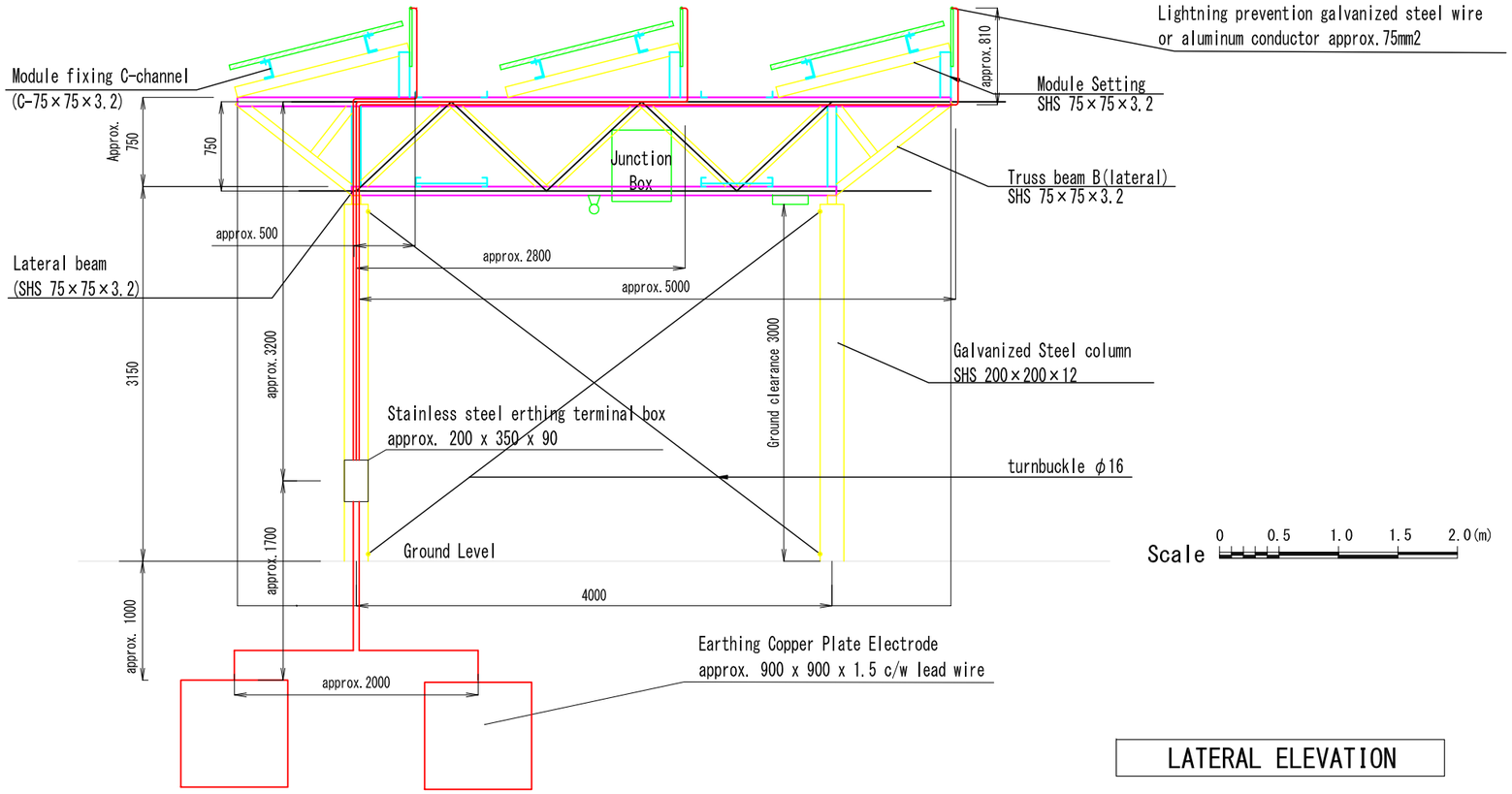


LATERAL ELEVATION

Scale 0 0.5 1.0 1.5 2.0(m)

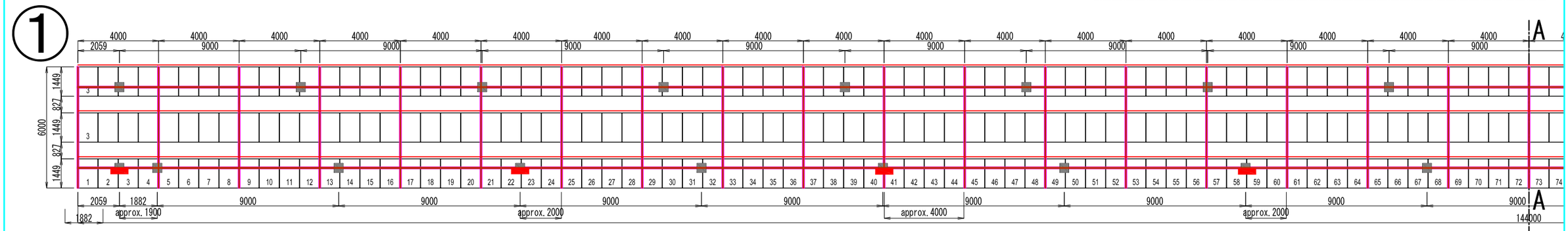
SUMMARY

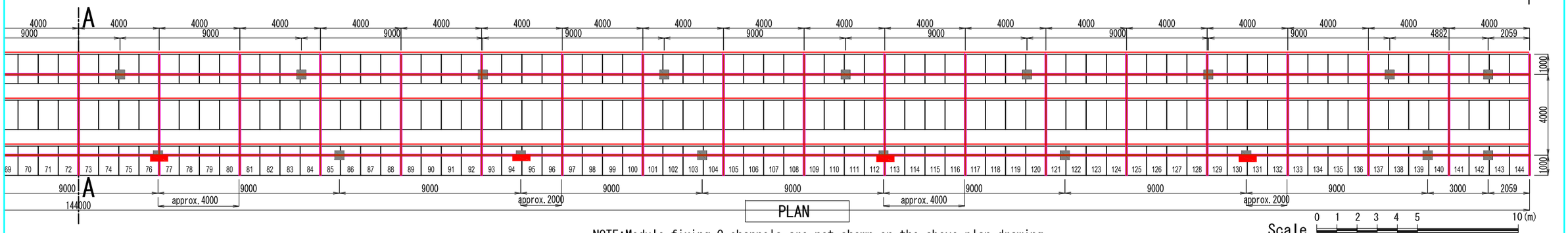
Lightning Protection System Aluminum Bar Conductors 75mm2 total 1,794m
Earthing Terminal Box : 24nos.
Earthing Copper Plate Electrode 900x900x1.5 : 48 nos.

ARRAY- 1

Lightning Protection System Aluminum Bar Conductors 75mm2 total 684.1m
Beside PV modules : 144m x 3 = 432.0m
Horizontal : (5.0+2.8+0.5)x8+3x(1.9+2x4+4x3)= 132.1m
Vertical : 8x(3x3.2+2x1.7+2) = 120.0m
Earthing Terminal Box : 8 nos.
Earthing Copper Plate Electrode 900x900x1.5 : 16 nos.

①





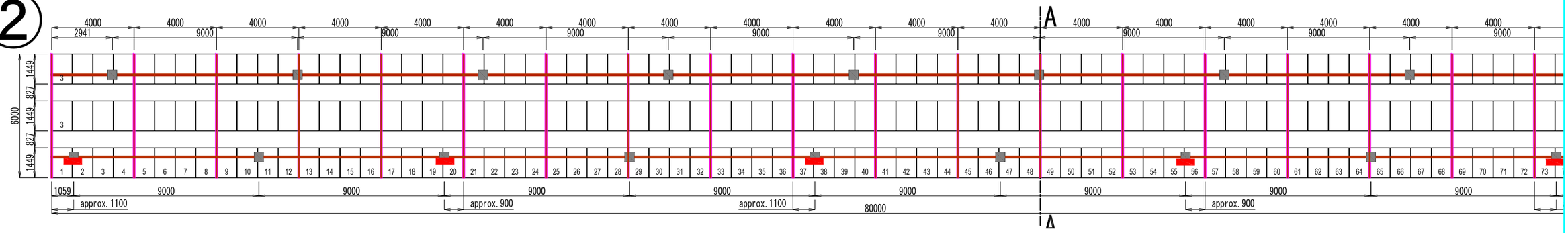
PLAN

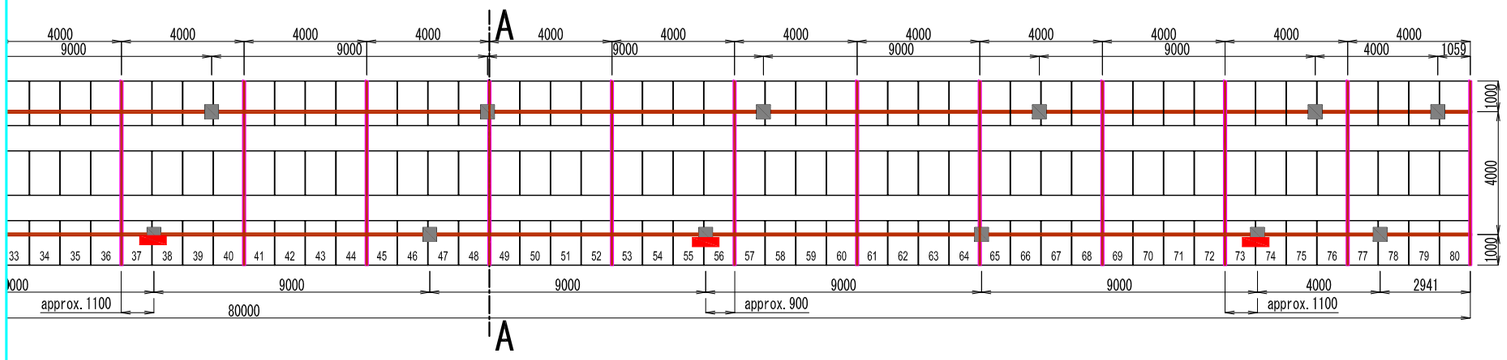
Scale 0 1 2 3 4 5 10(m)

NOTE:Module fixing C-channels are not shown on the above plan drawing

	PROJECT	COUNTRY	SHEET CONTENTS	DRAWING NO.
JAPAN INTERNATIONAL COOPERATION AGENCY	Preparatory Survey on the Project for Clean Energy Promotion Using Solar Photovoltaic System	The Lao People's Democratic Republic	Airport 236kWp PV array earthing system (1/3) (Scale: 1:50, 1:200)	PWT-07

②

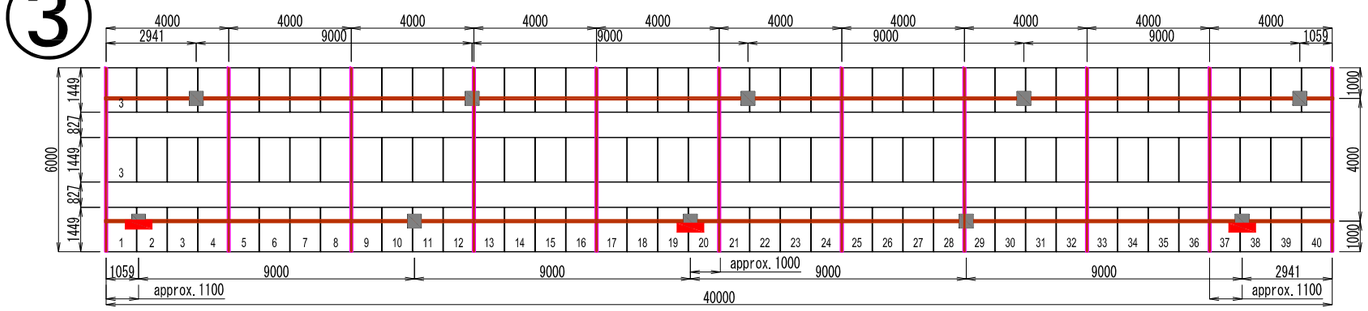




ARRAY– 2
Lightning Protection System Aluminum Bar Conductors 75mm2 total 371.8m
Beside PV modules : 180 x 3 = 240.0m
Horizontal : (5.0+2.8+0.5)x8+3x(0.9*2+1.1*3)= 56.8m
Vertical : 5x(3*3.2+2*1.7+2) = 75.0m
Earthing Terminal Box : 5 nos.
Earthing Copper Plate Electrode 900x900x1.5 : 10 nos.

Scale 0 1 2 3 4 5 10(m)

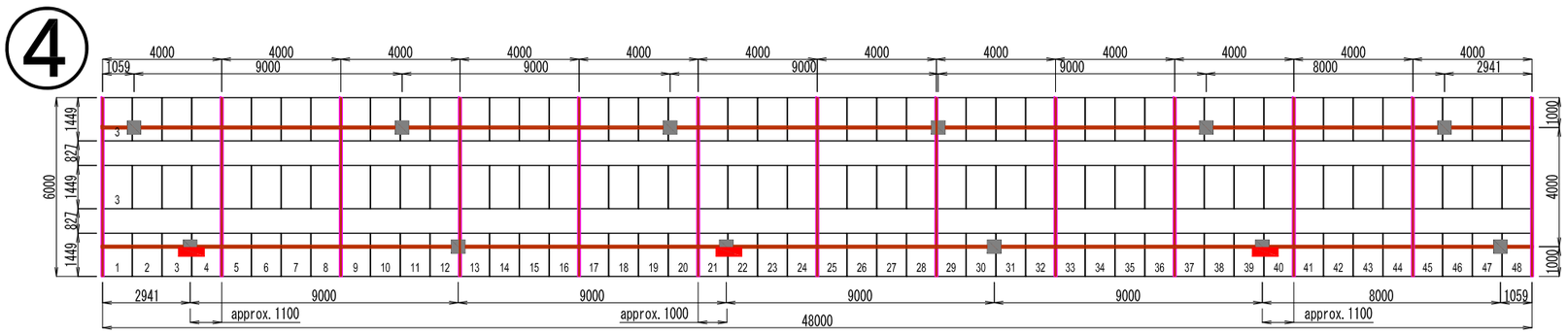
③



ARRAY– 3
Lightning Protection System Aluminum Bar Conductors 75mm2 total 199.5m
Beside PV modules : 40m x 3 = 120.0m
Horizontal : (5.0+2.8+0.5)x3+3x(1.1x 2+1.0) = 34.5m
Vertical : 3x(3*3.2+2*1.7+2) = 45.0m
Earthing Terminal Box : 3 nos.
Earthing Copper Plate Electrode 900x900x1.5 : 6 nos.

Scale 0 1 2 3 4 5 10(m)

④



ARRAY– 4
Lightning Protection System Aluminum Bar Conductors 75mm2 total 223.5m
Beside PV modules : 48m x 3 = 144.0m
Horizontal : (5.0+2.8+0.5)x3+3x(1.1x2+1.0)= 34.5m
Vertical : 3x(3*3.2+2*1.7+2) = 45.0m
Earthing Terminal Box : 3 nos.
Earthing Copper Plate Electrode 900x900x1.5 : 6 nos.

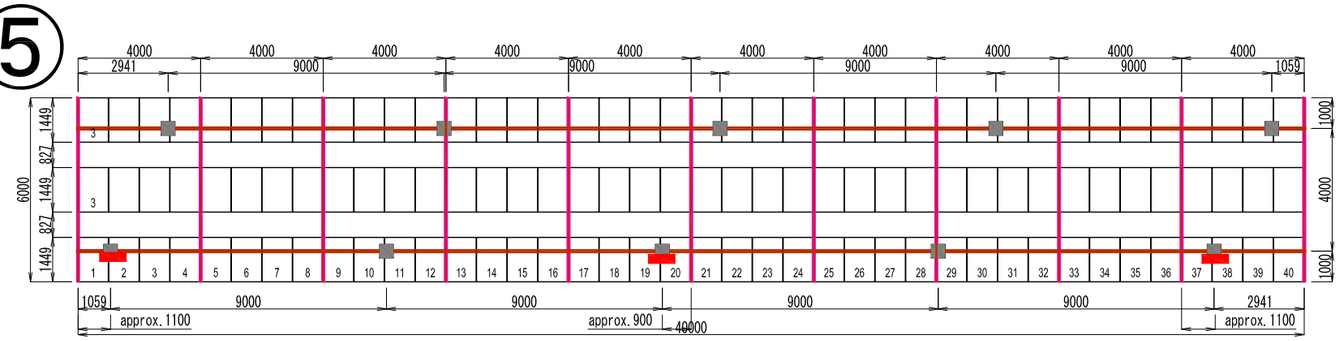
Scale 0 1 2 3 4 5 10(m)

PLAN

NOTE:Module fixing C-channels are not shown on the above plan drawing

	PROJECT	COUNTRY	SHEET CONTENTS	DRAWING NO.
JAPAN INTERNATIONAL COOPERATION AGENCY	Preparatory Survey on the Project for Clean Energy Promotion Using Solar Photovoltaic System	The Lao People's Democratic Republic	Airport 236kWp PV array earthing system (2/3) (Scale: 1:200)	PWT-08

⑤



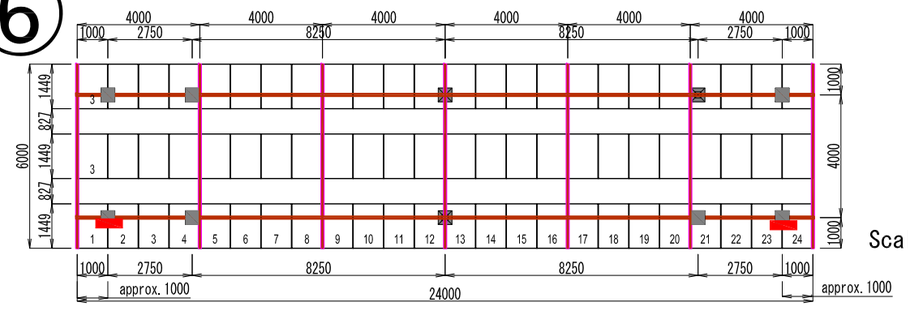
Scale 0 1 2 3 4 5 10(m)

ARRAY- 5

Lightning Protection System Aluminum Bar Conductors 75mm2 total 199.2m
- Beside PV modules : 40m x 3 = 120.0m
- Horizontal : (5.0+2.8+0.5)x3+3x(1.1x2+0.9)= 34.2m
- Vertical : 3x(3*3.2+2*1.7+2) = 45.0m

Earthing Terminal Box : 3 nos.
Earthing Copper Plate Electrode 900x900x1.5 : 6 nos.

⑥



Scale 0 1 2 3 4 5 10(m)

ARRAY- 6

Lightning Protection System Aluminum Bar Conductors 75mm2 total 124.6m
- Beside PV modules : 24m x 3 = 72.0m
- Horizontal : (5.0+2.8+0.5)x2+3x(1.0 x 2)= 22.6m
- Vertical : 2x(3*3.2+2*1.7+2) = 30.0m

Earthing Terminal Box : 2 nos.
Earthing Copper Plate Electrode 900x900x1.5 : 4 nos.

PLAN

NOTE:Module fixing C-channels are not shown on the above plan drawing

JAPAN INTERNATIONAL COOPERATION AGENCY

PROJECT	COUNTRY	SHEET CONTENTS	DRAWING NO.
Preparatory Survey on the Project for Clean Energy Promotion Using Solar Photovoltaic System	The Lao People's Democratic Republic	Airport 236kWp PV array earthing system (3/3) (Scale: 1:200)	PWT-09

APPENDICES

1. MEMBER LIST OF THE STUDY TEAM
2. STUDY SCHEDULE
3. LIST OF PARTIES CONCERNED IN THE RECIPIENT COUNTRY
4. MINUTES OF DISCUSSIONS
5. SOFT COMPONENT (TECHNICAL ASSISTANCE) PLAN
6. LIST OF COLLECTED DATA AND DOCUMENTS
7. REFERENCES

1. MEMBER LIST OF THE STUDY TEAM

Appendix 1 Member of the Study Team

1st Survey

No.	Name	Position	Affiliation
1	Mr. Hiroaki TAKASHIMA	Team Leader	Chief Representative, JICA Laos Office
2	Mr. Yoshiki EHARA	Planning Management	Natural Resources and Energy Group, Industrial Development Department, JICA
3	Yoshie MURAMATSU	Project Formation	In-house Consultant for Industrial Development Department, JICA
4	Mr. Shinji HOSOYA	Procurement Planning and Management	Office of Special Project Management, Second Management Department, JICS
5	Mr. Yasuharu MATSUDA	Chief Consultant/ PV Planning	NEWJEC Inc.
6	Mr. Takashi NAKAZAWA	Grid Connection PV System	NEWJEC Inc.
7	Mr. Tohru IMAI	Electric Equipment	NEWJEC Inc.
8	Mr. Tetsuro WADA	Architectural Design	NEWJEC Inc.
9	Mr. Tomokazu KIMURA	Coordinator 1	NEWJEC Inc.

2nd Survey

No.	Name	Position	Affiliation
1	Mr. Yasuharu MATSUDA	Chief Consultant/ PV Planning	NEWJEC Inc.
2	Mr. Takashi NAKAZAWA	Grid Connection PV System	NEWJEC Inc.
3	Mr. Tohru IMAI	Electric Equipment	NEWJEC Inc.
4	Mr. Takumi MARUOKA	Procurement/ Cost Estimate	NEWJEC Inc.
5	Mr. Yukihiro MIKUMO	Institutional/ Socio Economic	NEWJEC Inc.
6	Mr. Joji ISHIBASHI	Grid Connection and Operation	NEWJEC Inc.
7	Mr. Tetsuro WADA	Architectural Design	NEWJEC Inc.
8	Mr. Norihiro TAKASAWA	Coordinator 2	NEWJEC Inc.

