE took two weeks training at the Central TC. The contents of the training is an introductory content related to the work of each department of MOEE. Basically, MOEE has a plan to refer to the training contents which was held at the Paung Laung TC. In addition to MOEE overall trainings, specific trainings by each department have been conducted.



Source: Interview to MOEE

Figure 4-2 Part of MOEE Training Program of Electricity Sector in 2018

4.3.2 MOEE (Paung Laung TC)

Paung Laung Training Center which belongs to the Department of Hydropower Implementation (DHPI) of the Ministry of Electricity and Energy (MOEE) as of Oct 2018 is located in Paung Laung village in Lewe Township in Nay Pyi Taw Region. It has been established in 2005 and technical trainings related to hydropower and thermal power have been recently conducted. Soil and concrete laboratory is existed near the Paung Laung training center and physical and mechanical strength test of soil and concrete can be undertaken.

4.3.3 MOC

Training courses have been conducted for civil engineers (building, road, bridge, water supply and sanitation engineers), electrical engineers, technicians, construction workers such as carpenters, masons, reinforcement bar fabrication workers, electricians, plumbers, road construction workers and so on, as well as training for supporting staff such as store keepers, office staff and accounting personnel. An annual training program is prepared for each fiscal year and there are twenty-three numbers of training program in 2017-2018 fiscal year.

(see the Figure 4-3) Employees take lectures according to their designation. All newly employed engineers will take training course of 6 weeks. In addition to establishing a regular course for Junior Engineers, there are also programs specialized in specific fields (bridges, roads, etc.). There are training courses for selected Director, Deputy Director and Assistant Director.

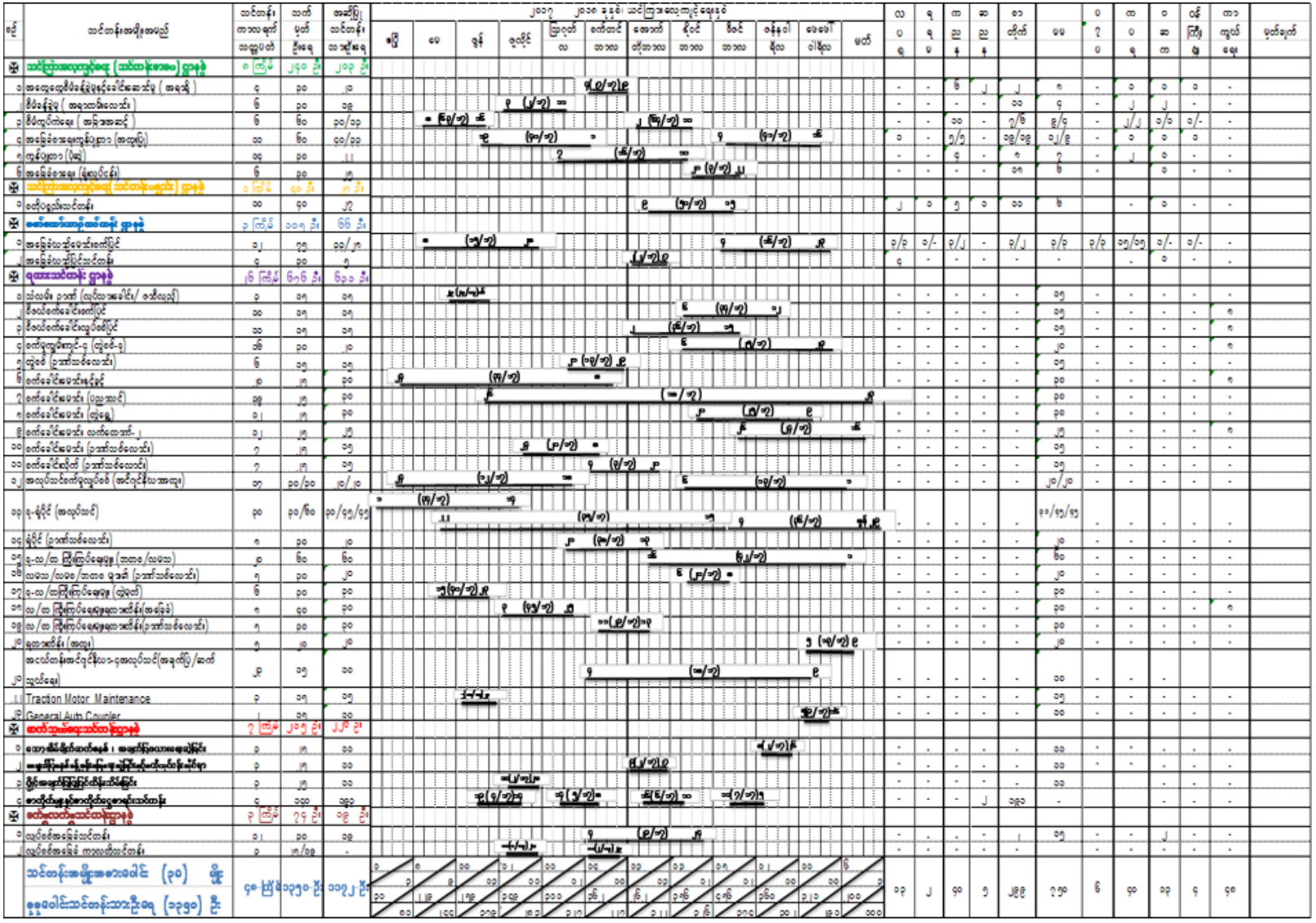
No	Name of Training	Time	Quantity	Week	2017									2018		
					Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1	Officer Training Course for Director(Civil) under 50	1	20	2										1---12		
2	Middle Rank officer Training Course for DD & AD under 50	1	20	4			5---30									
3	Officer Training Course for Staff Officer(Civil)	1	40	10				3----------8								
4	Building, Road and Bridge Quality Control Training Course	2	40	4			5---30				2---27					
5	Juiner Engineer (1) Civil Refresher Training Course	1	40	5					7---------8							
6	Juiner Engineer (2) Civil Refresher Training Course	2	40	5					7---------8					15--------16		
7	Juiner Engineer (2) Sanitary Refresher Training Course	1	20	2				3--14								
8	Juiner Engineer (3) Sanitary Refresher Training Course	1	20	4							2---27					
9	Juiner Engineer (3) Civil Refresher Training Course	2	40	6			5---------14							15---------23		
10	Juiner Engineer (4) Civil Entry Training Course	4	114	6		2---------9		3--------11			2--------10			8---------16		
11	Juiner Engineer (2) Electrical Refresher Training Course	1	20	4								6--------1				
12	Juiner Engineer (3) Electrical Refresher Training Course	1	20	4							2---27					
13	Workshop for Financial	1	40	1				3--7								
14	Staff Officer (Finance) & Accountant Refresher Training Course	1	142	4		2---26										
15	Accountant (2) Refresher Training Course	2	50	5				3--------4	21-------22							
16	Accountant (3) Refresher Training Course	2	50	5				3--------4				6--------1				
17	Accountant (4) Refresher Training Course	2	50	5							2-------2			1--------2		
18	Clerical Training Course for Supertendant & Branch Clark	1	20	4					7--------1							
19	Clerical Training Course for UD & LD	1	40	4								6--------1				
20	Housing Management Training Course	1	20	4								6--------1				
21	Store Keeper Training Course	1	20	5										1--------2		
22	Staff Officer(Sanitary)Training Course	1	20	2										1---12		
23	External Training Course(Occasional)															

Source: MOC

Figure 4-3 Annual Training Program of MOC Central Training Center in 2017-2018 Fiscal Year

4.3.4 MOTC (CITC)

Training program is established based on long-term objective, policy, objectives and procedures mentioned in Chapter 2. Figure 4-4 shows training program of MOTC (CITC) in 2017-2018 fiscal year.

