

## 資料 1 調査団員・氏名

## 資料

### 1. 調査団員氏名・所属

氏名	担当業務	所属先
大嶋 一成	総括	独立行政法人 国際協力機構 コンサルタント
古川 直人	計画管理	独立行政法人 国際協力機構 産業開発・公共政策部
清水 満	業務主任/電力・運営保守 管理計画/施工計画	東電設計株式会社
宮本 幸男	水力発電計画 A	東電設計株式会社
小林 博	水力発電計画 B	東電設計株式会社
足立 雪雄	電気/機械設備計画 /保護・制御計画	東電設計株式会社
市川 福夫	送変電設備計画	東京電力株式会社
吉田 憲一	資機材調達計画/積算	JEM株式会社
林 のぶき	環境社会配慮	東電設計株式会社
柳瀬 崇	経済財務分析	東京電力株式会社
中俣 公德	自然条件調査	東設土木コンサルタント

## 資料 2 調査行程(第一次調査～第三次調査)

2. 調査行程

(1) 第一次調査行程

第1次現地調査行程表

日付 (暫定)			調査団											
			業務主任	水力発電A	環境	水力発電B	調達・積算	自然条件	経済財務	電機	送変電			
			清水	宮本	林	小林	吉田	中俣	柳瀬	足立	市川			
1	7月29日	日	移動(東京～マニラ)											
2	7月30日	月	JICAマニラ・大使館・DOE他表敬訪問、I/R提出											
3	7月31日	火	キックオフ・ミーティング(DOE-REMB) 無償説明・プロジェクト説明											
4	8月1日	水	プロジェクト実施体制・イサバラ地点対象地点確認 現地調査工程等に関する調整											
5	8月2日	木	情報収集(他ドナー動向、IEE必要性、NIA情報、現地委託先)											
6	8月3日	金												
7	8月4日	土	団内会議			移動(東京～マニラ)								
8	8月5日	日	移動(マニラ～イフガオ)											
9	8月6日	月	イフガオ州関係表敬訪問(州議会)／無償説明・プロジェクト説明											
10	8月7日	火	ステーク・ホルダー会議／申請手続き調整			既設発電所(アンパンガル調査:施工条件・運転状況確認)								
11	8月8日	水	住民説明会／イサバラ移動											
12	8月9日	木	イサバラ州関係表敬訪問／無償説明・プロジェクト説明→現地確認											
13	8月10日	金	現地確認調査			現地再委託見積依頼								
14	8月11日	土	団内会議											
15	8月12日	日	資料整理											
16	8月13日	月	現地確認調査	現地確認調査	実施主体調査	施設計画調査 電力需給状況 機材調達調査	調達条件調査	自然状況調査 流量資料等						
17	8月14日	火	再委託契約	施設計画状況	再委託契約									
18	8月15日	水	イサバラ～イフガオ移動／資料収集											
19	8月16日	木	運転保守調査	施設計画調査	法手続・土地収用	施設計画調査 電力需給状況 機材調達調査	調達条件調査	地表踏査						
20	8月17日	金	据付条件調査											
21	8月18日	土	イサバラ～イフガオ移動											
22	8月19日	日	団内会議											
23	8月20日	月	資料整理											
24	8月21日	火	施工条件調査 据付条件調査 連系条件	施設計画調査 電力需給状況 機材調達調査	実施主体能力 環境関連調査	施設計画調査 電力需給状況 機材調達調査	調達条件調査	地表踏査						
25	8月22日	水												
26	8月23日	木												
27	8月24日	金	団内会議											
28	8月25日	土	資料整理							東京～マニラ				
29	8月26日	日	資料整理							マニラ～イフガオ移動				
30	8月27日	月	施工条件調査 据付条件調査 連系条件	施設計画調査 電力需給状況 機材調達調査	法手続・土地収用	施設計画調査 電力需給状況 機材調達調査	調達条件調査	地質踏査	イフガオ財務状況					
31	8月28日	火												
32	8月29日	水												
33	8月30日	木	移動(イフガオ～イサバラ)											
34	8月31日	金	イサバラ追加情報収集							イサバラ財務状況				
35	9月1日	土	移動(イサバラ～マニラ)											
36	9月2日	日	資料整理											
37	9月3日	月	マニラ追加情報調査			現地調査結果 報告書(案)作成	マニラ追加情報調査	現地調査結果 報告書(案)作成	DOE,ERC					
38	9月4日	火									NIA			
39	9月5日	水	現地調査結果 報告書(案)作成			マニラ～東京	現地調査結果 報告書(案)作成	マニラ～東京	マニラ～東京					
40	9月6日	木												
41	9月7日	金												
42	9月8日	土												
43	9月9日	日												
44	9月10日	月				現地調査結果報告			現地調査結果報告					
45	9月11日	火				移動(マニラ～東京)			移動(マニラ～東京)					
合計			45	45	45	39	39	33	12	0	0			

(2) 第二次調査行程

第2次現地調査行程表

日付(暫定)			調査団											
			業務主任	水力発電A	環境	水力発電B	自然条件	調達・積算	送変電	経済財務	電機			
			清水	宮本	林	小林	中俣	吉田	市川	柳瀬	足立			
1	9月30日	日	移動(東京～成田)											
2	10月1日	月	プロジェクト内容の説明 (JICAマニラ、DOE-REMB、NIA)			移動(東京～成田)								
3	10月2日	火	移動(マニラ～イサバラ)			移動(マニラ～イサバラ)								
4	10月3日	水	ステークホルダー会議 (懸案事項確認、概要説明)			ステークホルダー会議 (懸案事項確認、概要説明)			東京～成田					
5	10月4日	木	追加調査 (余裕高、設計妥当性確認)			追加調査 (余裕高、設計妥当性確認)			DOE、NIA					
6	10月5日	金	移動(イサバラ～イフガオ)			移動(イサバラ～イフガオ)			NEDA					
7	10月6日	土	団内ミーティング		移動(東京～成田)	団内ミーティング		移動(東京～成田)		資料整理				
8	10月7日	日	資料整理		移動(マニラ～イフガオ)	資料整理		移動(マニラ～イフガオ)						
9	10月8日	月	ステークホルダー会議 (土地収用・法手続き状況確認、概要説明)					追加積算資料の収集 単価整合性調査 施工単価の積算	IFELCOとの調整 (技術・売電契約等)					
10	10月9日	火	住民説明会 (土地収用・法手続き状況確認、概要説明)						連系線ルート確認他	IFELCOとの調整 (売電契約条件)				
11	10月10日	水	施工計画妥当性確認 ワークスルー	設計内容妥当性確認 設計修正(適宜) 工事数量の確認 量水標移設・測水	土地収用状況確認 法手続き状況確認 ワークスルー	移動 (イフガオ～イサバラ)	設計・施工内容妥当 性確認(地質) 量水標移設・測水	移動 (イフガオ～イサバラ)						
12	10月11日	木				追加積算資料の収集 単価整合性調査 施工単価の積算		ISELCOとの調整 (連系条件・売電契約)						
13	10月12日	金						移動(イフガオ/イサバラ～マニラ)						
14	10月13日	土	セミナー資料準備					移動(マニラ～成田)						
15	10月14日	日	NIAセミナー開催:灌漑設備を利用した小水力開発											
16	10月15日	月	マニラ調達施工機械 等 調査	水圧管路等調査(運 搬含む)	ERC認可関係進捗状 況確認他	マニラ調達機材調査 (運搬含む)								
17	10月16日	火	第二次現地調査結果報告書(現地説明用)作成											
18	10月17日	水												
19	10月18日	木												
20	10月19日	金	現地調査結果の説明(JICA、DOE、NIA)											
21	10月20日	土	移動(マニラ～東京)											
合計			21	21	15	20	14	9	9	12	0			

(3) 第三次調査行程

第3次現地調査行程

日時			JICA		調査団									
			総括	計画管理	業務主任	水力発電B	環境社会配慮	水力発電A	自然条件調査	資機材調達積算	送配電	経済財務	電気	
			大嶋	古川	清水	小林	林	宮本	中俣	吉田	市川	柳瀬	足立	
1	12月2日	日			移動(東京～マニラ)									
2	12月3日	月			DOE-REMB打合せ									
3	12月4日	火			NIA-CO打合せ									
4	12月5日	水			移動(マニラ～イサベラ)									
5	12月6日	木			ラテラルB調査									
6	12月7日	金			マリス打合せ									
7	12月8日	土			移動(イサベラ～イフガオ)		Move to Manila							
8	12月9日	日			資料整理		Move to Ifugao							
9	12月10日	月			ステークホルダー協議									
10	12月11日	火			現地追加調査									
11	12月12日	水			現地追加調査									
12	12月13日	木			住民説明会									
13	12月14日	金			移動(イフガオ～マニラ)									
14	12月15日	土			資料整理									
15	12月16日	日	移動(東京～マニラ)		資料整理									
16	12月17日	月	DOE-REMB, NIA-CO打合せ		DOE-REMB, NIA-CO打合せ									
17	12月18日	火	NIA-CO打合せ		NIA-CO打合せ									
18	12月19日	水	同上(予備日)		追加調査									
19	12月20日	木	MD署名DOE-REMB, NIA-CO		追加調査									
20	12月21日	金	移動(マニラ～東京)		追加調査									
21	12月22日	土			移動(マニラ～東京)									
Total			7	7	21	21	15							

### 資料3 関係者（面会者）リスト

### 3. 相手国関係者リスト

Name of Organization	Division	Name
NATIONAL		
Department of Energy (DOE)	Undersecretary	Atty. Jose M. Layug, Jr.
DOE	Director of Renewable Energy Management Bureau (REMB)	Mr. Mario C. Marasigan
DOE	Division chief of Hydropower & Ocean Energy Management Division (HOEMD)	Mr. Ronnie N. Sargento
DOE	HOEMD	Mr. Epifanio E. Gacusan Jr.
DOE	HOEMD	Mr. Rey Salvania
DOE	HOEMD	Mr. Jowil Rodrigues
National Irrigation Administration (NIA)	Administrator	Mr. Antonio S. Nangel
NIA	Engineering & Operation Sector, Operations Department, Irrigation Engineering Center	Mr. B.S. Labiano
NIA	同上	Ms. Eden P. Bulatao
NIA	同上	Mr. Roneo F. Solis
在フィリピン日本国大使館	商務官	是枝憲一郎
JICA フィリピン事務所	次長	伊藤 晋
JICA フィリピン事務所	所員	濱口 勝匡
JICA フィリピン事務所	所員	松田 博幸
JICA フィリピン事務所	Program Manager	Mr. Floro O. Adviento
JICA フィリピン事務所	Program Officer	Mr Juan Paulo M. Fajardo
IFUGAO		
Provincial Government of Ifugao (PGI)	Governor	Mr. Eugene M. Balitang
PGI	Vice Governor	Mr. Pedro Mayam-o
PGI	PPDO	Ms. Camelita Buyuccan
PGI	PPDO	Ms. Nancy
PGI	PPDO	Ms. Kristine
PGI	PPDO	Ms. Gema



PGI	PAssO	Mr. Pedro Namingit
PGI	PLO	Mr. Gary Guyguyon
PGI	PAENRO	Mr. Julita Bahingawan
Municipality of Asipulo	Mayor	Mr. Hon. Eladio
Municipality of Asipulo	Vice Mayor	Mr. Toma Pulupul
Municipality of Asipulo	Executive Assistant of Mayor	Mr. Raymundo A. Binbinon
Municipality of Asipulo	MPDO	Mr. Arnold G. Guyguyon
Municipality of Asipulo	MAssO	Mr. Robert Pinkihan
Barangay Haliap	BRGY Captain	Mr. Roger manghi
Barangay Haliap	BRGY Captain since Nov.2012	Mr. Basilio B. Bayaona
Barangay Haliap	BRGY Kagawad	Ms. Nancy Addangna
Barangay Haliap	BRGY Kagawad	Ms. Maria Lad-ao

## 資料 4 討議議事録(M/D)及び MOA

- (1) M/D 8 月
- (2) M/D 12 月
- (3) エネルギー省とイフガオ州政府の合意書(MOA)

**Minutes of Discussions  
on the Preparatory Survey  
for Mini-Hydropower Development Project  
in the Philippines  
(for Mini-Hydropower Project in the Province of Ifugao)**


In response to the request from the Government of the Republic of the Philippines, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), in consultation with the Government of Japan, decided to conduct a Preparatory Survey (hereinafter referred to as "the Survey") for two project ("Mini-Hydropower Project in the Province of Ifugao", and "Micro/Mini Hydropower Development Project on Irrigation Canal"). This minutes of Discussions is agreed for the Mini-Hydropower Project in the Province of Ifugao (hereinafter referred to as "the Project").

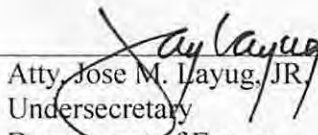
JICA sent to the Republic of the Philippines the Preparatory Survey Team (hereinafter referred to as "the Team"), headed by Mr. Kazunari OSHIMA, In-house consultant of Electric Power Division, Natural Resources and Energy Group, Industrial Development and Public Policy Department, JICA. The Team is scheduled to stay in the country for 1<sup>st</sup> mission from July 29 to September 11<sup>th</sup>, 2012.

Both sides agreed that the final terms and agreements necessary to implement the Project shall be subject to full government authorization and consent of appropriate government signatories. Finally, upon obtaining requisite final authorities therefor, both sides agree that they shall cooperate fully and do all such further acts and things and execute and deliver any further documents that may be necessary to give effect to the transactions contemplated under the Project.


The Team held discussions with the officials of concerned authorities in the Philippines (hereinafter referred to as "the Philippines side"). In the course of the discussions, both sides have confirmed the main items described in the sheets attached hereto.

Makati, August 3rd, 2012

  
\_\_\_\_\_  
Mr. Susumu Ito  
Senior Representative  
Japan International Cooperation Agency

  
\_\_\_\_\_  
Atty. Jose M. Layug, JR.  
Undersecretary  
Department of Energy

  
\_\_\_\_\_  
Mr. Naoto Furukawa  
Deputy Assistant Director  
Japan International Cooperation Agency

  
\_\_\_\_\_  
Mr. Marlo C. Marasigan  
Director  
Department of Energy – Renewable  
Energy Management Bureau



## ATTACHMENT

The Team explained that the Project will be conducted under the Japanese Grant Aid Program aiming at promoting "Green Growth", which the Government of Japan puts stress on, by introducing mini-hydropower plant with elaborated technologies of Japan.

### 1. Objective of the Project

The objective of the Project is to sustain Rice Terrace Conservation Fund, to contribute to energy diversity, to CO<sub>2</sub> reduction, and to enhance electrification with mini-hydro power generation in Ifugao province.

### 2. Selection of Locations of Projects

The project site is located in Ifugao province as shown in Annex-1.

### 3. Responsible and Implementing Organizations

- (1) The responsible organization is Department of Energy (DoE).
- (2) The implementing organization is provincial government of Ifugao (PGI).

The Organization Structures of DoE is shown in Annex-2.

As for the other organizations such as owner of mini-hydropower plant, and operation and maintenance, the Philippines side has responsible for taking MoA with organizations in charge. The Team requested the Philippines side that the MoA shall be given to the Team by September 10<sup>th</sup>, 2012.

### 4. Component of the Project

- (1) Items originally requested by the Philippines Side are as follows.
  - a) Construction and installation of Likud mini-hydropower plant
  - b) Connecting power system to 13.8kV distribution lines
  - c) Overseas study tour and training for HOEMD
- (2) Based on discussion, Both side confirmed requested components as follows.
  - a) Construction and installation of Likud mini-hydropower plant
  - b) Connecting power system to 13.8kV distribution lines
  - c) Trainings in Philippines

The Team explained that the requested components are considered as candidate components to be implemented. However, the items of the components might be adjusted due to the budget frameworks of the Japanese side and result of the survey.

### 5. Japan's Grant Aid Scheme

- (1) JICA confirmed that the Philippines side understood Japan's Grant Aid Scheme explained by the Team as described in Annex-3 and 4.
- (2) The Philippines side will take the necessary measures, as described in Annex-5, for smooth implementation of the Project as prerequisites for the Japan's Grant Aid to be implemented.

### 6. Schedule of the Survey

The Team will continue the Survey in Philippines until September 11<sup>th</sup>, 2012.

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## 7. Environmental and Social Considerations

- (1) The Philippines side agreed to comply with the JICA Guidelines for Environmental and Social Considerations (hereinafter referred to as "JICA Guidelines") as well as laws and regulations in the Philippines, and was requested to prepare Environmental Checklist and Monitoring Form which are designated by JICA Guidelines for an outline design.
- (2) The Philippines side agreed to make necessary arrangements with concerned governmental organizations in order to secure funding for and execution of the above environmental matters in a schedule as required for smooth execution of the Project.

## 8. Other Relevant Issues

### (1) Status of the Survey

The Team explained that the purpose of the Survey is to collect information and data necessary for the outline design and cost estimation of the Project components which are confirmed through the Survey and the analysis in Japan.

### (2) Progress of preparatory works for the Project

The Philippines side agreed to undertake preparatory works necessary for the Project including land use permission. The preparatory works shall be completed no later than six months from the conclusion of Grant Agreement (G/A).

### (3) Enhancement of structure for operation and maintenance

The Team emphasized that the establishment of an operation and maintenance structure with the allocation of enough number of qualified engineers and skilled technicians who will be in charge of operating and maintaining the new facilities is a crucial factor for implementation of the Project. The Philippines side understood its importance and agreed to formulate the operation and maintenance structure and submit the plan to JICA by November 2012.

### (4) Budget for operation and maintenance

The Team emphasized that it is essential for the Philippines side to secure the necessary budget for operation and maintenance based on periodical overhaul and preventive maintenance program including major overhauls of equipment to be procured under the Project in order to ensure long-term stable power supply. To secure the cost for maintenance and repair of the project site, the Team recommended allocation of revenue from electricity sales properly. The Philippines side has fully understood and committed to secure budget allocation especially until the plant operation starts.

### (5) Counterpart personnel

The Team requested the Philippines side that the necessary number of counterpart personnel shall be assigned to the Team and necessary arrangements with related organizations shall be made during the Survey in Philippines. The Philippines side agreed to support the Team based on the request.

### (6) Questionnaires

The Team requested the Philippines side that the answers to the questionnaires which the Team had already submitted to the Philippines side shall be given to the Team by September 10<sup>th</sup>, 2012.

### (7) Customs and tax exemption

The Philippines side understands that it shall be fully responsible on exemption of taxes, custom duties and any other levies imposed in the Republic of Philippines, in case the



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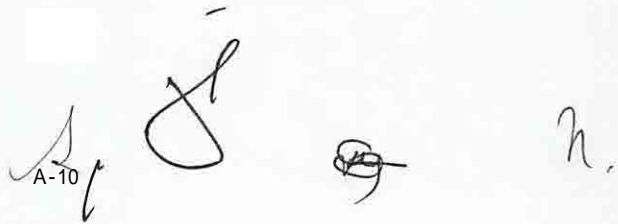
Project is implemented.

(8) Operation of the Rice Terraces Conservation Fund (RTCF)

The Philippines side explained that the proposed project aims at i) stable supply of electricity, and ii) promotion of preservation activities of the rice terrace through RTCF by raising power sales profit. In this context, both sides agreed that the study will cover the issues regarding the operation of the RTCF.

(End)

- Annex-1 Project Site
- Annex-2 Organization Chart of DoE
- Annex-3 Japan's Grant Aid
- Annex-4 Flow Chart of Japan's Grant Aid Procedures
- Annex-5 Major Undertakings to be taken by Each Government

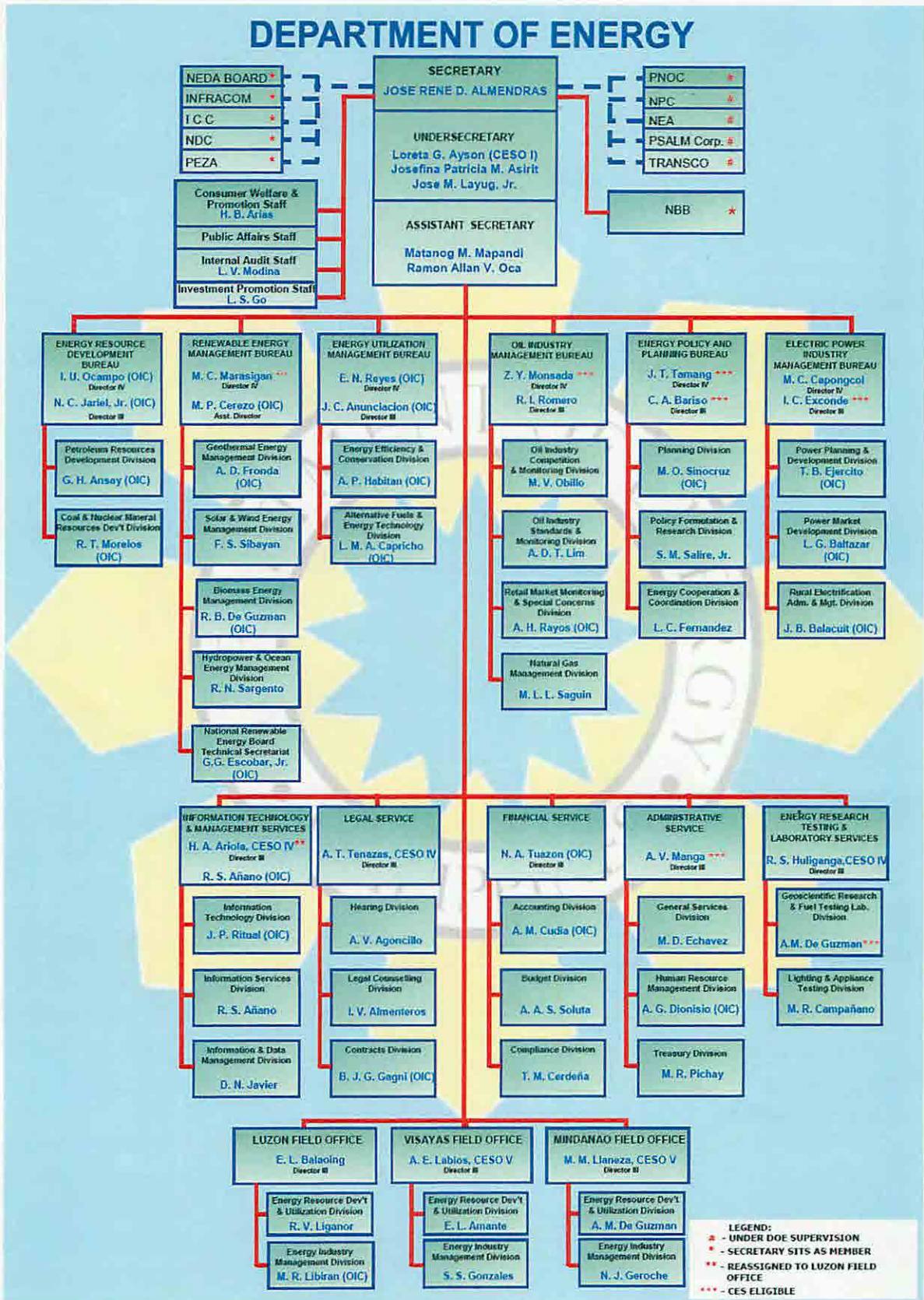
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Project Site



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Organization Chart of DoE





## Japan's Grant Aid

The Government of Japan (hereinafter referred to as "the GOJ") is implementing the organizational reforms to improve the quality of ODA operations, and as a part of this realignment, a new JICA law was entered into effect on October 1, 2008. Based on this law and the decision of the GOJ, JICA has become the executing agency of the Grant Aid for General Projects, for Fisheries and for Cultural Cooperation, etc.

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

### **1. Grant Aid Procedures**

The Japanese Grant Aid is supplied through following procedures :

- Preparatory Survey
  - The Survey conducted by JICA
- Appraisal & Approval
  - Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Authority for Determining Implementation
  - The Notes exchanged between the GOJ and the recipient country
- Grant Agreement (hereinafter referred to as "the G/A")
  - Agreement concluded between JICA and a recipient country
- Implementation
  - Implementation of the Project on the basis of the G/A

### **2. Preparatory Survey**

#### **(1) Contents of the Survey**

The aim of the preparatory Survey is to provide a basic document necessary for the appraisal of the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of a basic design of the Project.
- Estimation of the Project cost.

The contents of the original request by the recipient country are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed based on the guidelines of Japan's Grant Aid scheme.

JICA requests the Government of the recipient country to take whatever measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization of the recipient country which actually implements the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country based on the Minutes of Discussions.



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(2) Selection of Consultants

For smooth implementation of the Survey, JICA employs (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the Report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the appropriateness of the Project.

**3. Japan's Grant Aid Scheme**

(1) The E/N and the G/A

After the proposed Project is approved by the Cabinet of Japan, the Exchange of Notes(hereinafter referred to as "the E/N") will be signed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the recipient country to continue to work on the Project implementation after the E/N and G/A are signed by both sides.

(3) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport of materials or those of the recipient country are to be purchased. When JICA and the Government of the recipient country or its designated authority deem it necessary, the Grant Aid may be used for the purchase of the products or services from a third country. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals".

(4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to fulfill accountability to Japanese taxpayers.

(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as shown in Annex-5.

(6) "Proper Use"


The Government of the recipient country is required to maintain and use properly and effectively the facilities constructed and the equipment purchased under the Grant Aid, to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Grant Aid.

(7) "Export and Re-export"

The products purchased under the Grant Aid should not be exported or re-exported from the recipient country.

(8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an

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account under the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). JICA will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

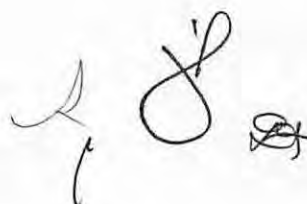
(9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions paid to the Bank.

(10) Social and Environmental Considerations

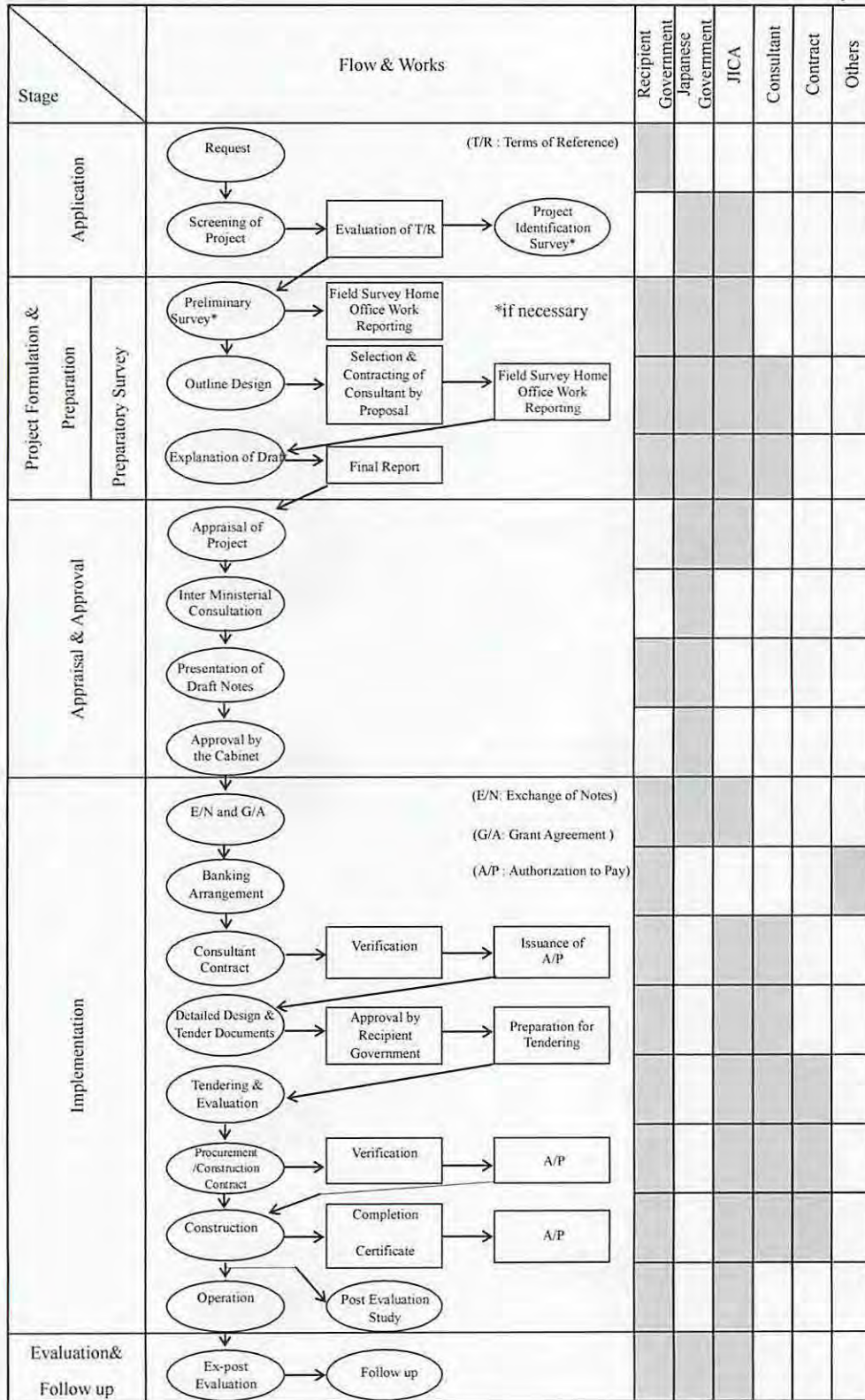
A recipient country must carefully consider social and environmental impacts by the Project and must comply with the environmental regulations of the recipient country and JICA guidelines for Environmental and Social Considerations.

(End)

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**Flow Chart of Japan's Grant Aid Procedures**



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## Major undertakings to be taken by each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	to secure [a lot] / [lots] of land necessary for the implementation of the Project and to clear the [site] / [sites];		●
2	To construct the following facilities		
	1) The building	●	
	2) The gates and fences in and around the site		●
	3) The parking lot	●	
	4) The road within the site	●	
	5) The road outside the site		●
3	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project outside the [site] / [sites]		
	1) Electricity		
	a. The distributing power line to the site		●
	b. The drop wiring and internal wiring within the site	●	
	c. The main circuit breaker and transformer	●	
	2) Water Supply		
	a. The city water distribution main to the site		●
	b. The supply system within the site (receiving and elevated tanks)	●	
	3) Drainage		
	a. The city drainage main (for storm sewer and others to the site)		●
	b. The drainage system (for toilet sewer, common waste, storm drainage and others) within the site	●	
	4) Gas Supply		
	a. The city gas main to the site		●
	b. The gas supply system within the site	●	
	5) Telephone System		
	a. The telephone trunk line to the main distribution frame/panel (MDF) of the building		●
	b. The MDF and the extension after the frame/panel	●	
	6) Furniture and Equipment		
	a. General furniture		●
	b. Project equipment	●	
4	To ensure prompt unloading and customs clearance of the products at ports of disembarkation in the recipient country and to assist internal transportation of the products		
	1) Marine (Air) transportation of the Products from Japan to the recipient country	●	
	2) Tax exemption and custom clearance of the Products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	●	
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the purchase of the products and the services [ be exempted ] / [be borne by the Authority without using the Grant]		●
6	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
7	To ensure that [the Facilities and the products] / [the Facilities] / [the products] be maintained and used properly and effectively for the implementation of the Project		●
8	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project		●
9	To bear the following commissions paid to the Japanese bank for banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
10	To give due environmental and social consideration in the implementation of the Project.		●

\*1 B/A : Banking Arrangement, A/P : Authorization to pay) \*2 If the environmental screening category is C, No. 10 is unnecessary

**Minutes of Discussions  
on the Preparatory Survey  
for Mini-Hydropower Development Project  
in the Philippines  
(for Mini-Hydropower Project in the Province of Ifugao)  
(Explanation on Draft Final Report)**

In response to the request from the Government of the Republic of the Philippines, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), in consultation with the Government of Japan, decided to conduct a Preparatory Survey (hereinafter referred to as "the Survey") for two projects ("Mini-Hydropower Project in the Province of Ifugao", and "Micro/Mini Hydropower Development Project on Irrigation Canal"). This minutes of Discussions is agreed for the Mini-Hydropower Project in the Province of Ifugao (hereinafter referred to as "the Project").

JICA conducted a first field survey from July 29 to September 11, 2012. Second field survey was conducted from September 30 to October 20, 2012. Through discussions, field surveys and with the result of technical examination in Japan, JICA prepared a Draft Final Report of the Survey.

In order to explain and to consult with the officials of concerned authorities in the Philippines (hereinafter referred to as "the Philippines side") on the contents of the Draft Final Report, JICA dispatched to the Philippines the Preparatory Survey Team for Draft Final Report Explanation (hereinafter referred to as "the Team"), which is headed by Mr. Kazunari OSHIMA, In-house consultant of Energy and Mining Division I, Natural Resources and Energy Group, Industrial Development and Public Policy Department, JICA. The Team is scheduled to stay in the Philippines from December 2 to 22, 2012.

Both sides agreed that the final terms and agreements necessary to implement the Project shall be subject to full government authorization and consent of appropriate signatories. Finally, upon obtaining requisite final authorities therefor, both sides agree that they shall cooperate fully and do all such further acts and things and execute and deliver any further documents that may be necessary to give effect to the transactions contemplated under the Project.

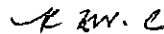
The Team held discussions with the officials of concerned authorities in the Philippines side. In the course of the discussions, both sides have confirmed the main items described in the sheets attached hereto.

Makati, December 20, 2012



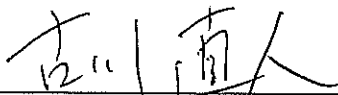

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Mr. Susumu Ito  
Senior Representative  
Japan International Cooperation Agency



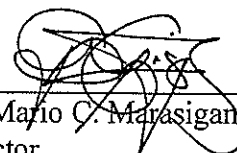

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Mr. Ramon Allan V. Oca  
Undersecretary  
Department of Energy




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Mr. Naoto Furukawa  
Deputy Assistant Director  
Japan International Cooperation Agency




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

## ATTACHMENT

The Philippines side has recognized, as the Embassy of Japan in the Philippines explained, that the Project will be conducted in accordance with the "Green Growth" policy by the Government of Japan, which emphasizes on utilization of the elaborated products, such as hydro turbines, fabricated by Japanese small, medium scale enterprise.

### 1. Objectives of the Project

The objectives of the Project are to sustain Rice Terrace Conservation Fund, to contribute to energy diversity, to CO<sub>2</sub> reduction, and to enhance electrification with mini-hydro power generation in Ifugao province.

### 2. Selection of Locations of Projects

The project site is located in Ifugao province as shown in Annex-1.

### 3. Contents of the Draft Final Report

The Philippines side agreed and accepted in principle the contents of the Draft Final Report and the Draft Technical Specifications for the Project explained by the Team.

### 4. Responsible and Implementing Organizations

- (1) The responsible organization is Department of Energy (DoE).
- (2) The implementing organization is provincial government of Ifugao (PGI).

The Organization Structures of DoE and PGI are shown in Annex-2, and Annex-3.

As for the other organizations such as owner of mini-hydropower plant, and for operation and maintenance, the Philippines side has responsible for taking (Memorandum of Agreement) MoA with organizations in charge. The Team strongly requested the Philippines side that the signed MoA shall be given to the Team within January, 2013.

### 5. Components of the Project

The following are selected as the Project Components.

- (1) Construction and installation of Likud mini-hydropower plant (2x410kW)
- (2) Connecting power system to 13.8kV distribution lines
- (3) Training in Philippines

### 6. Confidentiality of the Project

#### (1) Project Cost

The Team explained the estimated cost of the Project as described in Annex-4. The Philippines side also agreed that the cost for the Project contains procurement cost of equipment, construction cost of facility, transportation cost up to the Project site, installation cost and the Consultant fees.

The Philippines side agreed that the cost for the Project should not exceed the amount agreed in the Exchange of Notes (E/N) to be signed between the governments. The Philippines side understood that the estimated cost for the Project attached as Annex-4 is not the final and is subject to change as a result of the detailed design to be implemented after the E/N.

#### (2) Detailed specifications of the Facilities and Equipment

Both sides agreed that all information related to the Project including estimated cost, detailed drawings and specifications of the facilities and equipment, and other technical information shall not be disclosed to any outside parties (i.e. outside of JICA and the Philippines side) before the conclusion of all contract(s) for the Project.

## **7. Possibility of Change in Scope, Schedule and Cost of the Project**

The Team stressed that scope, schedule, and cost for the Project are tentative and subject to change due to the domestic circumstances in Japan and in the Philippines. The Philippines side understood it.

## **8. Japan's Grant Aid Scheme**

- (1) JICA confirmed that the Philippines side understood Japan's Grant Aid Scheme explained by the Team as described in Annex-5 and 6.
- (2) The Philippines side will take the necessary measures, as described in Annex-6, for smooth implementation of the Project as prerequisites for the Japan's Grant Aid to be implemented.

## **9. Environmental and Social Considerations**

- (1) The Philippines side agreed to comply with JICA Guidelines for Environmental and Social Considerations (April 2010) (hereinafter referred to as "JICA Guidelines") as well as laws and regulations in the Philippines, and was requested to prepare Environmental Checklist and Monitoring Form which are designated by JICA Guidelines for an outline design.
- (2) The Philippines side agreed to make necessary arrangements with concerned governmental organizations in order to secure funding for and execution of the above environmental matters in a schedule as required for smooth execution of the Project.
- (3) The Philippines side agreed that JICA may disclose (the part of) the monitoring results conducted by the Philippines side. JICA explained that JICA may disclose further information, when third parties request, subject to approval of the Philippines side.

## **10. Other Relevant Issues**

- (1) Progress of preparatory works for the Project

The Philippines side agreed to undertake preparatory works necessary for the Project including land use permission, and any authorization procedure. The preparatory works shall be completed no later than six months from the conclusion of Grant Agreement (G/A).

- (2) Budget for operation and maintenance

The Team explained estimated cost of operation and maintenance for micro/mini hydropower pilot plant, which is written in Draft Final Report. In addition, the Team emphasized that it is essential for the Philippines side to secure the necessary budget for operation and maintenance based on periodical inspection and preventive maintenance program including major overhauls of equipment to be procured under the Project in order to ensure long-term stable power supply. The Philippines side has fully understood and committed to secure budget allocation including necessary cost until the plant operation starts.

- (3) Enhancement of structure for operation and maintenance

Through the Survey, both side (DoE, PGI, and JICA) agreed power plant operation and maintenance setup as written in Draft Final Report. The Team emphasized that the establishment of an operation and maintenance structure with the allocation of enough number of qualified engineers and skilled technicians who will be in charge of operating and maintaining the new facilities is a crucial factor for implementation of the Project. The Philippines side understood its importance.

- (4) Counterpart personnel

The Team requested the Philippines side that the necessary number of counterpart personnel shall be assigned to the Team and the necessary arrangements with related organizations be made during implementing stage in the Philippines. The Philippines side



has agreed to accept the request.

(5) Customs and tax exemption

The Philippines side understands that it shall be fully responsible on exemption of taxes, custom duties and any other levies imposed in the Republic of Philippines, in case the Project is implemented.

(6) Operation of the Rice Terraces Conservation Fund (RTCF)

The Philippines side explained that the proposed project aims at i) stable supply of electricity, and ii) promotion of preservation activities of the rice terraces through RTCF by raising power sales profit. In this context, both sides agreed that the Project will cover the issues regarding the operation of the RTCF.

(End)

- Annex-1 Project Site
- Annex-2 Organization Chart of DoE
- Annex-3 Organization Chart of PGI
- Annex-4 Estimated Project Cost (Confidential)
- Annex-5 Japan's Grant Aid
- Annex-6 Flow Chart of Japan's Grant Aid Procedures
- Annex-7 Major Undertakings to be taken by Each Government



## MEMORANDUM OF AGREEMENT

### KNOW ALL MEN BY THESE PRESENTS:

This Memorandum of Agreement herein referred to as the "Agreement" made and entered into by and between:

The **DEPARTMENT OF ENERGY**, an agency of the Republic of the Philippines created under Republic Act No. 7638 with principal office address at Energy Center, Rizal Drive, Bonifacio Global City, Taguig City, Metro Manila, represented herein by its Secretary, **Hon. CARLOS JERICO L. PETILLA**, hereinafter referred to as "**DOE**";

and

The **PROVINCIAL GOVERNMENT OF IFUGAO**, a local government unit with principal office address at Provincial Capitol, Poblacion South, Lagawe, Ifugao, represented herein by its Governor, **Hon. EUGENE M. BALITANG**, through Sanggunian Panlalawigan Resolution No. 2013-598, hereinafter referred to as "**PGI**";

The **DOE** and **PGI** collectively hereinafter referred to as "**Parties**" and individually as "**Party**".

### WITNESSETH: That

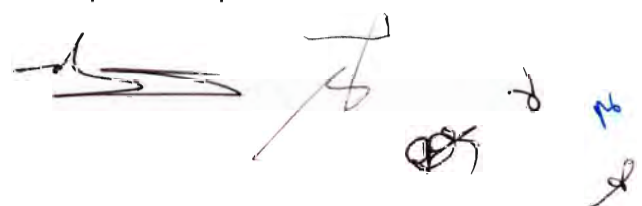
WHEREAS, the DOE is tasked to formulate policies and programs for the accelerated development of renewable energy systems and the promotion and commercialization on its applications;

WHEREAS, in fulfillment of the abovementioned task, the DOE implements the provisions of Republic Act No. 9513 or the Renewable Energy Act of 2008;

WHEREAS, the DOE submitted a proposal for Grant-Aid Project to Japan International Cooperation Agency (JICA) for Mini-hydropower Development in the Philippines;

WHEREAS, in response to the aforementioned proposal, the Government of Japan through JICA has conducted Preparatory Survey as part of Japan's Grant-Aid Program for the Likud Mini-hydropower Project (hereinafter referred to as the "Project" or the "Mini-hydro Project") located in the Municipality of Asipulo, Ifugao Province;

WHEREAS, the Likud Mini-hydro Project shall consist of the construction and installation of a mini-hydropower demonstration plant together with its transmission facilities that can provide an alternative source of electricity and partially address the energy requirements of Ifugao province under a cooperation period due to end



upon the completion of the implementation process. (Annex 1 – Overall Project Schedule);

WHEREAS, DOE shall establish institutional arrangements and coordination with local government units and other government and private agencies/entities that would be involved in the Project, including the provision of technical assistance;

WHEREAS, in accordance with the coordination and negotiation of the DOE with prospective agencies that may be involved in the Project implementation, the PGI have been identified by the DOE to cooperate and collaborate in the Project and PGI have agreed to be the recipient of the ownership of the mini-hydro demonstration plant including its transmission facilities;

WHEREAS, PGI through its Sanggunian Panlalawigan passed and approved several Resolutions/Executive Orders in support of the Likud Mini-hydro Project development initiative by the DOE and JICA;

WHEREAS, PGI is committed and supports the promotion of sustainable energy projects to provide socio-economic and environmental benefits to the people of Ifugao Province;

WHEREAS, the revenue that can be collected from the operations of the Likud Mini-hydro Project shall be deposited in a trust account to be managed by the PGI and to be used for the following; a) operation and maintenance of the Likud Mini-hydropower Plant, b) rehabilitation of the rice terraces, and c) research and development of hydropower resources in Ifugao Province.

NOW, THEREFORE, in view of the foregoing premises, the DOE and PGI hereby stipulate and agree as follows:

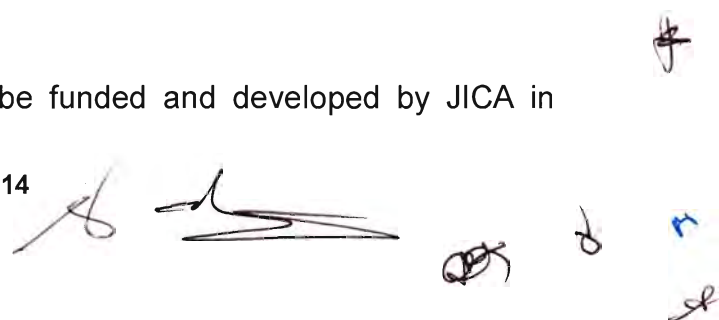
- To mobilize resources appropriate to each of the **Parties** and bear each **Party's** own costs incurred in the performance of this Agreement;
- To ensure the success of the Project implementation phase, including construction, operation and maintenance, fund disbursements and monitoring;
- To provide positive socio-economic and environmental benefits to the people of Ifugao Province in general; and
- To maximize the impacts of the Likud Mini-hydro Project in terms of efficient energy generation.

The Parties hereby agree on, respect, and submit to the following Terms of Reference:

## TERMS OF REFERENCE:

### 1. Purposes of the Project

The Mini-hydro Project that is expected to be funded and developed by JICA in



cooperation with DOE and PGI aims to contribute to diversifying energy and reduction of gas emissions by utilizing domestic renewable energy by developing untapped hydropower potentials in the Province. The Project also aims to maintain and improve the quality of life of the local people engaged in rice terraces farming.

The JICA plans to develop the Likud Mini-hydro Project in Asipulo, Ifugao to secure funds that will be used for conservation activities supporting the Ifugao Rice Terraces protection and preservation program.

## 2. Scope of the Project

The JICA, with the support of DOE and PGI, will provide financial and technical assistance in the construction of a grid connected mini-hydro power generation facility in Municipality of Asipulo, Ifugao, and help set up an operation scheme for a sustainable energy development. The PGI under the supervision of the DOE will take full responsibility for the operation and maintenance of the facilities when they are transferred by DOE.

## 3. Project Organization

To ensure the smooth flow of activities and performance of the Project, DOE and PGI shall be responsible for organizing their own systems of execution, including the cooperative support to be accorded by any other concerned organizations.

## 4. Conditions for Cooperation

The specific activities under this Agreement is mutually agreed upon by the **Parties**, documented and defined as follows:

### 4.1 Duties and Responsibilities of the DOE

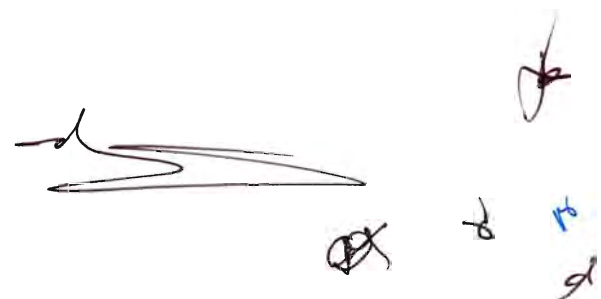
- a. Support the development of the Likud Mini-hydro Project in partnership with JICA and the PGI;
- b. Supervise and assist the PGI in the preparation of documents and acquisition/negotiation for permits and licenses for the implementation of the Likud Mini-hydro Project;
- c. Review the detailed feasibility study, engineering design plans and drawings, etc. in coordination with JICA and PGI;
- d. Facilitate the issuance of necessary endorsement for duties and tax exemption of imported or locally fabricated equipment and shoulder Value-Added Tax of locally procured materials for the implementation of the Likud Mini-hydro Project;
- e. Any assistance within the capability of the DOE to provide that which is necessary to implement the Likud Mini-hydro Project, including securing public consent among the residents and local communities of the site;
- f. Receive all the assets and facilities of the Likud Mini-hydro Project at the end

of construction period and transfer to the PGI or its assigns at the end of the cooperation period;

- g. Issue a Certificate of Acceptance upon completion of the construction period and continuously monitor, supervise, and extend assistance in the operation and maintenance and in the utilization of the generated power after the turnover of the Project;
- h. Act as counterpart agency to JICA and as a coordinating body in relation with other governmental and non-governmental organizations concerned with the smooth implementation of the Project; and
- i. Provide counterpart personnel and necessary funds in the fulfillment of its responsibilities and undertakings.

