CHAPTER 8

USE AND FACILITATION OF HYDROPOWER RESOURCE DATABASE

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8.1 CONSIDERATION OF DATABASE USE AND FACILITATION

8.1.1 Purpose of Information Provision

It is expected that HRD (Hydropower Resource Database) developed in this study will be used in the DOE (Department of Energy) to upgrade information on hydro power potential sites, develop a GIS (Geographic Information Systems) database, enable searching and centralized management, and to provide information on HEP development to investors.

In the near future, accelerating HEP development by private investment and providing efficient information to investors are also significant purposes. In this chapter, we review the provision of information to investors by the DOE, and propose a tool to make it possible. According to the Hydropower Sector Work Program in the NREP 2011-2030 (National Renewable Energy Program) established by the DOE on July 2011, the DOE has collected bids for the 50 hydropower potential sites selected in this study and mentioned the work program through the evaluation, implementation and operation.

8.1.2 Considerations into the Basic Policy

(1) Considerations into the Basic Policy

The utilization strategy of the database to be developed in this study is to fulfill the purpose described above.

1) Information provision through the website

The latest information is available for a large indefinite number of investors at anytime. Assistance from the ITSM (Information Technology and Management Service, DOE) which manages the DOE's website will be necessary for this service.

This service will be fully available under the current situation of staff and budget, if the contents are prepared from the database by the HOEMD (Hydropower and Ocean Energy Management Division, DOE) and if updating, subscription and publication of the website are supported by ITMS.

2) Establishment of an information desk for HEP development

Information of hydro power potential sites will be provided to investors from the database by establishing an information desk in the DOE. Sustainability is an important issue because it is necessary to have a sufficient number of staff and a sufficient budget.

3) Distribution of printed hydro power related information

HEP development brochures that are prepared from the database will be distributed to investors.

4) Provision of HEP development information by seminars, etc.

The DOE has held seminars for investors to facilitate the development of RE (Renewable Energy) in the past. The seminars will be effective for providing the HEP development information from the database, but that information will be limited exclusively to seminar participants. Therefore, the opportunities to provide information will be affected by the frequency of the seminars. Using the database in conjunction with 1) above will produce results.

After reviewing these methods, providing HEP development information from the database via the website is considered the best way to accelerate investment in HEP development. Furthermore, presentations on HEP development information are considered efficient.

(2) Information to Be Provided

Only basic information will be made available on the website because of the unspecified number of investors.

The following content could be provided.

1) Awarded or applying status of hydropower potential sites
2) Basic information on new hydro potential sites
3) Information on preferential treatment, etc. for HEP development projects
4) Information on procedures concerning HEP development projects
5) Information on loan terms, borrower requirements, etc. for HEP development projects
6) Information on the hydro power resource database
7) Links to related websites concerning HEP development
8) Contact personnel in the DOE and contact address

(3) Needs Research of Investors

The information to be provided via the website will be narrowed down based on interviews with target investors from the private sector, ECs (Electric Cooperatives), LGUs (Local Government Units), etc., and discussions with the DOE.

(4) Facilitation of Website

Information on HEP development will be provided on the DOE's website. Data contents will be provided in "PDF" format. Information of hydro power potential sites will be also provided as maps through the "Google Earth" interface.

(5) Support of Information Provision such as Loan Terms for HEP Development

Generally, an HEP development project requires a long time to recover investment, because of the huge initial investment. For this reason, fund procurement, evaluations of project finances, etc. will be key points of investment strategies. In this regards, it is effective to provide related information to investors from the private sector, ECs, LGUs, etc.

8.1.3 Data Provision to Developers

To promote HEP development, it is recommended to provide following information to developers.

- List of hydropower potential sites
- Information about each hydropower potential site

Though some information is suitable for general release, other data should restrict public viewing. Therefore, it is important for the DOE to discuss which information should be opened to the public and which information should remain unpublicized and restricted to concerned parties.

(1) Current Situation of Data Provision

At present, the DOE releases information on RE registration and accreditation on their website. The released information is as shown below.

- List of awarded RE projects
- Summary of RE projects
- List of applying RE projects

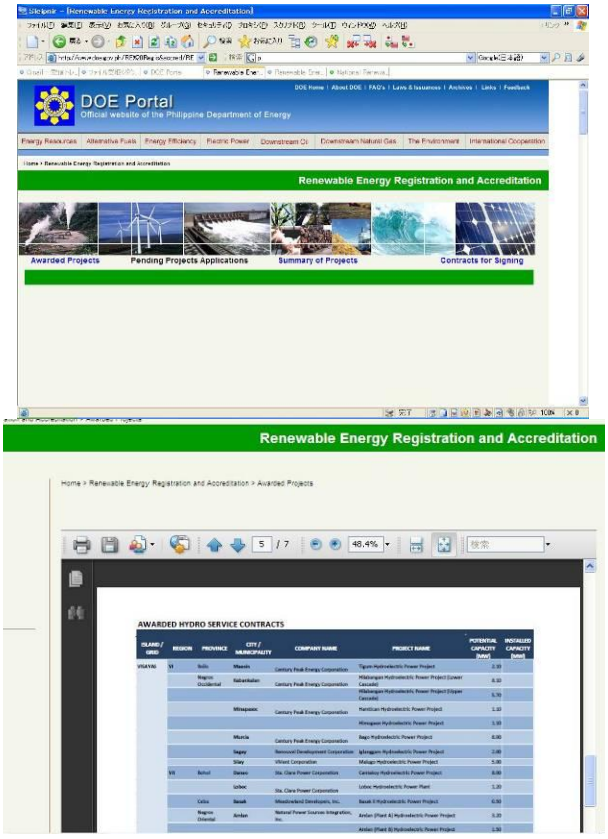


Fig. 8.1-1 Current DOE Website related to RE

Source: http://www.doe.gov.ph/

(2) Data Provision to Developers

To promote HEP development, the following information should be provided to developers.

1) List of Projects

A list of projects contains basic information for all developers interested in investment. This data contains the following items.

a) Project Name
b) Project Location (Region, Province, Municipality)
c) River System / River Name
d) Basic Parameters (Maximum Output, Type)

2) Project Location on River System Map

The project location on a river system map is essential for development of hydropower projects. This data contains the following items.

a) Hydropower potential sites on a river system map
b) Existing dams and weirs on a river system map

3) DOE Contact Information

Contact information for the DOE is basic and essential information for developers. Therefore, a contact address at the DOE should be made available to all developers.

