添付資料

添付資料 1
関係者リスト

添付資料 1:関係者リスト

Department of Energy (DOE)

Renewable Energy Management Bureau (REMB)

Mr. Mario C. Marasigan	Director
Mr. Ronnie Sargento	Chief of HOEMD Division
Mr. Epifanio G. Gacusan	Senior Science Research Specialist
Mr. Arturo F. Torralba	Senior Science Research Specialist
Mr. Winifredo S. Malabanan	Senior Science Research Specialist
Mr. Rey V. Salvania	Senior Science Research Specialist
Mr. Dante L. Castillo	Senior Science Research Specialist
Mr. Elwin T. Pantujan	Science Research Specialist
Ms. J. L. Morante	Administrative Aide IV
Ms. Ida A. Madrideo	Administrative Aide IV
Ms. Monaliza S. Verma	Administrative Aide IV
Mr. Victorio R. Raagas	Senior Science Research Specialist

Information Technology Management Services (ITMS)

Mr. J.P. Raum	Chief of ITS Division
Mr. Romeo S. Anano	Senior Science Research Specialist
Mr. Raul C. Drapete	Senior Science Research Specialist
Mr. Wy Robie Osongco	Senior Science Research Specialist

Planning Bureau

Mr. Emmanuel Talag	Senior Science Research Specialist
Mr. Jason Jude	Geologist

Alternative Fuels and Energy Technology Division

Ms. Loudes Maria A. Capricho	Supervising Science Research Specialist

Philippine Oil Company Renewable Corporation (PNOC- RC)

Mr. Antonio G. Buenviaje	Project Engineer
Mr. Jim. M. Venezvola. Jr.	Project engineer

National Power Company Small Power Utility Group (NPC-SPUG)

Mr. Melburgu S. Chiu	Vice President

Department of Public Works and Highway (DPWH)

Mr. Arthur M. Narciso	GIS Specialist

National Electrification Authority (NEA)

Mr. Mr. Rod N. Padua	Manager
Mr. Wilfredo Bucsit	Engineer

National Grid Corporation of the Philippines (NGCP)

Mr. Melchor P. Valdeabella	Chief
Ms. Rosicar E. Escober	Cheif
Mr. Medel P. Limsuan	Assistant Cheif

Flood Control Sabo Engineering Center (FCSEC/DPWH)

Mr. Grecile Christopher R. Damo	Engineer III

Department of Envirnment and Natural Resources (DENR)

Ms. JOYCELINE A. GOCO	Director
Mr. Roberto L. De Leon	Chief
Mr. Diosmedado T. Cocal	Chief

Philippines Institute of Volcanology and Seismology (PHIVOLCS)

Mr. Julio P. Sabit	Supervising Science Research Specialist

National Commission on Idigenous Peoples (NCIP)

Ms. Myrna L. Caoagas	Director

Development Bank of the Philippines (DBP)

Mr. Rustico Moli D. Cruz	Director
Ms. Mariam Isolde G. Salvador	Program Developer Officer

Land Bank

Mr. Jose Pepito B. Gupo	Chief
Ms. Josefina A. Ramos	Chief

Local Government Unit - Guarantee Corporation

Mr. Ernesto H Hernandez Jr.	Account Officer
Ms. Irmina V. Iya	Account Officer

Sibulan Municipality (LGU-Sibulan)

Mr. Ronilo Duran	Director

Calatrava Municipality (LGU-Calatrava)

Ms. Hon. Araceli T. Somosa	Mayor
Mr. Ernesto P. Porsica	Eingineer

Mabinay Municipality (LGU-Mabinay)

Mr. Hou Ernie T. UY	Mayor

National Economic and Development Agency (NEDA)

Ms. Gizella Marie A. Herrena	Senior Economic Specialist
Ms. Chiristine G. Danao	Senior Economic Development Specialist
Mr. Art Reagan M. Jarin	Economic Specialist

Wholesale Electricity Spot Market (WESM)

Ms. Elaine De Guzman Gonzales	Department Head

Cooperative Development Authority (CDA)

Mr. Rodorigo Rebello	Cooperative Development Specialist

Negros Oriental II Electric Cooperative, Inc. (NORECO2)

Mr. Chito S. Lozano	Engineering Manager

V-M-C Rural Electric Services Cooperative, Inc. (VRESCO)

Mr. Arturo A. Caprera, Jr.	Manager

Oriental Mindoro Electric Cooperative, Inc. (ORMECO)

Mr. Romeo N. Cuasay	General Manager

Antique Electric Cooperative, Inc. (ANTECO)

Mr. Ludovico Lim	General Manager

JICA Philippine Office

Mr. Takahiro SASAKI	Chief Representative
Mr. Katsumasa HAMAGUCHI	Representative
Ms. Flerida C. Chan	Section Chief
Ms. Jennifer Erice	Officer

添付資料 2
収集資料リスト

添付資料2　収集資料リスト

（調査名 フィリピン国水力発電資源インベントリー調査）

番号	資料の名称（参照URL）	形態（図書･ビデオ地図･写真等）	オリジナル･コピーの別	発行機関	発行年
1	PDP 2009-2030	電子データ	コピー	DOE	2009
2	Transmission Development Plan (2007-2016)	電子データ	コピー	NTC	2007
3	Transmission Development Plan 2009	電子データ	コピー	NGCP	2009
4	O'ILAW Program Terminal Report	A4	コピー	DOE	2008
5	2009 POWER SECTOR SITUATIONER	電子データ	コピー	DOE	2009
6	Electric Distribution Utilities Location and Jurisdiction	電子データ	コピー	NEA	2009
7	NEA Rural Electrification Chronicle	CD	オリジナル	NEA	2009
8	National Renewable Energy Plans and Programs	電子データ	コピー	DOE	2011
9	Competition in Electricity Markets in the Philippines	電子データ	コピー	University of Philippines	2008
10	WESM_Investment Forum 2007	電子データ	コピー	DOE	2007
11	Renewable Energy Act of 2008	刊行物	コピー	DOE	2008
12	16th EPIRA Status Report	電子データ	コピー	DOE	2010

添付資料2　収集資料リスト

（調査名 フィリピン国水力発電資源インベントリー調査）

番号	資料の名称（参照URL）	形態（図書･ビデオ地図･写真等）	オリジナル･コピーの別	発行機関	発行年
13	PSALM_Update on the Status and Opportunities in Privatization 2007	電子データ	コピー	DOE	2007
14	C01_RE Contracts April 2011	電子データ	コピー	DOE	2011
15	C02_RE Contract Applying	電子データ	コピー	DOE	2011
16	E01_Phil-Exist-Mini-3rd	電子データ	コピー	DOE	2010
17	E02_Phil-Exist-Major-3rd	電子データ	コピー	DOE	2010
18	P01_Phil-Prop-Mini-3rd	電子データ	コピー	DOE	2010
19	P02_Phil-Prop-Major-3rd	電子データ	コピー	DOE	2010
20	P03_NEA_Updated Hydro potential sites	電子データ	コピー	DOE	2010
21	P04_NPC Study in Luzon	A4	コピー	NPC	1987
22	Dam in the Philippines	A4	コピー	DPWH/JICA	2000
23	フィリピンの地方自治	刊行物	コピー	自治体国際化協会	1998
24	Climate Regions in the Philippines	電子データ	コピー	PAGASA	2004

添付資料2　収集資料リスト

（調査名 フィリピン国水力発電資源インベントリー調査）

番号	資料の名称（参照URL）	形態（図書･ビデオ地図･写真等）	オリジナル･コピーの別	発行機関	発行年
25	Impacts of ENSO on Philippines Annual Rainfall	電子データ	コピー	PAGASA	2005
26	Climate Change Issues and Related Extreme Weather Conditions	A4	コピー	PAGASA	2009
27	フィリピンビジネスハンドブック	刊行物	オリジナル	フィリピン日本人商工会議所	2006
28	Revised Procedure Manual for DENR Administrative Order	刊行物	オリジナル	DENR	2007
29	DENR-DOE Memorandum of Agreement On Streamlining of EIS Process for Energy Projects	A4	コピー	DOE/DENR	1999
30	The free and prior informed consent (FPIC) guidelines of 2006	A4	コピー	NCIP	2006
31	NAMRIA Products and Service	電子データ	コピー	NAMRIA	1987
32	1/50,000 Topological Map (Luzon and Visayas)	地図	オリジナル	NAMRIA	1987
33	SRTM of Philippines	電子データ	コピー	USGS	2011
34	Road and Bridge Network in the Philippines	電子データ	コピー	DPWH	2011
35	Climate Statistics	A4	コピー	PAGASA	2005
36	Stream Flow Data 1980-2000	刊行物	オリジナル	DPWH	2001 2002

添付資料2　収集資料リスト

（調査名 フィリピン国水力発電資源インベントリー調査）

番号	資料の名称（参照URL）	形態（図書･ビデオ地図･写真等）	オリジナル･コピーの別	発行機関	発行年
37	Geology and Tectonic Map of the Philippines	電子データ	コピー	DENR	2009
38	Distribution Map of Limestone Deposits in the Philippines	電子データ	コピー	DENR	2011
39	Distribution of Active Faults & Trenches in the Philippines	電子データ	コピー	PHIVOLCS	2000
40	Distribution of Volcanoes in the Philippines	電子データ	コピー	PHILVOLCS	2008
41	Mainstreaming Disaster Risk Reduction in Subnational Development and Land Use/Physical Planning in the Philippines	A4	コピー	NEDA	2008
42	Distribution Map of Earthquakes in the Philippines	A4	コピー	USGS	2010
43	Metallic Mineral Deposits of the Philippines	電子データ	コピー	DENR	2011
44	Non Metallic Mineral Deposits of the Philippines	電子データ	コピー	DENR	2011
45	Showing the Location of Protected Areas in the Philippines	電子データ	コピー	DENR	2010
46	National Commission on Indigenous People	電子データ	コピー	DENR	2010
47	Ethnographic Map of the Philippines	A4	コピー	DENR	2010
48	Philippine Map Showing the Approved CADTs as of February 2009	A4	コピー	DENR	2009

添付資料 3

討議議事録（Minutes of Meetings）

3-1 1st Site Investigation

3-2 2nd Site Investigation

3-3 4th Site Investigation (Contents of the HRD and Recommending Organization)

3-4 6th Site Investigation (Publication of the Final Report on JICA Web-site, HRD Installation and Recommendation on HRD Operation and Utilization)

3-5 7th Site Inevstigation (HRD Installation)

Minutes of Meeting during the 1st Site Investigation

The Study Project on Resource Inventory on Hydropower Potential in the Philippines

Between NEWJEC Inc. and Hydropower and Ocean Energy Management Division,

Renewable Energy Management Bureau Department of Energy (DOE)

Japan International Cooperation Agency (JICA) Study team had conducted the 1st Site Investigation on "the Study Project on Resource Inventory on Hydropower Potential in the Philippines" (the Study) from March 15th to April 13th in the Philippines.

During the 1st field investigation, the study team explained his proposals on March 19, 2010 and both of the study team and DOE discussed on the detailes scope of the Study on March 22 and 26, 2010. The agreed matters are given in the attachment hereto.

Draft inception report is to be revised according to agreed matters between JICA study team and DOE and Inception report will be submitted at the 2nd field investigation.

Manila, 9 April 2010

Yuichi SANO
Team Leader,
The Study Team

Ronie N. Sargento
OIC - Division Chief,
Hydropower and Ocean Energy Management Division

Attachment

1. Scope of the Study

The scope of the Study is to be revised as given in Table 1 through hearing DOE's needs and discussion between JICA study team and DOE. Revised framework of overall Study is shown in Fig. 1.

Detailed scope of the Study, which was agreed between both JICA study team and DOE, is summarized in Table 2.

2. Schedule of the Study

Revised schedule of the Study is given in Table 3. Site reconnaissance will be conducted in the next dry season in 2011 for prioritized potential sites.

3. The capacity range of hydropower potential sites for database

Small, medium and large scale hydropower schemes shall be included in database. Also, run-of-river type and reservoir type schemes are to be involved.

4. Development of hydropower potential database

The National Electrification Administration (NEA), National Power Corporation (NPC) and DOE have studied specific hydropower potential sites all over the Philippines. The NEA has identified about 1,000 mini-hydropower potential sites based on its mini-hydropower program which began in the 1980s. In 2002, restructuring the Philippine electric industry moved ahead. One of barriers to investment of hydropower development has been the lack of organized detailed database on hydropower potential sites, therefore U. S. Department of Energy and National Renewable Energy Laboratory (US-NREL) conducted data collection of hydropower potential sites from the relevant organizations.

Hydropower potential database shall be developed by using the above existing databases and new database as shown in Fig. 2.

5. Map study and Site verification of new hydropower potential sites

DOE requested to add new hydropower potential sites to database with appropriate accuracy for promoting hydropower development.

Both parties agreed that around 150 – 200 new potential sites are to be identified in the maps of 1:50,000, then site reconnaissance of about 50 potential sites which are prioritized by ranking study is to be conducted in order to verify results of map study. Site reconnaissance will be conducted by a local consultant.

6. Screening and ranking of hydropower potential sites

Flowchart of screening and ranking of potential sites is shown in Fig. 3.

Preliminary project layout is examined and construction cost is to be updated . Spreadsheets for ranking study are shown in Fig. 4.

7. Information map and hydropower potential database

All existing and new hydropower potential sites, existing hydropower plants and hydropower plants under construction will be plotted on information map. (see Fig. 4)

Hydropower potential database shall be developed by using Arc view for GIS data and Access.

8. Selection criteria for new hydropower potential sites

New hydropower potential sites are to be selected according to the following criteria, which were discussed with DOE. The target areas shall be discussed and confirmed before starting of the selection.

(1) Priority area (Island)

Mindoro, Masbate, Marindouque, Catanduanes, Ronblon, Panay, Bohole, Negros

(2) Provivce

CAR, Region I, Region III

(3) High demand area

(4) Area supplied by selected ECs

Accessibility, distance from T/L, Socio-environmental issues and so on shall be considered to select potential sites.