#### **4.2 Duties and Responsibilities of the PGI**

- a. Provide assistance to the DOE and JICA in the preparation and formulation of the Likud Mini-hydro Project, particularly in the coordination with other governmental agencies, communities and private agencies to ensure the smooth implementation and success of the Project;
- b. Provide counterpart personnel and funds to cover the expenses for the application of hydropower service contract with DOE, permits, licenses and certifications for the Likud Mini-hydro Project;
- c. Prepare documentation and secure/negotiate necessary and appropriate permits and licenses for the construction and installation of the Likud Mini-hydro Project facilities, including acquisition of lands, rights of way and other real properties;
- d. Coordinate with the DOE in the selection and training of interim personnel and workers of the Likud Mini-hydro Project;
- e. Issue a Certificate of Acceptance after the turnover of the DOE of the Likud Mini-hydro Project to the PGI;
- f. Assume ownership, supervision, operation and control of the Likud Mini-hydro Project upon turnover by the DOE;
- g. Operate and maintain the Likud Mini-hydro Project and provide appropriate salaries and wages for the Project's personnel and workers;
- h. Administer and manage collection of fees and/or tariff for the utilization of electricity from the Mini-hydro Project;
- i. Ensure the safety and security of the DOE, JICA and the Contractor at all times;



- j. Restrict the use of funds generated from the Project to conservation activities supporting the Ifugao Rice Terraces protection and preservation program and make annual reports, for the first five years of operation, to JICA and DOE on how the funds are used;
- k. Procure a suitable place for the Project and warrant that construction and operation of the Mini-hydro Project at such place which has minimum impact to the environment;
- l. Sell available power from the Likud Mini-hydro Project during and after the cooperation period to Ifugao Electric Cooperative, Inc. (IFELCO) and/or any other customer at a reasonable rate as may be covered by a mutual energy sales agreement between the PGI and IFELCO; and
- m. Open a trust account for the flow of funds to be used in the operation and maintenance of the demonstration mini-hydro Project as well as for the conservation of rice terraces and other priority Projects as maybe identified by the PGI under its priorities.

## 5. Development Costs

“Development Costs” shall include any and all costs and expenses incurred or on behalf of the Parties in connection with the Likud Mini-hydro Project or the fulfilment of their respective responsibilities under Section 4 herein that are attributable to their respective internal organizations, employees, representatives, advisors, or agents, including the cost and travel of such agents. Each **Party** shall shoulder its own development costs.

## 6. Transfer of Title and Risk Loss

Title and risk loss shall pass from the JICA to the **DOE** upon the construction of the Likud Mini-hydro Project facilities and the **DOE** agrees to assume all liability for the facility on and after the date when the JICA sends a notice of completion of construction, and for the duration of the lifetime of the facility, or until its transfer to the ultimate owner, **PGI**;

## 7. Quality Assurance and Satisfaction

Duties and responsibilities to be undertaken by any **Party** shall be executed and completed in a reasonable manner that is acceptable and satisfactory to all Parties.

## 8. Force Majeure

Neither **Party** shall be liable for any delay or failure in the performance of its obligations under this Agreement if and to the extent such delay or failure in performance arises from any cause or causes beyond the reasonable control of the **Party** affected hereinafter referred to as “Force Majeure”, shall include, but not limited to, the following:

- a) acts of God, including storm, earthquake, drought, flood or any other such

operation of the forces of nature that the **Party** affected could not reasonably foresee or provide against; and

- b) war (declared or undeclared), hostilities, invasion, act of any foreign enemy, threat of or preparation of war, riot, insurrection, civil commotion, rebellion, revolution, usurped power, civil war, and labor troubles or other industrial troubles, strikes, embargoes, blockades, and sabotage of labor.

## 9. Liability

Neither **Party** shall be held liable for any loss or damages sustained by the other **Party** as a result of act or omission by Third Parties, arising out of or in connection with the implementation of this Agreement. A **Party** to this Agreement shall not make any claims against the other Parties for any liabilities it has incurred as a result of any damages sustained by Third Parties from any causes whatsoever.

No **Party** shall be liable to the other **Parties** for any indirect, consequential, punitive or any other damages other than the actual, direct and foreseeable costs, losses and damages incurred by such **Party** as a result of a breach of this Agreement.

## 10. Confidentiality

10.1 Any data, document, plan, design or drawing, or information received by the other **Party** in connection with the Project shall not be disclosed to a Third Party or used other than for the purpose of this Project, without prior written consent of the disclosing **Party**.

Any data, document, plan, design or drawing, or information collected, developed or formulated during the course of implementing the Project, which may be mutually determined by the **Parties** as classified shall not be disclosed to a third party, unless with the other **Party's** prior written consent.

Notwithstanding the stipulation written above, a receiving **Party** may disclose the information to consultants or advisors who need to know such information for the purpose of implementation of this Agreement and who are legally bound to maintain confidentiality of the information.

The confidentiality obligations set forth in this Agreement shall terminate five (5) years or on the earlier date by mutual written agreement hereto.

10.2 The foregoing restriction shall not apply to:

- a) Information which at time of disclosure is generally available to the public;
- b) Information which after disclosure becomes generally available to the public through no fault of the receiving **Party**;
- c) Information which the receiving **Party** can show was in its possession prior to the disclosure and which was not acquired directly or indirectly from the other **Party**;

- d) Information which the receiving **Party** can show was received by it after the time of disclosure from the third party without any obligation of confidentiality and which was not acquired directly or indirectly from the other **Party**; and
- e) Information which is required to be disclosed pursuant to any applicable law, regulation, judicial or administrative order or decree, or request by the other regulatory organization having authority pursuant to the law.

Notwithstanding the foregoing, the **Parties** hereto shall not request from each other any fee, cost or consideration with regard to the disclosure of information.

### 11. Publication of Results

For the public interest and the mutual benefits of the **Parties**, without prejudice to the Section 10, the **Parties** agree to promote and give full credits to each **Party's** contributions for the Project and all outcomes resulting from the activities under this Agreement in any type of communication, written and oral, such as company report, conferences, papers or news media.

### 12. Intellectual Property Rights

It is understood and agreed that:

- 12.1 Notwithstanding the foregoing, any intellectual property rights, including copyright, trademark, patent or industrial design rights, resulting solely from joint activities under this Agreement shall be jointly owned by the **Parties** and each of the **Parties** shall be allowed to use such property for their own purposes with mutual agreement upon prior to its use; and
- 12.2 Any intellectual property rights contributed by one of the **Parties** shall remain the property of that Party.

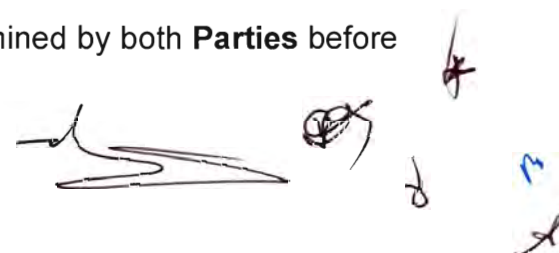
Termination of this Agreement for any reason shall not affect the rights and obligations of any parties under this Article.

### 13. Applicable Law

This Agreement shall be governed by and construed in accordance with the laws of the Republic of the Philippines.

### 14. Consultation and Settlement of Disputes

- 14.1 The **Parties** shall endeavour to resolve any difficulties or misunderstandings resulting from, or relating to the Project in the spirit of cooperation and mutual trust.
- 14.2 Any questions arising in connection with the interpretation or implementation of the provisions hereof or anything unspecified herein shall be promptly resolved or specified through discussion.
- 14.3 Detailed schedules and procedures shall be determined by both **Parties** before





the commencement of the Project.

If no such mutual and amicable agreement is attainable, the matter shall be subject to exclusive jurisdiction of the Court of Justice of the Philippines.

### 15. Withdrawal and Modification

Any **Party** can withdraw from this Agreement without any liabilities and costs by providing written notice to the other **Parties** at least sixty (60) days without prejudice. For the purpose of clarification, any **Party** who withdraws from this Agreement pursuant to this Article shall be liable for any costs and liabilities incurred by the Project before such withdrawal and shall not be liable after such withdrawal. The **Parties** agree that the terms of this Agreement may be modified upon mutual agreement. Each such modification shall be contained in an addendum, which shall form an integral part of this Agreement. Any variation or modification shall only be valid if produced in writing and signed by the **Party** hereto.

### 16. Working Language

The working language of the Project is English. If translation into English of any language is necessary (verbal or written), each party will bear its own costs. In event of a difference in meaning, English shall prevail.

### 17. Terms of Cooperation:

This Agreement shall become effective on the date and signing by the **Parties** and shall be effective through and to the end of the Likud Mini-hydro Project, which is planned for January 31<sup>st</sup>, 2015, or an earlier date by mutual written agreement hereto (Attached appendix: Schedule of Activities).

However, Section 9, 10, 12, 13 and 14 shall survive expiration or termination of this Agreement.

In case any **Party** breaches or defaults the performance of any provisions of this Agreement, and such breach or default is not cured within sixty (60) days after the breaching **Party** receives notification by the non-breaching **Party**, the non-breaching **Party** shall have the right to terminate this Agreement.

### 18. Miscellaneous

18.1 No **Party** may assign or otherwise transfer any of its rights or obligations under this Agreement without prior written consent of the other **Parties**.

18.2 Nothing hereto contained in this Agreement shall be construed to create between the Parties partnership, joint venture, agency relationship or other business entity.

18.3 The Parties hereby agree that, to the extent that it or any of its property may have or hereafter acquire (or may be attributed, whether or not claimed) any right of immunity (including, but not limited to sovereign immunity) from suit, court jurisdiction, execution, attachment prior to judgment, attachment in aid of



execution of a judgment, set-off or other legal process. It hereby irrevocably waives and agrees not to claim, to the fullest extent permitted by law, such right of immunity (other than immunity from bankruptcy and insolvency laws to which it is otherwise entitled) with respect to (a) its obligations under this Agreement, (b) any legal proceedings to enforce such obligations, and (c) any legal proceedings to enforce any judgment rendered in any proceedings to enforce such obligations.

18.4 This Agreement constitutes the entire agreement among the **Parties** and supersedes any prior written or oral agreement among the **Parties** concerning the subject matter. No modifications of this Agreement shall be binding unless executed in writing by all **Parties**.

18.5 In the event that a section of the present document was declared illegal or invalid, the other sections of the present document will be considered valid and will be in force.

#### 19. Final Provisions:

Notwithstanding to the contrary herein, any provisions of this Agreement shall not be construed as a guarantee for certain level of power production, timing of the completion of the Project or any other level of performances or services for the DOE and PGI.

#### 20. Notice

All notices or communication required or permitted to be given under this Agreement shall be written in English and shall be given to the address and persons shown below. Each **Party** may change the designated person at anytime by giving written notice to the other **Party**.

#### To the DOE:

**Hon. CARLOS JERICHO L. PETILLA**  
Secretary  
Department of Energy  
Energy Center, Rizal Drive, Bonifacio Global City  
Taguig City, Metro Manila, Philippines

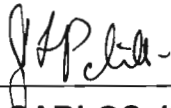
#### To the PGI:

**Hon. EUGENE M. BALITANG**  
Governor  
Provincial Capitol, Poblacion South, Lagawe,  
Ifugao, Philippines

IN WITNESS WHEREOF, the **Parties** set their hands this FEB 11 2013 day of \_\_\_\_\_  
2013 at \_\_\_\_\_, Philippines.

**DEPARTMENT OF ENERGY**

By:



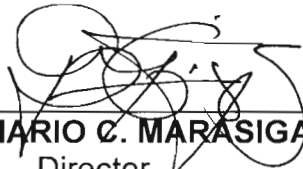
**HON. CARLOS JERICO L. PETILLA**  
Secretary



IN REPLYING PLS CITE:  
SOE-JLP-13000790



Witnessed by:



**MR. MARIO C. MARASIGAN**  
Director  
Renewable Energy Management Bureau

**PROVINCIAL GOVERNMENT  
OF IFUGAO**

By:



**HON. EUGENE M. BALITANG**  
Governor



**ATTY. VLADOBOYD T. NGIPOL**  
Legal Officer

*Handwritten marks and initials in the bottom right corner.*

**ACKNOWLEDGMENT**

REPUBLIC OF THE PHILIPPINES }  
MANILA CITY, METRO MANILA } S. S.

I, ATY. ISIDRO V. ALMENTEROS a Notary Public duly authorized in the city named above to take acknowledgments, certify that on this \_\_\_\_\_, personally appeared:

Name	Competent Evidence of Identity	Date and Place of Issuance
HON. CARLOS JERICO L. PETILLA	Passport No. EB4810205	27 February 2012 Tacloban City

known to be the same person described in the foregoing instrument, who acknowledged before me that his signature on the instrument was voluntarily affixed by him for the purposes stated therein, and who declared to me that he executed the instrument as his free and voluntary act and deed as well as the free and voluntary act and deed of the government agency herein represented.

This instrument which consists of fourteen (14) pages including this page on which the acknowledgment is written, is signed on each and every page thereof by the Party and his instrumental witness and sealed with my notarial seal, refers to a Memorandum of Agreement between DOE and the Provincial Government of Ifugao for the Likud Mini-hydro Project in Asipulo, Ifugao.

WITNESS MY HAND AND SEAL on FEB 11 2013 at MANILA.

NOTARY PUBLIC

**ATTY. ISIDRO V. ALMENTEROS**  
 Notary Public  
 Until December 31, 2014  
 IBP No. 878369/MLA/Oct.19, 2012  
 (Covers Calendar Years 2013 and 2014)  
 PTR (2013) No. 1413061/MLA/12-28-2012  
 MCLE Compliance No. III-0016394  
 Attorney's Roll No. 34272

Doc. No. 155 :  
 Page No. 12 :  
 Book No. 60 :  
 Series of 2013.

**ACKNOWLEDGMENT**

REPUBLIC OF THE PHILIPPINES }  
MANILA CITY, METRO MANILA } S. S.


I, ATY. ISIDRO V. ALMENTEROS, a Notary Public duly authorized in the city named above to take acknowledgments, certify that on this \_\_\_\_\_, personally appeared:

Name	Competent Evidence of Identity	Date and Place of Issuance
HON. EUGENE M. BALITANG	Passport No. EB4731594	17 February 2012 DFA Manila

known to be the same person described in the foregoing instrument, who acknowledged before me that his signature on the instrument was voluntarily affixed by him for the purposes stated therein, and who declared to me that he executed the instrument as his free and voluntary act and deed as well as the free and voluntary act and deed of the government agency herein represented.

This instrument which consists of fourteen (14) pages including this page on which the acknowledgment is written, is signed on each and every page thereof by the Party and his instrumental witness and sealed with my notarial seal, refers to a Memorandum of Agreement between DOE and the Provincial Government of Ifugao for the Likud Mini-hydro Project in Asipulo, Ifugao.

WITNESS MY HAND AND SEAL on FEB 11 2013 at MANILA.

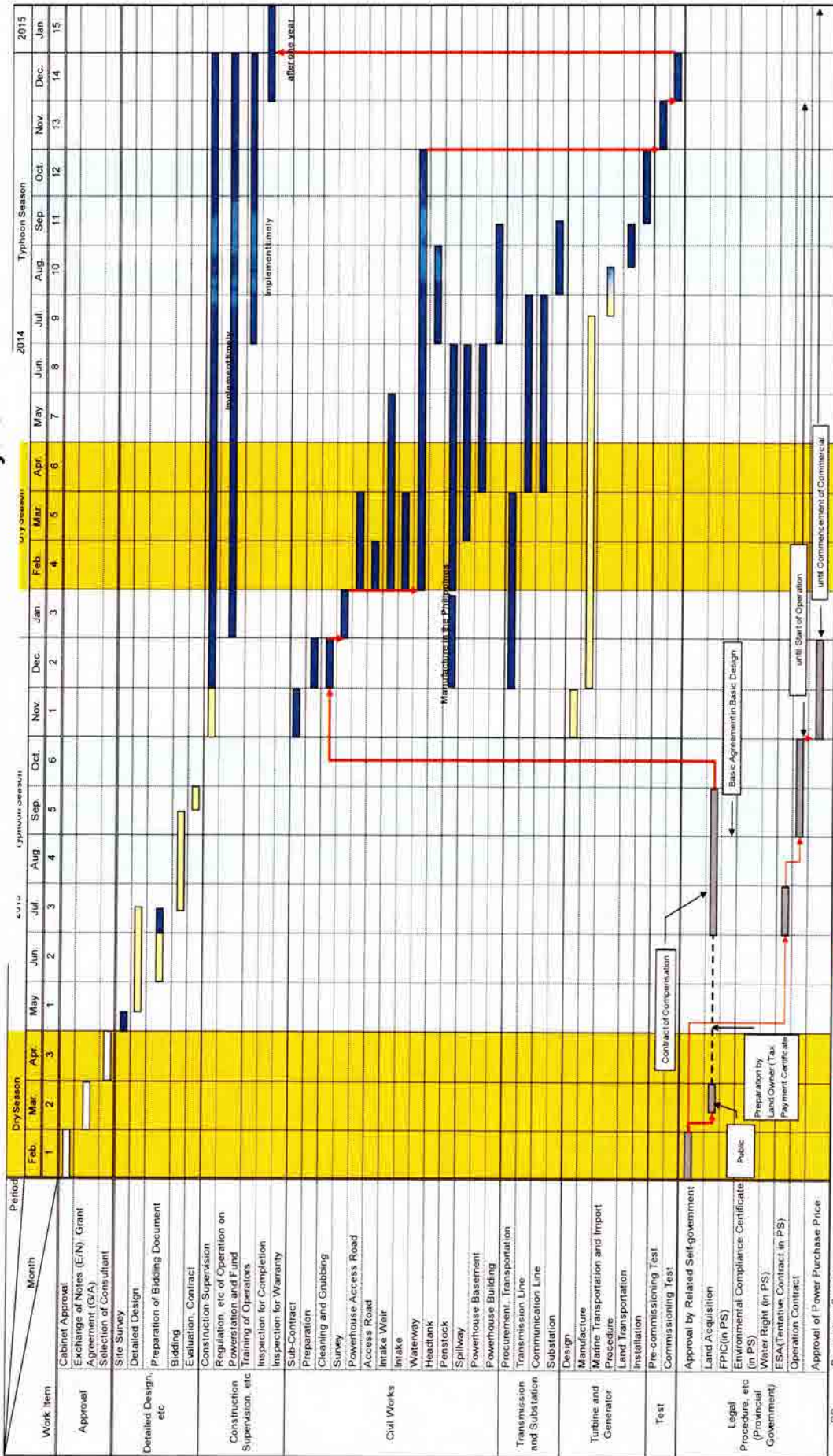
  
**ATTY. ISIDRO V. ALMENTEROS**  
 Notary Public  
 Until December 31, 2014  
 IBP No. 876369/MLA/Oct. 19, 2012  
 (Covers Calendar Years 2013 and 2014)  
 PTR (2013) No. 1418061/MLA/12-23-2012  
 MCLE Compliance No. III-0016394  
 Attorney's Roli No. 34272

NOTARY PUBLIC

Doc. No. 155 :  
 Page No. 23 :  
 Book No. 60 :  
 Series of 2013



# Annex – 1 Overall Schedule of Likud Mini-hydro



\* Iligao Provincial Government has started the legal procedure for Water Right and Environmental Compliance Certificate. Thus it can deal on only a modification if an alteration occurs in this survey.

- PS : Preparatory Survey
- Work in Japan
- Filed Work
- Legal Procedure

*(Handwritten signatures and marks)*

## Annex – 1

Likud Mini-hydro Project Table of Work Activities and Responsibilities								
STAGE	WORK ITEMS	Financial Responsibilities			Activity Responsibilities			REMARKS
		JICA	DOE	PGI	JICA	DOE	PGI	
Before Implementation	1 Organize Management Body							◎ : Execution ○ : Review △ : Assist
	a. Establishment of the O&M Organization / Institution			◎		△	◎	
	b. Establishment of rice terrace fund management Organization / Institution			◎		△	◎	
	Acquisition of Rights and Permits							
	a. Environmental Compliance Certificate (ECC) from DENR			◎		△	◎	
	b. Water Rights Permit from NWRB			◎		△	◎	
	2 c. Right of Way	◎		◎		△	◎	
	d. Free Prior Inform Consent (FPIC)			◎		△	◎	
	e. PPA (tariff rate) approval from ERC			◎		△	◎	
	f. Necessary Permits and Operating Contracts			◎		△	◎	
Implementation	1 Review the FS, Engineering Design Plan and Drawings	-	-	-	◎	○		
	2 Construction	◎			◎	△	△	
	3 Ocean / Inland Transportation	◎			◎			
	4 Exemption from Taxes, Duties	-	-	-		◎		
	5 Compensation during construction	◎				△	◎	
	6 Preparation of O&M Guide and Manual	◎			◎	△		
	7 Select training of personnel and workers of the mini-hydro Project	-	-	-		△	◎	
	8 Operator Training on O&M	◎			◎	△		
	9 Procure a suitable place for the Project and warrant that construction and Operation of the mini-hydro Project.	-	-	-			◎	
O&M	1 Operation and Maintenance of MHP			◎		△	◎	
	2 Power sale			◎		△	◎	
	3 Fund Management			◎		△	◎	
Monitoring	1 Inspect, Test, analyze and commission the Project facilities	◎			◎	△	△	
	2 Monitor the progress of the mini-hydro Project during the cooperation period	◎			◎	△	△	
	3 Supervision and assistance in O&M of the mini-hydro plant, including administration and management.		◎			◎		
	4 Restrict the use of funds generated from the Project for rice terraces conservation activities	-	-	-		△	◎	
	5 Continuously monitor, supervise, and extend assistance in the operation and maintenance of the power plant even after cooperation period		◎			◎		
	6 Documentation and Reporting		◎	◎		◎	◎	
Handover	1 Transfer the all assets (1st step)	-	-	-	◎	◎		
	2 Transfer the all assets (2nd step)	-	-	-		◎	◎	
	3 Issue a Certificate of Acceptance	-	-	-		◎	◎	
Others	1 Assume ownership, supervise, operation and control of the mini-hydro Project			◎			◎	
	2 Securing the safety and security of the DOE, e8 and the Contractor			◎			◎	




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## 資料5 ソフトコンポーネント計画書



## ソフトコンポーネント計画書 (フィリピン国イフガオ小水力発電計画準備調査)

### 1. ソフトコンポーネントを計画する背景

2008年10月、フィリピン政府は東南アジア地域における最初の包括的再生可能エネルギー関連法規となる再生可能エネルギー法（Renewable Energy Act of 2008, RA.9315：以下「RE法」）を制定した。同法は「エネルギー自給率の向上」、「再生可能エネルギー開発を通じた中央及び地方政府の能力強化」、「経済成長と環境保護の両立」を目的とする。同法施行以降、水力開発が活発になっているものの、フィリピン国では小水力開発に関する適正技術が定着していないために、独立発電事業者(IPP：水力開発に経験のない急造会社、中国等の外国資本含む)による水力開発が、全体計画無しに無秩序に行われており、地域社会や生態系への環境影響緩和、河川単位の治水、灌漑用水確保などに十分配慮した適切な開発が求められている。

イフガオ州は山岳急斜面に展開する棚田群で有名であり、1995年にはUNESCOにより世界遺産に登録された。しかしながら、近年のグローバリゼーションの浸透を背景に荒廃が進み、2001年には世界遺産危機リスト<sup>1</sup>に加えられた。

現在、イフガオの棚田保全に関する責任は、国から州政府に移管されているものの、財政的支援は殆どなく、州政府は棚田保全に必要な資金を独自に確保しなければならない。棚田保全は単に物理的な維持補修だけが必要とされるのではなく、耕作する住民の安定的な生活が担保されて初めて達成出来るものである。イフガオ州の至近の試算によれば保全のための必要資金は年間60～100百万円となっている。これは州の年間開発予算(2009年時点で約155百万円/年)の40%～65%程度に相当し、実施上、開発予算の中から棚田保全のための費用を継続的に拠出することは困難である。

また、イフガオ州の主要産業は稲作を中心とする農業であるが、耕作条件が厳しく生産量が少ないために、殆どが自家消費され、州財政の改善には繋がらない。このように、現状において棚田保全のための資金確保は外部からの支援に頼らざるを得ない状況にある。

イフガオ棚田保全に関する国際支援として2010年1月、GSEP<sup>2</sup>（旧称 e8：以降本書中 e8で統一）は、アンバンガル（Ambangal）小水力発電所（200kW）を開発し、その売電収益に基づく棚田保全基金（Rice Terraces Conservation Fund、以下「RTCF」）を創出したが、同プロジェクトにより創出される基金は必要保全資金の10%程度を充当するに過ぎない。

かかる状況の下、2012年にフィリピン国政府より、地方電化の促進及び棚田保全のための財源確保を目的とした小水力発電設備の建設に関する我が国の無償資金協力支援への要請があった。

<sup>1</sup> 2012年6月の「第36回世界遺産委員会ロシア会議」において危機リストからの除外が決定された。

<sup>2</sup> Global Sustainable Electricity Partnership（旧称 e8）: G8 カントリーの主要電力10社から構成される再生可能エネルギーの普及を目的とした国際的 NPO であり、日本からは東京電力㈱、関西電力㈱が参加している。

本事業の小水力発電所(820kW)の運転維持管理及び同発電所運転より新たに追加される資金を含めた RTCF の運営管理は、イフガオ州政府により行われることとなる。DOE や州政府はアンバンガル小推力発電所の開発に際して、e8 スタッフとともに運転員養成や RTCF 運営規定の制定等を行った経験があり、先方政府等は本プロジェクトに関する体制整備や基金運用適正化を進めようとしている。しかしながら、本プロジェクトの目的である棚田保全事業への貢献は、小水力発電所の安定的な運転、RTCF の適正利用により初めて担保されるものであり、本プロジェクトの成否を左右する重要な課題であることから、先方政府等の実施する体制整備等をより確実かつ効果的なものとするための支援が必要である。

上記を背景として、要請元の DOE、実施主体となる州政府も運転・維持管理方法の指導、RTCF 改訂に関する指導等のソフトコンポーネントの実施を期待している。

## 2. ソフトコンポーネントの目標

本事業に係わるソフトコンポーネントは、RTCFの適正利用による棚田保全活動を推進するため、本事業により建設されるリクッド小水力発電所の安定的運転維持管理のための組織・人材育成及びRTCF運営の適正化を目標として実施するものである。

## 3. ソフトコンポーネントの成果

本ソフトコンポーネントの導入により、次のような成果が期待される。

- ① 発電所運転維持管理体制の確立
- ② 棚田保全基金運営の適正化

## 4. 成果達成度の確認方法

### (1) 発電所運転維持管理体制の確立に関する成果確認方法

発電所の維持管理体制の確立に関する成果は、本活動で作成される「運転管理マニュアル」、後述するステージ毎に実施する確認試験、最終選考試験結果（実際の運転維持管理作業に関する現地試験含む）により確認する。

### (2) 棚田保全基金運営の適正化に関する成果確認方法

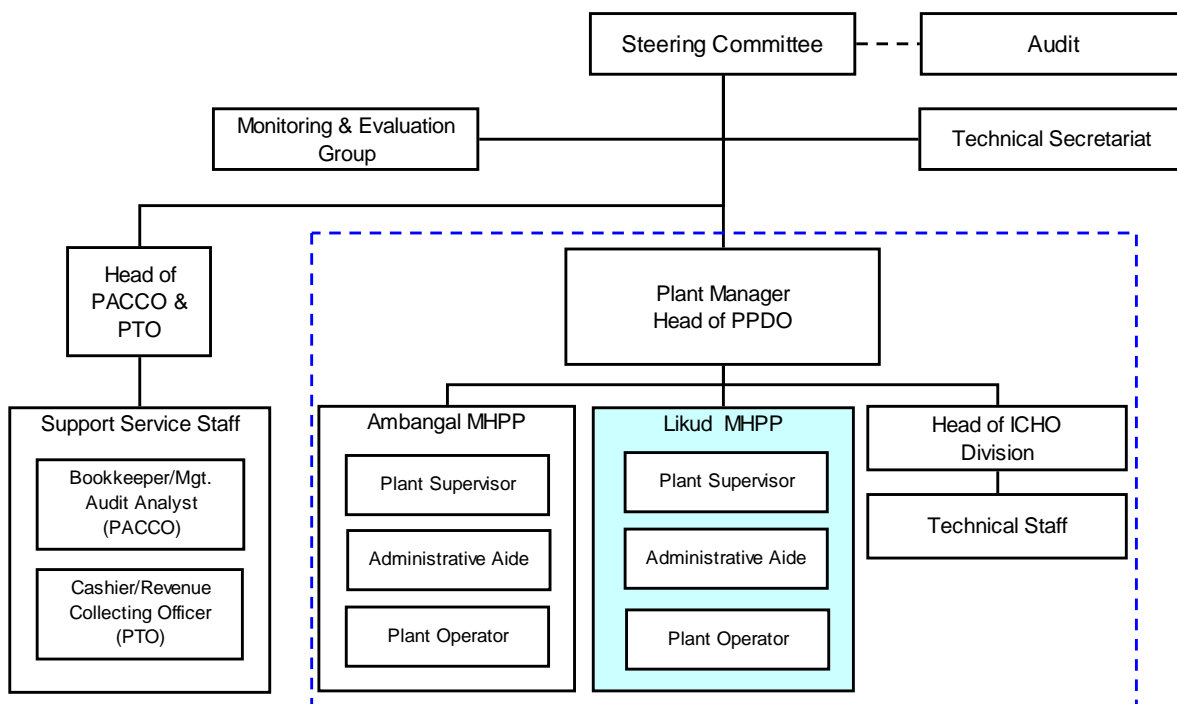
棚田保全基金運営の適正化に関する成果は、本活動の中で作成する改訂ガイドラインに関するステアリングコミッティ（州知事、州議会代表者、ホスト郡メイヤー、ホスト村長、NGO より構成される。図-1 参照）及び DOE の承認及び州議会承認をもって確認する。

## 5. ソフトコンポーネントの活動内容及び投入計画

### (1) プロジェクト管理体制

現在、既設アンバンガル発電所の運転維持管理及び RTCF 運営管理は図-1 に示す体制で実施されている。本事業によるリクッド小水力発電所の運転維持管理は、この体制の中に

組み入れられることとなる。なお、RTCF 管理体制については現行体制を基本とするが、本ソフトコンポーネント活動を通じて改善の必要性が認められた場合には、適宜、改訂するものとする。



PACCO : 州会計事務所  
 PTO : 州出納事務所  
 PPDO : 州計画開発事務所  
 ICHO : イフガオ文化遺産事務所

図-1 プロジェクト管理体制

(2) 発電所運転維持管理体制の確立

e8 によるアンバンガル小水力発電開発においては、発電所運転維持管理に関するトレーニングが実施され、このトレーニングを通じて選定された運転維持管理要員は、運転開始から約3年間、特に不具合無く安定的な運転維持管理を行ってきている。

本ソフトコンポーネント計画は、e8 によるトレーニングを参考として策定したものである。

1) 発電所運営管理体制

発電所の運転維持管理体制については、本事業に係わる準備調査の中で、DOE、州政府との協議を通じて図-2 のとおりとすることが確認されている。各要員の役割は表-1 に示す通りである。

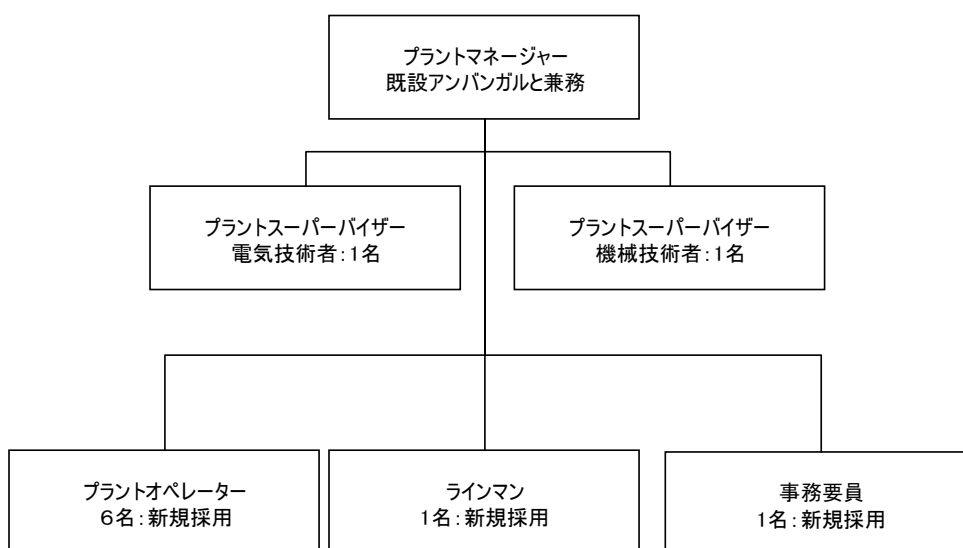


図-2 リクッド小水力発電所運転維持管理体制

表-1 水力発電所運営維持管理要員

職位	所属部署	役割
プラントマネージャー(1人)	州計画開発事務所長(PPDO)	発電所及び棚田保全基金の総合運営管理責任者(アンバンガル水力発電所と兼務)
プラントスーパーバイザー(2人:電気・機械)	州計画開発事務所職員(PPDO)	水力発電所の運営維持管理責任者 電気技術者及び機械技術者
プラントオペレーター(6人)	州計画開発事務所職員(PPDO)	水力発電所の運営維持管理。 2人組で8時間交代制シフト。 導水路・水槽・取水口設備のハトール、水車・発電機の定期点検。 発電量の記録
ラインマン(1名)	州計画開発事務所職員(PPDO)	連系線の巡回点検・保守
事務要員(1人)	州計画開発事務所職員(PPDO)	水力発電所に関わる収支管理。 イフェルコ配電会社へ売電請求。 棚田保全基金配分管理

上記、網掛部の要員が本ソフトコンポーネント活動の対象

## 2) トレーニング対象者

トレーニングは「運転員トレーニング」と「プラントスーパーバイザー教育」に大別して実施する。このうち運転員は基本的にプロジェクトサイト周辺の地域住民から希望者を募る。プラントスーパーバイザーは州政府から指名された者を選定し、トレーニング対象とする。

最終的に運転員は6名、ラインマン1名、プラントスーパーバイザー2名を選定するが、トレーニングはその3倍程度の人員（運転員及びラインマン18名、スーパーバイザー6名）を対象に実施する。運転員トレーニングの参加者は基本的に工業高校（電気・機械・土木）卒業者、プラントスーパーバイザーは電気・機械の技術者資格を有する者（あるいは準ずる者）とする。プラントスーパーバイザー候補者は運転員トレーニングのすべての過程に参加することを前提とする。

トレーナーは本邦技術者、DOE 職員の他、既設アンバンガル発電所の選手員他を活用する。

## 3) トレーニング実施時期及び実施概要

水力発電所の運転維持管理とは、単に水車発電機を操作するだけでなく、河川水量、気象状況、電力需要等を考慮して、土木設備＋機械設備＋電気設備＋制御設備＋配電設備の総合的な水力発電設備全体の運転維持管理を指している。本トレーニングでは一部メーカーの行う初期操作指導（水車・発電機・制御装置の機器の取り扱い方の指導）と連携して実施するものの、最終的には運転員等が、上記の総合的な運転維持管理を行えるよう指導するものであり、本計画では下記の内容で実施する。

トレーニング期間は基本的に現地工事開始から竣工検査前までの間を下記の4ステージに分けて実施する。なお、各ステージ終了時時点で習得内容を把握するための試験を実施し、最終選考に反映する。

### ① 第一ステージ: 工事開始直後(水力発電に関する基礎知識レクチャー)

工事開始直後にトレーニング対象者を選定する。

第一ステージは、対象者に水力発電に関する基礎知識醸成を図ることを目的として実施する。具体的な講義内容は下記の通りとする。()内はトレーナー

- a. フィリピン国における水力開発の現状と課題 (DOE 職員)
- b. 水力発電の仕組み (本邦技術者)
- c. 水力発電施設の機能と役割 (本邦技術者)
- d. 水力発電所の運転維持管理 (本邦技術者及びアンバンガル運転員 & スーパーバイザー)

### ② 第二ステージ: 導水路コンクリート工事期間中(建設工事における OJT)

実際のリクッド水力発電所の建設工事に作業員として参加することにより、発電所建屋及び主要構造物並びにゲート等の主要補機等を確認・周知させて、運転開始後の修繕方法

等についての理解・習得を容易ならしめる。

③ 第三ステージ:第二ステージ後(既設アンバungal発電所における実地訓練)

既設アンバungal発電所の運転員をトレーナーとして、各員(プラントスーパーバイザー含む)に実際の運転維持管理作業の補助員として従事させる。

④ 第四ステージ:リクッド小水力発電所有水試験期間(基本運転操作の実地訓練)

リクッド発電所の機器据え付け後の有水試験期間中に運転操作の実地訓練を行う。

本ステージにおいては、水車・発電機・制御器の操作はメーカー技術者の行う初期操作指導として実施するが、河川水量、電力需要等を考慮した発電量の決定、土木設備と電気機械設備、送配電設備の総合的な操作方法等についてコンサルタント技術者が指導する。

なお、第四ステージ開始前に本邦技術者が運転管理マニュアルを作成し、同マニュアルに従った訓練を行う。

4) 最終選考方法

最終選考は①トレーニングへの参加状況、②トレーニング期間中の学習態度、③最終選考試験(筆記・面接)結果を総合的に判断する

5) 投入計画(詳細は表-4参照)

表-2 発電所運転維持管理体制の確立に関する投入計画

ステージ	日本側投入要員(MM)			DOE職員(MM)*3
	現地	国内	計	
第一ステージ	0.5x1名(水力土木)	0.5x1名(土木)*1	1.0	0.4x1名(土木)
第二ステージ	0.5x1名(水力土木)	0.5x1名(電気/機械)	1.0	0.4x1名(土木)
第三ステージ	0.5x1名(電気/機械)		0.5	0.4x1名(電気)
第四ステージ	0.5x1名(土木)	0.5x1名(土木)*2	2.5	0.4x1名(土木)
	1.0x1名(電気/機械)	0.5x1名(電気)		0.83x1名(電気)
計	3.0	2.0	5.0	4.03

国内作業内容

\*1: 講義資料の作成

\*2: 運転管理マニュアル作成

\*3: DOEは本プロジェクトの要請元であり、本投入に関する費用は発生しない。

(3) 棚田保全基金運営の適正化

1) 現行ガイドラインの改定のためのワーキンググループ設置

棚田保全基金については、e8により運営のガイドラインが整備されている。同ガイドラ

イン策定に当たっては、州知事・州議会代表を除くステアリング・コミッティメンバー（事務局 PPDO）から構成されるワーキンググループが組織された。

本活動においても同様にワーキンググループを組織し、このグループを中心としてガイドラインの改訂作業を行う。

## 2) ガイドライン改訂のための活動

ガイドライン改訂は、下記の段階で実施する。

### ① 現行ガイドラインの課題把握

現行のガイドラインに関する問題点について、ワーキンググループの中で明らかにし、対応策を検討する。なお、州政府は 2010 年 7 月に棚田保全活動強化のための青年協力隊派遣を日本政府に要請している。JICA は同派遣を準備中であり、派遣が実施された場合には可能な限り連携する。

### ② ガイドラインの改定作業

上記の問題点及び対応策を考慮した現行ガイドラインの改訂作業をワーキンググループ内で行う。

### ③ 改訂ガイドラインの承認

改訂ガイドラインはステアリング・コミッティの正式承認を受けると共に、現行州条例の改定に向けたロードマップを策定する。

改訂ガイドラインに沿った IEC(Information Education Campaign)を州関係機関と共同して実施する。

## 3) 投入計画（詳細は表-4参照）

表-3 棚田保全基金運営の適正化に関する投入計画

実施段階	日本側投入要員(MM)	現地要員	計
	現地作業のみ		
現行ガイドライン課題把握	0.5x1名(組織制度)	1.0	1.5
ガイドラインの改定作業	1.0x1名(組織制度)	1.0	2.0
改定ガイドライン承認	0.5x1名(組織制度)	1.0	1.5
計	2.0	3.0	5.0

## 6. ソフトコンポーネントの実施リソースの調達方法

イフガオ州においては、既設のアンバンガル小水力発電所が約 3 年間順調に稼働しており、運転員等の管理要員は発電所の運転維持管理作業にある程度精通してきている。また、

アンバンガル発電開発に伴う RTCF ガイドラインの策定作業に従事したワーキンググループ員の殆どは現在も州職員として勤務していることから、本ソフトコンポーネントの実施に関してはこれらのローカルリソースを最大限に活用することとする。

但し、本事業で建設されるリクッド小水力発電設備仕様は既設アンバンガル発電所の設備仕様と異なる部分（ex.水車発電機形式、運転制御方法、発電使用水量等）も多いこと、ガイドライン改訂に際しても、プロジェクト目標達成のための客観的判断による指導が必要であることから、本邦コンサルタントによる支援は不可欠である。なお、ガイドラインの改定や州条例化のための活動は、本邦コンサルタント要員滞在期間中だけでなく、州議会や州内担当部署（州会計事務所、州出納事務所、州計画開発事務所、イフガオ文化遺産事務所）との継続的な調整が必要である。このため、本邦コンサルタントを現地要員により、本邦コンサルタントの補間業務に当たらせることとする。なお、現地には EU 支援による農業振興のための NPO（現在は解散）職員として活動し、現地の棚田保全活動や文化に精通した人材もあり、e8 ではこれらの人材を雇用してガイドライン策定作業の支援を行っている。本ソフトコンポーネント実施においても、e8 で雇用した現地人材を雇用することを想定している。

## 7. ソフトコンポーネントの実施工程

ソフトコンポーネントの実施は建設工事の進捗にあわせ表-5 に示すとおりとする。



表-4 投入要員の活動内容

発電所運転維持管理体制の確立					棚田保全基金運営の適正化		
ステージ	日	水土木	電気/機械	DOE職員	段階	組織制度	現地要員
第1 ステージ	国内 作業	講義資料の作成: 下記3項目 (各5日) ① 水力発電の仕組み(水力発電概論) ② 水力発電土木施設の機能と役割 ③ 水力発電所の運転管理 (必要性、作業内容等)					
	第1日目	移動(東京～マニラ)			第1回 現地活動 (課題把握)	移動(東京～マニラ)	
	第2日目	DOEとの事前調整				DOEとの事前調整	
	第3日目	移動(マニラ～イフガオ)				移動(マニラ～イフガオ)	
	第4日目	トレーニーの選定及び履歴把握					
	第5日目	トレーニング計画の説明				WG開催(現状の問題点)	
	第6日目	室内講義					
	第7日目	確認試験問題等作成				WG結果整理	本邦コンサルタントと同行動 (休日除く)計8日間
	第8日目						
	第9日目	室内講義		本邦コンサルタントと同行動		既往RTCF利用プロジェクト実態調査(3 サイト)	
	第10日目	オンサイトレクチャー				WG(問題点の整理、アクションプラン作 成)	
	第11日目						
	第12日目	移得確認試験及び結果講評					
	第13日目						
	第14日目	移動(イフガオ～マニラ)				移動(イフガオ～マニラ)	以降、実態調査、アクションプランフォロー アップ、ガイドライン草稿作成(WGと共同 作業)
第15日目	移動(マニラ～東京)			移動(マニラ～東京)		22日間	
第2 ステージ	国内 作業		講義資料の作成(15日) 発・送・変各設備を組み合わせた制御 方法等、実務的な運営維持管理技術				
	第1日目	移動(東京～マニラ)			第2回 現地活動 (改訂作業)	移動(東京～マニラ)	
	第2日目	DOEとの事前調整				DOEとの事前調整	
	第3日目	移動(マニラ～イフガオ)				移動(マニラ～イフガオ)	
	第4日目					WG(ガイドライン改定作業)	
	第5日目	建設工事現場での指導 (第1グループ)					
	第6日目					WG結果整理	本邦コンサルタントと同行動 (休日除く)計18日
	第7日目	確認試験問題等作成		本邦コンサルタントと同行動			
	第8日目					WG(ガイドライン改定作業)	
	第9日目						
	第10日目	建設工事現場での指導 (第2グループ)					
	第11日目					WG結果整理	
	第12日目	結果講評					
	第13日目	確認試験					
	第14日目	移動(イフガオ～マニラ)				移動(イフガオ～マニラ)	
第15日目	移動(マニラ～東京)		移動(東京～マニラ)	移動(マニラ～東京)			
第3 ステージ	第2日目		移動(マニラ～イフガオ)		本邦コンサルタントと同行動 (休日除く)計18日		
	第3日目						
	第4日目		室内講義 ①～④:各1日			改定ガイドラインに関する関係機関との 調整	
	第5日目						
	第6日目						
	第7日目		確認試験問題等作成			調整結果の整理	
	第8日目			本邦コンサルタントと同行動			
	第9日目					WG(調整結果の反映)	
	第10日目		既設アンバングル発電所における模擬運 転			正式承認に向けた州議会との調整	
	第11日目						
	第12日目					WG(アクションプラン作成等)	
	第13日目		確認試験			移動(イフガオ～マニラ)	以降、州議会調整等フォローアップ(12日 間)
	第14日目		移動(イフガオ～マニラ)			移動(マニラ～東京)	
	第15日目		移動(マニラ～東京)				
	第4 ステージ	国内 作業	運転維持管理マニュアルの作成(15日間)				
第1日目		移動(東京～マニラ)			第3回 現地活動 (承認等)	移動(東京～マニラ)	
第2日目		DOEとの事前調整				DOEとの事前調整	
第3日目		移動(マニラ～イフガオ)				移動(マニラ～イフガオ)	
第4日目						WG(DFガイドライン確認)	
第5日目		有水試験時の実務訓練(河川水量、電力需要等を考慮した発電量の決定、土 木設備と電気機械設備、送配電設備の総合的な操作方法等)				ステアリング・コミティ開催	
第6日目							
第7日目		最終選考試験問題等準備				WG結果整理	本邦コンサルタントと同行動 (休日除く)計8日
第8日目						州議会への説明	
第9日目		運転維持管理マニュアル説講義(第1G)				コミュニティにおけるIEC	
第10日目		運転維持管理マニュアル説講義(第2G)					
第11日目		土木関係選考試験(第1グループ)	有水試験時の運転操作訓練				
第12日目		土木関係選考試験(第2グループ)					
第13日目		選考試験結果の評価					
第14日目		移動(イフガオ～マニラ)				移動(イフガオ～マニラ)	以降、州条例制定及びIECの フォローアップ 計22日
第15日目		移動(マニラ～東京)	資料整理	本邦コンサルタントと同行動		移動(マニラ～東京)	
第16日目							
第17日目							
第18日目			運転維持管理マニュアル の講義(電気/機械)				
第19日目							
第20日目							
第21日目							
第22日目			資料整理				
第23日目			Wrapup講義				
第24日目			電気機械選考試験				
第25日目			最終選考				
第26日目			最終選考				
第27日目			最終選考結果の公表				
第28日目			移動(イフガオ～マニラ)				
第29日目			資料整理				
第30日目		関係機関報告/帰国					

表-5 ソフトコンポーネント実施工程表

			2013					2014															
			10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4		
Classify rainy / dry season																							
Construction Supervision	Civil Worked	Preparation Work including Center Line	[Work in JPN]																				
		Clearing and Grubbing	[Work in JPN]																				
		Intake Weir	Diversion	[Work in the Philippines]																			
			Concrete	[Work in JPN]																			
		Intake Gate, Settling Basin	Excavation	[Work in the Philippines]																			
			Concrete	[Work in JPN]																			
		Headrace	Excavation	[Work in the Philippines]																			
			Concrete	[Work in JPN]																			
		Head-Tank	Excavation	[Work in the Philippines]																			
			Concrete	[Work in JPN]																			
		Spillway	Excavation	[Work in the Philippines]																			
			Concrete	[Work in JPN]																			
		Penstock	Excavation	[Work in the Philippines]																			
			Installation	[Work in JPN]																			
	Power house, Tail race	Access road	[Work in the Philippines]																				
		Excavation	[Work in the Philippines]																				
	Clean up	Building	[Work in JPN]																				
			[Work in JPN]																				
	Electrical & Mechanical	Turbine/Generator Design	-	[Work in JPN]																			
		Manufacture	-	[Work in JPN]																			
Import/Custom clearance		-	[Work in JPN]																				
Land Transportation		-	[Work in JPN]																				
Installation		-	[Work in JPN]																				
Commissioning Test (w/o water)		-	[Work in JPN]																				
Distribution Line	Preparation Work	-	[Work in JPN]																				
	Construction 22kV line	-	[Work in JPN]																				
	Construction 400V line	-	[Work in JPN]																				
Soft Component	Training on O&M Management	1st stage	[Work in JPN]																	0.5	0.5		
		2nd stage	[Work in JPN]																	0.5	0.5		
		3rd stage	[Work in JPN]																	0.5			
		4th stage	[Work in JPN]																	0.5	0.5		
	Strengthen the RTCF management	Identify issue/problem on the existing RTCF regulation	Institution set-up	[Work in JPN]																	0.5		
		Revise/improve the RTCF regulation	Local Consul.	[Work in JPN]																			1.0
			Institution set-up	[Work in JPN]																	1.0		
		Approval of revised/improved RTCF	Local Consul.	[Work in JPN]																			1.0
			Institution set-up	[Work in JPN]																	0.5		
		Total																			7.0		3.0

## 8. ソフトコンポーネントの成果品

### (1) 発電所運転維持管理体制の確立

- ① 組織体制表を含む規約
- ② 各ステージの習熟度試験結果
- ③ 最終選考結果
- ④ 運転維持管理マニュアル

### (2) 棚田保全基金運営の適正化

- ① RTCF 運営に関する改訂ガイドライン
- ② ステアリング・コミッティメンバー及び州議会承認書

## 9. ソフトコンポーネントの概略事業費

ソフトコンポーネントに係わる概略事業費は、下表のとおり。

表-6 ソフトコンポーネント概略事業費

項目	金額(円)	備考
直接人件費	5,390,000	
直接経費	5,428,900	
間接費	6,899,200	
合計	17,717,100	

## 10. 相手国の責務

本計画で建設された設備を継続的に適正かつ効果的な使用と維持管理を行っていくために、相手国実施機関であるDOE/州政府Mは以下の事項の責務を負う必要がある。

<ソフトコンポーネント実施中>

- A) 本ソフトコンポーネント実施に必要なDOE/州政府側の予算の確保（トレーニー日当等）
- B) 運営組織の規約作成ならびに新規雇用の適切な実施
- C) トレーニング会場の提供
- D) RTCF利用に関する広報活動

<ソフトコンポーネント実施後>

- E) 運営組織の規約遵守
- F) RTCFの継続的な透明性確保
- G) マニュアル・ガイドラインの継続的な活用と定着化
- H) 技術を習得したローカルスタッフの継続的な雇用
- D) RTCF利用のモニタリング及び広報活動の継続

## 資料6 その他資料・情報

- (1) PO No.2010-019 州条例及び棚田保全基金運用ガイドライン
- (2) モニタリング実施の合意(DOE&PGI)
- (3) 2011年度ステークホルダー及び住民協議議事録
- (4) 2012年度ステークホルダー及び住民協議議事録
- (5) イフガオ族の生活・文化への影響について
- (6) イフガオ族の文化継承者の証言

ORDINANCE PRESCRIBING THE ORGANIZATIONAL STRUCTURE AND THE POLICIES AND SYSTEMS GOVERNING THE OPERATION, MAINTENANCE AND MANAGEMENT OF THE AMBANGAL MINI-HYDRO POWER PLANT AND THE RICE TERRACES CONSERVATION FUND

EXPLANATORY NOTE

With the completion of the Ambangal Mini-Hydro Power Plant (AMHPP), through a grant from the e8 Group through the effort of the Tokyo Electric Power Company (TEPCO) and with the cooperation of the Department of Energy (DOE), a dream became a reality.