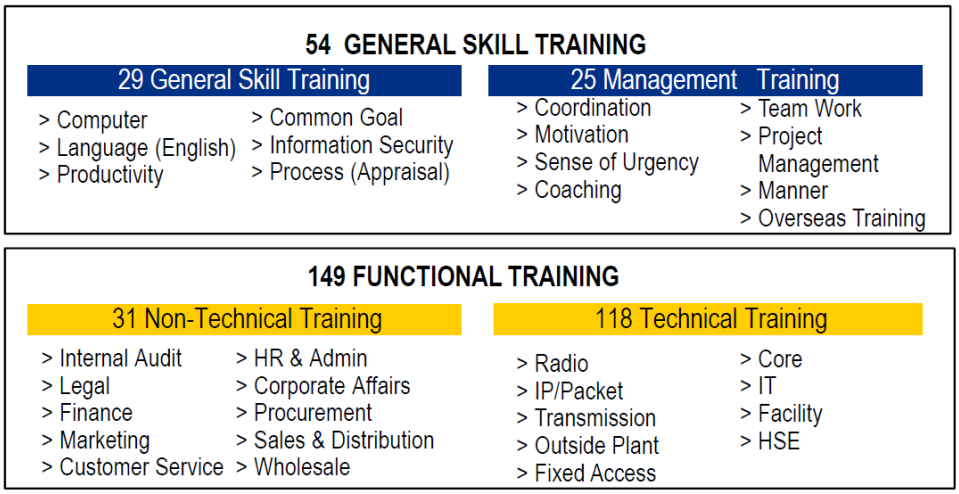


Source: MOTC (CITC)

Figure 4-4 Training program of MOTC (CITC) in 2017-2018 fiscal year

4.3.5 MOTC (MPT)

There is an annual training program, and it is updated once a year during February to April. Training plan has to be reported to Board of Directors. After approval, it is announced to all departments. When the program is updated, feedback on past programs is reflected to it. OJT is implemented independently by each department.



Source: MOTC (MPT)

Figure 4-5 Training Program of MOTC (MPT) in 2017 Fiscal Year

4.3.6 CEPCO

Based on the CEPCO HRD policy mentioned in Chapter 2, the department of transmission / substation and distribution emphasizes the development of personnel who can respond to the trust and expectations of our customers by performing their duties promptly and reliably. To achieve this aim, CEPCO seeks to foster a new generation personnel and improve the required knowledge and skills and inherit them.

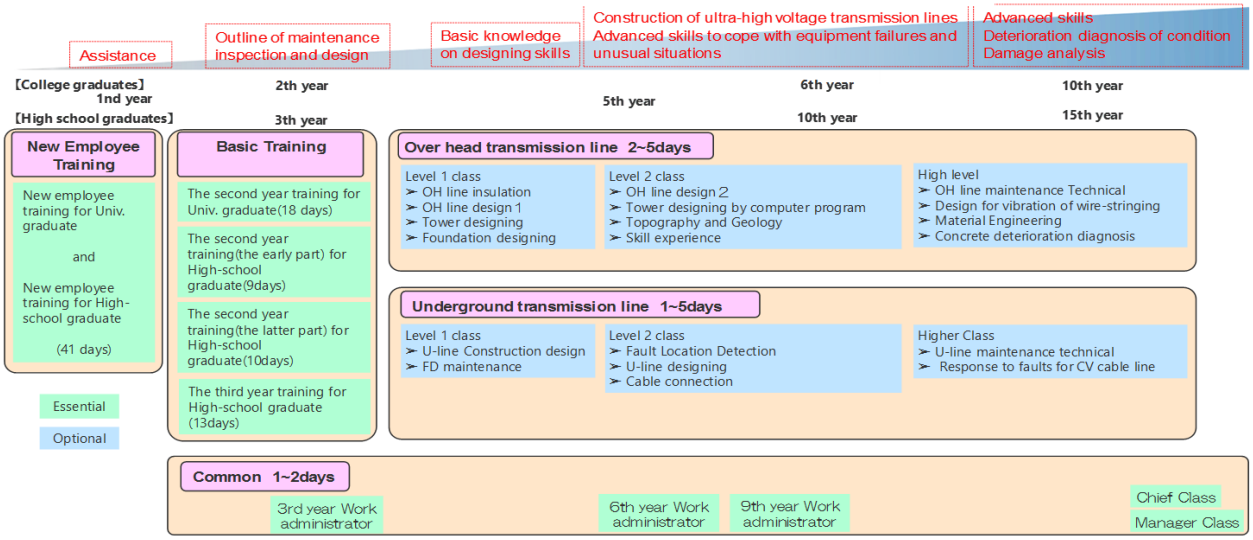
Both departments have various practical facilities that can effectively acquire knowledge and skills such as technology to maintain stable supply of electric power, technology of early supply and restoration. Widely varied practical training is provided to new, general and managing-level employees.

Example of capacity target level of transmission / substation department is shown in Figure 4-6. Life-cycle training program of transmission / substation department which is established based on capacity target level is shown in Figure 4-7. Regarding the way of establishment of capacity target level and life-cycle program, distribution department is similar with transmission / substation department.

Experience		Capacity Target Level
University graduate	High-school graduate	
the 1st year	the 1st year	Understand the basic of business. Assist the routine business.
the 2nd year	the 3rd year	Master the basic of business, operation and patrol. Possess basic skills for maintenance and installation work of standard facilities.
the 6th year	the 10th year	Possess a wide-area of specialty knowledge and skill. Can be the key person in the office.
the 10th year	the 15th year	Possess an advanced skill. Possess leadership in the team. Possess a broad view of the electrical engineering.
⇩ most of them	⇩ some of them	
Assistant manager & Manager		Possess overall decision-making ability as a manager. Can educate & lead the subordinates

Source: CEPCO

Figure 4-6 Example of Capacity Target Level of Transmission / Substation Department in CEPCO



Source: CEPCO

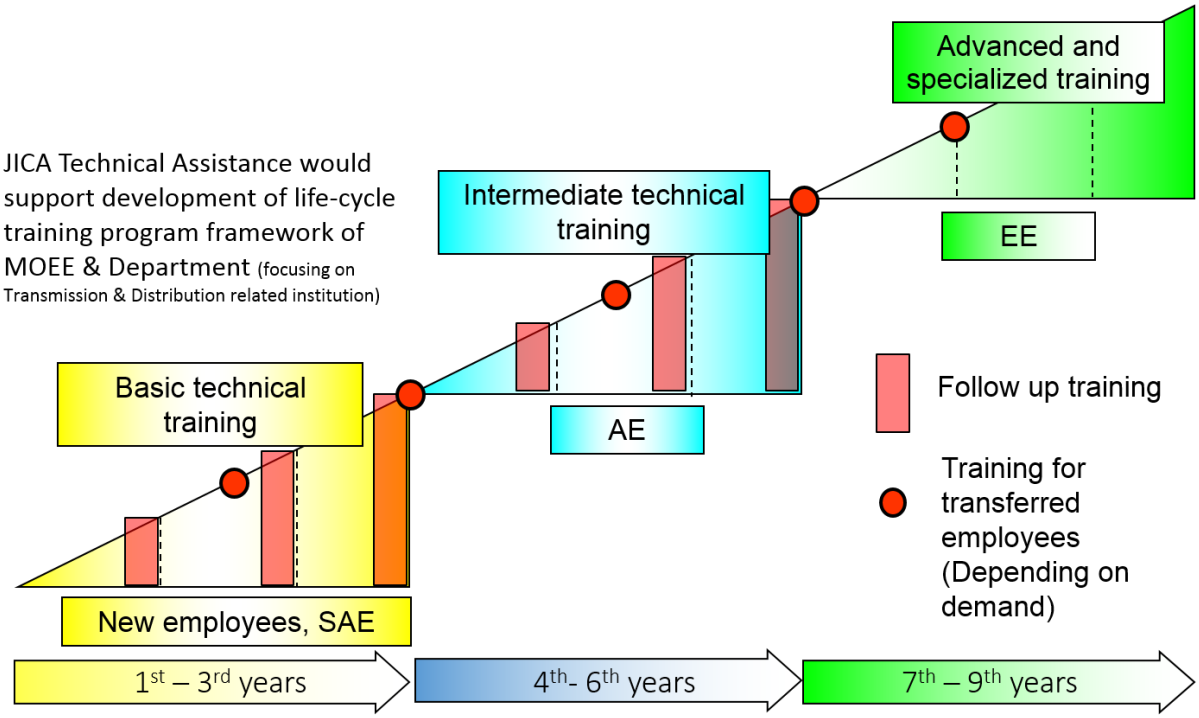
Figure 4-7 Life-cycle Training Program based on Capacity Target Level in CEPCO