3rd Survey

No.	Name	Position	Affiliation
1	Mr. Yoshiharu YONEYAMA	Team Leader	Senior Representative, JICA Laos Office
2	Ms. Yoshiki EHARA	Coordination Planning	Natural Resources and Energy Group, Industrial Development Department, JICA
3	Mr. Yasuharu MATSUDA	Chief Consultant/ PV Planning	NEWJEC Inc.
4	Mr. Takashi NAKAZAWA	Grid Connection PV System	NEWJEC Inc.
5	Mr. Tohru IMAI	Electric Equipment	NEWJEC Inc.
6	Mr. Tomokazu KIMURA	Coordinator 1	NEWJEC Inc.

2. STUDY SCHEDULE

1st Survey

No.	Date	Day	JICA Mission				Consultant				
			Team Leader	Planning Management	Project Formation	Procurement Planning and Management (JICS)	Chief Consultant	Grid Connection PV system	Electrical Equipment	Architectural Design	Coordinator 1
			Hiroaki TAKASHIMA	Yoshiki EHARA	Yoshie MURAMATSU	Shinji MURAMATSU	Yasuharu MATSUDA	Takashi NAKAZAWA	Tohru IMAI	Tetsuro WADA	Yuichi KIMURA
1	16-Dec-09	Wd							Arriving at Laos from Cambodia		
2	17-Dec-09	Th	C.C to MTWT and MEM	Arriving at Laos			Arriving at Laos from Cambodia		(1) C.C. to JICA, MPWT, DCA, MEM and DOE (2) Site survey on the roof and parking lot at MEM		
3	18-Dec-09	Fr	C.C. to EoJ	C.C. to JICA and EoJ		C.C. to JICA and EoJ	Same with JICA Mission	(1) Site survey on the roof and parking lot at MEM (2) Temporary site survey on parking lot at PMO			
4	19-Dec-09	Sa		Site survey on parking lot and power house at Wattay International Airport		Site survey on parking lot and power house at Wattay International Airport	Same with JICA Mission				
5	20-Dec-09	Su		Indoor work	Arriving at Laos	Indoor work	Internal Meeting and arrangement of collected data				
6	21-Dec-09	Mo		(1) C.C. to DOE, MOE, MPI (2) Site survey at MPI & affiliated institute of MPI			(1) C.C. to DOE and MPI (2) Site survey at MPI & affiliated institute of MPI (3) Visit to EDL and collection of relevant data				(1) C.C. to DOE, MOE and MPI (2) Site survey at MPI etc.
7	22-Dec-09	Tu		(1) C.C. to PMO and requesting permission on site survey (2) Discussion with MEM relating the PV installation at MEM (3) Temporary site survey on parking lot at PMO		Discussion with MEME and site survey at PMO	Same with JICA Mission	Temporary site survey on parking lot at PMO			
8	23-Dec-09	Wd		(1) Reporting the result of survey to MPI (2) Discussion on MD with DCA (3) Ms. MURAMATSU leaves Laos			(1) Visit to L-JATS and collection of data (2) Discussion on MD with DCA	Site survey on electrical room in International Terminal Building		Leaving Laos	Site survey on electrical room in International Terminal Building
9	24-Dec-09	Th	(1) Visit to PMO (2) Reporting to EoJ	(1) Discussion on MD with DOE (2) Visit to PMO (3) Reporting to EoJ (4) Leaving Laos	Arriving at Narita	(1) Discussion on MD with DOE (2) Visit to PMO (3) Reporting to EoJ	(1) Visit to PMO (2) Collection of weathering data (3) Reporting to EoJ	Visit to PMO (Confirmation of candidate site for PV installation)		Arriving at Osaka	(1) Visit to PMO (2) Collection weathering data (3) Visit to local consultant
10	25-Dec-09	Fr		Arriving at Narita		Leaving Laos	Leaving Laos	Leaving Laos			Leaving Laos
11	26-Dec-09	Sa				Arriving at Narita	Arriving at Osaka				Arriving at Narita

2nd Survey

No	Date	Day	Chief Consultant/ PV Planning	Grid Connection PV System	Electric Equipment	Procurement/ Cost Estimation	Institutional/ Social Economic	Grid Connection and Operation	Architectural Design	Coordinator 2
			Yasuharu MATSUDA /NEWJEC	Takashi NAKAZAWA /NEWJEC	Tohru IMAI /NEWJEC	Takumi MARUOKA /NEWJEC	Yukihiro MIKUMO /NEWJEC	Joji ISHIBASHI /NEWJEC	Tetsuro WADA /NEWJEC	Norihiro TAKAZAWA /NEWJEC
1	31-Jan-10	Su	Arriving at Vientiane via BKK							Arriving at Vientiane from BKK
2	1-Feb-10	Mo	・C.C. to DCA ・Site survey on the location of PV display panel at Wattay International Terminal Building ・C.C. to WREA							Same as on the left
3	2-Feb-10	Tu	・C.C. to JICA Laos Office ・C.C. to PMP ・C.C. to L-JATS ・C.C. to EoJ							Same as on the left
4	3-Feb-10	Wd	・Measuring solar trojectory at the parking lot and site survey on the electrical room in Wattay International Terminal Building ・Discussion with PMO on official site survey and collection of data ・Discussion with EDL on electrical specification for grid connection							Same as on the left
5	4-Feb-10	Th	・Remeasuring solar trojectory and power consumption at International Terminal Building			Market survey on local consultants and contractors				Market survey on local consultants and contractors
6	5-Feb-10	Fr	Data collection of exchange rate in Laos	Study on electrical specification and number of equipments		・Market survey on local consultant and local concrete				・Market survey on local consultant and local concrete
7	6-Feb-10	Sa	Preparation for presentation material to be held on February 11, 2010		Market survey on construction materials (cables, gasoline price, etc.)					Indoor work
8	7-Feb-10	Su	Ditto		Study on electrical specification of PV system	Data arrangement				Indoor work
9	8-Feb-10	Mo	Discussion with the environmental office in DOE and preparatio of M.M	Study on electrical specification and number of equipments		・Discussion with the environmental office in DOE ・Visit to ready-mixed concrete company				・Discussion with environmental office in DOE and preparation of the Meeting
10	9-Feb-10	Tu	・Reporting the progress to JICA ・Discussion with DOE on the joint meeting ・Requesting PMO for permission of site survey	・Visit to local steel manufacturer ・Check the presentation material						・Reporting to JICA ・Market survey on insurance related
11	10-Feb-10	Wd	・Printing presentation material	Arrangement of electrical specification and numbers of equipment and quanty		Discussion with local contractors				Preparation of the Meeting

No	Date	Day	Chief Consultant/ PV Planning	Grid Connection PV System	Electric Equipment	Procurement/ Cost Estimation	Institutional/ Social Economic	Grid Connection and Operation	Architectural Design	Coordinator 2
			Yasuharu MATSUDA /NEWJEC	Takashi NAKAZAWA /NEWJEC	Tohru IMAI /NEWJEC	Takumi MARUOKA /NEWJEC	Yukihiro MIKUMO /NEWJEC	Joji ISHIBASHI /NEWJEC	Tetsuro WADA /NEWJEC	Norihiro TAKAZAWA /NEWJEC
12	11-Feb-10	Th	The First Joint Meeting at DOE conference room							Same as on the left
13	12-Feb-10	Fr	・Preparatio of MM of the Meeting ・Discussion with JICA Laos Office	Arrangement of electrical specification and numbers of equipment and quanty		・Discussion with local consultant ・Discussion with JICA Laos Office				・Preparation of MM ・Discussion with JICA
14	13-Feb-10	Sa	・Preparation of MM of the Meeting	Ditto		・Arrangement of collected data				・Preparation of MM
15	14-Feb-10	Su	Confirmation of collecting data and preparation of schedule for the next week	Ditto		Ditto				Leaving Laos and arriving at BKK
16	15-Feb-10	Mo	・Discussion with PMO, DCA and LAA	・Site survey on candidate temporary stock yard ・Requesting the provision of single line diagram and the permission on site survey on new electrical room		・Discussion with local consultants		Arriving at Vientiane via. BKK		
17	16-Feb-10	Tu	・Internal meeting ・Discussion with EDL and PMO		Internal meeting and preparation of cost estimation data	Internal meeting and discussion on cost estimation data		・Internal meeting ・Discussion with EDL and PMO	・Internal meeting ・Preparation of cost estimation data ・Discussion with PMO	
18	17-Feb-10	Wd	・Discussion with LAA and receiving drawings	・Discussion with LAA ・Updating T/S	・Discussion with LAA ・Site survey on air port	・Discussion with local contractor		・Discussion with LAA ・Site survey on airport	・Discussion with local contractor ・Site survey on air port	
19	18-Feb-10	Th	・Site survey on LAA wiring ・Study on mounting structure for PV module	・Site survey on LAA wiring ・Updating the technical specification		・Collection of cost estimation (unit cost) ・Discussion with DOE ・Discussion with local contractor		・Site survey on LAA wiring ・Updating the T/S	・Collection of unit cost data ・Study on mounting structure for PV module	
20	19-Feb-10	Fr	・Discussion with DOE on permission of PMO ・Translating T/S into English	・Finalization of Electrical T/S		・Discussion with local contractor ・Review of cost estimation (unit cost)		・Finalization of Electrical T/S	・Study on mounting frame at airport ・Review of unit cost	
21	20-Feb-10	Sa	・Preparation of basic layout arrangement at Airport	・Study on Grid Code for PV system connection	・Study on construction method for wiring at air port	・Arrangement of unit costs	Arriving at Vientiane via BKK	・Preparation wiring plan at air port	・Preparation of mounting frame drawing and quantity at airport	

No	Date	Day	Chief Consultant/ PV Planning	Grid Connection PV System	Electric Equipment	Procurement/ Cost Estimation	Institutional/ Social Economic	Grid Connection and Operation	Architectural Design	Coordinator 2
			Yasuharu MATSUDA /NEWJEC	Takashi NAKAZAWA /NEWJEC	Tohru IMAI /NEWJEC	Takumi MARUOKA /NEWJEC	Yukihiro MIKUMO /NEWJEC	Joji ISHIBASHI /NEWJEC	Tetsuro WADA /NEWJEC	Norihiro TAKAZAWA /NEWJEC
22	21-Feb-10	Su	・Preparation of basic layout at PMO ・Preparation for the 2nd Meeting	Ditto	Ditto	Ditto	Preparation of environmental screening	Ditto	・Arrangement of unit costs	
23	22-Feb-10	Mo	・Discussion with PMO, L-JATS and LAA)	・Discussion with PMO ・Updating single line diagram for PMO	・Discussion with PMO ・Study on construction method for wiring at PMO	・Discussion with PMO ・Arrangement of unit costs ・Discussion with local contractor	・Discussion with PMO ・Executing screening	・Discussion with PMO and preparation of wiring plan at PMO	・Discussion with ・Study on mounting frame at PMO	
24	23-Feb-10	Tu	・Study on structure & layout at air port ・Preparation for the Meeting	・Preparation of presentation material	・Preparation of wiring plan at PMO	・Reporting contacted local contractors to DOE	Market survey on Taxes system in Laos	・Preparation wiring plan at PMO and review of presentation material	・Study on design condition for mounting frame ・Preparation of basic drawing of the frame	
25	24-Feb-10	Wd	・Preparation for the Meeting ・Collection of rainfall data ・Collection of LAA Budget LAA	Ditto	・Preparation of wiring plan at PMO ・Review of presentation material	Discussion with local contractors	Market survey on Labor condition	・Preparation of wiring plan at PMO	Discussion with local contractors	
26	25-Feb-10	Th	・2nd Joint Meeting ・Preparation of MM	・2nd Joint Meeting ・Preparation of MM	・2nd Joint Meeting ・Preparation of MM	・2nd Joint Meeting ・Discussion with local contractor	・2nd Joint Meeting ・Preparation of MM	・2nd Joint Meeting ・Preparation of MM	・2nd Joint Meeting ・Discussion with local contractor	
27	26-Feb-10	Fr	・Reporting to JICA Laos Office ・Reporting to EoJ	・Reporting to JICA Laos Office ・Reporting to EoJ	・Reporting to JICA Laos Office ・Reporting to EoJ	・Confirmation of transportation route ・Discussion with local contractor	・Market survey on custom duties ・Reporting to JICA Laos Office	・Confirmation of transportation route ・Reporting to JICA Laos office	・Confirmation of transportation route ・Reporting to JICA Laos office	
28	27-Feb-10	Sa	Internal Meeting							
29	28-Feb-10	Su	Preparation for moving Cambodia							
30	1-Mar-10	Mo	Moving from Laos to Cambodia							

3rd Survey

No.	Date	Day	JICA Mission		Consultant			
			Team Leader	Coordination Planning	Chief Consultant/ PV Planning	Grid Connection PV System	Electric Equipment	Coordinator 1
			Yoshiharu YONEYAMA /JICA	Yoshiki EHARA /JICA	Yasuharu MATSUDA /NEWJEC	Takashi NAKAZAWA /NEWJEC	Tohru IMAI /NEWJEC	Yuichi KIMURA /NEWJEC
1	5-Sep-10	Su		Arriving at Vientiane	Arriving at Vientiane		Arriving at Vientiane	
2	6-Sep-10	Mo		・C.C. to MEM ・C.C. to JICA Laos Office ・C.C. to PMO and explain MD	Same with JICA Mission	Arriving at Vientiane	Same with JICA Mission	Arriving at Vientiane
3	7-Sep-10	Tu		・C.C. to DCA ・Meeting with PMO and new requesting by PMO about parking lot structures	Same with JICA Mission	・C.C. to EDL ・Explanation of DR to EDL relating to system protection devices ・Site survey on additional candidate parking lot at the airport and collecting the relevant drawings (in the afternoon)		
4	8-Sep-10	We		(1) Explanation of Draft Report at MEM participated by MEM, PMO, MPWT,LAA, EDL (2) Proposal of alternative countermeasures by Mr. Viraphonh (MEM) responding to PMO's new request - Option 1 : Asking PMO to respect the MD concluded in January 2010 - Option 2 : Installing the same capacity PV system with that of PMO at new EDL's premise - Option 3 : Expanding install capacity at the airport (verbal approval was gotten by DCA) (3) Site survey on new EDL's premise				
5	9-Sep-10	Th		(1) Discussion with DOE or modification of Draft MD (2) Confirmation of PMO' s written request (draft)	・Same with JICA mission in the morning ・ Site survey on new EDL's premise in the afternoon	(1) Collection of electrical equipment drawings for new EDL Building at EDL in the morning (2) Site survey on new EDL's premise and survey on the existing substation in the afternoon		
6	10-Sep-10	Fr	Reporting to EoJ Mr. EHARA leaves Laos		Reporting to EoJ and leaving Laos	Reporting to EoJ and leaving Laos	Reporting to EoJ and leaving Laos	Reporting to EoJ and leaving Laos
7	11-Sep-10	Sa		Arriving at Narita	Arriving at Osaka	Arriving at Osaka	Arriving at Osaka	Arriving at Narita

3. LIST OF PARTIES CONCERNED IN THE RECIPIENT COUNTRY

Appendix 3 List of Parties Concerned in the Recipient Country

Ministry of Energy and Mines (MEM)

Mr. Bountheung PHENGTHAVONGSA	Director of the Cabinet
Mr. Viraphonh VIRAVONG	Director General, Department of Electricity (DOE)
Mr. Hatsady SYSOULATH	Deputy Director General , DOE
Mr. Anousak PHONGSAVATH	Head of Division, Rural Electrification Division (RED), DOE
Mr. Khanthara SISAMOUTH	Deputy Director of Division, Rural Electrification Division, DOE
Mr. Nobuo HASHIMOTO	JICA Expert, Power Policy Advisor, DOE
Mr. Chantho MILATTANNAPHENG	Director of Division, Social and Environmental Management Division, DOE

Ministry of Public Works and Transportation (MPWT)

Mr. Vanpheng CHANTHAPONE	Deputy Director General, Department of Civil Aviation (DCA)
Mr. Somphonh SYGNAVONG	Director of Aerodrome Division, Department of Civil Aviation

LAO Airport Authority (LAA)

Mr. Khamkong MOLAPHOUM	Director General
Mr. Donh SITHAMMALA	Deputy Director General
Mr. Baysy VONGXAY	Director of Power/Water Supply Center
Mr. Chanmany KHOUNXAIGNABOUASY	Chief of Accounting Office

Electricité du LAOS (EDL)

Mr. Boung MANIVONG	Director of Business – Finance Division
Mr. Vanhdy VILAYSANE	Deputy Director, Technical Department
Mr. Xanaphone PHONEKEO	Manager, Technical Standard Office
Mr. Khamphila PHOMMASEN	Deputy Manager of Statistics & Planning Office
Mr. Bounkheut VILAYHAK	Deputy Chief of Technical Standard Office
Mr. Sengphet SOULIGNAVONG	Manager of Loss Reduction & DSM Department

Prime Minister's Office (PMO)

Prof. Dr. VONGDARA Boviengkham	Chairman of the Prime Minister's Office, Vice Minister
Mr. Phaychith SENGMANY	Deputy Director – General of Cabinet
Mr. Outhen KEOBOUALA	Director General, Administration and Protocol Department
Mr. Inpone SULIUTTAMITH	Deputy Director of Administration and Protocol Department
Engr. Somphone PHANOUSITH	Permanent secretary of National Science Council, Assistant Advisor to the Prime Minister, National Science Council
Mme Khempheng PHOLSENA	Minister to the Prime Minister's Office, Head of Water Resources and Environmental Administration (WREA), Chairperson of the Lao National Mekong Committee
Mr. Keo Ta PHE TSAKHONE	Department of the Finance

Ministry of Planning and Investment (MPI)

Mr. Fongsamout KHAMVALVONGSA	Secretary to Minister
Mr. SOMMALA Kouthong	Senior Officer, Asia- Pacific and Africa Division, Department of International Cooperation

Lao-Japan Airport Terminal Services

Mr. Kaykeo VORARATH	General Director
Mr. Chanthaboun PATHAMMAVONG	Deputy General Manager, Facility Department
Mr. Yoshitaka TAKEMURA	Deputy General Director, General Manager
Mr. Bounheuang SOUKHASEUM	Assistant Manager, Maintenance Section, Facility Department

Embassy of Japan

Mr. Masaaki MIYASHITA	Ambassador of Japan
Mr. Ken NAKAMURA	First Secretary
Mr. Yuichi METOKU	Second Secretary

Japan International Cooperation Agency, Laos Office

Mr. Hiroaki TAKASHIMA	Chief Representative
Mr. Masato TOGAWA	Chief Representative
Mr. Yoshiharu YONEYAMA	Senior Representative
Mr. Hiroaki ASAOKA	Representative
Mr. Mizuki MATSUZAKI	Representative
Ms. Yoko HATTORI	Representative

4. MINUTES OF DISCUSSIONS

Minutes of Discussions

on

the Preparatory Survey

on

The Project for Introduction of Clean Energy by Solar Electricity Generation System

The Government of Japan (hereinafter referred to as "GoJ") has established Cool Earth Partnership as a new financial mechanism. Through this, GoJ is cooperating actively with developing countries' efforts to reduce greenhouse gasses emissions, such as efforts to promote clean energy. A new scheme of grant aid, "Program Grant Aid for Environment and Climate Change", was also created by GoJ as a component of this financial mechanism. According to the initiative of Cool Earth Partnership, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), in consultation with GoJ, decided to conduct a Preparatory Survey (hereinafter referred to as "the Survey") on the The Project for Introduction of Clean Energy by Solar Electricity Generation System (hereinafter referred to as "the Project").

JICA sent to the Lao People's Democratic Republic (hereinafter referred to as "Lao PDR") the Preparatory Survey Team (hereinafter referred to as "the Team"), headed by Mr. Hiroaki TAKASHIMA, Chief Representative, JICA Laos Office, and is scheduled to stay in Lao PDR from December 17th to 25th, 2009.

The Team held discussions with the concerned officials of the Government of Lao PDR (hereinafter referred to as "GoL") and conducted a field survey.

In the course of discussions and field survey, both sides confirmed the main items described in the attached sheets.

Vientiane Capital

DATE: 12th January, 2010

Mr. Hiroaki TAKASHIMA
Leader
Preparatory Survey Team
Japan International Cooperation Agency

Mr. Hatsady SYSOULATH
Deputy Director General
Department of Electricity
Ministry of Energy and Mines

DEVANE PASEUTH.

The Prime Minister's Office

Mr. Yakua LOPANGKAO
Director General
Department of Civil Aviation
Ministry of Public Works and Transportation

ATTACHMENT

1. Current Situation

GoL recognizes the importance of renewable energies promotion including solar energy as a sustainable energy resource and one of countermeasures against climate change.

In Lao PDR, Solar Home System is popular equipment in un-electrified rural area. Even though, GoL recognizes lack of awareness of effects of climate change among people. GoL is keen to promote renewable energy including solar power.

Department of Electricity, Ministry of Energy and Mines is now drafting the "National Renewable Energy Strategy". The target of the strategy is to electrify 90 percent of all households by 2020, and 30 percent of these are expected to utilize renewable energy including solar energy.

In this situation, both sides confirm that the Project, which introduces photovoltaic (PV) power generation systems connected to the national power grid, is one of the important pilot systems to accelerate introduction of solar energy.

2. Objective of the Project

The objective of the Project is to promote clean energy utilization and achieve CO2 emissions reductions by installing the PV system to be connected to the national grid.

3. Responsible Organization and Implementing Organization

The responsible organization is Ministry of Energy and Mines (hereinafter referred to as "MEM") (The organization chart of responsible organization is shown in Annex-1). MEM will take overall responsibility of the Project including necessary coordination between relevant ministries and organizations.

The implementing organizations are Prime Minister's Office (hereinafter referred to as "PMO") and Ministry of Public Works and Transportation (The organization chart of the implementation organizations are shown in Annex-2). The implementation organizations shall take responsibilities, such as securing the land space and preparation, under coordination by MEM for smooth implementation of the Project.

4. Items Requested by GoL

4-1. After discussions with the Team, the installation of the on-grid power generating system using photovoltaic including following equipments were requested by the GoL.

The Team took note the request from GoL, and explained that the amount of capacity might be reduced through assessment by the relevant Japanese authorities. GoL understood the explanation.