4) Detailed Project Information

For developers who are interested in projects as an investment, detailed project information will be provided by the DOE. This data contains the following items.

a) Project Name

b) Project Location (Island, Region, Province, Municipality, Coordinates)

c) River System / River Name

d) Data of Reservoir
(Reservoir Area [km^2], Reservoir Capacity [m^3], High Water Level [EL.m], Low Water Level [EL.m], Normal Water Level [EL.m])

e) Power Generation Plan
(Maximum Output [MW], Firm Output [MW], Power Generation Type, Estimated Annual Power Generation [MWh], Catchment Area [km^2], Maximum Discharge [m^3/s], Gross Head [m], Effective Head [m], Intake Water Level [EL.m], Tailrace Water Level [EL.m])

f) Project Evaluation
(Estimated Construction Cost [USD, PHP], Estimated Unit Cost [USD/kW, PHP/kW], Unit Cost [USD/kWh, PHP/kWh], EIRR (Economic Internal Rate of Return) [%], FIRR (Financial Internal Rate of Return) [%])

g) Civil Works
(Height and Crest Length of Weir [m], Length of Penstock and Tailrace [m], Length of Access Road [km])

h) Electric Mechanical / Transmission Line Works
(Turbine (Type, Number of Unit, Rated Capacity [MW]), Generator (Type, Number of Units, Voltage [V], Rating [kVA]), Transformer (Number of Units, Voltage [V], Rating [kVA]), Transmission (Line Voltage [kV], Length [km]))

i) Project Study (Type, Date, Sponsor, Author)

5) Site Reconnaissance Report

It is quite variable for developers to show site information such as accessibility, road conditions, river conditions, and photographs obtained by site reconnaissance. Site reconnaissance report was available where conducted.

8.1.4 Methods for Data Provision

The study team has discussed with the DOE staff about data provision for HEP (Hydro Electric Power) projects. Based on these discussions, it was agreed that information / data should be disclosed to developers via the DOE website and face-to-face services. Basically, information/data disclosed on the website will be basic and general. This information/data can be prepared by utilizing basic functions of HRD.

Table 8.1-1 Methods for Data Provision

Method	Contents
1. Website	Download available from the DOE website 1) List of Projects 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) Estimated construction cost 4) Site reconnaissance report

8.2 DATABASE USE AND FACILITATION PLAN

Information / Data are to be disclosed to developers via the DOE website and face-to-face services. Basically, information/data disclosed on the website will be basic and general. This information/data can be prepared by utilizing the HRD functions.

(1) DOE Website

1) List of Projects

a) Project Name
b) Project Location (Region, Province, Municipality)
c) River System / River Name
d) Basic parameters (Maximum Output, Type)

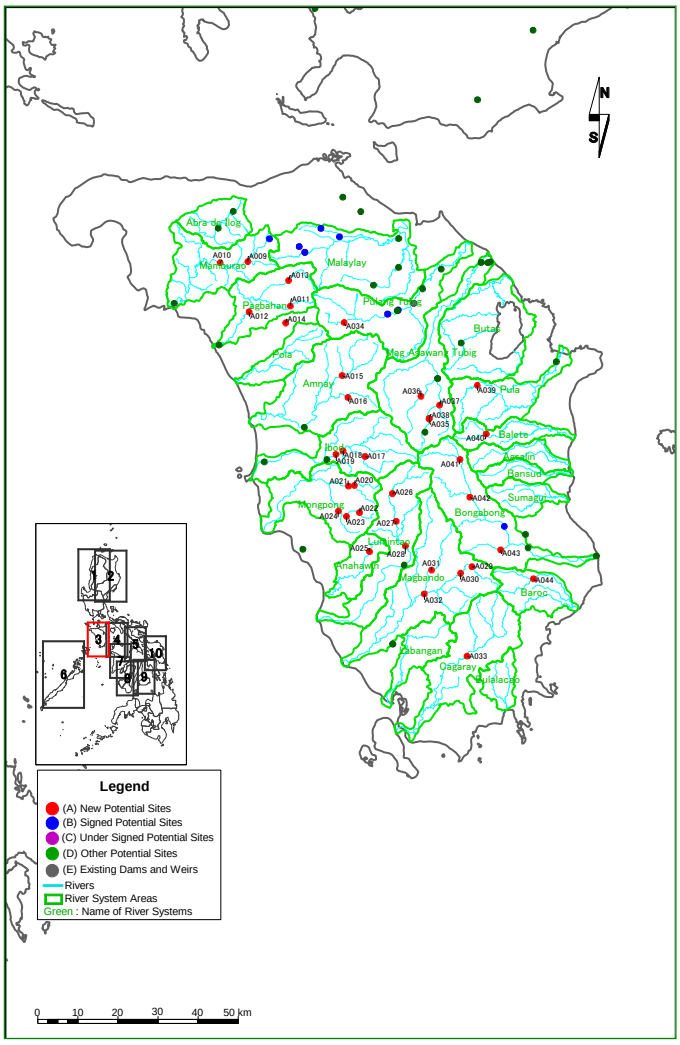
Table 8.2-1 Example of "List of Projects"