4.3.7 MOEE (MPE)

MPE have conducted ten training courses such as Plant Operator Training Course, Plant Safety Training Course, Troubleshooting Techniques Training Course, Industrial Pollution Control Training Course, Energy Management Training Course, Instrumentation and Process Control Training Course, Welder Training Course, Fitter Training Course, Basic LPG Handling and Safety Training Course and Laboratory Training Course. The training program was prepared in 1977 by United Nations Industrial Development Organization (UNIDO) and has been used until now.

4.4 Option of Life-cycle Training Program Framework

Option of life-cycle training program is shown in Figure 4-8. MOEE employees are sometimes transferred from/to other institutions. Then, "Training for transferred employees" shall be provided. Additionally, "Follow up training" shall be conducted for new employees, Sub Assistant Engineer (SAE) and Assistant Engineer (AE), so that all employees can reach their capacity to target capacity level.



Source: JICA Expert Team

Figure 4-8 Option of Life-cycle Training Program

Chapter 5 Trainer Selection Policy

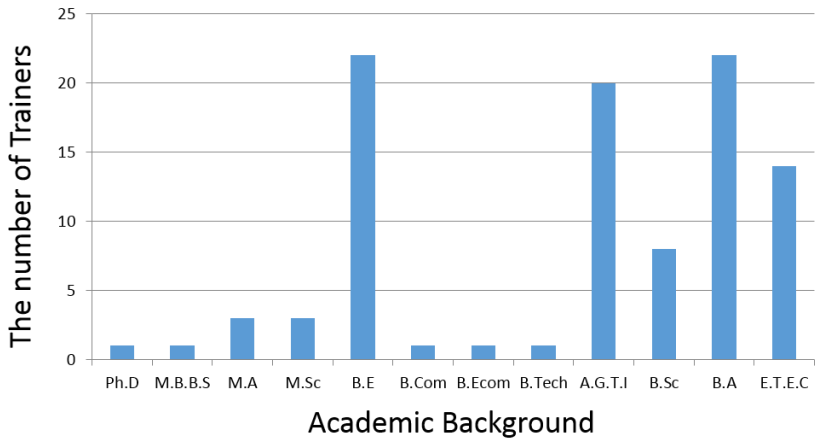
5.1 Trainer Selection Policy of Each Institution

5.1.1 MOC

There are dedicated trainers who work fulltime for engineering courses, accounting courses, office staff courses, housing courses, storekeeper courses and trade training courses at the Central TC of MOC. In addition, there are senior engineers such as Chief Engineers who sometimes works a part time at engineering course trainings by teaching the subjects which they are specialized as necessary at the Central TC of MOC. Moreover, retired officers are invited to engineering course trainings at the Central TC of MOC as outside trainers to teach their specialized subjects at the trainings.

5.1.2 MOTC (CITC)

One of the trainer selection criteria is based on their academic background. Figure 5-1 shows the number of trainers and their academic background.



Academic Background	No. of Trainers
Ph.D	1
Bachelor of Medicine, Bachelor of Surgery (M.B.B.S)	1
Master of Arts (M.A)	3
Master of Science (M.Sc)	3
Bachelor of Engineering (B.E)	22
Bachelor of Commerce (B.Com)	1
Bachelor of Economic (B.Ecom)	1
Bachelor of Technology (B. Tech)	1
Associateship Government Technical Institute (A.G.T.I)	20
Bachelor of Science (B.Sc)	8
Bachelor of Arts (B.A)	22
Electrical Training Evening Classes (E.T.E.C)	14
Total	97

Source: MOTC (CITC)

Figure 5-1 The number of Trainers in MOTC (CITC) and their Academic Background

5.1.3 MOTC (MPT)

There are 32 numbers of dedicated trainers who work full time for computer skill training, English language training, soft skill training and technical training at the MPT TC. Sometimes trainings are outsourced to vendors and experts are sometimes hired as outside trainers.

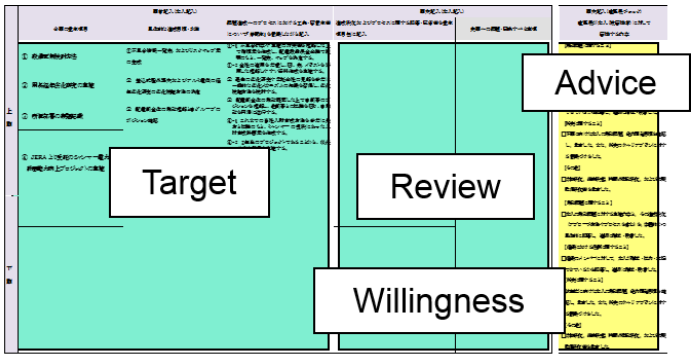
5.1.4 MOEE (MPE)

If there is someone who requests to transfer him/her to the TC, he/she may have a chance to be assigned as a permanent trainer. The head office decides a trainer based on the education level such as graduates from college or university. Teaching skills are not considered as one factor to become a trainer. Permanent trainers

have to stay there until they retire. There is little possibility of job rotation.

5.1.5 CEPCO

Trainers are selected based on experiences, willingness and suitability. Not only senior trainers but also junior trainers are also selected for effective training. To check willingness and suitability, periodic interviews are conducted for all employee based on interview sheet as shown in Figure 5-2. Employees fill the interview sheet every year. On the interview sheet, the employees make a target at beginning of Fiscal Year (April) and review one's work at end of Fiscal Year (March).



Source: CEPCO

Figure 5-2 Image of Interview Sheet

5.2 Example of Trainer Selection Criteria

Experience, willingness and suitability would be one of the examples of trainer selection criteria. Willingness and suitability to be trainer would be clarified through interview sheet to be filled by officers/staffs.

1. Experience
   - Junior trainer: 5-8 years experiences
   - Senior trainer: more than 15 years
   - Noteworthy experience (e.g. JICA training course for trainer)
2. Willingness

   One of the option is interview sheet to check willingness
3. Suitability

   One of the option is interview sheet to check suitability

Chapter 6 Budget

6.1 Cost allocation between TC and Mother Departments/ Institutions

6.1.1 MOEE

Each department in MOEE has been allocated with a certain amount of budget for conducting trainings in each fiscal year. The budget amount varies based on the number of staff in a department; for example ESE has bigger amount of budget than DEPP. The amount of budget for a training in DEPP is 1,000,000 MMK in 2018-19 fiscal year.

There is no specific budget for maintenance and operation of a main building, dormitories, a kitchen and a dining room of the Central TC in MOEE. It is difficult to maintain these TC facilities with the current budget condition.