Pursuant to our aspiration of harnessing and developing the water resources of the province for beneficial use as embodied under Provincial Ordinance No. 2007-045, and to sustain that "reality" a success story, it becomes necessary to pass a legislative measure prescribing the organizational structure and the policies and systems that will govern the operation, maintenance and management of the Ambangal Mini-Hydro Power Plant and the rice terraces conservation fund.

The approval of this Ordinance will pave the way for the efficient and reliable commercial operation of the AMHPP, and for the proper and effective utilization and management of the revenue generated from its commercial operation, which is necessary in the realization of the purposes of the project.

In our sincere desire that this "demonstration project" be a success, this Ordinance is being proposed.



ROBERT K. HUMIWAT

Author





Republic of the Philippines  
**PROVINCE OF IFUGAO**  
**OFFICE OF THE SANGGUNIANG PANLALAWIGAN**

Capitol, Lagawe, Ifugao  
Tel./Fax No. (074) 382-2111



111<sup>th</sup> REGULAR SESSION  
18 January 2010

- PRESENT:** Hon. Jose T. Gullitiw, Member and Temporary Presiding Officer  
Hon. Robert K. Humiwat  
Hon. Joseph J. Odan  
Hon. Lucio D. Ayahao, Jr.  
Hon. Rodolfo T. Dulnuan  
Hon. Clemente T. Bongtiwon  
Hon. Aldrin B. Guingayan  
Hon. Martin L. Habawel, Jr.  
Hon. Allan P. Cutiyog  
Hon. Jomar A. Buyuccan
- ABSENT:** Hon. Hon. Nora D. Dinamling, Vice-Governor  
Hon. Samson T. Atluna - on leave

**PROVINCIAL ORDINANCE NO. 2010-019**

(Author: Hon. Robert K. Humiwat)

**ORDINANCE PRESCRIBING THE ORGANIZATIONAL STRUCTURE AND THE POLICIES AND SYSTEMS GOVERNING THE OPERATION, MAINTENANCE AND MANAGEMENT OF THE AMBANGAL MINI-HYDRO POWER PLANT AND THE RICE TERRACES CONSERVATION FUND**

**SECTION 1. TITLE.** - This Ordinance shall be known as the "Ambangal Mini-Hydro Power Plant and Conservation Management Ordinance."

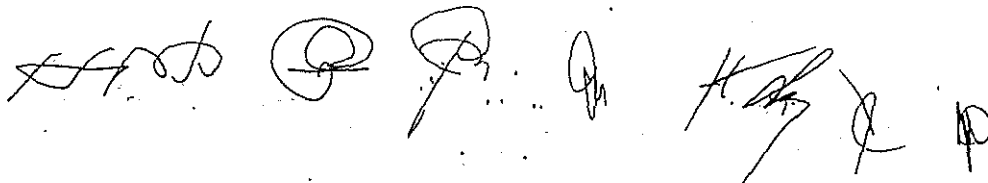
**SECTION 2. PURPOSES.** - This Ordinance is enacted for the following purposes:

- a.) To prescribe the organizational structure of the Ambangal Mini-Hydro Power Plant (AMHPP) including the functions and compensation of each office/position for the efficient and reliable operation, maintenance and management of the plant;
- b.) To prescribe the policies and systems that would govern the operation, maintenance and management of the AMHPP with due consideration to pertinent laws, rules and regulations affecting the technical, financial and administrative aspect of the plant operation, maintenance and management of the plant.
- c.) To prescribe the policies and systems governing the treatment, management and utilization of the Rice Terraces Conservation Fund with strict observance of the purpose/s of the fund and commitments of the Provincial Government of Ifugao to the e8 and other stakeholders.

**SECTION 3. DEFINITION OF TERMS.** - As used in this Ordinance, the following terms/abbreviations shall be defined as:

- a.) AMHPP - Ambangal Mini-Hydro Power Plant
- b.) AMHPPPO - Ambangal Mini-Hydro Power Plant Office
- c.) Admin. - Administration/Administrative
- d.) AWOL - Absent Without Official Leave
- e.) CDA - Cooperative Development Authority
- f.) CIS - Communal Irrigation System
- g.) COA - Commission on Audit
- h.) Com. - Committee

- i.) DOE - Department of Energy
- j.) DOLE - Department of Labor and Employment
- k.) DS - Deposit Slip
- l.) DTI - Department of Trade and Industry
- m.) e8 - e8 group of electric utility companies
- n.) EO - Executive Order
- o.) E-NGAs - Electronic-New Government Accounting System
- p.) Gov't - Government
- q.) HRMO - Human Resource Management Office
- r.) ICHO - Ifugao Cultural Heritage Office
- s.) IFELCO - Ifugao Electric Cooperative
- t.) JEV - Journal Entry Voucher
- u.) MEG - Monitoring and Evaluation Group
- v.) MOA - Memorandum of Agreement
- w.) MOU - Memorandum of Understanding
- x.) MOOE - Maintenance and Other Operating Expenses
- y.) MBO - Management by Contract
- z.) NGO - Non-Government Organization
- aa.) No. - Number
- ab.) O & M - Operation and Maintenance
- ac.) OJT - On-the-Job Training
- ad.) ORs - Official Receipts
- ae.) PACCÓ - Provincial Accounting Office
- af.) PAdmO - Provincial Administrator's Office
- ag.) PAENRO - Provincial Environment and Natural Resources Office
- ah.) PEO - Provincial Engineering Office
- ai.) PGI - Provincial Government of Ifugao
- aj.) PGO - Provincial Governor's Office
- ak.) PLO - Provincial Legal Office
- al.) POW - Program of Work
- am.) PPDO - Provincial Planning and Development Office
- an.) Prov'l - Provincial
- ao.) PTO - Provincial Treasury Office
- ap.) RAAF - Report of Accountability for Accountable Forms
- aq.) RCD - Reports of Collection and Deposit
- ar.) RCI - Reports of Checks Issued
- as.) Reha. - Rehabilitation
- at.) REMB - Renewable Energy Management Bureau
- au.) SC - Steering Committee
- av.) SEC - Securities and Exchange Commission
- aw.) SITMO - Save the Ifugao Terraces Movement
- ax.) SP - Sangguniang Panlalawigan
- ay.) Tech - Technician/Technology
- az.) TSG - Technical Secretariat Group
- aaa.) WFP - Work and Financial Plan



**SECTION 4. AMHPP ORGANIZATIONAL STRUCTURE.** - The AMHPP organizational structure, as shown in Annex "A" and made as an integral part of this ordinance, shall be composed of the Steering Committee, Plant Manager, Plant Supervisor, five (5) Plant Operators, Provincial Accounting Office, Provincial Budget Office and Provincial Treasury Office.

a.) The Steering Committee shall be headed by the Provincial Governor as Chairman, with the Chairman of the Sangguniang Panlalawigan Committee on Public Works and Utilities, the Municipal Mayor of Kiangon, the Sanggunian Bayan of Kiangon Chairman of the Committee on Energy, Barangay Captains of the host barangays (Ambabag, Pindongan and Mungayang), Representative/s from es and DOE for the duration of the cooperation period, Municipal Mayors of the Rice Terraces Heritage Sites, and one (1) representative from a local NGO to be selected by the Steering Committee as members.

b.) The five (5) plant operators shall be hired through a job order appointment and they must be residents of the host barangays. The other positions or offices shall come from the existing organic personnel of the Provincial Government.

**SECTION 5: FUNCTIONS, DUTIES AND COMPENSATION.** - The different offices/positions shall have the following functions, duties and compensation:

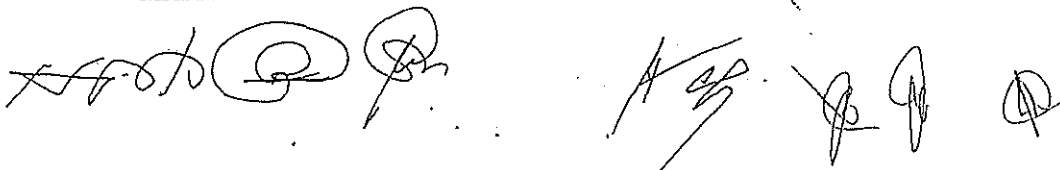
a.) The Steering Committee has the primary function of over-all supervision relative to the operation, maintenance and management of the AMHPP ~~including the management of the AMHPP~~ including the management of the conservation fund and the implementation of the projects funded from the conservation fund upon approval by the Sangguniang Panlalawigan. The Steering Committee shall be responsible in the review of the AMHPP budgets and development plans and recommends the projects to be funded from the conservation fund prior to submission to the SP for the required appropriation ordinance.

The Members of the Steering Committee are not entitled to any compensation. However, any member from the private sector shall be entitled to actual traveling, accommodation and miscellaneous expenses subject to the availability of funds provided for in the approved appropriation ordinance for the AMHPP.

b.) Plant Manager - It has the primary function to supervise regularly the operation, maintenance and management of the AMHPP including the implementation of the projects funded from the conservation fund.

The Plant Manager shall come from the organic personnel of the Provincial Government. The PPDO Head shall be designated as the Plant Manager of the AMHPP in addition to her regular functions.

The PPDO Head shall not be entitled to any increase in salary or salary grade due to the additional duties and responsibilities. However, the Plant Manager shall be entitled to an honorarium, the amount of which shall be determined and provided for in the annual or supplemental appropriation ordinance for the AMHPP.





- c.) Plant Supervisor - It has the primary function to supervise the day-to-day operation, maintenance and management of the AMHPP. The Plant Supervisor shall be responsible in the preparation of the shifting schedule, preventive and corrective maintenance schedule, monthly power bill and other technical reports, and responsible in the monthly reading of the tariff meter, and in the supervision of the operators.

The Plant Supervisor shall not be entitled to any increase in salary or salary grade due to the additional duties and responsibilities. However, the Plant Supervisor shall be entitled to an honorarium, the amount of which shall be determined and provided for in the approved annual or supplemental appropriation ordinance for the AMHPP.

- d.) Operators - They have the primary function to efficiently operate and maintain the equipment and devices in the power plant and to maintain the continuous and unhampered flow of water from the intake weir to the power plant.

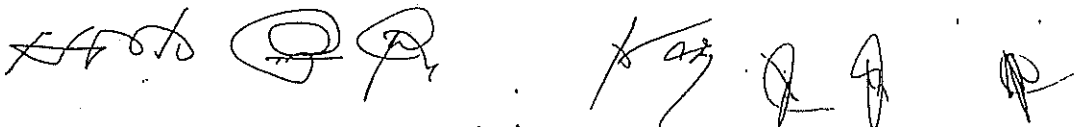
The Operators are responsible for the hourly reading of statistical meters and instruments, and perform established standard operating procedures and regular preventive maintenance as well as minor corrective maintenance work and plant housekeeping. They shall be responsible for the daily inspection and cleaning/clearing of the waterways from the intake weir to the penstock.

The Operators shall be entitled to wages and other benefits based on the feasibility study or the approved appropriation ordinance.

- e.) The Bookkeeper/Management Audit Analyst and Cashier/Revenue Collecting Officer shall be designated from the organic personnel of the Provincial Accounting Office and Provincial Treasurer's Office, respectively. They shall not be entitled to any increase in salary or salary grade due to the additional duties and responsibilities. However, they shall be entitled to an honorarium, the amount of which shall be determined and provided for in the approved annual or supplemental appropriation ordinance for the AMHPP.

**SECTION 6. POLICIES AND SYSTEMS IN THE OPERATION, MAINTENANCE AND MANAGEMENT OF AMHPP.** - The following policies and systems shall be observed in the operation, maintenance and management of the AMHPP:

- a.) The operation, maintenance and management of the AMHPP shall be treated as economic enterprise of the Provincial Government. **There shall be a separate set of books as a Special Account in the General Fund in conformity to Section 313 of the Local Government Code of 1991 and the prescribed government accounting and auditing rules and regulations. All revenues from the operation of the AMHPP shall be used exclusively for the operation, maintenance and management of the AMHPP, for the conservation and development of the Ifugao Rice Terraces, and for the fulfillment of the commitments of the PG as stipulated in the various MOAs with the different stakeholders.**



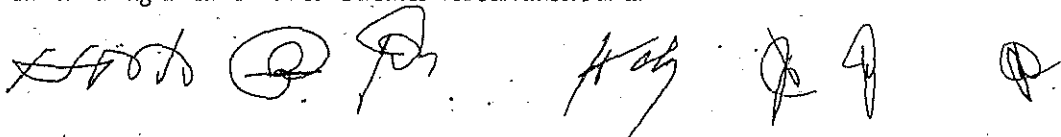
- b.) The annual budget for the operation, maintenance and management of the AMHPP shall be prepared by the Plant Manager for review and consideration by the Steering Committee. The Steering Committee shall submit the annual budget on or before October 16 of the preceding year to the Sangguniang Panlalawigan for legislative authorization through an appropriation ordinance. The approved annual budget or any supplemental budget for the operation, maintenance and management of the AMHPP is not subject to any higher review and shall immediately be made operative upon authorization by the Sangguniang Panlalawigan through an appropriation ordinance and upon approval and signature by the Provincial Governor or due to inaction of the Provincial Governor within fifteen (15) days from date of receipt. However, applicable provisions of Sections (313), (315), (319), (320), (321), (322), (323), (324) and (325) of Article 1, Chapter 3, Title V, Book II of the Local Government Code and its implementing rules and regulations shall be observed in the budgeting process.
- c.) In case of any veto by the local chief executive, Section 55, Chapter 3, Title II, Book 1 of the Local Government Code and its implementing rules and regulations shall apply.
- d.) The operation and maintenance of the AMHPP shall be initially done by the Provincial Government. However, consistent with the present industry practice of outsourcing expertise of other entity for a better result and to insulate the Provincial Government from future personnel and financial problems related to the operation and maintenance of the AMHPP, the operation and maintenance of the AMHPP shall be contracted out to competent private or government organization or individual at the earliest possible time, but in no case shall it be beyond the cooperation period.

The AMHPP management shall prepare the terms of reference in contracting out the operation and maintenance of the AMHPP, subject to approval of the Steering Committee and legislative authorization by the SP.

- e.) Other related policies, systems and procedures necessary for the safe, efficient and other reliable operation, maintenance and management of AMHPP shall be formulated and established by the AMHPP management, but in no case shall it be contrary to existing industry standards, rules and regulations as well as the terms and conditions set forth in the memoranda of agreement with the different stakeholders and the provisions of this Ordinance. Any operation, maintenance and management policies, systems and procedures shall be approved by the Steering Committee prior to implementation, but subject to review and amendment by the Sangguniang Panlalawigan through a legislative measure/s.

**SECTION 7. RICE TERRACES CONSERVATION FUND.** - There shall be a rice terraces conservation fund to be established from the proceeds of the operation of the AMHPP to be used exclusively in the conservation and development of the Ifugao Rice Terraces.

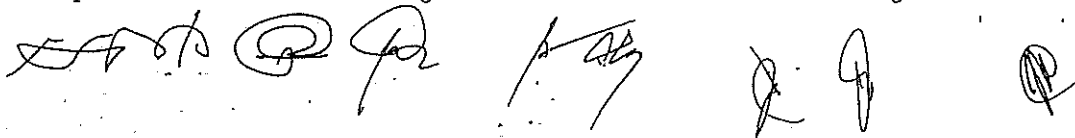
**SECTION 8. POLICIES AND SYSTEMS IN THE MANAGEMENT OF THE RICE TERRACES CONSERVATION FUND.** - The following policies and systems shall be observed in the management of the Rice Terraces Conservation Fund:



- a.) The net profit from the operation of the AMHPP shall be treated as a Special Account in the General Fund of the Provincial Government, but shall be used exclusively for the conservation and development of the Ifugao Rice Terraces and to satisfy the commitment of the Provincial Government as stipulated in various Memoranda of Agreement duly entered into by the Provincial Government with the different stakeholders. A separate set of books shall be established by the Provincial Government in conformity with the prescribed government accounting and auditing rules and regulations.
- b.) The net profit from the operation of the AMHPP shall be determined every December 31<sup>st</sup>. The net profit shall be applied to satisfy the commitment of the Provincial Government as stipulated in various MOAs entered into by the PG with the different stakeholders and the remainder shall be appropriated for the conservation and development of the Ifugao Rice Terraces based on an approved annual rice terraces conservation and development plan.
- c.) Upon determination of the annual net profit generated from the operation of the AMHPP, the management of the AMHPP shall immediately prepare an annual budget indicating therein the available annual net profit together with the annual rice terraces conservation and development plan for the review by the Steering Committee. The Steering Committee, upon review, shall endorse the annual budget together with the annual rice terraces conservation and development plan to the SP for legislative authorization of the annual budget through an appropriation ordinance and approval of the annual rice terraces conservation and development plan on or before the 15<sup>th</sup> February of the year.  

The approved annual rice terraces conservation and development plan and annual budget is not subject to any higher review and shall be implemented and disbursed in conformity with existing and pertinent laws, rules and regulations and ordinances.
- d.) In case of any veto by the local chief executive, Section 55, Chapter 3, Title II, Book 1 of the Local Government Code and its implementing rules and regulations shall apply.
- e.) Policies, systems, procedures and criteria necessary for the efficient and effective management of the Conservation Fund shall be formulated and established by the AMHPP management taking into consideration the project objectives as envisioned by e8, the terms and conditions set forth in the memoranda of agreement with the different stakeholders, provisions of this Ordinance and existing and pertinent rules and regulations. However, any policies, systems, procedures and criteria shall be approved by the Steering Committee prior to implementation but subject to review and amendment by the Sangguniang Panlalawigan through a legislative measure.

**SECTION 9. TRANSITION PERIOD.** - All expenses related to the commercial operation of the AMHPP for the period of one (1) year shall be funded from the annual budget of the Provincial Government. For the second year and subsequent years of commercial operation, the budget for the operation, maintenance and management of AMHPP shall be from its revenue generated.



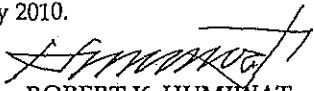
SECTION 10. PENAL CLAUSE - Without prejudice to the provision of the LGC and other existing laws, any public officer found administratively guilty of violating the provisions of this Ordinance shall be suspended for one (1) month for the first offense, six (6) months for the second offense, and dismissal for the third offense.

SECTION 11. REPEALING CLAUSE - All ordinances, executive orders or issuances and policies of the Provincial Government of Ifugao contrary or inconsistent with this Ordinance are deemed repealed.

SECTION 12. SEPARABILITY CLAUSE - Should any part of this Ordinance be declared unconstitutional or invalid by proper authority, other parts or provisions hereof which are not affected shall continue to be in full force and effect.

SECTION 13. EFFECTIVITY CLAUSE - This Ordinance shall take effect upon approval and publication for three (3) consecutive days in newspaper of local circulation. However, where there are no newspapers of local circulation, the same may be posted in at least two (2) conspicuous and public accessible places and shall take effect after ten (10) days from the date a copy thereof was posted.

APPROVED and ENACTED by the Sangguniang Panlalawigan of Ifugao this 18th day of January 2010.



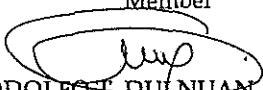
ROBERT K. HUMIWAT  
Member



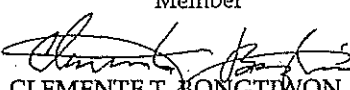
JOSEPH J. ODAN  
Member



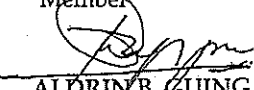
LUCIO B. AYAHAO, JR.  
Member



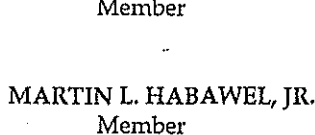
RODOLFO T. DULNUAN  
Member



CLEMENTE T. BONGTIWON  
Member



ALDRIN B. GUINGAYAN  
Member



MARTIN L. HABAWEL, JR.  
Member

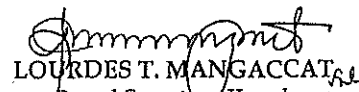


ALLAN P. CUTIYOG  
Member



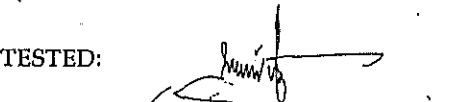
JOMARA BUYUCCAN  
Member

CERTIFIED CORRECT:




LOURDES T. MANGACCAT, <sup>SE</sup>  
Board Secretary II and  
Acting Sanggunian Secretary

ATTESTED:



JOSE T. GULLITIW  
Member and Temporary Presiding Officer

APPROVED:



TEODORO B. BAGUILAT, JR.  
Provincial Governor

Date: \_\_\_\_\_

**Guideline**  
**On**  
**The Operation and Management**  
**Of**  
**The Ambangal Hydropower Power Plant (AHPP)**  
**And**  
**Rice Terraces Conservation Fund (RTCF)**

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## **Chapter 1 Management of the Rice Terraces Conservation Fund**

### **Section 1 The Rice Terraces Conservation Fund**

The Rice Terraces Conservation Fund is the net profit of the power sale of the Ambangal Hydropower Plant. In other words, all the necessary costs of the operation and maintenance for the Ambangal Hydropower plant are deducted from the gross income becomes the Rice Terrace Conservation Fund. The monthly revenue is not always same amount because of water volume, which is the source of power generation in Ambangal River.

The fund shall be used / allocated/ released in accordance with the Provincial Ordinance and IRR and this guideline.

### **Section 2 Basic Principles**

- 1) Ownership – to foster clients’ ownership of the projects, participation should start already in the preparation of a Barangay Development Plan that will contain a terrace conservation plan and in project planning and implementation.
- 2) Participation– Clients participate all throughout the project cycle. Participation may come in terms of attending planning sessions, provision of counterpart, and maintenance of the completed project.
- 3) LGU Support – Provision of counterpart in terms of funds and personnel who will assist and provide technical assistance in the planning, supervision and monitoring of projects. During Information Education Campaign (IEC), ICHO develop the support mechanism with MLGU, BLGU and NGO.

### **Section 3 Area Coverage**

The 1<sup>st</sup> year of the budget for the Rice Terraces Conservation Fund is very limited because the operation of power plant has just started and the Fund is not enough to utilize, so the fund utilization in the 1<sup>st</sup> year is focus the area as follows.

- a. 3 host Barangays of Ambabag, Mugayang, and Pindungan
- b. One Barangay of Municipality Kiangan
- c. 3 Barangay is selected from 4 Heritage Municipalities

The number of project related the Rice Terraces Conservation activity can be increased from the 2<sup>nd</sup> year by and by.



Table-1 The implementation Plan of the Rice Terraces Conservation Utilization

	Area	Year 0	Year 1				Year 2				Year 3			
		4th quarter	1st quarter	2nd quarter	3rd quarter	4th quarter	1st quarter	2nd quarter	3rd quarter	4th quarter	1st quarter	2nd quarter	3rd quarter	4th quarter
Brgy. Nacacadan	Kiangan	1st IEC	Follow up IEC	Prepare proposal	Start implementation	Completion								
3 Host Brgys	Kiangan		1st IEC	Follow up IEC	Prepare Proposal	Start implementation	Completion							
Brgy A	1 Brgy is selected from 4 Heritage Municipalities				1st IEC	Follow up IEC	Prepare Proposal	Start implementation	Completion					
Brgy B	1 Brgy is selected from 4 Heritage Municipalities					1st IEC	Follow up IEC	Prepare Proposal	Start implementation	Completion				
Brgy C	1 Brgy is selected from 4 Heritage Municipalities						1st IEC	Follow up IEC	Prepare Proposal	Start implementation	Completion			
Brgy D	1 Brgy is selected from the other Municipalities							1st IEC	Follow up IEC	Prepare Proposal	Start implementation	Completion		
Brgy E	1 Brgy is selected from the other Municipalities								1st IEC	Follow up IEC	Prepare Proposal	Start implementation	Completion	
Brgy F	1 Brgy is selected from the other Municipalities									1st IEC	Follow up IEC	Prepare Proposal	Start implementation	Completion

- 1) 3 Host Barangays (Ambabag, Pindungan and Mungayang)
  - a. Three host Barangays receive the five (5) % of share
  - b. Make long term and short term terrace conservation plan for the certain period of years
  - c. The proposal submitted by community proponent shall be listed in the Barangay Development Plan and/or the terrace conservation plan
  - d. Based on the plan, each client makes own proposal and submits to ICHO through Barangay LGU attached its endorsement
  - e. If the budget of the three host Brgys are not enough, they can also access the allocation of Municipality of Kiangan
  
- 2) Municipality of Kiangan
  - a. Municipality of Kiangan has forty (40)% of share forever.
  - b. Municipality of Kiangan shall make a strategic plan how and from which Barangay start, and when the fund is utilized. (Make 5 years master plan) (ICHO conducts IEC for consulting with Municipality of Kiangan, SB members and Brgy Captain and council members and gather the needs)
  - c. Based on the plan, community proponent makes own proposal and submits to ICHO through MLGU attached its endorsement
  - d. As for the 1<sup>st</sup> year, since the fund has not enough collected, one project, which is not

- large amount of budget, is implemented as pilot projects.
- e. From the 2<sup>nd</sup> year, the number of the project is to increased subject to the availability of the fund
- 3) Other Municipalities which are included in the Ifugao Rice Terraces Master Plan
    - a. Other Municipalities have forty (40)% of share forever.
    - b. Make a master plan per Municipality for a Terrace Conservation Plan  
(ICHO conducts IEC for consulting with each MLGU, Mayor, SB members, Brgy Captain and council members and gather the needs)
    - c. Based on the plan, each community proponent makes own proposal and submits to ICHO through MLGU attached the endorsement
    - d. As for the 1<sup>st</sup> year, since the fund has not enough collected, two projects, which are not large amount of budget, are implemented as pilot projects.  
The projects are selected from the 3 heritage municipalities of Banaue, Mayoyao, Hunduan. From which municipal is implemented is depending on the consultation with ICHO and each musicality.
    - f. From the 2<sup>nd</sup> year, the number of the implementing project is to increased subject to the availability of the fund

#### **Section 4 Approach**

The basic approach to be adopted in the implementation of the Rice Terraces Conservation Fund will be community-based using the community organizing process where community participation will be highlighted. This is to instill sense of ownership on the part of the project clients and other stakeholders.

#### **Community organizing process (4 cycles)**

Phase 1: Information and Orientation (1<sup>st</sup> quarter)

- ✓ Conduct Information Education Campaign (IEC) to gain proper understanding and support
- ✓ Community consultation / Focus group discussion/ Data gathering / Initial community profile

Phase 2: Planning (2<sup>nd</sup> quarter)

- ✓ Conduct planning workshop to come with the terraces conservation plan (long term, integrated plan) of the community and annual investment plan includes individual project and time frame

Phase 3: Implementation and Monitoring (3<sup>rd</sup> quarter, project duration depends on the type of

projects)

- ✓ Based on the above-mentioned plan, each proponent makes his or her own proposal. ICHO staff assists the proponent how to make proposal when they conduct pre-implementing meeting.
- ✓ Once the fund release, the proponent starts to implement a project. And ICHO conducts monitoring.

Phase 4: Completion (4h quarter)

- ✓ ICHO conducts final inspection. If it completes, the proponent makes a operation and maintenance plan, and sign of certificate of acceptance

### **Information Education Campaign (IEC)**

IEC is implemented quarterly basis based on an action plan of ICHO as ICHO's regular activity.

Ifugao Cultural Heritage Office (ICHO) conducts Information Education Campaign (IEC) in each municipality invites the Mayor, Municipal Planning Development Office (MPDO), SB members, Brgy. Captain, Brgy Council members and some NGO, which are interested in rice terraces conservation activities. And ICHO gets the needs and plans related terrace conservation. If there is no plan, ICHO assists them to make a long-term, short-term plans include financial, technical assistance from each MLGU during IEC.

1) Purpose of IEC:

To inform the community on Rice Terraces Conservation Program

To get the support of the communities

2) Target Participants

Municipal LGU (Mayor, MPDC, SB council members)

Brgy LGU (Brgy Captain, Council members)

Organizations in the communities

Council of Elders

3) Contents

- a. Nature of the Rice Terraces Conservation Fund: Definition, Source
- b. Objective of the Fund in the context of the Provincial Master Plan for the Rice Terraces Conservation
- c. Allocation, Fund management, Utilization,
- d. Accessing the fund
  - what projects are eligible for funding?
  - what are the requirement?

Beneficiaries Participation  
Application Procedure  
Approval and Funding  
Implementation and Completion  
Participatory Monitoring and Evaluation  
Project Termination/withdrawal  
Start of submission of proposal

- e. Action Plan for the preparation of the community Rice Terraces Conservation Plan
  - f. Statement of commitment
- 4) Strategy
- Community meetings
- Preparatory activities (ground working activities); meetings with the Mayor, SB, Key officers of the MLGU (MA, MPDC, ME), Brgy Officials, Key Leaders
- 5) Campaign Materials
- a. Brochure of RTC
  - b. Visuals
- 6) Conduct IEC
- 7) IEC evaluation meeting for next IECs

### **Section 5 Eligible Projects**

The following are the priority projects to be funded under the Rice Terraces Conservation Fund:

- 1) Rehabilitation of damaged/abandoned rice terraces and/or restoration of rice terraces to full productive capacity thus contributing to the implementation of the terraces conservation program of the province in general.
- 2) Rehabilitation of communal irrigation systems (CIS) to ensure adequate and continuous water supply for rice production.
- 3) Support to existing enterprise development projects in the form of capability building activities.
- 4) Reforestation projects:
  - ◆ Muyong enrichment to support watershed
  - ◆ Agro-forestry- planting of other forest and fruit tree varieties in the “pinugo” that may provide raw materials for livelihood projects.
  - ◆ Establishment of nursery- the procurement and propagation of endemic trees, quality and fast growing trees and water bearing trees but the preference of beneficiaries on the determination of species to

be procured must also be considered.

5) Cultural Enhancement

- ◆ Assistance to cultural events that are related to the rice production cycle.
- ◆ Research and documentation of undocumented Ifugao oral tradition related to rice production cycle.

6) Organic Agricultural Input Production

- ◆ Production and promotion of organic base agricultural inputs.
- ◆ Seed production or seed assistance

<b>Project Classification</b>	<b>Maximum Project Period (Duration)</b>
1. Rice Terrace Restoration	6 months
2. Community Irrigation System (CIS)	6 months
3. Support to Enterprises	6 months
4. Rice Terrace Watershed enhancement	2 years
5. Cultural Enhancement	6 months
6. Organic Agriculture Input Production	6 months

**Section 6 Criteria in Selecting Projects**

- 1) The proposed project must be one of the priority projects identified in the community rice terraces conservation plan or Brgy Development Plan.
- 2) Projects sites must be located in the heritage sites or community with rice terraces.
- 3) There should be a significant number of beneficiaries to be served.
- 4) Project beneficiaries are willing to provide counterpart of not less than 25% of the total project cost for CIS, livelihood and reforestation project, and 40-50% for stone and mud walling and muyong enrichment projects.
- 5) Project must be environment and culture friendly
- 6) It must be taken into consideration that soil, rock particles and solid waste must not cause damages and siltation at the terraces areas and water bodies especially downstream, and project must conform with existing customs and traditions (muyong, organic farming and communal irrigation etc.)
- 7) Identified projects must directly contribute to the conservation and preservation of the rice terraces to sustain and increase production and profitability of the Tinawon and other improved traditional rice varieties.

- 8) Necessity (Is the project in line with the needs of the proponent?)
- 9) Urgency
- 10) Sustainability (Is a sense of ownership towards the project at the proponent sufficiently secured?)
- 11) Output (the result of project implementation) is highly public rather than individual person
- 12) Cost performance (how many persons benefit per 10,000pesos of project cost?)

<b>Project Classification</b>	<b>Priority</b>
1. Rice Terrace Restoration	High
2. Community Irrigation System (CIS)	High
3. Support to Enterprises	Low
4. Rice Terrace Watershed enhancement	High
5. Cultural Enhancement	Medium
6. Organic Agriculture Input Production	Medium

### **Section 7 Qualified Proponents/Clients**

- ◆ Local Government Units
- ◆ Rice Terraces Farmer's Organizations, Associations and Federations
- ◆ Women's Organization
- ◆ LGU assisted and accredited People's Organizations
- ◆ Primary or Community-based Cooperative

For proponents of enterprise development project they must meet the following criteria.

- ◆ Organization is registered with authorized and appropriate Government agency like the SEC, CDA, DTI, DOLE and Municipal Government.
- ◆ Organization must be active with a track record of one (1) year of good standing as validated by evaluation committee of ICHO.

### **Section 8 Application Procedure**

- 1) Secure application and project proposal form at PPDO/ICHO.
- 2) Fill up form and attach necessary supporting papers:
  - ◆ For New Project Proposals  
Certificate of registration/Accreditation by M/PLGU,CDA,DOLE,SEC,  
Endorsement by M/BLGU,  
Bank Account Number

List of Brgy Development plan and/or the investment plan

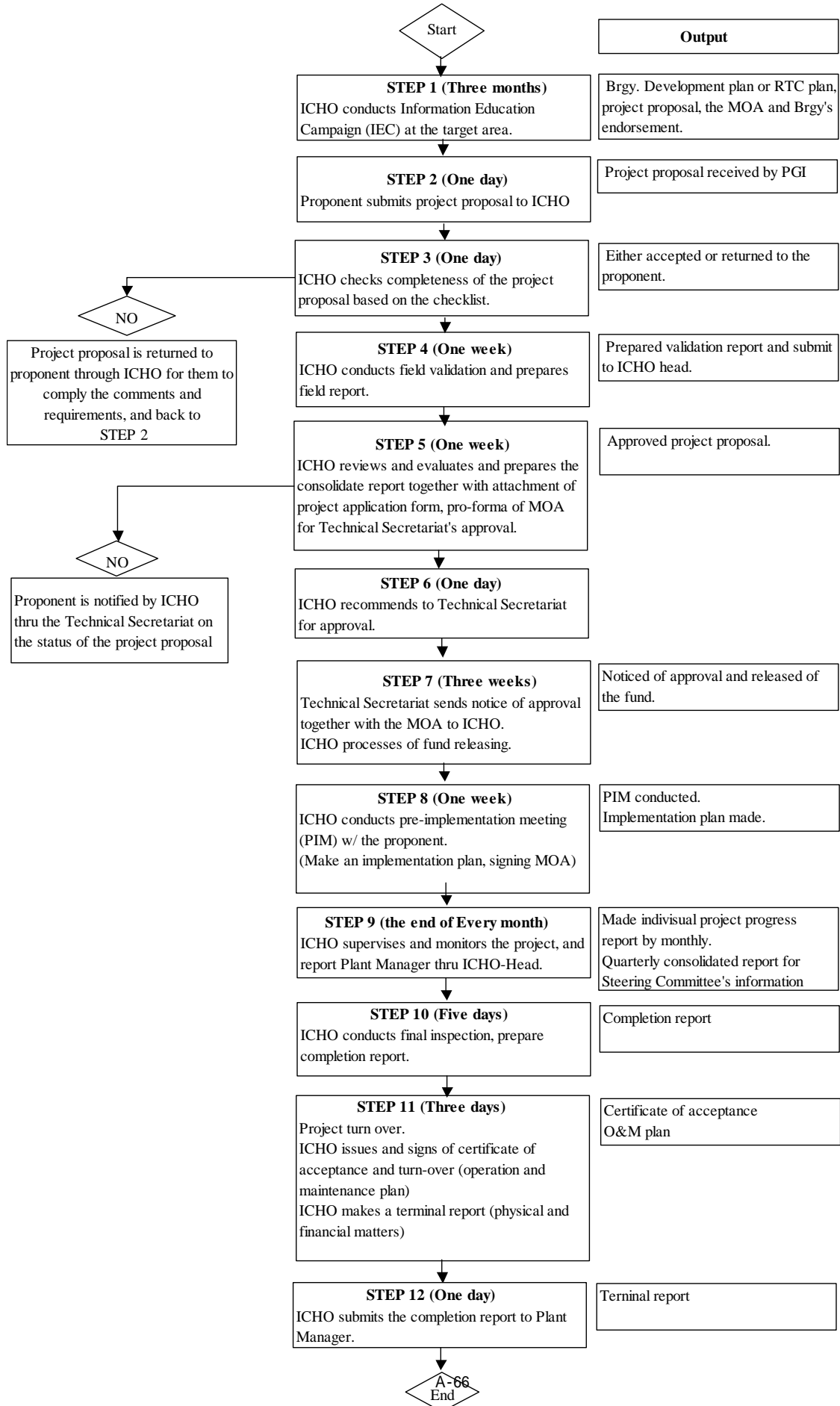
◆ For Continuing Projects

Program or Project Status Report or Terminal Report,  
Financial Statement

Project implementation plan for the following year

- 3) Submit accomplished form to the Ifugao Cultural Heritage Office for the Approval Processing
- 4) Wait for notice on the result of proposal processing

## Section 9 Project approval, implementation and fund utilization Flow





### Section 10 Project Implementation and Completion Procedure

Office Representative	Activity	Time Frame
PPDO-ICHO	Schedule and Conduct pre-implementation meeting <ul style="list-style-type: none"> <li>• Presentation of approved project proposal with POW(Program of Work), schedule and plan of activities</li> <li>• MOA signing</li> </ul> * Implementation plan and MOA as the Output	One day
ICHO-MEG	Implementation Proper <ul style="list-style-type: none"> <li>• Mobilization of funds</li> <li>• Supervision and monitoring visits</li> <li>• Prepare certificate of completion</li> </ul>	Depends on the nature of project
PPDO-ICHO/ Inspectorate team	Conduct post implementation activities <ul style="list-style-type: none"> <li>• Inspection</li> <li>• Signing and issuance of certificate of acceptance and turn-over</li> </ul>	One day
	<ul style="list-style-type: none"> <li>• Payment of balances of the project costs</li> </ul>	2 weeks
PPDO-ICHO	Preparation of project completion report	One week
Clients	Project maintenance	Continues

### Section 11 Funding Level

Project Classification	Fund Ceiling (PhP)	Proponent's Counterpart in (%)
1. Rice Terrace Restoration	100, 000	50
2. Community Irrigation System (CIS)	100, 000	25
3. Support to Enterprises	25,000	10
4. Rice Terrace Watershed enhancement	50,000	10
5. Cultural Enhancement	25,000	10
6. Organic Agriculture Input Production	50,000	10

### Section 12 Funding Mode

- Approved proposals are funded in a yearly basis subject to the availability of fund

- If the fund is exhausted, any other approved proposals will be considered for the next fiscal year

### **Section 13 Ineligible Project Proposals**

- Project proposals with overlapping funding from other sources
- Project proposals from blacklisted proponents
- Project proposals from proponents without legal identity
- Project proposals requiring funds more than the fund ceiling set per program type
- Project proposal of the same content submitted by two proponents within the same area

### **Section 14 Project Proposal Application Format**

#### 1) Identifying Information

- Project Title
- Project Location
- Project Proponent
- Project Beneficiaries
- Total Project Cost
- Fund Sources
- Budget Requested
- Contact Person/s
- Address
- Contact Number/s
- Bank Account Name and Number
- Type of Registration and Number

#### 2) Background:

- Project Area/Coverage:** (describe the needs and potentials of the project)
- Rationale:** (why is there a need to undertake the proposed project)
- Objectives:** (what do the project aims to achieve?)
- Project Description:** (describe the proposed project and include project proponents if there are)
- Project Activities:** (activity plan to be undertaken to achieve the project objectives)
- Budgetary Requirements/Breakdown**
- Signature of Proponents**

### **Section 15 Violations**

Any action undertaken not in accordance with the approved project proposal shall be considered

a violation and may warrant sanction against the proponent. Violations such as the following:

- a. Diversion of project funds
- b. Misuse or re-alignment of funds
- c. Unaccounted project funds
- d. Discontinuation of project within the implementation period
- e. Substandard quality of project output

## **Section 16 Formats**

## **Chapter 2 Monitoring and Evaluation**

It is the first attempt to realize the project which the Provincial Local Government Unit operates and maintains the Ambangal Hydropower plant as well as utilize of revenues from the proceeds of the hydro plant's power sales for the Rice Terrace Conservation Fund.

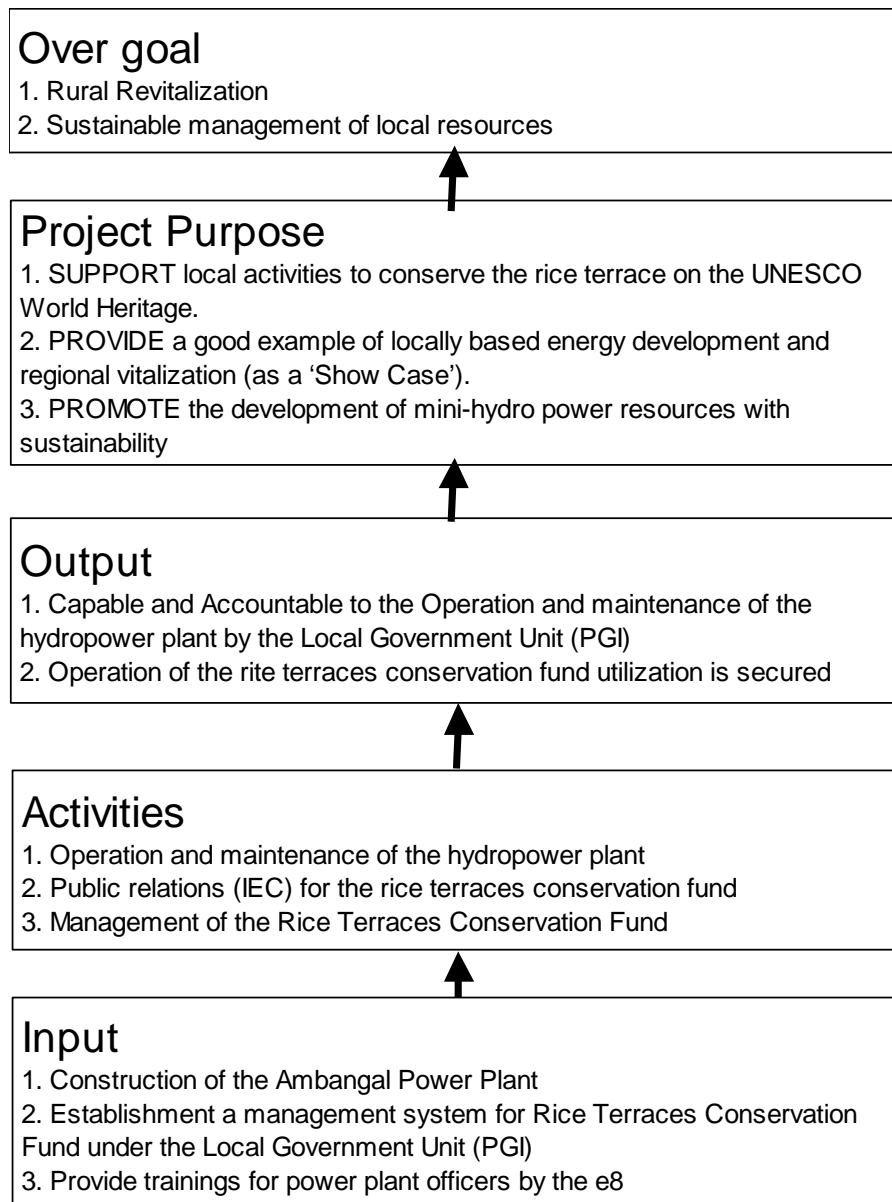
Monitoring is routine work. After the Ambangal power plant begins, monitoring checks whether activities are performed and output produced as planned, and makes adjustments if needed. Monitoring is a pillar of management work, managing the objectives initially established in the plan and revising activities and output in response to the various changes during implementation. Monitoring carefully keeps track of the actual situation of the implementation process. Monitoring helps to consider whether the activities should be continued as planned, whether there are prospects that the objective will be achieved.

And the purpose of evaluation is to verify whether the operation of the Ambangal power plant and management of the Rice Terraces Conservation Fund have been implemented smoothly and are on their way to produce effects. Evaluations contribute to and improvement of the operation contents. Evaluation provides a very good opportunity to revise the operations. The actual social conditions and various internal and external factors required for the success of the operations often become clearer after the start of the activities. Based on this, it is important to verify once more whether the operation strategy is fine as it is, whether anything should be added to the activities in order to produce an effect, or whether the timing and quality of the input are sufficient. It is further important to implement concrete improvement measures and give recommendations.

There are two levels of monitoring to be periodically conducted. One is the overall monitoring to check the operation and maintenance and the management of the Ambangal power plant and the management of the Rice Terraces Conservation Fund, and the other one is the project monitoring to check each project that the fund is released.

The figure below shows the logical framework for operation and management of the Ambangal power plant and the rice terraces conservation fund.

Figure - Logical Framework for operation and management of the Ambangal power plant and the rice terraces conservation fund.



### Section 1 Overall Monitoring and Evaluation

The overall monitoring and evaluation of the power plant operation and maintenance and the utilization of the rice terraces conservation fund are undertaken by the Monitoring and Evaluation Group (MEG) which shall be composed of;

- ✧ The Provincial Engineering Office (PEO) –Lead office,
- ✧ The Provincial Governor’s Office (PGO),

- ✧ The Provincial Agriculture Environment and Natural Resources Office (PAENRO)
- ✧ Save the Ifugao Terraces Movement (SITMO)

The concerned offices identify permanent members and designation orders are issued to document their legal membership to the Monitoring and Evaluation Group.

Monitoring and Evaluation by the MEG is quarterly basis. The report shall be submitted to the Steering Committee within the first fifteen (15) days of the first month of the succeeding quarter.

Monitoring and evaluation items are as follows.