Region	Province	Municipality	Project Name	River System	River Name	Project Status	Max Output (MW)	Type	Rank
Region-04B	Occidental Mindoro	-	Aglubang No.1	Magasawangtubig	Aglubang	New_Potential	1.40	Run of River	C
Region-04B	Occidental Mindoro	-	Aglubang No.2	Magasawangtubig	Aglubang	New_Potential	0.70	Run of River	C
Region-04B	Occidental Mindoro	-	Bongabong No.1	Bongabong	Bongabong	New_Potential	0.70	Run of River	C
Region-04B	Oriental Mindoro	-	Pagbahan No.2	Pagbahan	Pagbahan	New_Potential	1.80	Run of River	C
Region-04B	Oriental Mindoro	-	Balanaan No.1	Bugsanga	Bugsanga	New_Potential	0.60	Run of River	C
Region-04B	Oriental Mindoro	-	Cagaray	Cagaray	Cagaray	New_Potential	0.60	Run of River	C
Region-04B	Oriental Mindoro	-	Catuiran No.1	Catuiran	Catuiran	New_Potential	0.60	Run of River	B
Region-04B	Oriental Mindoro	-	Pula	Magasawangtubig	Aglubang	New_Potential	0.30	Run of River	C
Region-04B	Oriental Mindoro	-	Balete	Magasawangtubig	Aglubang	New_Potential	0.50	Run of River	C
Region-04B	Romblon	-	Binaya-an	Binaya-an	Binaya-an	New_Potential	5.70	Reservoir	C
Region-04B	Romblon	-	Cantingas No.1	Cantingas	Cantingas	New_Potential	0.70	Run of River	C
Region-04B	Romblon	-	Cantingas No.2	Cantingas	Cantingas	New_Potential	6.50	Run of River	C
Region-04B	Romblon	-	Cantingas No.3	Cantingas	Cantingas	New_Potential	7.70	Reservoir	A
Region-04B	Romblon	-	Cambajao	Cambajao	Cambajao	New_Potential	1.60	Run of River	C
Region-04B	Romblon	-	Lumbang	Lumbang	Lumbang	New_Potential	0.60	Run of River	C
Region-04B	Romblon	-	Agbalit	Canloay	Agbalit	New_Potential	2.30	Run of River	C
Region-04-B	Occidental Mindoro	Victoria	Aglubang	-	Aglubang River	Large_Potentia	13.60	Run-of-River	-
Region-04-B	Oriental Mindoro	Naujan	Dulangan 2	-	Dulangan River	Mini_Potential	1.00	-	-
Region-04-B	Oriental Mindoro	Baco	Dulangan	-	Dulangan River	Large_Potentia	24.00	Run-of-River	-
Region-04-B	Oriental Mindoro	Bongabong	Bongabong	-	Bongabong River	Large_Potentia	28.00	Run-of-River	-
Region-04-B	Oriental Mindoro	Naujan	Catuiran	-	Catuiran River	Large_Potentia	18.00	Run-of-River	-
Region-04-B	Oriental Mindoro	San Teodoro	Alag	-	Inabasan River	Large_Potentia	39.50	Run-of-River	-
Region-04-B	Oriental Mindoro	Baco	Dulangan Hydroelectric Power Project	-	-	Signed	18.00	-	-
Region-04-B	Oriental Mindoro	Baco	Linao-Cawayan HEP (Lower Cascade)	-	-	Signed	2.10	-	-
Region-04-B	Oriental Mindoro	Baco	Linao-Cawayan HEP (Upper Cascade)	-	-	Signed	2.10	-	-
Region-04-B	Oriental Mindoro	Bongabong	Bongabong HEP	-	-	Signed	10.00	-	-
Region-04-B	Oriental Mindoro	San Teodoro	Alag HEP	-	-	Signed	20.00	-	-
Region-04-B	Oriental Mindoro	Naujan	Catuiran Hydroelectric Power Project	-	-	Applying	8.00	-	-
Region-04-B	Oriental Mindoro	Naujan	Catuiran (Upper Cascade) Hydroelectric Power Project	-	-	Applying	8.00	-	-
Region-04-B	Oriental Mindoro	Naujan	Cantakoy Hydroelectric Power Project	-	-	Applying	8.00	-	-
Region-04-B	Oriental Mindoro	San Teodoro	Inabasan Hydroelectric Power Project	-	-	Applying	10.00	-	-
Region-04-B	Palawan	Brooke's Point	Cabinbin	-	Cabinbin River	Mini_Potential	0.80	-	-
Region-04-B	Palawan	Puerto Princesa	Babuyan	-	Babuyan River	Mini_Potential	5.60	Reservoir	-
Region-04-B	Palawan	Puerto Princesa	Langogan	-	Langogan River	Mini_Potential	6.80	Run-of-River	-

2) Project Location on River System Map

The image proposed for "Project Location on River System Map" is shown in Fig. 8.2-9 and contains the following items.

a) Location of hydropower potential sites on river system map
b) Existing dams and weirs on river system map



ID	Site	RivSysName
A009	Sinambalan No.1	Mamburao
A010	Sinambalan No.2	Mamburao
A011	Alitangan	Pagbahan
A012	Pagbahan No.1	Pagbahan
A013	Pagbahan No.2	Pagbahan
A014	Salagan	Salagan
A015	Amnay	Amnay
A016	Ulango	Amnay
A017	Patrick No.1	Ibod
A018	Patrick No.2	Ibod
A019	Patrick No.3	Ibod
A020	Mongpong No.1	Mongpong
A021	Mongpong No.2	Mongpong
A022	Balangan No.1	Mongpong
A023	Balangan No.2	Mongpong
A024	Balangan No.3	Mongpong
A025	Anahawin	Anahawin
A026	Lumintoa No.1	Lumintao
A027	Lumintoa No.2	Lumintao
A028	Lumintoa No.3	Lumintao
A029	Balanaan No.1	Magbando
A030	Balanaan No.2	Magbando
A031	Bugsanga No.1	Magbando
A032	Bugsanga No.2	Magbando
A033	Cagaray	Cagaray
A034	Catuiran No.1	Pulang Tubig
A035	Tinangi-on	Mag Asawang Tubig
A036	Ibato	Mag Asawang Tubig
A037	Aglubang No.1	Mag Asawang Tubig
A038	Aglubang No.2	Mag Asawang Tubig
A039	Pula	Pula
A040	Balete	Balete
A041	Bongabong No.1	Bongabong
A042	Bongabong No.2	Bongabong
A043	Siange	Bongabong
A044	Wasig	Baroc

Fig. 8.2-1 Example of "Project Location on River System Map"

3) Contact Information

To support developers who are interested in developing HEP projects, the contact information (telephone number/e-mail address) of HOEMD staff is updated on the DOE website. The developers are able to contact the persons in charge.

(2) Face-to-Face Services

Upon request from developers, the information desk staffed by the HOEMD will provide information/data related to the relevant project to developers. The HRD can assist in this and make it easy to provide the related information / data on the target projects effectively.