Common trainings and specific trainings for each department for electricity sector have been conducted at MOEE Central TC. All departments bear expense of each training cost such as meal, printing and copying training materials, etc. in case of common trainings in MOEE. The amount of shared expense does not depend on the number of participants from a department. After each training, expenses for this training such as meal, printing cost, expenses for an opening and closing ceremony were requested to related departments. Concerning a specific training conducted by each department such as ESE, DPTSC, etc., each department bears its own expense. In some years, even a training for newly employed employees could not be conducted due to budget constraints in a department.

Cost allocation between MOEE Central TC and Departments/Institutions is shown in Table 6-1. Three main work sectors such as management, administration and training are divided for cost allocation. Management works include management of overall TC and management of training group such as distribution department. Administration works include training facility procurement plan, training facility provision, utility of training center, accommodation, transportation of trainees and salary of administration staff. Training works include life-cycle training program preparation, detailed training development, overall coordination of the detailed training course prepared by each training group, provision of trainers, training procurement plan, training equipment provision, training equipment maintenance, training materials, development of textbooks/handout, printing of textbooks/handout and evaluation of trainees.

Institution for MOEE Central TC has not been established as of November 2018 and manpower planning branch in DEPP manages TC. There has been no life-cycle training program preparation recently.

Table 6-1 Cost Allocation between DEPP and Departments/Institutions for MOEE Central TC as of Nov. 2018

Works		DEPP	Department/ Institutions
Management	Management of overall TC	✓	
	Management of training group (e.g. distribution department)	✓	
Administration	Training facility procurement plan	✓	
	Training facility provision (e.g. furniture, maintenance, cleaning)	✓	
	Utility of a training center (e.g. electricity, water)	✓	
	Accommodation (e.g. dormitory, meal)	✓	
	Transportation of trainees		✓
	Salary of administration staff (general affair, accounting)	✓	
Training	Life-cycle Training program preparation	-	-
	Detailed training course development		(✓)
	Salary of trainers		✓
	Training equipment procurement plan	(✓)	(✓)
	Training equipment maintenance	(✓)	(✓)
	Training materials provision (e.g. insulator, safety tools)	(✓)	(✓)
	Development of textbooks/handout		✓
	Printing of textbooks/handout	✓	

Source: JICA Expert Team based on interview to MOEE

6.1.2 MOEE (No. (1) Refinery Plant (Thanlyin) MPE)

No. (1) Refinery Plant (Thanlyin) MPE TC is located next to No. (1) Refinery Plant (Thanlyin) in Thanlyin Township. MPE training center used to belong to the Refinery Plant, however it has been transferred to Administration Department of MPE. The office of Administration Department is in Nay Pyi Taw and the training center requests the budget approval from Administration Department. Because of the limitation of the budget, training was not conducted at the No. (1) Refinery Plan (Thanlyin) MPE TC from July, 2017 to Oct, 2018. As of Oct, 2018, renovation of this TC was carried out and a new training about knowledge of LPG Handling and Safety Policy Safety was planned to be conducted in Nov, 2018.

Table 6-2 shows cost allocation between No. (1) Refinery Plant (Thanlyin) MPE TC and Departments/Institutions. Practical trainings and On the Job Training (OJT) had been conducted at the No. (1) Refinery Plant (Thanlyin) by using facilities of the Plant (currently the No. (1) refinery plant is not operating). There are dormitories for trainees. Concerning meal, TC does not prepare meal to trainees recently although TC prepared it before. Therefore, trainees have to use necessary expense for meal after receiving 1000 Ks/day/person for meal allowance from the government. Transportation for trainees is provided by Departments/Institutions and other administration works are done by TC.

Table 6-2 Cost Allocation between No. (1) Refinery Plant (Thanlyin) MPE TC and Departments/Institutions

Works		Training Center	Departments /Institutions	Remark
Management	Management of overall TC	✓		
	Management of training group	✓		
Administration	Training facility provision (including furniture, maintenance, cleaning)	✓		
	Utility of training center (e.g. electricity, water)	✓		
	Accommodation (e.g. dormitory)	✓		
	Transportation of trainees		✓	
	Salary of administration staff (general affair, accounting)	✓		
Training	Life-cycle Training program preparation	✓		
	Detailed training course development	✓		
	Salary of trainers	✓*	✓*	
	Training equipment procurement plan	-	-	
	Training equipment provision			No. (1) Refinery Plant (Thanlyin) nearby the TC
	Training equipment maintenance			No. (1) Refinery Plant (Thanlyin) nearby the TC
	Training materials (e.g. carpenter materials, pile, etc.)			No. (1) Refinery Plant (Thanlyin) nearby the TC
	Development of textbooks/handout	✓*	✓*	
	Printing of textbooks/handout	✓*	✓*	

* For trainings conducted by outside trainers, textbooks/handout are developed and printed by outside trainers from other refinery plants, fertilizer factories and LPG plants and for those by permanent trainers at TC, they are developed and printed by TC.

Source: JICA Expert Team based on interview to MPE

6.1.3 MOEE (Paung Laung TC)

Paung Laung training center belongs to DHPI in MOEE as of November 2018 and the budget planning is done by DHPI. The maintenance of Paung Laung training center is undertaken by Construction Division in DHPI. Institutions of Paung Laung TC has not been established and DHPI manages TC. Table 6-3 shows cost allocation between DHPI and Departments/Institutions.

Table 6-3 Cost Allocation between DHPI and Departments/Institutions for Paung Laung TC as of Nov. 2018

Works		DHPI	Department/ Institutions
Management	Management of overall TC	✓	
	Management of training group (e.g. distribution department)	✓	
Administration	Training facility provision (e.g. furniture, maintenance, cleaning)	✓	
	Utility of training center (e.g. electricity, water)	✓	
	Accommodation (e.g. dormitory, meal)	✓	
	Transportation of trainees		✓
	Salary of administration staff (general affair, accounting)	✓	
Training	Life-cycle Training program preparation	-	-
	Detailed training course development		(✓)
	Salary of trainers		✓
	Training equipment procurement plan	(✓)	(✓)
	Training equipment maintenance	(✓)	(✓)
	Training materials provision (e.g. insulator, safety tools)	(✓)	(✓)
	Development of textbooks/handout		✓
	Printing of textbooks/handout	✓	

Source: JICA Expert Team based on interview to DHPI

6.1.4 MOC

In the Central TC of MOC, an annual training program is prepared every year and budget planning is done based on the annual training program. Central Training Center and its two branches of TC belongs to Department of Highway (DOH) and budget approval is requested to DOH in Nay Pyi Taw by the Principal of TC.

6.1.5 MOTC (CITC)

CITC is one of the departments in MOTC and it has its independent budget to operate and maintain.

It has revenue from running shops and from renting hostels and classrooms to automotive mechanics trainees and training fees from a car driving and a big car driving training. The profit got from these trainings have been used for the welfare of trainees, Officers and Staff in CITC, for example: one hundred kyat for each trainee for breakfast, food support to Officers and Staff and activities to strengthen the unity among Officers and Staff in CITC.

Regarding trainings, 500 Ks per trainee for dry ration and 500 Ks per trainee for fresh ration are allowed by Union Budget. Annual training program is prepared based on the necessity of 18 departments in MOTC. Annual meeting is held at CITC to decide the annual training program and the annual training program is approved at the MOTC Executive Committee (EC) meeting.

It estimates revenue and expenditure for every fiscal year based on annual training program and the budget is adjusted with State/Region budget.

6.1.6 MOTC (MPT)

During February to April, Training Master Plan is updated by Training Team and all departments by analyzing the feedback, by discussing with each department to know the requirement, by preparing the proposed plan. By

confirming from each division and by estimating the budget. Updated Training Plan is reported to HR and Administration division. HR and Administration division adjust policy and strategy to align with business strategy, support management to communicate with other divisions, approve training target and submit the training plan to BOD to get approval on budget.