1) The Ambangal power plant

Visual inspection of all civil structures and electrical mechanical system of the power plant and substation (functionality of the systems)

- ✓ The performance of the power plant officers
- ✓ The record of daily power generation, the daily patrol & inspection of the power plant and other equipments, written reports of meetings, working time record

2) Financial Status (Balance sheet of income and expenses of the Ambangal Hydropower plant operation & maintenance and management of the rice terraces conservation fund)

- ✓ Monthly Income of the Ambangal power sale record and other income related to the Ambangal (ex. penalty fee)
- ✓ Monthly Disbursement of the Ambangal power plant and ICHO
- ✓ Monthly Petty Cash of the Ambangal power plant
- ✓ Monthly Record of handling the rice terraces conservation fund (Get and outlay, and releasing the fund)
- ✓ Monthly record of the bank account (check the bank book of the trust fund)

3) Utilization of the Rice Terraces Conservation Fund

- ✓ Activities and implementation process (No of submitted proposal, No. of approved proposal, No. of fund release, No. of implementing projects, and No. of completion projects, type of project fund release)
- ✓ The implementation of the decisions and plans agreed upon the steering committee
- ✓ Effectiveness and efficiency of the fund

Main checkpoints in Monitoring

Monitoring Item	Main Checkpoints of Monitoring
Performance	<input type="checkbox"/> How is the operation of the Ambangal power plant

	and utilization of the Rice Terraces Conservation Fund
Activities and implementation process	<input type="checkbox"/> Are activities implemented as planned? <input type="checkbox"/> If activities are not as planned, what factor impeded the activities? <input type="checkbox"/> Is there sufficient communication within the PGI <input type="checkbox"/> Is there sufficient communication between PGI, the power plant, IFELCO for the operation and management of the Ambangal power plant? <input type="checkbox"/> Is there sufficient communication between PGI and MLGUs for the utilization of rice terraces conservation fund? <input type="checkbox"/> Does the operation and management of the power plant and utilization of the fund have a high recognition in Executive office? <input type="checkbox"/> Is there strong sense of ownership? <input type="checkbox"/> Is the degree of participation of the target group (proponent) in the activities of the rice terraces conservation high? <input type="checkbox"/> Is the recognition with respect of the PGI's staff and the power plant officers to the operation and management high?
Input	<input type="checkbox"/> Is the fund utilization performed as planned? <input type="checkbox"/> Is there no problem in quality, quantity and timing of the fund utilization? <input type="checkbox"/> If there is a problem, what is the impeding factor?
Necessity of adjustments	<p>(Considered based on the results of monitoring the items above)</p> <input type="checkbox"/> Is an achievement of the conservation of the rice terraces possible in the current condition (changes in the process of fund utilization, rule & regulation and guideline)? <input type="checkbox"/> Are there any new important assumptions that influence the operation and management of the power plant and fund utilization? <input type="checkbox"/> What issues must be remembered for the future?

## Evaluation Checkpoint

Evaluation Item	Evaluation Checkpoint
Verification of performance	<input type="checkbox"/> Is the operation and management of the Ambangal Power plant and the fund utilization implemented as planned? <input type="checkbox"/> As securing the rice terraces conservation fund as planned? <input type="checkbox"/> Are there prospects that the PGI's objective of supporting conserves the rice terraces will be achieved?
Verification of implementation of process	<input type="checkbox"/> Are the activities implemented as planned? <input type="checkbox"/> Are there no problems in the operation and management system (decision-making process, function of the related office, communication mechanisms within the related agencies)? <input type="checkbox"/> Are the suitable officers assigned? <input type="checkbox"/> Is the degree of participation of the target group (proponent) in the activities of the rice terraces conservation high? <input type="checkbox"/> Did any other problems occur during the process of implementing the project? What is the cause?
Relevance	<p>Necessity</p> <input type="checkbox"/> Is the area coverage of fund releasing in line with the needs of the target area and group?
Effectiveness	Achievement of forecast for the PGI's objective



	<input type="checkbox"/> Looking at the operation and management of the Ambangal power plant and the rice terrace conservation fund is likely achieved? <input type="checkbox"/> Are there any factors that inhibit the achievement of the PGI's objective? Causal relationship <input type="checkbox"/> Is the output sufficient to achieve the PGI's objective?
Efficiency	<input type="checkbox"/> Is the output achievement level adequate? (Compare performance with targets) <input type="checkbox"/> Are there any factors that inhibited the achievement of the output? <input type="checkbox"/> Were the fund utilization of RTC sufficient to produce the output? <input type="checkbox"/> Timing: was the RTCF management of an adequate quantity and quality performed in the right time to conduct the activities as planned? Is it being implemented?
Impact	<input type="checkbox"/> Are the PGI's overall goal and the objective consistent? <input type="checkbox"/> Are any effects or influences beyond the overall goal assumed? <input type="checkbox"/> Are measures taken to ease particularly negative influences? Influence on the establishment of policies and the laws, systems.
Sustainability	<input type="checkbox"/> Is there sufficient organizational capacity to implement activities to produce effects? (Assignment of human resources, decision-making process and so on.) <input type="checkbox"/> Is a sense of ownership towards the project at the proponent sufficiently secured? <input type="checkbox"/> Is the budget for RTCF secured?

## Section 2 Project Monitoring and Evaluation

The project monitoring and evaluation is lodged at the Ifugao Cultural Heritage Office (ICHO), one of the divisions of the Provincial Planning and Development Office (PPDO). The project monitoring and evaluation cater to the monitoring of projects funded and implemented under the rice terraces conservation fund. It is on a per project basis unlike the overall monitoring that

focuses on a higher level. The monitoring and evaluation schedule is monthly for agriculture, reforestation, enterprise development, culture related projects and bi-monthly for infrastructure projects.

Technical assistance of the appropriate offices of the Provincial Government is tapped as the need arises.

The output of the monitoring visits of ICHO which comes in terms of the Project Status Report (PSR) is submitted within seven (7) days after the conduct of the monitoring and evaluation visit to the Plant Manager for reference and appropriate action.

Monitoring and evaluation items are as follows

- ✓ Progress of each fund released project (both activity and financial status)
- ✓ Accomplishment of the released project
- ✓ Efficiency and Effectiveness of the fund releasing (setting the ceiling of fund, timing of releasing fund, allocation by installments)

1) Measures for monitoring

a. Before the conduct of the monitoring, the team of ICHO shall secure the following documents for their reference:

- ✓ Approved project proposal
- ✓ Program work
- ✓ Previous project status report

b. Scheduling and coordination with implementers, LGUs, other partner offices and agencies

c. Conduct of actual monitoring visits

d. Document its findings and observations using the prescribed form

e. Submit report to the Plant Manager through the head of ICHO and give feed back to the implementers

2) Reporting

The project monitoring reports serve as feedback for project implementers and PGI staff on the status of the projects and on the problems and issues being encountered during project implementation.

The report is consolidated and submitted to the MEG through the Plant Manager.

3) Monitoring Checklist

I. Agriculture Related Projects	What To Monitor and Document
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<ul style="list-style-type: none"> <li>• Seed Production or seed assistance</li> </ul>	<ul style="list-style-type: none"> <li>• Project accomplishment to date</li> <li>• No. of clients</li> <li>• Expenditure for the period</li> <li>• Counterpart of stakeholders if fulfilled</li> <li>• General assessment if project is on track per planned schedule</li> </ul>	<ul style="list-style-type: none"> <li>• Observations &amp; findings</li> <li>• Problems/Issues</li> <li>• Recommendations</li> </ul>
<ul style="list-style-type: none"> <li>• Pest Control &amp; Soil Fertility Project</li> </ul>	<ul style="list-style-type: none"> <li>• Project accomplishment to date</li> <li>• No. of clients</li> <li>• Expenditure for the period</li> <li>• Counterpart of stakeholders if fulfilled</li> <li>• General assessment if project is on track per planned schedule</li> </ul>	
<p>II. Environmental Related Projects</p>		
<ul style="list-style-type: none"> <li>• Nursery establishment Project</li> </ul>	<ul style="list-style-type: none"> <li>• Project accomplishment to date</li> <li>• Expenditure for the period</li> <li>• No. of workers</li> <li>• No. of customers</li> <li>• No. of potted seedlings</li> <li>• Survival and Mortality Rates</li> <li>• Counterpart of stakeholders if fulfilled</li> <li>• General assessment if project is on track per planned activity and schedule</li> </ul>	

<ul style="list-style-type: none"> <li>• Forest Enrichment Project</li> </ul>	<ul style="list-style-type: none"> <li>• Project accomplishment to date</li> <li>• Expenditure for the period</li> <li>• No. of clients</li> <li>• Area planted</li> <li>• Kinds and no. of forest trees planted</li> <li>• No. of surviving trees</li> <li>• Mortality Rate</li> <li>• Counterpart of stakeholders if fulfilled</li> <li>• General assessment if area planted is maintained</li> <li>• General assessment if project is on track per planned activity and schedule</li> </ul>	
<ul style="list-style-type: none"> <li>• Agro-forestry Project</li> </ul>	<ul style="list-style-type: none"> <li>• Project accomplishment to date</li> <li>• No. of clients</li> <li>• Area Planted</li> <li>• Kinds and no. of forest trees planted</li> <li>• No. of surviving trees</li> <li>• Mortality Rate</li> <li>• Counterpart of stakeholders if fulfilled</li> <li>• General assessment if area planted is maintained</li> <li>• General assessment if project is on track per planned activity and schedule</li> </ul>	
<p>III. Culture Projects</p>		<ul style="list-style-type: none"> <li>• Observations &amp; findings</li> </ul>

<ul style="list-style-type: none"> <li>Assistance to cultural events Project</li> </ul>	<ul style="list-style-type: none"> <li>Project accomplishment to date</li> <li>No. of clients</li> <li>General assessment if project is on track per planned activity and schedule</li> </ul>	<ul style="list-style-type: none"> <li>Problems/Issues</li> <li>Recommendations</li> </ul>
<ul style="list-style-type: none"> <li>Research &amp; Documentation Project</li> </ul>	<ul style="list-style-type: none"> <li>Project accomplishment to date</li> <li>No. of researchers involved in the project</li> <li>No. of Output</li> <li>Counterpart of stakeholders if fulfilled</li> <li>General assessment if project is on track per planned activity and schedule</li> </ul>	
IV. Infrastructure Projects		
<ul style="list-style-type: none"> <li>Rehabilitation of damaged rice terraces Projects, Communal Irrigation System</li> </ul>	<ul style="list-style-type: none"> <li>Project accomplishment to date</li> <li>Expenditure for the period</li> <li>No. of clients</li> <li>Service area</li> <li>Counterpart of stakeholders if fulfilled</li> <li>General assessment if project is on track per planned activity and schedule</li> </ul>	
V. Livelihood Projects	<ul style="list-style-type: none"> <li>Project Status</li> <li>Expenditure to date</li> <li>No. of Clients</li> <li>Project Output</li> <li>Sales</li> </ul>	

	<ul style="list-style-type: none"> <li>• Income</li> <li>• General assessment if project is on track per planned activity and schedule</li> <li>• Networking &amp; linking activities</li> </ul>	
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### Chapter 3 Reports

The Status of the Ambangal power plant operation, maintenance and management and the Utilization of the Rice Terraces Conservation Fund shall be reported to e8/TEPCO through Department of Energy (DOE) **by monthly** during the cooperation period. Please see the list of reports and formats.

#### 1) Report of The Ambangal Hydropower Plant

Format-1: Monthly record of;

- ✓ Generation time
- ✓ Total generated electricity (kWh)
- ✓ Electricity consumption of the Ambangal power house
- ✓ Total outage causality

Format-2: Monthly patrol and inspection report

Format-3: Quarterly regular patrol and inspection

Format-4: Monthly income, Monthly disbursement, and Monthly petty cash

#### 2) Report of the Rice Terraces Conservation Fund

Format-4: Monthly record of the total Rice Terraces Conservation Fund (Monthly Net Profit) and the total amount of the released fund to the project proponent

Hard copy of bankbook of the bank account for the trust fund (RTCF)

Format-5: Monthly conservation fund activities (No.of; proposal, approved project, implementing project and released fund)

Format-6: Quarterly report of monitoring and evaluation for the Rice Terraces Conservation fund management

## **Chapter 4 Administration Services**

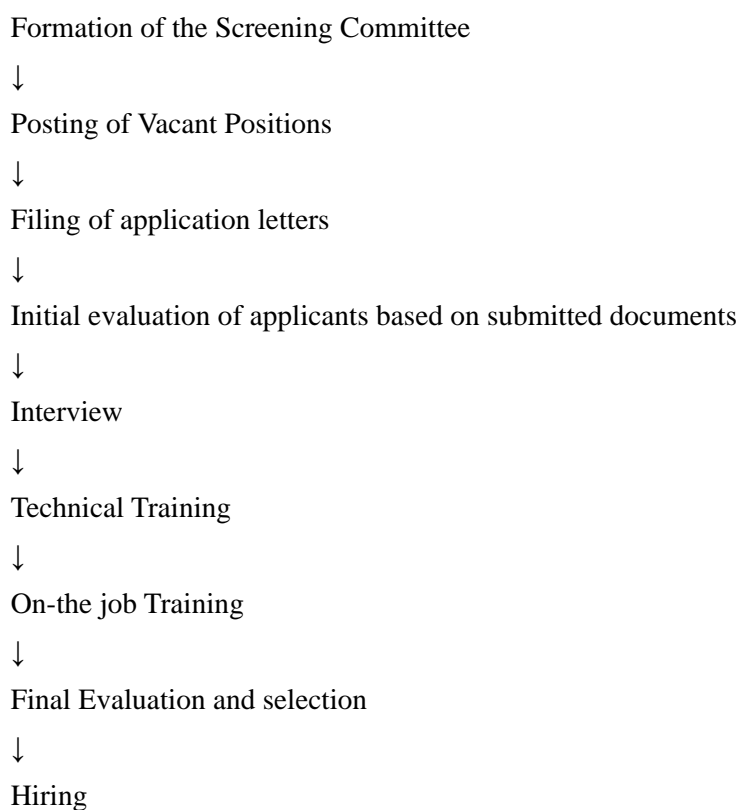
The administrative Services (AS) is mandated to formulate and implement policies, plan, programs and regulations on human resource, treasury and fund management, and general administrative services.

The AS for the Ambangal Hydropower plant and the Management of the Rice Terraces Conservation Fund is basically followed by the government rules and regulations.

Since the first public enterprise, which the provincial government of Ifugao manages the hydropower plant, if anything unspecified which is not prescribed in the government law shall be promptly resolved or specified through discussion with the concerned agencies.

### **Section 1 Selection/Hiring Process of Operator and Water Guard**

#### 1) SELECTION FLOW:



#### 2) POLICIES, CRITERIA & REFERENCE:

##### a. Pool of Applicants

To ensure publicity of vacancies, the vacant positions shall be posted in seven conspicuous places in the Province together with the qualification standards and requirements.

b. Factors to be rated

CRITERIA	PERCENTAGE
Education	35
Experience	10
Technical Training & OJT	30
Psycho-Social Attributes & Personality Traits & Potentials	10
Oral communication skills	10
Meritorious awards/outstanding accomplishments	05
GRAND TOTAL	100

c. References/Details of the Factors to be rated:

**Education 35%**

- ◆ This shall include the educational background of the applicant its relevance to the vacant position.
- ◆ To determine the relevance of the education, reference should be based on the duties and responsibilities of the operators and water guard. The indicator for relevance is the closeness, similarity and relatedness or functional relationship of the major functions: skills, abilities and knowledge required of the position.
- ◆ The basis for the evaluation shall be the documents submitted with the application letter on or before the deadline. Hence, the application letter should include all supporting documents that would prove the merit, fitness and qualification of the applicant and should be included for submission on or before the set deadline. Documents submitted after the deadline shall not be considered or accepted for evaluation.
- ◆ All proof of merit, fitness, competence and qualifications should be covered by proper documents. All photocopies should be duly certified /authenticated by authorized staff.
- ◆ Applicants who meet the minimum basic education qualification will be given a full rating of 30%. No additional points will be given to any applicant with a higher educational level.

**Experience 10%**

- ◆ Refers to the skills or knowledge gained or acquired by an individual in a previous employment in a public or private organization which would enable the applicant to perform his job better.
- ◆ Relevant experience is an appropriate knowledge and skill acquired from previous employment and designations, which has significant closeness and functional relationship with the qualification requirement and duties and responsibilities of the position to be filled



up.

**Technical Training and on the Job-Training 30%**

- ◆ As part of the selection process, the qualified and short listed applicants who will be notified to join trainings will be appraised on their performance during the technical training and on-the-job-training. Grossly, the basis will be the applicant’s attitude, knowledge and skills observed and gained. Evaluation mechanisms like pre and post tests etc will be prepared by the trainers and administered as appropriate.

**Psycho-Social Attributes & Personality Traits and Potentials: 10%**

- ◆ This refers to the characteristics or traits of a person, which involves both psychological and social aspects. Psychological includes the way he/she perceives things, ideas and beliefs.
- ◆ Points for this factor will be determined through an interview and the applicants will be assessed on the following points:

No.	Factors to be Rated	Weighted % Points
1	POTENTIALS (knowledge, skills acquired which have relevance to the position to be filled up)	3.0
2	WORK STANDARDS (refers to how an applicant assesses himself in terms of work output)	2.0
3	SERVICE ORIENTATION (how an applicant views government service/work)	1.0
4	STRESS TOLERANCE (ability to work effectively and efficiently even under pressure)	1.0
5	COURTESY (the manner in which the applicant responds to different people of different status politeness, kindness, respect)	2.0
6	PHYSICAL FITNESS/GENERAL APPEARANCE (this refers to the general health status of the applicant in relation to the work for the effective and efficient delivery of services)	1.0
	Total	10.0

**Oral Communication Skills 10%**

- ◆ Oral communication skills shall be assessed during the interview and the following factors shall be considered:

No.	Factors to be Rated	Weighted % Points
1	ALERTNESS (ability to grasp ideas or questions asked)	3.0
2	PRESENTATION (the manner on how an applicant discusses or presents ideas in creative or logical way)	3.0
3	CONFIDENCE (composure in discussing or presenting ideas, the manner an applicant presents his ideas with ease, (self-confidence)	2.0
4	VERSATILITY (ability to speak fluently in English, Tagalog or vernacular)	2.0
	Total	10

**Meritorious Awards/Outstanding Accomplishments 5%**

- ◆ A rate of five percent (5%) will be given to meritorious awards or outstanding accomplishment of the applicant provided relevant to the position applied for.

d. Process in Evaluating Applicants

The selection and hiring of the AHPPO staff could be facilitated through the following process:

- ◆ Application letters addressed to the Local Chief Executive will be submitted and received at the HRMD
- ◆ Applicants shall initially be screened at the HRMD to determine if they meet the set minimum qualification standards. The basis for initial evaluation shall be the documents submitted on or before the set deadline of submission. It is required that all applicants must submit all the necessary documents to support or prove their fitness, merit, competence and qualifications on or before the lapse of application as basis for evaluation. All proofs of merit should be properly documented and as much as possibly, duly certified by HRMD.
- ◆ The HRMD shall act as secretariat to the screening committee.
- ◆ Applicants found qualified shall be included in the selection line-up or list of qualified applicants and shall be consolidated in the Comparative Assessment Form with their initial ratings.
- ◆ Those initially found qualified shall be notified to undergo further assessment such as: interview, skills test, written examination and others. Notices shall be sent through mail or through other channels that ensures fast and efficient delivery.
- ◆ The HRMD prepares a list of qualified candidates or a selection line-up and submit the same to the screening committee for deliberation.

- ◆ Oral communication skills and physical characteristics/personality traits and potentials shall be assessed through an in-depth interview by the screening committee. Otherwise, the screening committee may at its discretion constitute itself into a panel and interview the applicants.
- ◆ Applicants will also be evaluated on their performance during the technical training and on-the-job-training.
- ◆ After the interview, technical and on-the-job trainings, a deliberation follows whereby all actions will be evaluated by the screening committee. Summary of their ratings including the overall rating shall be reflected in the Comparative Assessment Form as basis for the screening committee to recommend and the LCE for action.

e. Composition of the Screening Committee

The composition of the Screening Committee shall be as follows:

Chairman:	LCE		
Members :		HRMO	: 1
		PEO	: 1
		PPDO	: 1
		Plant Manager	: 1
		GSO	: 1

f. Qualification Standards:

Position	Qualifications
Water Guard	<ol style="list-style-type: none"> <li>1. Physically &amp; mentally fit as certified by a Government physician</li> <li>2. Willing to be assigned on field</li> <li>3. At least finished two years college education</li> <li>4. Experience on electrical and mechanical works will be an advantage</li> <li>5. Willing to undergo trainings</li> <li>6. Preferably 18-40 years old, (male or female)</li> <li>7. Preferably resident of the 3 host barangays</li> </ol>
Operators (4)	<ol style="list-style-type: none"> <li>1. Physically &amp; mentally fit as certified by Government physician</li> <li>2. Willing to work anytime of the day (Monday –Sunday)</li> <li>3. Willing to undergo training</li> <li>4. At least finished 2 years college education, technical/vocational course related to electrical/ or mechanical</li> <li>5. Preferably 18-40 years old</li> <li>6. Preferably resident of the 3 host barangays</li> </ol>

**g. Job Description of Operator and Water Guard**

Position	Duties & Responsibilities
Operator and Water guard	<p>Monitors &amp; records the power generation data</p> <p>Operates and maintains the power plant</p> <p>Ensures the power plant is clean and safe.</p> <p>Maintains the record book for visitors.</p> <p>Conducts regular maintenance of the power plant</p> <p>Checks and clean obstruction on water ways</p> <p>Conducts daily patrol/check of the water ways (intake, settling basin, headrace channel, fore bay)</p> <p>Monitors and records the daily flow at the intake</p>

3) Action Plan:

No.	ACTIVITY	OFFICE/PERSON RESPONSIBLE	TIME FRAME
1	Formation of the Screening Committee	HRMD	
2	Posting of Vacant Positions	HRMD	
3	Filing of application letters	Applicants	
4	Initial evaluation of applicants based on submitted documents Notify qualified applicants for the interview	HRMD	
5	Interview  Consolidation & preparation of Comparative Assessment for the short listing of applicants Notify qualified applicants for the technical training	HRMD to organize & coordinate the interview  HRMD	
6	Technical Training	'e8 - Trainers	EO Sept. 4 <sup>th</sup> week Nov. 1 <sup>st</sup> & 2 <sup>nd</sup> week Dec. 4 <sup>th</sup> week
7	On-the job Training	'e8 - Trainers	Oct. 4 <sup>th</sup> week
8	Final Evaluation and selection	HRMD	
9	Hiring Preparation and submission of hiring		

	documents		
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**Section 2 Selection/Hiring Process of Plant Manager, Plant Supervisor and Admin Aide**

1) Admin Aide

- This position is hired in accordance with the government law.

Position	Qualifications
Admin aide 11	1. At least 2 years college preferably secretarial & other related courses 2. Computer literate 3. Willing to do occasional field work 4. 1 year relevant experience 6. Preferably 18 – 40 years old, (male or female) 7. Preferably resident of the 3 host barangays

2) Plant Manager and Plant Supervisor

- The Plant Manager and the Plant Supervisor are to be assigned from the Provincial Government Officer (PGI Staff) for the first six (6) months.
- Once the fund which is utilized for the operation and maintenance cost is saved enough, that is the time these position will be hired from outside to ensure the plant management.
- If the first six months operation is no good and/or very difficult for the PGI's staff, the PGI will contract out the management of the power plant by the reliable organization/company.

Position	Qualifications
Plant Manager	1. Degree holder preferably BSEE, BSME, BSCE, & other related courses 2. 120 hours of relevant training 3. 5 years' experience in managerial & supervisory work 4. Experience in networking and linkaging 5. RA 1080 or Civil Service professional eligible
Plant Supervisor	1. Degree holder preferably BSEE, BSME, BSCE, & other related courses 2. 80 hours of relevant training 3. 3 years' experience in supervisory work

	4. RA 1080 or Civil Service professional eligible
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**Section 3 Training / On-the-Job-Training of Personnel**

The first top ten qualified applicants will be the priority to attend the technical training

The ten qualified applicants will undergo one month intensive training

The Post Evaluation Results of the one-month intensive training will be the basis in hiring the 4 operators, 1 water guard, 1 technician. The remaining 3 trainees will be treated, as reserve staff in case there will be vacancies later.

The Plant Supervisor will join the one-month intensive training.

**Section 4 Working Hours/Work Place of the Ambangal Hydropower Plant**

**Option 1,2 and 3 are prepared.**

**Section 5 Performance Evaluation of Personnel**

Performance evaluation of personnel will be done twice a year hence a semestral evaluation scheme will be utilized. This will be the basis for renewal or non-renewal of contract of services of employees.

- 1) A semestral evaluation form will be designed for this purpose

**Section 6 Leaves/Absences of Personnel**

Leaves

Leave/s is allowed once a month but it should be filed using prescribe application leave form 2 - 3 days ahead. Leave is without pay.

Absences

In case of absence, staff should inform the Plant Supervisor through any means of communication.

**Section 7 Criminal Sanctions of Personnel**

Grounds for admin./criminal sanction	Sanction
1. Habitual Absenteeism (Pls. refer to HRMO)	1 <sup>st</sup> offense - warning 2 <sup>nd</sup> offense - one month suspension 3 <sup>rd</sup> offense - termination
2. Abandonment of posts	1 <sup>st</sup> offense - warning 2 <sup>nd</sup> offense - one month suspension 3 <sup>rd</sup> offense - termination
3. AWOL	1 <sup>st</sup> offense - warning

	2 <sup>nd</sup> offense - one month suspension 3 <sup>rd</sup> offense -termination
4. Substitution/ Neglect of duty	1 <sup>st</sup> offense - warning 2 <sup>nd</sup> offense - one month suspension 3 <sup>rd</sup> offense -termination
5. Below satisfactory performance (FAIR & POOR)	1 <sup>st</sup> below satisfactory rating - warning twice below satisfactory rating – termination/non renewal of contract
6. Misbehavior a. Drunkenness b. Tardiness c. Discourtesy/disrespect d. Insubordination	1 <sup>st</sup> offense - warning 2 <sup>nd</sup> offense - one month suspension 3 <sup>rd</sup> offense -termination

### Section 8 Termination of Personnel

In case of termination of personnel, management should inform the concerned employee 30 days ahead of time

A termination letter should be issued to the concerned employee for documentation purposes

### Section 9 Formats

## Chapter 5 Financial Services

The Financial Services (FS) are mandated to formulate and implement fiscal policies, programs and regulations, monitor the utilization of government-administered funds, and provide staff support services pertaining to budget and accounting.

The FS for the Ambangal Hydropower plant and the Management of the Rice Terraces Conservation Fund are basically followed by the government rules and regulations.

Since the first public enterprise, which the provincial government of Ifugao manages the hydropower plant, if anything unspecified which is not prescribed in the government law shall be promptly resolved or specified through discussion with the concerned agencies.

### Section 1 Running Cost

#### A. Personnel Wage

Table number 1) and 2) shows the necessary operation cost by monthly basis. These costs shall be utilized from the monthly income of power sale except the 1<sup>st</sup> month of operation.

(Peso)

Name	Monthly salary	Philhealth	TEV	SSS	Technical Services	Honorarium Per Month
Plant Manager (grade 15)						
Plant Supervisor (grade 10)						
Water guard						
Admin aide 11						
Operators (4)						
PACCO (3 staff)						
PTO (3 staff)						
Total						

#### B. Operation and Maintenance Cost

This will be included in the annual work plan and budget of PPDO.

(Peso)

Expenses Items	Items	Monthly	Remarks
Maintenance*1	Repair, Spare parts	60,783	Annual necessary



			cost Php 730,000
Auditor fee		1,200	For COA
Water Right fee		645	Annual necessary cost Php 7,735
Tax & Escalation	Income Tax Corporate Tax	19,000	It is necessary from the 7 <sup>th</sup> year
General Administrative Expenses		2,000	
Monthly Total		83,628	

\*1 Maintenance cost: it is computed by 2% of total construction cost (P36, 470,000pesos x 0.2). This cost should be reserved for future's repair fee, replacement of parts, on-call fee for technician and so on. So, this amount shall be deducted from the monthly income and keep in the bank.

## Section 2 Financial Management

### 1) Transition

Meanwhile that the project is not yet in full operation funds for the start-up operation for at least three (3) months shall be source out from the Provincial Government. The fund provided and sourced out for its initial operation shall be treated as a trust fund. A separate bank account shall be opened with PNB-Lagawe Branch for the purpose. Disbursements shall follow the usual accounting and auditing rules and regulation.

### 2) Economic Enterprise

Once the Ambangal power plant is fully operational and starts to collect fees/income, the same shall be treated as an economic enterprise of the Province. It shall maintain its separate set of books as prescribed by government accounting and auditing rules and regulations.

### 3) Reporting

Separate set of financial reports such as the Trial Balance, Balance Sheet, Income Statement, Cash Flow Statement and Bank Reconciliation Statement shall be prepared on a monthly basis and at the end of the year to be submitted to the COA donor agency and such other authorities of the Provincial Government.

### 4) Auditorial visits

Books of accounts and all the other pertinent records shall be made available for inquiry, verification and audit purposes to the COA, donor agency auditor and other authorities.

5) Work and financial plan

An annual WFP divided into four quarters shall be prepared as basis for procurements and disbursements.

6) Procurement

All procurements shall be in accordance to the provision of RA 9184.

7) Forms

All forms to be used shall be those prescribed by government.

8) Petty Cash Fund

**Section 3 Transaction**

1) Income /Collections

Transaction	Document	Office
1. Sale	Official Receipts	Ambangal power plant
2. Booking-up	Report of Collection Cash Receipts Journal General and subsidiary Ledgers	Ambangal power plant
3. Reporting	Trial Balance Financial Statements	Ambangal power plant

2) Disbursements

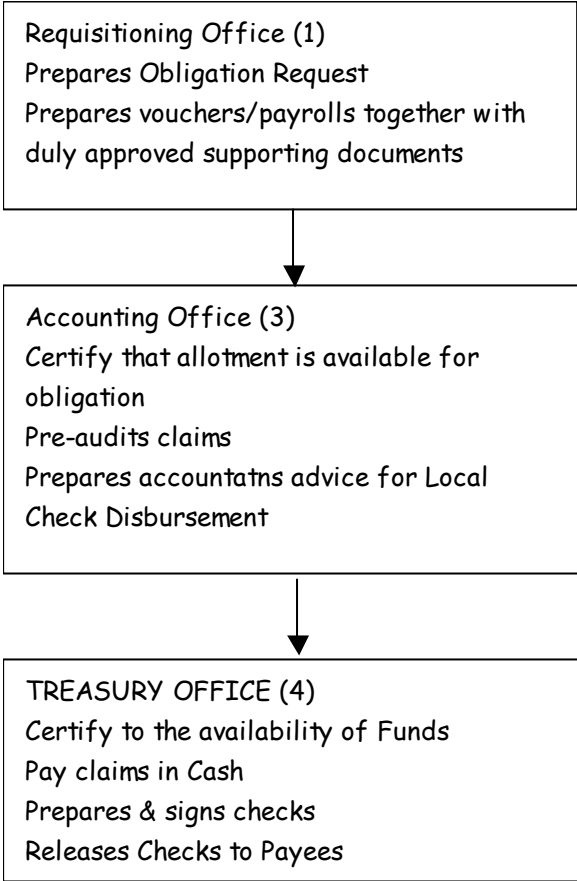
Transaction	Document	Office
1. Expense	Voucher/payroll	Ambangal power plant
2. Booking-up	Report of Disbursements Report of checks issued Report of Disbursements General Subsidiary Ledger Trial Balance/F/S	Ambangal power plant

3) Petty cash

Transaction	Document	Office
1. Expense	Cash advance	Ambangal power plant
2. Booking-up	Report of Disbursements	Ambangal

	Report of cash	power plant
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**Section 4 Flow Chart of Financial Transaction (Trust Fund)**



## Section 5 Workflow of Income

Responsible Person/Office	Activity
Ambangal MHPP <ul style="list-style-type: none"> <li>• Operator</li> <li>• Admin Aide</li> <li>• Supervisor</li> <li>• Admin Aide</li> </ul>	<ul style="list-style-type: none"> <li>• Daily recording of Power generated/sales and make appropriate reports to the Plant Supervisor</li> <li>• Prepares monthly bill statement based on the power generation record and submits to plant supervisor for signing</li> <li>• Signs the bill</li> <li>• Sends the bill to IFELCO</li> </ul>
IFELCO	<ul style="list-style-type: none"> <li>• Receives bill and pay to the Provincial Treasury Office</li> </ul>
PTO <ul style="list-style-type: none"> <li>• Collecting Officer</li> <li>• Liquidating Officer</li> <li>• Provincial Treasurer</li> <li>• Liquidating Officer</li> </ul>	<ul style="list-style-type: none"> <li>• Receives cash/check from IFELCO</li> <li>• Issue Official Receipt to acknowledge receipt of cash/check</li> <li>• Records collection in the Cash Book- Cash In Treasury</li> <li>• Prepares deposit slip in Three copies</li> <li>• Deposit collection with authorized depository Bank (PNB)</li> <li>• Prepares Report of Collections &amp; Deposits (RCD) in 4 copies with attached 2<sup>nd</sup> copy of the ORs and Deposit Slips (DS) and submits to Liquidating officer or Treasurer for review &amp; signature</li> <li>• Checks remittances and verify accountable forms of collector.</li> <li>• Reviews and signs the RCD</li> <li>• Forwards original &amp; 2<sup>nd</sup> copy of RCD with attached OR's &amp; validated DS's to the Provincial Accounting Office</li> <li>• Files the 2<sup>nd</sup> copy of the RCD with the 3<sup>rd</sup> copy of the ORs &amp; DSs.</li> <li>• Copy furnish the AMHP with the RCD (4th copy)</li> </ul>
Provincial Accounting Office <ul style="list-style-type: none"> <li>• Bookkeeper</li> <li>• Head of bookkeeping</li> </ul>	<ul style="list-style-type: none"> <li>• Receives the RCD with attachments</li> <li>• Reviews and prepares Journal Entry Voucher (JEV) at</li> </ul>

section/Provincial Accountant <ul style="list-style-type: none"> <li>• Bookkeeper</li> </ul>	the E-NGAS <ul style="list-style-type: none"> <li>• Reviews and approves the prepared JEV in the E-NGAS</li> <li>• Generation and printing of financial statements from the E-NGAS</li> </ul>
<ul style="list-style-type: none"> <li>• Depository Bank</li> </ul>	<ul style="list-style-type: none"> <li>• Furnishes the Accounting Office with the monthly Bank Statement of the AMHPP fund</li> </ul>
<ul style="list-style-type: none"> <li>• Provincial Accounting Office</li> <li>• Bookkeeper</li> <li>• Provincial Accountant</li> </ul>	<ul style="list-style-type: none"> <li>• Receives the Bank Statement of the fund and prepares the Bank Reconciliation Statement</li> <li>• Submits all prepared and generated financial reports to the Provincial accountant for review and signature</li> <li>• Reviews &amp; signs the Financial Statements</li> </ul>

**Section 6 Workflow of Disbursements**

Responsible Office/Person	Activity	Time frame	Forms
AMHPP <ul style="list-style-type: none"> <li>• Admin Aide</li> </ul>	<ul style="list-style-type: none"> <li>• Prepares vouchers/payrolls together with duly approved supporting documents and records in control book of the project</li> <li>• Submits to PPDO for recording and notation</li> </ul>		
PPDO <ul style="list-style-type: none"> <li>• Receiving clerk</li> <li>• PPDO</li> <li>• Liaison Officer</li> </ul>	<ul style="list-style-type: none"> <li>• Receives, records vouchers/Payrolls</li> <li>• Signs notation</li> <li>• Submits to PACCO</li> </ul>		

<p>PACCO</p> <ul style="list-style-type: none"> <li>• Receiving clerk</li> <li>• Management Audit Analyst</li> <li>• Provincial Accountant</li> <li>• Liaison Officer</li> </ul>	<ul style="list-style-type: none"> <li>• Receives vouchers/payrolls with supporting documents and put number the voucher</li> <li>• Pre-audits claims</li> <li>• Records in the control book</li> <li>• Certifies to the completeness and propriety of supporting documents and existence of fund held in trust</li> <li>• Forwards to PTO</li> </ul>		
<p>PTO</p> <ul style="list-style-type: none"> <li>• Receiving Clerk</li> <li>• Provincial Treasurer</li> <li>• Liaison Officer</li> </ul>	<ul style="list-style-type: none"> <li>• Receives the vouchers/payrolls and enter to logbook</li> <li>• Forwards to Provincial Treasurer for certification on the cash availability.</li> <li>• Certifies the availability of fund.</li> <li>• Forwards the vouchers/payrolls to PGO/PAdmin</li> </ul>		
<p>PGO/Admin</p> <ul style="list-style-type: none"> <li>• Receiving clerk</li> <li>• Prov'l Governor/Prov'l Administrator</li> <li>• Liaison Officer</li> </ul>	<ul style="list-style-type: none"> <li>• Receives and enter to logbook</li> <li>• Forwards to the Provincial Governor for approval of the voucher/payroll</li> <li>• Approves the voucher/payroll</li> <li>• Forwards the approved vouchers/payrolls to PTO for payment</li> </ul>		
<p>PTO</p> <ul style="list-style-type: none"> <li>• Cashier</li> <li>• Prov'l Treasurer</li> <li>• Liaison Officer</li> </ul>	<ul style="list-style-type: none"> <li>• Receives approved vouchers/payrolls for payment</li> <li>• Prepares check, initials it and submits to Prov'l Treasurer for signature</li> <li>• Signs the check</li> <li>• Records in the logbook and forwards to PGO/PAdmin for counter signature of the check</li> </ul>		

<ul style="list-style-type: none"> <li>• PGO/PAdmin</li> <li>• Receiving clerk</li> <li>• Prov'l Governor/Prov'l Administrator</li> <li>• Liaison Officer</li> </ul>	<ul style="list-style-type: none"> <li>• Receives check, enter into logbook and forwards to the Prov'l Governor/Prov'l Administrator</li> <li>• Countersigns the check</li> <li>• Submits the approved check to PACCO</li> </ul>		
<p>PACCO</p> <ul style="list-style-type: none"> <li>• Receiving clerk</li> <li>• Prov'l Accountant</li> <li>• Liaison Officer</li> </ul>	<ul style="list-style-type: none"> <li>• Receives check, enter to logbook</li> <li>• Prepares Accountants Advice of Local Check Disbursement and submits to Prov'l Accountant</li> <li>• Certifies to the correctness of the prepared advice</li> <li>• Forwards Advised checks to the cashier at the PTO</li> <li>• Deliver Accountants Advice to depository bank</li> </ul>		
<p>PTO</p> <ul style="list-style-type: none"> <li>• Cashier</li> </ul>	<ul style="list-style-type: none"> <li>• Receives checks for release</li> <li>• Records checks to the Check Register Book</li> <li>• Release checks to claimants</li> <li>• Record to Cash In Bank Book</li> <li>• Prepares Report of Checks Issued(RCI)</li> <li>• Submits RCI with the vouchers/payrolls to the PACCO</li> <li>• Files receiving copy of RCIs.</li> <li>• Prepares Report of Accountability for Accountable Forms (RAAF)</li> </ul>		
<p>PACCO</p> <ul style="list-style-type: none"> <li>• Bookkeeper</li> </ul>	<ul style="list-style-type: none"> <li>• Receives the RCIs with vouchers/payrolls &amp; duplicate copy of checks attached</li> <li>• Reviews and prepares Journal</li> </ul>		

<ul style="list-style-type: none"> <li>• Head of bookkeeping section/Prov'l Accountant</li> <li>• Bookkeeper</li> </ul>	<p>Entry Voucher (JEV) of each disbursement at the E-NGAS</p> <ul style="list-style-type: none"> <li>• Reviews and approves the prepared JEV in the E-NGAS</li> <li>• Generation and printing of financial statements from the E-NGAS</li> <li>• Submits financial reports to COA, copy furnished the AMHPP</li> </ul>		
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**Section 7 Workflow of Disbursements (Petty Cash)**

Responsible Office/Person	Activity	Time frame	Official Forms
<p>PTO</p> <ul style="list-style-type: none"> <li>• Cashier</li> <li>• AMHPP Plant Supervisor</li> <li>• AMHPP Admin Aide</li> <li>• Cashier</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Establishment of the Petty cash fund (estimate amount: P20, 000.00)</b> <ol style="list-style-type: none"> <li>1.Prepare the cash advance voucher in her name with attached trust funding slip</li> <li>2.Submit to AMHPP</li> <li>3.Signs Trust Funding Slip</li> <li>4.Process in the usual accounting procedures</li> <li>5. Encash check and keep the cash in a safety vault</li> </ol> </li> </ul>		<p>Disbursement Voucher, Trust Funding Slip</p> <p>Commercial Check</p>
<p>AMHPP</p> <ul style="list-style-type: none"> <li>• Requesting Personnel</li> <li>• Plant Supervisor</li> <li>• Requesting Personnel</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Utilization of the Petty cash fund</b> <ol style="list-style-type: none"> <li>1.Accomplish Box A 'Requested by' portion of the PCV</li> <li>2.Signs Box A 'Approved by' portion of the PCV</li> <li>3.Submit the duly approved PCV to Cashier (Petty Cash Fund Custodian)</li> <li>4.Signs in Box B ' cash received</li> </ol> </li> </ul>		<p>Petty Cash Voucher</p>



	by' portion of PCV and receives the desired amount of cash needed for emergency purchase.		
PTO • Cashier	<ol style="list-style-type: none"> <li>1. Signs Box B 'paid by' portion of PCV</li> <li>2. Issues the 2<sup>nd</sup> copy of the PCV to the requesting personnel</li> <li>3. Records paid PCVs in the CDR (Cash Disbursement Record). Fill up the following columns: date, reference, name of payee, nature of payment, amount in the credit column and cash advance balance.</li> <li>4. File the original copy of the PCV awaiting liquidation</li> </ol>		PCV, Cash Disbursement Record
AMHPP • Requesting Officer/Admin Aide	<ul style="list-style-type: none"> <li>• <b>Liquidation of Petty Cash Advance</b></li> </ul> <ol style="list-style-type: none"> <li>1. After the purpose for which it was given has been served, accomplish all the supporting documents in accordance with Government accounting requirements and submits to cashier together with the 2<sup>nd</sup> copy of the PCV.</li> </ol>		Trust funding Slip, Disbursement Voucher/payrolls, Purchase Request Canvass, Abstract of Bids, Purchase Order, acceptance & Inspection, Pre and Post Inspection, Travel Order, Certificates of Appearance, Official Receipts, Appendix A & B, Liquidation Report,



	<p>not equal to the amount paid, retrieve from file the CDR and record the necessary adjustments based on the liquidated PCV. Fill up the following columns: Date, reference, name of payee, and nature of payment, amount in the appropriate debit, credit and balance columns.</p>		
<p>PTO</p> <ul style="list-style-type: none"> <li>• Cashier</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Replenishment of Petty Cash Fund</b></li> </ul> <ol style="list-style-type: none"> <li>1. Retrieve from file the PCV together with the supporting documents. Check the completeness of all the PCVs for replenishment.</li> <li>2. Prepare the Petty Cash Replenishment Report (PCRR) in 2 copies based on the PCVs in numerical sequence and fills up the following columns: date, PCV Number, particulars &amp; amount. This is done when the Petty cash fund is about to be depleted.</li> <li>3. Signs in the 'Certified Correct by' porting of the PCRR.</li> <li>4. Based on the PCRR, prepare DV in 3 copies.</li> <li>5. Attached the PCRR &amp; PCVs to the Trust Funding Slip and Disbursement Voucher.</li> <li>6. Submit to AMHPP</li> </ol>		<p>PCRR</p> <p>Disbursement Voucher</p>
AMHPP			

<ul style="list-style-type: none"> <li>• Admin Aide</li> <li>• Plant Supervisor</li> <li>• Admin Aide</li> </ul>	<ol style="list-style-type: none"> <li>1. Receives documents and enter to logbook</li> <li>2. Signs in the Trust funding Slip</li> <li>3. Forwards documents to PACCO for the usual Government Accounting Procedure.</li> </ol>		
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**Section 8 Service Coverage**

Budget preparation

Cash advances for local travels

Cash advances for special projects and events

Clearances from property accountabilities

Disposal of unserviceable, obsolete and excess properties

Grievances

Liquidations for special projects and events (with or without refund)

Liquidations on local or local travels (with or without refund)

Liquidations on local travels (with reimbursement)

Liquidations and replenishment of petty cash

Mailing

Processing of;

Initial salaries

Monetization

Overtime services

Salary differentials

Payment of terminal leaves

Payment to service utility/contractors

Petty cash advances for outsourced emergency repairs

Petty cash advances for procurement of parts, supplies and materials

Personnel development

Nominations to study and non-study programs, conferences and workshops

Pre-travel documentation of foreign trainings/scholarship grants

Personnel movement/hiring

Daily time records

Details/reassignments

Hiring of applicants

Leave applications (less than 30 days)

Leave applications (30 days or more)

Promotional appointments/lateral transfers

Secondments

Terminal leaves

Procurement

Annual Procurement Program

Procurement request

Alternative methods

Public bidding

Requisitions for / Issuances of:

Equipment, furniture and fixtures (included in the APP)

Equipment, furniture and fixtures (not included in the APP)

Fuel withdrawals

In-house services

Supplies and Materials (included in the APP)

Supplies and Materials (not included in the APP)

Vehicle dispatch/Trip tickets

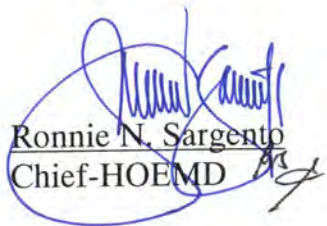
## **Section 9 Formats**

**MEMORANDUM OF UNDERSTANDING  
ON  
JICA ENVIRONMENTAL SOCIAL CONSIDERATION**

During the discussion, JICA Consultant Team (TEPSCO headed by Mr. Mitsuru Shimizu) provided the explanation to the Department of Energy (DOE), which is the responsible organization to implement the Likud Mini-hydropower Development Project, the necessity and importance of the Environmental Social Consideration and Environmental Monitoring to be conducted.

Hydropower and Ocean Energy Management Division (HOEMD) of the DOE understand the necessity as well as the importance of said Environmental Monitoring and agreed to conduct needed monitoring in conformity to the Environmental Monitoring Sheet provided by JICA.

December 20, 2012

  
Ronnie N. Sargento  
Chief-HOEMD

MEMORANDUM OF UNDERSTANDING

ON

ENVIRONMENTAL MONITORING

During the discussion, JICA Consultant Team (TEPSCO headed Mr. Mitsuru Shimizu) provided the explanation to the Provincial Planning Development Office (PPDO) of Ifugao Province, which is designated as the organization to operate and maintain Likud Mini Hydro Power Plant, the necessity and importance of the Environmental Monitoring to be conducted after the commencement of Likud Mini Hydro Power Plant operation.

PPDO understand the necessity as well as importance of said Environmental Monitoring and agreed to conduct needed monitoring in conformity to the Environmental Monitoring Sheet provided by JICA.

December 12, 2012 in Lagawe, Ifugao Province



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Engineer Carmelita B. Buyuccan

Provincial Planning and Development Coordinator, Ifugao Province

**Minute of Meeting with Sangunian Bayan members in Municipality of Asipulo**

Date: February 21, 2011, 13:40-15:00

Venue: Sangunian Bayan Hall of aAsipulo

Present: 16 persons

Mayor of Asipulo: Hon. Eladio Bang-ud

SB members: Hon. Thomas U. Pull (Vice- Mayor)

Hon. Denis P. Gumangan

Hon. Clarence D. Dupingay

Hon. Clarence P. Bahingawan

Hon. Romel D. Pallay

Hon. Christine D. Humiwat

Hon. Florence Piggangay

Hon. Fernando D. Dupingay

Hon. Robert P. Ullani

JICA: Mr. K. Hamaguchi

Ms. Jennifer P. Erice

JICA Study Team: Mr. M. Shimizu

Mr. Y. Miyamoto

Ms. N. Hayashi

Mr. Ignacio N. Bunoluna

Highlights of the meeting/Discussion:

1. Preliminaries

- The meeting started at 1:40pm after the SP meeting finished in Lagawe, the JICA study members proceed to visit Asipulo Sangunian Bayan members to explain the purpose of the Cotcot study.
- PPDC Carmelita Buyuccan introduced the JICA and JICA Study team to the SB members.