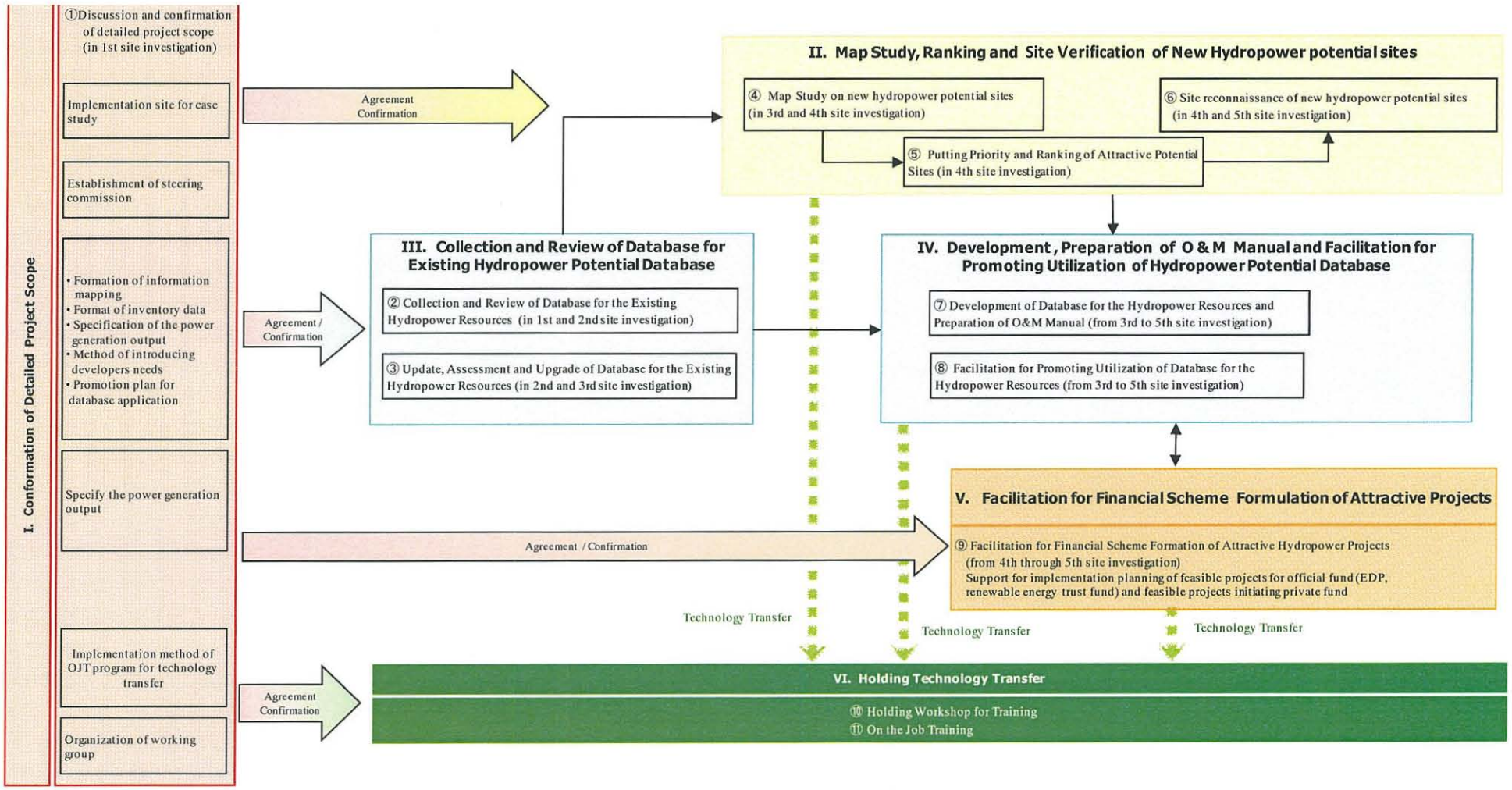


Fig. 1 Framework of Overall Study

Table. 1 Comparison of Project Scope of proposal and revised proposal

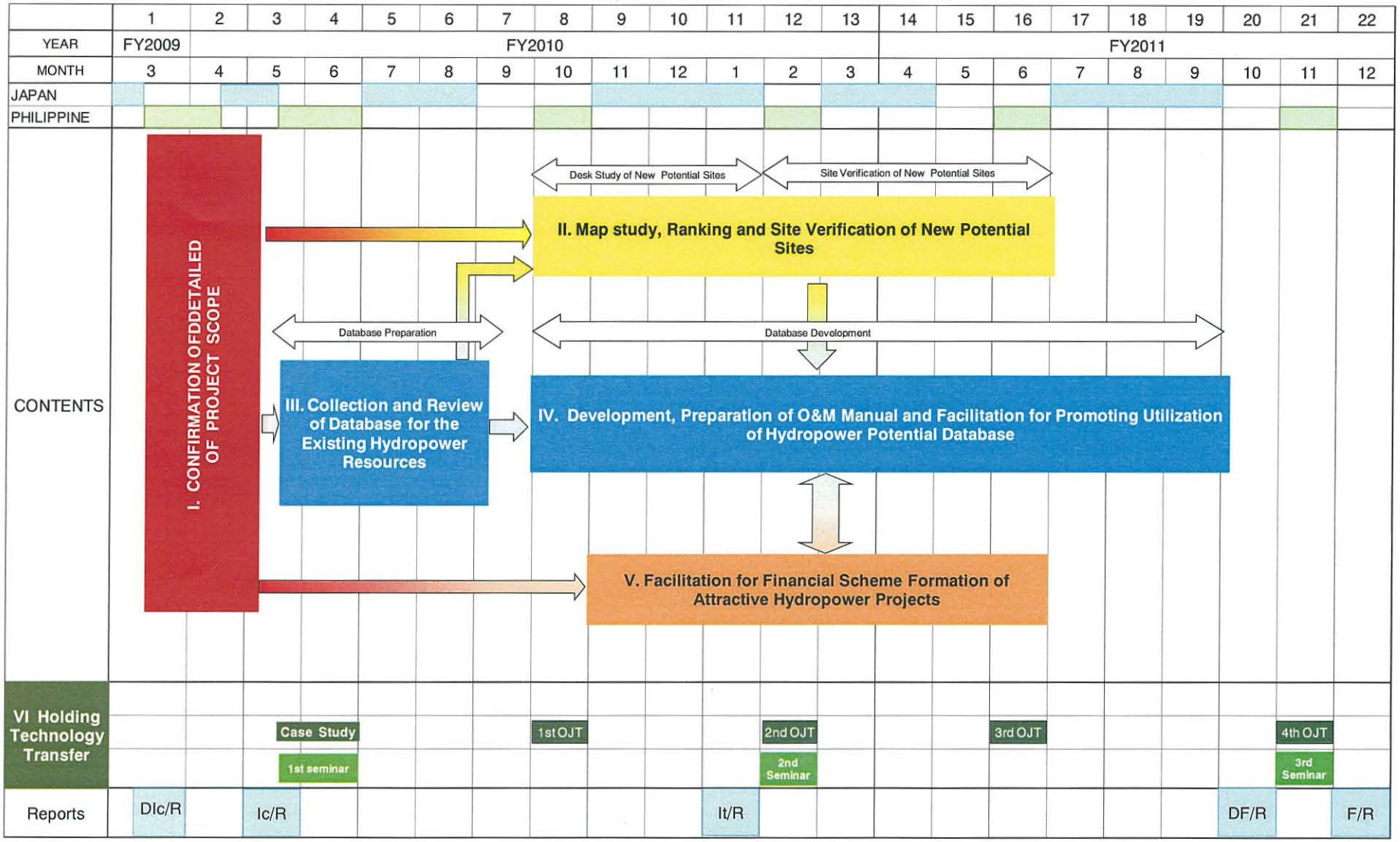
	Revised	Proposal
Project Scope	(1) Discussion and Confirmation of the Detailed Scope of Work (2) Collection and Review of Database for the Existing Hydropower Resources (3) Update, Assessment and Upgrade of Database for the Existing Hydropower Resources (4) Map Study of New Potential Sites (5) Putting Priority and Ranking of Attractive Potential Sites. (6) Site Verification of New Potential Sites. (7) Development of Database for the Hydropower Resources and Preparation of O&M Manual (8) Facilitation for Promoting Utilization of Database for the Hydropower Resources (9) Facilitation for Financial Scheme Formation of Attractive Hydropower Projects (10) Technology Transfer for Project Identification of Hydropower Resources, Financial Evaluation and Analysis, Hydropower Engineering etc. (11) Holding Workshop for Training	(1) Discussion and Confirmation of the Scope of Work (2) Collection and Evaluation of Database for the Existing Hydropower Resources and Results of F/S (Feasibility Study) (3) Implementation of Case Study for New Potential Sites of Hydropower Resources (4) Development of Database for the Hydropower Resources and O&M Manual (5) Facilitation for Promotion of Utilizing Database for the Hydropower Resources (6) Facilitation for Identifying Projects Applying for Financial Assistances (7) Technology Transfer for Project Identification of Hydropower Resources and Database O & M (8) Holding Seminars
Components of the Study	I. Confirmation of Detailed Project Scope II. Map study, Ranking and Site Verification of New Potential Sites III. Collection and Review of Database for the Existing Hydropower Resources IV. Development, Preparation of O&M Manual and Facilitation for Promoting Utilization of Hydropower Potential Database IV. Facilitation for Financial Scheme Formation of Attractive Hydropower Projects V. Holding Technology Transfer (On-the-job Training and Workshop)	I. Determination of detailed scope II. Planning of new hydropower projects III. Development, O & M and Facilitation of utilization promotion of hydropower potential database IV. Facilitation for producing implementation plan of attractive projects V. Implementation of technology transfer (on-the-job-training and seminar)

Table 2 Detailed Scope of the Study

item	Proposal	Agreed
Range of hydropower potential sites	Basically, 0.1 – 10MW	No upper limitation small, medium and large scale hydropower shall be involved Run-of-River and Reservoir schemes
Information map		
Range of potentials	DOE database, small-scale of 94 sites and large-scale of 60 sites	All potential sites selected by DOE, NEA, NPC shall be included No upper limitation
Database		
Range of potentials	Potential sites which have coordinates and where the location can be identified on the 1:50,000 map are to be included.	Agreed
Program	GIS (Arc view) , Form (Access)	Agreed
Base map	GIS base map is 1:50,000 topographic map.	Agreed
Data Format	Basically, DOE database format To add socio-environmental items, leveling construction cost, GIS data etc.	Agreed
Potential sites for case study		
Sites for case study	3 to 4 prospective potential sites are to be selected and site reconnaissance and pre-feasibility study is to be conducted.	Site reconnaissance is to be carried out at about 50 selected sites. Pre-feasibility is not necessary
Schedule	Field investigation is planned at the 2nd site investigation based on discussion with DOE.	Field investigation is to be conducted during the 4th site investigation in February, 2011 after ranking study.
On-the-job-training, workshop		
Current Needs	See DIcR	DOE requested design programs in order to examine F/S submitted by applicants, the Consultant replied that basic program (stability analysis etc.) and technical standards (JICA project in Lao PDR) will be available.
Contents of training program	See DIcR	To consider DOE's needs, i.e. capacity development to examine F/S of medium to large-scale hydropower projects. Dam design, Transmission line design etc. are to be included. Detailed training program shall be informed beforehand

Promoting utilization of database		
Basic policy	- Needs study - Promotion of Database utilization through Wab-site - Workshop for promotion of Database - Setting up the organization in charge of promotion of the database utilization - Implementation of Assistance measure for implementation of project	- Promotion of Database utilization through Wab-site
Working Group (WG)		
purpose	Effective and efficient transfer technology and working together.	Agreed
Working group	Hydropower WG Social Environmental and Economic / Financial Analysis WG Database WG	Agreed
member	DOE, NEA, other related organizations	Ocean & Hydro power division, DOE mainly, But not limited
Steering Committee		
purpose	The Consultant recognized that GIS data developed government agencies are essential for reliable and useful database, therefore steering committee is important to support to collect data.	At present, not necessary. DOE explained that Steering committee is required after F/S, consists of investor/developer (PNOC-RC, LGU), bank (DBP), Market (EC, PU) and DOE.

Table 2 Tentative Schedule of tha Study



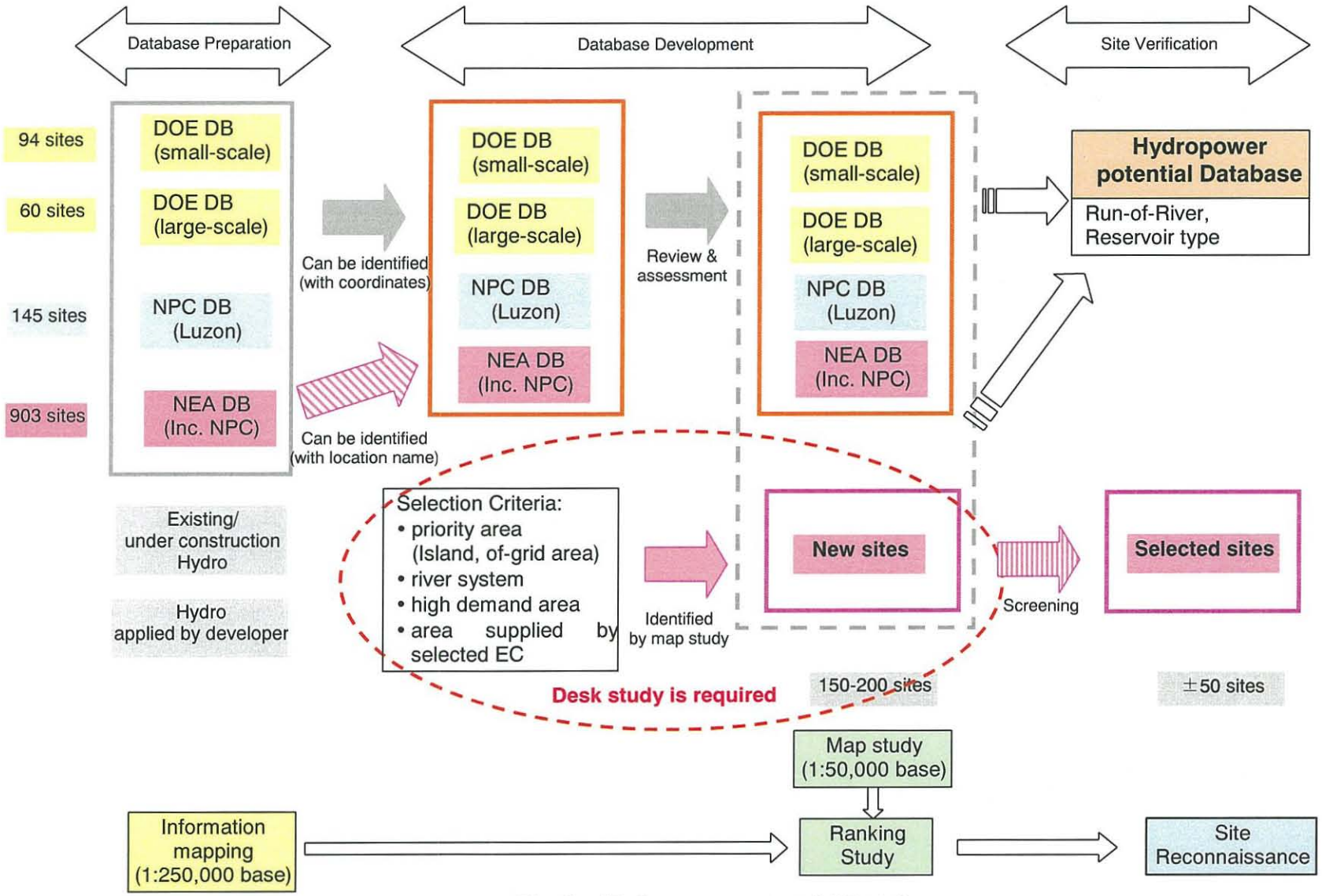


Fig. 2 Hydropower potential Database

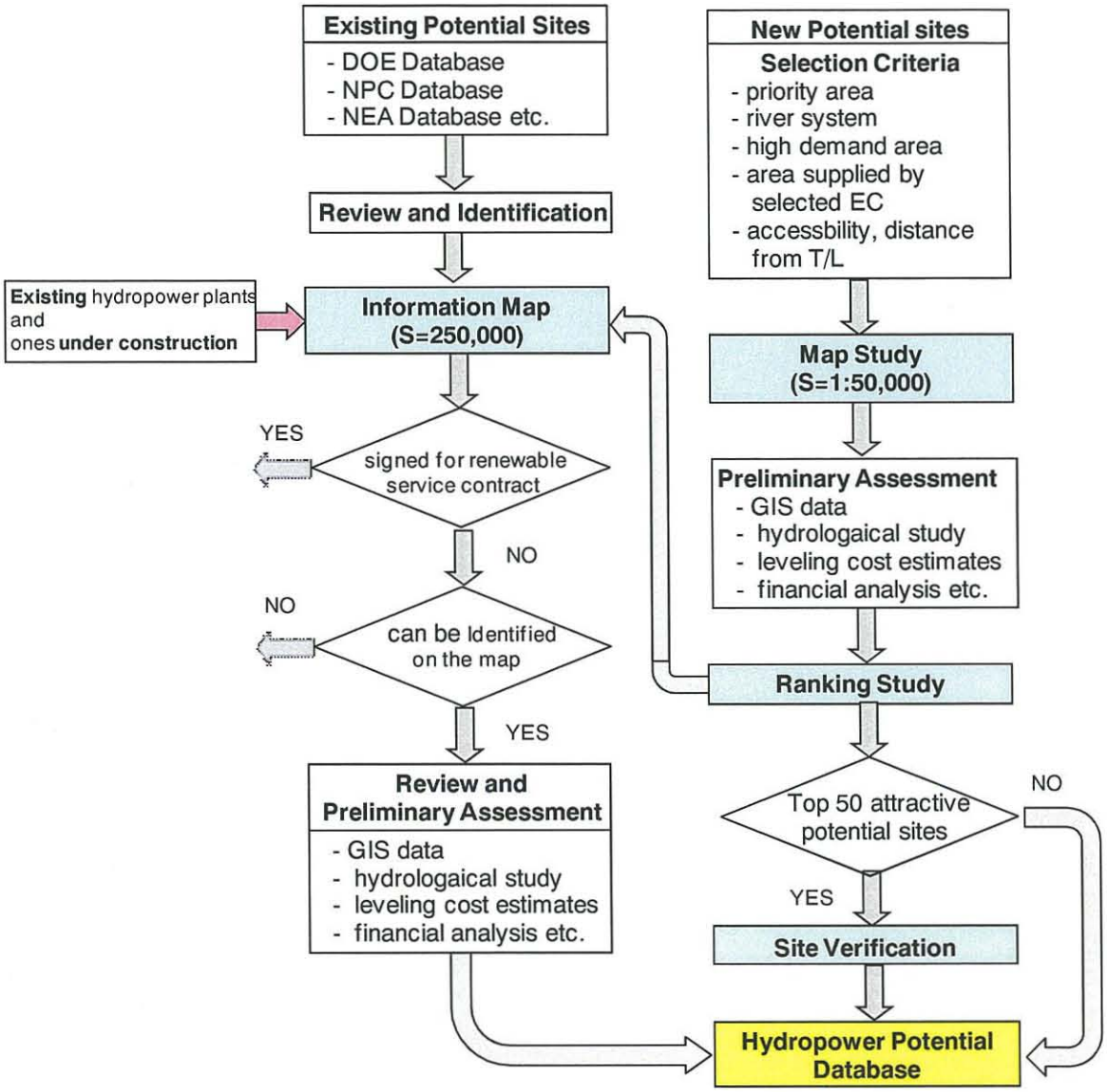
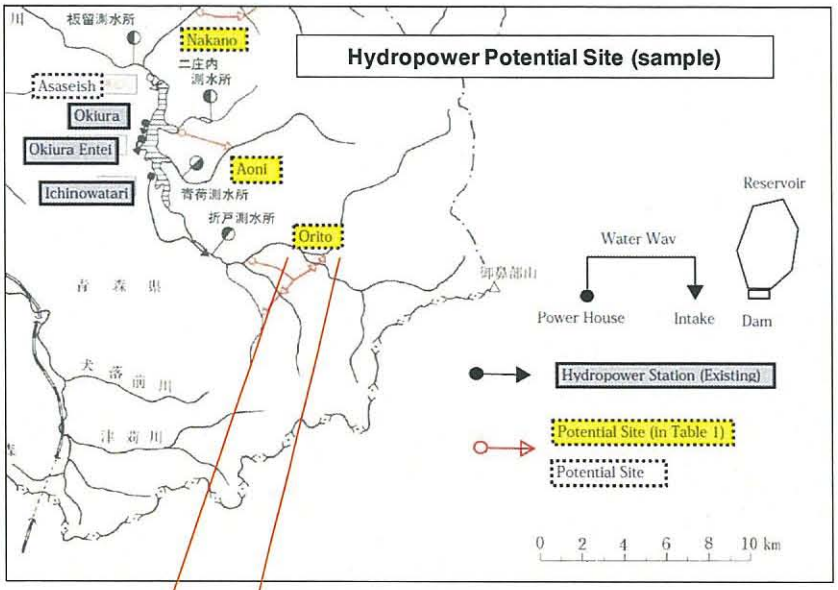