1) Project Information

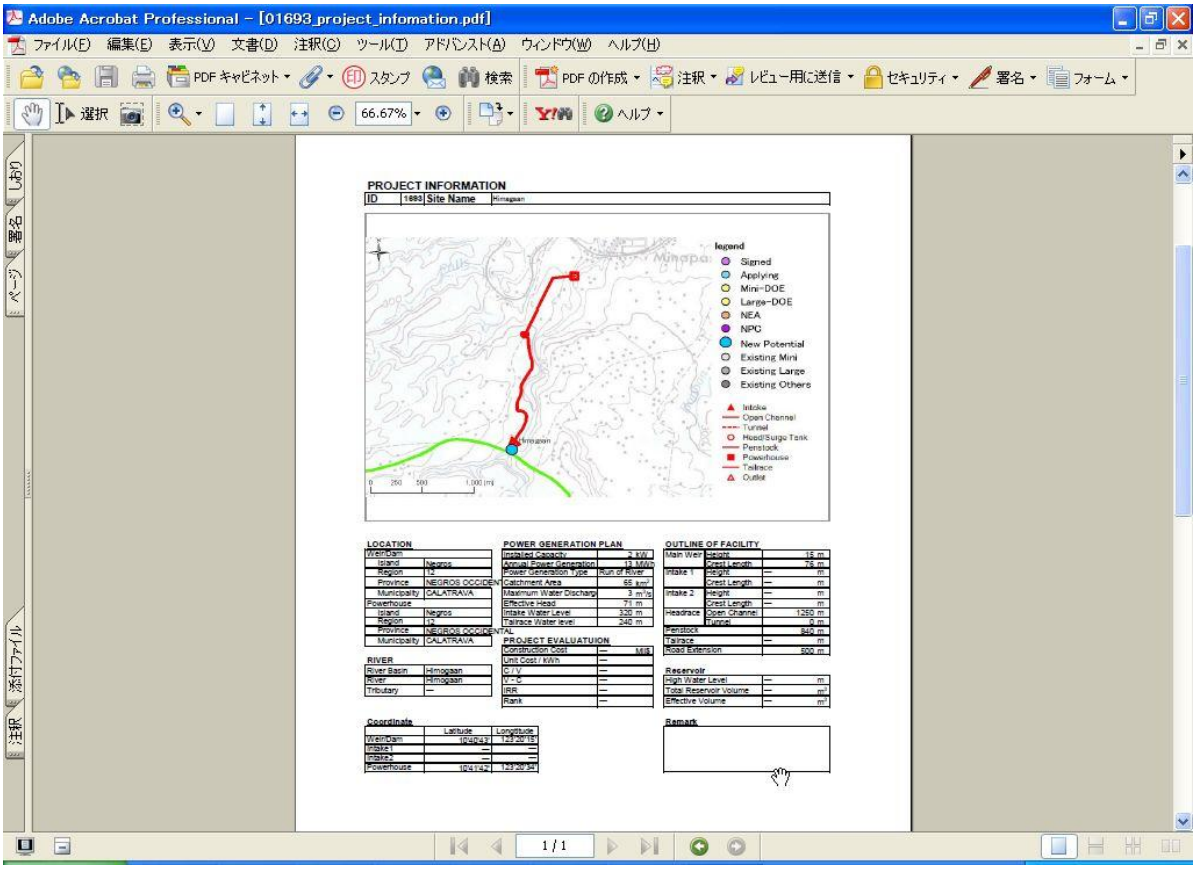


Fig. 8.2-2 Example of "Project Information"

2) Site Reconnaissance Results

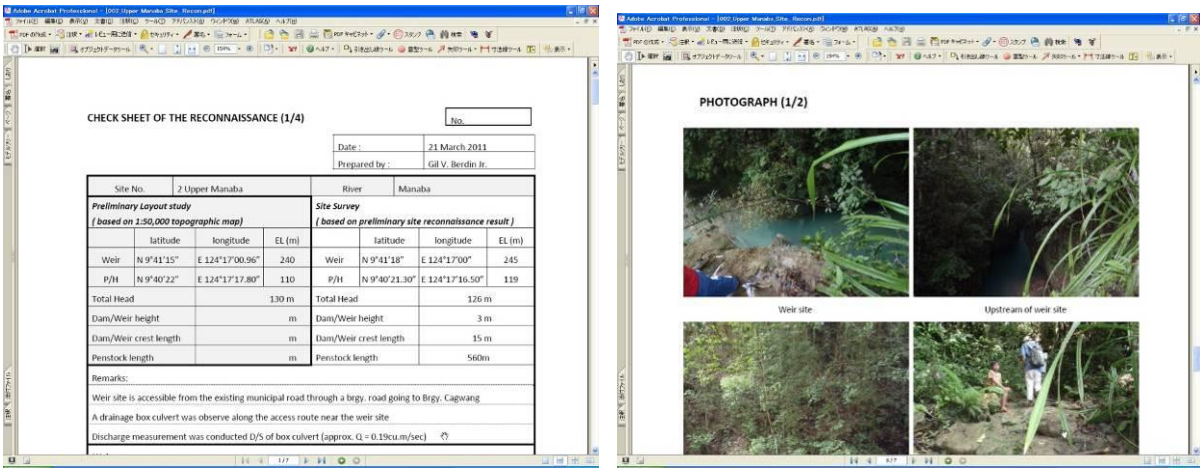


Fig. 8.2-3 Example of "Site Reconnaissance Result"

8.3 TRAINING AND SEMINARS FOR DATABASE USE AND FACILITATION

8.3.1 Seminars and Training in Database Operation and Maintenance

(1) Training Program and Results

The study team has made a presentation on the outline of the HRD system, GIS data, potential sites, search function, database maintenance system, etc. to the DOE on September 2, 2011.

Training programs in HRD operation and maintenance were conducted from September 5 to 9, 2011 (5th site visit) for the DOE concerned and from November 28 to December 2, 2011 (6th site visit) for the REMB staffs in charge and ITMS staffs. In addition, the practical On-the-Job-Training for producing the reference materials of bidding was conducted from March 5 to 6, 2012 (7th site visit). A list of participants and an outline of the training program are as follows

Table 8.3-1 Participants in the HRD System Training Program

Section	Participants
DOE- REMB HOEMD	Mr. Weng Malabana, Mr. Rey Salvania, Mr. Dante Castillo, Mr. Elwyn Pantujan,, Ms. Jennifer Molante, Ms. Ida Madrideo
DOE- REMB TSMD	Mr. Victrio Raagas
DOE- ITMS	Ms. Ivy, Mr. Raul Drapete

Table 8.3-2 Outline of the Training Program

Date	Principal activities
Sep. 5, 2011 (Mon)	Explanation of system, program and data details
Sep. 6, 2011 (Tue)	Explanation of system operation and demonstration
Sep. 7, 2011 (Wed)	Exercise for HRD operation (Excluding maintenance system)
Sep. 8, 2011 (Thu)	Exercise for HRD maintenance system
Sep. 9, 2011 (Fri)	Examination and discussion

The check items for confirming achievement are as follows.

- Searching for sites and browsing project information
- Making information maps for reviewing validity of potential site
- Making information maps to promote potential sites with ECs or investors
- Maintenance such as adding, updating and removing sites on the database
- Management of data stored on the HRD

(2) Output of Training to the HRD

To evaluate the skill of operating the HRD system, exercises and examinations were conducted. An example of the examination materials are shown below.