2. Presentation

- Mr. K. Hamaguchi, JICA personnel presented the purpose of visit SB members and the back ground of the Cotcot study.
  - Scaling up of mini-hydro projects in Ifugao
  - Support for Rice Terrace Conservation Fund
- Mr. M. Shimizu, the Study Team Leader presented the outline of Cotcot study.
  - Objectives of the project
  - History and background of the project of the project
  - Location of the project



- Schedule and items of the feasibility study
- Basic considerations in the planning and designing of the project

### 3. Discussion/Open Forum

- Hon. Dennis Gumangan, SB member who joined the JBIC study team in 2004 in Barangay Haliap (Mappit site) before asked the status of previous study and the difference between past study and the study this time.

Mr. Shimizu replied that during JBIC pilot study, the team conducted only pre-feasibility study which was simple visual inspection, but that study was suspended in the middle stage due to UNESCO's opposition and Free Prior Informed Consent for the indigenous peoples rights concern. Since then e8 tried to develop the Mappit site. But there were some opposition due to some speculation and suspicion on the intent of the study team saying it was for the purpose of treasure hunting. They pretended to conduct mini-hydro study but real intention was to find gold. This is why the development of the site was transferred in Ambangal of Kiangang where it is now finished and operational.

- Another SB member asked if the host Barangay had any benefit from the Ambangal project.

PPDC Carmelita Buyucan answered that since Energy Regulatory Committee has not yet approved authority to sell powers, though the operation has started and meter reading of power output sent to IFELCO. Thus none of benefit shares yet. Once it is approved, the sharing will be consult with host municipality of Kiangang and host Barangays.

- How about the impact on the environment?

Mr. Shimizu answered the Study team would conduct Initial Environmental Examination (IEE) and considered the mitigation measure to minimize the impact.

- How about the possibility of affecting upstream of river?

The Study team will examine it.

### 4. Conclusions and closing.

- Without conducting feasibility study, the JICA study team cannot say anything like impact, economical and financial viability and organizational aspect of the project. During the e8 study, there were some misunderstanding towards the study, but now the SB members accept and support the study.
- 2 SB members were asked to join the community consultation the next day.

**Minute of Meeting with Sangunian Panlalawigan (SP) members  
in Provincial Government of Ifugao**

Date: 21 February 2011, 10:00-12:30 AM

Venue: Sangguniang Panlalawigan plenary hall, Provincial Capitol of Ifugao

Present:

Vice Governor:	Pedro G Mayam-o, Presiding Officer
SP members:	Jose Jordan T. Gullitiw
	Robert K. Humiwat
	Victor H. Bunnol, Jr.
	Robert B. Mangyao
	Joseph J. Odan
	Frederick F. Dulnuan
	Clemente T. Bongtiwon
	Victor B. Bunnol, Sr
	Gerald D. Luglug
	Ronel T. Gayamo
JICA:	K. Hamaguchi
	Jennifer P. Erice
Project Study Team:	M. Shimizu
	Y. Miyamoto
	N. Hayashi
	Ignacio Bunolna (Interpreter)
	Wilfrido Palarca (IEE study member)
	Martin John S. Morales (IEE study member)

Highlights of the meeting/Discussion:

1. Preliminaries

- Vice Governor Pedro Mayam-o, presiding officer, called the meeting to order at 10 o'clock AM after the secretary declared that there was a quorum.
- Board Member Robert Mangyao moved, and duly seconded, for the suspension of the rules to accommodate the presentation of the visitors.
- The presiding officer acknowledged the presence of the study team and JICA and requested them to proceed with the presentation.
- Before the presentation, PPDC Carmel Buyuccan, thanked the SP for accommodating the request to do a presentation of the proposed feasibility study of the Cotcot mini-hydro power plant. She went on to introduce the members of the study team and the representative from JICA.

2. Presentation

- Mr. K. Hamaguchi, JICA personnel, presented the background and purpose of the visit of the Cotcot feasibility study team.
  - Scaling up of mini-hydro projects in Ifugao
  - Support for Rice Terrace Conservation Fund
- Mr. M. Shimizu, the Study Team Leader, presented the outline of Cotcot feasibility study.
  - Objectives of the project
  - History and goal of the mini-hydro development in Ifugao
  - Basic concept of the project
  - Location of the project
  - Schedule and items of the feasibility study
  - Basic considerations in the planning and designing of the project

### 3. Discussion / Open Forum

- What the capacity the proposed Cotcot mini-hydro power plant?
  - ↓
  - 1M (1,000 kW)
- How much Rice Terrace Conservation Fund (RTCF) will be generated from the Cotcot project?
  - ↓
  - It will depend on the result of the feasibility study. However, the study team projects it will generate 10 to 15 Million pesos per year.
- Why was the output capacity changed? During the JBIC study and e8 study, every time a study is made the capacity changed. The original plan was 900kW, and 1.5 MW and then 1 MW this time. (Hon. Jordan Gullitiw)
  - ↓
  - The study team has to analyze what scale will be the most feasible. It has to be examined.
- After the study, will it be surely implemented? There were many studies conducted in the past, but none of them was realized. (Hon. J. Gullitiw)
  - ↓
  - JICA funded on a grant basis the Feasibility Study (FS) and is offering through the “Environmental Development Project” (EDP) of Development Bank of the Philippines (DBP) for the implementation as soft loan project.
- Why was the JBIC study suspended? (Hon. J. Gullitiw)
  - ↓
  - UNESCO then has negative perception on mini-hydro power plant thinking that it will adversely affect the landscape of the rice terraces, a UNESCO World Heritage site. But now UNESCO understood what a mini-hydro power is specially after the e8

funded project.

- Consider the impact by the project on the Ifugao intangible culture. Consider the environmental impact on heritage and wild life. It might have an adverse effect on the cultural lifestyle. ( Hon. Joseph Odan)

↓

It will be examined in the Feasibility Study.

- Can the Provincial Government of Ifugao (PGI) prevail on the loan?

↓

It depends on the decision of PGI after the result of Feasibility Study.

- How much would be the construction cost?

↓

It is about 100 Million pesos, equivalent to 2 Million US dollar. The PGI had a plan of provincial hospital establish with 50 Million pesos loan project in the past, but it was cancelled. If the Cotcot project will be implemented as a loan project, it is another story if the PGI really can avail a loan. The SP is worried about how the PGI can repay such big loan? The SP would like to ask JICA and TEPSCO to find sponsor and/or any grant scheme for the Cotcot. 100% of loan is very impossible.

↓

The study team will analyze if the project is financially, economically, organizationally, environmentally feasible or not and show the cash flow.

- Does UNESCO still oppose the Cotcot project? (Hon. Robert Mangyao)

↓

It is located outside the heritage sites and they have a good understanding about mini-hydropower projects.

- The name Cotcot is not correct because all facilities will be located in municipality of Asipulo. Cotcot is a sitio and is located in the municipality of Kiangan. We should change that to “Likud”, the proper name of its location.

↓

The suggestion was accepted but it will still be finalized by the end of the study.

- Will the RTCF be allocated only the World Heritage site? (Hon. J. Dulnuan)

↓

As long as there are rice terraces, the municipality can access from it. In case of the Ambangal project, the host barangays and municipality has priority over the RTCF but other barnagays in other municipalities are eligible and have a share in the allocation of the RTCF.

- Will the tourism industry also be able to implement by the RTCF?(Hon. J. Dulnuan)

↓

It could be. PPDO made the draft operation and guidelines of RTCF. It will be finalized soon and copy to be provided to SP members later.

- By who and how will the RTCF management monitored? (Hon. J. Dulnuan)
  - ↓
  - The Ordinance 2010-019 described its management structure and some implementation guidelines. This will be further refined to include the monitoring system.
  
- Hon. Robert Humiwat thanked JICA and the members of the study team for again initiating the study of the Likud mini-hydro power plant. He informed that this is in keeping with the provincial ordinance on mini-hydro power development in the province. While the study is a 100% grant from JICA, the construction phase will be another story as this is proposed for a loan which brings about some skepticism. He emphasized that the profit to be derived will go for loan repayment before any other.
 

He asked if the study team and JICA help in scouting for possible grant for the Project. In the meantime he asked that the feasibility study be completed first as it can be offered on a Build Operate and Transfer scheme.
  
- Hon Humiwat suggested that the executive department of the PGI should look into the application for Water Right permits of all feasible sites to ensure that PGI has right for the development. It should be included in the plan to be presented to the SP and EXECOM.
  - ↓
  - The Water Right application requires annual payment. It depends on the use of water volume for generation power. In case of the Ambangal, it is around 7,000peso per year.
  
- During the JBIC study, the Cotcot was proposed as grant project. Can it be revive as grant project? (Hon. Robert Mangyao)
  - ↓
  - There is no more grant project for the Philippines under JICA scheme because the Philippine has become a middle income level of country.
  
- Can JICA help in the conduct of FS for the potential sites?

#### 4. Conclusions and adjournment

- Since it was already getting past noon and there were no more questions, the Presiding Officer thanked the members of the study team and JICA. Likewise PPDC Carmel Buyuccan thanked the SP for accommodating the team to present and for their participation and inputs.

Meeting ended at 12:30.

# JICA's assistance for Rice Terraces Conservation and Mini-hydropower Development in Ifugao Province

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Mr. Katsumasa Hamaguchi  
Representative, JICA Philippine Office  
February 21, 2011

Japan International Cooperation Agency

## Background

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“Pilot Study on Rural Vitalization Project for the Conservation of the Ifugao Rice Terraces” by former JBIC (now JICA) in 2004.

Ambangal Mini-hydro Project by e8 thorough TEPCO in 2010.

JICA has been exploring the possibility for supporting this unique project in Ifugao Province.

2 possible areas for cooperation were identified through the series of discussions with the Governor.

- (1) Scaling up of Mini-hydro projects
- (2) Support for Rice Terrace Conservation Fund

Japan International Cooperation Agency

## (1) Scaling up of Mini-hydro Projects

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### Background

- Request letter from the Governor dated September 30, 2010 for the support for feasibility study of Cotcot site.
  
  - Environmental Development Project (EDP)
    - > 2 step loan facility through DBP
    - > Total Amount: 24.8 Billion Yen (approx. 12.4 Billion Pesos)
    - > Target Sectors:
      - 1) Water Supply and Sanitation
      - 2) Renewable Energy
      - 3) Industrial Pollution Control
      - 4) Waste Management
- No hydro projects applied yet.

## (1) Scaling up of Mini-hydro Projects

---

### Project Title

Study for Promoting Implementation of EDP

### Objectives

- Formulate "Guideline for Evaluating Mini-hydro Project" (DBP)
- Conduct F/S of Cotcot site as a case study (PGI)

### Duration

Feb 2011 to Aug 2011 (7 months)

### Consultants

Tokyo Electric Power Services Co., Ltd (TEPSCO)  
Headed by Mr. Mitsuru Shimizu

## (2) Support for Rice Terrace Conservation Fund

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### Background

- Request letter from the Governor dated November 11, 2010 for the Japanese Overseas Cooperation Volunteers (JOCV) program.

### Objectives

To support Provincial Government to manage RTCF

### Duration

2 years

Thank You.

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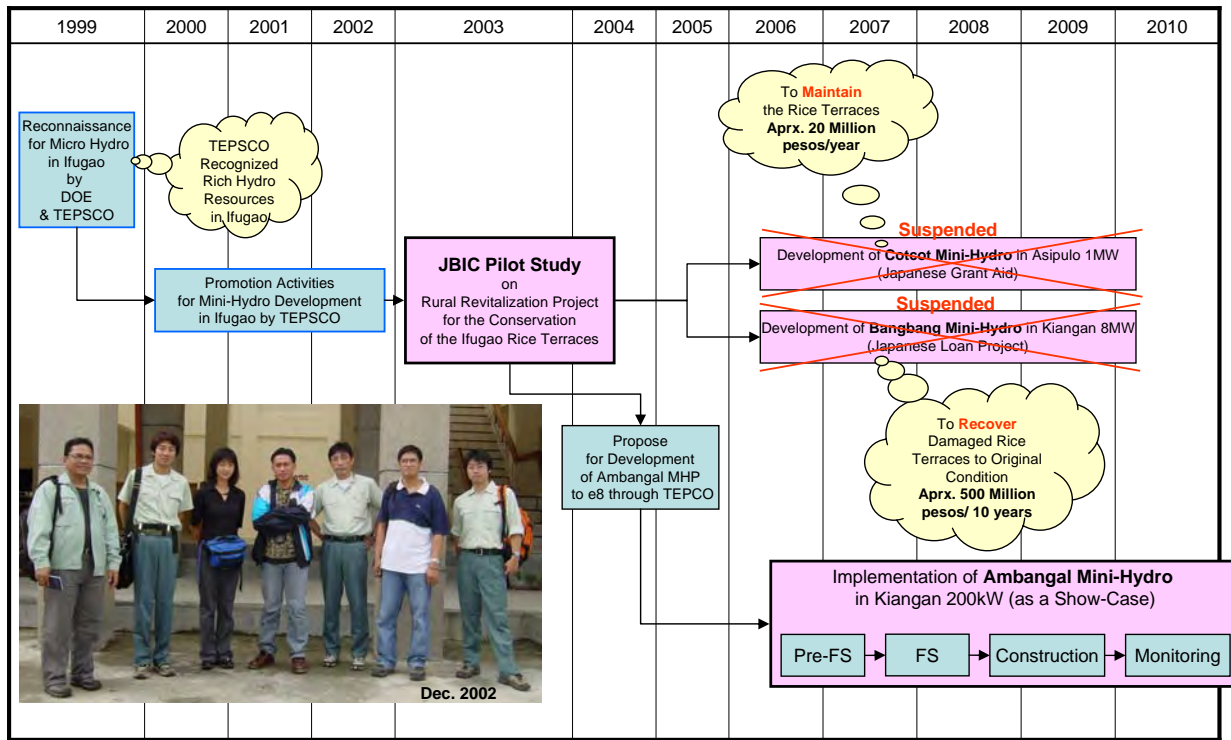
# Outline of the Likud Mini-Hydropower Development in Asipulo, Ifugao

Note: "Cotcot" is tentative name for only Feasibility Study period

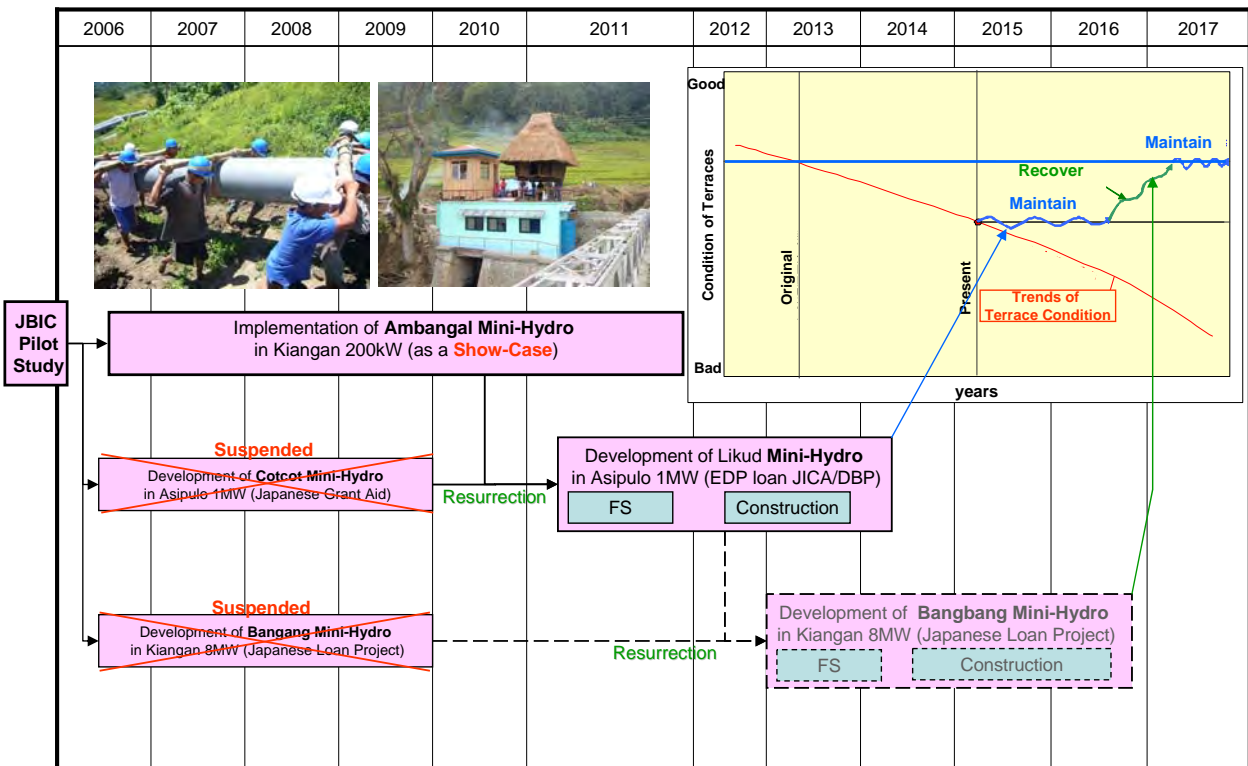
## Project Objectives

- Support local activities to conserve the Ifugao Rice Terraces.
- Enhancement of "Rice Terrace Conservation Fund" by making use of electricity sales from the Likud MHP.
- Promote development of the Mini-Hydro Power resources with sustainability in the Ifugao & the Philippines.
- To show Philippines a good reference of regional contribution by Mini-hydropower development and aims to expand the application of the Environmental Development Project.

# History and Goal of the Mini-Hydro Development in Ifugao



# History and Goal of the Mini-Hydro Development in Ifugao



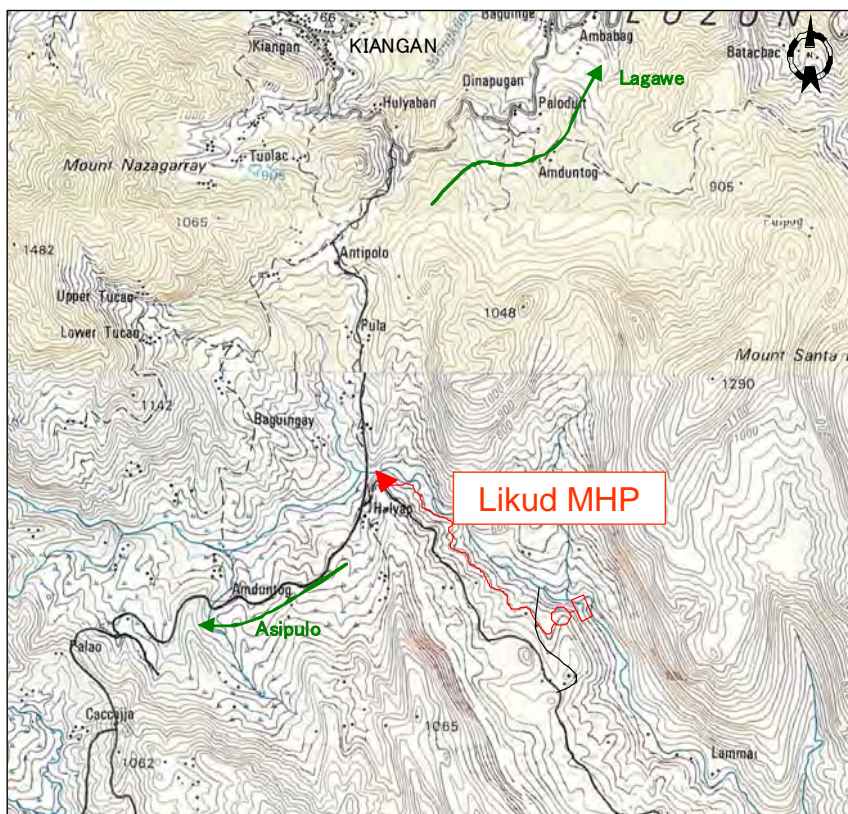
## Basic Concept of the Project

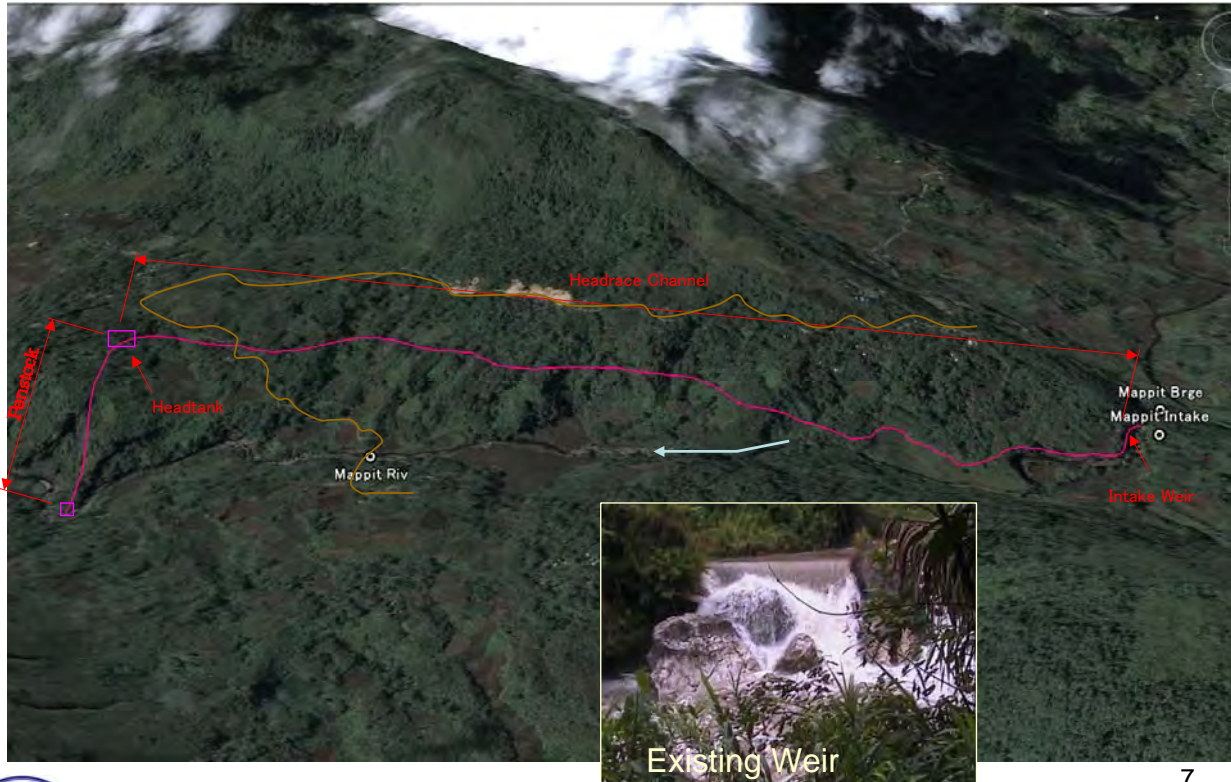
- Generated electricity is sold to the electric power cooperative through grid connection.
- Utilizing the revenue of the Project for the conservation of Ifugao rice terraces.



- Repair and Maintenance of Eroded Rice Terraces
- Improvement of Irrigation systems
- Micro Finance
- Reforestation, etc.

## Location of Likud Mini-Hydropower Site





Items	Feb.	Mar	Apr	May	Jun	Jul	Aug
Basic Data Collection	■						
Presentation/Community Consultation	■		■		■	■	
Installation of Water Level Gauge	■						
Measurement of River Flow and Water Level	■	■	■	■	■	■	■
Topographic Survey	■	■	■	■	■		
Initial Environmental Examination	■	■	■	■	■		
General Layout Plan		■					
Generation Plan			■				
Design of Civil, Electrical & Mechanical Facilities			■	■	■		
Cost Evaluation				■	■		
Economical & Financial Analysis					■	■	
Preparation of Draft Report						■	■
Final Report							■

■ : Activities at the Project Site/Manila  
 ■ : Activities in Japan



Installation of Water Level Gauge



Water Level Gauge



Measurement of River Flow



Topographic Survey



Social Perception Survey

## Site Selection

- Enhancement of “Rice Terrace Conservation Fund” for *“Maintain Ifugao Rice Terraces (Aprox. 20 Million pesos/year)”* could be generated in combination with Ambangal MHP. (It is recognized in JBIC Study)
- Power plant must be located outside of World Heritage Area

## System Layout

- Irrigation water must be diverted from the Intake/Headrace.  
( Water use for irrigation is the higher priority rather than power use)
- Minimize the area affected around the Project Area.

Water Diversion for Irrigation System





## People's Comment about Ambangal MHP (Reference)

*"At the start when you were coming to consult with us, we were doubtful and suspicious. We were concerned because part of our forest and rice land will be affected. But after the series of meetings and contacts, I began to change my mind, especially when I saw how the team was seriously working even during bad weather. This was also observed by our neighbours. We gave our consent even if we were not 100 percent sure. But it was a good decision and I was happy when the project started construction and the lands affected were compensated. During the inauguration, there were many people who attended. I am convinced that the project, as you have been saying during the many community meetings, is for the benefit of the community."*

Eliza Guimbungan, resident of Pindongan, Kiangan.

## End of Presentation



*Haggiyo !!!*

MINUTES OF THE CONSULTATION MEETING WITH THE BARANGAY COUNCILS OF HALIAP AND PANUBTUBAN ON FEBRUARY 22, 2011 HELD AT THE HALIAP BARANGAY HALL AT 9:15 A.M.

PRESENT:

Roger Manghi	Barangay Captain, Haliap
Oscar Lay-o	Barangay Captain, panubtuban
Josephine Bistol	Kagawad, Panubtuban
Moises Dillag	Kagawad, Paunubtuban
Agnes gucmi	Kagawad, Panubtuban
Basilio Bayaona	Kagawad, Haliap
Ernesto Tagtag	Kagawad, panubtuban
Clemente Tenenan	Kagawad, Haliap
Rosemarie Daquel	Kagawad, Haliap
Francis Bummac	Kagawad, panubtuban
Fedelito Rendon	Kagawad, Haliap
Constancio Catama	Kagawad, Haliap
Estela Bagiw	Barangay treasurer, Haliap
Nancy Addangna	Barangay secretary, Haliap
Maria Lad-ao	Kagawad, Haliap
Ernesto Nalliw	Kagawad, Panubtuban
Donato Khablinan	kagawad, Panubtuban
Willie Palarca	Consultant, AECOM
Martin Morales	Consultant, AECOM
Benjamin Panganiban	Haliap
Alfredo Bituwon	Haliap
Jayson Magayanes	Chief of Party, Ularte-Garcia Surveying
Cecilia Garcia	Project manager, Ularte-Garcia Surveying
Mitsuru Shimizu	TEPSCO
Yukio Miyamoto	TEPSCO
Nobuki Hayashi	TEPSCO
Carmelita Buyuccan	PPDC, PPDO
Antonio Linglingon,	Staff, PPDO
James Sawey	Documentor
Ignacio Bunolna	Facilitator

HIGHLIGHTS OF THE MEETING/DISCUSSION:

I – PRELIMINARIES

- The meeting started at 9:15 AM after a video presentation on the e8 Ifugao Ambangal Minihydro power plant
- Opening prayer was led by Barangay Captain Oscar Lay-o
- Kagawad Basilio Bayaona, on behalf of the Barangay Council of Haliap, welcomed the Participants
- PPDC Carmelita Buyuccan acknowledged the presence of everyone and asked each one to do a self introduction starting from the barangay councils. After the self introduction she proceeded to thank the members of the councils for accommodating the request to meet with the study team. She informed that a similar meeting was also done earlier with the members of the



Sangguniang Panlalawigan and the Sangguniang Bayan of Asipulo. And now the team is here to consult with the barangay councils. She encouraged everyone to listen very well and ask questions and comments saying that their participation is important.

## II – PRESENTATION

- NOBUKI HAYASHI, Social preparation expert of the study team , presented and discussed the following:
  - a. Objectives of the project
  - b. History and goal of the mini-hydro development in Ifugao
  - c. Basic concept of the project
  - d. Location of the project
  - e. Schedule and items of the feasibility study
  - f. Basic considerations in the planning and designing of the project
- To enhance better understanding of the presentation, some items were translated by the facilitator in the local dialect.

## III- DISCUSSION/OPEN FORUM

- Barangay secretary Nancy Addangna asked for an assurance of the implementation as she said that the same team conducted a study of the Cotcot minihydro some years ago but it was not pursued. What if this will happen again? This gave some people to suspect of other motives, looking for treasure for instance.

Engr. Buyuccan of the PPDO responded by explaining what happen then during the conduct of the study. The position of the Provincial Government supports the conduct of the feasibility study. Result of the feasibility study will largely determine the implementation.

- Kagawad Ernesto Nalliw recounted what happened to the earlier failed Cotcot minihydro proposal in 2005. He however said that he is supporting the conduct of the feasibility study.

PPDC Carmel Buyuccan thanked the Kagawad for the statement of support.

- Barangay treasurer of Haliap asked if it is a grant since it is foreign funded.

PPDC Carmel Buyuccan explained that the fund for the conduct of the feasibility study is a grant funded by JICA. But fund for the construction and implementation will have to be sourced out. JICA is offering a soft loan from the EDP but it is up to the Provincial Government to decide. The feasibility study result will largely determine the decision.

- Kagawad Tenenan asked what happens if there are some problems on the right of way.

PPDC Carmel Buyuccan explained that acquisition for right of way is part of the feasibility study. The council should help in the negotiation. She informed that in the Ambangal mini-hydro

Council members of both, Haliap and Panubtuban, are unanimous in saying YES, the study should proceed.

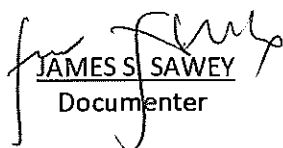
#### IV. SUMMARY OF AGREEMENTS/ACTION POINTS

1. Both Councils of Haliap and Panubtuban support the conduct of the feasibility study of the Likud Minihydro power plant.
2. Installation of water level gauge will be on Wednesday, February 23, 2011. The Barangay Council of Haliap (c/o Kgd Constancio Catama) will be responsible in recruiting two (2) laborers for the installation. One water level gauge reader will be hired preferably from sitios near the installation site to start immediately. Barangay secretary of Haliap is tasked to scout for a suitable candidate.
3. Household interview for the initial environmental examination will commence by mid March. Ten (10) interviewers (5 male, 5 female) from each barangay will be trained and hired for this activity. Candidate applicants to submit their names to the barangay secretary on or before March 15, 2011. Depending on the number of teams, local guides will also be hired.
4. Topographic Survey team will come on Monday, February 28, 2011, to start the survey. They will coordinate with the Barangay Council for support and possible assistance to the team.
5. To facilitate understanding and appreciation on minihydro power plant, a field trip for the members of the Barangay Councils is scheduled on Monday, February 28, 2011 to visit the Ambangal mini-hydro power plant.

#### V. CLOSING STATEMENTS/ADJOURNMENT

- Barangay captain Oscar Lay-o of Panubtuban expressed his gratitude and thanked the members of the study team and representatives of the Provincial government of Ifugao for choosing the their barangays for the conduct of the feasibility study. He likewise thanked his colleagues from Panubtuban and Haliap for their presence and support and expressed hope for the success of The project.
- PPDC Carmelita Buyuccan , on behalf of the provincial government, thanked the members of the barangay councils of Haliap and Panubtuban for accepting and supporting the conduct of the feasibility study. She said that the Provincial Government will try its best to look for the fund required for the construction if the project is found feasible.
- The meeting was adjourned at 11:40 AM.

PREPARED BY:

  
JAMES S. SAWEY  
Documenter

## CONSULTATION MEETING

Date: February 22, 2011

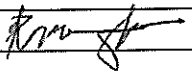
Venue: Haliap Barangay Hall

### ATTENDANCE

Name	Position	Office/Barangay	Signature
1. OSCAR UY-O	Bargy Capt.	Panambutan	[Signature]
2. Josephine U. Butil	Bargy Kagawad	Panambutan	[Signature]
3. MOSES B. DILLAG	Bargy Kagawad	PANUBTUBAN	[Signature]
4. Agnes B. Guemi	Kagawad	Panambutan	[Signature]
5. Basilio Bayadera	Kagawad	Haliap	[Signature]
6. Ernesto Fajlag	Kagawad	Panambutan	[Signature]
7. CLEMENTE TEJINAN	BRGY KAGAWAD	HALIAP	[Signature]
8. ROSEMARIE DACQUEL	BRGY KAGAWAD	Haliap	[Signature]
9. Francis N. Bunnisc	"	Panambutan	[Signature]
10. FEDELITO A. RENDON	BRGY. KAGAWAD	Haliap	[Signature]
11. CONSTANCIO Catama	BRGY KAGAWAD	Haliap	[Signature]
12. Leticia P. Babil	Barang. Treasurer	Haliap	[Signature]
13. NANCY D. ADDANGNA	Barangay Secretary	Haliap	[Signature]
14. MARIA L. LAD-AG	Barangay Halimp	Haliap	[Signature]
15. Ernesto L. Nallin	Bargy Kagawad	Panambutan	[Signature]
16. DONATO B. Khablinan	Bargy Kagawad	Panambutan	[Signature]
17. Willy Palencz	AREDM Consultant	AREDM	[Signature]
18. Martin Morales	AREDM Consultant	AREDM	[Signature]
19. Benjamin Panganiban		Haliap	[Signature]
20. Alfredo Bittuwan		Haliap	[Signature]
21. Jason Magayanes	SURVEYOR		[Signature]
22. Mitsuro SHIMIZU	TEPSCO	Tokyo	[Signature]
23. Yukio HIYAMOTO	TEPSCO	Tokyo	[Signature]
24. Carmelita B. Bunnisc	PPDC	PPDO	[Signature]
25. Antonio Linghuan	PPDO Staff		[Signature]
26. Nobuki Hayashi	TEPSCO SP	TEPSCO	[Signature]
27. MA. CECILIA U. GARCIA	PROJ. MGR./GEODETIC ENGR	URLARTO-GARCIA SURVEYING	[Signature]
28. <del>JASON MAGAYANES</del>	<del>CHIEF OF PARTY</del>	"	
29. Ignacio Bunolra			[Signature]
30. JAMES STONEY			[Signature]

# CONSULTATION MEETING

## ATTENDANCE

	Name	Position	Office/Barangay	Signature
1.	ROGER M. MANGIT	BRGY CAPTAIN	HALAP	
2.				
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28 February 2011

A BRIEF REPORT ON THE PLANT VISIT OF THE BARANGAY COUNCILS OF HALIAP AND PANUBTUBAN  
TO AMBANGAL MINI-HYDRO POWER PLANT

The plant visit to Ambangal mini-hydro power plant was carried out on February 28, 2011. It was participated in by 27 members of the Council and Tanod of barangays Haliap and Panubtuban. This activity was planned earlier during the community consultation held at Haliap, the purpose of which was to enhance understanding and appreciation on the mini-hydro power plant.

As earlier agreed the participants arrived at 9.30 am at the power house and proceeded to register. Engr. Shimizu, project manager, welcomed the participants and introduced the plant operators present (Jonathan Tameray and Rodolfo Ananayo). Mr. Tameray gave a short briefing on the structures of the power plant, their daily activities and duties and responsibilities. At this point, the plant supervisor Engr. Jonathan Padduyao arrived and was asked to give further briefing. The participants were asked for any questions but there was none as they were more excited to see the structures and facilities.

The plant operators and supervisor guided the participants to see the facilities and civil structures of the plant. They explained to group the facilities and structures as they toured starting from the power house to the intake weir and were back at about 11.40 for lunch .

After lunch, the group was convened for an informal discussion as to their observations, learning and concerns. Here are some of their feedbacks:

- ✓ The mini-hydro plant is not destructive as we earlier thought
- ✓ There is no dam, intake weir is just like any irrigation system
- ✓ People who do not understand mini-hydro should come here
- ✓ People in Mappit are asking why they are not included
- ✓ Some people are very suspicious that the real motive of this is  
Looking for the treasure.

The group expressed satisfaction and looked forward to the implementation of the agreements made during the consultation in Haliap.

Overall, the plant visit was successful in carrying out its objective of raising positive understanding and appreciation on mini-hydro power plant. I would like however to make an observation. The Operators on duty and who conducted the briefing did well and were helpful. But I suggest that next time they should be in proper attire (not shorts and slippers) to project the good and professional image of the organization.

PREPARED BY:  
IGNACIO N. BUNOLNA

AMBANGAL Plant Visit  
 FEB. 28, 2011  
 ATTENDANCE SHEET

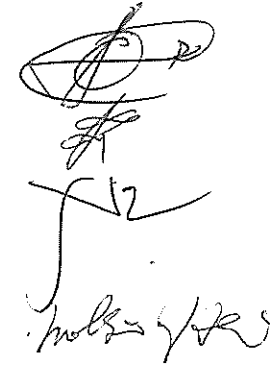


TOKYO  
Summit 2010

Name	Brangay/Office	SIGNATURE
1. Rosemarie M. Dacdul	Haliap	[Signature]
2. Jodela P. Pastis	Haliap	[Signature]
3. Stephanie U. Bical	Panubtuban	[Signature]
4. Ernesto L. Mallin	Panubtuban	[Signature]
5. Ernesto Tagtag	Panubtuban	[Signature]
6. CLEMENTE TENENAN	HALIAP	[Signature]
7. Maria Land-ao	Haliap	[Signature]
8. MOISE B. DILLIG	PANUBTUBAN	[Signature]
9. Fedelito Arsdon	Haliap	[Signature]
10. Basilio Bayuona	Haliap	[Signature]
11. Agnes Guñini	Panubtuban	[Signature]
12. Francis N. Bummac	"	[Signature]
13. NELSON DING	Panubtuban	[Signature]
14. Donato Khablian	panubtuban	[Signature]
15. Maria Land-ao	Panubtuban	[Signature]
16. OSCAR LAY-O	"	[Signature]
17. Jacqui Torda	panubtuban	[Signature]
18. JOE NAY-IT	Panubtuban	[Signature]
19. Joseph Lay-o	Panubtuban	[Signature]
20. BERNARD NGIHTIT	panubtuban	[Signature]
21. Regie Baling	panubtuban	[Signature]
22. Jimmy Lod-ao	panubtuban	[Signature]
23. Lawrence Putac	Haliap	[Signature]
24. Alfredo Bittion	Haliap	[Signature]
25. Elba Doukiran	Haliap	[Signature]
26. Nancy Admagna	Haliap	[Signature]
27. Pedro Pillo	Panubtuban	[Signature]
28. BERNARD K. PADDUNAO	PPPO	[Signature]

29 Ananayo Rodolfo  
30 JONATHAN TAMERAY  
31. Ignacio Buzoba  
32 MITSUHI SHIMIZU  
33 Nobuki Hayashi  
34 Fidel Karaguez

OPERATOR  
OPERATOR  
TEPSLO  
TEPSLO  
TEPSLO



Handwritten signatures and initials, including a large signature at the top, a signature with '12' below it, and another signature at the bottom.

### Highlights of the Stakeholder meeting

**Date:** 14:30-16:30, 27 April 2011  
**Venue:** PPDO office, Lagawe, Ifugao  
**Participants:** PPDO, IFELCO, DOE, DOE Luzon field office, the local topographic surveyor and JICA Study Team  
 24 participants (See attendance sheet)  
**Agenda:** Preliminary Power Planning of the Likud Mini-hydropower by JICA Study Team (TEPSCO)

#### Highlights:

- Project leader, Mr. Shimizu explained the preliminary power planning of the Likud mini-hydropower
  - Available plant discharge in Lamut River was examined by conversion ratio of 6 years data of Hapao gauging station in Municipal Hungduan
  - Topographic survey was done by the local surveyor and established the map 1/2000 scale
  - Demand forecast in Ifugao: 5% increase annually
  - Examined 4 routes of waterway which would be the best location to develop  
The result was Case B
  - Optimum capacity of the Likud power plant must be reflected on the load demand of Ifugao
- Confirmed the planned schedule this time (Civil team, Electrical mechanical and Distribution line team, and social preparation team)
- The local topographic surveyors continues to their activities, particularly, staking the wooden stick along the centerline of waterway route and profile survey

#### Opinions/Suggestions

- Demand forecast is right that 5% increase annually
- As for the community consultation tomorrow, it is difficult let the communities understand about demand forecast and technical issues on the mini-hydropower development. It is better just described the potential affected area, and where the waterway route pass through in there area.
- The PGI will apply the pre-development contract for the Likud mini-hydropower project, but the Sangunian Panlalawigan (the Ifugao Council members) Resolution has not yet issued.
- ERC finally issued the provisional approval for the selling rate P3.61 peso/kWh for the Ambangal mini-hydropower plant, so the PGI will bill to IFELCO the total generated power of last year 2010 soon. The amount is around P3.7 Million pesos.



PROVINCE OF IFUGAO  
ATTENDANCE SHEET

Office: Ifugao Provincial Government  
 Title of meeting/seminar/workshop: Meeting w/ JICA Study Team  
 Venue: PPDO Date: April 27, 2011  
 Expected number of participants: \_\_\_\_\_ Scheduled time: \_\_\_\_\_

Name	Agency, Position	Signature
1 WANCY GAWO - IUNLUNIL	PPDO - PO-1	
2 Wenefredo Malabanan	DOE - HOEMP	
3 Rey V. Salvania	DOE - HOEMP	
4 GOICHI KANEBA	TEPSCO TEAM	
5 DOBIT CABAZON	STUDY TEAM	
6 YPZ TUGUIVAY	IFELCO	
7 NELSON FASATRO	DOE - LFO	
8 RUSSELL G. PANGALANAN	DOE - LFO	
9 Nobuki Hayashi	TEPSCO	
10 Yukio Miyamoto	TEPSCO	
11 MA. CECILIA GARCIA	UGSES (SURVEY TEAM)	
12 JASON MACAYANES	UGSES (CUTTING TEAM)	
13 MASATO SHIMIZU	TEPSCO	
14 Ignacio Bunaha		
15 RICARDO BUTALE JR		
16 KATHRINE ANN CAGAT	SITIM	
17 KRISTINE N. GUAZON	PPDO	
18 Margie Ngiti	PPDO	
19 Jeannette Dulawan	PPDO	
20 Brian John Tubarban	PPDO	
21 Manuel Linares	PPDO	
22 Epifania B. Manglan	PPDO	
23 Gemma B. Tanyag	PPDO	
24 CARMELITA B. BUYUGAN		
25		

CERTIFIED CORRECT:

29

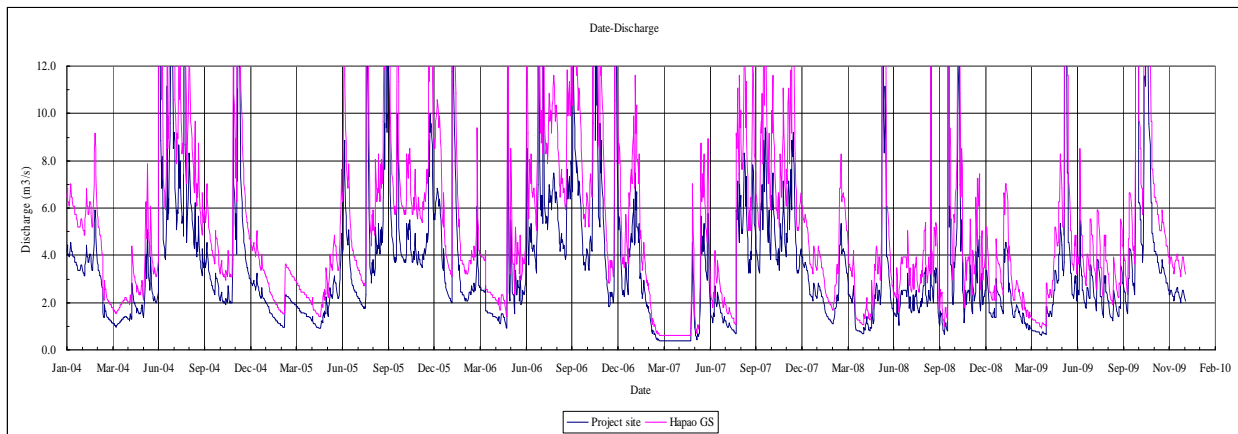
Activity Secretariat

## Preliminary Power Planning of Likud Mini-Hydropower

### Contents of Preliminary Power Planning

1. Estimation for the available plant discharge
2. Examination and selection of the general layout
  - Result of the Topographical Map (1/2,000)
  - Selection of the location of the main civil facilities
  - Comparison study between waterway routes
3. Next examination
  - Site works
  - Internal Works

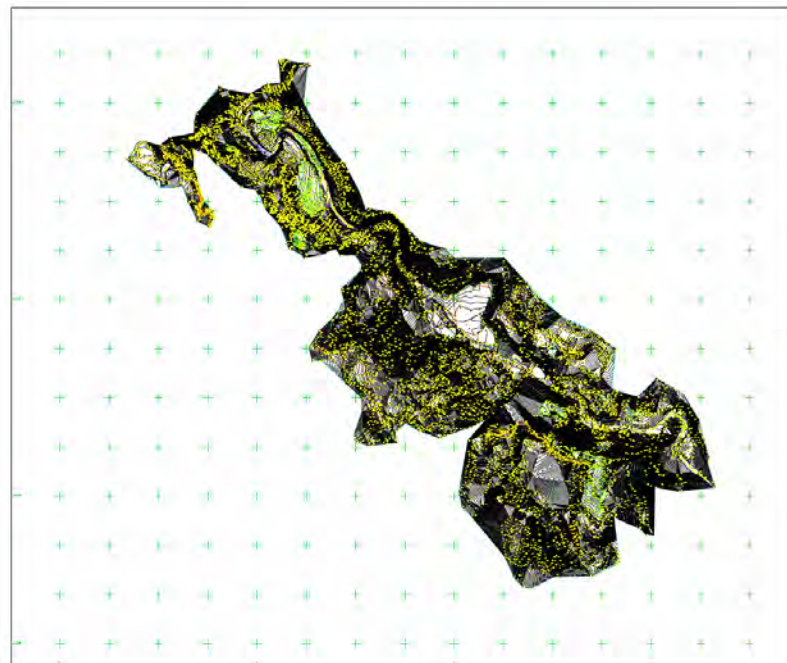
## Estimation for the available plant discharge



1. Observation record of the daily river flow  
     Hapao gauging station: 6 years from Jan. 2004 to Dec. 2009
  
2. Conversion from Hapao GS to Project site  
     Annual precipitation (excluded evaporation)  
         Project site: 2,125mm / Hapao GS: 3,219mm = 0.660  
     Catchment area  
         Project site: 44km<sup>2</sup> / Hapao GS: 45km<sup>2</sup> = 0.978

## Examination and selection of the general layout

- ✓ Result of the Topographical Map (1/2,000)

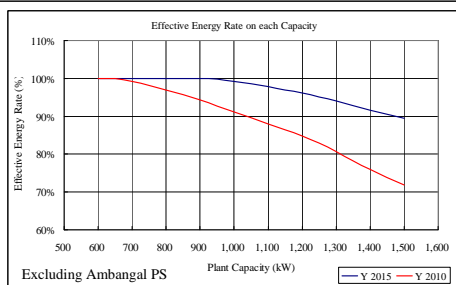
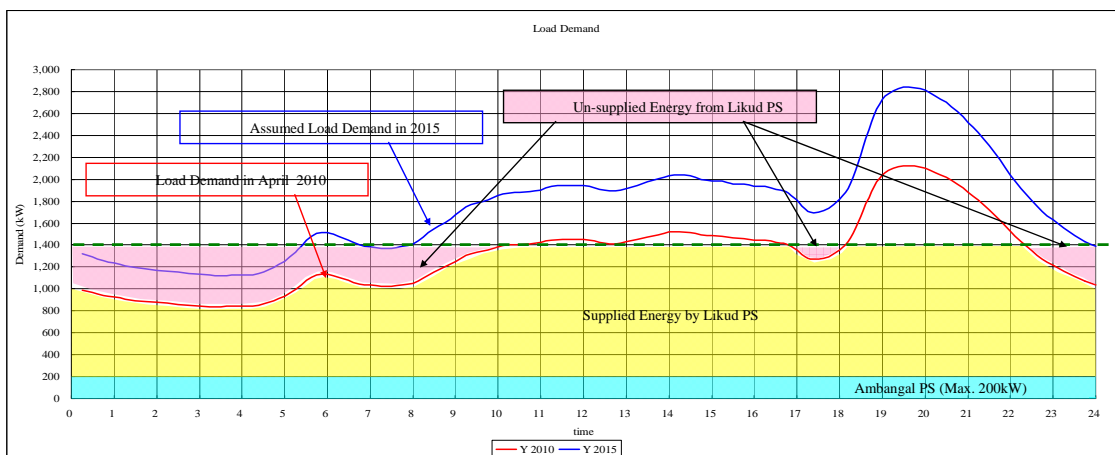


## Examination and selection of the general layout

- ✓ Selection of the location of the main civil facilities



## Examination and selection of the general layout



**Issue on the load demand**

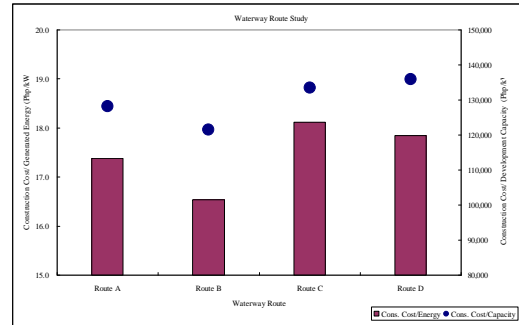
For example; Likud PS has 1,200kW capacity.  
 Total supply capacity including Ambangal PS : 1,400kW  
 Load demand from 22:30 to 10:00 is lower than total supply capacity.  
 Energy supply is limited based on the load demand.