Table 1 Projects requested by Lao Government

	Description
Location	PMO Complex and Wattay International Airport
Outline	The power produced is used for each building and excess power will be

	transmitted to the national grid.
Requested equipment	(1) Solar module PMO: approximately 50 kWp Wattay International Airport: approximately 90 kWp Total capacity will be 140 kWp (2) Junction boxes (3) Power Conditioners (4) Distribution boards (5) Cables for electric distribution (6) Data collecting and display device
Capacity Building	(1) On the Job training (2) Operation and maintenance training (3) Data collection and analysis training

4-2. The project sites are shown in Annex-3.

4-3. GoL explained that there is no duplication between requested contents of the Project and any other plans implemented by the other donors or GoL.

4-4. GoL has understood that the detailed component and the design of the Project shall be confirmed at the time of 2nd phase of the Preparatory Survey.

4-5. The Team will report the findings and items requested by the GoL to JICA Headquarters and the Government of Japan.

5. Japan's Program Grant Aid for Environment and Climate Change

GoL understood the Japan's Program Grant Aid for Environment and Climate Change scheme explained by the Team as described in Annex-4, 5, 6, 7 and 8.

GoL suggested that some items indicated in Annex-8 such as item No.3 and some items of No. 7 would not be necessary in the Project. The Team took note and explained that those items should be clarified with the result of 2nd Preparatory Survey and detailed design.

6. Schedule of the Study

6-1. The Team will proceed to further survey in Lao PDR until December 25th 2009 as the 1st phase of the Preparatory Survey.

6-2. After completion of the 1st phase of the Preparatory Survey, the Team will report the results to GoL, JICA Headquarters and GoJ.

6-3. Based on the results of the 1st phase of the Preparatory Survey, JICA will conduct the 2nd phase

of Preparatory Survey for the discussion of detailed component and design as well as collection of further data necessary for design by the end of March 2010.

6-4. JICA will prepare the draft report and reference document in English and dispatch a mission to Lao PDR in order to explain their contents at the end of July 2010.

6-5. When the contents of the report are accepted in principle by the GoL, JICA will prepare the final report and reference document, and submit them to the GoL and to the Procurement Agent by the end of August 2010.

7. Other Relevant Issues

7-1 Permission of Land Acquisition / Usage

GoL agreed that the lands and facilities to install the PV system shall be allocated by the Implementation Organizations, and necessary arrangements shall be completed by the time of the 2nd Phase of the Preparatory Survey.

GoL also agreed to secure temporary stockyard during installation of the equipment and materials.

7-2 Procurement of Equipment

The Team explained that, in accordance with the policy of Government of Japan, products of Japan shall be procured for major equipments in the Project. GoL also requested products of Japan for major equipments.

7-3 Coordination with Relevant Organizations

The responsible Organization for the Project shall be the focal point for the Team, and responsible for the coordination with the relevant organizations. GOL agreed to establish a consultative committee in order to coordinate with the Japanese side such as the JICA Laos Office and the procurement agency. Terms of Reference of the Consultative Committee is referred to Annex-9.

7-4 Environmental and Social Considerations

The Team explained the outline of JICA Environmental and Social Considerations Guideline (hereinafter referred to as "the JICA Guideline") to GoL. GoL took the JICA Guideline into consideration, and shall complete the necessary procedures.

7-5 Operation and Maintenance

The Implementation Organizations secure and allocate the necessary budget and personnel for the operation and maintenance of grid-connected PV system procured and installed under the Project. Responsible Organization oversees the operation and maintenance activities by the Implementation Organizations.

7-6 Customs and Tax exemption

GoL agreed that GoL shall be responsible for the exemption and/or reimbursement (payment/assumption) of all customs, tax, levies and duties incurred in Laos for implementation of the Project.

7-7 GoL shall ensure the security of all concerned Japanese nationals working for the Project, if deemed necessary.

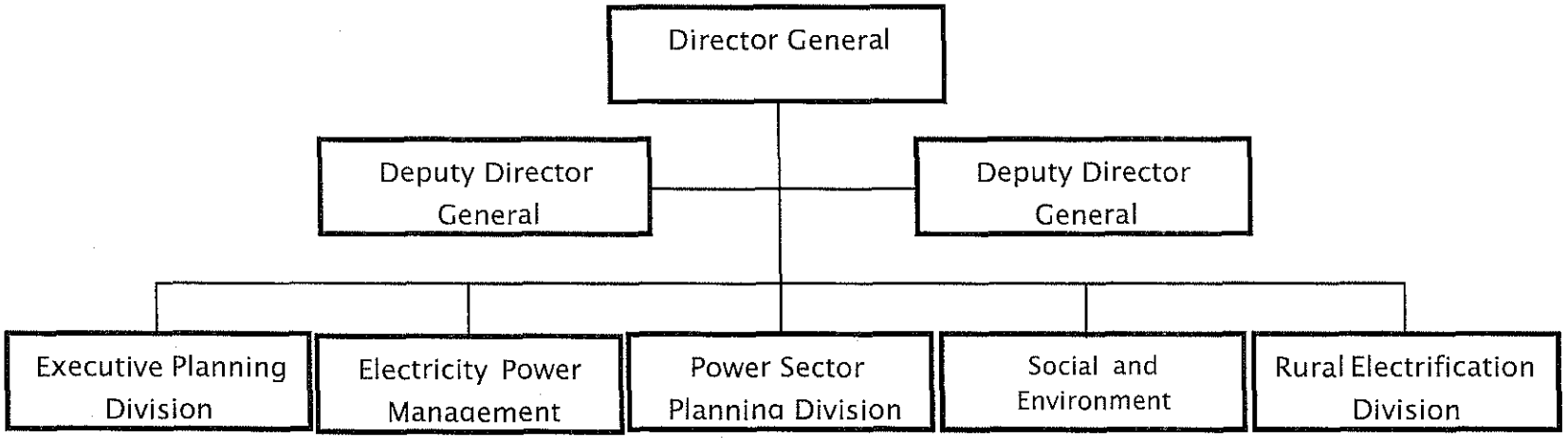
7-8 GoL shall provide necessary numbers of counterpart personnel to the Team during the period of their Surveys in Laos

<List of Annex>

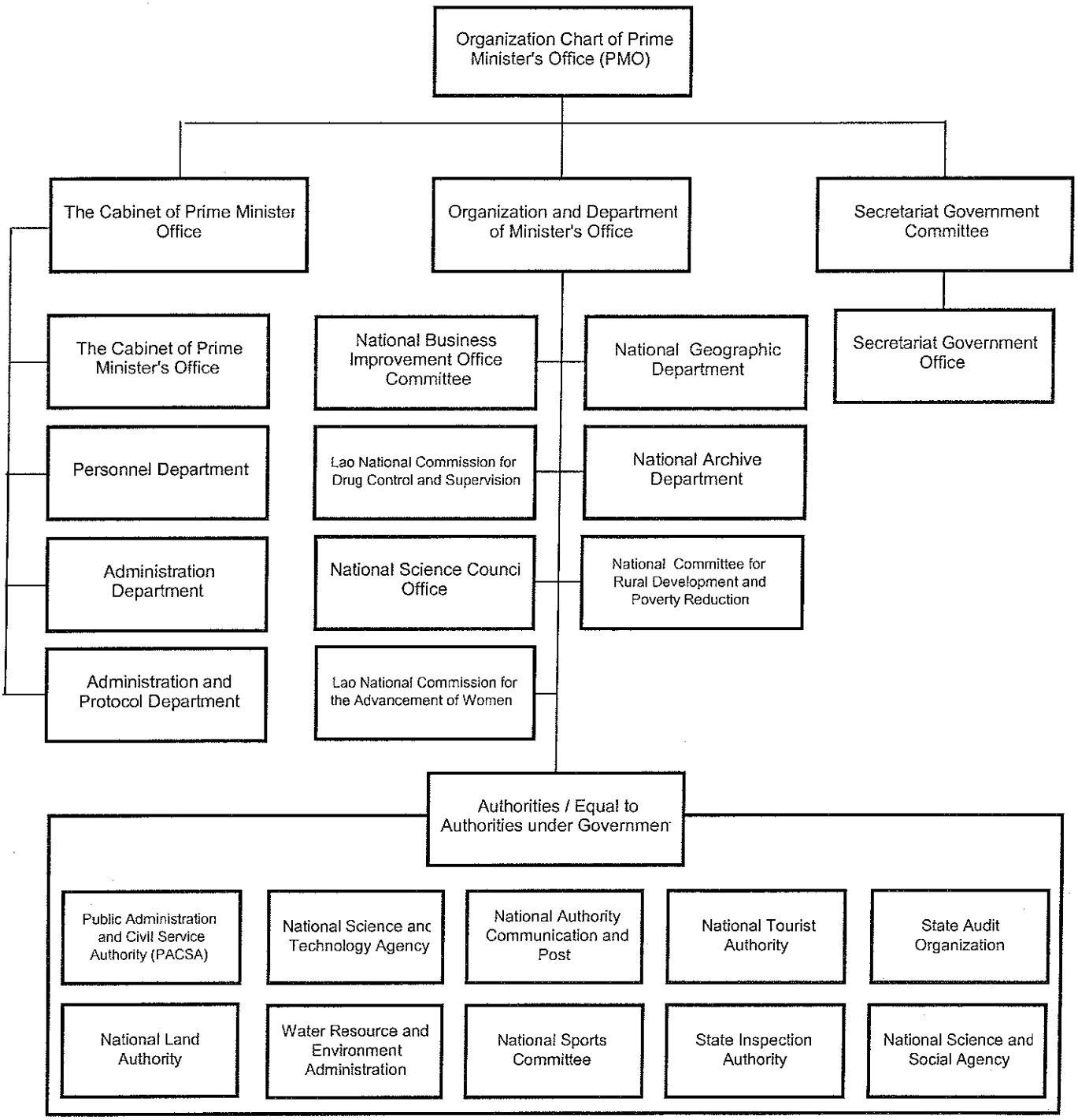
Annex-1 Organization Chart of Responsible Organization
Annex-2 Organization Charts of Implementing Organizations
Annex-3 Candidate site of the Project
Annex-4 Program Grant Aid for Environment and Climate Change
Annex-5 General Flow of Program Grant Aid for Environment and Climate Change
Annex-6 Flow of Funds for Project Implementation
Annex-7 Project Implementation System
Annex-8 Major Undertakings to be taken by Each Government
Annex-9 Terms of References of the Consultative Committee

Organization Chart of Responsible Organization (Department of Electricity, Ministry of Energy and Mines)

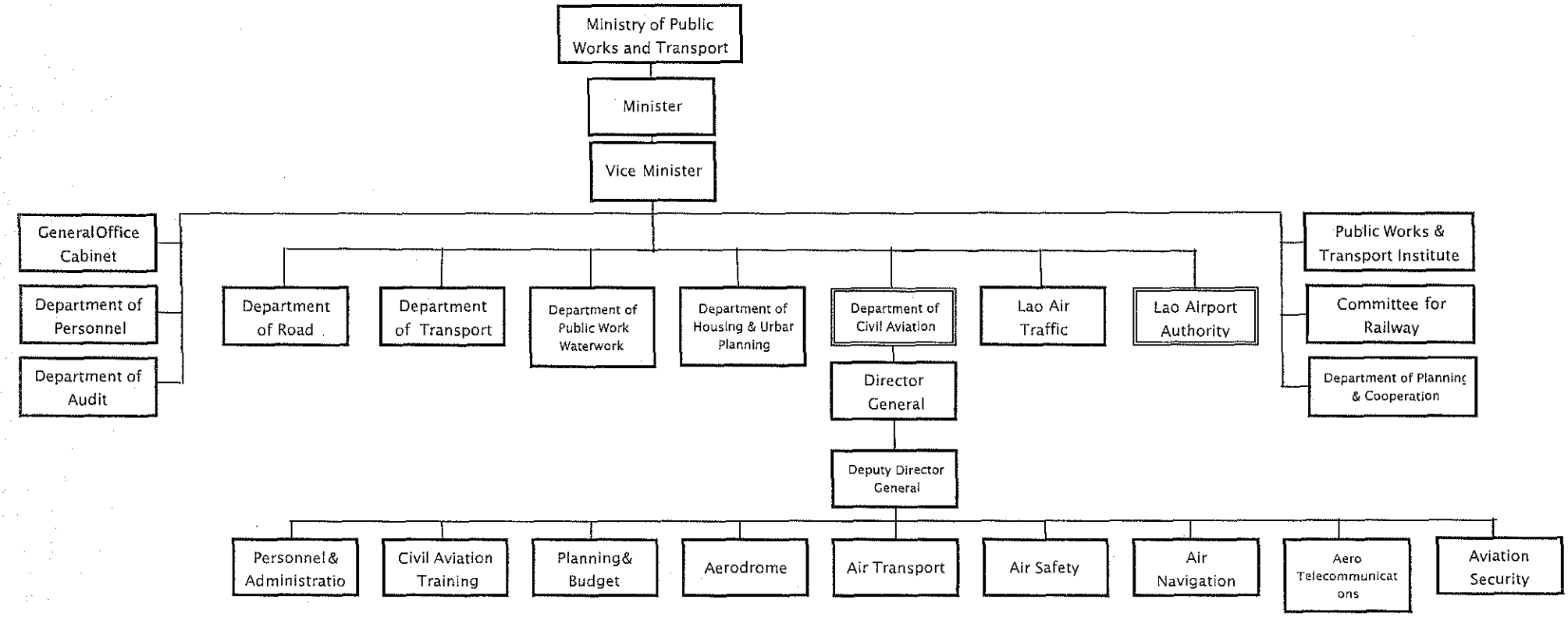
Department of Electricity



Organization Charts of Implementing Organization (Prime Minister's Office)

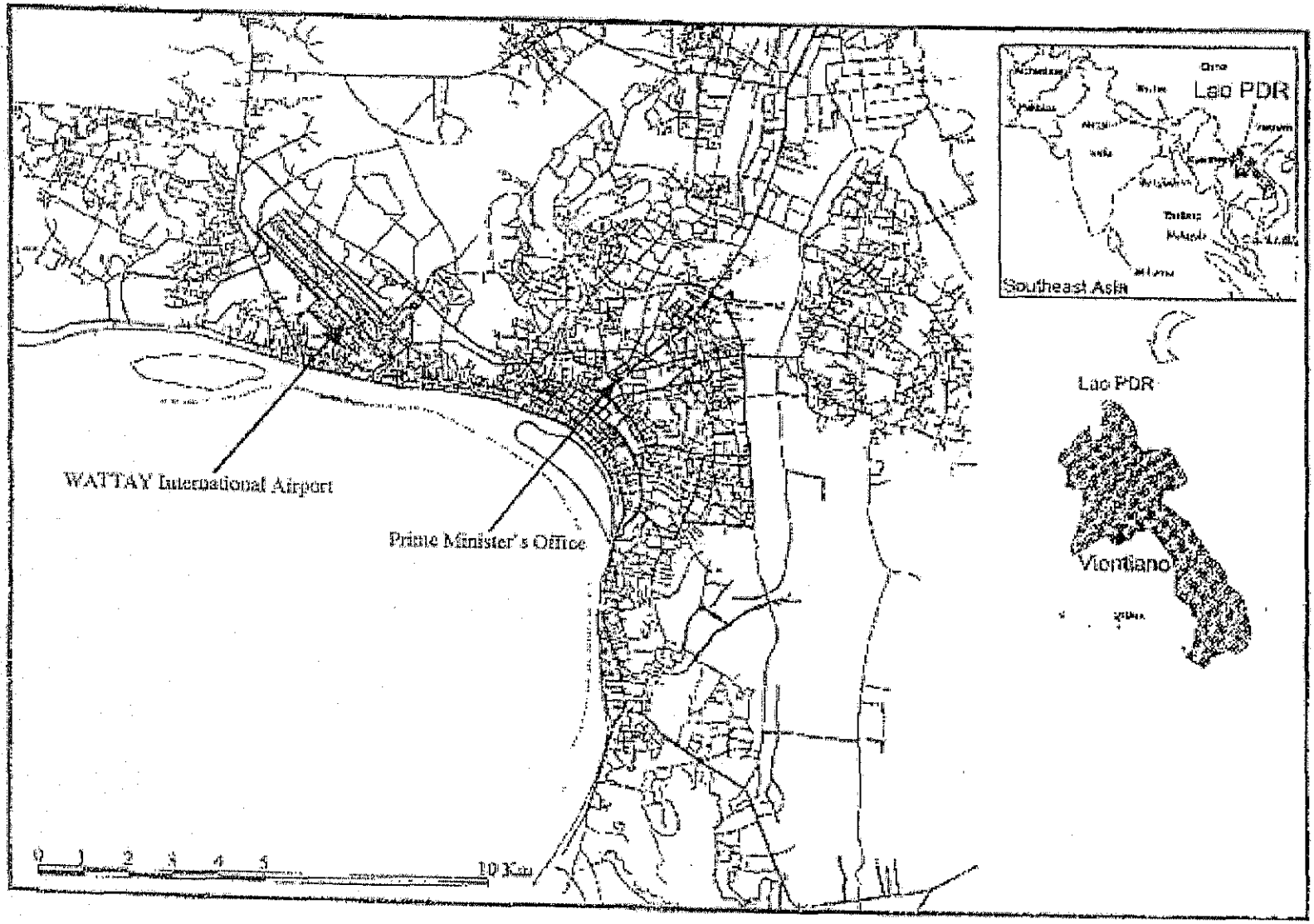


Organization Charts of Implementing Organization (Ministry of Public Works and Transportation)



Candidate Site for PV System supported by the Project

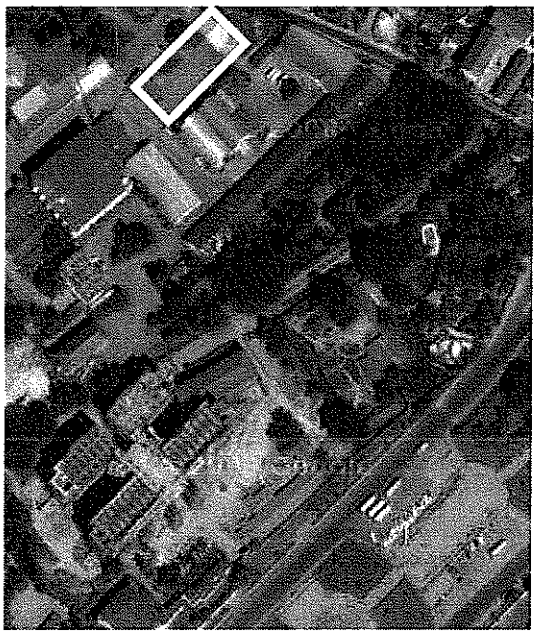
Location:



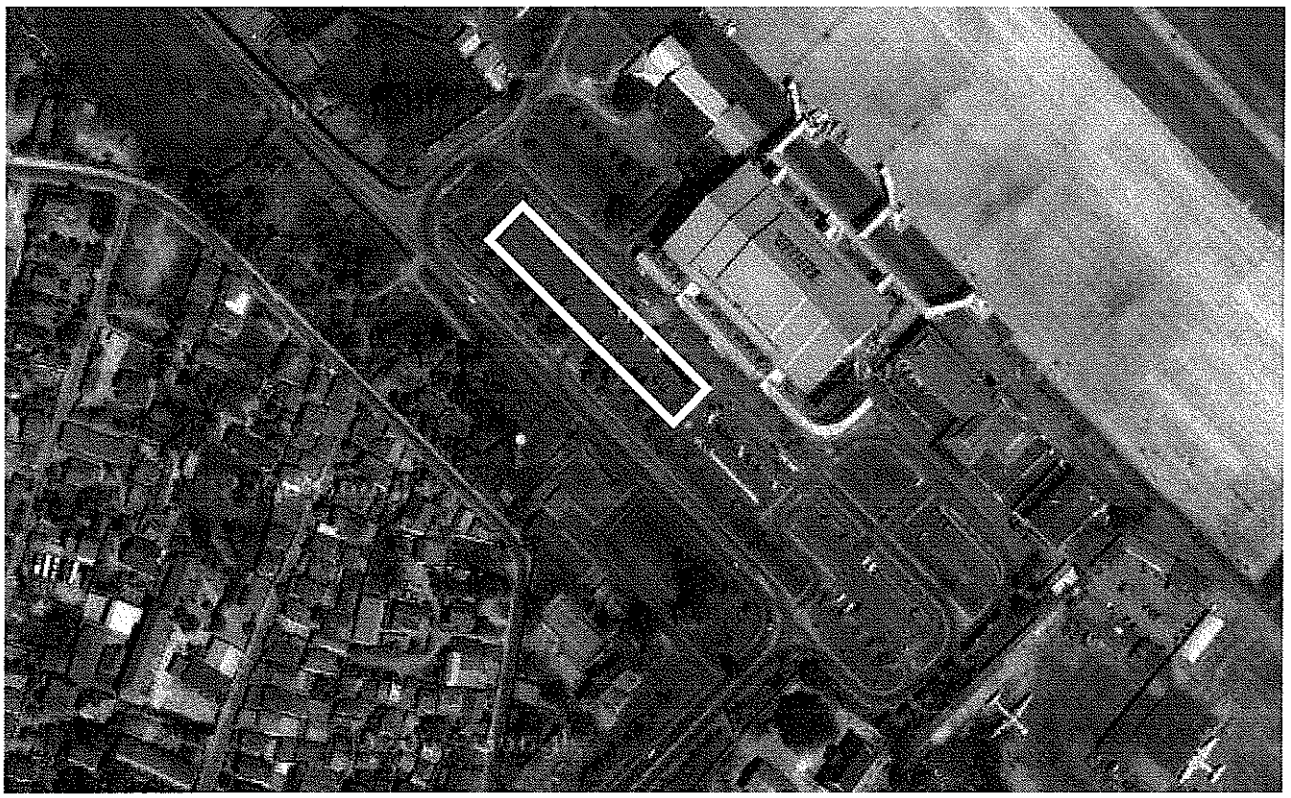
Candidate Site for PV System supported by the Project

Site Map:

Prime Minister's Office



WATTAY International Airport



Program Grant Aid for Environment and Climate Change of the Government of Japan
(Provisional)

The Grant Aid provides a recipient country (hereafter referred to as "the Recipient") with non-reimbursable funds to procure the facilities, equipment, and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

Based on "Cool Earth Partnership" initiative of the Government of Japan, the Program Grant Aid for Environment and Climate Change (hereafter referred to as "GAEC") aims to mitigate effects of global warming by reducing GHGs emission (mitigation; e.g. improvement of energy efficiency) and to take adaptive measures (adaptation; e.g. measures against disasters related to climate change, including disaster prevention such as enhancing disaster risk management).GAEC may contain multiple components that can be combined to effectively meet these needs.