6.1.7 MOTC (IDCS)

The budget approval procedure is the same as other governmental departments.

Table 6-4 shows cost allocation between the TC and Departments/Institutions in MOC and MOTC (CITC, MPT, and IDCS)

Table 6-4 Cost Allocation between the Training Center and Departments/Institutions

Works		Training Center	Departments/ Institutions
Management	Management of overall TC	✓	
	Management of training group (e.g. distribution department)	✓	
Administration	Training facility provision (including furniture, maintenance, cleaning)	✓	
	Utility of training center	✓	
	Accommodation (e.g. dormitory, meal)	✓	
	Transportation of trainees		✓
	Salary of administration staff (general affair, accounting)	✓	
Training	Life-cycle Training program preparation	✓	
	Detailed training course development	✓	
	Overall coordination of the detail training course prepared by each training group	✓	
	Provision of trainers	✓	✓
	Training equipment procurement plan	✓	
	Training equipment provision	✓	
	Training equipment maintenance	✓	
	Training materials (e.g. carpenter materials, pile, etc.)	✓	
	Development of textbooks/handout	✓	✓
	Printing of textbooks/handout	✓	

Source: JICA Expert Team based on interview to MOC and MOTC (CITC, MPT and IDCS)

6.1.8 CEPCO

Annual training program is prepared by each Departments/Institutions such as distribution department, transmission and substation department, thermal power department and it is submitted to Human Resource Development (HRD) center for provision of facility, accommodation and budget approval.

Table 6-5 summarizes cost allocation between the TC of CEPCO and Departments/Institutions. In summary, all works except training materials and preparation of textbooks, purchase of textbooks are arranged by the TC. Departments/Institutions are responsible for training materials and preparation of textbooks and purchase of textbooks.

Table 6-5 Cost Allocation between the TC and Departments/Institutions for CEPCO TC

Works		Personnel Department/ HRD Center	Departments/ Institutions
Management	Management of overall TC	✓	
	Management of training group (e.g. Generation)		✓
Administration	Training facility provision (furniture, maintenance, cleaning)	✓	
	Utility of TC (e.g. electricity, water)		✓
	Accommodation (e.g. dormitory, meal)		✓
	Transportation of trainees		✓
	Salary of administration staff (general affair, accounting)		
Training	Life-cycle Training program preparation		✓
	Detail training course development		✓
	Salary of trainers	✓	
	Training equipment procurement plan		✓
	Training equipment provision	✓	
	Training equipment maintenance	✓	
	Development of textbooks/handout		✓
	Printing of textbooks/handout		✓

Source: JICA Expert Team

6.1.9 Proposed cost allocation between MOEE Central TC and Departments/Institutions

Proposed cost allocation between MOEE Central TC and Departments/Institutions is shown in Table 6-6.

Table 6-6 Proposed Cost Allocation between MOEE Central TC and Departments/Institutions

Works		Training Center	Departments/ Institutions
Management	Management of overall TC	✓	
	Management of training group (e.g. Distribution, Generation)	✓	
Administration	Training facility provision (including furniture, maintenance, cleaning)	✓	
	Utility of training center (e.g. electricity, water)	✓	
	Accommodation (e.g. dormitory, meal)	✓	
	Transportation of trainees	✓	
	Salary of administration staff (general affair, accounting)	✓	
Training	Life-cycle Training program preparation		✓
	Detailed training course development	✓	
	Salary of trainers	(✓)	✓
	Training equipment procurement plan	✓	
	Training equipment provision (e.g. transformer)	✓	
	Training equipment maintenance	✓	
	Development of textbooks/handout	✓	
	Printing of textbooks/handout	✓	

Source: JICA Expert Team

Chapter 7 Others

7.1 Introduction of Incentive System

Following section describe about the incentive system regarding participation of training.

7.1.1 MOEE

MOEE awards prize for top 3 trainees for some training programs.

7.1.2 MOC

MOC awards prize for top 3 trainees for training programs. Also, training system of MOC relates to Human Resource Development (HRD) department. Basically, the staffs who got high evaluation at the training course shall be prioritized for promotion in MOC.

7.1.3 MOTC (CITC)

Top 3 highly evaluated staffs in the training program would receive prize. Training system of MOTC (CITC) relates to Human Resource Development department. The staffs who got high evaluation at the training course shall be prioritized for promotion in MOTC. Also, those highly evaluated staffs shall be prioritized for training abroad when there is opportunity.

7.1.4 MOTC (MPT)

No specific incentive is provided; however, it would be difficult to work without training for new technology operation since IT systems are upgraded frequently.

7.1.5 MOTC (IDCS)

Top 3 highly evaluated staffs in the training program would receive prize with small amount of money. Also, those highly evaluated staffs shall be prioritized for training abroad when there is opportunity.

7.1.6 CEPCO

Since Human Resource Development Center is under the Personal Department, the result of training would be a part of personal evaluation consideration.

7.2 Alternative Funding Resources

7.2.1 Collaboration with Private Companies

Currently some private companies are providing training program as a part of their Corporate Social Responsibility (CSR) to the departments of MOEE. However, the contents of program and timing of training is most likely depending on private companies. Therefore, current training provision from private companies are not systematic and sustainable training. In order to make it more systematic and sustainable training provision, MOEE might collaborate with private companies more effectivity. One of the method would be the following.

1) Prepare annual training program based on life-cycle training program framework. And classify the courses which can be provided senior officers of MOEE and which needs to be provided from outside trainers.

2) The necessary training courses from outside are publicly offered as private donation course.
3) Private needs to satisfy the course requirement including detail training curriculums; however, they can also introduce their technology.

With above-mentioned method, MOEE is able to receive the training course based on their annual training program with sustainable manner.

7.2.2 Collaboration with International and Domestic Institution/Organization

Some international organizations including JICA currently provide capacity development program as technical assistance. Those are the good opportunities for MOEE to upgrade their capacity by introducing international know-how and experience into Myanmar. However, it should be more efficient to receive technical assistance if MOEE has life-cycle training program and annual training program which liked with the life-cycle training program. International and domestic institution/organization also can prepare their collaboration based on those training program.

7.2.3 Open Courses for Private Companies

MOEE might accept staffs from private companies with necessary expenses. For example, the private company which carries out construction works for MOEE would be necessary to join safety related training programs. Safety related program is important not only government staffs but also the staffs of private companies who actually carries out construction works for MOEE.

Appendix: Photos of Each Training Center Facilities

1. MOEE (Central TC)

	
Appearance of Training Center	Distribution Training Facilities
	
Training Materials and Tools in Store Room	Lecture room on the ground floor
	
Lecture room on the first floor	Female Dormitory

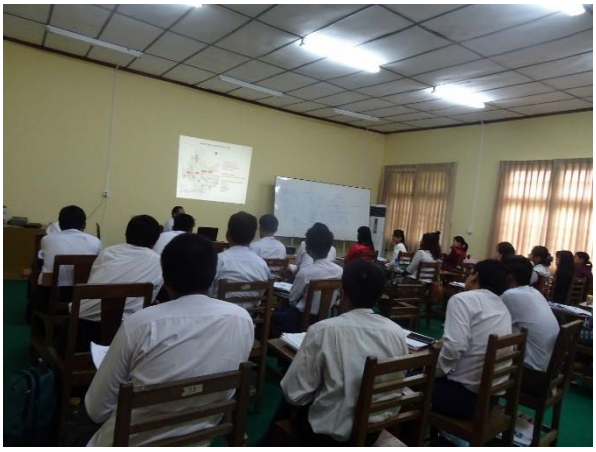
2. MOEE (Paung Laung Training Center)