Effective energy : 91% in 2011, 99% in 2015 (1,000kW)  
 85% in 2011, 96% in 2015 (1,200kW)

## Examination and selection of the general layout

✓ Comparison study between waterway routes

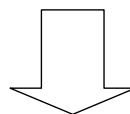
Item	unit	Route A	Route B	Route C	Route D
Intake water level	El.m	600.0	600.0	600.0	600.0
Headtank water level	El.m	597.0	596.0	595.0	589.0
Tail water level	El.m	545.0	541.0	540.0	510.0
Capacity	kW	730.0	800.0	770.0	970.0
Plant discharge	m <sup>3</sup> /s	2.00	2.00	2.00	1.70
Generated Energy	MWh	5,360	5,873	5,662	7,404
Gross head	m	55.0	59.0	60.0	90.0
Effective head	m	48.1	52.9	50.8	75.7
Head loss	m	6.9	6.1	9.2	14.3
Headrace length	m	1,554.0	1,940.0	2,382.0	3,858.0
Penstock length	m	210.0	110.0	230.0	180.0



Items		Unit	A	B	C	D
Feature of Generation Plan	Gross Head	m	55.0	59.0	60.0	90.0
	Effective Head	m	48.1	52.9	50.8	75.7
	Plant Discharge	m <sup>3</sup> /s	2.0	2.0	2.0	1.7
	Install Capacity	kW	730	800	770	970
	Total Length of Waterway	m	1,764	2,050	2,612	4,038
	Length of Waterway / Effective Head (L/H)	-	36.7	38.8	51.4	53.3
	Annual Generated Energy	MWh	5,360	5,873	5,662	7,404
	Constriction Cost	Pesos	93,186,000	97,132,000	102,554,000	132,137,000
	Unit Cost	Pesos/kWh	17.4	16.5	18.1	17.8
Feasibility	Technical Issues	-	Non Length of Access Road: 0.51km	Non Length of Access Road: 0.33km	Non Not Necessary Access Road	Long Headrace Long Distance Access Road: 2.28km
	Environmental Issues	-	No Significant Impact	No Significant Impact	No Significant Impact	Wide Affected Area Including Rice Field
	Financial Aspect	-	Low Financial Feasibility caused by Small Scale	No.1 Financial Feasibility	Low Financial Feasibility caused by Big L/H	Low Financial Feasibility caused by Long Headrace
	Comprehensive Feasibility	-	2	1	4	3

## Next Examination

- Site works
  - Detail Topographical Survey (Scale 1/200) around Intake weir and from Headtank to Powerhouse
  - Centerline and cross section survey on the waterway route Sticking toward the centerline of waterway
  - Parcellary survey for the confirmation of land owners
  - Social Survey (Focus Group Discussion, Key Informant Interview) for gathering socio-economic data
- Internal works
  - Examination for the optimum development capacity



Facility Design  
Construction Plan and Schedule, etc

MINUTES OF THE SECOND COMMUNITY CONSULTATION MEETING ON THE FEASIBILITY STUDY OF THE PROPOSED LIKUD MINI-HYDRO POWER PLANT PROJECT HELD AT THE BARANGAY HALL, HALIAP, ASIPULO ON APRIL 28,2011 AT 9:20 A.M.

PRESENT :

1. OSCAR LAY-O	Barangay Captain, Panubtuban
2. ROGER MANGHI	Barangay Captain, Haliap
3. NANCY ADDANGNA	Barangay Secretary, Haliap
4. MARIA LAD-AO	Kagawad, Haliap
5. ROSEMARIE DAQUEL	Kagawad, Haliap
6. FEDELITO RENDON	Kagawad, Haliap
7. ERNESTO TAGTAG	kagawad, Panubtuban
8. MOISES DILLAG	Kagawad, Panubtuban
9. DONATO KABLINAN	Kagawad, Panubtuban
10. JOSEPHINE BISTOL	Kagawad, Panubtuban
11. LEON DONATO	President, Haliap Farmers Ass'n
12. BALTAZAR DAMMIT	Farmer, Haliap
13. JOSE BIMMUCAL	Farmer, Haliap
14. PAQUITO ANGIHAN	Farmer, Mappit
15. CHRISTINE NGABIT	Women, Haliap
16. NELSON FAJARDO	DOE, Luzon Field Office
17. RUSSELE PANDARACAN	DOE, LUZON Field Office
18. WINIFREDO MALABANAN	DOE, Luzon Field Office
19. REY V. SALVANIA	DOE, Luzon Field Office
20. CECILE U. GARCIA	Project Manager, Ularte Garcia Surveying
21. JAYSON MAGAYANES	Surveyor, UGSES
22. CARMELITA BUYUCCAN	PPDC, PPDO
23. NANCY G. NALUNE	PO, PPDO
24. TONY LINGLINGON	Staff, PPDO
25. RAMON CABAZOR	Member, Study Team
26. RICARDO BUTALE	Asst., Study Team
27. IGNACIO BUNOLNA	Asst., Study team
28. NOBUKI HAYASHI	Member, Study Team
29. YUKIO MIYAMOTO	Member, Study Team
30. KANEDA	Member, Study Team
31. MITSURU SHIMIZU	Study Team Leader

HIGHLIGHTS OF THE MEETING

1 – OPENING PRAYER

The meeting started at 9:20 in the morning with an opening prayer led by Ms. Nancy Addangna, barangay secretary.

11- WELCOME REMARKS

In behalf of Barangay Captain Roger Manghi, who came in late, Kagawad Fidelito Rendon welcome remarks. He expressed gratitude for the support of both communities and to the study

team for continuing the activities since the first community consultation. He expressed confidence that the activities will successfully push through until the study is completed.

#### 111- ACKNOWLEDGEMENT OF PARTICIPANTS

Provincial Planning and Development Coordinator Engr. Carmelita Buyuccan acknowledged the presence of everyone and asked each one to introduce himself/herself. Each one stood up and introduced himself/herself starting with the barangay representatives of Haliap and Panubtuban, Department of Energy, Survey Team, project study Team and from the Provincial Government.

After the introductions, she thanked everyone especially the barangay representatives for their support and encourage them to continue to support the conduct of the study.

#### 1V – MEETING OVERVIEW

Engr. Mitsuru Shimizu, study team Leader, gave a brief outline of the activities for the day. The main purpose of the meeting is to present the proposed routes and to select the best route, where to place the head tank and power house. This will be the reference for the topographic survey team to conduct the detailed survey. After the meeting, the team will go to the proposed location of head tank and power house which will be revisited again tomorrow starting at the intake weir.

He informed that the study team will go back to Manila on Monday and will be back by the end of June to present the result of the study. The survey team however will continue to finish the topographic survey. He said that the final draft will be finalized in July for submission in August.

He ended by saying, we need your support, please support us.

#### V- BRIEF REVIEW OF THE AGREEMENTS MADE DURING THE PREVIOUS MEETING

The facilitator recounted some of the agreements and action points made during the previous consultation meeting held last February 22, 2011, like the following:

- Installation of water level gauge on February 23,2011
- Start of topographic survey on February 28,2011
- Household interviews initial environment examination to commence by mid march
- Hiring of local guides and interviewers
- Field trip to Ambangal power plant on February 28,2011

#### V1 – PRESENTATION

Unfortunately, there was a sudden brown out, Engr. Mitsuru Shimizu, study team leader made use then of the handout. He explained the following:

- Selection of the location of the main facilities
- Comparison study between waterway routes

From the presentation, it was clear that power house case B is the best option considering the technical, environmental and financial feasibility. He asked if there were any comments/ objections but there was none.

The facilitator asked where the power case B is located and the answer was that it is a part of barangay Haliap.

#### V11 – OPEN FORUM

- Kagawad Donato Kablinan asked if the water diverted will be for irrigation.

The facilitator responded that the main purpose of the proposed project is power generation and not for irrigation. He explained however that irrigation has a higher priority in the use of water. So that when there is low level of water supply, power generation will have to stop. This particular project is intended however for power generation.

Mr. Jose Bimmucal asked if outlet/spillways are provided in the design so that rice fields located below the headrace can avail of water. Engr. Shimizu said it is possible.

- Mr. Jose Bimmucal raised the issue of compensation for road right of way.

PPDC Carmelita Buyuccan responded saying that yes, compensation for road right of way can be paid based on the assessment and negotiation. She said that the owners of land affected by road right of way can only be identified after the survey. Possibly, the project will utilize 4 to 5 meters width. Claimants should also see to it that the ownership of the land they claim are duly transferred under their names to avoid delays in the transaction.

- Barangay secretary Nancy Addangna raised the problem encountered during the topo Survey where one Mr. Joseph Belingon did not allow surveyors to enter his property. She however hinted that should the property owner be given a work, like being one of the meter reader, he might allow entry to his property.

The facilitator, after referring to the study team leader, said this can be arranged and requested Ms. Addangna to make arrangement with Mr. Belingon and inform the study team leader on Saturday, April 30, 2011.

- The facilitator asked how many irrigation systems are found between intake weir and the proposed power house.

There are 3 irrigation systems, namely; a) Cotcot CIS with 13 farmer beneficiaries, b) Napuh Haliap CIS with 15 beneficiaries and c) Napuh Mappit CIS.

- Ms. CECILLE GARCIA of the topo survey team asked if it is needed that the lot owners be present during the staking.

There is no need provided that a community representative is present to identify who owns the lot. Mr. Baltazar Dammit who is guiding the team will act as the representative.

#### V111 – NEXT STEPS/ACTION POINTS

- Engr. Kaneda together with IFELCO will conduct a connection line route check tomorrow morning. They need a guide.

Kagawad Moises Dillag was asked to make arrangement for a guide. The guide will be picked up at the entrance to Napuh access road tomorrow morning at about 9.30.



- MS. Nobuki Hayashi informed that the conduct of interview to key informants and focus group discussions will be done after the topographic survey has been finished. This will be in June. Household interviews as earlier planned will not be done.
- The study team and topo survey team will undertake walk through from the intake weir to the proposed location of the forebay tomorrow. In this regard, laborers to guide and clear the route will be needed. Mr. Baltazar Dammit will contact the laborers.
- Staking will start on Monday. A local guide is needed. He should be able to identify the owners of the lot. The stakes once installed should not be transferred or removed.

#### 1X – CLOSING STATEMENTS

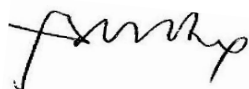
- PPDC Carmelita Buyuccan thanked the participants for their support and asked the barangay councils and representatives to continue to support the project.
- ENGR. Mitsuru Shimizu, Study Team Leader, said, “Please continue to support us”.
- Kagawad Rosemarie Daquel of barangay Haliap expressed gratitude for the project.
- Kagawad Josephine Bistol expressed her gratitude and support saying that even if barangay Panubtuban is now “sabit” because it is outside the project as option B was selected, we will still support the project provided you inform and invite us.
- Barangay Captain ROGER MANGHI, who came in late, expressed apologies for coming late.  
He said he came even if he was very late, because of other equally important business to attend to, to show his support to the project.

#### X – CLOSING PRAYER AND ADJOURNMENT

Kagawad Fidelito Rendon gave the closing prayer thanking God and asking for blessings for the successful realization of the project for the benefit of the communities.

The meeting ended at 11.30 in the morning.

PREPARED BY:



IGNACIO N. BUNOLNA

**PROVINCE OF IFUGAO  
ATTENDANCE SHEET**





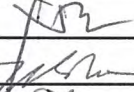
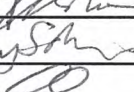
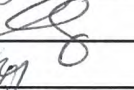
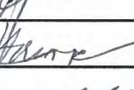
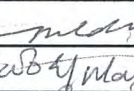
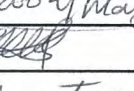
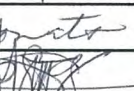
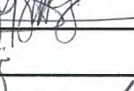
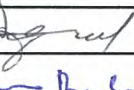
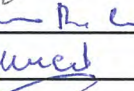
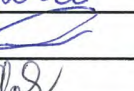
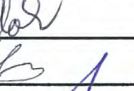
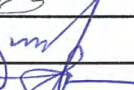
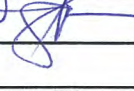
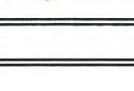

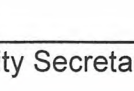
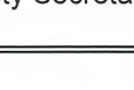



Office: Ifugao Provincial Government

Title of meeting/seminar/workshop:

Venue: Hallap Brgy. Hall

Date: April 28, 2011

Expected number of participants: \_\_\_\_\_ Scheduled time: \_\_\_\_\_

	Name	Male	Female	Agency, Position	Signature
1	<u>Oscar Ag. O</u>	/		<u>Brgy. Capt. - P</u>	
2	<u>NANCY GAWO - NALUNNE</u>		/	<u>PO-1</u>	
3	<u>Ramon Cabazon</u>	/		<u>STUDY TEAM</u>	
4	<u>Nelson Fajardo</u>	✓		<u>DOE-LFO</u>	
5	<u>Russ G. Pringuloman</u>		✓	<u>DOE-LFO</u>	
6	<u>Ignacio Buroka</u>	/		<u>Intermed. for Shilgum</u>	
7	<u>Winfredo Malabanan</u>	✓		<u>DOE-HOEMB</u>	
8	<u>Ray V. Salama</u>	/		<u>DOE-HOEMB</u>	
9	<u>MA. DECUA U. GARCIA</u>		✓	<u>NGSES - SURVEY</u>	
10	<u>Jason Macasanes</u>	✓		<u>UG SEC - SURVEY</u>	
11	<u>NANCY ADDANGOS</u>	✓	✓	<u>Brgy. Secretary - H</u>	
12	<u>Mama Lad.ao</u>		✓	<u>Brgy. Kgwad - H</u>	
13	<u>RICARDO L. BUTALE</u>	✓			
14	<u>ERNESTO B. TAH. TAG</u>	✓	✓	<u>Brgy. Captain Kgwad.</u>	
15	<u>LEON DONATO</u>	✓		<u>HFA - PRES. P</u>	
16	<u>DILLAG, MOISE B.</u>	/		<u>Brgy. Kgwad. P</u>	
17	<u>BAUZAR DAMMIT</u>	/			
18	<u>Prosemarie Dequel</u>			<u>Brgy. Kgwad</u>	
19	<u>Felicita Rondon</u>	✓		<u>Brgy. Kgwad</u>	
20	<u>Jose R. Burreal</u>	✓		<u>Farming</u>	
21	<u>Papito Angilan</u>	✓		<u>"</u>	
22	<u>Wendyline N. Butal</u>		✓	<u>Brgy. Kgwad</u>	
23	<u>Donato Khablian</u>	/		<u>Kgwad</u>	
24	<u>Tony Linghison</u>	/			
25	<u>Roder M. Manghi</u>	/		<u>Captain</u>	

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**29**

Activity Secretariat

**PROVINCE OF IFUGAO  
ATTENDANCE SHEET**

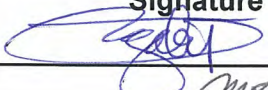

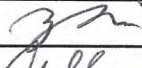
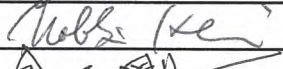
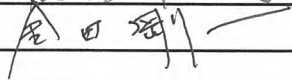
Office: Ifugao Provincial Government

Title of meeting/seminar/workshop: \_\_\_\_\_

Venue: \_\_\_\_\_

Date: \_\_\_\_\_

Expected number of participants: \_\_\_\_\_ Scheduled time: \_\_\_\_\_

	Name	Male	Female	Agency, Position	Signature
1	Christina Ngabit		F	Farmer	
2	SHIMIZU Mitsuru	M		TEPSCO/JICA	
3	Yusuro MIYAMOTO	M		TEPSCO/JICA	
4	Nobuki Hayashi	<del>M</del>	✓	TEPSCO/JICA	
5	GOICHI KANEH	✓		TEPSCO/JICA	
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**CERTIFIED CORRECT:**

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\_\_\_\_\_  
Activity Secretariat

## Preliminary Power Planning of Likud Mini-Hydropower

### Contents of Preliminary Power Planning

1. Estimation for the available plant discharge
2. Examination and selection of the general layout
  - Result of the Topographical Map (1/2,000)
  - Selection of the location of the main civil facilities
  - Comparison study between waterway routes
3. Next examination
  - Site works
  - Internal Works

## Highlights of the Meeting with the Local Authorities (Budget, Account and Treasury Office)

<b>Date:</b>	15:00-17:00, 30 June 2011
<b>Venue:</b>	GAZEBO, Lagawe, Ifugao
<b>Participants:</b>	Budget office, Account office and Treasury Office of the Provincial Government of Ifugao, PPDO, DOE, JICA Study Team, 9 participants (See attendance sheet)
<b>Agenda:</b>	Progress update on the feasibility study on the Likud mini-hydropower project by JICA Study Team (TEPSCO)

### [Highlights]

- JICA Study Team explained the status of feasibility study on the Likud mini-hydropower project.
  - Location of the Project area
  - General lay-out of the Likud mini-hydropower plant
  - Construction cost
  - The result of financial analysis

### (Q&A)

1. River water level in dry season in Ifugao becomes very low. Was this considered in the power generation of the Project and also considering the present situation of climate change.

→ A: The Study team installed two staff gauge. The one is in Municipality of Hungduan since 2004, and the other one is in the Project site, at Haliap, Municipality of Asipulo since last February 2001. The Study team monitors the level of water and the data is examined conservatively.

2. Can another mini-hydropower develop at the upstream of the Ambangal blook?

→ A: It is possible, but it maybe very small capacity such as pico-hydro. It is out of the scope under JICA Study this time, the Study team concentrates on the Likud hydropower project.

3. Not all the dividend shall be used for the rice terraces conservation fund because there is no

return from the farmers. Some portion of the dividend shall be used for another income generating project so that the Provincial Government of Ifugao (PGI) can avoid of the risk of collateral.

4. The PGI has no experience of having a loan project which generates income, but if it is really feasible, it is worth to invest. Many of the political leaders of the province tend to take just shortsighted approach for their point, but they should see long term vision to improve our life until our next generation.
5. Based on the latest guideline of LGU code, 20 % of IRA can be utilized for a loan project.

#### Closing Statements:

Ms Virginia Farro, Provincial budget officer gave the closing statements. She thanked the donor and study team for the project. She said that the mini-hydro power project, referring to the e8 Ambangal, is the first PLGU enterprise project and expressed hope it will be replicated in the proposed Likud mini-hydropower project.

**PROVINCE OF IFUGAO  
ATTENDANCE SHEET**

Office: Ifugao Provincial Government  
 Title of meeting/seminar/workshop: *MEETING RE: LIKOD MHPP*  
 Venue: *Gazebo Garden Restaurant* Date: *June 30, 2011*  
 Expected number of participants: \_\_\_\_\_ Scheduled time: \_\_\_\_\_

	Name	Male	Female	Office	Signature
1	Virginia D. Parro		✓	PBO	<i>[Signature]</i>
2	<del>STEWART P. PACHA</del>	✓		PTO	<i>[Signature]</i>
3	Tommy Ling Jingon	✓			<i>[Signature]</i>
4	Maribel B. Ligab		✓	PAO	<i>[Signature]</i>
5	Camelita B. Bunuccas		✓	PPDO	<i>[Signature]</i>
6	Nobuki Hayashi		✓	TEPSO/JICA	<i>[Signature]</i>
7	MITSUO SHIMIZU	✓		TEPSO/JICA	<i>[Signature]</i>
8	ARNEL CARACUEL			II	<i>[Signature]</i>
9	Ray V. Salvama	✓		DPF	<i>[Signature]</i>
10	Ignacio Buelna	✓			<i>[Signature]</i>
11					
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*[Signature]*

Highlights of the Meeting with the Sangunian Panlalawigan members who are in charge of Public Works & Utilities

<b>Date:</b>	9:30am-12:30pm, 30 June 2011
<b>Venue:</b>	Provincial Livelihood Center, Lamut, Ifugao
<b>No. of Participants:</b>	The PGI officials include PPDO staff, DBP officer, DOE, and JICA study team. Total number is 12 (See attendance list)
<b>Agenda:</b>	<ul style="list-style-type: none"> <li>a. Progress update on the feasibility study on the Likud mini-hydropower project by TEPSCO</li> <li>b. Environmental Development Project (EDP) scheme by Development Bank of the Philippines (DBP Solano branch)</li> </ul>

[Highlights]

**a. The Likud mini-hydropower project**

Before starting the presentation, e8 documentary film was showed to the participants.

Mr. Shimizu of JICA study team presented the result of feasibility study at this time for the Likud mini-hydropower project. The case B with maximum capacity of 810kW was recommended to the best option from an overall technical, environmental and financial feasibility. The total construction cost was about 113 million pesos.

(Q&A)

1. Board Member Humiwat asked if case D is possible to develop.

→ A: Technically possible, but it would be costly considering the length of the headrace is about 4km and environmental damages would cause.

2. Page 12, when we look at the Unit Construction Cost/kWh, the cheapest is Case B, but look at the Unit Construction Cost /kW, Case D is the cheapest. Can we not develop it?

→ A: If you look at Page 12, the graph of comparison of construction cost per capacity, the construction cost per kW is almost same among case A to D. But when you look at by construction cost per kWh, case B is better compared with the other cases. Even though the maximum output is big, if you cannot generate power with maximum output due to lack of water through full-year, it is very costly. It means the plant factor is low. JICA study team set the plant factor as high as 80% in case B, meaning, you will have full operation period of around 248 days per year.

3. I understood the spirit of development scale is met with the base load of Ifugao, but we don't want to miss opportunity that we might generate more power and sell it to other electric cooperative or spot market.



→ A: Look at page 11, the demand of Ifugao is small, you cannot sell when you want to sell it. And in order to sell the power outside of Ifugao, you need bigger capacity of transmission line which entails more construction cost.

4. Can we not develop more than 1000kW capacity at point of B?

→ A: Technically possible, but this is also very costly.

5. We (the SP member) would like to examine all case of Return of Investment (ROI), not only case B but the other case A, C and D.

→ A: will do by next visit

6. Engr. Salvania of DOE informed on the need of a Memorandum of Understanding as one requirement. Board member Humiwat also informed that they have requested the governor a Memorandum of Agreement for the undertaking of the feasibility study. He asked PPDO to coordinate with DOE regarding development requirements but first the pre-development.

#### **b. EDP scheme by DBP**

- The two officer of DBP Solano branch explained the EDP scheme, standard loan package in terms of, loanable amount, repayment period, interest and fees and charges, security and insurance of machineries and equipments.
- Technical assistance from central office is available.
- The loan terms and conditions will largely depend on the negotiation and agreement of both parties.

#### **c. Closing Statements**

Board member Humiwat, chairperson of the SP Committee on public works and utilities gave the closing statements. He thanked everyone for their participation especially the JICA study team and apologized for the many questions he raised but with the purpose of better understanding and decision. He asked DOE to help PGI secure the permit. Although there is yet no MOA regarding the conduct of the study as the SP required, he feels happy with the feasibility study nearing completion.

**PROVINCE OF IFUGAO  
ATTENDANCE SHEET**

Office: Ifugao Provincial Government  
 Title of meeting/seminar/workshop: MEETING OF PGI W/ TEPSCO RE: LIKOD MHRPP  
 Venue: PLC, LAMUT, IFUGAO Date: JULY 1, 2011  
 Expected number of participants: \_\_\_\_\_ Scheduled time: \_\_\_\_\_

	Name	Male	Female	Office	Signature
1	Catalina Lumang		✓	Provl Lga office	
2	SHIMIZU Mitsunori	✓		TEPSCO/JICA	
3	Rev. V. Salinas	✓		DOE-REMB	
4	Emelita B. Bongmacan		✓	PPDO	
5	Ignacio Benche	✓			
6	Nobuki Hayashi	✓	✓	TEPSCO/JICA	
7	EMIL CALMAG	✓		DBP	
8	IMELDA F. EISMA		✓	DBP	
9	Jordan T. Gullatiw	✓		S-P	
10	Robert K. Hernandez	✓		SPI	
11	Nancy Nalonne		✓	PPDO	
12	Kristine Guazon		✓	PPDO	
13	Roly Bolmaroz	✓		PLC	
14	Clifford Bauwang	✓		PLC	
15	Roxito Tuquiran			PLC	
16	Jacinto Mariano	✓		PLC	
17	Orly Wapu		✓	" "	
18	Nora M. Martinez		✓		
19	Nancy Batangay		✓	PLC	
20	JOEL TALIBO	✓		PLC	
21					
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## Contents of Presentation

1. Hydrological Analysis for Development Planning
2. General Layout of Hydropower Plant
3. Development Scale (Installed Capacity)
4. Outline of the Civil Structures
5. Selection of Electrical & Mechanical Equipment
6. Electric Power Generation and Development Cost
7. Financial Analysis
8. Next Activities

## Reliable Rive Flow Data: Hapao Gauging Station in Municipality Hungduan

Location ; 18km away from Likud project Site

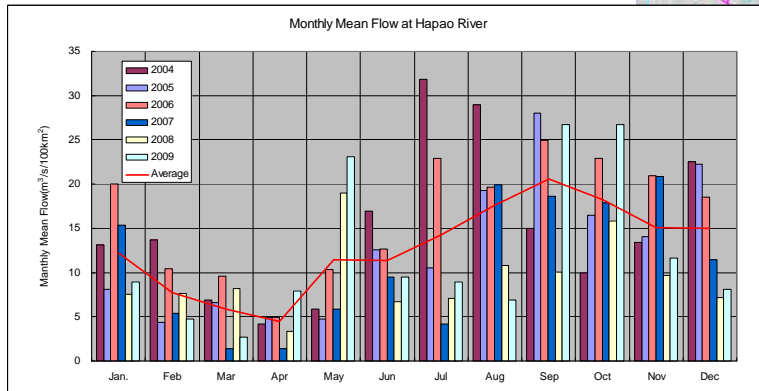
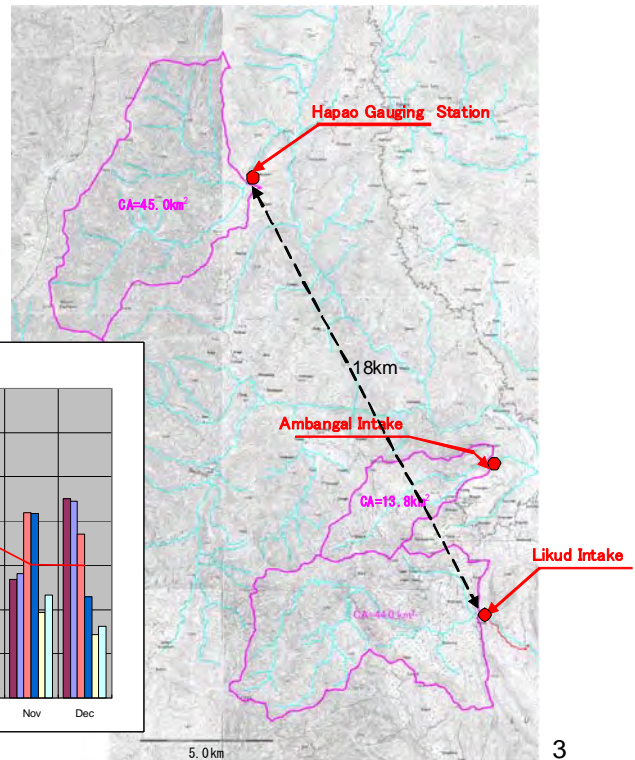
Brgy. Hapao, Hungduan

Observation Period ; Jan. 2004 – Dec.2009

6years

Catchment Area ; 45.0km<sup>2</sup>

Observed by ; TEPSCO

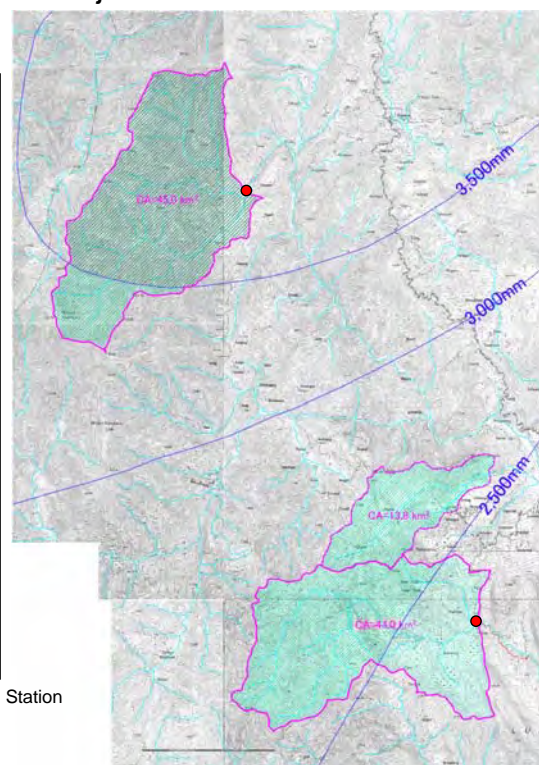


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## Annual Rainfall and Effective Precipitation at Project Site

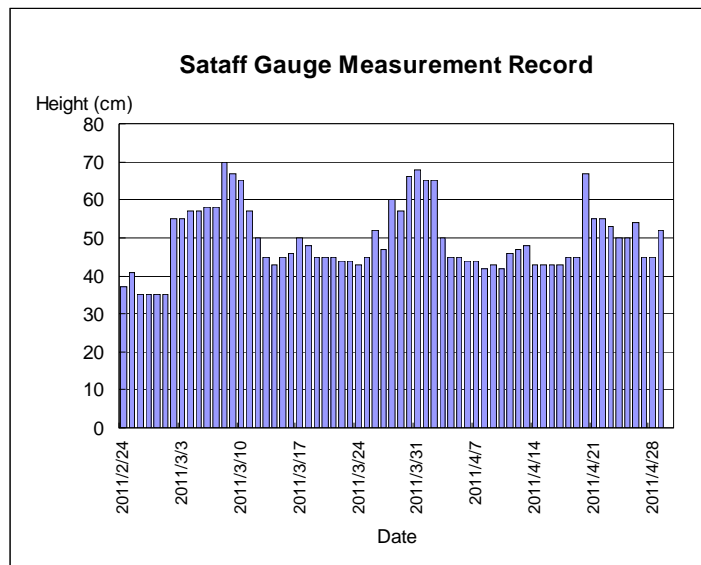
Items	Hapao	Likud
Catchment Area	45.01 km <sup>2</sup>	44.02 km <sup>2</sup>
Conversion Ratio (CR1)	1.000	0.978
Mean Annual Rainfall	3,671 mm	2,575 mm
Mean Annual Runoff	3,219 mm	-
Loss of Precipitation	452 mm	452 mm
Effective Precipitation	3,219 mm	2,123 mm
Conversion Ratio (CR2)	1.000	0.660

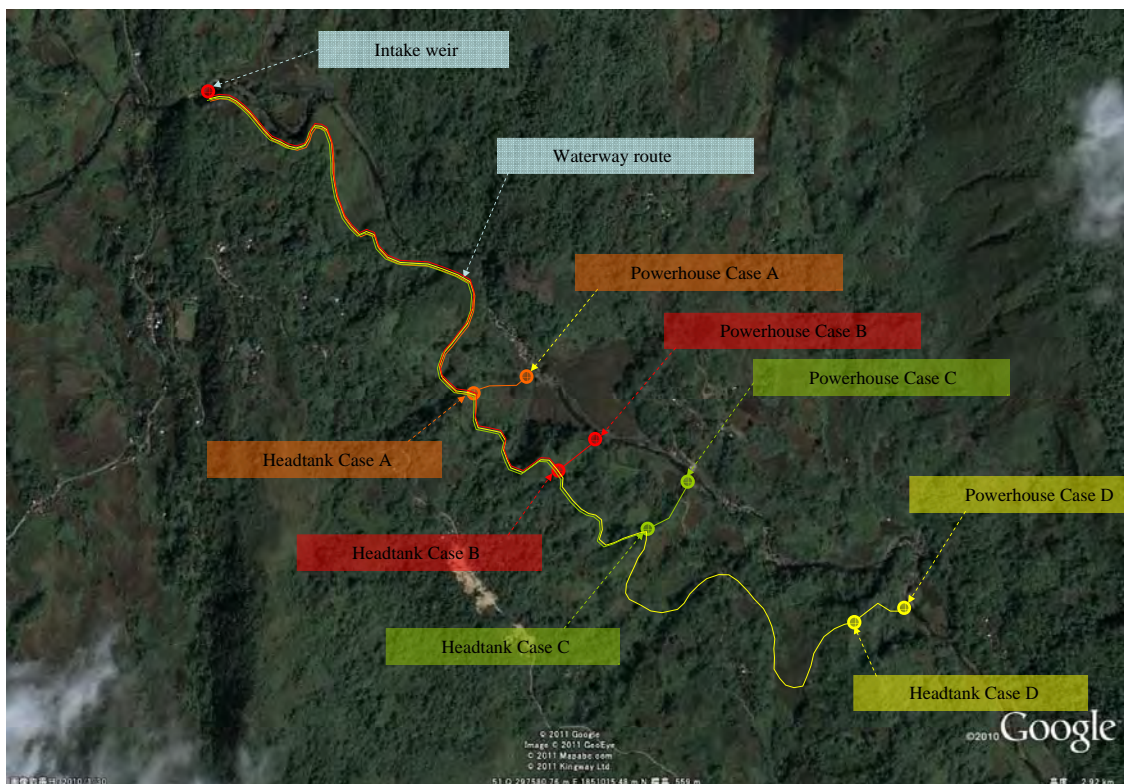
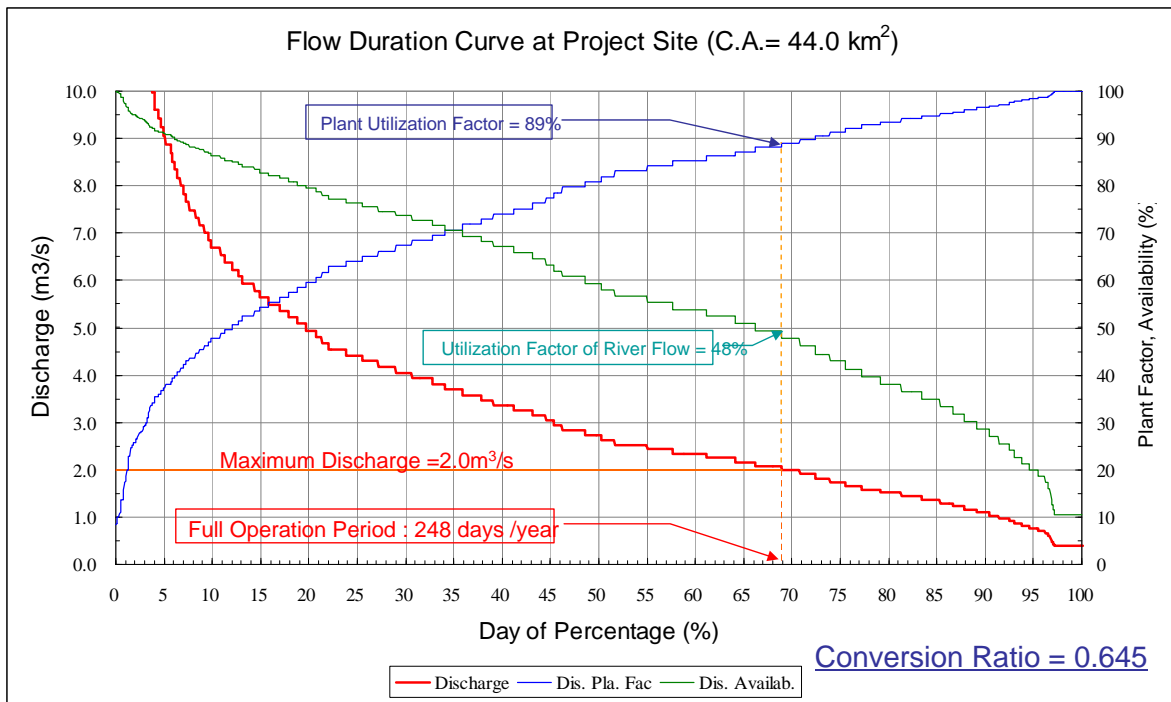
Note; Mean Annual Runoff based on Observed River Flow at Hapao gauging Station



1. Conversion from Hapao GS to Project site  
 River Flow of Project Site = CR1 x CR2 x River Flow of Hapao GS  
 = 0.978 x 0.660 x River Flow of Hapao GS  
 = 0.645 x River Flow of Hapao GS
  
2. Comparison of Actual River Flow Measurement Record  
 Study Team measured river flow at Hapao GS and Project site on same day  
 (Apr.30, 2011)  
 Hapao GS ; 2.40 m<sup>3</sup>/s }  
 Project Site ; 1.83 m<sup>3</sup>/s } 1.83 / 2.40 = **0.763**
  
3. Variation of Conversion Ratio in the Study  
 The conversion ratio (0.645) is Conservative, It will be validated in the study finally, based on additional river flow measurement at Hapao GS and Project Site during 3<sup>rd</sup> mission
  
4. Water Volume for Irrigation will be considered in the Study

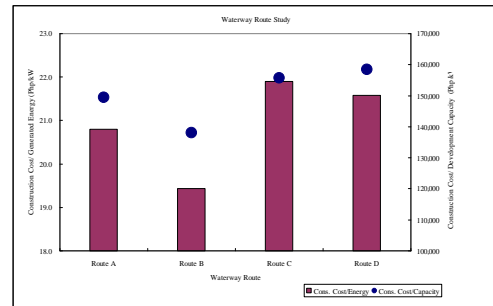
**0.645 was selected in this Report**





## Comparison study of Waterway Routes

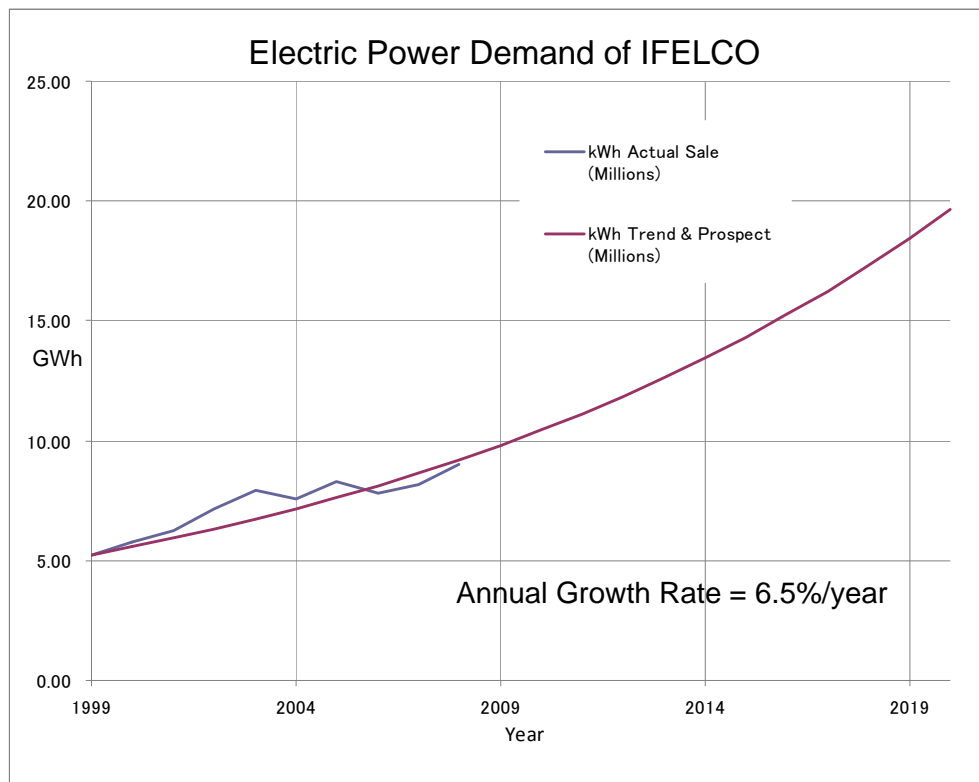
Item	unit	Route A	Route B	Route C	Route D
Intake water level	El.m	600.0	600.0	600.0	600.0
Headtank water level	El.m	597.0	596.0	595.0	589.0
Tail water level	El.m	545.0	541.0	540.0	510.0
Capacity	kW	740.0	820.0	790.0	1,000.0
Plant discharge	m <sup>3</sup> /s	2.00	2.00	2.00	1.70
Generated Energy	MWh	5,317	5,826	5,616	7,345
Gross head	m	55.0	59.0	60.0	90.0
Effective head	m	48.1	52.9	50.8	75.7
Head loss	m	6.9	6.1	9.2	14.3
Headrace length	m	1,554.0	1,940.0	2,382.0	3,858.0
Penstock length	m	210.0	110.0	230.0	180.0



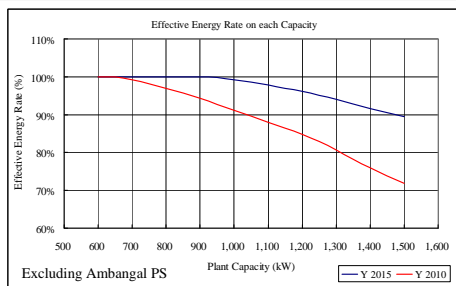
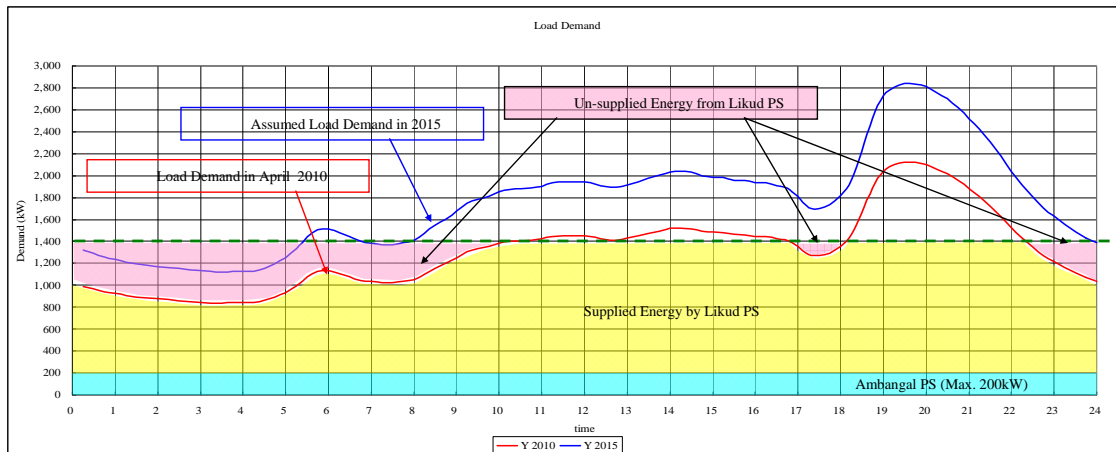
Items		Unit	A	B	C	D
Feature of Generation Plan	Gross Head	m	55.0	59.0	60.0	90.0
	Effective Head	m	48.1	52.9	50.8	75.7
	Plant Discharge	m <sup>3</sup> /s	2.0	2.0	2.0	1.7
	Install Capacity	kW	740	820	790	1,000
	Total Length of Waterway	m	1,764	2,050	2,612	4,038
	Length of Waterway / Annual Generated Energy	-	36.7	38.8	51.4	53.3
	Construction Cost	Pesos	110,592,037	113,250,000	122,996,954	158,501,748
	Unit Cost	Pesos/KWh	20.8	19.4	21.9	21.6
Feasibility	Technical Issues	-	Non Length of Access Road:	Non Length of Access Road:	Non Not Necessary Access Road	Long Headrace Long Access Road: 2.2km Wide Affected Area Including Rice Field
	Environmental Issues	-	No Significant Impact	No Significant Impact	No Significant Impact	Low Financial Feasibility caused by big L/H
	Financial Aspect	-	Low Financial Feasibility caused by Small Scale	No.1 Financial Feasibility	Low Financial Feasibility caused by big L/H	Low Financial Feasibility caused by Long Headrace
	Comprehensive Feasibility	-	2	1	4	3

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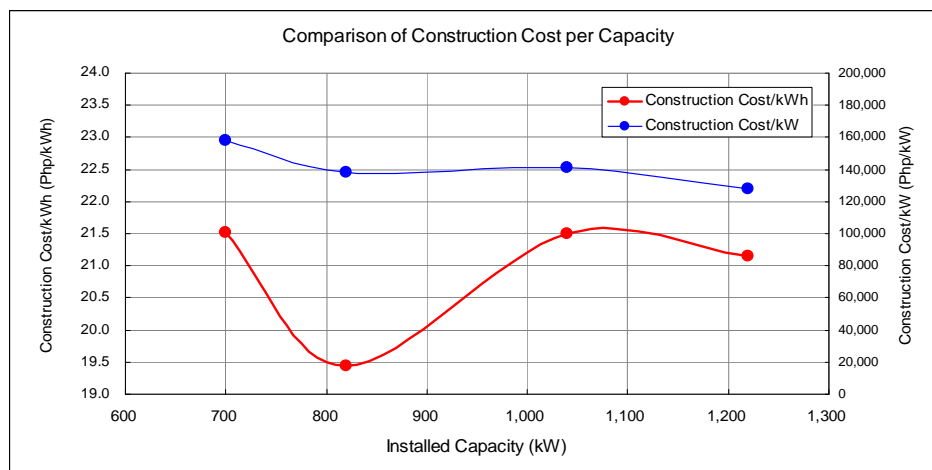
10



### Issue on the load demand

For example; Likud PS has 1,200kW capacity.  
 Total supply capacity including Ambangal PS : 1,400kW  
 Load demand from 22:30 to 10:00 is lower than total supply capacity.  
 Energy supply is limited based on the load demand.