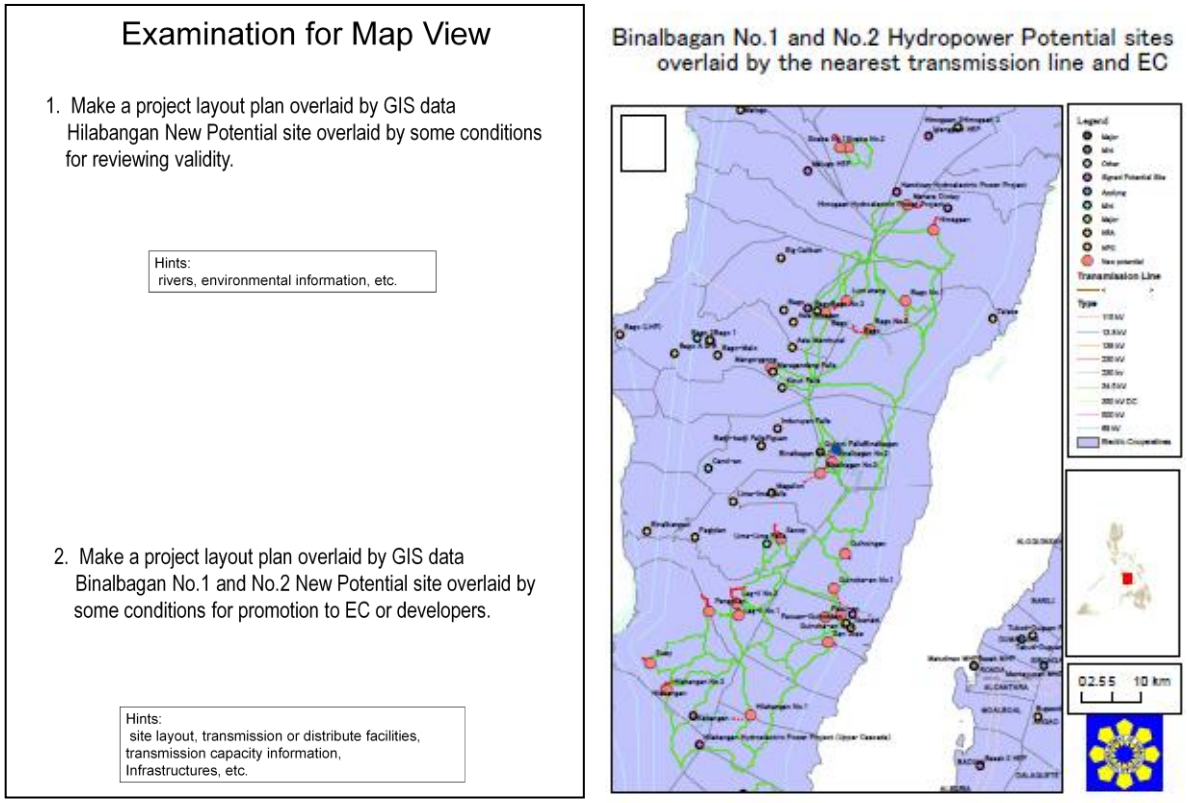


Fig 8.3-1 Example of Output of Exercise

(3) Issues concerning the Operation and Maintenance of the HRD System

The issues concerning the operation and maintenance of the HRD system were collected by interviews and check lists. A summary of these issues and countermeasures are shown below.

Table 8.3-3 Summary of Issues and Countermeasures concerning HRD Operation & Maintenance

Classifi-cation	Problem	Reason	Countermeasures
A	Had difficulty understanding cursor usage.	Easy to touch wrongly in ArcGIS	Operating instruction
	Had difficulty transiting to target site map.	In case of upper- or lower- named site, many people skip these words in typed input.	Instructed to recognize “Upper” and “Lower”
	Could not click "Project information" button to access site information.	Small and same style as other buttons	Practical instruction and exercise
	Could not make a map key.	Lack of operating knowledge	Practical instruction and exercise
	Could not display the "Protected Areas." Instead, they tried to display it by opening the "Project information."	Lack of knowledge for switching the "Table of Contents"	Practical instruction and exercise
	Could not edit the displayed content of legends.	Lack of operating knowledge	Practical instruction and exercise
	Could not adjust fonts or line feeding in case of title addition.	Lack of operating knowledge	Practical instruction and exercise
	Could not make a sign of a relevant location in the map key.	Lack of operating knowledge	Practical instruction and exercise
B	Typing errors	Small cells	Display magnification
	Had difficulty entering the coordinates as decimal numbers.	No converter degree, minutes or seconds in decimal numbers	Instruction of conversion
D	Could not select the "Layout View."	Lack of knowledge for "Layout View"	Operating instruction
	Occurrence of warning signs for wrong data type	Mixed currency, USD and PHP	Establish of each cell
E	Misunderstanding of meanings between "Stream name" and "River system"	Lack of vocabulary	Follow-up explanation

(Note) A: Literacy of ArcGIS, B: Operation Related, C: Printed Matter, D : Little understanding of Core Data, E : Others

8.3.2 Seminar for Promoting Utilization of the HRD

In order to promote utilization of the HRD developed in the study, a Joint Seminars by JICA (Japan International Cooperation Agency) and DOE were held in Manila City, Cebu City and Baguio City (total 2 cities in this period) for private developers/investors, ECs, LGUs, etc during the 6th site visit in November 2011. Additional seminars were also held in Mindoro, Bohol, Panay, Negros, and Northern Luzon (total 6 cities in this period) from February to March, 2012. The program of the seminar is shown below.

Subject: DOE / JICA Joint Workshop
Promoting of HEP Development
Venue: Manila (Nov. 23) / Cebu (Nov. 25) / Baguio (Nov. 29)
Mindoro (Feb. 16) / Bohol (Feb. 20) / Panay (Feb. 22) / Negros (Feb. 24) / Northern Luzon (Feb. 28, Mar. 1)

Time	*Topics*	*Resource Person/ Speaker*
9:00-9:30	Opening of Joint Seminar Renewable Energy Plans and Program	Mario Marasigan Director, DOE, EUMB
9:30-10:00	Results of the Study Project on Resource Inventory of Hydropower Potential in the Philippines	Mr. SANO JICA Project Leader
10:00-10:20	Hydropower Resource Database	Mr. Saruhashi JICA Expert
10:20-10:30	Coffee Break	
10:30-11:00	Present Status of HEP Development and Investment Incentives	DOE, EMUB, TSMD
11:00-11:30	HEP Development Promotion by Utilizing the Hydropower Resource Database	DOE, EMUB, HOEMD
11:30-12:00	Study of Projects for Financial Assistance	Dr. NAGAYAMA JICA Expert
12:00-13:00	Lunch Break	
13:00-13:30	DBP Loan as Two-step Loan to Environmental Development Project (EDP)	DBP
13:30-14:00	LAND Bank Financing and Project Preparatory Fund	LAND Bank
14:00-14:30	LGU-GC Guarantee Corporation – LFG Assistance Investment Incentives	LGU - GC
14:30-14:40	Coffee Break	
14:40-15:10	Experience with HEP Development (1)	Private Developers
15:10-15:40	Experience with HEP Development (2)	ECs/LGUs
15:40-16:10	Question and Answer	
16:10-16:20	Closing	DOE, Field office

In the seminars, the JICA study team made a presentation on the below topics.

- Results of the Study Project on Resource Inventory of Hydropower Potential in the Philippines
  - Objective and Outline of the Study
  - Outline and Methodology of Map Study of Hydropower Potential
  - Outline and Methodology of Site Reconnaissance on 50 Selected Sites

- Hydropower Resource Database (HRD)
  - Background and Purpose of Developing the Database System
  - Overview of the Database System
  - Proposal on Applying the HRD
  - Information to Be Provided through the HRD

- Present Status of HEP Development and Investment Incentives
  - Incentives for Developing RE
  - Mechanisms of the JICA Financial Model
  - Comparison of EDP (Environmental Development Project) and Private Banks

In addition to the JICA team's presentation, the present situation of HEP development was introduced by the DOE, and financing assistance for HEP development was introduced by the DBP (Development Bank of the Philippines), Land Bank, and LGU-GC (Local Government Unit Guarantee Corporation).

In these seminars, the following comments and requests are made from participants.

- Many developers have a lot of interests in developing mini-hydropower projects. Therefore, they expect to obtain useful data / information for relevant hydropower potential sites by the HRD system.