1. Procedures for GAEC

GAEC is executed through the following procedures.

Preparatory Survey 1	Preparatory Survey for project identification conducted by Japan International Cooperation Agency (JICA)
Application	Request made by a recipient country
Appraisal & Approval	Appraisal by the Government of Japan and Approval by the Cabinet
Determination of Implementation	The Notes exchanged between the Government of Japan and the Recipient Country
Grant Agreement (hereinafter referred to as the "G/A")	Agreement concluded between JICA and the Recipient
Preparatory Survey 2	Preparatory Survey for design conducted by JICA
Implementation	Procurement through the Procurement Agency by the Recipient

Firstly, if the candidate project for a GAEC is identified by the Recipient and the Government of Japan, the Government of Japan (the Ministry of Foreign Affairs) examines it whether it is eligible for GAEC. When the request is deemed appropriate, JICA, in consultation with the Government of Japan, conducts the Preparatory Survey (hereafter referred to as "the Survey") on the candidate project as Phase 1 of the Survey with Japanese consulting firms.

Secondly, the Recipient submits the official request to the Government of Japan, while the appropriateness, necessity and the basic components of the project are examined in the course of Phase 1 of the Survey,

Thirdly, the Government of Japan appraises the project to see whether it is suitable for Japan's GAEC, based on the Survey report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes (E/N) signed by the Governments of Japan and the Recipient.

Fifthly, JICA engages Grant Agreement (G/A) with the Recipient and executes the Grant by making payments of the amount agreed in the E/N and strictly monitors that the funds of the Grant are properly and effectively used.

Procurement Management Agent is designated to conduct the procurement services of products and services (including fund management, preparing tenders, contracts) for GAEC on behalf of the Recipient. The Agent is an impartial and specialized organization that will render services according to the Agent Agreement with the Recipient. The Agent is recommended to the Recipient by the Government of Japan and agreed between the two Governments in the Agreed Minutes ("A/M").

2 Preparatory Survey

1) Contents of the Survey

The purpose of the Preparatory Survey (hereafter referred to as "the Survey"), conducted by JICA on a requested project (hereafter referred to as "the Project"), is to provide the basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Survey are as follows:

- Confirmation of background, objectives, and benefits of the Project and institutional capacity of agencies and communities concerned of the Recipient necessary for project implementation.
- Evaluation of relevance of the Project to be implemented under the Grant Aid Scheme for Environment and Climate Change from a technical, social, and economic point of view.
- Confirmation of items agreed upon by both parties concerning the basic concept of the Project.
- Preparation of the design of the Project and reference document for tender.
- Estimation of cost for the Project.

The contents of the original request will be modified, as found necessary, in the design of the Project according to the guidelines of Japan's Grant Aid scheme.

The Government of Japan requests the Government of the Recipient to take whatever measures necessary to ensure its responsibility in implementing the Project. Such measures must be guaranteed even if they may fall outside the jurisdiction of the implementing organization of the Recipient. This has been confirmed by all relevant organizations of the Recipient through the Minutes of Discussions.

2) Selection of consulting firms

For the smooth implementation of the Survey, JICA will conduct the Survey with registered consulting firms. JICA selects the firms based on proposals submitted by firms with interest in implementing the Survey. The firms selected will carry out the Preparatory Survey and prepare a report, based on the terms of reference set by JICA.

3. Implementation of GAEC after the E/N

1) Exchange of Notes (E/N)

The content of GAEC will be determined in accordance with the Notes exchanged by the two

Governments concerned, in which items including, objectives of the project, period of execution, conditions and amount of the Grant Aid are confirmed.

2) Details of Procedures

Details of procedures on procurement and services under GAEC will be agreed between the authorities of the two governments concerned at the time of the signing of the G/A.

Essential points to be agreed are outlined as follows:

a) JICA will supervise the implementation of the Project.
b) Products and services will be procured and provided in accordance with JICA's "Procurement Guidelines for the Program Grant Aid for Environment and Climate Change."
c) The Recipient will conclude a contract with the Agent.
d) The Agent is the representative acting in the name of the Recipient concerning all transfers of funds to the Agent.

3) Focal points of "Procurement Guidelines for the Program Grant Aid for Environment and Climate Change"

a) The Agent

The Agent is the organization, which provides procurement of products and services on behalf of the Recipient according to the Agent Agreement with the Recipient. The Agent is recommended to the Recipient by the Government of Japan and agreed between the two Governments in the A/M.

b) Agent Agreement

The Recipient will conclude the Agent Agreement, in principle, within two months after the signing of the G/A, in accordance with the A/M. The scope of the Agent's services will be clearly specified in the Agent Agreement.

c) Approval of the Agent Agreement

The Agent Agreement is prepared as two identical documents and the copy of the Agent Agreement will be submitted to JICA by the Recipient through the Agent. JICA confirms whether the Agent Agreement is concluded in conformity with the E/N, A/M, and G/A and the Procurement Guidelines for the Program Grant Aid for Environment and Climate Change then approves the Agent Agreement.

The Agent Agreement concluded between the Recipient and the Agent will become effective after the approval by JICA in a written form.

d) Payment Methods

The Agent Agreement will stipulate that "Regarding all transfers of the fund to the Agent, the Recipient will designate the Agent to act on behalf of the Recipient and issue a Blanket Disbursement Authorization ("the BDA")to conduct the transfer of the fund (hereinafter referred to as "the Advances") to the Procurement Account from the Recipient Account.

The Agent Agreement will clearly state that the payment to the Agent will be made in Japanese yen from the Advances and that the final payment to the Agent will be made when the total remaining amount become less than three percent (3%) of the Grant and its accrued interests excluding the Agent's fees.

e) Products and Services Eligible for Procurement

Products and services to be procured will be selected from those defined in the G/A.

f) Firm and Consultant

The firm and consultant who would contract with the Agent shall be Japanese Nationals.

The consultants that will be employed to do detail design and supervise the work for the Project, however will be in principle, Japanese nationals recommended by JICA for the purpose of maintaining technical consistency with the Study.

g) Method of Procurement
When conducting the procurement, sufficient attention will be paid to transparency in selecting the firms and for this purpose, competitive tendering will be employed in principle.

h) Tender Documents
The tender documents should contain all information necessary to enable tenderers to prepare valid offers for the products and services to be procured by GAEC.

The rights and obligations of the Recipient, the Agent and the firms supplying products and services should be stipulated in the tender documents to be prepared by the Agent. Aside from this, the tender documents will be prepared in consultation with the Recipient.

i) Pre-qualification Examination of Tenderers
The Agent may conduct a pre-qualification examination of tenderers in advance of the tender so that the invitation to the tender can be extended only to eligible firms. The pre-qualification examination should be performed only with respect to whether the prospective tenderers have the capability of concluding the contracts.

For this, the following points should be taken into consideration:
(1) Experience and past performance in contracts of similar kind
(2) Financial credibility (including assets such as real estate)
(3) Existence of offices and other items to be specified in the tender documents.
(4) Their potentialities to use necessary personnel and facilities.

j) Tender Evaluation
The tender evaluation should be implemented on the basis of the conditions specified in the tender documents.

Those tenderers which substantially conform to the technical specifications and other stipulations of the tender documents, will be judged in principle on the basis of the submitted price, and the tenderer who offers the lowest price will be designated as the successful tenderer.

The Agent will submit a detailed evaluation report of tenders to JICA for its information, while the notification of the results to the tenderers will not be premised on the confirmation by JICA.

k) Additional procurement
If there is any remaining balance after the competitive and/or selective tendering and/or direct negotiation for a contract, and if the Recipient would like to procure additional items, the Agent is allowed to conduct this additional procurement, following the points mentioned below:
(1) Procurement of same products and services
When the products and services to be additionally procured are identical with the initial tender and a competitive tendering is judged not efficient, additional procurement can be conducted by a negotiated contract with the successful tenderer of the initial tender.
(2) Other procurements

When products and services other than those mentioned above in (1) are to be procured, the procurement should be conducted through competitive tendering. In this case, the products and services for additional procurement will be selected from among those in accordance with the G/A.

l) Conclusion of the Contracts
In order to procure products and services in accordance with the guideline, the Agent will conclude contracts with firms selected by tendering or other methods.

m) Terms of Payment
The contract will clearly state the terms of payment. The Agent will make payment from the "advances," against the submission of the necessary documents from the firm on the basis of the conditions specified in the contract. When the services are the object of procurement, the Agent may pay certain portion of the contract amount in advance to the firms on the conditions that such firms submit the advance payment guarantee worth the amount of the advance payment to the Agent.

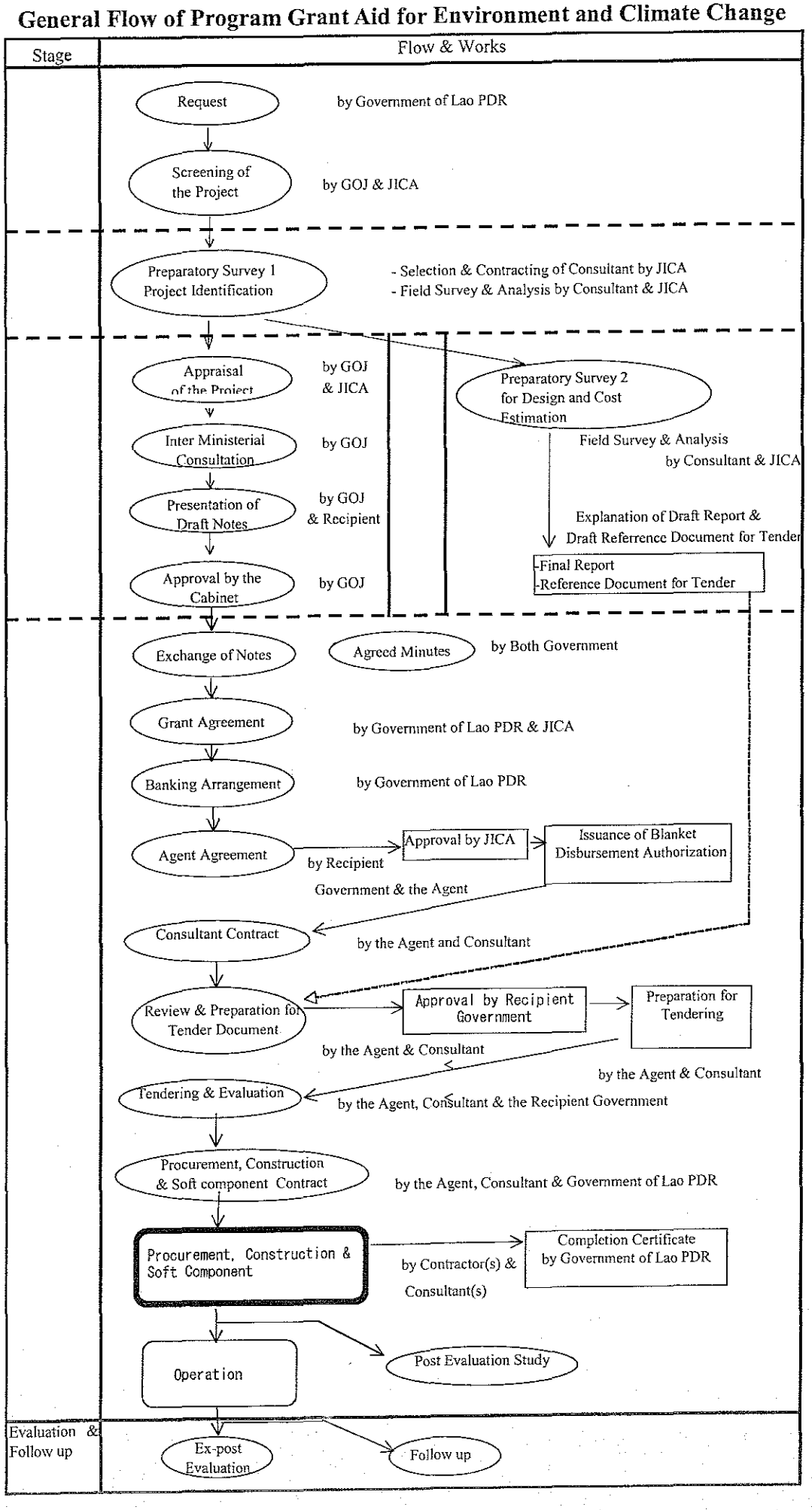
4) Undertakings required by the Government of the Recipient Country
In the implementation of the Grant Aid Project, the Recipient is required to undertake necessary measures as the following:

a) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the Project.
b) To provide facilities for distributing electricity, water supply and drainage and other incidental facilities in and around the sites.
c) To ensure all the expense and prompt execution for unloading, customs clearing at the port of disembarkation and domestic transportation of products purchased under the Grant Aid,
d) To ensure that customs duty, internal taxes and other fiscal levies that may be imposed in the Recipient with respect to the purchase of the Components and the Agent's services will be exempted by the Government of the Recipient.
e) To accord all the concerned parties, whose services may be required in connection with supply of the products and services under the contracts, such facilities as may be necessary for their entry into the Recipient and stay therein for the performance of their work.

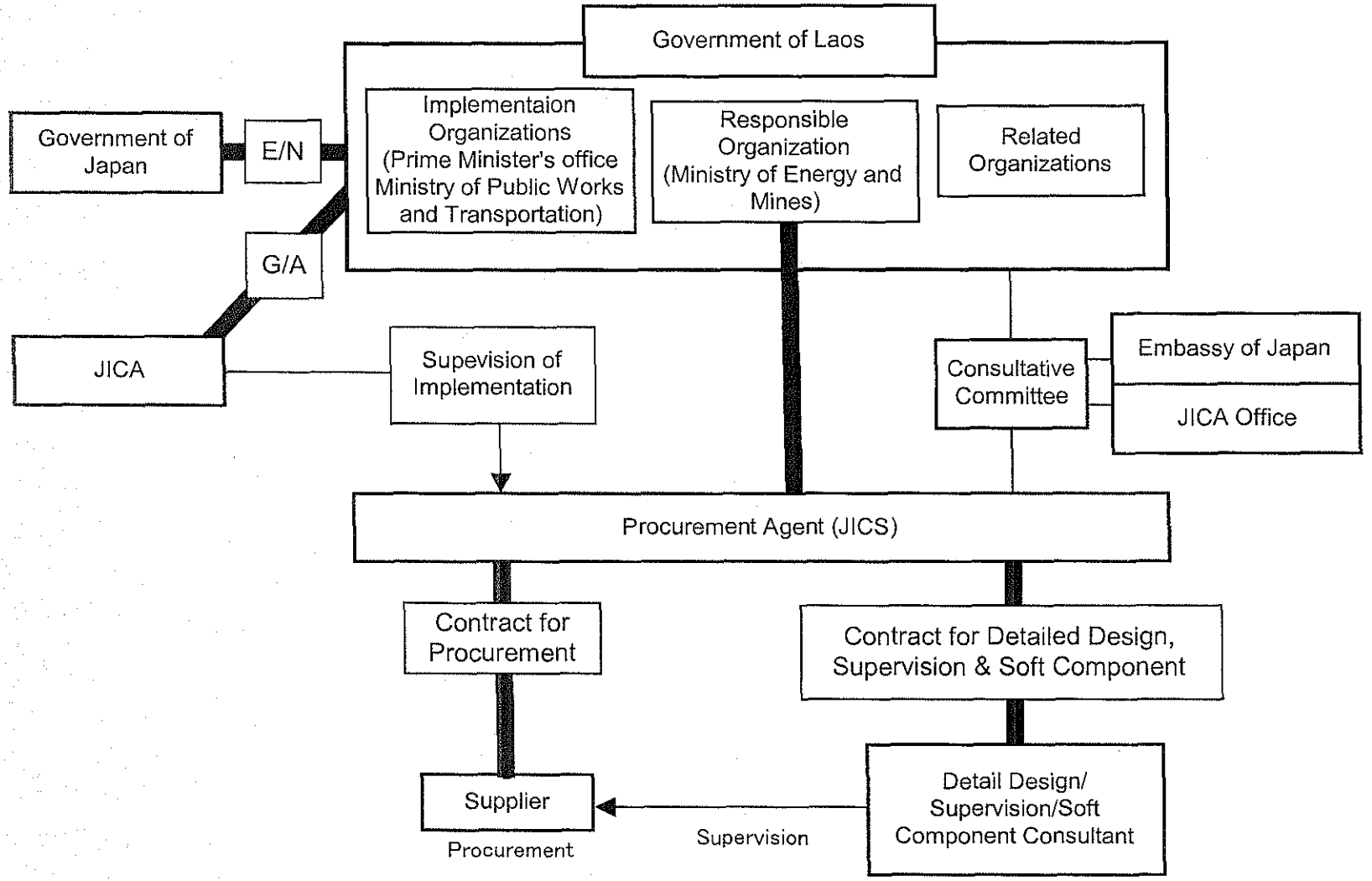
5) "Proper use of funds"
The Recipient is required to operate and maintain the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign personnel necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

6) "Export and Re-export" of products
The products purchased under the Grant and its accrued interest will not be exported or re-exported from the Recipient.

General Flow of Program Grant Aid for Environment and Climate Change

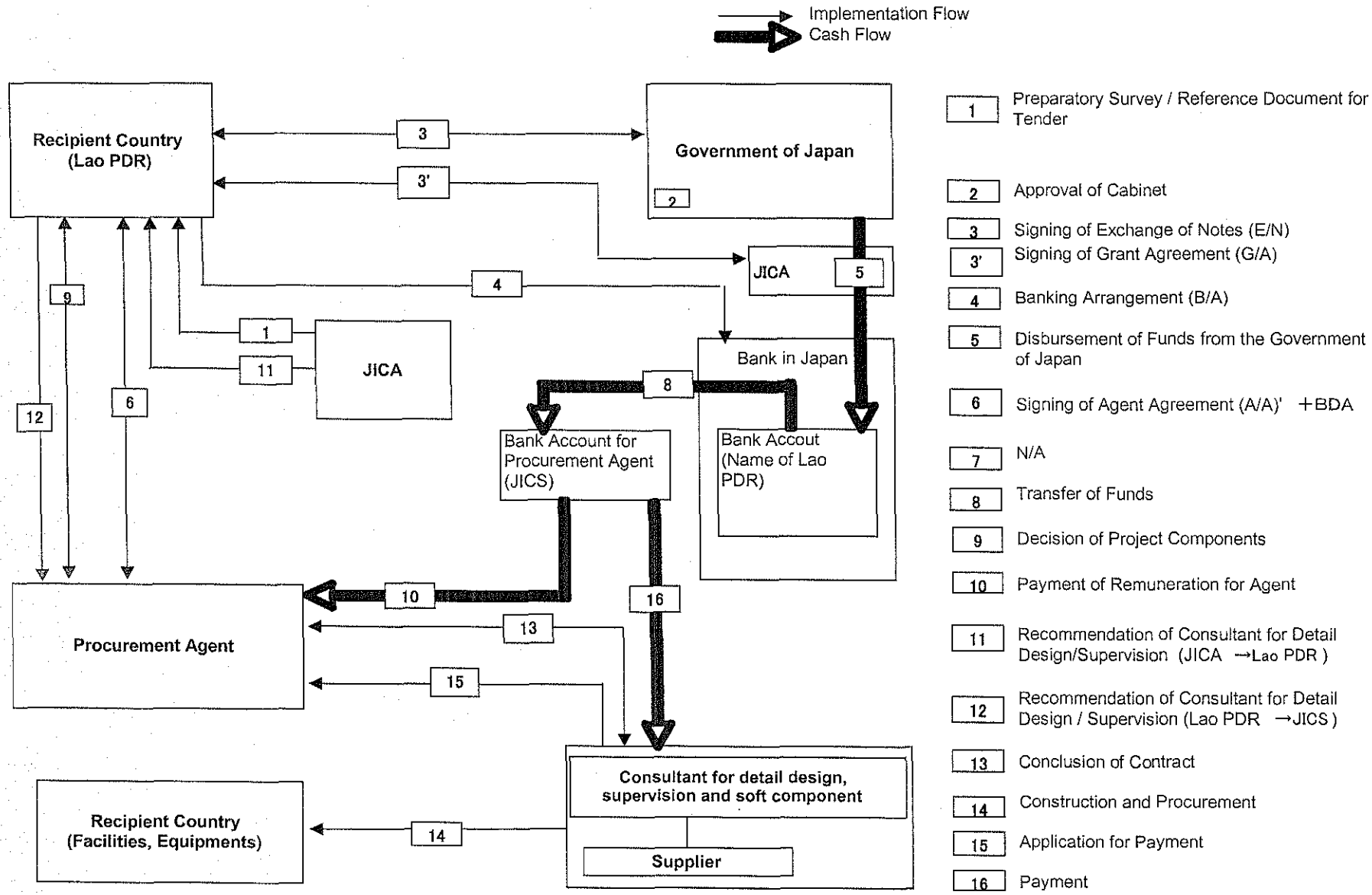


Project Implementation System



Flow of Funds for Project Implementation

Annex-7



1 Preparatory Survey / Reference Document for Tender

2 Approval of Cabinet

3 Signing of Exchange of Notes (E/N)

3' Signing of Grant Agreement (G/A)

4 Banking Arrangement (B/A)

5 Disbursement of Funds from the Government of Japan

6 Signing of Agent Agreement (A/A)' +BDA

7 N/A

8 Transfer of Funds

9 Decision of Project Components

10 Payment of Remuneration for Agent

11 Recommendation of Consultant for Detail Design/Supervision (JICA →Lao PDR)

12 Recommendation of Consultant for Detail Design / Supervision (Lao PDR →JICS)

13 Conclusion of Contract

14 Construction and Procurement

15 Application for Payment

16 Payment

Annex-8

Major undertakings to be taken by each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	To secure land		●
2	To clear, level and reclaim the site when needed urgently		●
3	To construct gates and fences in and around the site		●
4	To construct a parking lot if necessary		●
5	To construct roads		
	1) Within the site	●	
	2) Outside the site and Access road		●
6	To construct the facility and install the equipment	●	
7	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities if necessary:		
	1)Electricity		
	a. The power distribution line to the site		●
	b. The drop wiring and internal wiring within the site	●	
	c. The main circuit breaker and transformer for the site	●	
	2) Water Supply		
	a. The city water distribution main to the site		●
	b. The supply system within the site (receiving and elevated tanks)	●	
	3) Drainage		
	a. The city drainage main (for conveying storm water, sewage, etc. from the site)		●
	b. The drainage system within the site (for sewage, ordinary waste, storm water, etc.)	●	
	4) Gas Supply		
	a. The city gas main to the site		●
	b. The gas supply system within the site	●	
	5) Telephone System		
	a. The telephone trunk line to the main distribution frame/panel (MDF) of the building		●
	b. The MDF and the extension after the frame/panel	●	
	6) Furniture and Equipment		
	a. General furniture		●
	b. Project equipment	●	
8	To bear the following commissions applied by the bank in Japan for banking services based upon the Bank Arrangement (B/A):		
	1) Payment of bank commission		●
9	To ensure all the expense and prompt execution of unloading and customs clearance at the port of disembarkation in the recipient country		
	1) Marine or air transportation of the products from Japan or third countries to the recipient	●	
	2) To ensure all the expense and prompt execution of unloading, tax exemption and customs clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	●	
10	To accord Japanese nationals and / or nationals of third countries, including persons employed by the agent whose services may be required in connection with the Components such facilities as may be necessary for their entry into recipient country and stay therein for the performance of their work.		●
11	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the purchase of the Components and to the employment of the Agent will be exempted by the Government of recipient country		●
12	To maintain and use properly and effectively the facilities that are constructed and the equipment that is provided under the Grant.		●
13	To bear all the expenses, other than those covered by the Grant and its accrued interest, necessary for the purchase of the Components as well as for the agent's fees.		●
14	To ensure environmental and social consideration for the Programme.		●

Terms of Reference of the Consultative Committee (Provisional)

1. To confirm an implementation schedule of the Program for the speedy and effective utilization of the Grant and its accrued interest.