	
Appearance of Training Center	Lecture room
	
Lecture room	Dam model for training
	
Dining room	Dormitory

3. MOEE (No. (1) Refinery Plant (Thanlyin) MPE)

	
Appearance of Training Center	Appearance of Training Center
	
Lecture room	Lecture room
	
Lecture room	Dormitory

4. MOC

	
Appearance of Training Center	Lecture Room
	
Library	Clinic
	
Dining room	Dormitory

5. MOTC (CITC)

	
Appearance of Training Center	Computer room
	
Lecture room	Train for practical training
	
Dining room	Dormitory

6. MOTC (MPT)

	
Appearance of Training Center	Lecture room
	
Lecture room	Lecture room
	
English Classroom	Lecture room

Project Design Matrix (PDM)

Version.1:　Before commencement of the Project (as annex of R/D in October 2015)

Project Design Matrix (PDM)

Project Title: Project for Capacity Development of Power Transmission and Distribution Systems
Project Duration: Dec.2015 to Nov.2020 (tentative)
Target Area: Nay Pyi Taw as the main site and the whole country of Myanmar　　Oct-2015
Target Group: Engineers and technichians engaged in transmission and distribution in the Ministry of Electric Power (MOEP)　　Version. 1
Conterpart Organization : DEPP(Department of Electric Power Planning), MEPE(Myanma Electric Power Enterprise), ESE(Electricity Supply Enterprise), YESC (Yangon Electricity Supply Corporation), MESC (Mandalay Electricity Supply Corporation)

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal			
Efficiency and reliability of power supply and energy access is improved through the reignforcement and improvement of power supply infrastructure in Myanmar.	Decrease of no. of faults and their duraion of transmission and distribution (hereinafter referred to as "T&D")faults	Sampling survey	-Generation capacity will be developed for the power demand appropriately.
	T&D loss will be decreased by more than XX%	Data from counterpart organizations	
	Electrification rate will be improved by more than XX%	Data from counterpart organizations	
Project Purpose			
Capacity for engineers and technicians engaged in T&D system is strengthened.	Length of T&D lines of newly designed /constructed by utlizing obtained slkills/ standard through the Project	Data from counterpart organizations / Reports from experts	- The engineers and technicians trained by the Project will continue their services in their respective positions.
	No. of substations of newly designed /constructed by utlizing obtained slkills/ standard through the Project	Data from counterpart organizations / Reports from experts	- Any change of assistance policy by other donor will not adversely affect the Project implementation.
	No of faults and their duration at township offices where trained engineers/technicians are assigned.	Data from counterpart organizations / Reports from experts	- The Myanmar Government's policy and MOEP's policy on human resource development in the power sector will not be drastically changed.
	Reduction rate of T&D loss at township offices where traind engineers/technicians are assigned.	Data from counterpart organizations / Reports from experts	- Counterpart organizations appropriately allocates the budget for operation and maintenance for the facilities and staff training.
	No. of assigned trainers with accreditation in counterpart organizations	Data from counterpart organizations / Reports from experts	
Outputs			
1.The framewrok of human resource development is prepared.	Reccomandation for improvements of financial and institutional challenges	Report form experts	
	Reccomandation for improvements of techincal chalenges of T&D system including standardization	Report form experts	
	Proposed human resource development plan/policy	Proposed human resource development plan/policy	
2.Training programs are planned and implemented.	Authorized training prgram	Authorized training prgram	- The trained instructors continue their services in their respective positions.
	Syllabi, curricula and textbooks for trainings	Syllabi, curriculam and textbooks for trainings	
	No. of implemented traing of trainers (hereinafter referred to as "TOT")	Record/Report of TOT	
	No. of trainers trained	Record/Report of TOT	
	Authrized trainer's accreditation system	Internal traning policy document	
	Introduced necessary equipment and materials for trainings	Report from counterpart and site recognition	
	No.of textbooks related to techinical standardaization activity	No. of textbooks related to techinical standardaization activity	
	No. of trainees	Training report	
	No. of trainings	Training report	
	Implement evaluation system for trainees.	Evaluation report	
3.PDCA(Plan, Do, Check, and Action) cycle for training system is established and practiced.	No. of monitoring and evaluation for trainings	Results of monitoring and evaluations	
	No. of feedbacks for next training plan	Results of monitoring and evaluations	
	Continuous practices of PDCA	Results of monitoring and evaluations	

Activities	Inputs		
	Japanese side	Myanmar side	
1-1. To indentify institutional and financial challenges of counterpart organizations and provide necessary advices on them. (In particular distribution system) 1-2. To identify technical challenges of T&D system including standardization and provide necessary advices. (In particular distribution system) 1-3.To carry out assessment of human resource development plan/policy and existing training system. 1-4.To examine and advise the framework/roadmap of human resource development. 2-1.To discuss and plan training programs. 2-2.To develop syllabi, curricula and textbooks for trainings. 2-3.To conduct TOT 2-4.To prepare and implement trainer's accreditation system 2-5.To develop a procurement plan of equipment and materials for trainings and introduce them. 2-6.To advise techinical standardaization related to T&D system and reflect to textbooks for trainings. 2-7.To implementt trainings 2-8.To propose, and implement evaluation system for trainees. 3-1.To monitor and evaluate trainings system (Checking) 3-2. To propose actions to feedback for the next training plan (Action) 3-3.To establish the instituional capacity for continuous PDCA cycle.	1. Experts Long-term (Resident) ・Training Program /Coordinator Short-term (Visiting) ・Chief Advisor/Transmission and Distribution Systems ・Distribution System Planning and Designinig ・Distribution System Construction ・Distribution System Operation and Maintnance ・Transmission ・Substation ・Financial and Institutional Analysis 2. Trainings in Japan 3. Equipment and materials for trainings	1. Counterpart Personnel 2.Construction of new training facility 3. Office space and facilities for experts 4. Local cost 5. Available data and information relavant to the Project	**Preconditions**

Version.2: Approval on the 1st JCC in November 2016

Project Design Matrix (PDM)

Project Title: The Project for Capacity Development of Power Transmission and Distribution Systems
Project Duration: July 2016 to July 2021
Target Area: Nay Pyi Taw as the main site and the whole country of Myanmar
Target Group: Engineers and technicians engaged in transmission and distribution in the Ministry of Electricity and Energy (MOEE)
Counterpart Organization : DEPP(Department of Electric Power Planning), DPTSC(Department of Power Transmission and System Control), ESE(Electricity Supply Enterprise), YESC (Yangon Electricity Supply Corporation), MESC (Mandalay Electricity Supply Corporation)