Fig. 3 Flowchart of Development of Hydropower potential Database



Item List (example)

- Location
- Maximum Output
- Power generation type
- Basin Area
- Maximum Discharge
- Effective Head

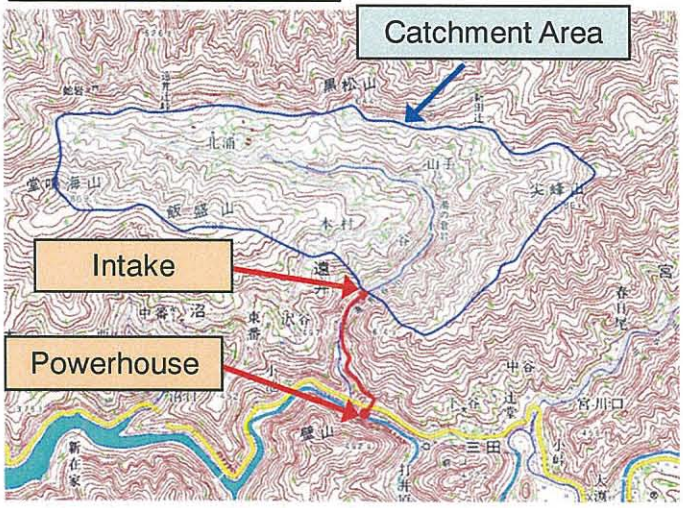
...etc

Inventory Database

River System	River Name	Point	Maximum Output (kW)	Possible Annual Electric Generation (10^3kWh)	Power Generation Type	Basin Area (Km^2)	Maximum Discharge (m^3/s)	Effective Head (m)
		Orito	4400	21800	Run-of-River	98.6	7.00	76.5
		Aoni	2300	12000	Run-of-River	22.3	1.70	166.7
		Nakano	3600	15600	Run-of-River	36.8	3.00	144.6

Information map (1:250,000 base)

Map study (1:50,000 base)



River Name, Place, Basin Area

Item	Contents
River System	Arita
River	Arita
Tributary	Toidani
Intake	Shimoyazisaki Shimizu-cho Arita-gun Wakayama-ken
Power Station	Shimoyazisaki Shimizu-cho Arita-gun Wakayama-ken
Basin Area	6.56 km^2
Steam-Gauging Point	Omata
Maintenance Flow Discharge	0.50 $m^3/s/100km^2$
Intake Point	0.03 m^3/s

Generation Plan

Item	Contents
Type	Run-of -River
Intake Water Level	340.00 m
Discharge Water Level	205.00 m
Gross Head	135.00 m
Installed Capacity	270 kW
Turbine Discharge	0.28 m^3/s
Effective Head	129.52 m
Power Generation Capacity	1,599 MWh
Total Construction Cost	354.0 PHP (million)
Unit Cost of Power Generation	151.4 PHP / kWh
Rank	B

100Php = 197.7Yen

Contents		
rete Gravity Dam		
3.00	Length (m)	30
	Length (m)	0
ad Laying Type		
0.55	Length (m)	1,100

**Open Channel or Tunnel

Spillway	Diameter (m)	Length (m)	
Tailra			
Open Channel	Width (m)		10
Turbi			
Generator	AC 3-Phase Synchronous		
Trans			

***Ro

Generation energy

Construction Cost

Unit Cost

Economic Evaluation

Note: Duration curve calculation, Optimum power discharge, Optimum design of major structures, Preliminary Cost estimates are included

Ranking Study (1:50,000 base)

Fig. 4 Information map and Spreadsheets for ranking study

Minutes of Meeting during the 2nd Site Investigation

The Study Project on Resource Inventory on Hydropower Potential in the Philippines

Between Hydropower and Ocean Energy Management Division,

Renewable Energy Management Bureau Department of Energy (DOE) and NEWJEC Inc.

Japan International Cooperation Agency (JICA) Study team had conducted the 2nd Site Investigation on "the Study Project on Resource Inventory on Hydropower Potential in the Philippines" (the Study) from May 25 to July 2, 2010 in the Philippines.

During the 2nd Site Investigation, the study team explained the Inception Report, which was revised based on the discussion on the Draft Inception Report during the 1st Site Investigation in last March with the DOE. Both of the parties discussed the scope of the Study on June 1, 2010. After the meeting the study team and DOE have continued to discuss the details of the scopes in the Inception Report. Finally, the DOE approved the Inception Report.

Agreed matters between JICA study team and the DOE during the 2nd Site Investigation are described hereinafter.

Manila, 25 June 2010

Mr. Mario C. Marasigan
Office-in-Charge Assistant Secretary
Director, Renewable Energy Management Bureau
Department of Energy

for 佐藤正和

Yuichi SANO
Team Leader,
The Study Team

Attachment

(1) The DOE fully assists and supports to collect GIS database to be required for development of the database of hydropower resources from relevant agencies.

(2) The DOE agreed and designated C/Ps to establish the following Working Groups,
- Hydropower Study Working Group
- Database Working Group
- Environmental / Social Consideration and Economic / Financial Analysis Working Group

(3) The programs of the Workshop for training shall be coordinated with the DOE in advance and the same can be revised in accordance with DOE's requests.

(4) New hydropower potential sites are to be selected in target areas discussed and confirmed during the 2nd Site Investigation.

1) Priority area (Island)
Mindoro, Masbate, Marinduque, Romblon, Panay, Bohol, Negros, Palawan and Samar
2) Region
CAR, Region I, Region II

DOE requested to include the Mindanao Island as a target area, however the Consultant explained that it is difficult to include the Mindanao Island because of safety, budget and duration of the Project in the meeting with DOE on June 11th 2010.

Minutes of Meeting during the 4th Site Investigation

The Study Project on Resource Inventory on Hydropower Potential in the Philippines

Between Renewable Energy Management Bureau Department of Energy (DOE) and NEWJEC Inc.

JICA study team made a presentation on Hydropower Resource Database (HRD) to personnel of REMB (Renewable Energy Management Bureau)-DOE on April 14th, 2011 at the REMB-Conference Room. JICA study team answered the question of REMB-DOE about the overall system and performance of the HRD (Attendant list is attached).

Mr. Marasigan gave his profound consent to the overall system and performance of the HRD. HRD system will be finalized to add the location data of intake and powerhouse to river profiles. The status of the projects is classified into three conditions as follows;

1. Potential sites
   - -Signed
   - -Under-signed
   - -Mini-hydro
   - -Major-hydro
   - -NPC sites
2. Existing sites
   - -Existing mini-hydro
   - -Existing major-hydro
   - -Other existing dams
3. New Potential sites

Mr. Marasigan and JICA study team agreed with holding the lecture on operation of HRD for REMB-DOE users in August, 2011.

Manila, 14 April 2011

Mr. Mario C. Marasigan
Director IV, Renewable Energy Management Bureau Department of Energy

for
Yuichi SANO
Team Leader,
The Study Team

Attachment

- Attendant list -

REMB-DOE

Mr. Mario C. Marasigan

Mr. Arturo F. Torralba, Jr.

Ms. Marrissa P. Cerezo

Mr. Elwyn T. Pantujan

NEWJEC Inc.

Mr. Satoshi Yamaoka

Mr. Hideo Takase

Mr. Takao Saruhashi

Mr. Ryuichi Nishi

Mr. Yukohiro Mikumo

Minutes of Meeting during the 4th Site Investigation

The Study Project on Resource Inventory on Hydropower Potential in the Philippines

Renewable Energy Management Bureau Department of Energy (DOE) and NEWJEC Inc.

JICA study team made a discussion with personnel of REMB (Renewable Energy Management Bureau)-DOE on April 14th, 2011 at the REMB-Conference room (Attendant list attached).

Mr. Marasigan agreed with our proposal of "Recommending organization for exploitation & facilitation of the HRD (Hydropower Resource Database)". Concerning the activity of exploitation and facilitation, roles are prescribed as follows, and personnel in charge are decided as attached document;

1. HOEMD (Hydropower & Ocean Energy Management Division)
   HOEMD accepts inquiries from investors and prepare the providing data by using the HRD. Occasionally, HOEMD provide the face to face interactive service to visiting investors.
2. TSMD (Technical Service Management Division)
   HOEMD provides the information of existing and pending contract to TSMD, then share the information with ITMS (Information Technology Management Section).
3. ITMS
   HOEMD provides the pdf files described the information such as specs, location etc to ITMS. Then ITMS subscribe the pdf files on DOE website for down loading. ITMS assist HOEMD in the field of making the map information etc.

Mr. Marasigan and JICA study team agreed with making an additional confirmation to HOEMD concerning the confidential information that should not be provided from each layer of HRD.

The "Recommending organization for exploitation & facilitation of the HRD" will be finalized to incorporate above additional confirmation.

Manila, 14 April 2011

Mr. Mario C. Marasigan
Director IV, Renewable Energy Management Bureau Department of Energy

for
Yuichi SANO
Team Leader,
The Study Team

Attachment

- Attendant list -

REMB-DOE

Mr. Mario C. Marasigan

Mr. Arturo F. Torralba, Jr.

Ms. Marrissa P. Cerezo

Mr. Elwyn T. Pantujan

NEWJEC Inc.

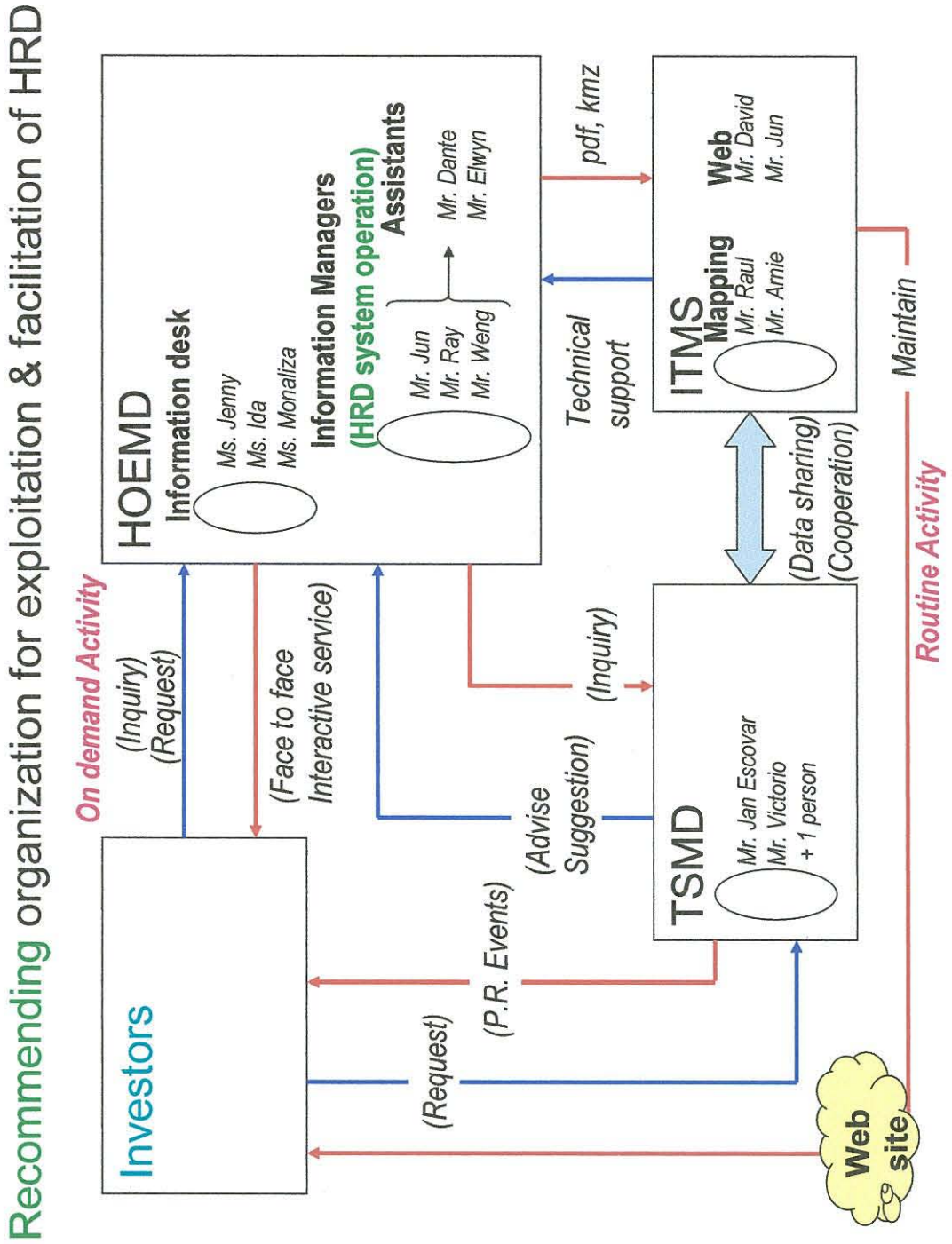
Mr. Satoshi Yamaoka

Mr. Hideo Takase

Mr. Takao Saruhashi

Mr. Ryuichi Nishi

Mr. Yukohiro Mikumo


Recommending organization for exploitation & facilitation of HRD
Investors
On demand Activity
(Inquiry)
(Request)
HOEMD
Information desk
Ms. Jenny
Ms. Ida
Ms. Monaliza
Information Managers
(HRD system operation)
Assistants
Mr. Jun
Mr. Ray
Mr. Weng
Mr. Dante
Mr. Elwyn
(Face to face
Interactive service)
(Advise
Suggestion)
(Inquiry)
(P.R. Events)
(Request)
pdf, kmz
Technical
support
ITMS
Mapping
Mr. Raul
Mr. Arnie
Web
Mr. David
Mr. Jun
(Data sharing)
(Cooperation)
TSMD
Mr. Jan Escovar
Mr. Victorio
+ 1 person
Web
site
Maintain
Routine Activity

Minutes of Meeting during the 4th Site Investigation

The Study Project on Resource Inventory on Hydropower Potential in the Philippines

Between Hydropower and Ocean Energy Management Division,

Renewable Energy Management Bureau Department of Energy (DOE) and NEWJEC Inc.

JICA study team made a presentation to REMB-DOE on April 8th, 2011 at the DOE-Audio Visual Room. After the presentation both parties discussed the overall system and performance of the Hydropower Resource Database (HRD) .

REMB-DOE expressed satisfaction to HRD. The status of the projects is classified into three conditions as follows;

1. Potential sites
   - -Signed
   - -Under-signed
   - -Mini-hydro
   - -Major-hydro
   - -NPC sites
2. Existing sites
   - -Existing mini-hydro
   - -Existing major-hydro
   - -Other existing dams
3. New Potential sites

REMB-DOE and JICA study team agreed with addition of information to the present status of HRD as shown below;

1) Active volcanoes
2) Active Fault lines
3) Geological map
4) Addition of the weir and powerhouse location on the river profile figure

The HRD will be finalized to incorporate above four additional information and final version will be presented in August, 2011.

Manila, 8 April 2011

Mr. Ronnie SARGENTO	*for* 佐野正和
Chief, Hydropower and Ocean Energy Management Division , Renewable Energy Management Bureau Department of Energy	*Yuichi SANO*
	Team Leader,
	The Study Team

Minutes of Meeting during the 6th Site Investigation
On Draft Final Report

The Study Project on Resource Inventory on Hydropower Potential in the Philippines
Between Hydropower and Ocean Energy Management Division.
Renewable Energy Management Bureau Department of Energy (DOE) and NEWJEC Inc.

JICA Study team had conducted the 6th Site Invitation on "the Study Project on Resource Inventory on the Hydropower Potential in the Philippines", (the Study) from November 20 to December 3, 2011.
During the 6th site investigation, the Study team submitted and explained the Draft Final Report. DOE gave the comments on Draft Final Report and both parties agreed to reflect the comments and revisions in Final Report.