2. To discuss the modifications of the Program, including modification of the design of the facility.

3. To exchange views on allocations of the Grant and its accrued interest as well as on potential end-users.

4. To identify problems which may delay the utilization of the Grant and its accrued interest, and to explore solutions to such problems.

5. To exchange views on publicity related to the utilization of the Grant and its accrued interest.

6. To discuss any other matters that may arise from or in connection with the G/A.

Minutes of Discussions
on
the Preparatory Survey (Outline Design)
on
The Project for Introduction of Clean Energy by Solar Electricity Generation System
in
the Lao People's Democratic Republic

(Explanation on Draft Final Report)

In December 2009, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched to the Lao People's Democratic Republic (hereinafter referred to as "Lao PDR") a Preparatory Survey Team on the Project for the Introduction of Clean Energy by Solar Electricity Generation System (hereinafter referred to as "the Project"), to hold discussions with relevant officials of the Government of Lao PDR (hereinafter referred to as "GoL") to conduct field surveys and to make technical evaluations. After discussing results of the Preparatory Survey in Japan, JICA prepared a Draft Outline Design Study Report.

In order to explain and to consult with the concerned officials of GoL on the components of the Draft Final Report, JICA dispatched to Lao PDR a Preparatory Survey Team for Draft Final Report Explanation (hereinafter referred to as "the Team"), which is headed by Mr. Yoshiharu YONEYAMA, Senior Representative of JICA Laos Office, from September 5th to 11th, 2010.

As a result of the discussions held between the Team and concerned officials of GoL and further consideration in Japan, the main items described on the attached sheets are confirmed.

Vientiane Capital, March, 16th, 2011

Mr. Yoshiharu YONEYAMA
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan

Mr. Hatsady SYSOULATH
Deputy Director General
Department of Electricity
Ministry of Energy and Mines
Lao People's Democratic Republic

Mr. Inthanousone SISANONH
Deputy Director General
Department of Civil Aviation
Ministry of Public Works and Transportation
Lao People's Democratic Republic

ATTACHMENT

1. Components of the Draft Final Report

Department of Electricity, Ministry of Energy and Mines (hereinafter referred to as "MEM") and Department of Civil Aviation (hereinafter referred to as "DCA"), Ministry of Public Works and Transportation (hereinafter referred to as "MPWT") accepted in principle the components of the Draft Final Report explained by the Team.

2. Program Grant Aid for Environment and Climate Change of the Government of Japan

GoL understood the contents of the Minutes of Discussions signed by the Team and GoL on 12th January, 2010 (hereinafter referred to as "the previous M/D"), and agreed to take the necessary measures confirmed on the previous M/D for smooth implementation of the Program following procedures of the Program Grant Aid for Environment and Climate Change of the Government of Japan as shown in **Annex-1**.

3. Confirmation of progress made for the previous M/D

3.1. Project site and capacity of PV system

The Team and GoL confirmed that project site is Wattay International Airport only as shown in **Annex-2**. The Team explained that the capacity of PV system can be increased up to 236kWp from 90 kWp in the previous M/D based on the result of outline design and cost estimation. The GoL accepted the change of PV capacity.

3.2. Implementing Agencies

The Team and GoL confirmed that Lao Airport Authority (hereinafter referred to as LAA) is the implementing agency for the Project on behalf of DCA.

4. Equipments to be procured

The Team explained that the list of equipment to be procured is as shown in **Annex-3** based on the result of the 2nd Preparatory Survey conducted in February 2010. After discussions, the Team and GoL agreed to procure the major equipment such as PV module, Power Conditioner and Transformer from Japan, while third country products are acceptable for other type of equipment and accessories.

5. Procurement Process for the Project

The Team and GoL reconfirmed that procurement process will be supervised by the Procurement Agent (hereinafter referred to as "the Agent") through necessary consultations with the Consultative Committee (hereinafter referred to as "the Committee"). The Team and GoL also reconfirmed roles of the Agent as follows;

(1) The Agent will render the services stipulated in the provisions of the Grand Agreement (hereinafter referred to as "the G/A") as well as the Exchange of Notes (hereinafter referred to as "the E/N") for the Project;

(2) The Agent will undertake the procurement procedures necessary for the Program according to the provisions of the G/A and the E/N and any other relevant guidelines

(3) JICA will provide a Final Report to the Agent; and

(4) The Agent will commence the procurement according to the contents of the Final Report of the Outline Design.

The Team explained that if tender price exceeds the amount agreed on the G/A and the E/N, quantity or/and items of the equipment would be reduced until the cost for the Project comes down to the amount agreed on the G/A and the E/N.

GoL agreed that if there is a remaining amount of the cost for the Project after tenders, additional items of equipment would be procured based on priorities which were set in the Final Report. Both sides confirmed that the parking lot in front of the domestic terminal building as shown in **Annex-2** would be the priority site in case of additional PV panel installation needed.

GoL also understood that decision on addition or reduction of the equipment to be procured would be made through necessary consultations with members of the Committee.

6. Project Cost

GoL agreed that the cost for the Program should not exceed the upper limit of amount agreed on in the E/N. The Team and GoL also agreed that the cost for the Project contains procurement cost of equipment, the cost for transportation up to the site for the Project, installation cost, the Consultant fee, the Agent fee, and the cost for soft component for the technical support of operation and maintenance of equipment.

7. Confidentiality of the Project

(1) Detailed specifications of the Facilities

The Team and GoL agreed that all the information related to the Project including detailed drawings and specifications of the facilities and equipment and other technical information shall not be released to any outside parties (i.e. outside of JICA, GoL and the Agent) before conclusion of all the contract(s) for the Project.

(2) Confidentiality of the Cost Estimation

The Team explained the cost estimation of the Project as described in **Annex-4**. The Team and GoL agreed that the cost for the Project estimates should never be duplicated or released to any outside parties (i.e. outside of JICA, GoL and the Agent) before tender for the Project. GoL understood that the cost for the Project Estimation attached as Annex-3 is not final and is subject to change as a result of examination through revision of the Outline Design Study.

8. The Consultative Committee

GoL agreed that MEM would chair the Committee in order to facilitate consultation and procurement process. The Terms of Reference of the Committee are outlined in Annex-8 of the previous M/D.

The members of the Committee are as follows:

(1) Representative(s) of MEM (Chair)
(2) Representative(s) of MPWT
(3) Representative(s) of LAA
(4) Representative(s) of JICA Laos Office

The first meeting of the Committee shall be held after the signing of the consultant contract between the Agent and the consultant. Further meetings shall be held upon request base of either GoL or the Japanese side. The Agent may advise JICA and GoL on the necessity to call for a meeting of the Committee.

9. Other Relevant Issues

9.1. Undertakings required by GoL

The Team requested GoL to abide by the following undertakings by GoL in addition to major undertakings described in the previous M/D and in **Annex-5** of this M/D. GoL agreed to do so.

(1) Land usage for PV system

MPWT is the owner of the land for the following equipment and materials for PV system. GoL has reconfirmed that there is no objection for the implementation of the Project.

1) for PV system
2) for Temporary stockyard

(2) Environmental and Social Considerations

GoL reconfirmed that EIA and IEE are not required for the project implementation of solar generation.

(3) Application of the Related Laws and Regulations

1) GoL agreed that the structural design for the installation of PV system should comply with the Architectural Regulation in Japan and Lao PDR.
2) Electrical design for Grid-connected PV system should be done in accordance with JIS/IEC, Grid Code in Lao PDR and Lao Electric Power Technical Standard (2004).

(4) Customs and Tax Exemption

GoL agreed that MEM should be responsible for the exemption of all customs, tax, levies and duties incurred in Laos for the implementation of the Project..

(5) Assignment of Counterpart Personnel

1) Overall project management

DCA and LAA will assign the following personnel for overall project management and

coordination for the implementation within one month after the signing of this M/D.

- A Project Director
- A Project Manager
- Necessary technical staff

2) Soft Component

GoL agreed to assign necessary personnel in accordance with the soft component plan proposed by the Team.

LAA will assign the focal Counterpart Personnel for the soft component.

Other personnel will be assigned from MEM and Elecricite Du Laos as required at the time of implementation of the Soft Component.

9.2. Ownership and Operation and Maintenance (O&M) Responsibilities of Equipments

GoL has reconfirmed that the MPWT is the final owner of Equipment and responsible for securing necessary budget and personnel for Operation and Maintenance (O&M) of Grid-connected PV system procured and installed under the Program. GoL confirmed that the Equipments procured under the Project shall be fully operated and maintained by LAA with assistance of Electricite Du Laos.

<List of Annex>

Annex-1 Program Grant Aid for Environment and Climate Change of the Government of Japan

Annex-2 Location Map of the Project Site

Annex-3 List of Equipments

Annex-4 Project Cost Estimation (Confidential)

Annex-5 Major Undertakings to be taken by GoL

Program Grant Aid for Environment and Climate Change
of the Government of Japan
(Provisional)

The Grant Aid provides a recipient country (hereafter referred to as "the Recipient") with non-reimbursable funds to procure the facilities, equipment, and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

Based on "Cool Earth Partnership" initiative of the Government of Japan, the Program Grant Aid for Environment and Climate Change (hereafter referred to as "GAEC") aims to mitigate effects of global warming by reducing GHGs emission (mitigation; e.g. improvement of energy efficiency) and to take adaptive measures (adaptation; e.g. measures against disasters related to climate change, including disaster prevention such as enhancing disaster risk management).GAEC may contain multiple components that can be combined to effectively meet these needs.

1. Procedures for GAEC

GAEC is executed through the following procedures.

Preparatory Survey 1	Preparatory Survey for project identification conducted by Japan International Cooperation Agency (JICA)
Application	Request made by a recipient country
Appraisal & Approval	Appraisal by the Government of Japan and Approval by the Cabinet
Determination of Implementation	The Notes exchanged between the Government of Japan and the Recipient Country
Grant Agreement (hereinafter referred to as the "G/A")	Agreement concluded between JICA and the Recipient
Preparatory Survey 2	Preparatory Survey for design conducted by JICA
Implementation	Procurement through the Procurement Agency by the Recipient

Firstly, if the candidate project for a GAEC is identified by the Recipient and the Government of Japan, the Government of Japan (the Ministry of Foreign Affairs) examines it whether it is eligible for GAEC. When the request is deemed appropriate, JICA, in consultation with the Government of Japan, conducts the Preparatory Survey (hereafter referred to as "the Survey") on the candidate project as Phase 1 of the Survey with Japanese consulting firms.

Secondly, the Recipient submits the official request to the Government of Japan, while the appropriateness, necessity and the basic components of the Program are examined in the course of Phase 1 of the Survey,

Thirdly, the Government of Japan appraises the Program to see whether it is suitable for Japan's GAEC, based on the Survey report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the Program, once approved by the Cabinet, becomes official with the Exchange of Notes (E/N) signed by the Governments of Japan and the Recipient.

Fifthly, JICA engages Grant Agreement (G/A) with the Recipient and executes the Grant by making payments of the amount agreed in the E/N and strictly monitors that the funds of the Grant are properly and effectively used.

Procurement Management Agent is designated to conduct the procurement services of products and services (including fund management, preparing tenders, contracts) for GAEC on behalf of the Recipient. The Agent is an impartial and specialized organization that will render services according to the Agent Agreement with the Recipient. The Agent is recommended to the Recipient by the Government of Japan and agreed between the two Governments in the Agreed Minutes ("A/M").

2. Preparatory Survey

1) Contents of the Survey

The purpose of the Preparatory Survey (hereafter referred to as "the Survey"), conducted by JICA on a requested project (hereafter referred to as "the Project"), is to provide the basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Survey are as follows:

- Confirmation of background, objectives, and benefits of the Project and institutional capacity of agencies and communities concerned of the Recipient necessary for project implementation.
- Evaluation of relevance of the Project to be implemented under the Grant Aid Scheme for Environment and Climate Change from a technical, social, and economic point of view.
- Confirmation of items agreed upon by both parties concerning the basic concept of the Project.
- Preparation of the design of the Project and reference document for tender.
- Estimation of cost for the Project.

The contents of the original request will be modified, as found necessary, in the design of the Project according to the guidelines of Japan's Grant Aid scheme.

The Government of Japan requests the Government of the Recipient to take whatever measures necessary to ensure its responsibility in implementing the Project. Such measures must be guaranteed even if they may fall outside the jurisdiction of the implementing organization of the Recipient. This has been confirmed by all relevant organizations of the Recipient through the Minutes of Discussions.

2) Selection of consulting firms

For the smooth implementation of the Survey, JICA will conduct the Survey with registered consulting firms. JICA selects the firms based on proposals submitted by firms with interest in implementing the Survey. The firms selected will carry out the Preparatory Survey and

prepare a report, based on the terms of reference set by JICA.

3. Implementation of GAEC after the E/N

1) Exchange of Notes (E/N)
The content of GAEC will be determined in accordance with the Notes exchanged by the two Governments concerned, in which items including, objectives of the project, period of execution, conditions and amount of the Grant Aid are confirmed.

2) Details of Procedures
Details of procedures on procurement and services under GAEC will be agreed between the authorities of the two governments concerned at the time of the signing of the G/A.

Essential points to be agreed are outlined as follows:
a) JICA will supervise the implementation of the Project.
b) Products and services will be procured and provided in accordance with JICA's "Procurement Guidelines for the Program Grant Aid for Environment and Climate Change."
c) The Recipient will conclude a contract with the Agent.
d) The Agent is the representative acting in the name of the Recipient concerning all transfers of funds to the Agent.

3) Focal points of "Procurement Guidelines for the Program Grant Aid for Environment and Climate Change"
a) The Agent
The Agent is the organization, which provides procurement of products and services on behalf of the Recipient according to the Agent Agreement with the Recipient. The Agent is recommended to the Recipient by the Government of Japan and agreed between the two Governments in the A/M.

b) Agent Agreement
The Recipient will conclude the Agent Agreement, in principle, within two months after the signing of the G/A, in accordance with the A/M. The scope of the Agent's services will be clearly specified in the Agent Agreement.

c) Approval of the Agent Agreement
The Agent Agreement is prepared as two identical documents and the copy of the Agent Agreement will be submitted to JICA by the Recipient through the Agent. JICA confirms whether the Agent Agreement is concluded in conformity with the E/N, A/M, and G/A and the Procurement Guidelines for the Program Grant Aid for Environment and Climate Change then approves the Agent Agreement.

The Agent Agreement concluded between the Recipient and the Agent will become effective after the approval by JICA in a written form.

d) Payment Methods
The Agent Agreement will stipulate that "Regarding all transfers of the fund to the Agent, the Recipient will designate the Agent to act on behalf of the Recipient and issue a Blanket Disbursement Authorization ("the BDA")to conduct the transfer of the fund (hereinafter

referred to as "the Advances") to the Procurement Account from the Recipient Account.

The Agent Agreement will clearly state that the payment to the Agent will be made in Japanese yen from the Advances and that the final payment to the Agent will be made when the total remaining amount become less than three percent (3%) of the Grant and its accrued interests excluding the Agent's fees.

e) Products and Services Eligible for Procurement
Products and services to be procured will be selected from those defined in the G/A.

f) Firm and Consultant
The firm and consultant who would contract with the Agent shall be Japanese Nationals.

The consultants that will be employed to do detail design and supervise the work for the Project, will, however, be in principle, Japanese nationals recommended by JICA for the purpose of maintaining technical consistency with the Study.

g) Method of Procurement
When conducting the procurement, sufficient attention will be paid to transparency in selecting the firms and for this purpose, competitive tendering will be employed in principle.

h) Tender Documents
The tender documents should contain all information necessary to enable tenderers to prepare valid offers for the products and services to be procured by GAEC.

The rights and obligations of the Recipient, the Agent and the firms supplying products and services should be stipulated in the tender documents to be prepared by the Agent. Aside from this, the tender documents will be prepared in consultation with the Recipient.

i) Pre-qualification Examination of Tenderers
The Agent may conduct a pre-qualification examination of tenderers in advance of the tender so that the invitation to the tender can be extended only to eligible firms. The pre-qualification examination should be performed only with respect to whether the prospective tenderers have the capability of concluding the contracts.

For this, the following points should be taken into consideration:
(1) Experience and past performance in contracts of similar kind
(2) Financial credibility (including assets such as real estate)
(3) Existence of offices and other items to be specified in the tender documents.
(4) Their potentialities to use necessary personnel and facilities.

j) Tender Evaluation
The tender evaluation should be implemented on the basis of the conditions specified in the tender documents.

Those tenderers which substantially conform to the technical specifications and other stipulations of the tender documents will be judged in principle on the basis of the submitted price, and the tenderer who offers the lowest price will be designated as the successful tenderer.

The Agent will submit a detailed evaluation report of tenders to JICA for its information, while the notification of the results to the tenderers will not be premised on the confirmation by JICA.

k) Additional procurement

If there is any remaining balance after the competitive and/or selective tendering and/or direct negotiation for a contract, and if the Recipient would like to procure additional items, the Agent is allowed to conduct this additional procurement, following the points mentioned below:

(1) Procurement of same products and services

When the products and services to be additionally procured are identical with the initial tender and a competitive tendering is judged not efficient, additional procurement can be conducted by a negotiated contract with the successful tenderer of the initial tender.

(2) Other procurements

When products and services other than those mentioned above in (1) are to be procured, the procurement should be conducted through competitive tendering. In this case, the products and services for additional procurement will be selected from among those in accordance with the G/A.

l) Conclusion of the Contracts

In order to procure products and services in accordance with the guideline, the Agent will conclude contracts with firms selected by tendering or other methods.

m) Terms of Payment

The contract will clearly state the terms of payment. The Agent will make payment from the "advances," against the submission of the necessary documents from the firm on the basis of the conditions specified in the contract. When the services are the object of procurement, the Agent may pay certain portion of the contract amount in advance to the firms on the conditions that such firms submit the advance payment guarantee worth the amount of the advance payment to the Agent.