- The DOE announced that 47 priority hydropower potential sites will be bid in the next year under open and competitive selection, and many developers are interested in the list of the potential sites.

- An expansion of the area of Map Study and an increase in priority sites were strongly requested from LGUs and ECs.

- The LGU requested to include their proposed potential sites in the priority potential sites for bidding.

- The RE-contracted potential sites that were canceled because of validity expiration were requested to be included in the bidding of the hydropower potential sites by the DOE.

- LGUs and ECs were interested in financing project preparation and implementation from the DBP and Land Bank. Their branch offices will provide necessary support to them.

- The DOE was requested to accelerate proceedings of a lot of RE-contracts under application.

8.4 UTILIZATION OF STUDY RESULTS ON NEW HYDROPOWER POTENTIAL SITES

(1) National Renewable Energy Plans and Programs 2011-2030

The DOE established the NREP 2011-2030 in July 2011. The NREP shows development goals, purposes and targets/road maps for RE in the Philippines. The sector sub-programs of geothermal, hydropower, wind, solar and ocean are shown in the NREP. Contents related to the 47 selected potential sites in this study are provided in "Resource Development of Work Program for Hydropower Project." According to the program, bidding, awarding contracts, construction, development, commissioning and operation are to be conducted continuously.

Table 8.4-1 Work Program for Hydropower Project (2011 - 2030)

Type of Activity	Work Program
RE Industry Services	1. Review of applications; endorsement for registration of applications 2. Monitoring of RE contracts 3. Advisory services to RE developers on: • RE policy mechanisms/guidelines • Sea water pump storage (PS) hydropower plant • Rural electrification using micro-hydropower
Resource Development	1. Developmental Activities for micro-hydropower • Commercialization via mini-grid system • Rural electrification using micro-hydropower **2. JICA optimization study** **a. Identification of at least 50 potential sites** **b. Project packaging of JICA 's optimization studies for hydropower** **- Tendering/Bidding and awarding of contracts** **- Construction and development activities** **- Commissioning and operation** 3. Sea water pump storage hydropower plant • Inventory of potential sea water PS facilities
R, D & D	1. Sea water pump storage hydropower plant • Development of sea water pump storage plant - Project packaging - Tendering/Bidding and awarding of contracts - Construction and development 2. Establishment of research center • New technology and designs for hydropower • Redesign and retrofitting program
RE Technology Support	1. Development of local manufacturing capability for micro-hydropower equipment and controls 2. Establishment of standards and best practices 3. Technology mentoring
Policy and Program	Support-related activities Developmental activities for micro-hydropower • Formulation of comprehensive program • Inventory of projects for optimization

Source: Renewable Energy Plans and Programs (2011-2030)

(2) Conversion Procedure for Project Study to Operation under the Renewable Energy Law

A process of approval and registration of implementation of F/S (Feasibility Study) for RE developers is conducted by the DOE under the Renewable Energy Law. There are two kinds of processes: 'Direct Negotiation' and 'Open and Competitive Selection'. Approval and registration of the application are conducted by means of Direct Negotiation at present. In this process, the applicants can apply for any hydropower potential site with the DOE provided there is no site duplication. The applications are to be evaluated from legal, financial and technical viewpoints in the registration process. The applicants who submit first have the first right to implement F/S. Open and Competitive Selection has not been yet done, and the DOE has the intention to conduct Open and Competitive Selection for bidding the 47 promising potential sites selected in this study. Both processes are shown in Figs.8.4-1 and 8.4-2. Also, the DOE receives applications to apply the RE law to existing hydropower plants. Awards such as preferential treatment of taxation, FIT (Feed-in-Tariff), etc. can be given to applicants after the application approval.

The process of conversion from the Pre-Development stage to the Development/Commercial stage is as shown in Fig.8.4-3.

DIRECT NEGOTIATION

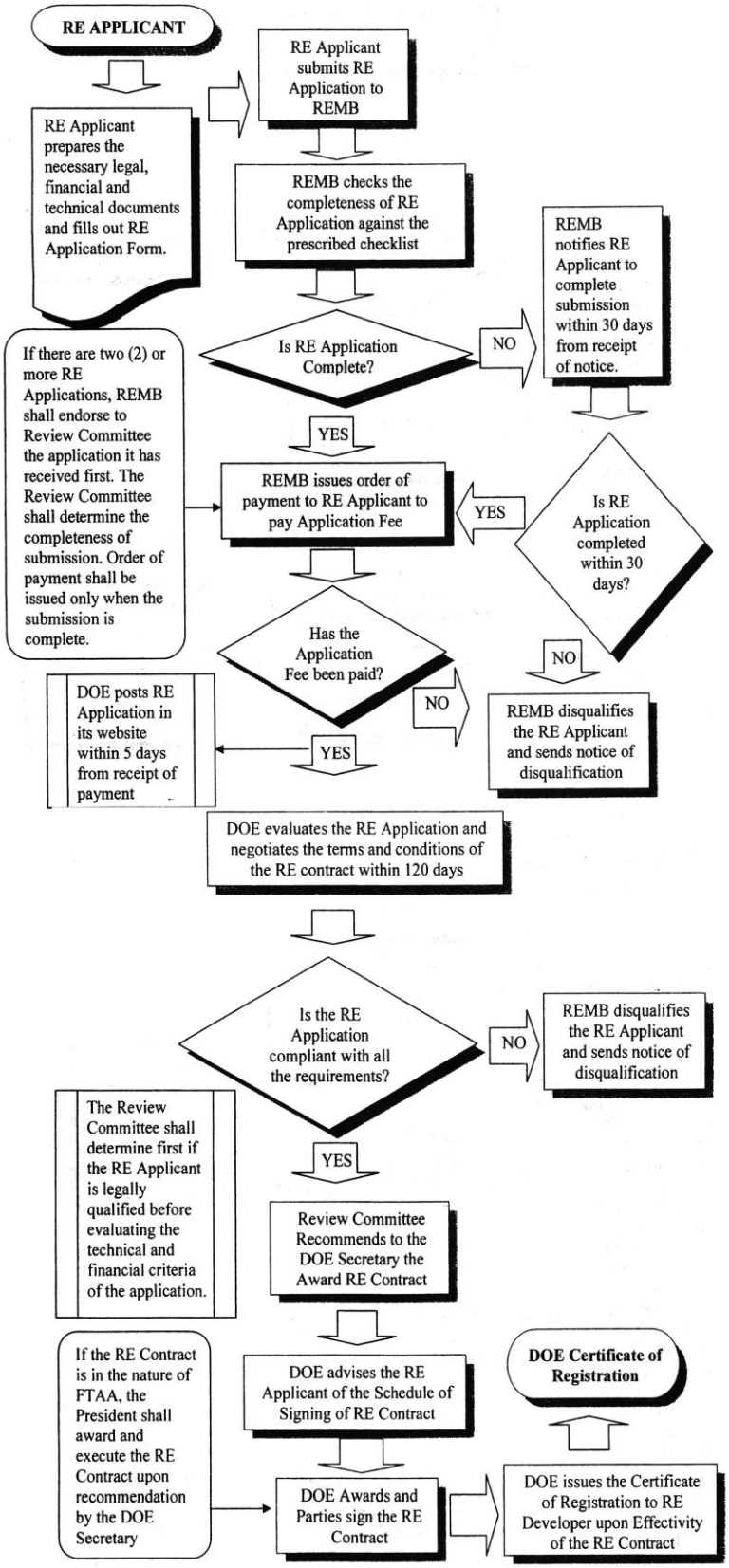


Fig.8.4-1 Process of Direct Negotiation

Source : Process Flow for the Registration of Renewable Energy Developer (Under R.A. 9513), DOE, March 2010