Manila, December 2, 2011

佐野 裕一

Mr. Mario C. Marasigan
Director, Renewable Energy Management Bureau
Department of Energy

Mr. Yuichi SANO
Team Leader
The Study Team

Mr. Ronnie Sargento, Ph.D
Chief. Science Research Specialist
Hydropower and Ocean Energy Management Division
Renewable Energy Management Bureau
Department of Energy

Table-1 Comments from DOE and Reply from the Study team (1st Reply)

	Chapter and page	Comments from DOE	Reply from the Study team
Chapter 2 Electricity Power Circumstance in the Philippines			
1	2.6.2 Establishment of National Renewable Energy, page 2-22	The actual function of NREB shall be referred to the law.	Agreed, to be revised
2	ditto	Incentives shall be referred to RE Act	Agreed, to be revised
Chapter 4 Basic Data For Hydropower Resources Database			
3	4.10.3 Price of Water Turbine, Generator and Transmission Line, page 4-66 ~ 4-70	To be Consistent with the figures or use momentary in US dollars	Agreed, to be revised in US dollars
Chapter 5 Survey for New Hydro Electric Power Potential Sites			
5	5.8 Economic and Financial Evaluation of Each Promising Power Project , page 5-61 ~ 5-62	No tables of 5.8-1 and 5.8-2	To be added a table of calculation results.
Chapter 6 Study on Projects for Financial Assistance			
6	6.3.3 Hydropower Investor, page 6-23 ~ 6-24	Why is only one hydro investor presented?	To be added several investors or to delete this chapter
7	6.4.2 Current Problems related to Main Mini-Hydro Investments, page 6-26 ~ 6-28	• Content mentioned in (2) Financial Source Issue relating to Hydropower Investment is not a problem. • Content mentioned in (3) Issues relating to FIT Introduction.	To be reviewed and reply.
8	6.4.2 Current Problems related to Main Mini-Hydro Investments, page 6-26 ~ 6-27	• Content mentioned in (4) Providing Investment Incentives cannot be understood throughout. It is recommended to be better not to discuss this issue.	To be reviewed and reply.
9	6.4.3 Proposal for Improvement of Investment Environment, page 6-27 ~ 6-28	• Content mentioned in (1) Establishment of Investment Promote Committee among NRB is better not to improve or recommended to delete it.	To be reviewed and reply.
10	6.4.3 Proposal for Improvement of Investment Environment, page 6-28	To check the appropriateness of Fig. 6.4-2 Proposal of Framework for Min-Hydropower Investment Promotion To correct the figure according to the followings • NREB is a policy body recommendatory to DOE • NREB separate entry IPO (Investment Promotion Office) is not under the NREB.	To be reviewed and reply.

Chapter 9 Issues and Recommendations			
11	9.2 Recommendations, page 9-4	To review (1) 1) Establishment of Investment Promote Committee among NREB according to comments of the above 7 and 8.	To be reviewed and reply.
12	9.2 Recommendations, page 9-5	To explain (2) Recommendations for Utilization of Promoting Hydropower Potential Sites selected by this Study.	To revise the last sentence "DOE has no experiences …… To technical training for them" as follows "DOE has experienced the examination of F/S of Mini-hydropower projects, but not Poundage / Reservoir type and large-scale hydropower projects. Therefore, it is required to conduct technical training for those hydropower projects for them."
Others			
13	General	Minor Errors in spelling, grammar, standard nomenclatures etc,	To be correct.
14	ditto	To use abbreviation	Agreed, to be revised

Received by

December 2, 2011

Mr. Ronnie Sargento, Ph.D

Chief. Science Research Specialist

Hydropower and Ocean Energy Management Division

Renewable Energy Management Bureau

Department of Energy

Prepared by

December 2, 2011

佐野 裕一

Mr. Yuichi SANO

Team Leader

The Study Team

Minutes of Meeting during the 6th Site Investigation
On Final Report to be published on the JICA Web site

The Study Project on Resource Inventory on Hydropower Potential in the Philippines
Between Hydropower and Ocean Energy Management Division.
Renewable Energy Management Bureau Department of Energy (DOE) and NEWJEC Inc.

JICA Study team had conducted the 6th Site Invitation on "the Study Project on Resource Inventory on the Hydropower Potential in the Philippines", (the Study) from November 20 to December 3, 2011.

During the site investigation, the Study team discussed about Final Report to be published on the JICA Web site with DOE due to confidential data / information regarding promising hydropower potential sites identified in the Study.

JICA Study team explained 2 options to DOE

(1) To submit Final Report excluding confidential data / information for publication on JICA Web-site.

(2) Not to publish Final Report on JICA Web site for any period.

As a result of discussion, DOE and the Study team concluded to explore option (2) and disclosure period on JICA Web site is proposed to be 2 years.

Manila, December 2, 2011

Mr. Mario C. Marasigan
Director, Renewable Energy Management Bureau
Department of Energy

佐野 裕一

Mr. Yuichi SANO
Team Leader
The Study Team

Mr. Ronnie Sargento, Ph.D.
Chief. Science Research Specialist
Hydropower and Ocean Energy Management Division
Renewable Energy Management Bureau
Department of Energy

Minutes of Meeting during the 6th Site Investigation
On Draft Operation and Maintenance Manual of Hydropower Resource Database

The Study Project on Resource Inventory on Hydropower Potential in the Philippines
Between Hydropower and Ocean Energy Management Division.
Renewable Energy Management Bureau Department of Energy (DOE) and NEWJEC Inc.

JICA Study team had conducted the 6th Site Invitation on "the Study Project on Resource Inventory on the Hydropower Potential in the Philippines", (the Study) from November 20 to December 3, 2011.
During the 6th site investigation, the study team installed Hydropower Resource Database (HRD) into 3 PCs and confirmed that HRD systems operate properly by both parties.
Also, JICA Study team submitted and explained Draft Operation and Maintenance (O&M) Manual of HRD. DOE gave the comments on Draft O&M Manual and both parties agreed to reflect the comments and revisions in Final O&M Manual.

Manila, December 2, 2011

Mr. Mario C. Marasigan
Director, Renewable Energy Management Bureau
Department of Energy

佐野 裕一
Mr. Yuichi SANO
Team Leader
The Study Team

Mr. Ronnie Sargento, Ph.D
Chief. Science Research Specialist
Hydropower and Ocean Energy Management Division
Renewable Energy Management Bureau
Department of Energy

Minutes of Meeting during the 6th Site Investigation
On Recommendations of the Study

The Study Project on Resource Inventory on Hydropower Potential in the Philippines
Between Hydropower and Ocean Energy Management Division
Renewable Energy Management Bureau Department of Energy (DOE) and NEWJEC Inc.

JICA Study team had conducted the 6th Site Invitation on "the Study Project on Resource Inventory on the Hydropower Potential in the Philippines", (the Study) from November 20 to December 3, 2011.
During the 6th site investigation, the Study team submitted and explained the Draft Final Report to DOE. The Study team recommended the following actions and both parties agreed to implement these actions as soon as possible.

1. Sustainable Operation and Maintenance Hydropower Resource Database (HRD) systems

The JICA study team recommended organization and roles as described in Chapter 7 Development and O&M of Hydropower Resource Database 7.4.2 Organizations and Roles for Data Provision of Draft Final Report in order to achieve sustainable Operation and Maintenance of HRD systems.

The following three divisions shall fulfill their roles and coordinate mutually to achieve the sustainable operation and maintenance of HRD systems. Roles of each division are prescribed as follows.

(1) HOEMD (Hydropower & Ocean Energy Management Division)

- HRD system operation and maintenance
- Update of RE-contracts information
- Supervision on from registration, development until operation of HEP
- Data provision of HEP projects to developers
- Establishment the information desk
- Face to face service to developers
- Facilitation of new potential sites identified by JICA study
- Holding seminars

(2) TSMD (Technical Service Management Division)

- Technical assistance for facilitation of new identified sites and management of RE-contracts information
- Preparing the documents for data provision

Recommended organization of O & M of HRD systems and assigned staff are shown in the following figure. HOEMD shall always update HRD and manage HRD systems by the staff in charge properly.
The Study team strongly request DOE that the O & M organization, staff in charge, coordination with relevant division etc. shall be approved officially.

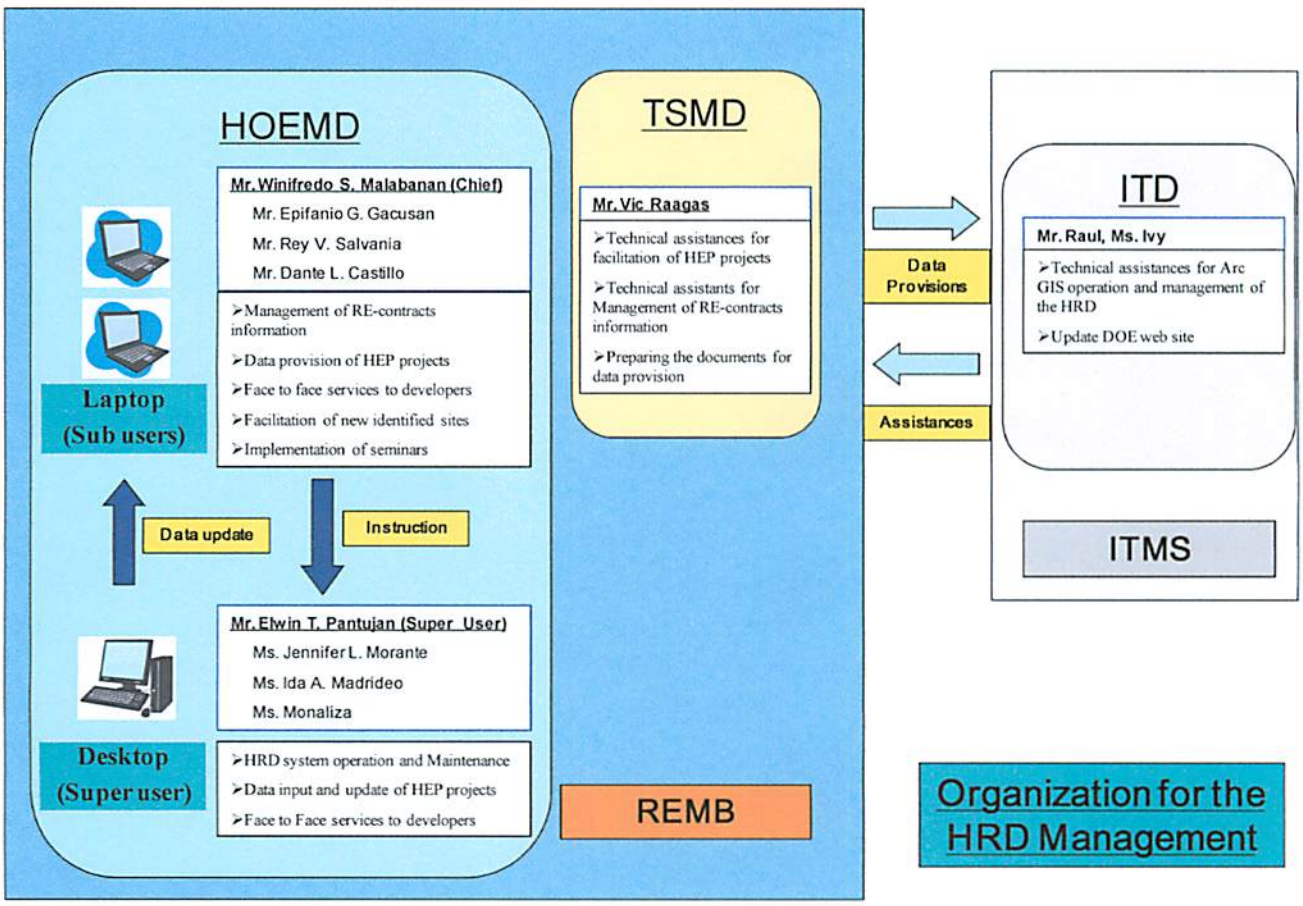


Fig. 1 Organization for the HRD systems Management

2. Utilization of Hydropower Resource Database (HRD) systems

The JICA study team recommended the following utilization of HRD systems as described in Chapter 8 Exploitation and Facilitation of Hydropower Resource Database of Draft Final Report in order to facilitate promotion of Hydropower development.

In this Study, the following methods are proposed to promote hydropower development by utilizing the database for developers / investors.

- Information provision through the web site
- Establishment of information desk for hydropower development
- Provision of data / information of the relevant potential site by Face-to-face service
- Seminars regarding hydropower development information

Information / data related to hydropower potentials are recommended to be disclosed to the developers on DOE web site and by means of face to face services.
Basic information / data are to be disclosed on the Web site, which can be prepared by HRD systems easily.

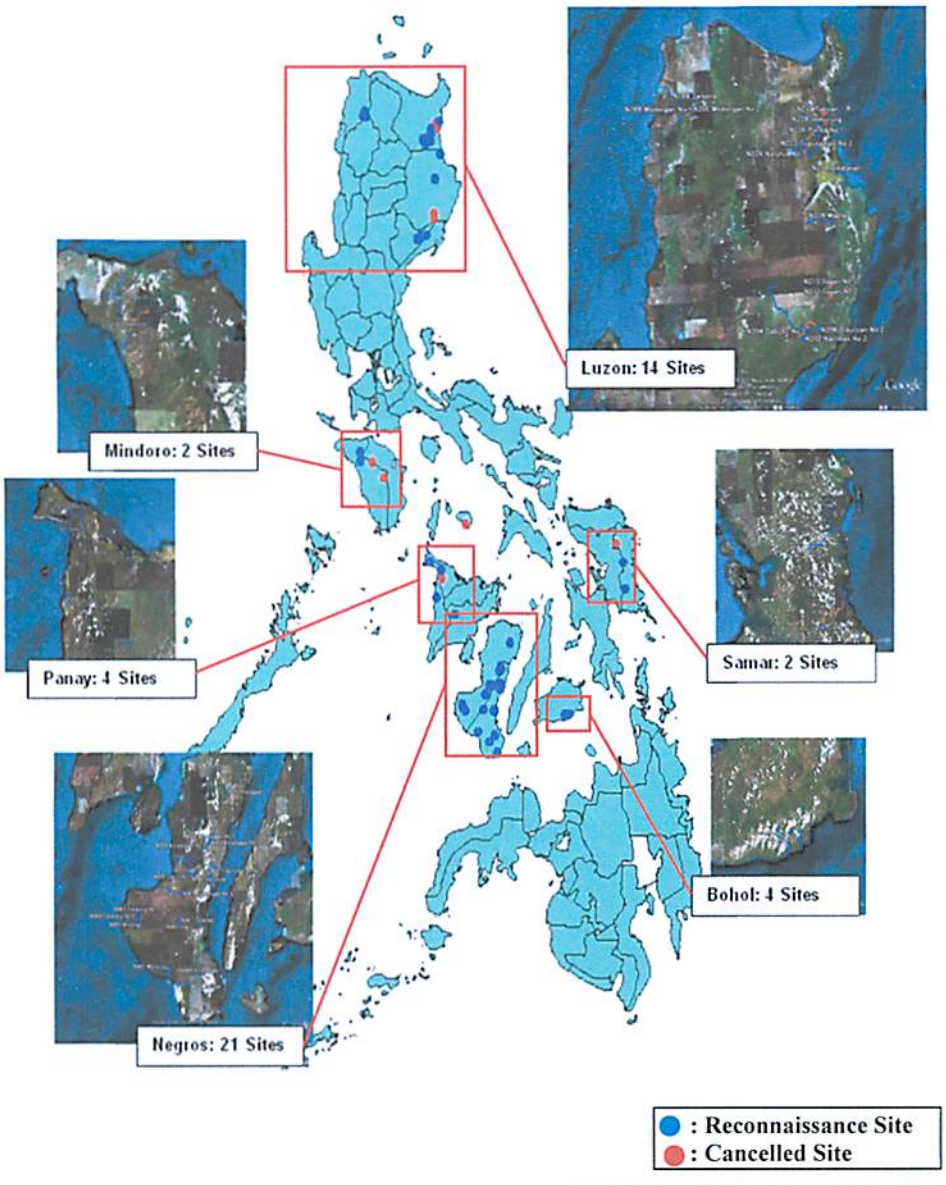
On the other hand, upon requests from developers, the information desk shall provide information / data related to the relevant project to developers. The information desk is to be established in HOEMD.
The HRD systems can provide the related information / data of the relevant project easily and effectively.

Table 1 Methods for Data Provision for developers

Method	Contents
1. Web site	Download available from the DOE web site 1) List of Projects (basic parameters) 2) Projects Location on River System Map
2. Face-to-Face Service	Provision of detailed information / data according to requests 1) Project Information 2) Summary evaluation of Project site 3) Preliminary estimated construction cost 4) Site Reconnaissance Report

3. New hydropower potentials identified in the Study

The JICA study team identified 252 potential sites by Map study and screened 47 sites from economic, environmental and accessibility aspects. As a result, the site reconnaissance was carried out at 47 prioritized sites to verify the results of Map study. (see attachment – 1)
47 verified potential sites are planned to be bided for implementation of Feasibility study by DOE in next year. The data / information of the relevant potential site can be provided easily and effectively by using HRD systems.