4) Undertakings required by the Government of the Recipient Country

In the implementation of the Grant Aid Project, the Recipient is required to undertake necessary measures as the following:

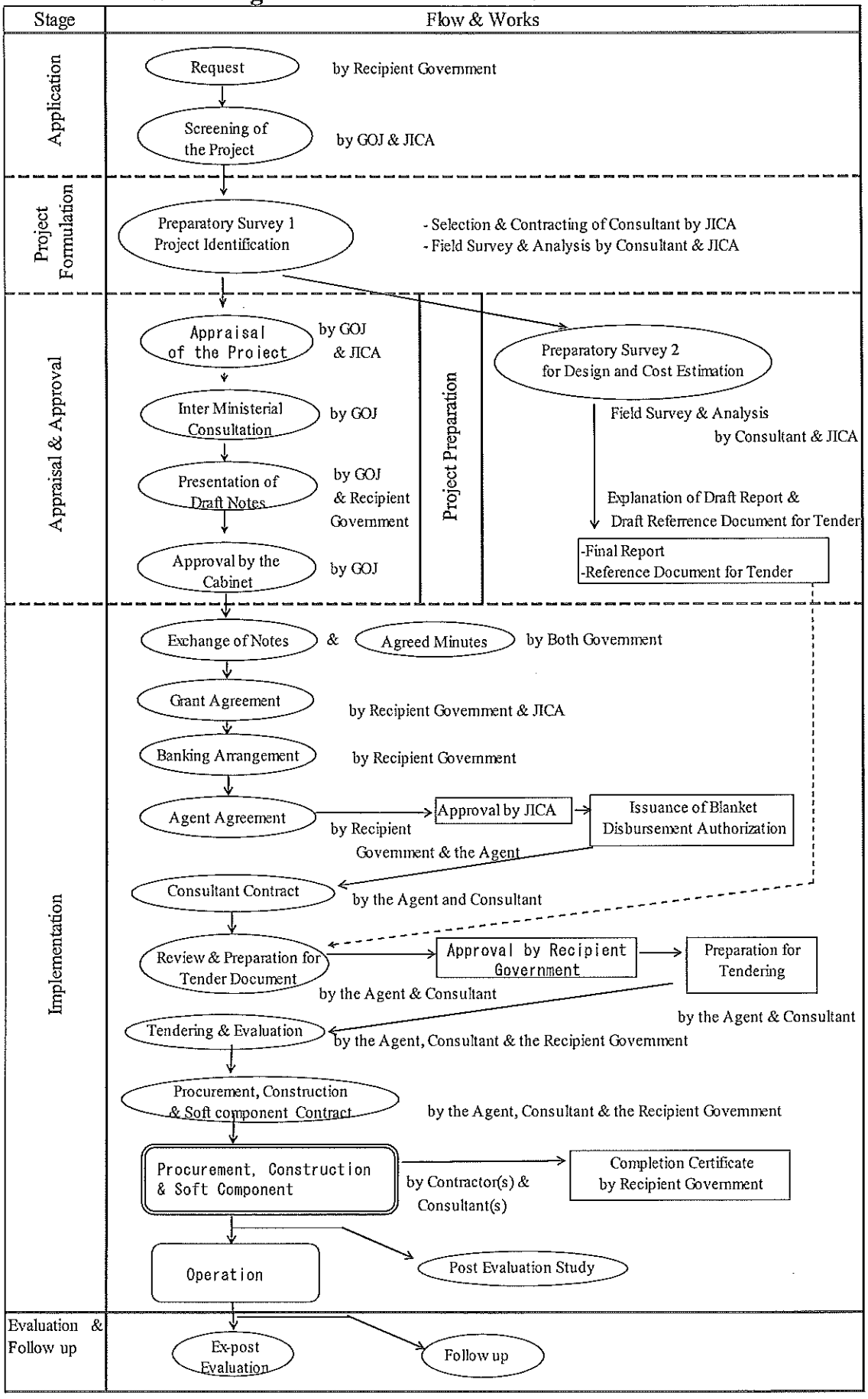
a) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the Project.
b) To provide facilities for distributing electricity, water supply and drainage and other incidental facilities in and around the sites.
c) To ensure all the expense and prompt execution for unloading, customs clearing at the port of disembarkation and domestic transportation of products purchased under the Grant Aid,
d) To ensure that customs duty, internal taxes and other fiscal levies that may be imposed in the Recipient with respect to the purchase of the Components and the Agent's services will be exempted by the Government of the Recipient.
e) To accord all the concerned parties, whose services may be required in connection with supply of the products and services under the contracts, such facilities as may be necessary for their entry into the Recipient and stay therein for the performance of their work.

5) "Proper use of funds"

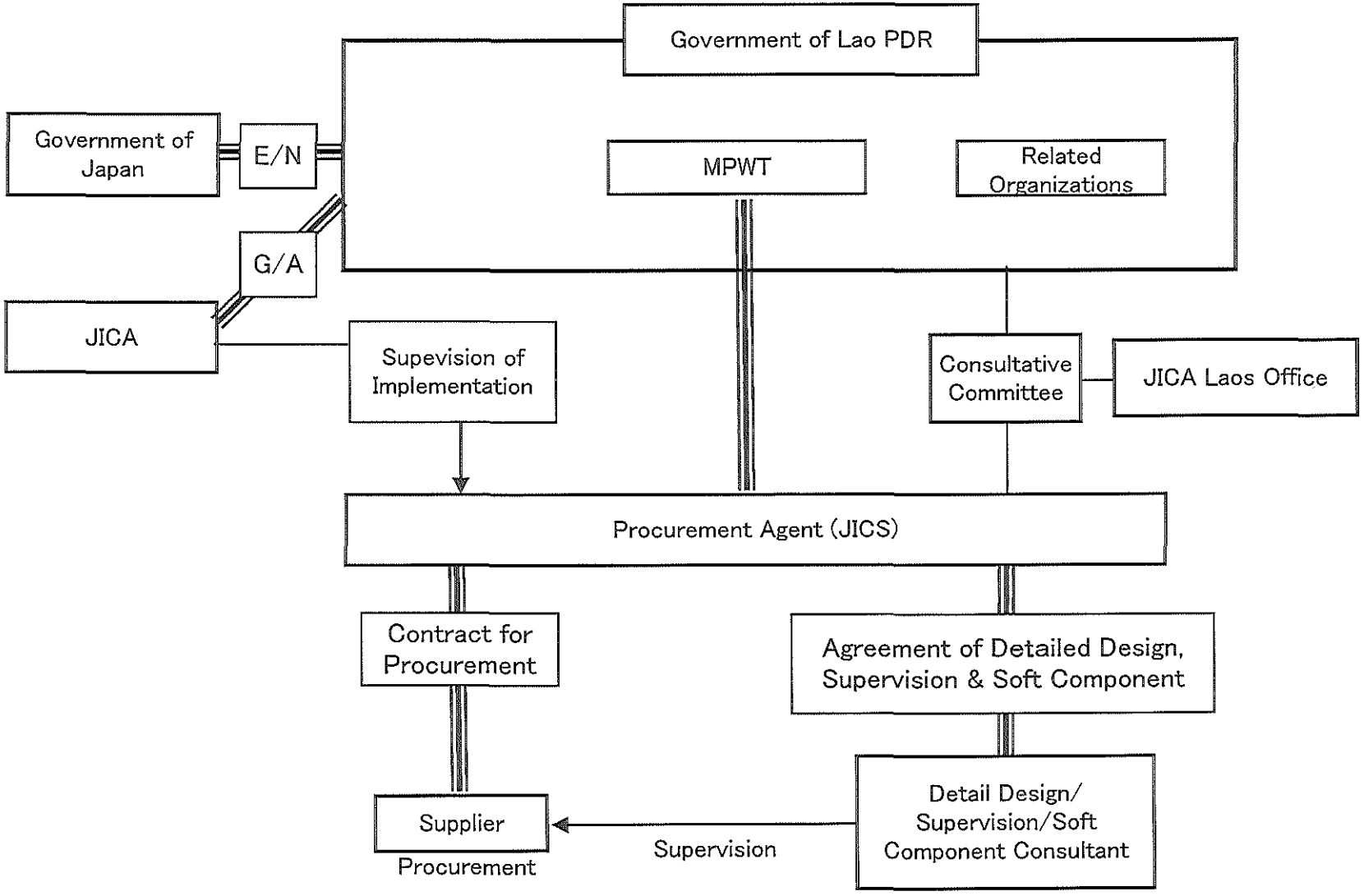
The Recipient is required to operate and maintain the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign personnel necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

6) "Export and Re-export" of products
The products purchased under the Grant and its accrued interest will not be exported or re-exported from the Recipient.

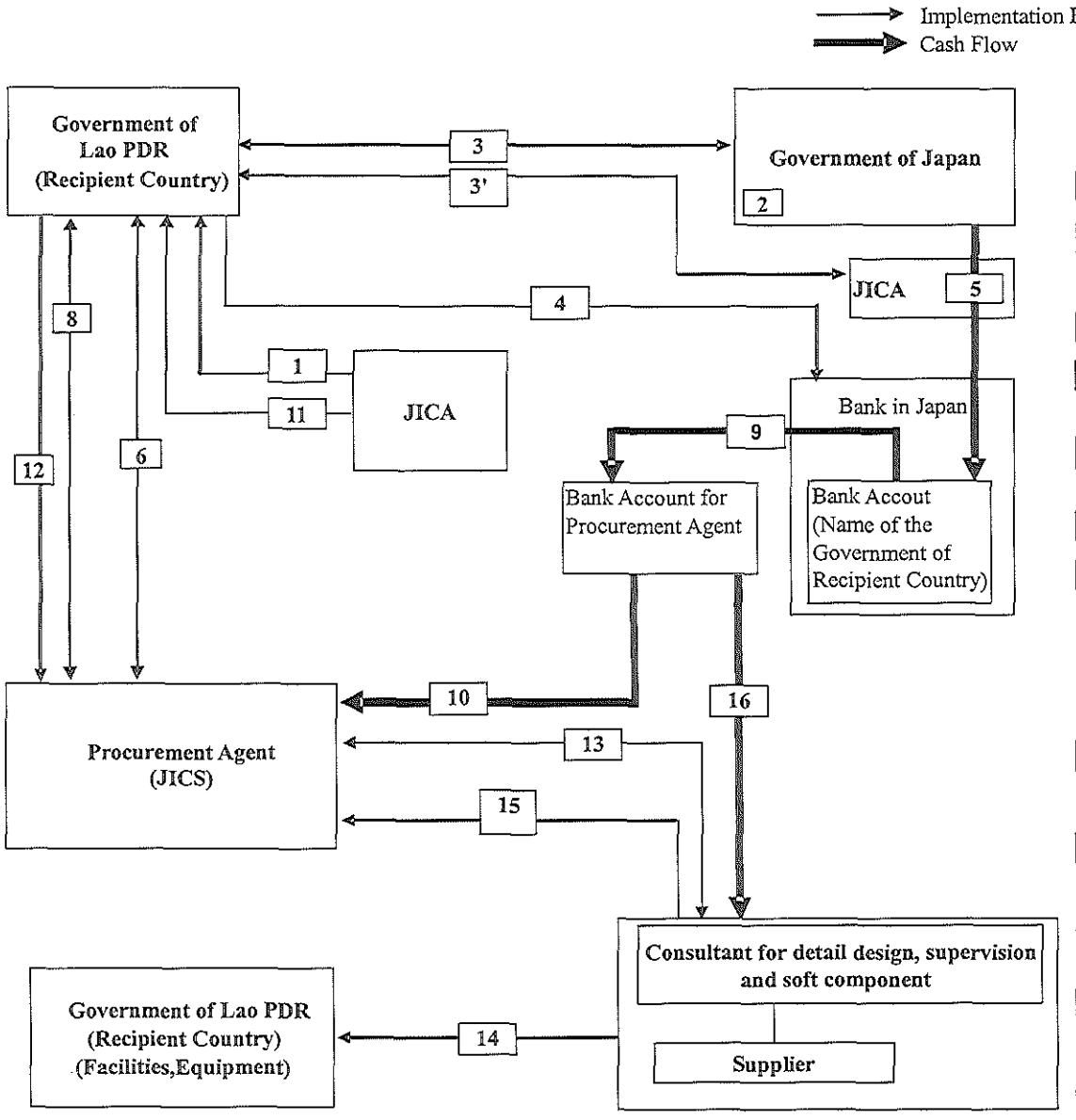
General Flow of Program Grant Aid for Environment and Climate Change

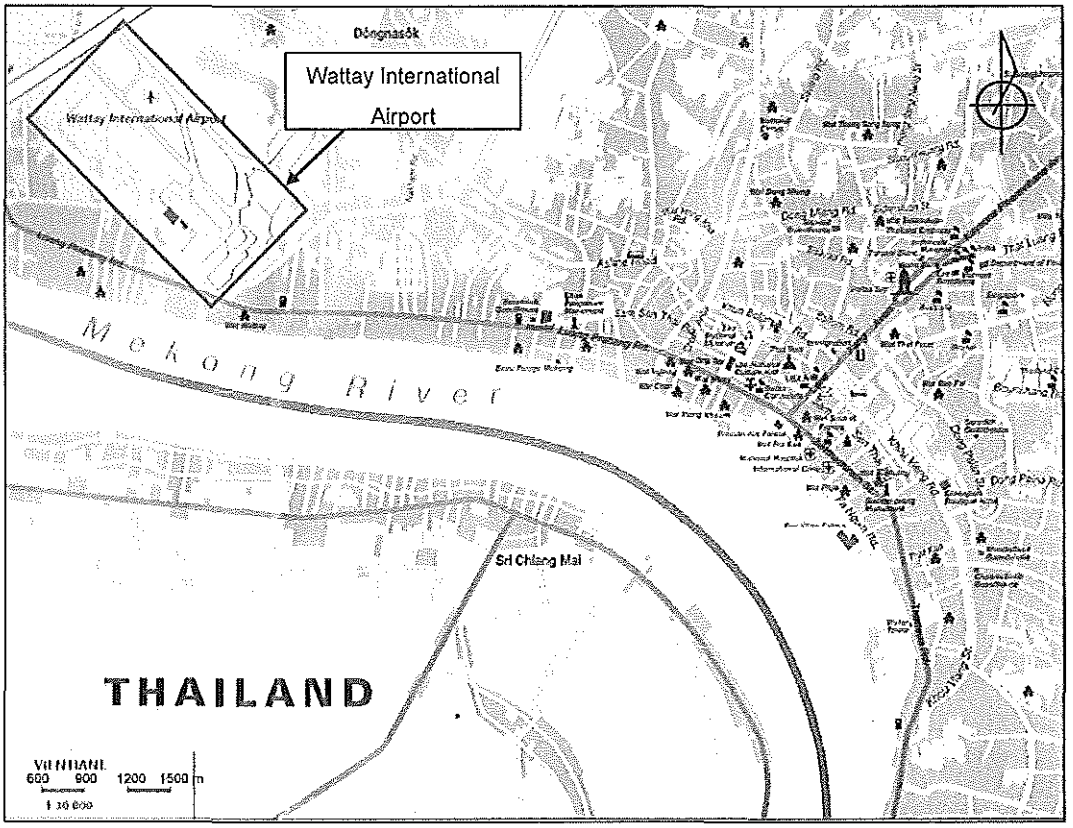


Project Implementation System

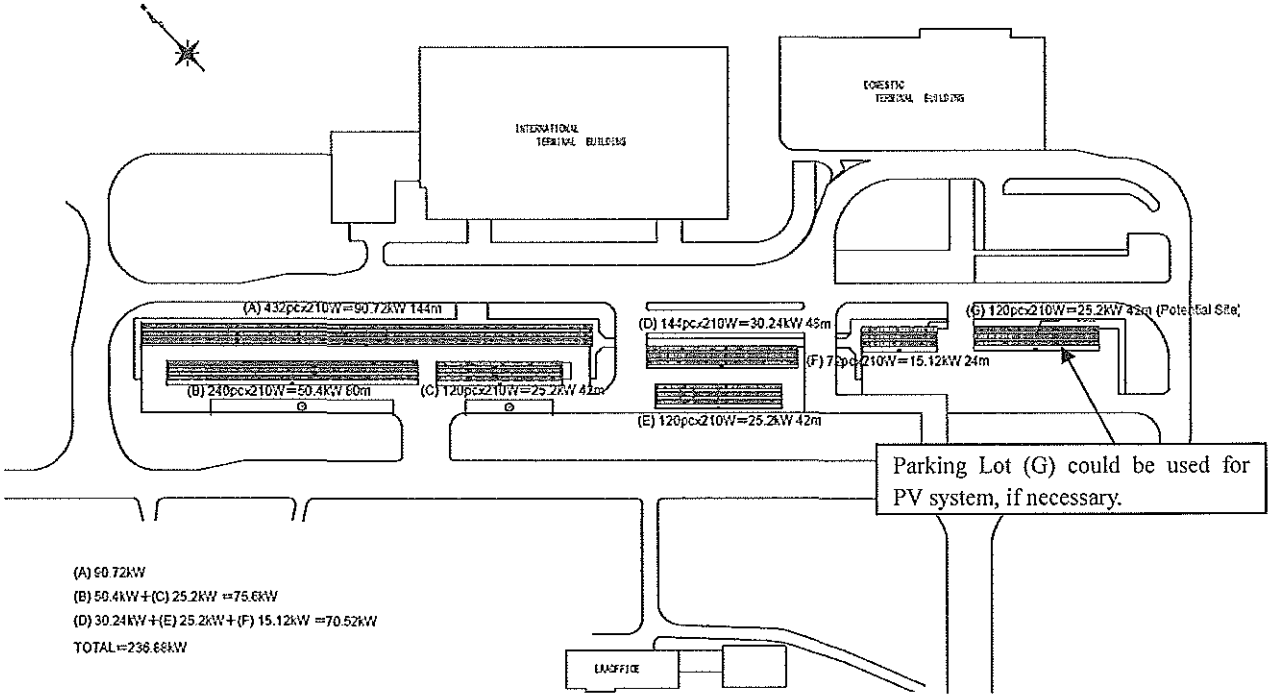


Flow of Funds for Project Implementation





Location Map of the Project Site



General Plan of Wattay International Airport

List of Main Equipment

Name of Device	Main Specification and/or Components	Qty	Purpose
Photovoltaic Module	(1) Applicable Standard: IEC or equivalent standard (2) General specification: 1) Type: Crystal type 2) Rated installed capacity: 236 kWp (90.72 kWp + 50.4 kWp + 25.2 kWp + 30.24 kWp + 25.2 kWp + 15.12 kWp)	1128 pc	Fundamental device in the PV system to convert solar energy to electric energy of DC
Adjunct Cable for PV Module	(1) Applicable Standard: JCS 4418B (2) Type: (a) HEM - CE Cable with (+) connector at one edge (b) HEM - CE Cable with (-) connector at one edge (c) HEM - CE Cable with (+) (-) connector at both edges (3) Size: 3.5sq - 1C	1 Ls	Cables connecting each module in series and necessary cable for the system
Junction Box	(1) Construction: Outdoor hanging type (2) Material: SPHC Steel plate (3) Input voltage cell: DC 500 V/circuit (4) Number of input circuits: 3 ~ 5 circuits (5) Input current of PV cell: 8.9 A/circuit (6) Number of output circuits: 1 circuit (breaker workable in tropical region) (7) Devices to be stored: Circuit breaker for wiring (DC500V 50A), islanding connector, blocking device, lightning protection device by induction type, and heat-sensitive terminal caps	25 pc	Boxes to integrate the wiring cables connecting each module in series, and necessary device for the system
Collection Box	(1) Construction: Outdoor hanging type (2) Material: SPHC Steel plate (3) Input voltage cell: DC500V (4) Input current of PV cell: 50A/circuit (5) Number of input circuits: 5 circuits with breaker for tropical region use (6) Number of output circuits: 1 circuit with breaker for tropical region use (7) Breaker (Switch): Circuit breaker for input wiring (DC500V 50A) Circuit breaker for output wiring (DC500V 400A) (8) Others: Heat-sensitive terminal caps	3 pc	The wiring cables from each junction box will connect to the collection boxes in parallel and DC electricity will be transmitted to power conditioner from the collecting boxes. The collecting boxes are necessary for a large scale PV system.
Power Conditioner	(1) General specification for installed capacity: 236 kW 1) Construction: Indoor free-standing type 2) Main circuit model: Self-excitation voltage type 3) Switching method: HF PWM 4) Cooling method: Forced cooling system (fans) (2) Electrical specification 1) Rated capacity: 236 kW 2) Rated input voltage: DC400V and less 3) Maximum allowable input voltage: DC0~600V and less 4) Voltage range for input operation: DC240V~500V and less 5) Follow-up control range for maximum output: DC240V ~ 420V and less 6) Output electrical mode: 3-phase and 3-wire system 7) Rated output voltage: AC202V 8) AC output current distortion rate: Total 5 % and less, each harmonic 3% and less 9) Power control system: Maximum output follow-up control 10) Efficiency: 90 % and more 11) Function: Automatic start, shut down, soft start, automatic voltage	1 Ls	Power conditioner has the following functions; (a) Converting DC to AC generated by PV module, (b) Keeping power quality at appropriate level by monitoring and watching AC power Therefore, a power conditioner is the essential device for PV system.

Name of Device	Main Specification and/or Components	Qty	Purpose
	regulator (3) Grid Protection Device: OVR(225/230/235/240V), (410/420/430V), interval (0.5/1.0/2.0S), UVR(160/165/170/175/180V), (350/360/370V), interval (0.5/1.0/2.0S), OVF(50.5/51/51.5/52Hz), interval (0.5/1.0/2.0S), UVF(48.5/49/49.5Hz), interval (0.5/1.0/2.0S), Blocking time after restoration: (5/150/200/300S) (4) Islanding Operation Detector: Active method and passive method prevailed in Japan (5) External Communication; Transmitted information: malfunction & measuring information by RS485 (6) Internal Lightning Protection Device; DC SPD Class II and above, AC SPD gap type class II and above		
Transformer	(1) Rated output: 300 kVA (2) Primary voltage (output): AC380-220V, 3-phases and 4-wires (3) Secondary voltage (input): AC200V, 3-phases and 3-wires (4) Frequency: 50Hz (5) Insulating class: H-type and dry class (6) Other specification: Rating plate, primary terminal - 5 taps and more	1 Ls	One of the main components of the power conditioner and converting AC voltage into required voltage level.
External Lightning Protection	(1) Applicable Standard: JIS A 4201-2003 (2) Protection level: Level III (3) Receiving part: lightning rod, horizontal conductor, and mesh conductor by rotating sphere method (4) Grounding: Keeping the same electrical potential with that of supporting structure of PV panel	1 Ls	Protecting outdoor facilities from lightning strike, necessary device for PV system to be installed in countries, where there are many lightning in rainy season.
Cubicle	(1) Material: SPHC Steel plate (2) Devices to be stored: 100kW x 3 power conditioner, 300 kVA equivalent transformer, data transmittal device, I/O switch, and circuit breaker (3) Internal Lightning Protection : AC SPD Class II and above at output side (4) Ventilation: Forced cooling system (cooling fans)	1 Ls	Box containing electrical devices, such as power conditioner and transformer, and protecting those devices from direct light and rain. The box is necessary when those electrical devices are installed outside.
Data Monitoring System	(1) Data monitoring device Measuring method: Measuring interval: 6 second Collecting data: DC - voltage /current, AC - voltage/current/power/ frequency Monitoring device: Personal computer (Windows XP or equivalent), serial signal converter (from RS485 to RS232C), uninterruptible power supply system (UPS), rack for personal computer (2) Required Function: Displaying instantaneous value, graph, operation performance of power conditioner, malfunction information and storing setting values for grid protection device in power conditioner	1 Ls	Monitoring device for operation performance of the PV system. The data monitoring system is necessary in terms of operation and maintenance of the system.
Display Device	(1) Construction: Indoor hanging type, LED plane luminescence panel (brightness 85% and more, average luminance of panel 200 lux/ 600 cd and more) (2) Display items: Instantaneous value of power output and cumulative generation energy (3) Display panel: 5~15 cm/ number (4) Size: H 1000 mm x W 1500 mm approximately	1 Ls	Necessary device for enlightenment of the PV system.