Nov. 2016
Version. 2

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions	Achievement	Remarks
Overall Goal					
Efficiency and reliability of power supply and energy access is improved through the reinforcement and improvement of power supply infrastructure in Myanmar.	Distribution loss of 17% in 2016 will be decreased to xx% by 2024. Total number (xx) and duration of faults (xx minutes per fault) in distribution system in Myanmar in 2016 will be decreased to less than (xx) by 2024.	Data from MOEE organizations Data from MOEE organizations	-Generation capacity will be developed for the power demand appropriately.		
Project Purpose					
Capacity for engineers and technicians engaged in T&D system is strengthened.	28 accidents at distribution line work in 2016 in ESE, YESC and MESC are decreased to less than 18 accidents by 2018, and 10 accidents in 2021. More than 2 pilot sites reduce the total number and duration of faults (minute per fault) more than the target value. More than 2 pilot sites reduce distribution loss more than the target value. More than 3 times of training for engineers and technicians are conducted by certified trainers in 2018, and more than 10 times by 2021.	Data from MOEE organizations / Reports from experts Data from MOEE organizations / Reports from experts Data from MOEE organizations / Reports from experts Data from MOEE organizations / Reports from experts	- The engineers and technicians trained by the Project will continue their services in their respective positions. - Any change of assistance policy by other donor will not adversely affect the Project implementation. - The Myanmar Government's policy and MOEE's policy on human resource development in the power sector will not be drastically changed. - Counterpart organizations appropriately allocates the budget for operation and maintenance for the facilities and staff training.		
Outputs					
1.The framework of human resource development is prepared.	More than one recommendation for improvements of financial and institutional challenges is applied in MOEE. More than one recommendation for improvements of technical challenges of T&D system including standardization is applied in MOEE. Proposed human resource development plan/policy	Report form experts Report form experts Proposed human resource development plan/policy			
2.Training programs are planned and implemented.	More than one training program is authorized. Syllabi, curricula and textbooks for trainings are prepared more than one each. Training of trainers (hereinafter referred to as "TOT") is implemented more than one time. 27 trainers certified Authorized trainer's accreditation system Introduced necessary equipment and materials for trainings At least one textbook related to technical standardization activity is prepared.	Authorized training program Syllabi, curriculum and textbooks for trainings Record/Report of TOT Record/Report of TOT Internal training policy document Report from MOEE and site recognition No. of textbooks related to technical standardization activity	- The trained instructors continue their services in their respective positions.		
3.PDCA(Plan, Do, Check, and Action) cycle for training system is established and practiced.	At least one time of evaluation for trainings At least one time of feedbacks for next training plan Continuous practices of PDCA	Results of monitoring and evaluations Results of monitoring and evaluations Results of monitoring and evaluations			

Activities	Inputs		
	Japanese side	Myanmar side	
1-1. To identify institutional and financial challenges of counterpart organizations and provide necessary advices on them. (In particular distribution system) 1-2. To identify technical challenges of T&D system including standardization and provide necessary advices. (In particular distribution system) 1-3.To carry out assessment of human resource development plan/policy and existing training system. 1-4.To examine and advise the framework/roadmap of human resource development. 2-1.To discuss and plan training programs. 2-2.To develop syllabi, curricula and textbooks for trainings. 2-3.To conduct TOT 2-4.To prepare and implement trainer's accreditation system 2-5.To develop a procurement plan of equipment and materials for trainings and introduce them. 2-6.To advise technical standardization related to T&D system and reflect to textbooks for trainings. 2-7.To implement trainings by trained trainers 2-8.To propose, and implement evaluation system for trainees. 3-1.To evaluate trainings system (Checking) 3-2. To propose actions to feedback for the next training plan (Action) 3-3.To establish the institutional capacity for continuous PDCA cycle.	1. Experts Long-term (Resident) ・Training Program /Coordinator Short-term Experts (Visiting) - Chief Advisor / Distribution System Technology - Deputy Chief Advisor /Distribution Technology (Operation and Maintenance) - Distribution Technology (Planning and Designing) - Distribution Technology (Construction) - Transmission Technology - Substation Technology - Human Resource DevelopmentPlanning 1 (Training system) - Financial and Institutional Analysis - Power Development/ Distribution Expansion Policy - Power Technology1 (Planning) - Power Technology2 (Regional cities) - Human Resource Development Planning 2 (Regional Cities) 2. Trainings in Japan 3. Equipment and materials for trainings	1. Counterpart Personnel 2.Construction of new training facility 3. Office space and facilities for experts 4. Local cost 5. Available data and information relevant to the Project	**Preconditions**

Version.3:　At the end of Phase I of the Project in November 2018

Project Design Matrix (PDM)

Project Title: The Project for Capacity Development of Power Transmission and Distribution Systems
Project Duration: July 2016 to July 2021
Target Area: Nay Pyi Taw as the main site and the whole country of Myanmar　　Nov. 2018
Target Group: Engineers and technicians engaged in transmission and distribution in the Ministry of Electricity and Energy (MOEE)　　Version. 3
Counterpart Organization : DEPP(Department of Electric Power Planning), DPTSC(Department of Power Transmission and System Control), ESE(Electricity Supply Enterprise), YESC (Yangon Electricity Supply Corporation), MESC (Mandalay Electricity Supply Corporation)

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions	Achievement	Remarks
Overall Goal					
Efficiency and reliability of power supply and energy access is improved through the reinforcement and improvement of power supply infrastructure in Myanmar.	Distribution loss of 17% in 2016 will be decreased to xx% by 2024.	Data from MOEE organizations	-Generation capacity will be developed for the power demand appropriately.	Actual value at the time of the end of Phase I (FY 2017 to 2018) is 14%.	
	Total number (xx) and duration of faults (xx minutes per fault) in distribution system in Myanmar in 2016 will be decreased to less than (xx) by 2024.	Data from MOEE organizations		The actual records of Myanmar country as a whole were not presented by MOEE. But it was decided that this item would remain as the indicator for overall goal because it can show the effect of the Project itself appropriately.	
Project Purpose					
Capacity for engineers and technicians engaged in T&D system is strengthened.	12 victims of work accidents at distribution line work in 2016 in ESE, YESC and MESC are decreased to less than 10 victims by 2018, and less than 7 victims in 2021.	Data from MOEE organizations / Reports from experts	- The engineers and technicians trained by the Project will continue their services in their respective positions.	Actual value is 11 victims. (Year 2017)	
	More than 2 pilot sites reduce the total number and duration of faults (minute per fault) more than the target value.	Data from MOEE organizations / Reports from experts	- Any change of assistance policy by other donor will not adversely affect the Project implementation.	In two townships (Takton and Kyaupadaung), distribution loss rate has been reduced.	
	More than 2 pilot sites reduce distribution loss more than the target value.	Data from MOEE organizations / Reports from experts	- The Myanmar Government's policy and MOEE's policy on human resource development in the power sector will not be drastically changed.	In three townships (Dala, Takton and Kyaupadaung), total number / total duration of power faults have been improved.	
	More than 3 times of training for engineers and technicians are conducted by certified trainers in 2018, and more than 10 times by 2021.	Data from MOEE organizations / Reports from experts	- Counterpart organizations appropriately allocates the budget for operation and maintenance for the facilities and staff training.	0 time training by certified trainers	
Outputs					
1.The framework of human resource development is prepared.	More than one recommendation for improvements of financial and institutional challenges is applied in MOEE.	Report form experts		Establishment of TCPC was recommended and has been approved by Deputy Minister.	
	More than one recommendation for improvements of technical challenges of T&D system including standardization is applied in MOEE.	Report form experts		Introduction of multi-transformer system and SOG-VCB into medium voltage distribution lines was recommended and have been actually applied in townships over Myanmar.	
	Proposed human resource development plan/policy	Proposed human resource development plan/policy		The direction of human resource development plan/policy was proposed.	
2.Training programs are planned and implemented.	More than one training program is authorized.	Authorized training program	- The trained instructors continue their services in their respective positions.	Regional Seminars for engineers in six major cities were authorized in MOEE and conducted in June and July 2018.	
	Syllabi, curricula and textbooks for trainings are prepared more than one each.	Syllabi, curriculum and textbooks for trainings		JICA experts prepared five themes of textbooks. But any syllabus, curriculum and textbook based on the systematized training program were not prepared.	
	Training of Trainers (hereinafter referred to as "TOT") is implemented more than one time.	Record/Report of TOT		The JICA expert team conducted the intentive training as the part of TOT.	
	27 trainers certified	Record/Report of TOT		Certificate Awarding Ceremony of Trainers was held in September 2018 and 26 trainers candidates were certified as a new trainer.	
	Authorized trainer's accreditation system	Internal training policy document		Trainer's accreditation system has not been considered and reviewed yet because the activities of MOEE related to the establishment of human resource development framework is stopped.	
	Introduced necessary equipment and materials for trainings	Report from MOEE and site recognition		Equipment and materials for training including had been procured and were installed on MOEE Training Center.	
	At least one textbook related to technical standardization activity is prepared.	No. of textbooks related to technical standardization activity		JICA expert team inputted information about technical standardization into prepared textbooks and lectured on the information through TOT.	
3.PDCA(Plan, Do, Check, and Action) cycle for training system is established and practiced.	At least one time of evaluation for trainings	Results of monitoring and evaluations		The training at regional seminars in June to July 2018 was reviewed and the implementation situation was evaluated.	
	At least one time of feedbacks for next training plan	Results of monitoring and evaluations		How to utilize the evaluation results on implementation of regional seminars for the next training was discussed.	
	Continuous practices of PDCA	Results of monitoring and evaluations		In the period of Phase I, training by C/Ps could be conducted only one time and the Project is not at the stage for conducting continuous practice of PDCA cycle yet.	