Region	Island	Run-of-River	Reservoir Poundage	Cancelled	Sub Total
CAR	Luzon	11	3	4	14
REGION 1					
REGION 2					
REGION 4-B	Mindoro	2	0	2	2
	Romblon	0	0	1	0
REGION 6	Panay	4	0	1	4
	Negros	20	1	0	21
REGION 7	Bohol	4	0	0	4
REGION 8	Samar	2	0	1	2
Sub Total		43	4	9	Total 47

Fig. 1 47 prioritized hydropower potential sites where the site reconnaissance was conducted

Manila, 2 December 2011

Mr. Jose M. Layug, Jr.
Undersecretary
Office of the Undersecretary
Department of Energy

Mr. Yuichi SANO
Team Leader
The Study Team

Mr. Mario C. Marasigan
Director, Renewable Energy Management Bureau
Department of Energy

Mr. Ronnie Sargento, Ph.D
Chief Science Research Specialist
Hydropower and Ocean Energy Management Division
Renewable Energy Management Bureau
Department of Energy

Minutes of Meeting during the 7th Site Investigation
On Transfer of Final Hydropower Resource Database

The Study Project on Resource Inventory on Hydropower Potential in the Philippines
Between Hydropower and Ocean Energy Management Division.
Renewable Energy Management Bureau Department of Energy (DOE) and NEWJEC Inc.

JICA Study team had conducted the 7th Site Invitation on "the Study Project on Resource Inventory on the Hydropower Potential in the Philippines", (the Study) from February 13 to March 7, 2012.

During the 7th site investigation, the JICA study team installed Final-version Hydropower Resource Database (HRD) into 3 PCs and confirmed that HRD systems operate properly by both parties.

Also, JICA Study team submitted and explained Final Operation and Maintenance (O&M) Manual of HRD. Final O&M Manual was revised and modified according to DOE's comments given during the 6th site investigation based on Draft O&M Manual.

Manila, March 5, 2012

Mr. Mario C. Marasigan
Director, Renewable Energy Management Bureau
Department of Energy

佐野 裕一

Yuichi SANO
Team Leader
The JICA Study Team

Mr. Ronnie Sargento, Ph.D
Chief. Science Research Specialist
Hydropower and Ocean Energy Management Division
Renewable Energy Management Bureau
Department of Energy

Security Policy for Hydropower Resource Database (HRD) System

The security policy for the HRD system was discussed and agreed to between the DOE and JICA study team are as shown below.

- The HRD system shall be installed in a desktop PC and two laptop PCs provided by JICA in this project until handover. After handover, the DOE will consider the distribution of the HRD system to the parties concerned.
- The HRD-installed PCs shall be connected only to the JICA-REMB WiFi network.
- The operation and maintenance (O & M) of the HRD shall observe the security policy of the DOE.

In addition, the JICA study team recommends to users of the HRD system to observe the security policy shown below.

- The User of the HRD system (hereafter referred as to "the User") must not use the HRD-installed PC (hereafter referred as to "the PC") for private purposes.
- The User must pay attention not to leak information.
- The User must not commit crimes such as illegal access, infringement of copyrights or cheating.
- The User shall agree and sign this security policy.

The security policy shown above shall be agreed and signed by the users when the HRD system is handed over.

添付資料 4
252 地点計画諸元一覧表

添付資料４　252地点計画諸元一覧表

ID	Island	Point	Max Output (MW)	Annual Energy Generation (MWh)	Type	Catchment Area (Km^2)	Max Power Discharge (m^2/s)	Effective Head (m)	Water Level (m)		Dam			Reservoir			Headrace (m)		Penstock (m)	Tailrace (m)	Capacity		Construction Cost (MUSD)	Road Extension (m)	Socio Environmental Assessment			EIRR (30 Year)	FIRR (30 Year)	Unit Cost /kWh ($)	Site Reconnaissance
									Intake	Tailrace	Type	Height (m)	Crest Length (m)	High Water Level (m)	Total Reservoir Volume (m^3)	Effective Volume (m^3)	Open Channel	Tunnel			River Water (%)	Facility (%)			Protected Area	Volcano	Residence				
1	Bohol	Sampelangon	0.58	3179.1	Run of River	17.8	1.58	47.2	125.0	70.0		10.0	10.0				0	2000	90	5	47%	59%	8.40	5500				-5.5%	-7.5%	2.47	
2	Bohol	Upper Manaba	0.95	4522.8	Run of River	22.8	1.03	117.2	245.0	119.0		3.0	15.0				1300	0	730	10	42%	52%	6.20	1335				3.8%	0.7%	1.27	Done
3	Bohol	Balite	1.30	5979.7	Run of River	26.8	1.25	130.1	247.0	109.0		4.0	15.0				1500	0	400	10	41%	50%	6.02	1300				8.5%	4.4%	0.93	Done
4	Bohol	Lower Manaba	0.51	2712.2	Run of River	67.0	2.48	26.7	111.0	79.0		4.0	22.0				2100	0	90	30	48%	58%	6.47	1400				-3.8%	-6.0%	2.20	Done
5	Bohol	Odiong	0.42	2053.2	Run of River	11.1	0.50	109.1	180.0	64.0		3.0	15.0				0	0	580	15	42%	53%	3.17	270				2.1%	-0.6%	1.43	Done
6	Bohol	Alihanan	0.92	5166.5	Run of River	13.8	1.20	97.2	180.0	75.0		10.0	10.0				1500	0	380	5	48%	61%	5.49	100	Aljawan_Cansuhay, Anibongan Water Forest Reserve			7.2%	3.7%	0.98	
7	Masbate	Manolib	0.52	2610.7	Run of River	11.9	0.95	70.8	180.0	100.0		10.0	33.0				3300	0	280	10	37%	54%	6.88	5250				-5.4%	-7.5%	2.48	
8	Masbate	Banadero	1.10	5522.1	Run of River	23.6	1.83	76.3	100.0	15.0		10.0	27.0				3300	0	130	10	38%	54%	8.12	3500				2.8%	-0.1%	1.37	
9	Mindoro	Sinambalan No.1	3.10	22370.5	Run of River	58.4	4.00	96.7	165.0	60.0		7.0	35.0				0	2150	180	10	64%	78%	13.19	4700				17.9%	12.3%	0.55	Done
10	Mindoro	Sinambalan No.2	4.70	20699.0	Reserovir	116.2	16.87	34.1	55.0	15.0	Rock Fill	45.0	315.0	55.0	50647500	11776868	0	0	100	30	39%	48%	48.29	4917			1.0	-3.3%	-5.7%	2.13	
11	Mindoro	Alitangan	9.70	41270.0	Run of River	24.8	3.79	310.8	500.0	170.0		10.0	32.0				6819	3260	780	10	38%	46%	26.49	18057				18.8%	11.1%	0.60	
12	Mindoro	Pagbahan No.1	12.00	53189.4	Run of River	44.4	6.45	224.9	468.0	229.0		5.0	30.0				5800	0	620	10	39%	48%	28.41	15000				24.6%	16.2%	0.50	Done
13	Mindoro	Pagbahan No.2	19.20	84940.9	Reserovir	200.2	29.07	78.9	115.0	30.0	Rock Fill	90.0	496.0	115.0	341640000	24264718	0	0	160	10	39%	48%	165.36	11875			1.0	-0.8%	-3.4%	1.77	
14	Mindoro	Salagan	8.20	37549.7	Run of River	66.9	9.24	107.7	200.0	85.0		10.0	55.0				500	6050	310	180	40%	50%	32.53	18000				11.2%	6.5%	0.81	
15	Mindoro	Amnay	6.00	45730.1	Run of River	186.2	11.57	63.5	240.0	165.0		10.0	60.0				5540	0	130	10	68%	83%	28.25	21500				16.5%	11.4%	0.58	
16	Mindoro	Ulango	5.50	25317.6	Run of River	42.2	5.83	116.1	240.0	110.0		10.0	33.0				4440	3000	250	10	40%	50%	23.59	23500				9.9%	5.5%	0.88	
17	Mindoro	Patrick No.1	5.30	40050.2	Run of River	144.5	9.25	70.9	300.0	220.0		10.0	75.0				0	5970	170	10	67%	82%	36.58	29700	Mts. Iglit-Baco Natural Park			9.0%	5.6%	0.86	
18	Mindoro	Patrick No.2	24.70	113587.3	Reserovir	188.5	26.06	112.9	220.0	100.0	Rock Fill	110.0	280.0	220.0	234410000	15960323	0	0	230	700	40%	50%	158.50	26000				3.6%	0.5%	1.28	
19	Mindoro	Patrick No.3	5.70	43245.2	Run of River	252.4	15.68	44.4	95.0	40.0		10.0	78.0		0		4700	2430	130	10	68%	82%	37.48	23000				9.8%	6.3%	0.81	
20	Mindoro	Mongpong No.1	2.30	10483.5	Run of River	39.0	5.58	52.5	240.0	180.0		10.0	45.0				1542	0	130	10	39%	49%	18.54	49000				0.5%	-2.2%	1.77	
21	Mindoro	Mongpong No.2	2.80	12953.5	Run of River	49.2	6.80	51.7	180.0	120.0		10.0	101.0				2400	0	110	10	40%	50%	21.79	51500				1.1%	-1.6%	1.67	
22	Mindoro	Balangan No.1	5.90	26290.8	Run of River	24.0	3.48	209.3	460.0	240.0		10.0	42.0				3400	0	430	10	39%	48%	22.08	47500	Mts. Iglit-Baco Natural Park			12.0%	6.8%	0.83	
23	Mindoro	Balangan No.2	3.90	18402.4	Run of River	67.9	8.89	53.8	240.0	180.0		10.0	45.0				3100	0	220	10	42%	51%	23.42	47500				4.8%	1.6%	1.25	
24	Mindoro	Balangan No.3	6.30	30087.9	Run of River	86.3	11.30	68.5	180.0	100.0		10.0	69.0				4840	0	330	10	42%	52%	31.44	42500				7.8%	4.2%	1.00	
25	Mindoro	Anahawin	2.70	12327.5	Run of River	35.8	4.95	67.7	160.0	85.0		5.0	50.0				4035	0	120	10	40%	50%	15.91	43500	Mts. Iglit-Baco Natural Park			4.7%	1.4%	1.30	
26	Mindoro	Lumintoa No.1	5.40	40619.2	Run of River	80.8	5.18	128.6	440.0	300.0		10.0	43.0				0	5040	220	10	67%	82%	28.99	35600	Mts. Iglit-Baco Natural Park			13.4%	9.1%	0.68	
27	Mindoro	Lumintoa No.2	7.60	58224.2	Run of River	164.7	10.23	91.0	300.0	200.0		10.0	33.0				2560	3005	260	10	68%	83%	36.56	33500	Mts. Iglit-Baco Natural Park			16.1%	11.2%	0.59	
28	Mindoro	Lumintoa No.3	6.70	51216.9	Run of River	210.2	13.06	62.9	200.0	125.0		10.0	95.0				0	5700	220	150	68%	83%	45.91	33500	Mts. Iglit-Baco Natural Park			9.3%	5.9%	0.84	
29	Mindoro	Balanaan No.1	6.30	28960.3	Run of River	42.8	5.92	130.5	450.0	310.0		10.0	56.0				0	3020	260	10	40%	50%	23.15	18000	Mts. Iglit-Baco Natural Park			12.8%	7.7%	0.75	
30	Mindoro	Balanaan No.2	5.10	37688.8	Run of River	79.5	5.26	120.0	310.0	180.0		10.0	33.0				0	6454	460	10	66%	80%	31.52	23000				10.5%	6.8%	0.78	
31	Mindoro	Bugsanga No.1	3.30	21791.8	Run of River	73.7	5.67	71.5	240.0	160.0		10.0	28.0				0	2400	160	10	60%	72%	19.53	25000				9.5%	6.0%	0.86	
32	Mindoro	Bugsanga No.2	12.30	58608.4	Reserovir	257.2	33.65	44.1	155.0	105.0	Rock Fill	55.0	317.0	155.0	131752500	27139093	0	0	90	15	42%	52%	79.75	27500				3.9%	0.8%	1.25	
33	Mindoro	Cagaray	15.20	72591.5	Reserovir	236.9	31.00	59.1	135.0	70.0	Rock Fill	70.0	345.0	135.0	405335000	33080008	0	0	120	15	42%	52%	104.49	27000				3.1%	0.2%	1.32	
34	Mindoro	Catuiran No.1	8.10	61387.8	Run of River	104.0	6.46	151.8	460.0	300.0		10.0	33.0				2260	2910	280	10	68%	82%	27.40	11466				25.9%	17.8%	0.41	Canceled
35	Mindoro	Tinangi-on	10.30	45814.8	Run of River	41.7	6.06	206.8	540.0	320.0		10.0	33.0				4653	0	700	10	39%	48%	26.00	13000	Mts. Iglit-Baco Natural Park			22.3%	14.8%	0.53	Canceled
36	Mindoro	Ibato	5.50	25061.5	Run of River	54.0	7.46	89.8	340.0	240.0		10.0	33.0				3800	0	240	10	40%	49%	20.93	19000				11.9%	7.5%	0.79	
37	Mindoro	Aglubang No.1	2.80	18504.0	Run of River	90.8	6.99	49.4	300.0	240.0		10.0	33.0				4600	0	130	10	60%	72%	17.94	13500				8.2%	5.0%	0.91	
38	Mindoro	Aglubang No.2	4.00	30802.2	Run of River	182.2	11.32	44.1	240.0	190.0		10.0	82.0				5630	0	120	10	68%	84%	21.56	12000	Mts. Iglit-Baco Natural Park			13.8%	9.4%	0.65	
39	Mindoro	Pula	1.00	6830.0	Run of River	55.9	4.13	30.7	140.0	100.0		10.0	63.0				0	3351	120	10	62%	74%	14.54	8000				-2.5%	-4.5%	1.98	
40	Mindoro	Balete	1.90	10101.8	Run of River	42.9	4.82	50.6	160.0	100.0		10.0	40.0				0	3233	210	10	47%	58%	16.52	7500				1.3%	-1.2%	1.52	
41	Mindoro	Bongabong No.1	8.20	54488.2	Run of River	63.3	4.87	204.2	560.0	340.0		10.0	33.0				0	8700	370	10	60%	72%	36.64	21000	Mts. Iglit-Baco Natural Park			15.1%	10.3%	0.63	
42	Mindoro	Bongabong No.2	9.20	71886.4	Run of River	166.2	9.75	114.9	340.0	210.0		10.0	50.0				0	8050	270	500	70%	85%	46.82	11500	Mts. Iglit-Baco Natural Park			15.2%	10.6%	0.60	
43	Mindoro	Siange	1.20	8541.9	Run of River	60.6	4.20	36.1	180.0	135.0		10.0	73.0				3000	0	110	10	64%	77%	11.36	7500				3.6%	1.1%	1.24	
44	Mindoro	Wasig	1.90	12733.3	Pondage	61.7	4.74	50.5	115.0	55.0	Rock Fill	50.0	326.0	115.0	37875000	5870404	0	2160	280	10	60%	73%	52.00	2000			1.0	-	-	3.71	
45	Negros	Sicaba No.1	1.00	7205.6	Run of River	13.5	1.18	112.4	500.0	380.0		10.0	33.0				1692	0	280	100	60%	78%	6.67	400	Northern Negros Natural Park			8.9%	5.5%	0.85	
46	Negros	Sicaba No.2	0.95	6546.4	Run of River	15.2	1.32	91.3	380.0	280.0		10.0	32.0				2267	0	260	10	60%	75%	6.64	1600	Northern Negros Natural Park			7.5%	4.3%	0.94	
47	Negros	Bago No.1	1.70	12184.5	Run of River	79.2	6.64	32.7	480.0	440.0		10.0	33.0				0	4636	60	10	62%	78%	23.34	20500	Northern Negros Natural Park	Kanloan		-1.1%	-3.2%	1.80	
48	Negros	Bago No.2	13.50	67224.1	Run of River	257.4	35.57	45.8	325.0	270.0	Rock Fill	60.0	330.0	325.0	114000000	31983653	0	3200	150	10	44%	54%	110.02	13000		Kanloan	1.0	1.3%	-1.0%	1.49	
49	Negros	Lum atang	3.20	13947.8	Run of River	19.2	3.27	121.0	400.0	270.0		10.0	55.0				2640	0	220	10	38%	47%	12.47	9000		kanloan		10.8%	6.7%	0.84	
50	Negros	Bago No.3	15.00	105818.0	Reserovir	363.1	30.45	59.1	265.0	200.0	Concrete	70.0	185.0	265.0	57936667	34035593	0	0	110	10	62%	77%	78.41	7500	Mt. Kanlaon Natural Park	Kanloan	1.0	12.8%	8.6%	0.68	
51	Negros	Mangorggong	1.10	5233.7	Run of River	10.7	1.83	73.7	440.0	360.0		10.0	35.0				530	0	220	10	38%	52%	6.39	3000		Kanloan		5.4%	2.1%	1.14	
52	Negros	Binalbagan No.1	13.00	52914.0	Pondage	216.9	20.32	76.9	295.0	210.0	Rock Fill	75.0	526.0	295.0	228900000	31285612	0	1948	180	10	35%	44%	135.68	1740		Kanloan		-4.6%	-7.1%	2.33	Done
53	Negros	Binalbagan No.2	3.60	27346.2	Run of River	229.5	8.21	54.2	196.0	133.0		5.0	30.0				0	2788	130	10	71%	82%	19.62	3370		Kanloan	1.0	13.3%	9.0%	0.66	Done
54	Negros	Binalbagan No.3	1.40	10346.6	Run of River	238.7	8.54	20.2	165.0	136.0		5.0	85.0				0	2960	110	10	71%	80%	18.19	1980		Kanloan		0.0%	-2.1%	1.61	Done
55	Negros	Sacop	2.30	10828.1	Run of River	21.7	3.04	92.6	200.0	100.0		10.0	27.0				3721	0	150	10	29%	51%	11.77	650		Kanloan		7.2%	3.5%	1.00	
56	Negros	Lag-il No.1	1.30	8802.7	Run of River	35.7	1.67	99.8	361.0	253.0		5.0	55.0				1979	0	190	10	60%	73%	7.11	3340				11.3%	7.3%	0.75	Done
57	Negros	Lag-il No.2	2.30	15513.1	Run of River	64.8	3.03	95.6	276.0	174.0		5.0	35.0				6000	0	240	10	60%	73%	11.33	4330				13.3%	8.8%	0.68	Done
58	Negros	Pangiplan	1.40	8969.2	Run of River	40.5	1.92	89.2	273.0	174.0		5.0	35.0				3448	0	250	10	60%	69%	8.40	2182				8.8%	5.3%	0.87	Done
59	Negros	Suay	0.77	5330.0	Run of River	35.2	3.07	32.2	100.0	60.0		10.0	39.0				2000	0	80	10	60%	75%	7.56	4500				2.8%	0.3%	1.33	
60	Negros	Hilabangan No.1	3.40	24102.8	Run of River	99.0	8.30	50.9	340.0	280.0		10.0	60.0				0	3070	140	10	62%	77%	23.50	18500				8.0%	4.8%	0.92	
61	Negros	Hilabangan No.3	3.60	28628.3	Run of River	390.9	12.87	35.1	138.0	97.0		5.0	67.0				1280	2200	110	10	74%	86%	21.61	3370	Ilog Hilabangan Water Forest		1.0	12.2%	8.3%	0.69	Done
62	Negros	Ilog	21.60	144358.9	Reserovir	887.3	41.53	62.0	162.0	94.0	Rock Fill	70.0	240.0	115.0	699351667	188511303	0	0	130	50	60%	72%	105.20	1330				13.3%	9.0%	0.66	Done
63	Negros	Calatong No.1	1.30	8862.0	Run of River	31.4	1.47	114.0	318.0	196.0		4.0	30.0				1600	0	240	10	60%	74%	6.23	3300				14.1%	9.3%	0.66	Done
64	Negros	Calatong No.2	1.70	11474.1	Run of River	46.7	2.21	98.5	180.0	71.0		4.0	35.0				4050	0	270	10	60%	73%	9.70	3150				10.5%	6.7%	0.78	Done
65	Negros	Binulug	4.50	24092.3	Run of River	51.7	3.50	159.8	263.0	93.0		3.0	35.0				4050	0	320	10	46%	58%	14.07	4360				19.9%	13.2%	0.54	Done
66	Negros	Tyabanan	10.60	41739.6	Reserovir	105.8	14.78	87.1	115.0	20.0	Rock Fill	80.0	348.0	115.0	119200000	9850541	0	1650	200	10	29%	43%	108.53	5000			1.0	-4.8%	-7.3%	2.37	
67	Negros	Pagatban	13.90	98271.2	Reserovir	343.0	24.20	69.0	95.0	20.0	Rock Fill	80.0	296.0	95.0	391600000	53886720	0	0	140	50	50%	77%	102.39	2600			1.0	7.0%	4.0%	0.95	
68	Negros	Bayawan	9.30	66184.7	Reserovir	272.5	19.23	59.0	95.0	30.0	Rock Fill	70.0	318.0	95.0	458010000	47366794	0	0	120	50	50%	77%	84.29	2250			1.0	4.2%	1.6%	1.16	
69	Negros	Mona-ol	1.90	14064.8	Run of River	31.3	2.26	103.8	175.0	63.0		3.0	42.0				1600	0	320	10	59%	80%	7.72	3680				19.5%	13.6%	0.51	Done
70	Negros	Sicopong No.2	6.40	45388.9	Reserovir	301.4	21.27	36.9	60.0	15.0	Rock Fill	45.0	454.0	60.0	350190000	50637223	2300	0	80	50	50%	77%	68.31	5000			1.0	2.0%	-0.3%	1.37	
71	Negros	Cauitan	3.30	25109.4	Run of River	48.7	3.52	117.8	226.0	96.0		5.0	17.0				5774	0	260	30	59%	83%	14.96	6800				17.4%	12.1%	0.55	Done
72	Negros	Canauay	1.40	10327.8	Run of River	33.1	2.39	72.5	268.0	187.0		3.0	45.0				2600	0	130	10	59%	80%	7.21	1297				13.9%	9.5%	0.65	Done
73	Negros	Guinsuan	0.86	6108.1	Run of River	17.0	1.20	92.0	400.0	300.0		10.0	37.0				1752	0	220	10	50%	77%	6.57	7500				6.6%	3.6%	1.03	
74	Negros	Manara Diotay	0.77	5321.3	Run of River	18.6	1.63	60.7	300.0	230.0		10.0	33.0				2500	0	410	10	60%	75%	8.19	4000	Northern Negros Natural Park			1.8%	-0.6%	1.43	
75	Negros	Himagaan	0.19	1161.2	Run of River	64.5	4.10	6.3	290.0	275.0		3.0	60.0				1250	0	840	10	48%	66%	11.49	600	Northern Negros Natural Park			-	-	9.02	Done
76	Negros	Guihoingan	0.94	6645.2	Run of River	18.5	1.30	91.9	420.0	320.0		10.0	47.0				1000	0	490	10	50%	77%	7.06	5500		Kanloan		6.8%	3.7%	1.00	
77	Negros	Guinobe-an No.1	6.70	37580.2	Run of River	71.3	4.27	192.3	321.0	117.0		3.5	10.0				0	4800	330	10	52%	61%	21.59	4260				20.0%	12.7%	0.53	Done
78	Negros	Pacu-an	8.30	41574.5	Run of River	103.2	7.62	131.8	266.0	125.0		4.0	45.0				0	2600	270	10	45%	54%	22.28	4711				23.0%	15.7%	0.49	Done
79	Negros	Guinoba-an No.2	2.90	21969.4	Run of River	183.1	6.71	54.2	117.0	54.0		4.0	35.0				0	2923	100	10	68%	82%	17.03	3571				11.8%	7.9%	0.71	Done