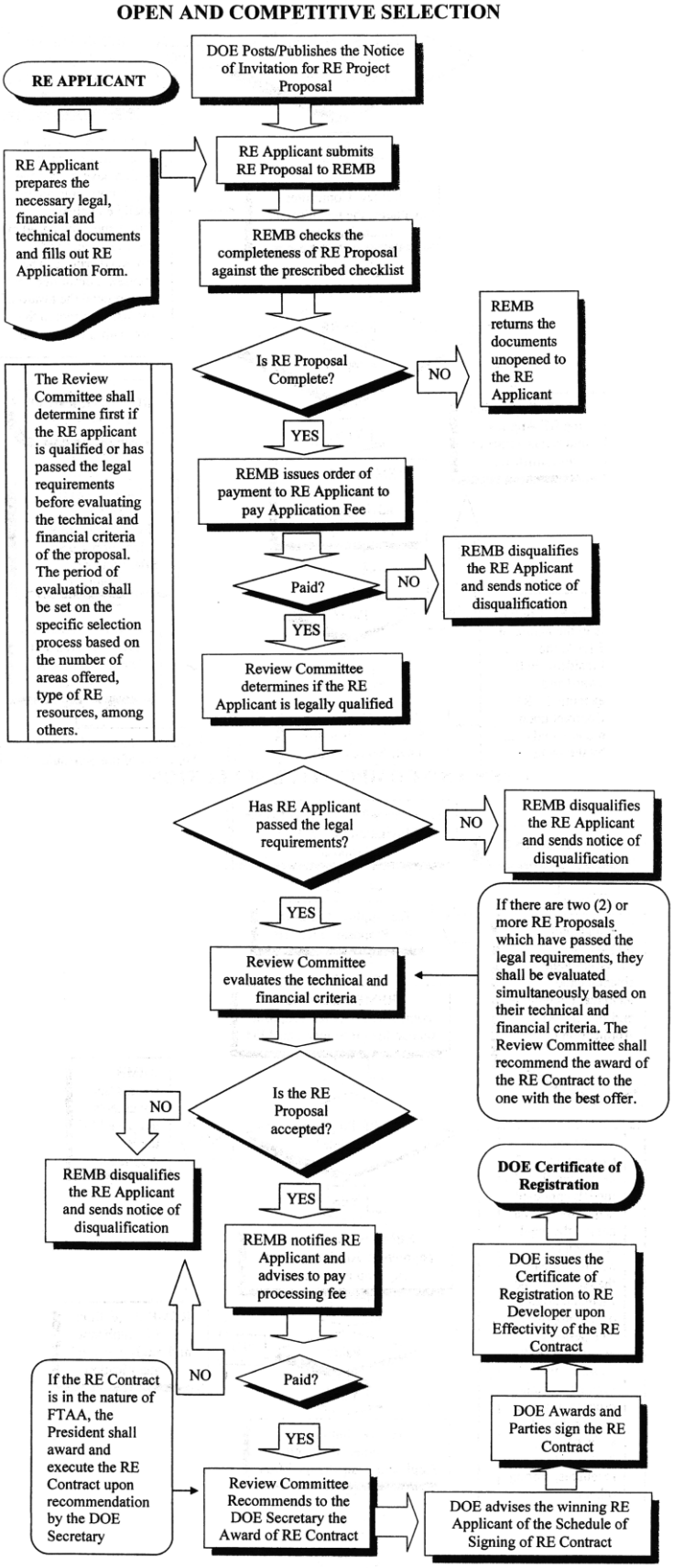


Fig. 8.4-2 Process of Open Bidding and Competitive Selection

Source : Process Flow for the Registration of Renewable Energy Developer (Under R.A. 9513), DOE, March 2010

CONVERSION FROM PRE-DEVELOPMENT STAGE TO DEVELOPMENT/ COMMERCIAL STAGE OF AN RE CONTRACT (R.A. No.9513)