Activities	Inputs		
	Japanese side	Myanmar side	
1-1. To identify institutional and financial challenges of counterpart organizations and provide necessary advices on them. (In particular distribution system) 1-2. To identify technical challenges of T&D system including standardization and provide necessary advices. (In particular distribution system) 1-3.To carry out assessment of human resource development plan/policy and existing training system. 1-4.To examine and advise the framework/roadmap of human resource development. 2-1.To discuss and plan training programs. 2-2.To develop syllabi, curricula and textbooks for trainings. 2-3.To conduct TOT 2-4.To prepare and implement trainer's accreditation system 2-5.To develop a procurement plan of equipment and materials for trainings and introduce them. 2-6.To advise technical standardization related to T&D system and reflect to textbooks for trainings. 2-7.To implement trainings by trained trainers 2-8.To propose, and implement evaluation system for trainees. 3-1.To evaluate trainings system (Checking) 3-2. To propose actions to feedback for the next training plan (Action) 3-3.To establish the institutional capacity for continuous PDCA cycle.	1. Experts Long-term (Resident) ・Training Program /Coordinator Short-term Experts (Visiting) - Chief Advisor / Distribution System Technology - Deputy Chief Advisor /Distribution Technology (Operation and Maintenance) - Distribution Technology (Planning and Designing) - Distribution Technology (Construction) - Transmission Technology - Substation Technology - Human Resource DevelopmentPlanning 1 (Training system) - Financial and Institutional Analysis - Power Development/ Distribution Expansion Policy - Power Technology1 (Planning) - Power Technology2 (Regional cities) - Human Resource Development Planning 2 (Regional Cities) 2. Trainings in Japan 3. Equipment and materials for trainings	1. Counterpart Personnel 2.Construction of new training facility 3. Office space and facilities for experts 4. Local cost 5. Available data and information relevant to the Project	**Preconditions**

List of Procured Materials and Equipment

Safety Equipment	Qty	Place
Safety Belt and Safety Rope	10	NPT Central Training Center
80-25000V Voltage Detector (Warning sound type)	10	NPT Central Training Center
11-77kV Voltage Detector (Pinwheel type)	10	NPT Central Training Center
Grounding tool for line work (Earth hook)	10	NPT Central Training Center
Separation distance measuring instrument	5	NPT Central Training Center
Laser-type distance measurer	5	NPT Central Training Center
Helmet	30	NPT Central Training Center
Safety Shoes	5	NPT Central Training Center
Leather Glove	5	NPT Central Training Center
Insulation-resistance Measuring Apparatus	5	NPT Central Training Center
GPS: Global Positioning System	10	NPT Central Training Center
Infrared Thermograph	5	NPT Central Training Center
Ladder	1	NPT Central Training Center

Materials and Equipment for Power Facilities	Qty	Place
11kV line switchgear - Switchgear for 11kV distribution line (Manual)	1	NPT Central Training Center
Small-capacity pole-mounted transformer - 25kVA (single phase) mock-up	1	NPT Central Training Center
- 100kVA (three phase) mock-up	1	NPT Central Training Center
Insulators for 11kV distribution line - Pin Insulators	9	NPT Central Training Center
- Strain Insulators	72	NPT Central Training Center
Current Limiting Arcing Horn	9	NPT Central Training Center
Enclosed cutout switch - Enclosed cutout switch	8	NPT Central Training Center: 5
- Spare fuse(20A)	4	NPT Central Training Center: 2
- Operation Rod	2	NPT Central Training Center: 1
Reinforced concrete pole (incl. stepbolts)	9	NPT Central Training Center
Middle -voltage insulated wire (SAC)	500	NPT Central Training Center
Connection materials for MV system (tension gun)	40	NPT Central Training Center
Connection materials for MV system (socket)	40	NPT Central Training Center
Low-voltage insulated wire - OW wire (4mm)	200	NPT Central Training Center
- OW wire (5mm)	200	NPT Central Training Center
- OW wire (60mm2)	300	NPT Central Training Center
Insulators for 400V distribution line and accessories	40	NPT Central Training Center
Connection materials for 11kV and Materials for 400V		NPT Central Training Center
Connection materials for Tr. and SOG etc. incl. Earthing		NPT Central Training Center
Hot-dip Galvanized Cross Arm and Single Pole Brace for 11kV - Angle iron (2.5" x 2.5" x 0.16" x 5'L)	37	NPT Central Training Center
- U channel iron (2" x 4" x 2" x 0.16' x 6'L)	34	NPT Central Training Center
- Angle iron (2.5" x 2.5" x 0.16" x 5'L)	38	NPT Central Training Center
Concrete Footing for poles	9	NPT Central Training Center
Gravel for Training Center Ground	80	NPT Central Training Center
Gravel for Training Center Ground (Additional)	75	NPT Central Training Center
Sand for Training Center Ground	15	NPT Central Training Center
Basement Concrete for guy wire		NPT Central Training Center
Plastic Layer for Training Center Ground	7	NPT Central Training Center

Equipment for Power Facilities at Pilot Sites	Qty	Place
11kV line switchgear with overcurrent breaking function - Switchgear for 11kV distribution line with overcurrent breaking function	2	Tatkon, Kyaukpadaung
Accessories for SOG (additional hotstick and head)	1	Tatkon, Kyaukpadaung
Accessories for SOG (handle rope)	2	Tatkon, Kyaukpadaung
Accessories for installation of SOG at sites	2	Tatkon, Kyaukpadaung
11kV Lighting Arrester, Polymer for SOG	12	Tatkon, Kyaukpadaung
Small-capacity pole-mounted transformer - 25kVA (single phase)	5	Under discussion
- 50kVA (single phase)	5	Under discussion
- 100kVA (three phase)	3	Tatkon: 1 (Others: Under discussion)
- 200kVA (three phase) incl.Modification (Primary:11-6.6kV)	3	Under discussion
Insulators for 11kV distribution line - Strain Insulators	28	Under discussion
Current Limiting Arcing Horn	51	Under discussion
Reinforced concrete pole (incl. stepbolts)	8	Under discussion
Enclosed cutout switch - Enclosed cutout switch	42	Under discussion
- Spare fuse(20A)	76	Under discussion
- Spare fuse(6A)	8	Under discussion
- Operation Rod	6	Under discussion
Parallel Joint Connector (PJ Connector) - Parallel Joint (PJ) Connector (For connecting 5mm copper wire to each other)	300	Under discussion
- Parallel Joint (PJ) Connector (For 5mm • 60mm2 copper wire interconnection)	50	Under discussion
- Parallel Joint (PJ) Connector (For connecting 60mm2 copper wire to each other)	150	Under discussion
- Cover for LV 5mm	300	Under discussion
- Cover for LV 60mm2	200	Under discussion

Training Office Equipment	Qty	Place
Lap-top Computer	10	Project Office
Projector & Screen	1	Project Office
Printer/Copier/Scanner	1	Project Office
AC	2	Project Office