添付資料４　252地点計画諸元一覧表

ID	Island	Point	Max Output (MW)	Annual Energy Generation (MWh)	Type	Catchment Area (Km^2)	Max Power Discharge (m^2/s)	Effective Head (m)	Water Level (m)		Dam			Reservoir			Headrace (m)		Penstock (m)	Tailrace (m)	Capacity		Construction Cost (MUSD)	Road Extension (m)	Socio Environmental Assessment			EIRR (30 Year)	FIRR (30 Year)	Unit Cost /kWh ($)	Site Reconnaissance
									Intake	Tailrace	Type	Height (m)	Crest Length (m)	High Water Level (m)	Total Reservoir Volume (m^3)	Effective Volume (m^3)	Open Channel	Tunnel			River Water (%)	Facility (%)			Protected Area	Volcano	Residence				
80	Negros	San Jose	1.20	6113.3	Run of River	28.5	2.08	73.4	204.0	123.0		2.5	22.0				1500	0	170	10	45%	55%	6.66	4413				7.0%	3.9%	1.03	Done
81	Negros	Talaptap	1.20	9362.7	Run of River	82.0	2.40	65.9	199.0	124.0		4.0	35.0				3000	0	170	10	61%	85%	8.19	3670				9.7%	6.2%	0.81	Done
82	Negros	Kandabong	2.10	9998.8	Run of River	29.0	4.05	64.1	140.0	70.0		10.0	33.0				4300	0	170	10	29%	52%	10.98	580				7.0%	3.3%	1.01	
83	Negros	Tanjoy	1.80	8675.1	Run of River	30.7	4.29	52.5	220.0	160.0		10.0	35.0				1894	0	180	30	29%	52%	10.80	4000				5.1%	1.8%	1.16	
84	Negros	Hinotongan	1.70	9475.0	Run of River	36.0	3.85	54.5	220.0	158.0		5.0	35.0				1890	0	180	50	47%	60%	9.15	0				8.7%	4.9%	0.89	Done
85	Negros	Inalacan	2.40	11622.2	Run of River	41.5	5.80	52.0	120.0	60.0		10.0	56.0				2300	0	190	10	29%	53%	13.73	4000				5.9%	2.5%	1.09	
86	Negros	Apolong	1.70	8409.4	Run of River	24.6	3.44	63.5	200.0	130.0		10.0	33.0				2000	0	460	50	29%	54%	9.96	750				5.8%	2.4%	1.09	
87	Samar	Bugtasan	2.10	8779.7	Run of River	45.3	5.59	47.1	100.0	42.0		22.0	65.0				4870	0	120	100	43%	45%	18.33	8000				-1.7%	-4.2%	1.94	
88	Samar	Mauo No.2	1.70	10216.8	Run of River	111.6	7.11	30.5	80.0	40.0		10.0	56.0				0	3318	180	100	58%	65%	18.61	1250				-0.3%	-2.6%	1.66	
89	Samar	Palanit No.1	1.40	4830.3	Run of River	9.4	1.75	103.8	190.0	80.0		10.0	29.0				550	0	180	50	35%	37%	5.96	1000				6.1%	2.1%	1.14	
90	Samar	Palanit No.2	0.28	1404.5	Run of River	11.1	1.08	34.0	80.0	40.0		10.0	27.0				350	0	210	30	48%	54%	4.14	1500				-7.5%	-9.6%	2.74	
91	Samar	Caglanipan	1.20	3923.8	Run of River	10.7	1.99	74.0	100.0	20.0		10.0	29.0				2850	0	290	30	35%	35%	7.03	400				0.8%	-2.2%	1.65	
92	Samar	Malaga	1.30	4470.6	Run of River	11.5	2.15	78.0	100.0	15.0		10.0	35.0				1600	0	130	10	35%	37%	6.99	450				2.6%	-0.8%	1.44	
93	Samar	Dawol	0.14	604.5	Run of River	9.0	1.17	16.1	40.0	18.0		10.0	66.0				670	0	50	10	42%	47%	4.11	800				-	-	6.26	
94	Samar	Sigo	0.74	2536.1	Run of River	8.0	1.49	64.0	125.0	55.0		10.0	27.0				300	0	210	30	35%	37%	4.95	750	Calbayog-Pan-As Hayiban Protected Landscape			-0.4%	-3.4%	1.81	
95	Samar	Matuguinao	0.44	2209.4	Run of River	17.8	1.72	33.5	100.0	60.0		10.0	31.0				1300	0	60	10	48%	54%	5.81	200				-5.3%	-7.5%	2.41	
96	Samar	Blanca	2.40	13076.7	Run of River	132.7	10.19	29.9	60.0	20.0		10.0	133.0				4250	0	80	50	53%	59%	19.89	6750	Samar Island Natural Park		1.0	2.2%	-0.5%	1.40	
97	Samar	Malauog	0.93	3163.1	Run of River	8.7	1.62	73.3	100.0	20.0		10.0	24.0				1110	0	180	10	35%	37%	5.72	1580				0.6%	-2.5%	1.68	
98	Samar	Sohoton	7.40	30838.0	Run of River	44.5	5.49	164.1	240.0	65.0		10.0	40.0				0	4025	340	30	43%	45%	25.29	17000	Samar Island Natural Park			12.7%	7.2%	0.77	
99	Samar	Legaspi	1.30	5366.8	Run of River	18.7	2.30	70.6	100.0	18.0		10.0	47.0				4800	0	330	10	43%	45%	11.22	1250				-1.7%	-4.2%	1.92	
100	Samar	Balangiga	2.10	8670.2	Run of River	25.3	3.12	83.3	160.0	70.0		10.0	33.0				2800	0	340	10	43%	45%	11.14	11000	Samar Island Natural Park			4.9%	1.5%	1.22	
101	Samar	Gasdo	1.20	4105.7	Run of River	9.9	1.85	83.3	200.0	110.0		10.0	27.0				1100	0	170	10	35%	37%	6.35	2350				2.8%	-0.7%	1.44	
102	Samar	Capoto-on	2.40	10912.2	Run of River	27.4	5.54	54.9	100.0	38.0		10.0	49.0				0	930	200	10	45%	49%	13.22	9000	Samar Island Natural Park			5.7%	2.2%	1.14	
103	Samar	Dolores No.1	1.90	8562.4	Run of River	39.7	8.03	29.9	180.0	140.0		10.0	35.0				4340	0	70	10	45%	49%	16.58	3800	Samar Island Natural Park			-0.7%	-3.3%	1.78	
104	Samar	Dolores No.2	13.10	54194.8	Reserovir	139.1	32.11	49.2	135.0	80.0	Rock Fill	60.0	226.0	135.0	215520000	27187224	0	0	90	30	42%	45%	72.95	12000	Samar Island Natural Park			4.3%	0.9%	1.23	
105	Samar	Dolores No.3	12.00	50994.5	Run of River	24.8	6.91	209.9	360.0	140.0		10.0	36.0				1920	0	610	10	38%	46%	24.82	13500	Samar Island Natural Park			29.1%	18.1%	0.45	Canceled
106	Samar	Dolores No.4	3.00	12324.9	Run of River	31.6	7.60	49.9	140.0	80.0		10.0	57.0				4038	0	170	10	40%	45%	19.55	14000	Samar Island Natural Park			2.1%	-1.0%	1.49	
107	Samar	Dolores No.5	7.40	47930.7	Run of River	218.3	18.93	47.6	80.0	25.0		10.0	79.0				1550	0	90	10	68%	70%	28.30	16500	Samar Island Natural Park			18.3%	12.2%	0.55	
108	Samar	Gicontol No.1	4.90	15682.8	Run of River	12.5	4.40	138.5	320.0	175.0		10.0	49.0				2880	0	260	10	32%	35%	15.53	17000	Samar Island Natural Park			10.2%	4.9%	0.94	
109	Samar	Gicontol No.2	4.90	17527.9	Run of River	23.9	6.97	86.4	175.0	80.0		10.0	39.0				2590	0	140	10	36%	39%	18.24	19000	Samar Island Natural Park			8.7%	4.1%	0.99	
110	Samar	Tagaoyan	0.28	1420.4	Run of River	20.0	1.94	19.1	100.0	75.0		10.0	41.0				708	0	50	10	48%	55%	5.52	3100	Samar Island Natural Park			-	-	3.63	
111	Samar	Candacan	8.50	17623.3	Pondage	109.1	35.52	29.2	100.0	65.0	Rock Fill	35.0	400.0	100.0	51940000	15990924	0	0	70	30	26%	22%	56.03	386			1.0	-7.3%	-11.3%	2.89	
112	Samar	Ulot	9.80	62651.9	Pondage	385.4	34.77	34.2	60.0	20.0	Rock Fill	40.0	178.0	60.0	105040000	96458175	0	0	70	30	67%	69%	47.41	4000	Samar Island Natural Park		1.0	12.7%	8.2%	0.69	
113	Samar	Balagon	13.90	57014.8	Pondage	132.2	30.84	54.1	100.0	40.0	Rock Fill	60.0	208.0	100.0	153270000	22630218	0	0	100	30	41%	44%	69.72	9000	Samar Island Natural Park			5.7%	2.1%	1.12	
114	Samar	Tubig	20.20	101920.9	Run of River	126.9	27.39	87.9	120.0	19.0		10.0	93.0				6600	0	260	10	46%	55%	29.82	0	Samar Island Natural Park			21.3%	13.0%	0.51	Done
115	Samar	Sulat	5.40	20157.0	Pondage	71.1	19.23	34.2	65.0	25.0	Rock Fill	45.0	155.0	65.0	103365000	11845929	0	0	80	30	38%	40%	36.73	7500	Samar Island Natural Park			0.3%	-2.6%	1.67	
116	Samar	Borongan	9.30	35166.8	Pondage	99.5	26.90	42.1	65.0	17.0	Rock Fill	53.0	217.0	65.0	75472000	15348003	0	0	90	30	38%	41%	56.57	6750	Samar Island Natural Park		1.0	2.0%	-1.1%	1.47	
117	Samar	Canoving	1.00	4567.2	Run of River	37.9	7.66	16.8	40.0	18.0		10.0	80.0				0	0	40	30	45%	50%	10.92	6250	Samar Island Natural Park		1.0	-3.7%	-6.0%	2.23	
118	Samar	Buhid	20.20	120333.2	Run of River	160.8	26.17	92.2	139.0	37.0		7.0	10.0				0	0	310	3100	56%	65%	30.61	12000	Samar Island Natural Park			32.0%	19.9%	0.38	Done
119	Samar	Suribao	16.10	38529.5	Pondage	126.0	37.79	51.1	75.0	18.0	Rock Fill	62.0	232.0	75.0	230764000	24428075	0	0	110	30	27%	26%	83.74	20000	Samar Island Natural Park		1.0	-1.2%	-4.7%	1.99	
120	Samar	Binuangan No.1	2.60	10740.3	Run of River	49.4	6.09	52.6	100.0	38.0		10.0	27.0				2680	360	260	10	43%	45%	16.27	17000	Samar Island Natural Park			2.6%	-0.4%	1.44	
121	Samar	Binuangan No.2	0.74	3621.9	Run of River	61.3	5.92	15.9	38.0	15.0		10.0	57.0				0	3800	40	10	48%	53%	20.83	14000	Samar Island Natural Park			-	-	5.36	
122	Samar	Llorente No.1	7.20	17279.2	Run of River	24.3	7.29	120.9	200.0	70.0		10.0	43.0				2750	0	230	10	27%	26%	19.48	15000	Samar Island Natural Park			9.1%	3.9%	1.06	
123	Samar	Llorente No.2	1.50	3136.1	Run of River	25.5	8.30	23.1	100.0	70.0		10.0	45.0				1150	0	70	10	26%	23%	12.30	15000	Samar Island Natural Park			-16.2%	-	3.74	
124	Samar	Llorente No.3	1.40	5884.4	Run of River	61.6	7.59	23.5	100.0	70.0		10.0	44.0				800	0	60	10	43%	46%	11.67	15000				-1.0%	-3.6%	1.90	
125	Samar	Llorente No.4	17.40	80523.0	Pondage	214.6	40.86	51.1	65.0	8.0	Rock Fill	62.0	400.0	65.0	279868000	38093227	0	0	110	30	47%	50%	107.49	15000	Samar Island Natural Park			4.2%	1.0%	1.22	
126	Samar	Catadongan	2.00	9919.2	Run of River	36.2	6.12	41.1	60.0	10.0		10.0	48.0				0	2950	130	10	50%	54%	17.78	10500	Samar Island Natural Park			0.2%	-2.4%	1.67	
127	Panay	Aclan No.2	5.40	42191.9	Run of River	225.8	13.54	49.1	105.0	40.0		10.0	67.0				0	9700	200	30	73%	85%	55.01	250			1.0	3.8%	1.3%	1.19	
128	Panay	Timbaban No.1	3.30	18573.4	Run of River	40.9	5.11	80.4	350.0	260.0		10.0	59.0				0	3320	220	10	52%	61%	18.98	10400	Aklan River Water Forest Reserve			7.8%	4.2%	0.95	
129	Panay	Ibajay No.1	4.00	14333.4	Run of River	16.8	3.23	151.6	260.0	100.0		10.0	27.0				1625	0	340	10	37%	39%	11.92	9000				13.2%	7.5%	0.78	Canceled
130	Panay	Ibajay No.2	4.40	25182.4	Reserovir	87.7	10.51	51.5	95.0	35.0	Concrete	10.0	91.0	95.0	13890000	10038604	0	2552	110	30	53%	62%	24.21	12500			1.0	8.7%	5.0%	0.89	
131	Panay	Dugayan	0.98	4745.9	Run of River	17.4	2.31	54.0	141.0	78.0		5.0	5.0				2930	0	330	30	46%	53%	9.99	11000				-2.0%	-4.3%	2.00	Done
132	Panay	Bulanao No.1	3.30	10223.4	Run of River	11.3	2.87	139.8	269.0	122.0		7.0	28.0				600	0	420	30	31%	34%	9.66	3350	Northwest Panay Peninsula Natural Park			11.2%	5.9%	0.88	Done
133	Panay	Bulanao No.2	2.00	7001.7	Run of River	11.8	2.97	83.0	140.0	50.0		10.0	22.0				1500	0	140	30	32%	38%	8.57	2522	Northwest Panay Peninsula Natural Park			6.1%	2.7%	1.14	
134	Panay	San Roque	1.80	6307.9	Run of River	9.2	2.30	96.6	140.0	35.0		10.0	46.0				2447	0	250	30	32%	38%	9.36	2500	Northwest Panay Peninsula Natural Park			3.2%	0.3%	1.37	
135	Panay	Ipayo	0.19	1139.6	Run of River	7.2	0.90	27.9	70.0	35.0		10.0	33.0				1372	0	210	100	52%	65%	4.49	1667				-	-	3.65	
136	Panay	Bacalan	1.40	5266.8	Run of River	19.7	4.66	38.6	80.0	35.0		10.0	27.0				1034	0	100	30	34%	41%	8.64	3806				1.8%	-0.8%	1.53	
137	Panay	Panganta	0.95	3429.5	Run of River	8.3	2.09	57.7	100.0	35.0		10.0	29.0				1685	0	170	30	32%	39%	7.08	3213				-1.3%	-3.5%	1.92	
138	Panay	Bacong	1.10	6318.8	Run of River	24.8	3.10	46.1	80.0	25.0		10.0	41.0				2900	0	130	50	52%	62%	9.47	3849				2.3%	-0.3%	1.39	
139	Panay	Tibiao No.2	1.50	7449.2	Run of River	49.3	5.86	32.3	85.0	44.0		10.0	65.0				2650	0	160	50	49%	54%	11.93	450				1.6%	-1.1%	1.47	Done
140	Panay	Dalanas No.1	7.10	40534.9	Run of River	100.4	12.04	71.7	200.0	120.0		10.0	43.0				3550	2820	130	10	53%	62%	31.62	6788	Dalanas River Water Forest			12.5%	7.8%	0.72	
141	Panay	Cairauan	3.20	17868.2	Run of River	29.8	3.72	106.4	200.0	85.0		10.0	62.0				0	4180	410	100	52%	61%	18.73	6162				7.4%	3.9%	0.97	
142	Panay	Paliwan No.2	3.30	20335.4	Run of River	116.2	7.97	50.6	140.0	80.0		10.0	123.0				2500	3500	120	10	60%	67%	27.88	6731				3.4%	0.7%	1.26	
143	Panay	Paliwan No.3	2.40	17240.7	Run of River	150.2	7.69	38.9	80.0	30.0		10.0	40.0				0	5025	150	50	70%	78%	24.22	984			1.0	2.9%	0.4%	1.28	
144	Panay	Cadian	4.90	22566.2	Run of River	55.0	6.54	92.8	280.0	180.0		10.0	37.0				1240	3130	180	10	43%	50%	21.05	12500				9.8%	5.5%	0.87	
145	Panay	Cangaranan No.1	2.70	13303.1	Run of River	39.9	4.34	78.6	320.0	230.0		10.0	38.0				4616	0	380	30	45%	53%	17.39	14500				4.4%	1.3%	1.23	
146	Panay	Cangaranan No.2	2.70	13171.7	Run of River	54.7	6.05	56.4	245.0	180.0		10.0	61.0				2580	0	150	10	45%	53%	15.15	12000				6.3%	2.8%	1.08	
147	Panay	Cangaranan No.3	6.10	37624.9	Run of River	144.7	10.30	73.0	180.0	100.0		10.0	67.0				0	9160	120	900	59%	67%	38.15	7000				7.7%	4.3%	0.93	
148	Panay	Cangaranan No.4	1.20	7659.4	Run of River	189.7	13.02	11.9	100.0	80.0		10.0	78.0				2400	0	40	10	60%	69%	15.54	4500				-1.7%	-3.8%	1.87	
149	Panay	Ipayo	1.10	4956.1	Run of River	22.4	2.57	52.3	100.0	40.0		10.0	49.0				3100	0	300	10	44%	49%	11.65	8500				-3.5%	-5.8%	2.20	
150	Panay	Maninila	2.60	12360.7	Run of River	54.6	6.04	53.1	260.0	200.0		10.0	47.0				0	5080	120	10	45%	52%	22.79	22500				-0.2%	-2.7%	1.74	
151	Panay	Inyaman	1.40	6439.2	Run of River	16.7	1.91	90.6	140.0	40.0		10.0	32.0				2881	0	290	30	44%	50%	9.55	8500				2.7%	-0.2%	1.40	
152	Panay	Banayan	1.40	7002.6	Run of River	31.6	3.28	54.0	100.0	37.0		10.0	58.0				2337	0	300	200	47%	54%	10.70	5000				2.2%	-0.5%	1.42	
153	Panay	Maoll	0.99	5204.1	Run of River	30.0	3.07	40.9	100.0	50.0		10.0	65.0				3500	0	190	30	47%	57%	10.78	2200				-1.8%	-4.1%	1.91	
154	Panay	Tipuluan	1.20	6065.9	Run of River	47.9	4.56	32.2	140.0	100.0		10.0	35.0				1696	0	170	30	49%	55%	9.58	5000	Sibalom Natural Park			1.7%	-0.8%	1.47	
155	Panay	Tiolas	0.62	3070.0	Run of River	13.5	1.57	50.6	120.0	60.0		10.0	38.0				3642	0	220	50	44%	54%	8.18	2500				-5.5%	-7.7%	2.46	