Effective energy : 91% in 2011, 99% in 2015 (1,000kW)  
 85% in 2011, 96% in 2015 (1,200kW)



Installed Capacity	kW	700	820	1,040	1,220
Maximum Discharge	m <sup>3</sup> /s	1.70	2.00	2.55	3.00
Number of Turbine Unit	Unit	2	2	3	3
Annual Effective Generation	MWh	5,142	5,826	6,821	7,377
Effective Plant Factor	%	83.9	81.1	74.9	69.0
Construction Cost	M.pesos	110.684	113.250	146.608	156.057
Unit Construction Cost / kW	Php/kW	158,120	138,110	140,970	127,916
Unit Construction Cost / kWh	Php/kWh	21.5	19.4	21.5	21.2



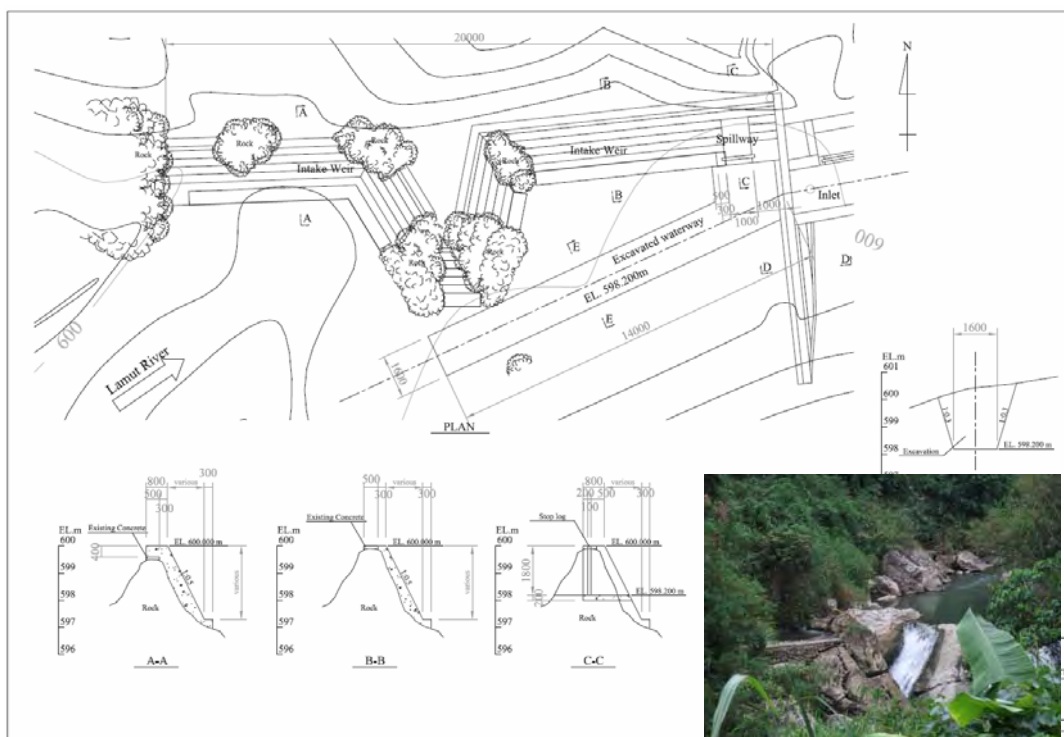
## General Layout



13

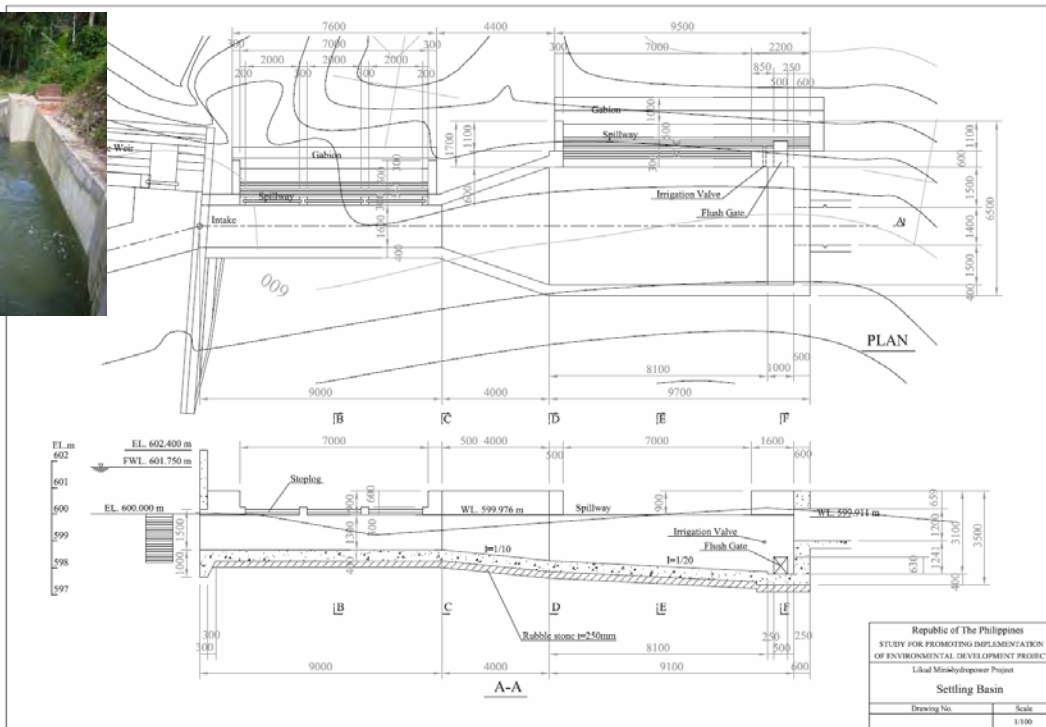
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## Intake Weir (Improvement of Existing Weir for Irrigation) :Height=about 3.0m



14

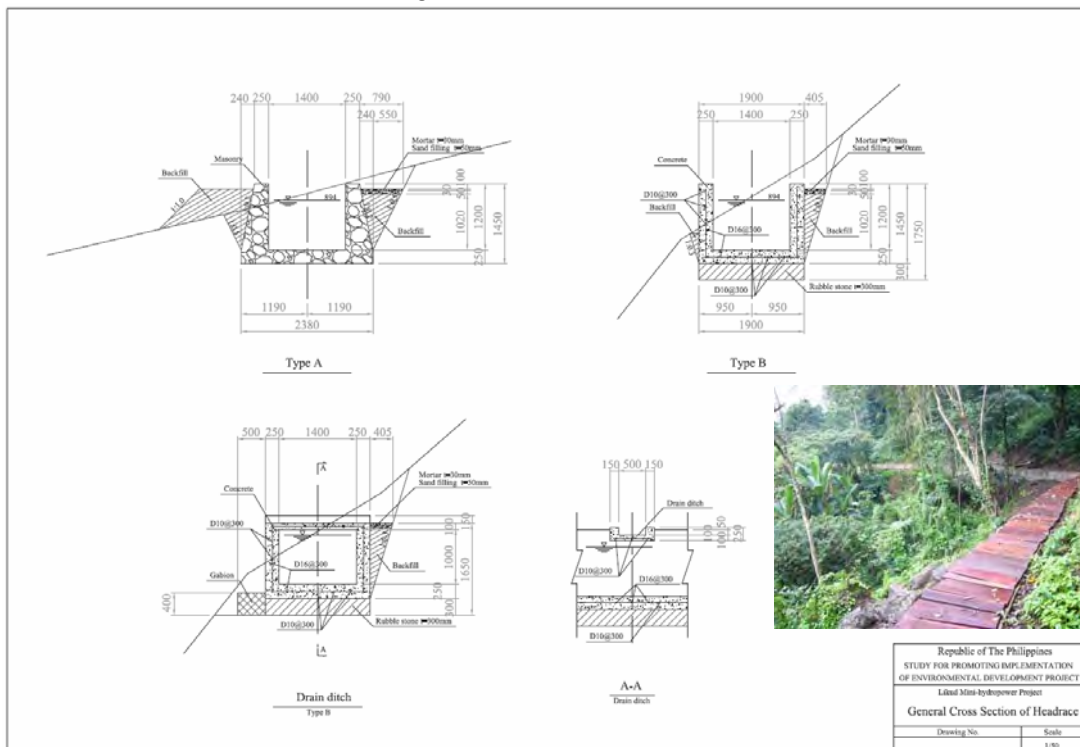
## Settling Basin



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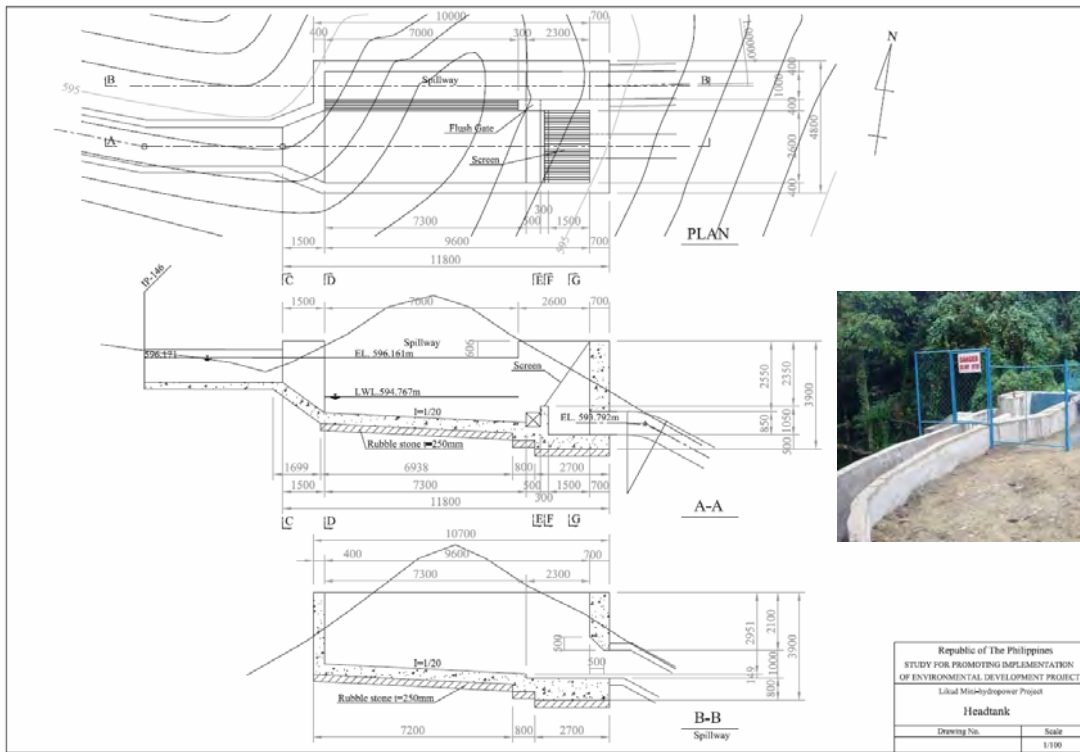
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## Headrace Channel Total Length=1,875 m



16

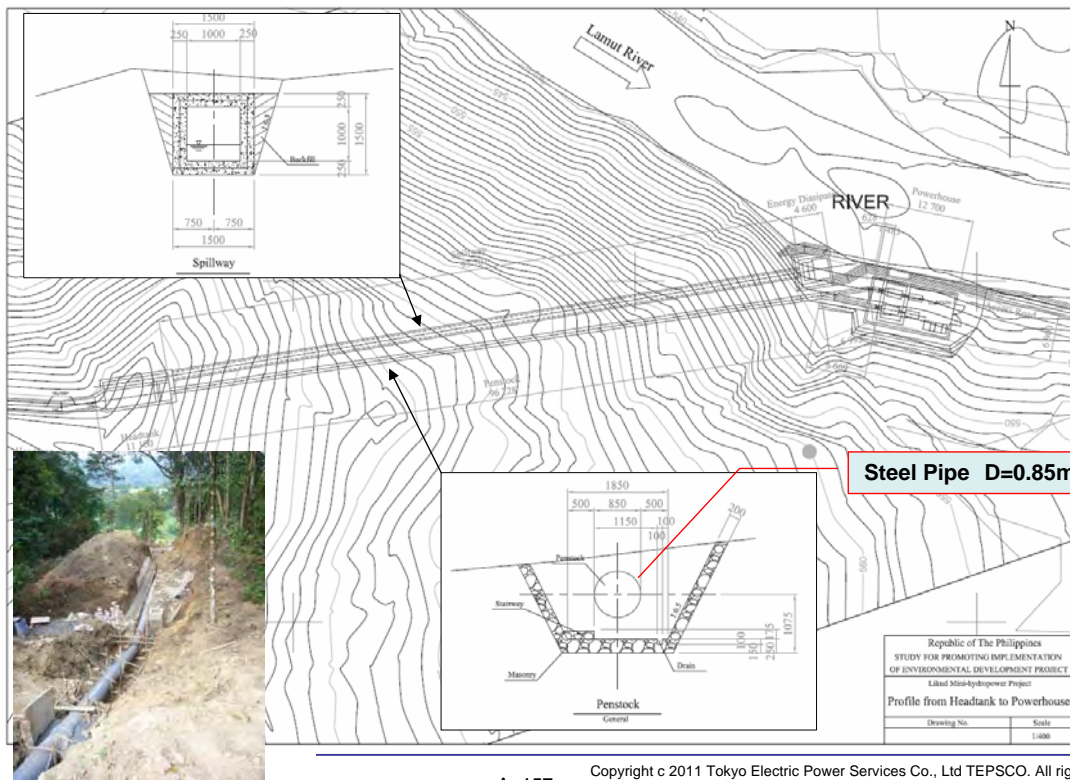
## Head-Tank



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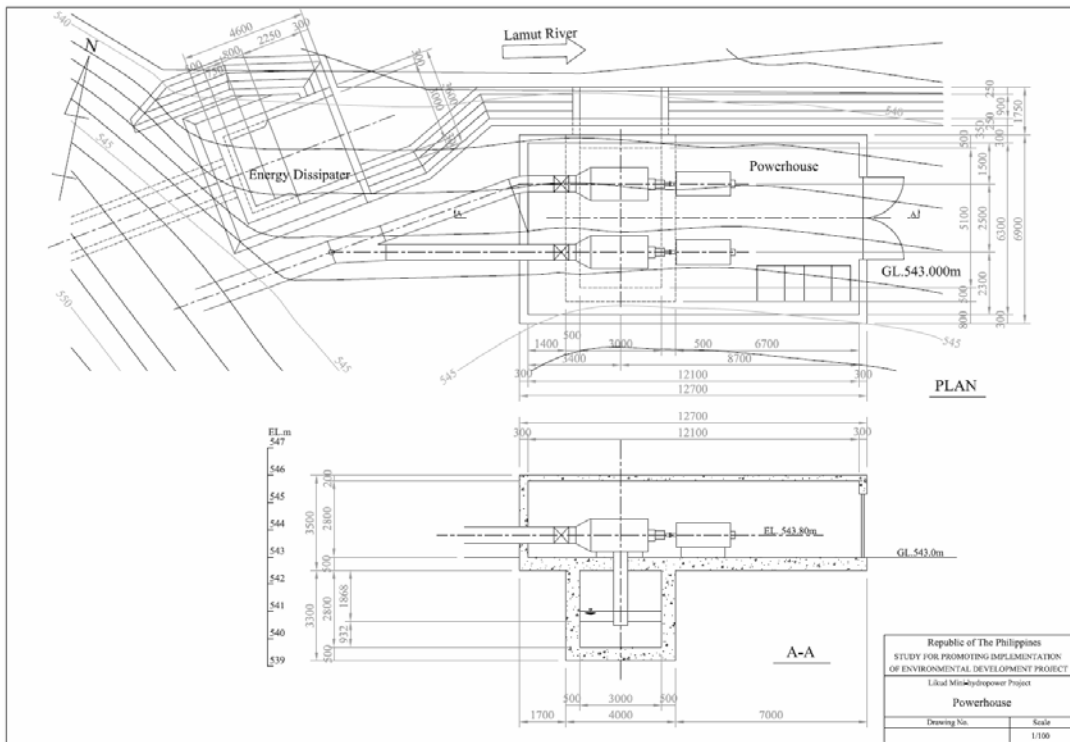
## Penstock ; Length=116.5m Spillway ; Length=106.5m



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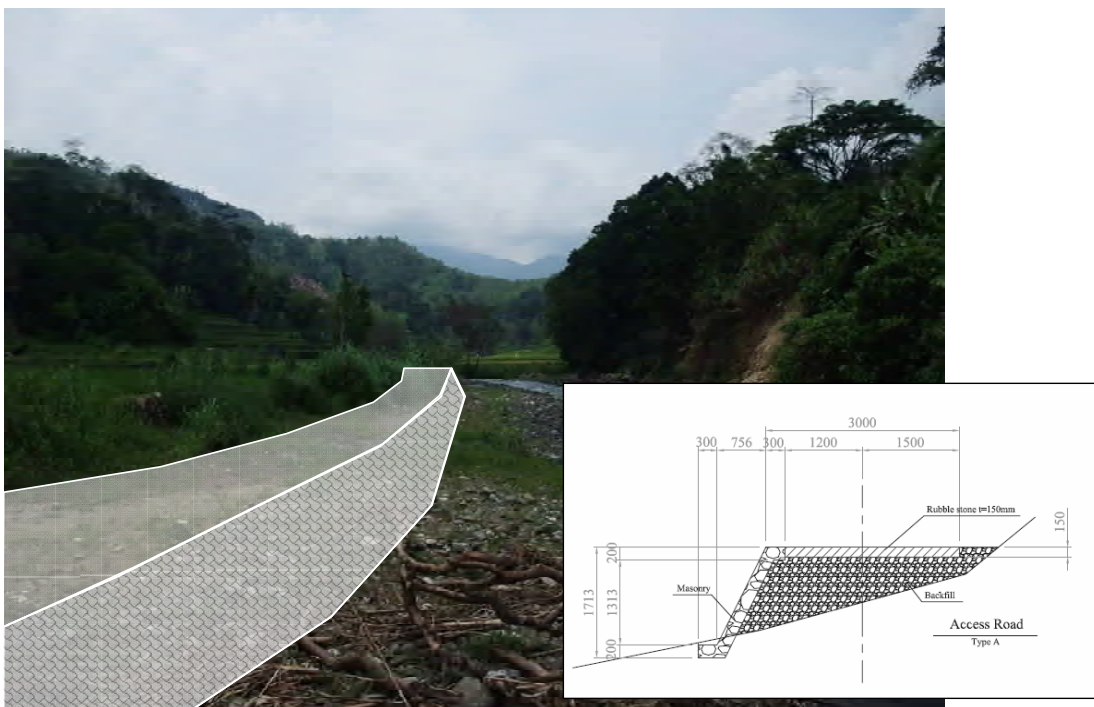
## Powerhouse



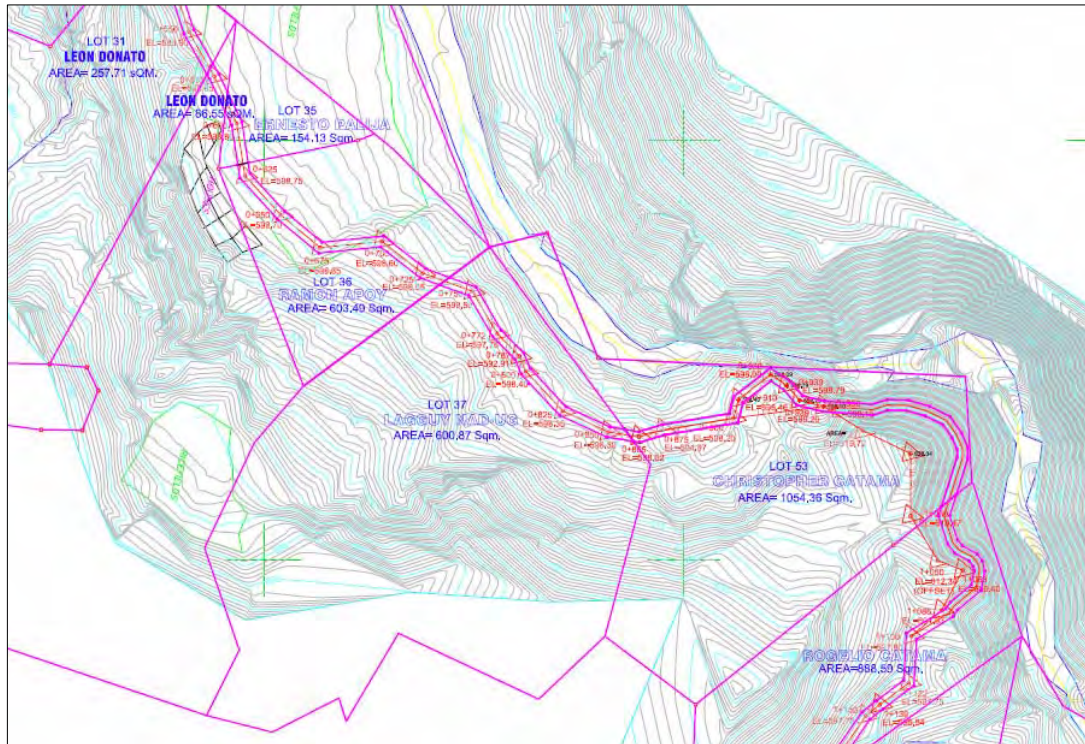
19

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## Access Road to Powerhouse from Washed-out Bridge

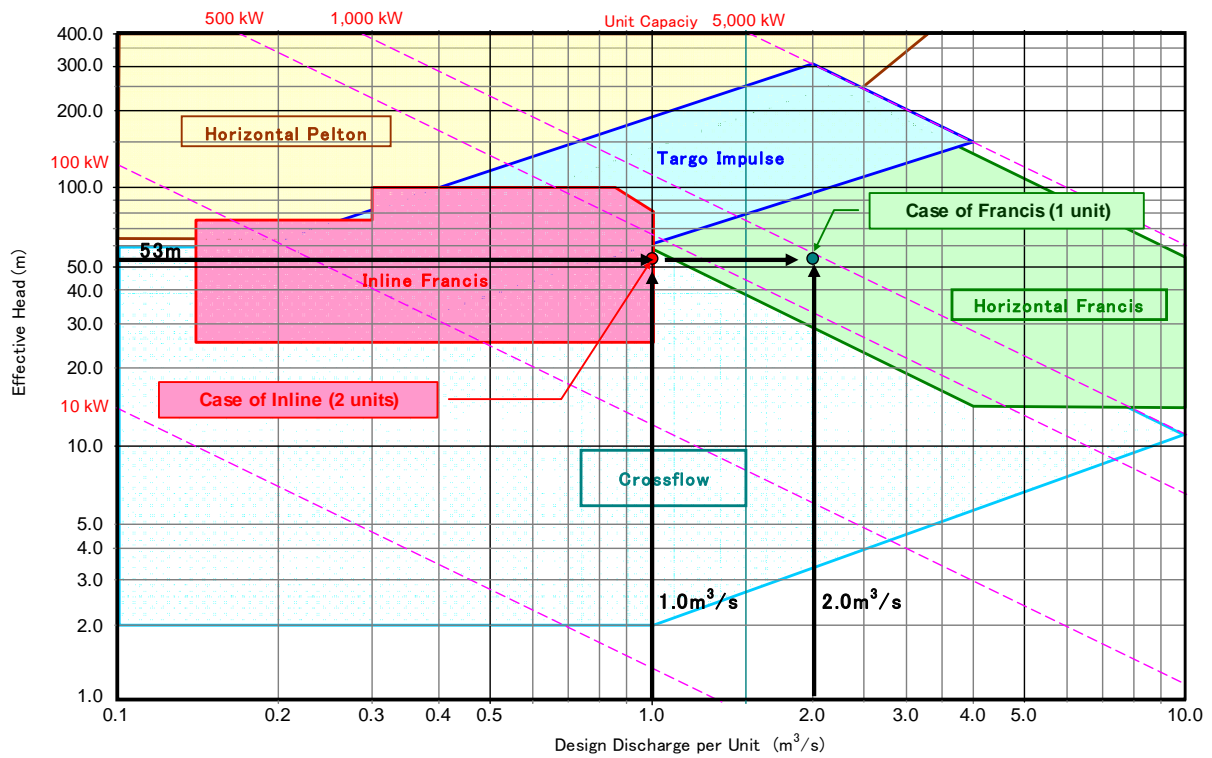


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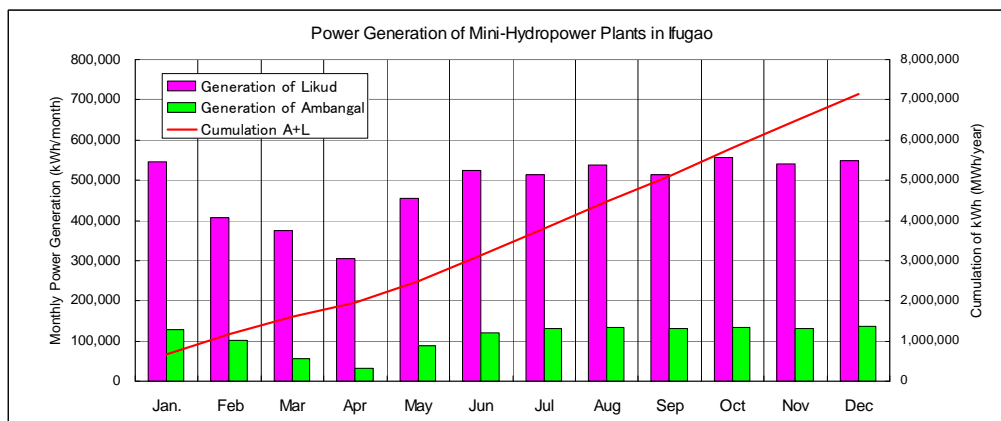
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Items	Francis Turbine	Inline Francis Turbine
Outline		
No. of Unit	1 (2)	2
Maximum Output	820kW (820kW)	820 kW
Firm Output	318 kW (410kW)	410 kW
Annual Effective Generation	5,755 MWh (5,826MWh)	5,826 MWh
Cost of T&G&C	Php 114,750,000 (Php 142,750,000)	Php 113,250,000
Cost T&G&C /Generation	19.9 Php/kWh (24.5Php/kWh)	19.4 Php/kWh
Operation	Easy But newly training will be necessary	Easy Already Trained in Ambangal MHP
Maintenance	Complex During maintenance work, the operation should stop completely	Easy During maintenance work, 1 unit can be operated
Result	-	<b>Selected for Likud MHP</b>

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Items	Unit	Ambangal MHP	Likud MHP	Total	Remarks	
Maximum Output	kW	200	820	1,020		
Annual Generation	MWh	1,443	6,333	7,776		
Annual Effective Generation	MWh	1,327	5,826	7,153	Loss=8%	
Account Rate for Demand	as of 2010	%	12.7	55.8	68.5	Demand 10,450 MWh
	as of 2015	%	9.3	40.7	50.0	Demand 14,327 MWh



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Contents	Quantity	Unit	Cost (Peso)	Remark
<b>Direct Cost</b>				
<b>Civil Works</b>				
Intake Weir	1.0	Ls	677000	
Settling Basin	1.0	Ls	1098000	
Headrace	1.0	Ls	21955000	
Headtank	1.0	Ls	1366000	
Penstock	1.0	Ls	3268000	
Spillway	1.0	Ls	1549000	
Powerhouse	1.0	Ls	1441000	
Access road	1.0	Ls	1201000	
Sub total	1.0	Ls	32555000	
Architectural Works	1.0	Ls	599000	
<b>Electro-mechanical Works</b>				
Turbine/Generator	1.0	Ls	64000000	Manufacturer supply
Transformer & Others	1.0	Ls	4000000	Local supply
Sub total	1.0	Ls	68000000	
Transmission	1.0	Ls	5250000	Local supply
Direct Cost Total	1.0	Ls	106404000	
<b>Indirect Cost</b>				
Engineering Cost	1.0	Ls	2605000	8% of Civil Works
Administration	1.0	Ls	326000	1% of Civil Works
Contingency	1.0	Ls	3256000	10% of Civil Works
Indirect Cost Total	1.0	Ls	6187000	
<b>Others</b>				
Right of Way	1.0	Ls	659000	
Total			113250000	

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Items	Decision process	Values
<b>Construction</b>	<b>Direct cost + indirect cost + other expenses</b> <b>Pre-operation interest</b>	<b>113 million Php</b> <b>8 million Php</b>
<b>O/M expenses</b>	<b>1% of Construction cost * Escalation</b>	<b>1.21 million Php</b>
<b>Wages</b>	<b>6 persons * 8,000Php/month * 12months * Escalation</b>	<b>0.576 millionPhp / year</b>
<b>Capacity</b>		<b>820 k W</b>
<b>Operation load</b>	<b>Annual average operation load</b>	<b>84 %</b>
<b>Power generation</b>	<b>Capacity*1.05 * Load * 8,760 hours</b>	<b>6,333 MWh/year</b>
<b>Losses</b>	<b>5% to10% referred by the past experiences</b>	<b>8% (5% in Gen 3% in T/D )</b>
<b>Power sales</b>	<b>Generation * ( 1 - Losses)</b>	<b>5,826 MWh/year</b>

Note) O/M expenses: According to "Q&A small hydro power business( March 2005)" edited by Study panels for Clean Energy, O/M expenses (including overhaul cost, operation detection system ) is calculated with 0.9% to the construction cost.

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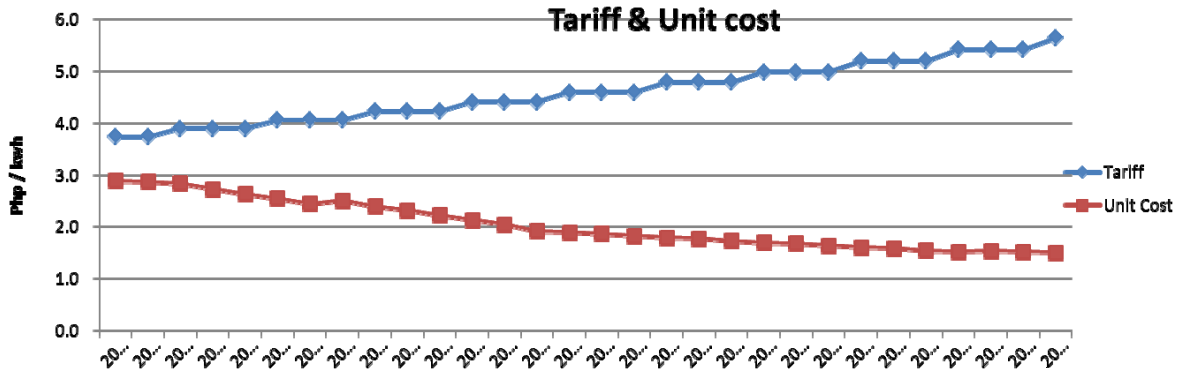
Items	Decision process	Values
Equity	<b>10% of construction cost</b>	<b>12.1 million Php</b>
Long term loan	<b>90% of construction cost</b>	<b>109.0 million Php</b>
Interest rate of LTL	Nominal interest rate is 8% to 10%. Therefore it is the average of 9% with fix interest rate.	<b>9%</b>
Repayment conditions	According to EDP advantage, Grace term of repayment is 5 years, term of repayment is 15 years, no repayment of interest rate is during the grace term.	Repayment : 15years Grace term : 5years
Depreciation conditions	Depreciation term	<b>30 years after operation</b>
	Residual rate	<b>5% of construction cost</b>
	Depreciation method	<b>Straight line</b>

Items	Calculation process
Value added tax	<b>10% of (Sales – fuel cost - O/M expenses)</b>
Fixed asset tax	<b>1% of booked assets</b>
Electricity tax	<b>10% of Income but deferred term is 7 years</b>
Business tax	<b>0.5% to Sales</b>
Corporate tax	<b>10% to profit before tax , but deferred term is 7 years</b>
Dividend	<b>Target of the dividend is 100% for rice terrace protection fund, but it is decreased during none profit term.</b>



When tariff is 3.7 Php/kWh at the first year of the operation and the tariff is escalated with 4.2 % per three years after three years of the operation, FIRR reaches 15%.

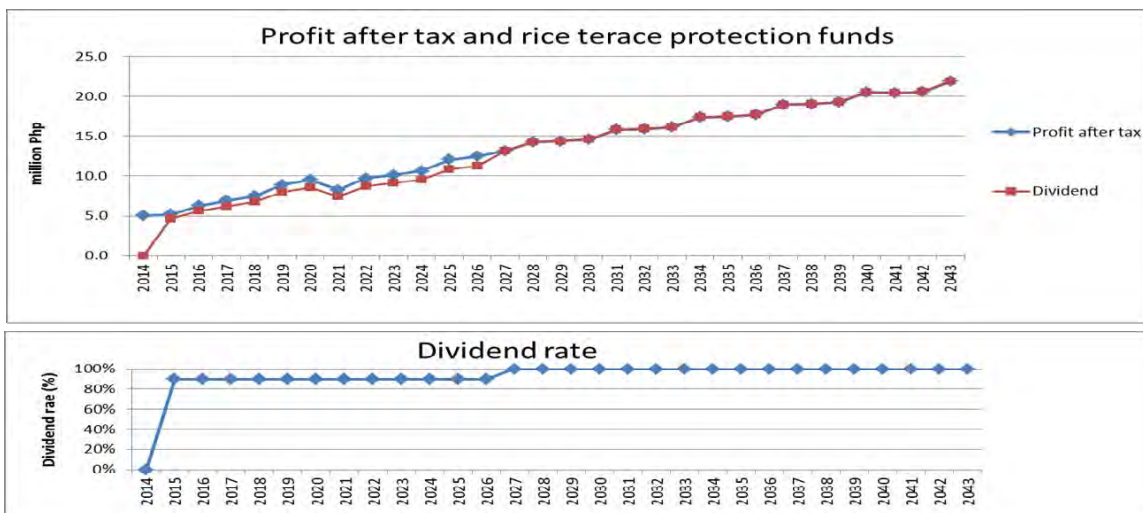
And the generation unit cost is 2.9 Php/kWh at the first year. The average generation cost in the calculation term is 2.4 Php /kWh due to increase wages and O/M expenses.



Rice terrace conservation fund is appropriated by dividend of the project, the dividend is decided by profit after tax and dividend ratio.

It is possible that the dividend ratio is 90% for rice terrace protection fund during the repayment of LTL, after that, it can be that the dividend ratio is 100% for creating rice terrace protection fund.

13 million pesos will be obtained as annual average Conservation Fund for the project period.



## Next Activities

1. Review and Finalize result of the Study
2. Issue Draft Final Report : end of July, 2011
3. Issue Final Report : end of August, 2011

Thank you Very Much !!

MINUTES OF CONSULTATION MEETING WITH THE BARANGAY COUNCIL HELD AT THE BARANGAY HALL, HALIAP, ASIPULO ON JULY 1, 2011 AT 9.45 AM.

PRESENT:

ROGER MANGHI	Barangay Captain, Haliap
ROSEMARIE DAQUEL	Kagawad
CHRISTOPHER CATAMA	Kagawad
CONSTACIO CATAMA	Kagawad
BASILIO BAYAONA	Kagawad
MARIA LAD-AO	Kagawad
NANCY ADDANGNA	Barangay Secretary
ESTELA BASILIO	Barangay Treasurer
BALTAZAR DAMMIT	Irrigators Ass'n officer
LILIAN TENENAN	Haliap
CARMELITA BUYUCCAN	PPDC, Ifugao
NANCY NALUNNE	PO 1 – PPDO, Ifugao
JONATHAN PADDUYAO	PPDO, Ifugao
IGNACIO BUNOLNA	Interpreter Study Team
REY V. SALVANIA	DOE
NOBUKI HAYASHI	TEPSCO/JICA
SHIMIZU MITSURU	TEPSCO/JICA

- The meeting started at 9.45 AM with a prayer led by Kagawad ROSEMARIE DAQUEL.
- Barangay Captain ROGER MANGHI warmly welcomed everyone saying that this is already the third consultation meeting with the barangay council. He expressed apologies for having missed the presentation during the second consultation meeting as he came in very late. Anyhow, he reiterated his position supporting the project and hope that this endeavor will indeed push through.
- Engr. CARMELITA BUYUCCAN, PPDC, acknowledged and thanked the presence of everyone especially the members of the barangay council. She said that the study team is here for the third consultation meeting to present progress of the study especially the affected land areas. She informed that after the meeting, she would like to have a walk through to the project site to see for herself the actual situation. She said that the study is still ongoing and hopefully be finally completed by end of August.
- PRESENTATION/DISCUSSION

NOBUKI HAYASHI of the study team presented and discussed the development plan of the the proposed Likud Mini-Hydropower Plant. She discussed the following:

- Hydrological analysis for development planning
- General lay-out of the hydro-power plant
- Development scale (installed capacity)
- Outline of the civil structures

- Selection of electrical and mechanical equipment
- Financial analysis
- Next activities

After the presentation, the facilitator asked the body for questions, clarifications and or comments. The following were raised.

- Barangay Captain Manghi informed that there was a reading to measure the riverflow conducted sometime in the late 90's. However, when asked if the data are available, he said none.
- Barangay secretary Nancy Addangna asked when will the meter reading end. Ms Hayashi said that the reading continue until end of the study which will be in August.
- Mr. Baltazar Dammit informed that some of the listed owners of the affected Lots are erroneous. The facilitator responded saying that one of the purpose of the meeting was to confirm the list of landowners. This is the opportunity to update and correct it. The council went through the list and made some corrections.
- Barangay captain Roger Manghi requested to have a separate meeting with the lot owners and the barangay council during the community consultation meeting for the final presentation. Engr. Carmelta Buyuccan said the suggestion will be Considered.

- CLOSING STATEMENTS

Engr. CARMELITA BUYUCCAN, PPDC, gave the closing remarks. She thanked the Presenter, Ms. HAYASHI, for ably presenting and discussing the technical contents. She also expressed appreciation to the members of the council for their presence and support. On the part of the provincial government, she expressed high hope that the officials will decide favorably and bring this endeavor to fruition. She asked that the community continue to support the project.

Kagawad Maria Lad-ao led the closing prayer. Meeting was adjourned at 11.45.

PREPARED BY :



IGNACIO N. BUNOLNA

## Consultation Meeting

Date: July 1, 2011  
 Venue: Haliap, Azeputo

### Attendance

	Name	Position	Office/Barangay	Signature
1	ROSEMARIE M. DALCOUR	BRGY KAGAWAD	HALIAP	
2	CHRISTOPHER CATAMB		HALIAP	
3	CONSTANCIO CATAMB	Brgy. Kag.	HALIAP	
4	Basilio Bayanana	Brgy Kagad	Haliap	Bayanana
5	ROGER MANGH	BRGY KAGAWAD	—	R Mangh
6	NANCY ADDANGNA	Brgy. Secretary	Haliap	
7	WANT GAND-WAWANE	PO-1	PPDO	
8	Emelita B. Bayanan	PPDC	PPDO	
9	Maria L. Lad-ao	Brgy Kagad	Brgy Haliap	
10	BLITZAR DAMMIT	Inspector	MAPPIT	
11	Julia P. Basilio	Brgy. Treasurer	Haliap	Julia Basilio
12	Jonathan K. Pardo	PPDO	Lagawe	
13	Lilian Tenenan		Haliap	
14	Tony Linglingon		PPDO	
15	Ignacio Bunobra		TEPCO-Local	
16	Ray V. Salvana	DOE		
17	SHIMIZU Mitsuru		TEPCO/JICA	
18	Nobuki Hayashi	TEPCO/JICA		
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## Highlights of the Sangunian Bayan member

<b>Date:</b>	13:50-15:30 , 8 <sup>th</sup> August 2011
<b>Venue:</b>	Municipal Hall, Asipulo, Ifugao
<b>No. of Participants:</b>	Sangunian Bayan (SB) members:9 PPDO: 2 JICA: 1 TEPSCO: 3
<b>Agenda:</b>	Result of feasibility study on Likud Mini-hydropower plant

## [Highlights]

- Mr. Shimizu of JICA project leader presented the results of the feasibility study around 30 minutes to the Sangunian Bayan members.
  - 1) There is no significant problem in terms of technology and environment for the implementation of the mini-hydropower project
  - 2) The case B which is maximum output is 810 kW is most feasible among 4 cases
  - 3) The total construction of cost is around 118 million pesos
  - 4) If The Provincial Government of Ifugao will implement the project, they will have to prepare 10% equity which is around 12 million pesos and 90% of construction cost will be borrowed from the Development Bank of the Philippines under EDP scheme.
  - 5) If the selling rate sets P4.55 pesos/kWh, annual average net profit, such as the RTCF will be around 11.6 million pesos.

## [Q&amp;A]

- Hon. Dennis Gumangan, the SB members asked what the PGI said about their equity of 12 Million pesos.
  - The PGI has not decided yet if the project would pursue or not. After the examination of the FS report, they will decide.
- The provincial officer of National Commission of Ingenious People (NCIP) came to the Municipal of Asipulo the other day, and said the necessity of implementation of Free Prior Informed consent (FPIC) for the Project and also issuing of the SB resolution and Barangay resolution for the Project. What is the direct benefit for the local people? How can SB members encourage the people? How about the case of the Ambangal project? Did the host communities get any benefit from the project?
  - As the host community, the local people has a priority to access the Rice Terraces Conservation Fund for rehabilitation of communal irrigation system (CIS) and the repair of damaged rice fields. And they also could receive a percentage share of the local

government share being the host community.

- Can the Likud mini-hydropower plant do isolated operation?
  - No, it will not be isolated operation due to the present small capacity of distribution line. Since the Likud's capacity is big as 810kW, the IFELCO line cannot manage the fluctuation of load. For the isolate operation, the additional cost will be taken for enhancement of distribution system. In case of the Ambangal power plant, since it is small capacity, the dummy load can cover the fluctuation.
- Vice Mayor, Tomas Pulupul, SB chairman said that as far as the SB Asipulo is concerned, they are supportive of the project and expressed hope that the PGI would pursue it.

**PROVINCE OF IFUGAO  
ATTENDANCE SHEET**

Office: Ifugao Provincial Government

Title of meeting/seminar/workshop: \_\_\_\_\_

Venue: ASIPULO Date: \_\_\_\_\_

Expected number of participants: \_\_\_\_\_ Scheduled time: \_\_\_\_\_

	Name	Male	Female	Office	CP Number	Signature
1	TOMAS B. PULLUPUL	/		SP		
2	DENIS P. GUMANGAY	/		-do-		
3	CLARENCE P. DATINGAYAN	/		-do-		
4	ROMEL D. PALLAY	/		-do-		
5	CHRISTINE D. HUMWAT		/	-do-		
6	FLORENCE B. PIGGANGAY		/	-do-		
7	FERNANDO D. DUPINGAY	/		-do-		
8	ROBERT P. ULLANI	/		-do-		
9	CHARLES T. HUMWAT (ABCD)	/		-do-		
10	CLARENCE D. DUPINGAY	/		-do- (on leave)		
11	JANE B. ANUDON (SKF REG)		/	-do- (on leave)		
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MINUTES OF THE COMMUNITY CONSULTATION MEETING HELD AT THE BARANGAY HALL, HALIAP,  
ASIPULO  
ON AUGUST 9,2011 AT 9.30 AM.

PRESENT : Pls see attached attendance sheet

#### I – PRELIMINARIES

- The meeting started with a prayer led by Mr. Alfredo Lobyoc
- The participants were acknowledged by representation as members of the barangay council, Lot owners, community elders, project study team and provincial government.
- The facilitator briefly recounted the number of community consultations already conducted and informed the body that this is now the final presentation of the feasibility study results. It was already presented to the members of the Sangguniang Panlalawigan and the Sangguniang Bayan of Asipulo. The final report will be completed this month for submission to JICA.

#### 11- PRESENTATION

Ms. Nobuki Hayashi of the study team presented results of the feasibility study, content of which are as follows :

- Project purpose
- Electric power demand in Ifugao
- Hydrological analysis
- Water diversion from intake weir
- General lay-out
- Outline of the structures
- Selection of turbine type
- Construction cost
- Financial analysis
- Conclusions and Recommendations

The presentation was done in English and translated to the vernacular language for better understanding.

#### 111- OPEN FORUM

1. Mr Ernesto Paliya, a lot owner, asked what would happen to the damages?

At this point the route of the headrace showing affected lot owners was shown and there were some corrections made as to the owner of the lot. Example, Jose Bimmucal et al was changed to be part of Nido Lumaho. Unfortunately, there was sudden brown out.

Engr. Carmelita Buyuccan informed the body that before any construction activities commence should the provincial government decide to pursue, the route and locations of the structures will be revisited to determine the real owners, hence, the lot owners will be part of

the activity negotiation meetings shall be undertaken to include the municipal and provincial assessor office. And that compensation for the right of way will be determined. Payment for right of way is included in the construction cost.

2. Barangay Captain Roger Manghi asked if there will be another consultation meeting.

As was said earlier, this is the final presentation as far as the feasibility study is concerned. Should the project continue, series of community meetings will be undertaken to secure the Free Prior and Informed Consent which is a requirement under the IPRA law.

#### 1V – IMPRESSIONS AND FINAL REMARKS

1. Barangay captain Roger Manghi said that although this is the only time he stayed on for the meeting from the start to the end, he understood the project and hope that the participants also understood as the presentation was done both in English and vernacular. He expressed his high hope for the provincial officials to agree and pursue this endeavor for the good of the province. He thanked the members of the study team and the provincial government who have been coming to consult with the community.
2. Engr. Mitsuru Shimizu, project team leader, thanked the barangay council and participants for their friendship and support since the first community consultation in February.
3. Engr. Carmelita Buyuccan, Provincial Planning and Development Coordinator, thanked the members of the Barangay council, the lot owners and the study team and so with the national and international agencies who supported this project. She thanked TEPCO, JICA and DOE for their support.

On the part of the Provincial Planning and Development Office(PPDO), they will try their best to contribute whatever they can to the provincial government to be able to implement the project by finding other means and sources to reduce the loan component.

“Thank you for all your support and cooperation.”

#### V – ADJOURNMENT

The meeting ended with a closing prayer led by Kagawad Rendon to include blessing of the food. The meeting adjourned at 12.00 noon.

PREPARED BY:



IGNACIO N. BUNOLNA

**PROVINCE OF IFUGAO  
ATTENDANCE SHEET**

Office: Ifugao Provincial Government

Title of meeting/seminar/workshop: Community Consultation

Venue: Haliap, Anepulo

Date: August 9, 2011

Expected number of participants: 30

Scheduled time: 9:30 a.m.

	Name	Male	Female	Office	CP Number	Signature
1	ROGER M. MANGH	-		BRGY HALIAP	09156715261	R M Mangh
2	Constancio Catama	✓		"	09265886922	Constancio
3	Benito Duppong	✓		Haliap		Benito Duppong
4	Guest, Palje	✓		Panabitan		Palje
5	Hool Bas-lan	✓		Tangngadon		Hool Bas-lan
6	Romeo Apog	✓		Licud Haliap		Romeo Apog
7	CHRISTOPHER CATAMA	✓		Licud, Haliap	09262866460	Christopher
8	Ayuta Vaggoz		✓	Licud, Haliap		Ayuta
9	Mula P. Bahilo		✓	Tangngadon	09069014582	Mula P. Bahilo
10	Calixto Catama	✓		Licud	09069711899	Calixto
11	Pablo Bittuwan	✓		Tangngadon		Pablo
12	MAXIMO PAD-O	✓		MAPPIT, Kiangon		Maximo Pad-o
13	ALFONSO LOBYOC Sr.	✓		Haliap, Eldaw		Alfonso
14	Rosemaria M. DeCruz		✓	Haliap		Rosemaria
15	NANCY ADDANGNA		✓	Haliap		Nancy
16	Roy V. Salvana	✓		DOF-MLA		Roy Salvana
17	Barilo Bayagoo	✓		HALIAP		Barilo Bayagoo
18	CLEMENTE TENEBAN	✓		HALIAP, Kagawad		Clemente
19	PETE ANGIHAN	✓		MAPPIT		Pete Angihan
20	Joseph Otano	✓		Tangngadon		Joseph
21	Maha Lad-oo		✓	Kagawad		Maha Lad-oo
22	BATAZAR DAMMIT	✓		MAPPIT		Batazar
23	PEIPE ADDANGNA	✓		Eldaw, Haliap		Peipe
24	Rogelio Catama	✓		Licud Haliap		Rogelio
25	Susan Pulog	✓		Tangngadon, Haliap		Susan
26	Jimmy Bimmucal	✓		MAPPIT, Kiangon		Jimmy
27	Robert Apog	✓		MAPPIT Kiangon		Robert

**CERTIFIED CORRECT:**

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*[Signature]*  
Activity Secretariat

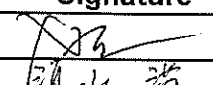
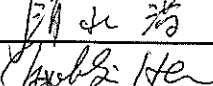
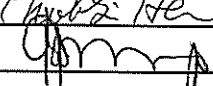
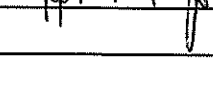
**PROVINCE OF IFUGAO  
ATTENDANCE SHEET**

Office: Ifugao Provincial Government

Title of meeting/seminar/workshop: \_\_\_\_\_

Venue: \_\_\_\_\_ Date: \_\_\_\_\_

Expected number of participants: \_\_\_\_\_ Scheduled time: \_\_\_\_\_

	Name	Male	Female	Office	CP Number	Signature
28	Ignacio Benolag	✓				
29	MITSURU SHIMIZU	✓		TEPCO		
30	Nobuki Hayashi		✓	TEPCO		
31	Carmelita Buryucan		✓	PPDD		
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**29**

  
Activity Secretariat

**Minutes of the Stakeholders meeting**

Date:	7 <sup>th</sup> August 2012, 9:30-11:30
Venue:	GAZEBO, Lagawe, Ifugao
Participants:	<ol style="list-style-type: none"> <li>1. Provincial Government of Ifugao Governor's office, PPDO, ICHO. PACCO, Legal office</li> <li>2. Municipality of Asipulo (Mayor, MPDO)</li> <li>3. Brgy. Haliap (Brgy. Captain, Council members)</li> <li>4. IFELCO (Electric Cooperative)</li> <li>5. DOE</li> <li>6. NIA (National level)</li> <li>7. JICA (JICA headquarter, Philippine Office, Consultant team)</li> </ol> <p>35 participants in total</p>
Agenda:	<p>Explanation of JICA Grant Aid for the Likud Mini-hydropower development project</p> <ol style="list-style-type: none"> <li>1. Objective of the project</li> <li>2. Schedule of preparatory survey (Stage 1), and construction (Stage 2)</li> <li>3. Role and responsible of the recipient country (DOE, PGI)</li> </ol>

**Open Forum:**

- 1 IFELCO Will the Likud project apply for FIT?
  - IFELCO has ESA with SM Avoitiz which will renew another 5 years up to 2017 with same buying rate of 4.20peso per kW. Since the Likud project has no capital investment because of JPN Grant Aid, it is better to take a bilateral contract.
  - IFELCO will buy electricity with lower rate of 4.20 peso per kW.