Name of Device	Main Specification and/or Components	Qty	Purpose
Weather Observation Device	(1) One thermometer (2) One pyranometer	1 Ls	Necessary to analyze the generation performance of the PV system
Supporting Structure for PV Module	(1) Material: JIS G3101, SS400 (2) Coating: Hot dip galvanized HDZ45 equivalent	1 Ls	Supporting and fixing PV modules

Note: The quantity and detailed specification in the table might be changed depending on the conclusion of the Bid Tender provided that the installed capacity of 236 kW shall be met.

Project Cost Estimation (Confidential)

This cost estimate is provisional and would be further examined by the Government of Japan for the approval of the Grant Aid.

1. Cost to be borne by the Japanese side:

2. Cost to be borne by the Laos side: Kip 0

Item	Amount
1. Clearing and leveling of the Site	Kip 0
2. Total (1.)	Kip 0

Note: Payment of Bank Commission is not included and issuing commission of the permission for the persons related to the Programme to enter the project sites and providing office space to the Consultant will be borne by the Laos side.

3. Cost to be borne by the Laos side for Operation and Maintenance (every year)

	LAA
Personnel expenses	-
Employment of temporary workers for the cleaning PV panel	Approx. Kip 6,000,000
Expendable and replacement parts cost in the short run (reserve fund)	Approx. Kip 5,000,000
Expendable and replacement parts cost in the long run (reserve fund)	Approx. Kip 164,000,000
Total (in the short run)	Approx. Kip 11,000,000
Total (in the long run)	Approx. Kip 170,000,000

The equipment to be procured in the Programme can be operated and maintained by the existing maintenance staff of the facility except employment of temporary workers for the cleaning PV panel.
At intervals the equipment will require replacement of worn out parts and consumables. In the short run, most of parts and consumables to be needed will be covered by those provided in the Programme, only minor, locally available items have to be purchased by the Laos side. After the provisions of the Programme have run out, necessary items that have to be purchased by the Laos side will increase.

4. Conditions for estimation

(1) Time of estimation: March 2010

(2) Foreign exchange rate: US$ 1.00 = JP¥ 91.36, Kip 1.00 = JP¥ 0.01081

(3) Others: The above estimation was carried out in accordance with relevant rules and the guideline of Japan's Grant Aid.

Major undertakings to be taken by each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side	
			MEM	MPWT
1	To secure land			○
2	To clear, level and reclaim the site when needed urgently			○
3	To construct gates and fences in and around site			○
4	To construct a parking lot if necessary			○
5	To construct roads			
	1) Within site	○		
	2) Outside the site and Access road			○
6	To construct the facility and install equipment	●		
7	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities if necessary:			
	1) Electricity			
	a. The power distribution line to the site			○
	b. The drop wiring and internal wiring within the site	○		
	c. The main circuit breaker and transformer for the site	○		
	2) Water Supply			
	a. The city water distribution main to the site			○
	b. The supply system within the site (receiving and elevated tanks)	○		
	3) Drainage			
	a. The city drainage main (for conveying storm water, sewage, etc. from the site)			○
	b. The drainage system within the site (for sewage, ordinary waste, storm water, etc.)	○		
8	To bear the following commissions applied by the bank in Japan for banking services based upon the Bank Arrangement (B/A)			
	1) Payment of bank commission		●	
9	To ensure all the expense and prompt execution of customs clearance at the port of disembarkation in the recipient country			
	1) Marin or air transportation of the products from Japan or third countries to the recipient	●		
	2) To ensure all the expense and prompt execution of tax exemption and customs clearance of the products at the port of disembarkation		●	
	3) Internal transportation from the port of disembarkation to the project site	●		
10	To accord Japanese nationals and / or nationals of third countries, including persons employed by the agent whose services may be required in connection with the Components such facilities as may be necessary for their entry into recipient country and stay therein for the performance of their work		●	
11	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the purchase of the Components and to the employment of the Agent will be exempted by the Government of recipient country		●	
12	To maintain and use properly and effectively the facilities that are constructed and the equipment that is provided under the Grant			●
13	To bear all expenses, other than those covered by the Grant and its accrued interest, necessary for the purchase of the Components as well as for the agent's fees	●		
14	To ensure environmental and social consideration for the Programme		●	

Note: ● means coming undertaking and○ means already done or out of subject.

5. SOFT COMPONENT (TECHNICAL ASSISTANCE) PLAN

1. Background

The Project for Introduction of Clean Energy by Solar Electricity Generation System will procure a Photovoltaic Generation system with the capacity of 236 kW, furnish it to Wattay International Airport in Vientiane City, Lao PDR and supply the generated energy to facilities in the airport for their power demand. The grid-connected PV system with a large scale of 200 kW class is the first case for Laos, although they have experience of independent off-grid PV systems. And staffs to be involved in operation and maintenance of the PV system at LAA have no experience and knowledge about PV system. Therefore, it is desirable to train those engineers/technicians who will be actually operating and maintain the PV system. At the same time, it is also desirable to offer the training program for officers in the MEM and EDL being involved in the Project, in terms of supporting the national target to attain the village electrification of 90 % by 2020 by means of grid connection and clean energy, such as PV system, wind power and mini-hydro.

The contractor will be conducting Operation and Maintenance Guidance for the purpose of furnishing the operators with practical method of operation and maintenance of the PV system. However, the basic knowledge underlying these methods is important for nurturing capabilities of judgment and decision making in various occasions of operating and maintaining the PV system, which is also useful in development and application thereto of future similar projects.

2. Target of Training Program

Based on the above background, the following targets are set in terms of production of effect and sustainability of the project.

- The installed PV system can work as planned.
- The installed PV system can be maintained in a sustainable manner.

3. Outcome of Training Program

Outcomes of the training program are as follows;

[For LAA Operation and Maintenance Staff at the site]

- Staff can operate and maintain the PV system in the normal condition.
- Staff can take appropriate actions when troubles and malfunctions occur.
- Staff can replace minor consumable goods, and procure necessary spare parts and consumable goods by themselves.

[For Officers in MEM and Engineers in EDL]

- They can acquire the knowledge relating to the fundamental technology of a PV system.
- They can understand the necessary technical issues relating to the agreement accompanied by a grid-connected PV system.
- They can acquire the knowledge to train the manpower relating to the introduction of a PV system.

4. Outcome Confirmation and Evaluation

Outcome confirmation and evaluation will be conducted in the second training program because the training program will be conducted twice, at the commissioning and 2.5 months after commissioning.

[For LAA Operation and Maintenance Staff at the site]

(1) Operation of the PV System

Operation performance record for the previous 2.5 months will be reviewed from the following viewpoint.

- Whether the PV system can work daily and generate electricity.
- Whether the electricity generation fluctuates within the range of ±20% in comparison with the expected monthly generation set at the planning stage as shown in Table 1.

If the actual electricity generation remains within the range of ±20%, it can be evaluated that the PV system works normally. If the actual electricity generation lowers than minus 20% or continuously declines, the PV system is supposed to be in some troubles. In this case, the operation and maintenance staff are requested to propose the estimated causes and their reasons in practical exercises. And their learning level will be confirmed in this practical exercise.

Table -1 Control Value for Monthly Generation Energy

(kWh/Month)	JAN	FEB	MAR	APR	MAY	JUN	JLY	AUG	SEP	OCT	NOV	DEC
Expected Generation	22,227	21,644	25,668	26,910	27,032	25,290	23,777	22,754	22,500	25,203	22,860	22,382
Upper Limit	27,000	26,000	31,000	32,000	32,000	30,000	29,000	27,000	27,000	30,000	27,000	27,000
Lower Limit	18,000	17,000	21,000	22,000	22,000	20,000	19,000	18,000	18,000	20,000	18,000	18,000

(2) Maintenance of the PV System

Daily and periodical maintenance check sheets and malfunction & trouble recording sheets for the previous 2.5 months will be reviewed from the following viewpoints.

- Whether any troubles and/or any malfunctions occur, and whether appropriate actions were taken based on the Maintenance Manual when some troubles and/or malfunctions had occurred.
- Whether consumable goods were replaced with properly when they replaced consumable goods (including the confirmation at the site).
- Whether daily and periodical inspections have been carried out properly based on the daily and periodical check sheets.

Any malfunctions would not happen generally because of just 2.5 months after the commissioning. If some malfunctions had happened, the malfunction part ought to have been replaced by the Contractor without charge because 2.5 months is within one (1) year's guarantee period. If the replacement and/or necessary measures were done by the Contractor based on the claim by the owner, it can be evaluated that the installed PV system is appropriately maintained in sustainable manner due to their well acquirement of knowledge about the PV system.

If some consumable goods such as SPD and lighting in cubicles were replaced with by the maintenance staff, the proper replacement (to be confirmed at the site) is worth evaluation. If all inspection items had been checked based on the daily and periodical maintenance manual, the maintenance inspection is worth evaluation. If some inspection items had been skipped and/or daily and periodical inspections had not been conducted as planned, the maintenance staff is requested to state the reasons and propose more practical maintenance plan in practical exercise. And their learning level will be confirmed in this practical exercise.

Inquiry survey of the learning level relating to operation and maintenance will be conducted on the last day of the Training Program to evaluate results of Training Program.

[For Officers in MEM and Engineers in EDL]

The training program conducted at the commissioning will provide;

(a) Fundamental technical knowledge about a PV system,
(b) Introduction of FAQ,
(c) Introduction of examples of typical malfunctions and their measures, and
(d) How to utilize operation log sheets.

Their learning level will be evaluated in practical exercise to be conducted in the above training

courses.

In the training program conducted in 2.5 months after commissioning, their learning level will be evaluated in the same manner as for operation and maintenance staff as mentioned above.

5. Planning of Training Program

(1) Content

Training program is planned to consist of a series of lectures, practical exercises, and OJT led by Japanese consultants. The program is to be carried out in two separate periods; one during the commissioning of the PV system, and the other 2.5 months after the commissioning.

There will also be O&M training provided by the Contractor of the project. Therefore, the consultant will coordinate with the Contractor and plan the detail of his training program so that the necessary techniques and knowledge are effectively transferred to the participants of the program. Those training items with a symbol (*) below are the ones presumably provided by the Contractor. The consultants will provide additional information for such items, if necessary, to make them more relevant, not just “how to operate”, in the context of understanding of PV system.

[Before Commissioning (Approximately two weeks before Commissioning)]

Lecture on basic knowledge

- Concept of Grid-connection and its planning
- Concept of reverse power flow
- Characteristics of PV power generation (difference between rated output and actual output)
- Required equipment and its electrical specification
- Dominant factors such as power consumption and load etc. in premises affecting the installed capacity of PV system
- Response of PV system to the grid troubles
- Shut down and start up of PV system

OJT Program

- Joint survey on wiring work
- Joint survey on final inspection before commissioning test
- Joint survey on commissioning test and adjustment (*)
- Start up, shut down and re-start up (*)
- Joint survey on completion inspection

[After Commissioning]

Training provided by the Contractor

- Daily inspection and maintenance (*)
- Periodical inspection and maintenance (*)
- Consumables and replacing work (*) (inc. exercises)
- Introduction of FAQ relating to operation and maintenance (*)
- Introduction of typical malfunctions and their measures (*) (inc. exercises)

Work plan for O&M on the basis of Operation Manuals (inc. exercises)

- Preparation of operation log sheet form (inc. exercises)
- Preparation of daily and periodical check sheet (inc. exercises)
- Preparation of failures/accident record form (inc. exercises)
- Analysis of operation log sheet and manner of utilization (inc. exercises)

It is very often experienced, in Japan and in other countries as well, that initial setting of the equipment and/or the lack of familiarity of operation lead to malfunction or unsatisfying performance of the PV system. Therefore, it is necessary to carry out a follow-up training program a certain period after the commissioning. This follow-up training program is proposed to consider 2.5-month experience of actual operation and maintenance of PV system, operation issues unique in the implementation and in Laos circumstances, to discuss problems and questions arose, and to revise the operation and maintenance management plan. This process aims for the establishment of more pragmatic and steady method of operation.

[About 2.5-month after commissioning]

- Joint inspection on the equipment (*)
- Evaluation of maintenance performance and trouble shooting (*)
- Evaluation of operational performance based on the analysis of log sheets, and finding critical issues and their measures, if any (inc. exercises)
- Review of data log sheet form and check sheet form

The obligation of the following-up training by the Contractor shall be incorporated into the Tender Documents as well as the training by the Contractor at the commissioning.

(2) Participants

Fig.-1 shows the organization chart for LAA. Four (4) staffs in Airport Management Center being in charge of maintenance of the power house in the airport are to maintain the PV system. The power house receives the electricity from EDL and provides facilities in the airport with electricity. Electrical staffs in LAA have been engaged in maintenance of electrical

facilities in the airport without technical support by EDL[1]. Therefore, their technical skills seem to be good.

Table-2 shows the required role and experiences for operation and maintenance staff of the PV system.

Addition to the LAA staffs, officers in Rural Electrification Division being in charge of rural electrification in MEM and engineers in Technical Department being in charge of grid-connection generation plants in EDL will be also objective personnel of the training program in terms of assistance to introduction of a grid-connected PV system in Laos.

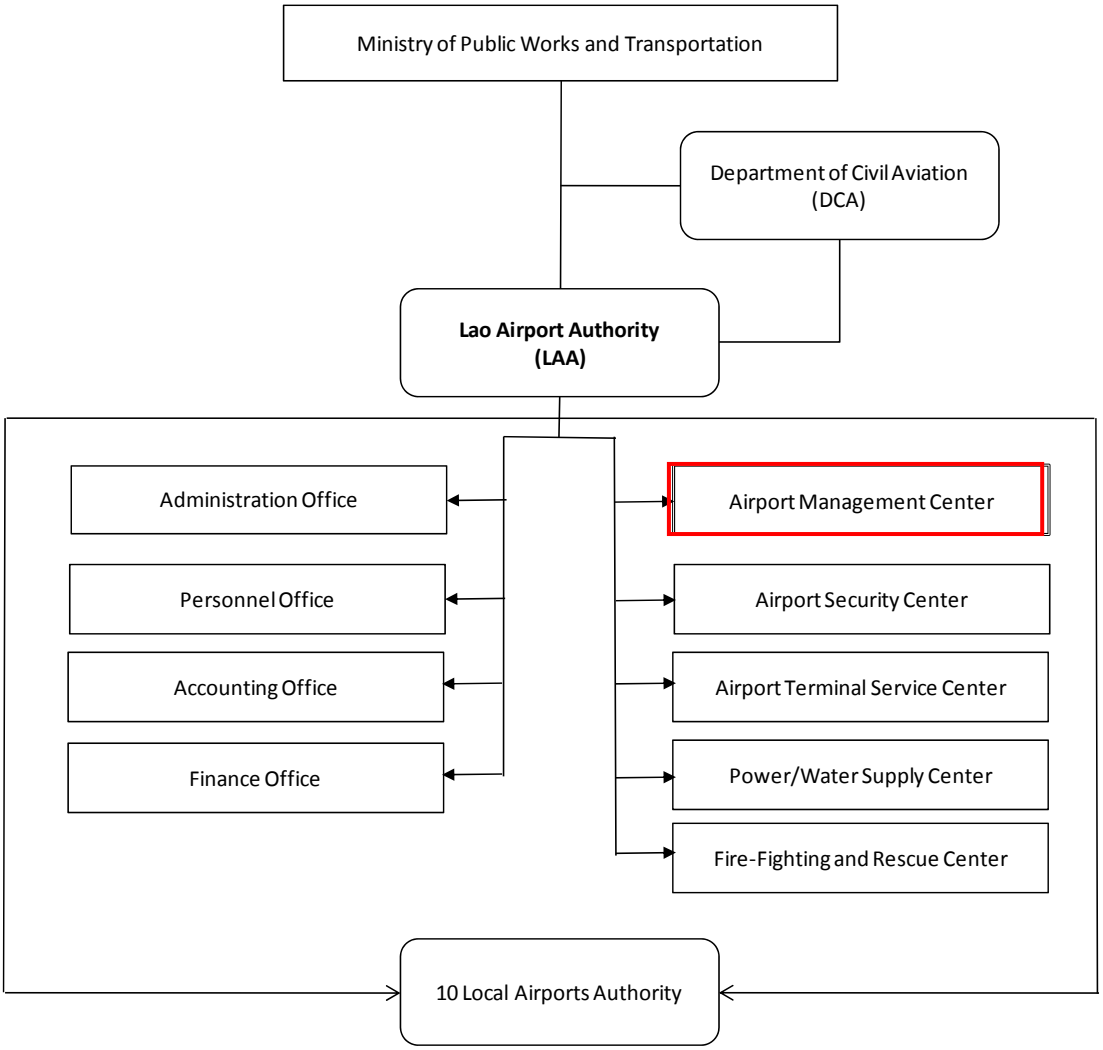


Fig.-1 Organization Chart of LAA

[1] Confirmed by EDL during the second phase survey.

Table -2 Candidate Participants to the Training

Organization	Department	Training Purpose (a) and Required Qualification (b)
LAA	Airport Management Center	(a) Daily operation and maintenance of the PV system (b) Those in charge of maintenance of electrical facilities at least 5 years
MEM	Rural Electrification Division	(a) Introduction of grid-connected PV system to Lao PDR in future (b) Bachelor of electrical engineer and his business experience at least 10 years
EDL	Technical Department	(a) Finding critical issues and establishing measures (b) Bachelor of electrical engineer and his business experience at least 10 years

The tentative programs applicable to candidate participants are shown in Table-3. And number of participants are set 3 ~ 5 personnel basically considering the possibility that participants may move to another section or department in future.

Table-3 Tentative Program Applicable to Participants

Contents of Program	LAA	EDL	MEM
	Airport Management Center	Technical Department	RED in DOE
	3 ~ 5 personnel	3~5 personnel	3~5 personnel
Before Commissioning			
Lecture on basic technology		○	○
OJT (Joint survey on wiring work)	○	○	
OJT (Joint survey on final inspection before commissioning test)	○	○	
OJT (Joint survey on commissioning test & adjustment)	○	○	
OJT (Start up, shut down and re-start up)	○	○	
OJT (Completion inspection)	○	○	
After Commissioning			
Follow-up of operational guidance	○	○	
Work plan for operation & Maintenance	○	○	
2.5 months after commissioning			
Joint inspection on the equipment	○	○	
Evaluation of maintenance performance and trouble shooting	○	○	
Evaluation of operational performance and improvement	○	○	○
Review of data log sheet and check sheet form	○		

(3) Schedule

The planned schedule for the above mentioned program is shown in Table-4.

Table -4 Training Schedule Before/After Commissioning

	Activities	-2nd week	-1st week	1st week	2nd week
Contents of Activities	Preparation Work				
	Lecture on basic knowledge				
	Joint survey on work & test (OJT)				
	Joint survey on completion inspection (OJT)				
	Operational Guidance (*)				
	Work plan for operation & Maintenance				
	LAA Airport Management Center				
	EDL Technical Department				
	MEM RED in DOE				
Lecturer	PV system Expert				
	Equipment & Electrical Expert				
	Interpreter				

Note: Bar chart expressed in dot line shows hourly base activities.

Table -5 Training Schedule 2.5 months after Commissioning

	Activities	1st week	2nd week
Contents of Activities	2.5 months inspection (*)		
	Evaluation of maintenance performance and trouble shooting (*)		
	Evaluation of operational performance and improvement measures		
	Review of data log sheet form and check sheet form		
Participants	PMO Management Department		
	LAA Airport Management Center		
	EDL Technical Department		
	MEM RED in DOE		
Lecturer	PV system Expert		
	Equipment & Electrical Expert		
	Interpreter		

(4) Resource for the Training Program

As already mentioned, the PV system with grid interconnection is the first-ever experience in Laos. Therefore, Japanese consultants are assumed to undertake the implementation of the training program. Consultants to be assigned should have adequate experiences in planning of PV system with grid connection. There will be two Japanese consultants, one

leader and one assistant, to be lecturers to the programs of both periods. Local consultants are not considered as the recipient country does not have an experience in similar projects.

On the other hand, some of participants are supposed to be not good at English. Therefore, the program had better be done in local language as much as possible by employing an interpreter. An interpreter will be dispatched from Japan unless an interpreter can be available in Laos. Addition to the employment of an interpreter, texts, manuals and technical references to be distributed in the program are translated into English. And some of them which seem to be very important had better be translated to the local language as much as possible to achieve further effectiveness of the program

The work schedule of consultants is planned as below. The first period program takes thirty days, and the second fifteen days including two travel days from and to the Site.