添付資料４　252地点計画諸元一覧表

ID	Island	Point	Max Output (MW)	Annual Energy Generation (MWh)	Type	Catchment Area (Km^2)	Max Power Discharge (m^2/s)	Effective Head (m)	Water Level (m)		Dam			Reservoir			Headrace (m)		Penstock (m)	Tailrace (m)	Capacity		Construction Cost (MUSD)	Road Extension (m)	Socio Environmental Assessment			EIRR (30 Year)	FIRR (30 Year)	Unit Cost /kWh ($)	Site Reconnaissance
									Intake	Tailrace	Type	Height (m)	Crest Length (m)	High Water Level (m)	Total Reservoir Volume (m^3)	Effective Volume (m^3)	Open Channel	Tunnel			River Water (%)	Facility (%)			Protected Area	Volcano	Residence				
156	Panay	Siuaragan	1.60	7831.1	Run of River	45.7	4.67	41.8	100.0	50.0		10.0	36.0				2260	0	110	10	47%	53%	10.60	4000				3.9%	0.9%	1.26	
157	Panay	Sibalom	2.20	9311.2	Run of River	26.8	3.47	78.2	200.0	110.0		10.0	26.0				0	4670	380	350	40%	46%	18.92	5000				-1.3%	-3.9%	1.87	
158	Panay	Aganan	3.70	18000.8	Run of River	39.1	4.25	107.8	220.0	100.0		10.0	67.0				0	3950	780	10	45%	53%	22.07	4832				5.3%	2.0%	1.13	
159	Panay	Mambusao	0.96	5079.8	Run of River	71.2	7.28	16.8	60.0	35.0		10.0	46.0				2650	0	150	50	47%	57%	14.31	3623				-6.6%	-8.6%	2.59	
160	Panay	Panay No.1	8.90	44932.4	Run of River	142.9	14.61	74.0	200.0	120.0		30.0	200.0				8620	0	130	10	47%	55%	42.82	13500			1.0	9.2%	5.1%	0.88	
161	Panay	Pacuan No.1	2.60	12146.3	Run of River	38.6	4.42	72.9	340.0	260.0		10.0	29.0				1160	0	120	10	44%	51%	12.56	16500	Jalaur River Water Forest			8.0%	4.1%	0.99	
162	Panay	Pacuan No.2	0.24	834.0	Run of River	4.8	0.94	33.1	260.0	220.0		10.0	32.0				1554	0	110	10	30%	38%	7.27	14000	Jalaur River Water Forest			-	-	8.52	
163	Panay	Pacuan No.3	2.30	11808.1	Run of River	56.1	5.74	50.9	220.0	160.0		10.0	59.0				3160	0	110	10	47%	56%	14.84	10500	Jalaur River Water Forest			4.9%	1.7%	1.18	
164	Panay	Ulian No.1	1.50	7352.7	Run of River	54.2	5.53	33.2	240.0	200.0		10.0	31.0				1060	0	60	30	47%	53%	9.99	6500				3.8%	0.8%	1.27	
165	Panay	Ulian No.2	1.00	7664.7	Run of River	59.2	3.78	33.8	193.0	151.0		7.0	10.0				1500	0	240	400	69%	83%	8.38	700				6.2%	3.4%	1.00	Done
166	Panay	Suage	2.50	11219.7	Run of River	34.0	4.04	75.8	260.0	175.0		10.0	47.0				0	2400	370	30	43%	49%	15.22	5635				4.0%	0.8%	1.26	
167	Marinduque	Boac No.1	3.20	14491.4	Run of River	38.8	5.36	73.1	220.0	140.0		10.0	25.0				0	2520	130	10	40%	49%	15.70	3000				7.3%	3.5%	1.00	
168	Marinduque	Boac No.2	6.60	30459.7	Reserovir	77.9	10.77	75.3	135.0	50.0	Rock Fill	50.0	264.0	135.0	64875000	6994623	0	3360	220	30	40%	50%	59.34	270			1.0	-0.8%	-3.4%	1.77	
169	Marinduque	Makulapnit	0.90	6438.0	Run of River	63.7	4.36	26.2	82.0	47.0		10.0	137.0				0	3050	70	10	64%	78%	13.52	100				-2.3%	-4.3%	1.91	
170	Marinduque	Dawis	0.34	1895.3	Run of River	5.6	0.70	63.7	200.0	130.0		10.0	24.0				769	0	150	10	44%	60%	3.45	454				-0.2%	-2.5%	1.68	
171	Marinduque	Libtangin	0.53	2942.2	Run of River	14.5	1.80	38.4	80.0	35.0		10.0	28.0				1300	0	100	10	44%	60%	5.66	200				-0.9%	-3.2%	1.77	
172	Marinduque	Catangon	0.68	3702.9	Run of River	15.8	1.95	44.6	100.0	50.0		10.0	50.0				3353	0	120	10	44%	59%	6.99	1727	Marinduque Wildlife Sanctuary			-0.6%	-3.0%	1.74	
173	Marinduque	Sabang	0.55	3046.5	Run of River	10.9	1.35	52.9	100.0	40.0		10.0	39.0				1620	0	150	10	44%	60%	5.54	525	Marinduque Wildlife Sanctuary			-0.1%	-2.5%	1.67	
174	Marinduque	Jolo	0.86	4698.6	Run of River	23.9	2.96	37.2	60.0	15.0		10.0	48.0				2179	0	170	30	44%	59%	8.53	127				-0.1%	-2.5%	1.66	
175	Marinduque	Tawiran	0.77	4158.2	Run of River	20.3	2.56	38.6	80.0	35.0		10.0	99.0				1034	0	110	10	43%	59%	7.44	930	Torrijos Water Forest Reserve			0.1%	-2.4%	1.65	
176	Marinduque	Cabuyo	0.60	3294.7	Run of River	15.9	1.96	39.4	80.0	35.0		10.0	39.0				2133	0	180	30	44%	60%	6.39	2887				-1.0%	-3.3%	1.81	
177	Romblon	Agpanabat	0.08	421.0	Run of River	3.9	0.54	19.4	65.0	40.0		10.0	27.0				400	0	50	10	40%	57%	2.60	2720				-	-	5.88	
178	Romblon	Sablayan	0.32	1781.5	Run of River	13.9	1.72	24.3	45.0	15.0		10.0	27.0				550	0	60	10	44%	60%	4.19	297				-3.7%	-5.8%	2.16	
179	Romblon	Porpagoja	0.87	5778.2	Run of River	36.7	2.82	39.2	60.0	15.0		10.0	177.0				0	0	70	50	60%	72%	7.17	3800				4.6%	1.9%	1.16	
180	Romblon	Libertad	0.11	577.8	Run of River	1.9	0.28	54.1	100.0	40.0		10.0	45.0				537	0	110	10	38%	57%	2.80	2952				-	-	4.61	
181	Romblon	Gabauan	0.51	2780.9	Run of River	9.8	1.24	53.2	100.0	40.0		10.0	45.0				1261	0	160	10	43%	59%	5.65	4266				-1.6%	-3.9%	1.91	
182	Romblon	Sicop	0.38	2107.2	Run of River	9.2	1.16	43.0	100.0	50.0		10.0	69.0				1592	0	110	10	43%	60%	5.30	1000				-4.7%	-6.8%	2.32	
183	Romblon	Carolina	0.30	1682.9	Run of River	9.7	1.20	32.8	100.0	60.0		10.0	27.0				1800	0	100	30	44%	61%	4.63	120				-6.2%	-8.2%	2.52	
184	Romblon	Pawala	0.56	4028.2	Run of River	11.8	0.80	89.7	120.0	20.0		10.0	27.0				2737	0	1030	30	64%	78%	6.86	3000				0.4%	-1.8%	1.58	
185	Romblon	Punog	0.60	4005.5	Run of River	11.9	0.91	84.5	100.0	9.0		10.0	27.0				3800	0	310	30	60%	72%	5.85	5000				2.5%	0.0%	1.38	
186	Romblon	Olango	0.43	2341.3	Run of River	11.5	1.45	38.3	60.0	15.0		10.0	49.0				1380	0	90	30	43%	59%	5.70	3750				-4.2%	-6.3%	2.28	
187	Romblon	Binaya-an	0.62	3354.7	Run of River	6.8	0.85	93.2	160.0	60.0		10.0	27.0				1123	0	190	10	43%	59%	4.61	2500				3.6%	0.7%	1.29	
188	Romblon	Cantingas No.1	2.80	12974.5	Run of River	19.4	2.68	131.2	360.0	220.0		10.0	40.0				2477	0	210	10	40%	50%	10.36	6000	Mt. Guiting-Guiting Natural Park			12.9%	8.2%	0.75	
189	Romblon	Cantingas No.2	1.30	8898.0	Run of River	29.7	2.29	73.8	220.0	140.0		10.0	40.0				3296	0	190	10	60%	74%	7.73	5000	Mt. Guiting-Guiting Natural Park			10.1%	6.5%	0.82	
190	Romblon	Cantingas No.3	2.70	20950.6	Run of River	45.4	2.82	121.3	140.0	10.0		10.0	40.0				1670	0	410	30	68%	84%	9.75	600				24.4%	16.9%	0.43	Canceled
191	Romblon	Cambajao	0.44	2412.1	Run of River	14.8	1.87	30.6	100.0	60.0		10.0	27.0				5855	0	140	10	43%	59%	7.97	2500				-10.7%	-12.5%	3.05	
192	Romblon	Lumbang	0.78	4272.5	Run of River	23.5	2.91	34.4	80.0	40.0		10.0	27.0				5800	0	140	100	44%	59%	9.86	3500				-3.4%	-5.5%	2.14	
193	Romblon	Agbalit	0.59	3227.5	Run of River	8.3	1.05	72.7	130.0	50.0		10.0	33.0				1700	0	170	30	43%	59%	5.35	2500				1.1%	-1.5%	1.55	
194	Luzon	Aganmala	5.20	16485.2	Run of River	43.0	5.30	119.7	360.0	230.0		10.0	33.0				5430	0	200	10	33%	34%	20.17	17500				6.4%	2.1%	1.15	
195	Luzon	Tamdagan No.1	9.80	28541.0	Run of River	52.1	7.48	159.2	400.0	230.0		10.0	33.0				5680	0	310	10	30%	32%	28.22	17500				10.7%	5.3%	0.92	
196	Luzon	Tamdagan No.2	2.40	13642.2	Run of River	200.2	8.74	34.8	230.0	185.0		10.0	40.0				0	3400	300	300	58%	62%	23.85	6700			1.0	0.3%	-2.1%	1.61	
197	Luzon	Labugaon	8.90	33193.6	Run of River	130.7	12.30	87.7	200.0	100.0		40.0	180.0				12300	0	180	150	39%	40%	53.77	3000				1.9%	-1.2%	1.48	
198	Luzon	Salsona	5.90	17990.8	Run of River	61.3	7.75	93.3	270.0	167.0		10.0	27.0				4300	0	190	10	33%	33%	19.78	685				8.4%	3.3%	1.01	Done
199	Luzon	Modongan No.1	11.00	28647.3	Run of River	71.9	12.41	107.7	385.0	267.0		5.0	20.0				3980	0	200	30	27%	28%	26.86	7995				12.6%	6.1%	0.87	Done
200	Luzon	Modongan No.2	10.40	33405.6	Run of River	120.8	13.60	92.6	255.0	156.0		10.0	53.0				0	6620	190	230	35%	35%	39.81	2870				6.8%	2.4%	1.09	Done
201	Luzon	Nailiman No.1	6.50	33211.2	Run of River	77.7	5.27	150.7	400.0	240.0		10.0	67.0				0	8130	460	10	48%	55%	32.84	3750	Quirino Protected Landscape			8.5%	4.7%	0.91	
202	Luzon	Nailiman No.2	2.80	22334.9	Run of River	147.0	7.72	44.8	220.0	166.0		5.0	102.0				0	3200	160	10	75%	87%	20.38	2000	Quirino Protected Landscape			8.9%	5.7%	0.84	Done
203	Luzon	Dabubu No.1	2.40	12401.8	Run of River	61.2	4.15	72.9	380.0	300.0		10.0	33.0				0	2430	190	10	48%	56%	15.47	4000	Quirino Protected Landscape			5.0%	1.8%	1.15	
204	Luzon	Dabubu No.2	6.70	39282.3	Run of River	74.1	7.06	115.7	305.0	175.0		5.0	40.0				0	6590	580	10	51%	64%	34.43	600	Quirino Protected Landscape			10.2%	6.6%	0.80	Done
205	Luzon	Dibuluan No.1	2.80	14237.5	Run of River	70.7	4.79	72.3	540.0	460.0		10.0	27.0				0	4160	180	10	48%	55%	22.01	16500				2.1%	-0.7%	1.45	
206	Luzon	Dibuluan No.2	2.20	17748.0	Run of River	100.5	5.36	51.8	360.0	300.0		5.0	30.0				0	5230	310	10	74%	87%	23.87	9700	Quirino Protected Landscape			3.4%	0.9%	1.24	Done