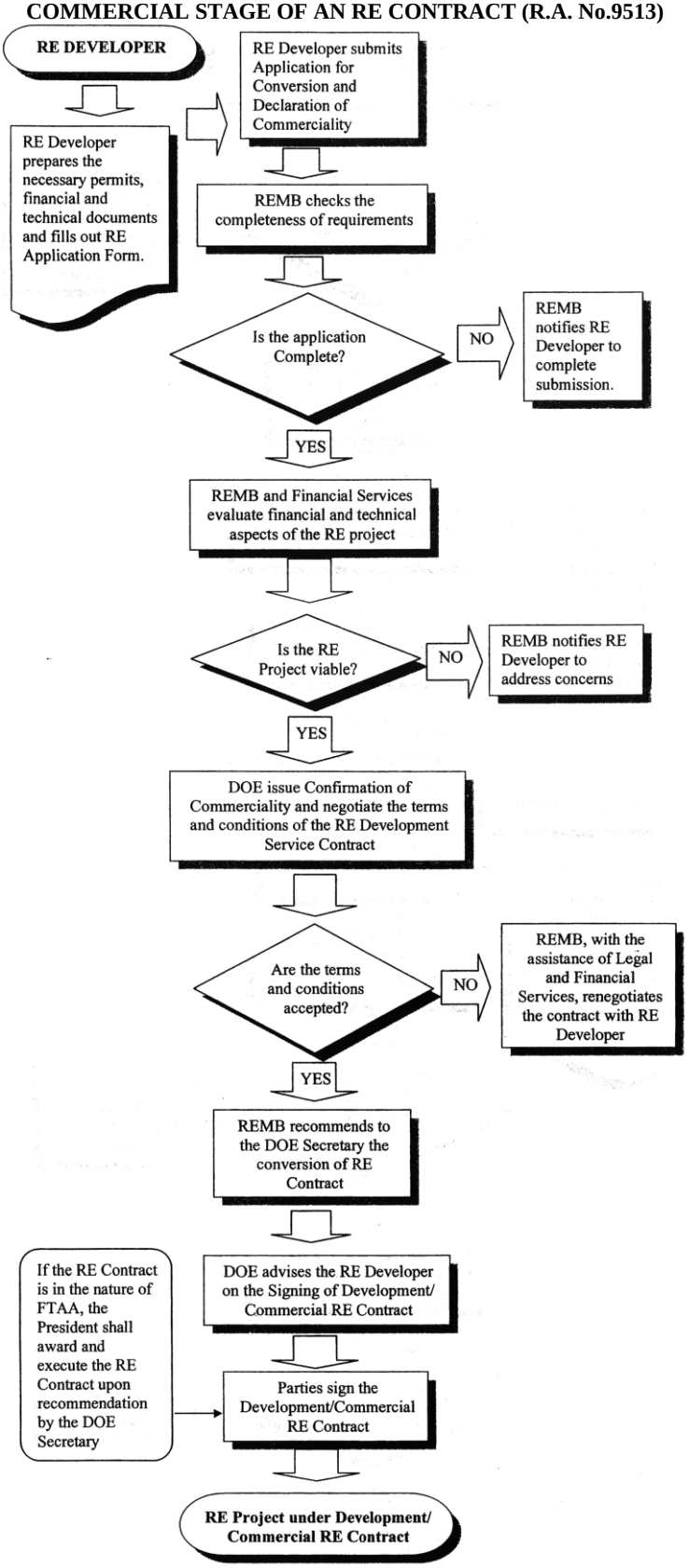


Fig.8.4-3 Process of Conversion from Pre-development Stage to Development/Commercial

Source : Process Flow for the Registration of Renewable Energy Developer (Under R.A. 9513), DOE, March 2010

CHAPTER 9

RECOMMENDATIONS

CHAPTER 9 RECOMMENDATIONS

Described below are recommendations for sustainable O&M (Operation and Maintenance) of the Hydropower resources database, effective utilization of the database for the promotion of HEP (Hydro Electric Power) development, promotion of promising HEP potential sites identified in this study, sharing and updating data / information in collaboration with related agencies and improvement of the investment environment surrounding HEP development.

(1) Sustainable O&M of the Hydropower Resources Database

The database should properly and efficiently provide data / information regarding promising HEP potential sites to the RE (Renewable Energy) developers and be utilized to promote the development of HEP projects. The database was developed so as to fulfill the following conditions.

- That it would be usable to unify management of promising HEP potential sites all over the Philippines.
- That it would be possible to search for promising potential sites.
- That it would be possible to find the development of river system (i.e. cascade development) and the awarded / applying projects on topographic maps.
- That it would be easy to update / add / delete data of hydropower potential sites.
- That it would be easy to search, sort and present data on individual sites.
- That it would be comprehensible with visualized GIS (Geographic Information Systems) data, and effective for use in presentations.

Furthermore, the following considerations were shown in database development so as to utilize the database sustainably.

- That the database could be used for the DOE's (Department of Energy) routine jobs.
- That templates for relevant documents and presentations would be easily provided.
- That the database operation and maintenance cost would be minimized by collaboration amongst the related divisions in the DOE.
- That a backup system and security system would be provided.

The DOE has to update the database and manage it so that it always contains the latest data and infomration.

(2) Effective Utilization of the Database for Promoting Hydropower Development

In this study, the following methods of utilizing the database for developers / investors are proposed to promote HEP development.

- Information provision through the website
- Establishment of an information desk for hydropower development
- Provision of data / information on relevant potential sites by face-to-face services
- Seminars to provide information on HEP development

The DOE and the consultant agreed that the DOE has to decide an O&M organization, staff assignments, budgets and coordination with other divisions in order to assuredly and diligently carry out the above activities, and maintain the sustainable operation of the database.

It is effective for promoting new HEP development to hold workshops for RE developers / investors in various locations in cooperation with financial institutions, for the purpose of presenting relevant data / information on hydropower potentials from the database and finance information.

(3) Effective Utilization of Promising Hydropower Potential Sites Selected by this Study

According to the program mentioned in the Resource Development of Work Program for HEP Project of the NREP (National Renewable Energy Program) 2011 – 2030 formulated in July 2011 by the DOE, bidding, awarding of contracts, construction, development, commissioning and operation are to be continually planned for the selected 47 potential sites in this study. This study is in the preliminary study stage, so the bidding for rights to implement F/S (Feasibility Study) is planned by means of "Open and Competitive Selection." The next stage is to judge feasibility of projects based on the results of investigations, designs and financial analyses from F/Ss. Then, projects can move forward to the D/D (Detail Design) and construction stages.

(4) Recommendations for Sharing and Updating Data / Information of the Database in Collaboration with Related Agencies

The database utilizes data / information of government agencies such as the DPWH (Department of Public Works and Highways), PAGASA (Philippine Atmospheric, Geophysical and Astronomical Services Administration, DPWH), NAMRIA (National Mapping and Resource Information Authority, DENR), NIA (National Irrigation Administration), DENR (Department of Environment and Natural Resources), and NGCP (National Grid Corporation of the Philippines). Evaluation of potential sites depends on basic data such as water resources, environment, infrastructure, etc. and the reliability of data / information. It would be useful towards providing developers / investors with updated and reliable data / information related to the potential sites by sharing and updating this data / information in cooperation with those institutions.

The DOE shall reduce developer / investor risk by sharing information with those government agencies related to water resource development such as the DPWH, PAGASA, NAMRIA, NIA and DENR. They also aim at economic development via the effective use of irrigation facilities.

(5) Need for Capacity-Building Capability for Evaluating F/S

In a short time, the DOE shall evaluate F/S results and issue development and construction permits to developers / investors. The DOE has experience with F/S for mini-HEP projects but not poundage or reservoir types or large-scale HEP projects. So, DOE staffs need to deal with the said duties.

The DOE currently uses a cash flow model of revenues and expenses to calculate profits and losses, along with the projected electricity generation assumed by the project proponent. Tariffs are the only precondition used for simulation (as of 2011). The DOE examines the validity of the IRR (Internal Rate of Return) solely based on this. Furthermore, the cost is derived from the data written in the F/S. The DOE should be able to replicate and simulate the F/S outputs, using financial programs.

(6) Further Cooperation with the DBP in Providing Information from the Database

In the interview with the DBP, applications for the EDP were thought to be increasing after deciding the official FIT (Feed-in-Tariff) price. Since F/S costs will be funded, cooperative activities for EDP promotion (especially the F/S component) are encouraged in utilizing EDP loans. For this purpose, participation by the DBP's local branches will be necessary.

(7) Encouraging Partnership between ECs and LGUs

Joint ventures between LGUs (Local Government Units) and ECs (Electric Cooperatives) can be beneficial to both parties, as it makes it easier for ECs to obtain project approval and LGUs can corporate with in-kind contributions like access roads.

(8) Possible Cooperative Activities with the CDA

Some ECs with good performance are considering joining the CDA (Cooperative Development Authority) in order to get exemptions from VAT (Value Added Tax), franchise tax, etc. The CDA should also consider cooperating in EDP promotion activities that target ECs. At present, 12 ECs have joined the CDA. The CDA has 16 local branches.