Table -6 Work Schedule of Consultant

Program	Work Description	Duration
Preparation **3 days**	- Consultation and confirmation with LAA concerning Program Content and Participants - Confirmation with MEM and EDL concerning Program Content and Participants - Confirmation with Procurement Agent concerning Program Content - Preparation of distribution material	1 day 0.5day 0.5day 1day
Before commissioning	**11days**	
Lecture on basic knowledge **6 days**	- Basic theory of photovoltaic generation - Utilization of photovoltaic generation - Grid-connection and its planning - Understanding surplus power and reverse power flow - Power supply to the water treatment plant from the grid - Power demand and loads in the plant (inc. practical exercise) - Workings of PV system during blackout of the system - Planning PV system (inc. practical exercise) - Arrangement between PV owner and power utility	↓ 1day ↓ 1day ↓ ↓ 1day 2days 1day
OJT program **5 days**	- Witnessing connection work and testing/inspection of the Contractor	5days
After commissioning	**14 days**	
Reinforcement of Contractors Guidance **6 days**	Following Operation Guidance of the Contractor - Additional explanations given on workings of PV system in the facility, using Operation and Maintenance Manual and the training materials - Discussion on findings of participants	7days
Planning O&M works **7 days**	- Proposing daily activities needs and making daily check sheet/log sheet form - Listing periodical inspection items, activities necessary, to make check sheet - Listing long-term inspection items, activities necessary, to make inspection check sheet	7 days
2.5 months after commissioning	**13 days**	
2.5 months inspection **2 days**	- Visual inspection - Confirmation of PV system operation	1day 1day
Evaluation of maintenance performance and trouble shooting **2 days**	- Review and evaluation of the previous 2.5 months experience of operation and maintenance - Trouble shooting (extracting problems and solutions, through enquiries and discussions	1day 1day
Evaluation of operation performance and measures **8 days**	- Evaluation of actual generation in comparison with planned through discussions - Discussion on how to utilize the log sheet - Individual presentation how to utilize the log sheet - Individual presentation relating to improvement measures for generation	2 days 2 days 2 days 2 days
Review and updating log and check sheets **1 day**	- Review and updating maintenance plan and log / check sheets	1day

(5) Schedule of Training Program

The work schedule for the training program is shown below, assuming that the agreement between the procurement agent and the Contractor will be concluded in November 2011.

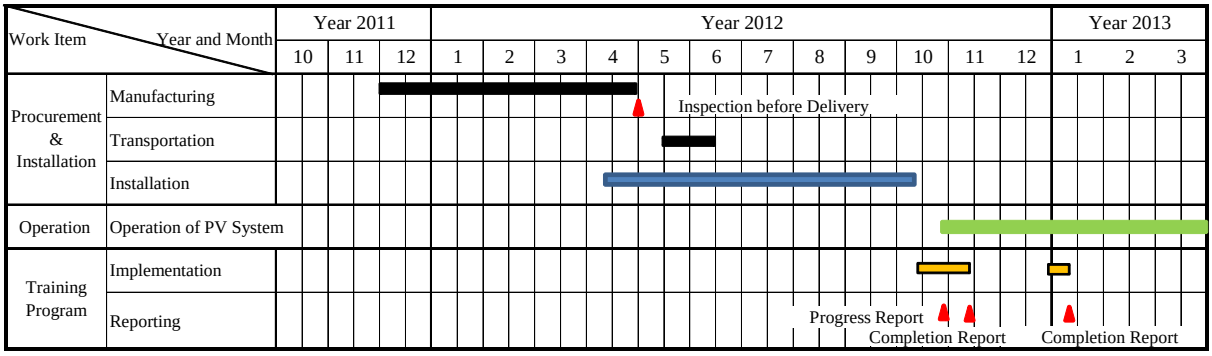


Fig. -2 Training Program Implementation Schedule

(6) Products of Training Program

Products of training program are outlined below.

- A training program textbook prepared by the Consultant
- Progress reports
- Completion reports (inc. evaluation of operation record and trouble shootings)
- Single line diagram prepared in the exercise and so on
- Visual record (DVD) of periodical inspection (2.5-month inspection)
- Work plan for operation and maintenance (with revision)
- Results of questionnaires

(7) Responsibility of Receipt Country

It is important that participants take part in the training in accordance with the training schedule for the achievement of the program objectives, which, however, requires the participants of being away from their work place for weeks. Therefore, there must be an official designation as a participant given by the section/department management who appreciates the usefulness of the program. It is also important that the government agencies appoint persons who will be in charge of PV and renewable energy in the future.

6. COLLECTED DATA AND DOCUMENTS

Appendix 6 List of Collecting Data and Documents

No.	Title	Form	Original/ Copy	Released by	Published Year
1	Lao People's Democaratic Republic, Peace Independence Democracy Unity Prosperity, Lao PDR Climate Change Stragey	Print (16 pages)	Copy	-	2009.12
2	Electricity Statistics Year Book 2007 of Lao PDR	Book (58 pages)	Original	DOE, MEM	2006.06.23
3	Electricite du Laos, Annual Report 2008	Book (47 pages)	Original	EDL	-
4	Supplemental Information to the request application from on Grid-Connected Photovoltaic Power Generation System for Wattay International Airport, Department of Civil Aviation (DCA), Ministry of Public Works and Transportation	Print	Copy	JICA Laos Office	2009.9.22
5	Organization Chart of Prime Minister's Office	print (1page)	Copy	PMO	2009.6.4
6	Monthly Invoice from EDL to MEM and to No.100 Building (2008, local language)	Print (3 pages)	Copy	EDL	2009.12.21
7	Development Plan Drawing at PMO (Local language)	Print (A3)	Copy	PMO	-
8	Organization Chart of L-JATS	Print (1 page)	Copy	L-JATS	2009.12.1
9	L-JATS Balance Sheet, Income Statement, Breakdown of Expenses (for 2006, 2007 and 2008)	Print (10 pages)	Copy	L-JATS	2009.3.10
10	Vientiane Monthly Rainfall, number of rainy day and temperature (from January to December 2009)	Print (3 pages)	Copy	DMH	-
11	Daily Rainfall for 2007, 2008 and 2009	E. Data	Copy	DMH	-
12	Organization Chart of Lao Airports Authority	Print (1 page)	Copy	DCA	-
13	LAA Budget and Disbursement for 2008, 2009 (Local language)	Print (4 pages)	Copy	LAA	-
14	Lao Grid Code	E. Data	Copy	EDL	
15	Lao Electric Power Technical Standard	Print (165 pages)	Copy	MIH	2004.02.12
16	Inter National Passenger Terminal Building Boring Log (1)	Print (1 page)	Copy	LAA	1998.07
17	Law on Electricity	E.Data (19pages)	Copy	Prime Minister	1997.04.12

DOE	Department of Electricity
MEM	Ministry of Energy and Mines
PMO	Prime Minister's Office
EDL	Electricite du Lao
L-JATS	Lao-Japan Airport Terminal Services Co. Ltd.
DMH	Department of Meteorology and Hydrology
DCA	Department of Civial Aviation
LAA	Lao Airports Authority
MPWT	Ministry of Public Works and Transport
MIH	Ministry of Industry and Handicrafts
E. Data	Electronic Data

7. REFERENCES

The Preparatory Survey on the Project for Introduction of Clean Energy by Solar Electricity Generation System

Attendance List

Subject : Mutual understanding for the PV System Installation at PMO and Airport
Date : February 11, 2010
Place : DOE 2F Conference Room

No.	Name	Organization / Department	Signature
1.	Norihiro Takasawa	Newjec Inc / International Operation	
2.	Viraphanh Virasay	DOE	
3.	Ir. Somphone PHANOUSITH	National Science council, PMO.	
4.	Anousak Phongsavath (Mr)	DOE / MEM	
5.	Mr. Vilai Sack	PM	
6.	MR vongphachanh sisthivong	National science council, PMO	
7.	MR vankoly vilaysack	EDL.	
8.	Mr. Xanaphone Phoneseo	EDL	
9.	Ms Baysy Vongsay	LAA	
10.	Mr. Khamphone PH.	LAA	
11.	Ms. KeyKeu VORARATH	L-JATS Lao-Japan Airport Services	
12.	Mr. YOSHITAKA TAKEMURA	L-JATS	
13.	Mr. Nobuo HASHIMOTO	JICA Expert	
14.	Mr. Khamso Kouphoxham	Dep of Electricity, MEM	
15.	Mr. Khanthara S.	Dep of Electricity MEM	
16.	MR SOMPHONH	Dept of CIVIL AVIATION	
17.	SUGNAVONG TORU. IMAI	NEWJEC	
18.	Takumi MARUOKA	NEWJEC	

19.	TAKASHI NAKAZAYA	NEWJEC	中沢 孝之
20.	Yoko Hattori	JICA	服部 洋子
21.	KEOTA PHETSAKHONG	P. M-O	
22.	Mr. Boualom	DOE	
23.	Y. MATSUDA ~~y. Matsuda~~	NEWJEC	~~y. Matsuda~~
24.			
25.			

The Preparatory Survey on the Project for Introduction of Clean Energy by Solar Electricity Generation System

Attendance List

Subject : Detailed Explanation of the PV System at PMO and Airport
Date : February 25, 2010
Place : DOE 2F Conference Room

No.	Name	Organization / Department	Signature
1.	Yasuharu MATSUDA	NEWJEC	
2.	Ms. KaiKao VORARATH	L-JATS	
3.	MR Bounheuang SOUKHASEUM	L-JATS	
4.	Mr Bay Syj VONSEKHAY	LAA	
5.	Mr Vanpheng Chanthaphone	DCA	
6.	Mr Khomphoune THONGTHA	IAA	
7.	Dr. Daovong PHONEKEO	DOE	
8.	Ir. Somphone PHANOUSITH	National Science Council Prime Minister's Office	
9.	Mr Keota Rhetsakhone	P.M.O	
10.	Mr. Khanthara S.	DoE	
11.	Mr. Viengkeo C	DoE	
12.	Mr thavone K	EDL	
13.	Takuwi MAROOKA	NEWJEC. JICA Team	
14.	Ms. oudomsine	DOE	
15.	Mr vongkoby-V	EDL	
16.	Joji ISHIBASHI	Newjec Inc JICA Team	
17.	TAKASHI NAKAZAWA	Newjec	
18.	Yoko HATTORI	JICA, Representative	

19.	Yoshiharu Yoneyama	JICA, Senior Representative	
20.	ETSUO WADA	Newjec	和田悦郎
21.	TORU IMAI	NEWJEC	
22.	Yukihiro MIKUMO	Newjec	三雲是弘
23.			
24.			
25.			
26			
27			
28			
29			
30			

Meeting on Draft Outline Design Study Report at DOE

Date/Time: September 8, 2010.

(1/2)

No	Name & Surname	Title	Organization	Email/ Phone	Signature
1	TAKASHI NAKAZAWA	ENGINEER	NEWJEC	nakazawa@yahoo.co.jp	中沢 [signature]
2	TORU IMAI	Engineer	NEWJEC	[illegible]@yahoo.co.jp	[signature]
3	TOMOKAZU KIMURA	Project Coordinator	NEWJEC	kimuratm@newjec.co.jp	[signature]
4	YASUHARU MATSUDA	Engineer	NEWJEC	haruhiro2826@ yahoo.co.jp	[signature]
5	Shinji HOSOYA	Assistant Project Manager	JICS (Japan International Cooperation System)	hosoya_shinji@jics.or.jp	[signature]
6	Anousak PHONGSAVATH	Head of Rural Electr. Div / DOE/MEM	MEM	anousak_p@yahoo.com	[signature]
7	[illegible] HASHI[illegible]	JICA [illegible]	JICA	[illegible]	[signature]
8	Viraphonh Viravong	Director General	DOE	viraphonh123@yahoo.com	[signature]
9	Vanhdy Vilaysouk	deputy director	EDL		
10	Vilaysouk	technical department		vanhdy_edl@yahoo.com	[signature]
11	[illegible]	Technical.	NSC (PMO)	55443446	[signature]
12	MR. Vongphachanh Sitthivong	Technical staff	NSC (PMO)	55620991	[signature]
13	Mr Bounkeuth. VILAYHAK	Technical - officer	EDL	2407047	[signature]
14	Mr Donh SITHAMMALA	Deputy Director LAA	LAA	55814644	[signature]
15	SOMPHONH SYGNAVONG	DIRECTOR DIV	DEPT. CIVIL AVIATION	55521987	[signature]
16				phenhgs@yahoo.com	[signature]
17	Mr. Khamso Keophokham	Director of Division	Dept. of Electricity	khamsokeophokham@yahoo.com 2206[illegible]	[signature]
18	Mr Khammanh SOPRASEUTH	Technical staff	Dept - of Electricity	Ka_manh@yahoo.com	[signature]
19	Ir. Somphone PHANOUSITH	Permanent Secretary	National Science Council	sphanousith@gmail.com	[signature]

NEWJEC

ENGINEERING CONSULTANTS
ISO 9001/14001 Accredited

NEWJEC Inc.
3-20, Honjo-Higashi 2-chome, Kita-ku, Osaka 531-0074, Japan
Tel. 81-6-6374-4059, Fax. 81-6-6374-5198
E-mail : overseas@newjec.co.jp

Attention : Mr. Vanpheng Chanthapone
Deputy Director General, Department of Civil Aviation,
Ministry of Public Works and Transport
Date : January 18, 2011
Project : Introduction of Clean Energy by Solar Electricity Generation System in the Lao People's Democratic Republic
Subject : Permission for New Arrangement of PV module at Wattay International Airport

Dear Sir,

We would like to express our gratitude for your kind cooperation during our third visit in Vientiane from September 5 to September 10, 2010.

In accordance with PMO's withdrawal from the project, PMO's installed capacity of 75 kW is likely to be integrated with the Airport.

Under the above situation, we would like to get DCA's permission concerning new installed capacity and new PV modules arrangement in preparation for the final conclusion, so that we can commence the preparation of designing and cost estimation smoothly.

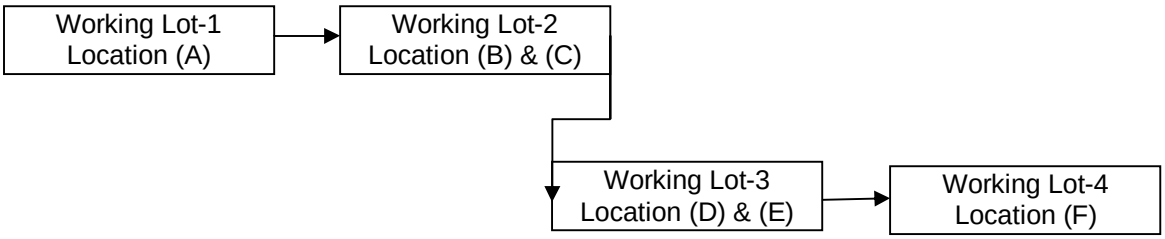
.

The comparison between the existing plan and new plan at the Airport is as follows;

Location	Existing Plan	New Plan
(A)	90.72 kW	90.72 kW
(B)	40.32 kW	50.40 kW
(C)	-	25.20 kW
(D)	-	30.24 kW
(E)	-	25.20 kW
(F)	-	15.12 kW
Total	131.04 kW	236.88 kW

The new installed capacity of 236 kW has been increased by 31 kW from the existing plan of 205 kW (130 kW at the Airport + 75 kW at PMO) considering the latest results of Tender Prices for the similar projects.

Addition to the above 236 kW proposal, we would like to propose the four working lots (construction procedure) as shown below to minimize inconvenience of parking users and secure the safety of common people.



In this connection, we much appreciate if you, DCA permit the above new installed capacity of 236 kW and the PV modules arrangement as shown in the drawing attached hereto including the potential site (G), and the construction procedure.

The potential site (G) means the potential additional installation site of PV module if Project Cost cannot meet the E/N amount of 480 Million Japanese Yen after resulting of Tender Price.

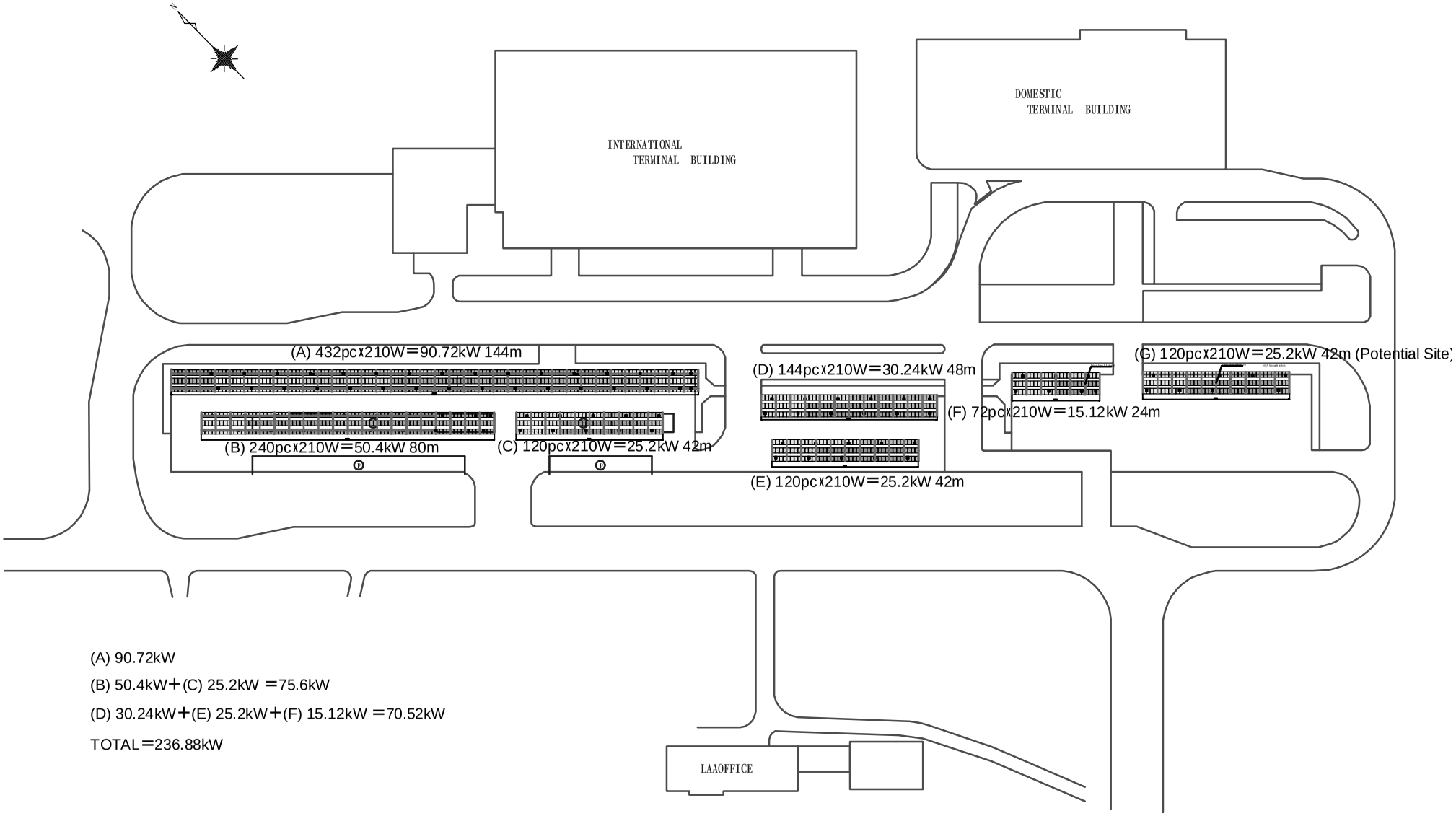
Your earliest possible response will be highly appreciated.

Sincerely Yours,

Yasuharu Matsuda
Team Leader

NEWJEC Inc.

C.C. Mr. Somphonh Sygnavong, Director of Aerodrome Division, DCA
C.C. Mr. Donh Sithammala, Deputy Director General, LAA
C.C. Mr. Anousak Phongsavath, Head of Division, DOE
C.C. Mr. Viraphonh VIRAVONG, Director General, MEM
C.C. Engr. Somphone Phanousith, PMO
C.C. Mr. Sumiyoshi, JICA Head Office
C.C. Mr. Yoneyama, JICA Laos Office



(A) 90.72kW

(B) 50.4kW+(C) 25.2kW =75.6kW

(D) 30.24kW+(E) 25.2kW+(F) 15.12kW =70.52kW

TOTAL=236.88kW

Official Approval by Department of Civil Aviation

Date:	Mon, 31 Jan 2011 18:52:08 -0800 (PST)
From:	"vanpheng chanthaphone" <vanhphengc64@yahoo.com>
Subject:	Re: JICA PV system in Lao PDR (Approval of new installed capacity, arrangement at the Airport)
To:	"Matsuda" <haruhiro2826@yahoo.co.jp>
CC:	phone98@yahoo.com

Dear Matsuda

If you are officially withdrawal the project with PMO's, we have no objection to install the new PV module arrangement and number of working lots by your request on January 18, 2011 by e-mail.
You can start the designing and cost estimation based on your planning accordingly.
When your next visit to Lao ?

Rqards,
Vanpheng C.
Lao DCA

From: Matsuda <haruhiro2826@yahoo.co.jp>
To: DCA Mr. Vanpheng <vanhphengc64@yahoo.com>
Cc: DCA Mr. Somphonh <phonh98@yahoo.com>; DOE Mr. Anousak <anousak_pv@yahoo.com>; DOE Mr. Khanthara <ktlssm@yahoo.com>; JICA Mr. Matsuzaki <matsuzaki.mizuki@jica.go.jp>; JICA Mr. Yoneyama <Yoneyama.Yoshiharu@jica.go.jp>; MEM Mr. Viraphonh <Viraphonh123@yahoo.com>; PMO Mr. Somphone <phanusith@yahoo.com>; JICA Mr. Sumiyoshi <Sumiyoshi.Hiroshi@jica.go.jp>; JICA **福田様** <Fukuda.Hidemasa@jica.go.jp>; JICA **江原様** <Ehara.Yoshiki@jica.go.jp>
Sent: Mon, January 31, 2011 1:38:40 PM
Subject: JICA PV system in Lao PDR (Approval of new installed capacity, arrangement at the Airport)

Dear Mr. Vanpheng CHANTHAPONE

I sent you the requesting letter for your approval concerning the new installed capacity, new PV module arrangement and number of working lots on January 18, 2011by e-mail.

Unfortunately, we have not received your reply up to now.

Can we start the designing and cost estimation based on our letter dated January 18, 2011?
I attaches my letter hereto for your reference.

Your quick response will be highly appreciated.

Best Regards,
Yasuharu Matsuda, NEWJEC


JICA