207	Luzon	Dibuluan No.3	18.00	68604.3	Reserovir	194.1	20.34	106.3	295.0	180.0	Rock Fill	105.0	360.0	295.0	275275000	19770438	0	1400	380	400	35%	41%	164.95	3000	Quirino Protected Landscape			-3.5%	-6.1%	2.18	
208	Luzon	Dibuluan No.4	0.49	2791.8	Run of River	211.5	13.15	4.8	180.0	170.0	Rock Fill	10.0	222.0	180.0	19035000	33565050	0	0	30	20	50%	62%	14.46	0			1.0	-	-	4.72	
209	Luzon	Ilagan L-1	5.20	21602.7	Run of River	83.4	7.74	82.9	500.0	410.0		20.0	80.0				0	1080	150	10	38%	45%	21.42	11000	Quirino Protected Landscape			9.1%	5.0%	0.92	
210	Luzon	Ilagan N0.1	6.40	36000.2	Run of River	197.1	11.64	67.4	480.0	400.0		20.0	200.0				0	6500	160	10	52%	61%	48.64	11000				3.7%	0.9%	1.24	
211	Luzon	Ilagan N0.2	12.30	84915.0	Run of River	307.2	16.21	91.9	400.0	300.0		5.0	40.0				8150	2130	140	10	71%	75%	53.49	10500				16.4%	11.1%	0.58	Canceled
212	Luzon	Ilagan R-1	5.10	28499.9	Run of River	117.9	6.96	89.7	400.0	300.0		5.0	40.0				9680	0	180	10	52%	61%	28.81	16500				7.9%	4.3%	0.94	
213	Luzon	Ilagan N0.3	49.20	270806.7	Reserovir	544.4	53.07	108.6	295.0	180.0	Rock Fill	120.0	445.0	295.0	415800000	57728820	0	0	210	50	55%	60%	299.45	10000				6.6%	3.3%	1.01	Canceled
214	Luzon	Ilagan R-2	5.80	21967.0	Run of River	71.3	7.47	94.9	305.0	200.0		20.0	110.0				5316	0	190	350	35%	41%	43.78	19000				-0.9%	-3.6%	1.84	
215	Luzon	Buyasan	1.50	7430.5	Run of River	43.9	2.98	61.6	200.0	123.0		10.0	73.0				9390	0	140	10	48%	54%	18.23	6500				-4.2%	-6.4%	2.26	
216	Luzon	Disabungan	3.80	21104.3	Run of River	116.5	6.87	67.7	200.0	120.0		5.0	20.0				0	9010	200	10	52%	60%	34.93	400	Nothern Sierra Madre Natural			1.0%	-1.4%	1.51	
217	Luzon	Disabungan R-1	5.60	31433.5	Run of River	147.8	8.72	78.7	220.0	135.0		10.0	33.0				0	5530	210	10	52%	61%	28.25	5500	Nothern Sierra Madre Natural			9.9%	5.9%	0.83	
218	Luzon	Catalangan No.2	7.70	43166.8	Reserovir	360.0	21.48	43.9	105.0	55.0	Concrete	55.0	214.0	105.0	79200000	34763097	3300	0	160	30	52%	61%	61.35	2250			1.0	3.0%	0.3%	1.29	
219	Luzon	Maplas	9.50	56438.4	Run of River	137.9	11.27	102.6	210.0	98.0		5.0	12.0				3200	7000	190	10	60%	64%	47.26	11600				11.0%	6.8%	0.77	Done
220	Luzon	Masipi	0.75	3430.7	Run of River	26.3	2.44	39.5	100.0	50.0		10.0	147.0				2000	0	1130	100	38%	50%	13.55	0				-	-	3.60	
221	Luzon	Barayon	1.20	5637.8	Run of River	49.1	4.05	36.6	100.0	55.0		10.0	133.0				3050	0	120	10	42%	51%	12.34	1250				-2.5%	-4.8%	2.01	
222	Luzon	Tuguegarao No.1	7.90	44212.2	Run of River	94.8	5.60	171.4	340.0	160.0		5.0	20.0				0	5787	280	10	52%	61%	29.99	11000	Penablanca Protected Landscape and Seascape			15.6%	9.9%	0.63	
223	Luzon	Tuguegarao No.2	4.70	23997.3	Run of River	172.0	11.77	49.7	178.0	122.0		5.0	30.0				0	3320	230	10	48%	55%	25.82	7250	Penablanca Protected Landscape and Seascape			7.2%	3.7%	0.99	Done
224	Luzon	Natulud No.1	4.10	18948.9	Run of River	56.4	4.45	114.4	210.0	85.0		5.0	30.0				0	4300	220	10	44%	50%	18.94	953	Penablanca Protected Landscape and Seascape			8.6%	4.6%	0.92	Done
225	Luzon	Natulud No.2	3.20	23997.7	Run of River	323.5	10.55	38.1	110.0	63.0		5.0	74.0				6370	0	130	10	71%	81%	18.64	4200	Penablanca Protected Landscape and Seascape		1.0	11.8%	7.9%	0.72	Done
226	Luzon	Pered No.1	2.10	10714.1	Run of River	57.5	3.94	67.6	215.0	138.0		10.0	30.0				3050	0	260	10	48%	55%	13.76	11000	Penablanca Protected Landscape and Seascape			4.6%	1.5%	1.21	Done
227	Luzon	Pered No.2	2.60	13614.6	Run of River	75.3	4.99	65.5	180.0	105.0		10.0	60.0				3350	0	190	10	48%	57%	14.93	7000	Penablanca Protected Landscape and Seascape			6.8%	3.4%	1.02	
228	Luzon	Pered No.3	4.40	16541.4	Pondage	137.2	14.37	37.4	95.0	50.0	Rock Fill	45.0	180.0	95.0	44895000	15486112	7420	0	130	10	35%	41%	50.35	640			1.0	-7.8%	-10.2%	2.77	
229	Luzon	Immurung	4.10	12000.8	Run of River	23.3	3.65	136.5	245.0	100.0		5.0	25.0				2050	0	370	30	29%	32%	11.96	0				10.5%	5.8%	0.92	Done

添付資料４　252地点計画諸元一覧表

ID	Island	Point	Max Output (MW)	Annual Energy Generation (MWh)	Type	Catchment Area (Km^2)	Max Power Discharge (m^2/s)	Effective Head (m)	Water Level (m)		Dam			Reservoir			Headrace (m)		Penstock (m)	Tailrace (m)	Capacity		Construction Cost (MUSD)	Road Extension (m)	Socio Environmental Assessment			EIRR (30 Year)	FIRR (30 Year)	Unit Cost /kWh ($)	Site Reconnaissance
									Intake	Tailrace	Type	Height (m)	Crest Length (m)	High Water Level (m)	Total Reservoir Volume (m^3)	Effective Volume (m^3)	Open Channel	Tunnel			River Water (%)	Facility (%)			Protected Area	Volcano	Residence				
230	Luzon	Paranan-L	1.00	4640.4	Run of River	42.0	3.90	33.4	200.0	160.0		10.0	67.0				7020	0	70	10	38%	50%	12.17	500				-5.2%	-7.4%	2.40	
231	Luzon	Paranan	1.20	5703.2	Run of River	40.3	3.48	44.2	180.0	125.0		10.0	53.0				5400	0	120	10	40%	52%	13.68	1750		Cagua		-3.8%	-6.1%	2.20	
232	Luzon	Taboan No.1	3.10	17195.3	Run of River	84.7	5.05	75.8	165.0	80.0		20.0	75.0				0	3190	140	10	52%	60%	21.39	8500		Cagua		4.9%	1.8%	1.15	
233	Luzon	Taboan - R	1.60	7084.9	Run of River	13.6	1.15	177.5	260.0	75.0		10.0	27.0				600	0	360	10	42%	48%	7.53	3500				7.8%	3.8%	0.99	Canceled
234	Luzon	Twin Peaks	7.00	30770.6	Run of River	70.0	5.93	145.0	180.0	20.0		10.0	53.0				8500	0	260	10	42%	48%	26.07	7250				11.8%	7.0%	0.78	Canceled
235	Luzon	Taboan No.2	2.30	12088.9	Reserovir	313.0	20.28	14.3	25.0	5.0	Concrete	15.0	150.0	25.0	41266250	20633125	0	0	40	30	49%	57%	19.90	9000				1.2%	-1.4%	1.53	Done
236	Luzon	Hang	1.60	8699.8	Run of River	57.1	3.33	60.7	100.0	30.0		40.0	300.0				2780	0	320	30	53%	59%	37.97	3000	Penablanca Protected Landscape and Seascape		1.0	-	-	3.98	
237	Luzon	Lobod	0.48	2198.6	Run of River	50.8	4.71	13.1	40.0	20.0		10.0	150.0				1030	0	250	100	38%	50%	12.02	0	Penablanca Protected Landscape and Seascape		1.0	-	-	4.98	
238	Luzon	Dikatayan	9.20	41308.7	Reserovir	220.0	18.08	62.0	121.0	53.0	Rock Fill	70.0	180.0	75.0	124951667	24935663	0	0	120	50	43%	49%	62.69	2700				2.5%	-0.4%	1.38	Done
239	Luzon	Dilacnadanom	2.70	10190.2	Run of River	34.0	3.56	94.0	120.0	15.0		10.0	53.0				4750	4786	200	10	35%	41%	26.64	10000	Nothern Sierra Madre Natural			-4.9%	-7.4%	2.41	
240	Luzon	Pinacanauan No.1	3.30	17205.7	Run of River	69.1	4.58	89.8	300.0	200.0		10.0	67.0				0	4090	180	10	48%	57%	24.31	26000	Nothern Sierra Madre Natural			3.2%	0.4%	1.34	
241	Luzon	Pinacanauan No.2	1.10	4797.2	Run of River	20.0	1.93	71.4	200.0	120.0		10.0	33.0				12500	0	190	10	37%	47%	32.52	25000	Nothern Sierra Madre Natural			-	-	6.34	
242	Luzon	Palanan No.1	8.90	34229.9	Run of River	50.4	5.17	208.8	400.0	180.0		10.0	60.0				0	3200	580	10	35%	42%	27.14	16000	Nothern Sierra Madre Natural			13.9%	8.0%	0.74	
243	Luzon	Palanan No.2	2.30	13047.2	Run of River	100.4	5.99	48.9	180.0	120.0		10.0	40.0				3000	100	70	2310	52%	62%	19.82	20000	Nothern Sierra Madre Natural			2.2%	-0.5%	1.44	
244	Luzon	Palanan No.3	15.20	68391.0	Reserovir	347.2	28.63	64.0	115.0	45.0	Rock Fill	75.0	320.0	115.0	323287500	44299312	0	0	140	30	42%	49%	108.58	27500	Nothern Sierra Madre Natural		1.0	1.9%	-1.0%	1.46	
245	Luzon	Palanan No.4	0.93	4924.2	Run of River	356.6	24.80	4.8	40.0	30.0	Concrete	10.0	100.0	40.0	12127500	21760128	0	0	50	30	47%	57%	26.25	28000	Nothern Sierra Madre Natural			-	-	5.04	
246	Luzon	Palanan - L	2.40	9292.3	Run of River	40.2	4.22	72.5	100.0	20.0		10.0	33.0				0	4800	210	10	35%	42%	21.55	7000	Nothern Sierra Madre Natural			-3.0%	-5.6%	2.14	
247	Luzon	Dibebinan	1.20	6278.6	Run of River	51.5	3.41	44.9	100.0	45.0		10.0	53.0				4150	0	120	10	48%	57%	13.32	7000	Nothern Sierra Madre Natural			-2.1%	-4.4%	1.97	
248	Luzon	Dimatatno No.1	8.30	34244.7	Run of River	57.3	5.32	189.2	380.0	180.0		10.0	33.0				0	6630	320	10	38%	45%	34.63	16500	Nothern Sierra Madre Natural			8.7%	4.6%	0.94	
249	Luzon	Dimatatno No.2	7.00	35601.2	Run of River	82.4	5.59	152.0	180.0	15.0		10.0	80.0				0	6020	360	30	48%	55%	33.85	23000	Nothern Sierra Madre Natural			9.2%	5.3%	0.89	
250	Luzon	Dinapique	1.60	8287.3	Run of River	56.5	3.83	53.3	120.0	60.0		10.0	80.0				4020	650	170	10	48%	56%	15.33	2500				-0.3%	-2.7%	1.70	
251	Luzon	Amro	0.95	4002.0	Run of River	27.5	2.88	42.1	100.0	50.0		10.0	80.0				3670	2520	110	10	35%	46%	23.74	28000	Pinamaca			-	-	5.63	
252	Luzon	Dilalongan	1.10	5117.8	Run of River	26.7	2.48	57.9	220.0	155.0		10.0	10.0				1350	0	210	10	38%	50%	9.19	2750				0.3%	-2.4%	1.66	