DOE It will be decided by consulting between DOE and PGI. We have to consider the increasing of RTCF and the burden of raising the tariff rate for the consumers

TEPSCO In terms of technical issue on FIT, if the Likud apply for FIT, IFELCO distribution line will have to be upgraded and/or need to be installed a new higher voltage of line. It may add the additional cost for the line.

IFELCO IFELCO peak load is around 2.2 MW, and base load is around 1.1MW. IFELCO still can receive the generated electricity from the Likud as the embedded system.
  
- 2 IFELCO Is it possible that IFELCO can operate and maintain the Likud power

- plant as the embedded system? So that the PGI has no extra money of O&M, and will provide necessary RTCF to the PGI.
- PGI It is one of options that IFELCO would manage by contract, since the PGI has not enough man-power who is capable of O&M.
- 3 DOE Regard with acquisition of necessary permits, we had very bitter experience affected by delay of procedure during the e8 project.
- TEPSCO During the e8 project, the stance of DOE support the PGI, but for the Likud, DOE has responsible for handling the project, thus need to close coordinate with the PGI
- PGI It was very hardship of acquiring permits for the PGI, may we request DOE to appoint person from national level to designate processing all permits/certificates? Because the schedule has already fixed, and it is very difficult to get all necessary permits by the end of this year.
- DOE DOE also has limited resource person though DOE wish to support. Joint hand of DOE and the PGI
- 4 PGI If IFELCO will extend the contract with SN Aboitiz another 5 years, what will be happened to the Likud power purchase?
- IFELCO As of now, IFELCO buys the power from SN Aboitiz, 800,000kw per month. And we amend the volume of power purchase every year
- 5 TEPSCO Would PGI update the status of the motion to ERC for raising the selling rate of the Ambangal power plant? It might be affected to the Likud project.
- PGI PGI submitted it to ERC, and it is still in ERC on hand. We will follow it up.

#### **PGI Action Plan**

- 1 Exit meeting of the 1<sup>st</sup> survey was fixed by the Governor on 27<sup>th</sup> August, but 26<sup>th</sup> August will be a national holiday so as to be a holiday on 27<sup>th</sup> August. In such case, the meeting will be held on 28<sup>th</sup> August.
- 2 Draft MOA between DOE and PGI shall be prepared as soonest.
3. Application of ECC has already submitted to the DENR Region office but not yet replied by DENR, so will follow it up.
4. Water Right Permit has yet ready to submit. Appropriate office of PGI will be

prepared.

5. Application of FPIC will be apply to NCIP provincial office as soonest.
6. Raising additional 1.43/kW for the Ambangal will be followed up.
7. Draft of ESA between PGI and IFELCO will be prepared by appropriate office of the PGI.

PROVINCE OF IFUGAO  
ATTENDANCE SHEET

2012-8.7

Office: PPDO  
 Title of meeting/ seminar/ workshop: stakeholders meeting  
 Venue: Gazebo Garden Restaurant Date: \_\_\_\_\_  
 Expected Number of participants: 35 Scheduled time: \_\_\_\_\_

NO.	NAME	MALE	FEMALE	OFFICE	CONTACT NO.	SIGNATURE
1	Nancy Gano - Valonne		✓	PPDO	0905673372	
2	Virajinda D. Parro		✓	PBO	091725278482	
3	RENAR B. PATACIL	✓		PPDO-ICHO	09264988831	
4	Rosemarie M. Daquid		✓	<del>PPDO</del>	09067503587	
5	EPIFANIO G. GACUSAN JR	✓		DOE-HUEND	09167824568	
6	JUAN PABLO P. P. P. P.	✓		JICA	09998847459	
7	OSHIMA Kazunari	✓		JICA		
8	Yoshida Kenichi	✓		TEPCO		
9	ROGER M. M. M.	-		BRGT CAPT.	09357108896	
10	CONSTANCIO CATAMA	✓		BLGU	09265656922	
11	Rosemarie P. Lindawan		✓	PLGU-Ifugao	09052190576	
12	Ignacio Bumbra	✓				
13	Nobuki Hayashi		✓	JICA/TEPCO		
14	Mitsuru Shimizu	✓		"		
15	Yukio Miyamoto	✓		"		
16	Hiroshi Kobayashi	✓		"		
17	Kiminori Nakamata	✓		"		
18	Kenichi Yoshida	✓		"		
19	Kiminori Nakamata	✓				
20	CHRISTOPHER MADRUL	✓		IFELCO		
21	JPZ TUGUINAY	✓		IFELCO		
22	JAIMIE PE RENITO VI	✓		IFELCO	09172827998	
23	CHARLES BAGUILAT	✓		IFELCO		
24	JONATHAN K. PADDUNA	✓		PPDO		
25	EDEN P. BUAYON		✓	NIA C.O.	09175261920	
26	Norbento N. Taguba	✓		PLGU-PPD		
27	Arnold G. Gunguyon	✓		MPDO-Asipulo	0917562520	
28	FLAVIO H. BANGUAD	✓		Mayor	09088971938	
29	GARY GUYENON	✓		LD-V	0917207169	
30	ARNEL CARACMAN			TEPCO		

CERTIFIED CORRECT:





# Preparatory Survey for Mini-Hydropower Development Project in the Philippines

July 2012

## Background of the Project

The Government of the Philippines, in the "National Renewable Energy Program" of June 2011, targets to triple its renewable energy capacity to compare with the rate of 2010 in order for energy security as well as reduction of greenhouse gas emissions. In this situation, small scale hydropower is expected to contribute to secure power supply especially in provincial areas since its potential (10MW or less) is plenty and promising sites distribute nationwide.

In Ifugao Province, one of the target sites of the Project, is famous for the Rice Terrace designated as a World Heritage. Due to its preferred topographic and hydrological conditions, the area is very rich in mini hydropower potential which is currently unutilized. In addition, the Provincial Government of Ifugao (PGI), which took over the responsibility to conserve the World Heritage from National Government, is running short of fund for conservation of the Rice Terrace.

On the other hand, in Isabela Province, located next to Ifugao Province, power consumption is high especially in Santiago City, however, the power supply to this area is dependent on other area.

In line with above background, in March 2012, the Government of the Philippines requested Japanese Government for Grant Aid on development of Likud Mini-hydro Project in Ifugao Province and a mini-hydro project utilizing at existing irrigation systems in Isabela Province.



### Objectives

- To contribute to diversifying energy and reduction of greenhouse gas emissions by utilizing domestic renewable energy with developing mini-hydro plants
- To enhance RTCF using profit of Likud Mini-hydro Plant
- To demonstrate the value of newly-introduced mini-hydro plants in terms of regional contribution by energy resource development in the region as well as effective use of untapped hydro potential in the region.

### Outcomes of the Projects

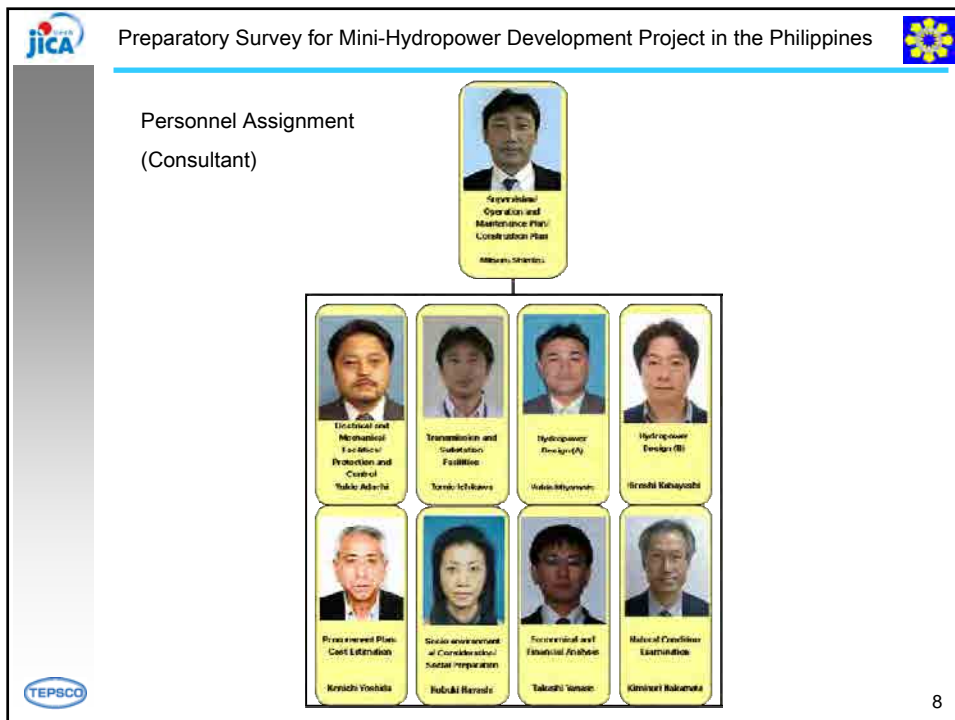
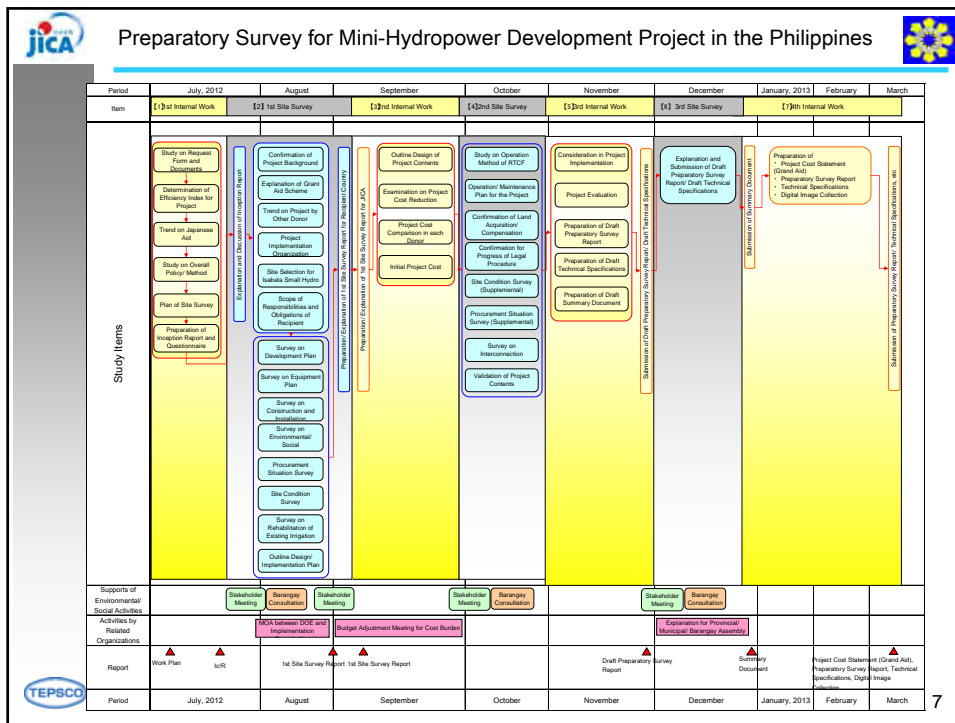
- Likud Mini-hydro Plant in Ifugao Province,
- Mini-hydro Plant utilizing existing irrigation facilities in Isabela Province, and
- Electric transmission/transformation/distribution facilities in the vicinity of each site.



### Target Sites









### Implementation Policy of the Project

Policy-1 : The Project is planned based on consultation with JICA and is implemented complying with JICA's "The Guidelines of the Japanese Grant Aid" and other relevant guidelines.

Category	Title	Version	Issue
Preparatory Survey for Grant Aid	Preparatory Survey Integration Manual	Trial	Mar. 2009
	Preparatory Survey Integration Manual (Civil Works)	Trial	Mar. 2009
	Preparatory Survey Integration Manual (Equipments)	-	Mar. 2009
	Guidelines of Preparing Report for Grant Aid Project	-	Mar. 2011
	Guidelines of Soft Component	Third edition	Oct. 2010
Procurement for Grant Aid	Guidelines of Consulting Services in Grant Aid Project	Revised	Nov. 2010
	The Procurement Guidelines of the Japanese Grant Aid (Japanese Version)		Sep. 2010
	The Procurement Guidelines of the Japanese Grant Aid (English Version)	Tentative	Aug. 2009
Others	Notifications from JICA and others		



### Implementation Policy of the Project

Policy-2 : In order to duly understand and consider local community's intention to the Project, Stakeholder meeting as well as Barangay consultations are held in a timely manner.

Items	Organization	Ifugao	Isabela
Competent authority	Department of Energy (DOE)	PA	PA
	National Irrigation Administration (NIA)	-	PA
Province	Representative of Provincial Council	PA	PA
	Provincial planning and Development Office (PPDO)	PA	PA
	Ifugao Cultural Heritage Office (ICHO)	PA	-
	Provincial Legal Office (PLO)	PA	PA
	Provincial Engineering Office (PEO)	PA	PA
	Provincial Accounting Office (PACCO)	PA	-
	Provincial Treasury Office (PTO)	PA	-
Municipal	Municipal Planning and Development Office (MPDO)	PA	-
Irrigation	Magat River Integrated Irrigation System (MARIIS), etc	-	PA
Project area	Representative of Barangay (Barangay Captain, Elders Meeting)	PA	-
Others	Electric Cooperative (IFELCO/ ISELCO-I)	PA	PA
	Local NGO (Save the Ifugao Terraces Movement :SITMO)	PA	-

PA: Participation

Note: Members in Ifugao Province are same members in Technical Working Group organized in e8 Ambangal Mini-hydro Project. Members in Isabela Province is arranged considering the project site, implementation body, etc.



### Implementation Policy of the Project

Policy-2 : In order to duly understand and consider local community's intention to the Project, **Stakeholder meeting** as well as **Barangay consultations** are held in a timely manner.

No.	Time	Main Agenda
1	Beginning of 1 <sup>st</sup> Site Survey	Explanation of survey contents/ method Confirmation of issues and needs of related authorities Necessity/ contents of MOA Responsibility/ obligation of each authority Activity/ schedule of each authority in the Project
2	End of 1 <sup>st</sup> Site Survey	Explanation of 1 <sup>st</sup> site survey outline Discussion/ confirmation of issues for land acquisition, legal procedure, etc
3	2 <sup>nd</sup> Site Survey	Explanation of project contents (development plan, facility plan) Confirmation of process/ condition for land acquisition, legal procedure, etc discussion for maintenance/ operation system in the Project
4	3 <sup>rd</sup> Site Survey	Explanation of Draft Preparatory Survey Report Confirmation of process/ condition for land acquisition, legal procedure, etc



### Implementation Policy of the Project

Policy-3 : In order to facilitate the Project, various application procedure is carried out complying with relevant laws of the Philippines and considering required particulars and period.

Permission/ License	Remarkable matters in the Project
1). Pre-Development Contract	Unnecessary because DOE is supervisory organization in the Project
2) LGU Endorsement	When appropriate, report on progress, and gain their consensus and support
3). Right of Way	When appropriate, hold a community consultation, and report on progress of the survey, and gain their consensus and support
4) NCIP Certification FPIC	When appropriate, hold a community consultation, and report on progress of the survey, and gain their consensus and support. At the same time report on progress to NCIP provincial office
5)Environment Compliance Certificate	Relatively shorter period of issuing Certificate for Non-coverage (CNC) for run-of-river type
6) Water Rights Permit	CNC (ECC) has to attaché when you apply water right.
7) Energy Sales Agreement	During the survey, coordinate with electric cooperative and NGCP, and gain the basic agreement.
8) Renewable Energy Service/ Operating Contract	Need to submit; F/S report, NCIP Certificate, ECC, Water right permit, and Energy Sales Agreement
9) Certificate of Compliance	Need to submit; FS report, ECC, Water Right Permit, Draft ESA, RE-contract, Certificate of Endorsement of DOE (COE)



Implementation Policy of the Project

Policy-4 : The Project, in principle, complies with technical/integration Standards of the Philippines ,while Japanese/international codes and JICA's "Guideline and Manual for Hydropower Development" are also referred as appropriate.

Policy-5 : Aiming at sustainable and stable project efficiency, durability of equipments and cost reduction in construction/operation are enhanced by introducing Japanese technology combined with Local traditional techniques in designing, execution planning and cost estimation.

< Reference >

Ifugao Province is famous for its unique but accurate and reliable stone masonry technique used in construction of rice terraces. The technique has been utilized for the construction of intake weir, headrace, foundation of powerhouse, etc. of Ambangal Mini-hydro Project. This local traditional technique is also applicable for immediate repair of damaged structures. Ambangal Mini-hydro Project introduced traditional subcontract method called "Pakyaw" for securing labor and completed as scheduled. Application of such local culture or custom to construction works is examined in the survey to facilitate implementation of the Project.



Tentative Schedule of 1st Mission

Table with columns for Date, JICA (Planning Management, Leader, Consultant Leader), Hydropower A, Environment, Hydropower B, Procurement, Natural Condition, Economist, Electrical, and Distribution. Rows 1-45 detail the mission schedule with activities like 'Site Reconnaissance', 'Stakeholder Meeting', and 'Data Collection'.







Tentative Schedule of 2nd Mission

Date (Tentative)	Consultant									
	Consultant Leader	Hydropower-A	Environment	Hydropower-B	Natural Condition	Procurement	Distribution	Economist	Electrical	
1 30-Sep Sat	M.SHIMIZU	Y.MIYAMOTO	N.HAYASHI	H.KOBAYASHI	K.NAKAMATA	K.YOSHIDA	T.ICHIKAWA	T.YANASE	T.ICHIKAWA	
2 1-Oct Mon	Move to Manila			Move to Manila						
3 2-Oct Tue	Meeting with DOE-REMB			Move to Isabela						
4 3-Oct Wed	Move to Isabela			Confirmation of Result of Topo-Survey and Geological Survey				Move to Manila		
5 4-Oct Thu	Additional Survey in Isabela			Additional Survey				Meeting w/DOE&NEDA		
6 5-Oct Fri	Stakeholder Meeting			Move to Ilugao				NEDA		
7 6-Oct Sat	Move to Ilugao		Move to Manila	Internal Meeting		Move to Manila		Data Arrangement		
8 7-Oct Sun	Internal Meeting		Move to Ilugao	Data Arrangement		Move to Ilugao				
9 8-Oct Mon	Data Arrangement				Stakeholder Meeting in Ilugao				Additional Survey in Ilugao	
10 9-Oct Tue	Barangay Consultation				Additional Survey in Ilugao					
11 10-Oct Wed	Additional Survey in Ilugao				Move to Isabela					
12 11-Oct Thu	Additional Survey in Ilugao				Additional Survey in Isabela					
13 12-Oct Fri	Additional Survey in Ilugao				Additional Survey in Isabela					
14 13-Oct Sat	Move to Manila									
15 14-Oct Sun	Data Arrangement					Back to Tokyo				
16 15-Oct Mon	Additional Survey in Manila									
17 16-Oct Tue	Additional Survey in Manila									
18 17-Oct Wed	Preparation of Site Report									
19 18-Oct Thu	Preparation of Site Report									
20 19-Oct Fri	Explanation of Results of Survey (DOE, JICA, EOJ)									
21 20-Oct Sat	Back to Tokyo									

3rd Mission : Dec.2 – Dec.22,2012 (Tentative) Explanation/Discussion DF/R



Major Activities for Likud MHP

Technical Components

Items	Results of FS	Preparatory Survey	Remarks	
Review of Feasibility Study	Fund Source	Loan (EDP) Equity : 10% of Cost Interest Rate: 8-10%	Grant Except: VAT, Tax, ROW, Compensation, Cost for Approval Permission	<Additional Survey> •Stacking 25m each •Geological Survey •Survey for Procurement of Materials and Equipment •Survey for ROW and Compensation
	Development Scale	810kW	Review based on Additional Survey and Guideline for Japan's Grant Aid	
	Civil Structures	It will be same as FS		
	Turbine	Inline Francis x 2 units	Normal Type of Francis x 1 or 2 units	
	Project Cost	Based on Philippine's Standard	It shall be followed Guideline for Japan's Grant Aid	

Soft Components

Items	Original/ Present	for Likud MHP	Remarks
RTCF Regulation	Fund Source from Ambangal MHP only	It shall be consider New Source from Likud MHP	Technical Working Grope will be established by PGI DOE/JICA will support
Energy Seles Agreement	2.58 peso/kWh e8 require 4.00/peso kWh ERC has not approved	ERC issues shall be solved ESA for Likud MHP shall be established	
Plant Management System	Plant Management System is only for Ambangal MHP	Comprehensive Management System shall be established	
O & M Training Program	It was leaded by Doe & e8	Collaboration with Japanese consultant and Ambangal MHP Team	

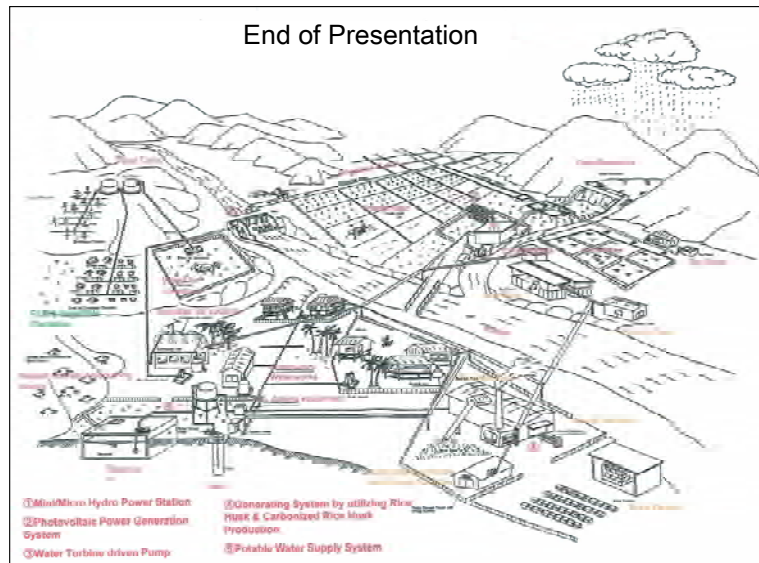


### Major Activities for Isabela MHP

Items	Contents	Preparatory Survey
Selection of Project site	Discussion with DOE and NIA Verification at the site	
Organization Structures	Plant Owner Plant Operation and Management Management of the Benefits from Power Sales	To Check the Capability of each bodies
Confirmation about Legal Matter	Water Right Permit, IEE/EIA, FPIC	Technical Working Grope will be established by PGI DOE/JICA will support
Establishment Plant Management System	Plant Manage, Plant Supervisor, Operator Regulation :O & M method, Recording, Accounting etc O&M Training Program	
Energy Seles Agreement	Draft ESA shall be established	
Survey for Construction	Topographic Survey, Geological Survey, Hydrological Survey, Checking of Existing Structures, Procurement Survey, Power Demand Survey, Survey for Grid Connection	



### End of Presentation



- ① Mini/Micro Hydro Power Station
- ② Photovoltaic Power Generation System
- ③ Water Turbine driven Pump
- ④ Generating System by utilizing Rice Husk & Carbonized Rice Husk production
- ⑤ Potable Water Supply System

### Minutes of the BRGY consultation

Date:	8 <sup>th</sup> August 2012 9:40-12:00
Venue:	Barangy Haliap Hall, Asipulo, Ifugao
Participants:	<ol style="list-style-type: none"> <li>1. Provincial Government of IFugao (PPDO)</li> <li>2. Municipality of Asipulo ( MPDO)</li> <li>3. Brgy. Haliap (Brgy. Captain, Council members)</li> <li>4. Affected landowners</li> <li>5. DOE</li> <li>6. JICA (JICA headquarter, Philippine Office, Consultant team)</li> </ol> <p>30 participants in total</p>
Agenda:	<p>Explanation of JICA Grant Aid for the Likud Mini-hydropower development project</p> <ol style="list-style-type: none"> <li>1. Objective of the project</li> <li>2. Schedule of preparatory survey (Stage 1), and construction (Stage 2)</li> <li>3. Request of assistance for the survey on the site</li> </ol>

#### Highlights:

1. Barangay Kagawad acknowledged the participants and stated the meeting.
2. Mr. Shimizu of TEPSCO study team presented the objective of the project, schedule of the survey and construction. Afterwards he requested to local community to assist/guide the study team at the site. Mr. Arnold Guyguyon of MPDO translated what he said to the local community.

Discussion points were: a. the deference between the previous FS in 2011 and the survey this time  
b. Request assistance of the local community for the survey

3. Mr. Nakamata of TEPSCO study team requested assistance to the local community for checking the geological condition of the site.
4. Ms. Hayashi of TEPSCO study team explained the necessity of household survey that she analyzes the impact of affected lands by the project. The schedule of interview is fixed based on the response of the community as follows.
  - a. Sitio Likud: August 19<sup>th</sup>, 2pm
  - b. Sitio Tangadon: August 18<sup>th</sup>, 9am
  - c. Sitio Mappit: August 26<sup>th</sup>, 2pm
  - d. Sitio Haliap: August 16<sup>th</sup>, am
  - e. Irrigator's Association: August 17<sup>th</sup>, 9am

**The result of the consultation**

1. The community agreed to conduct the survey this time and promised to support the study team.
2. No particular question raised by the community.
3. Mr. Arnold Guyguyon of MPDO expressed his remembrance of a long history of mini-hydropower development in Ifugao. The local community could not understand the benefit of hydropower project at that time thus the project was not push through in Municipality of Asipulo. But after realization of the Ambangal mini-hydropower in Municipality of Kiangan in 2010, no one doubt of the hydropower development.

LIKUD MINIHYDRO POWER PROJECT  
BARANGAY CONSULTATION

August 08, 2012, Wednesday, 9:00 A.M.

Haliap Barangay Hall

Haliap, Asipulo, Ifugao

PROGRAM

- I. Opening:
  - a. Prayer :
  - b. Acknowledgment of Pax : Ms. Nancy Gano-Nalunne  
PPDO Technical Support
  - c. Opening & Welcome Statement : Hon. Roger M. Manghi  
Barangay Captain, Haliap, Asipulo
  - d. Message : Mr. Kazunari Oshima  
Leader of the Grant Aid Survey Mission  
JICA Headquarters, Japan
  - e. Overview & Objectives of the Meeting : Engr. Epifanio G. Gacusan  
DOE-HOEMD
- II. Discussion Proper
  - a. The Proposed Likud Minihydro Power Plant Project (LMHPP), Project Timetable & Mission Schedule : Grant-Aid Survey Mission  
Mr. Mitsuru Shimizu-Consultant Leader
  - b. Interview Schedule with Lot owners and Elders : Mr. Ignas N. Bunolna  
Local Counterpart Survey Mission
  - c. Open Forum
- III. Closing:
  - a. Next Steps : PPDO
  - b. Impression : Engr. Arnold G. Guyguyon  
MPDC, Asipulo, Ifugao  
: Hon. Tomas U. Pullupul  
Municipal Vice-Mayor, Asipulo, Ifugao
  - c. Closing statement : Mr. Raymundo Binbinon  
Executive Assistant, MLGU Asipulo
  - d. Closing Prayer :

Emcee: Hon. Rosemarie Dacquel

### Minutes of the Stakeholders meeting

Date:	28th August 2012,10:40-12:10
Venue:	Sangunian Panlalawigan's conference room 3F, Lagawe, Ifugao
Participants:	<ol style="list-style-type: none"> <li>1. Vice Gov., 7 Sangunian Panlalawigan members</li> <li>2. Provincial Planning Development Office (Ms. Camelita Buyuccan, Nancy)</li> <li>3. DOE representative (Mr. Ronnie Sergent, Mr. Jowill Rodrigues)</li> <li>4. JICA Philippine Office, TEPSCO Consultant team</li> </ol> <p>31 participants in total</p>
Agenda:	<p>Explanation of JICA Grant Aid for the Likud Mini-hydropower development project</p> <ol style="list-style-type: none"> <li>1. Objective of the project</li> <li>2. Schedule of preparatory survey (Stage 1), and construction (Stage 2)</li> <li>3. Role and responsible of the recipient country (DOE, PGI)</li> </ol>

#### Highlights:

1. For better understanding by the SP members regards with JICA Grant Aid project, DOE representative, JICA Philippines officials, and JICA consultant (TEPSCO) jointed the SP regular meeting. And explained the scheme of JICA Grant Aid, the schedule of JICA survey, and implementation, and the required documents are to be prepared by the PGI
2. Major information for the PGI was informed as follows.
  - a. The PGI responsible for getting the permits and licenses for the Likud project, such as, ECC, Water right, FPIC and Right of Way (ROW) at their cost.
  - b. DOE and the PGI will have to take MOA for making clear each role and responsibility for the project

#### Open Forum:

- 1 Vice GOV. Will the Likud project be a grant or a loan? Can we disregard the loan project at page 9 in your presentation?  
JICA The Likud project will be implemented by a Grant Aid project.
- 2 A SP Regarding the counterpart share, Can DOE shoulder the application fees instead of the PGI? Because PGI's budget is not be enough.  
DOE Application fees for the permits are minimal. Those fees shall be shouldered by the PGI.
- 3 Vice GOV. Since the consultant and the contractor will be selected from Japanese companies, Will the all materials and goods are Japanese made?  
TESPCO Electrical mechanical portion, such as water turbine, generator and

controller will be procured from Japan. Cement and other materials for civil structure, and distribution line will be procured from the Philippines.

DOE For the electrical mechanical parts, DOE will procedure of tax exemption (Duty free).

4 Vice GOV. Regarding the MOA between DOE and the PGI, can we check the contents?

DOE DOE's legal office is now reviewing the draft MOA.

GOV. I have a draft MOA, so please provide the copy to all SP members, so that we can input and make comments on that.

A SP member Will the MOA cover all project phases until construction stage, or will we have separate MOAs for the survey and the construction?

DOE The MOA will be only one to make sure the role and responsibility of each DOE and the PGI for the Project.

DOE will be responsible for the VAT and TAX exemption, while the PGI will be responsible for the permits and the clearance, such as ECC, FPIC, water right and the land acquisition.

B SP member Will DOE facilitate the MOA to avoid misunderstand of the SP members. During the Ambangal project, it took so long time to go and back to finalize.

5 B SP member As for the selling rate of the Ambangal, it is stressful for us that ERC dictate the lower price. The negotiation between the PGI and IFELCO was useless. DOE should help the PGI for ERC approval.

DOE We will elevate to our secretary to consider.

PPDO The motion of raising the selling rate to ERC is still on processing. 2.58 peso per kWh is not final price. The legal officer of the PGI has to check everyweek.

6 C SP member Has PPDO already started to consult about land acquisition to possible affected landowners?

PPDO Yes, we conducted the 1<sup>st</sup> consultation regards with the affected lands by the Project and its compensation last May 2012. So far there is no big issue raised.

And we also plan to apply the budget for land acquisition for next supplement budget hearing in October 2012.

## Minutes of the Stakeholder Meeting

Date:	8 <sup>th</sup> October 2012, 10:46-12:30
Venue:	GAZEBO, Municipal of Lagawe, Ifugao
Participants:	The Affected communities Brgy. Council members Municipal Government of Asipulo: Mayor, MPDO Provincial Government of Ifugao: PPDO, Provincial Assessor's Office, Legal, PEO IFELCO DOE, JICA Philippine Office, TEPSCO study team 40 participants in total
Agenda:	1. Result of 1 <sup>st</sup> survey (technical, geological, social conditions) 2. Status of required documents for the Likud 3. Confirm the 2 <sup>nd</sup> mission schedule (Walk through, install staff gauge)

## Highlights:

1. Opening and welcome statement by Ms. Buyuccan of Provincial Planning Development Coordinator (PPDC)
2. Mr. Miyamoto (Civil), Mr. Nakamata (Geologist), Ms. Hayashi (Social) presented the result of 1<sup>st</sup> survey mission of the Likud Hydropower Development Project
3. Ms. Nany of Provincial Planning Development Office (PPDO) informed the present status of preparation of the required documents for the Likud hydropower development project (ROW, NCIP, ECC, Water right, MOA).
4. Joint Walk through along the affected area will be held at 8am on 10<sup>th</sup> October 2012.

The participants are;

- a. Provincial Assessors Office
  - b. Provincial Engineering Office
  - c. Municipal Assessors Office
  - d. Municipal Planning Development Office
  - e. Affected land owners
  - f. TEPSCO study team
5. Closing statement was presented by the Mayor of Asipulo.

## Open Forum

- NICEP Provincial office asked the PGI to submit the assurance of implementation of



project.

↓

JICA Philippines office answered that JICA cannot commit the implementation at this moment because now is middle of survey, and the decision depends on the Japanese cabinet in next February 2013.

- DENR-EMB (for ECC) required the PGI to submit DOE endorsement, the registration of pre-development contract, and the resolution from host community that they have no objection for the project.

↓

DOE answered that the responsible agency is DOE for the project, thus pre-development contract is not necessary. And DOE will send the endorsement letter to the concerned agencies for processing permits and licenses.

The Barangay council members and the affected land owners agreed to prepare the resolution.

- Joint Walk Through is to confirm the affected land area by the affected land owners and the PGI officials by walking along from the proposed intake site, the proposed headrace, the proposed head-tank, the proposed penstock and the proposed power house.

↓

Barangay Captain and the affected land owners agreed to join the walk through.



The list of affected land owners by the Likud project

CLAIMANT	Total Land Area (m <sup>2</sup> )	Affected Land Area (m <sup>2</sup> )	Affected Percentage (%)	Remark
REPUBLIC OF THE PHILIPPINES	4,833	508	10.5	
JOSE BIMMUCAL, et. al.	15,954	96	0.6	Replaced by Anita Dalanag, et. al.
NIDO LUMAHO	5,872	395	6.7	
LEON DONATO	73,228	1,128	1.5	
BENITA DAMMIT	12,488	622	5.0	
MOD-E PAD-E	12,602	307	2.4	
BEN POH NAC	10,393	0	0.0	
ERNESTO PALJA	2,582	172	6.7	
RAMON APOY	8,345	599	7.2	
LAGGUY NAD-UG	30,874	720	2.3	
CHRISTOPHER CATAMA	20,507	1,003	4.9	
ROGELIO CATAMA	12,470	914	7.3	
CALIXTO CATAMA	18,073	1,178	6.5	
CARLOS CATAMA JR.	22,633	519	2.3	
CONSTANCIO CATAMA	19,011	398	2.1	
ALVIN CATAMA	24,721	580	2.3	
JOSE BIMMUCAL, et. al.	11,387	93	0.8	Replaced by Linda Pitpitunge
JOSEPH OTAHA	8,254	245	3.0	
ANTONIO TIMOTEO	2,405	199	8.3	
BENITO BAGTO	5,676	325	5.7	
JOSE BIMMUCAL, et. al.	18,145	437	2.4	Replaced by Jimmy Bimmucal
ALEX PELLOG	1,585	58	3.6	
JOSEPHINE OCAMPO	9,733	1,737	17.8	
UNKNOWN (Penstock)		128		
UNKNOWN (Pwerhouse Access)		538		
UNKNOWN (Headrace Access)		2,107		
	351,772	15,007	4.3	

The status of required documents for the Likud project

	Areas of Concern	Time Frame	Lead Office	Remarks	as of 19th Oct. 2012
1	Land and ESA				
	a. Settle right of way	Nov. 2012 to January 2013	Office of the Provincial Assessor	Fund is proposed in the 2013 Provincial AIP	Conducted the 2nd walk through to verify the boundaries of each landowner Initial Agreement between PGI and the landowners which is described willing to sale the land will be signed by end of Nov. 2012
	b. Energy Sales Agreement	Draft ESA by end of Oct. 2012	PPDO IFELCO	ERC should approved by the completion of construction	Bilateral Contract (PGI & IFELCO) Unit Price : 4.35 peso/kWh
2	Acquisition of the following permits & licenses:				
	a. Certificate of Pre-condition with NCIP Provincial Office	Sep. to Dec. 2012	PPDO	Request forwarded to NCIP on Aug. 9, 2012	1. Pre-FBI meeting was done on Sep.19th 2012. The cost of FBI is 37,000pesos, once the PGI pay, the FBI will carry out within 15 days. 2. NCIP requested to have project commitment for assurance the project from JICA, but DOE said it is beyond NCIP's mandate. DOE will confirm it with NCIP.
	b. Water Permit with NWRB	Sep. to Dec. 2012	PPDO	Application submitted on Aug. 13, 2012 through JRS speed mail	NWRB requested PGI to submit the DOE endorsement. DOE will send.
	c. Environment Compliance Certificate with Regional DENR Office	Sep. to Dec. 2012	PPDO	Application e-mailed on Feb. 1, 2012 at DENR Office, La Trinidad, Benguet	DENR-EMB requested PGI to submit DOE endorsement, BRGY's endorsement, and FS report.
	d. Memorandum of Agreement with DOE	Sep. 10, 2012	PPDO	MOA being reviewed by Provincial Legal Office of the Provincial Government	DOE's legal finished reviewing and waiting for the SP's comments of PGI.
	e. Hydro service Contract with DOE				DOE is the owner of the project until turn over the ownership to PGI, thus the pre-development contract is not necessary. But the development contract will be needed for COC of ERC and the operation.
3	New Findings in 2nd Mission	Non			

PROVINCE OF IFUGAO  
ATTENDANCE SHEET

Office: \_\_\_\_\_  
 Title of meeting/ seminar/ workshop: Meeting of Stakeholders of the Likud MHP Project  
 Venue: Gazebo Restaurant, Pob. West, Lagawe Date: Oct. 8, 2012  
 Expected Number of participants: \_\_\_\_\_ Scheduled time: 10:00 a.m.

NO.	NAME	MALE	FEMALE	OFFICE	CONTACT NO.	SIGNATURE
1	EPIFANIO G. GARCIA JR	/		DOE-REMB	(02) 8402 92	
2.	FUORO O. ADVIENTO	/		JICA	889-7112 100212	
3.	REY V. SALVANIA	/		DOE-REMB	840 2192	
4.	JOWIN E. RODRIGUEZ	/		DOE-REMB	840 2192	
5.	Camelita B. Buyuccan		/	PRDO / PLGU	(077) 382-21-09	
7	MITSURU SHIMIZU	/		TEPCO		
8	YUKIO MIYAMOTO	/		TEPCO		
9	Hiroshi Kobayashi	/		TEPCO		
10	Kiminori NAKAMATA	/		TCC		
11	Kenichi YOSHIDA	/		JEM		
12	TOMIO ICHIKAWA	/		TEPCO		
13	Takashi YANASE	/		TEPCO		
14	Nobuki HAYASHI		/	TEPCO	0919 459 2138	
15	Hiroyuki Matsuda	/		JICA		
16	VUAN PAULO FERRER	/		JICA		
17	CATMA CONSTANCIO	/		BLGU	09265656922	
18	BASILIO BAYARONA	/		BLGU	09068423195	
19	ROGER MAUGHY	/		BLGU	09235710820	
20	BALTHAZAR DAMMIT	/			090587 37606	
21	Lawrence Putal	/		BLCU	09261218710	
22	PEDRO K. NAMINGIT	/		PASSO	09052162673	
23	Fidelito A. Rendon	/		BLGU	09242709077	
24	ARNEL CARACINA	/		TEPCO		
25	FIDEL MAGUIAN	/		TEPCO		
26	ROMEO S. OLA	/		TEPCO		
27	SICATUNA TAMSON	/		JICA		
28	Maario Galatia	/		PASSO		
29	Roger Madaston	/		TEPCO		
30	Prozemanie M. Dequiel		/	BLGU		
31	NANCY D. ADDARIGANA		/	KAHAD		

CERTIFIED CORRECT:

PROVINCE OF IFUGAO  
ATTENDANCE SHEET

Office: \_\_\_\_\_  
 Title of meeting/ seminar/ workshop: \_\_\_\_\_  
 Venue: \_\_\_\_\_ Date: \_\_\_\_\_  
 Expected Number of participants: \_\_\_\_\_ Scheduled time: \_\_\_\_\_

NO.	NAME	MALE	FEMALE	OFFICE	CONTACT NO.	SIGNATURE
32	Maria L. Last-ao		✓	BLGU	09066113734	<i>[Signature]</i>
33	Honorio T. Rimohya	✓		PEO		<i>[Signature]</i>
34	GARY B. GUYGUYO	✓		PLD		<i>[Signature]</i>
35	ELALIN H. BANGUD	✓		Mayor	09088971938	<i>[Signature]</i>
36	CHRIS MADULL	✓		IFELCO		<i>[Signature]</i>
37	OPUNO ATOLBA	✓		II		<i>[Signature]</i>
38	JAIMIE PE BENTO, JR	✓		II		<i>[Signature]</i>
39	Nancy Gawn- Walwinne		✓	PPDO		<i>[Signature]</i>
40	Arnold G. Gugguon	✓		MPDO -Asipulo	09175652520	<i>[Signature]</i>
41	Kristine Huazon		✓	PPDO	09061197827	<i>[Signature]</i>
42	Jonathan K. Padayao	✓		PPDO	09209050427	<i>[Signature]</i>
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Preparatory Survey  
for  
Mini-Hydropower Development Project  
in  
the Philippines

Results of 1<sup>st</sup> Survey

Oct. 1, 2012

### Background of the Project

The Government of the Philippines, in the "National Renewable Energy Program" of June 2011, targets to triple its renewable energy capacity to compare with the rate of 2010 in order for energy security as well as reduction of greenhouse gas emissions. In this situation, small scale hydropower is expected to contribute to secure power supply especially in provincial areas since its potential (10MW or less) is plenty and promising sites distribute nationwide.

In Ifugao Province, one of the target sites of the Project, is famous for the Rice Terrace designated as a World Heritage. Due to its preferred topographic and hydrological conditions, the area is very rich in mini hydropower potential which is currently unutilized. In addition, the Provincial Government of Ifugao (PGI), which took over the responsibility to conserve the World Heritage from National Government, is running short of fund for conservation of the Rice Terrace.

On the other hand, in Isabela Province, located next to Ifugao Province, power consumption is high especially in Santiago City, however, the power supply to this area is dependent on other area.

In line with above background, in March 2012, the Government of the Philippines requested Japanese Government for Grant Aid on development of Likud Mini-hydro Project in Ifugao Province and a mini-hydro project utilizing at existing irrigation systems in Isabela Province.

## Objectives

- To contribute to diversifying energy and reduction of greenhouse gas emissions by utilizing domestic renewable energy with developing mini-hydro plants
- To enhance RTCF using profit of Likud Mini-hydro Plant
- To demonstrate the value of newly-introduced mini-hydro plants in terms of regional contribution by energy resource development in the region as well as effective use of untapped hydro potential in the region.

## Outcomes of the Projects

- Likud Mini-hydro Plant in Ifugao Province,
- Mini-hydro Plant utilizing existing irrigation facilities in Isabela Province, and
- Electric transmission/transformation/distribution facilities in the vicinity of each site.

## Part-I

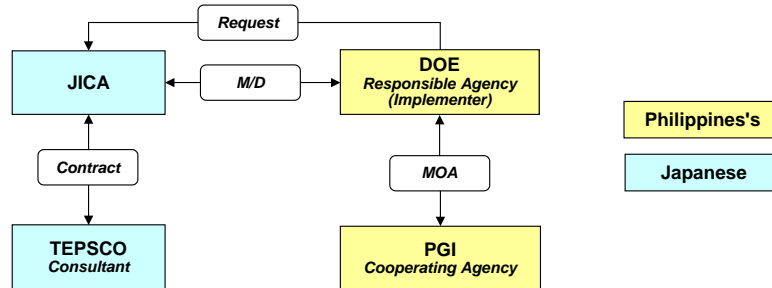
### Likud Mini-Hydropower Development in Ifugao

1. Minutes of Discussion
2. Project Site
3. Overall Schedule of Japan's Grant Aid Program
4. Results of Site Survey
5. Action Plan of PGI
6. Project Component
7. Concerns / Issues



(1) Responsible and Implementing Organization

a. Organization Structure : Preparatory Survey Stage

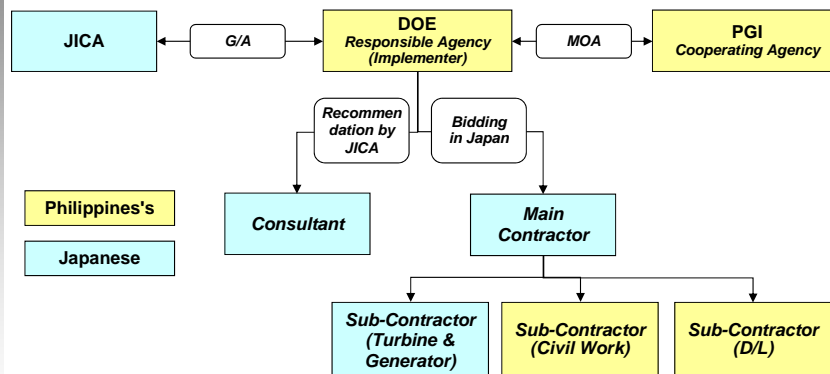


**Note; The MOA shall be given to the Team by Sep. 10,2012  
The Plan of O & M Structure shall be submitted to JICA by Nov. 2012**



(1) Responsible and Implementing Organization

b. Organization Structure : Implementation Stage







## (2) Component of the Project

Items Originally Requested by POG	Confirmed Components of the Project
a. Construction and Installation of Likud MHP	a. Construction and Installation of Likud MHP
b. Connecting Power System to 13.8kV	b. Connecting Power System to 13.8kV
c. Overseas Study Tour and Training for HOEMD	c. Training in the Philippine

## (3) Counterpart Personnel

*The Team requested the Philippines side that the necessary number of counterpart personnel shall be assigned to the Team and necessary arrangement with related organization shall be made during the Survey*



## (4) Cost Sharing

Cost Sharing between Philippines Side and Japan Site

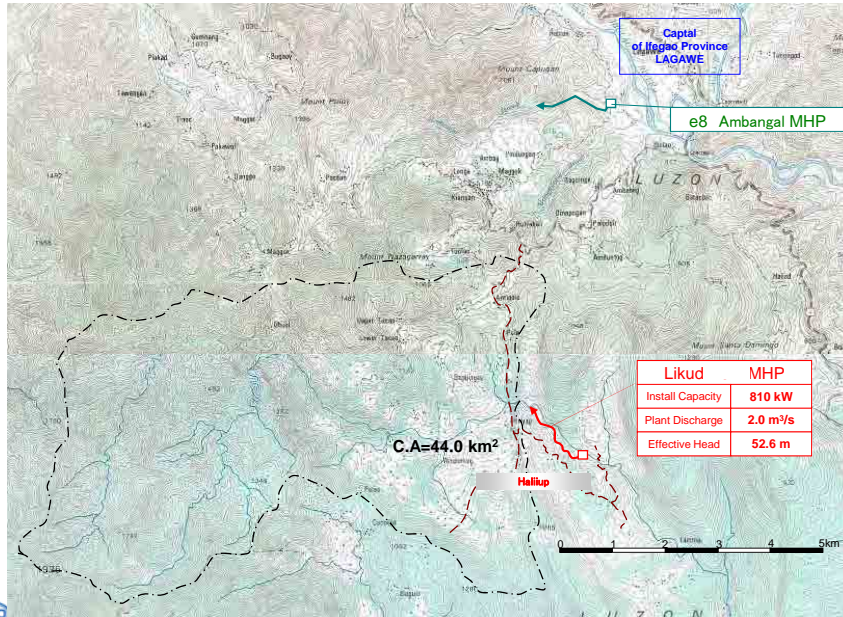
Items	Remarks	Philippines	Japan	Note
Project Management Cost	Cost of C/P for Project Supervision and Management Travel Expenses, Accommodation, Allowance etc.	○	×	
Tax and Compensation	Right of Way	○	×	
	Compensation	○	×	
	Cost for Legal Procedure	○	×	
	VAT	○	×	Civil and Transmission & Sub Station Cost
	TAX	○	×	
Cost for Banking Arrangement	Import Tax Exemption and Custom Clearance	○	×	
Consultant's Cost	Cost for Detail Design	×	○	
	Cost for Preparation of Bidding Documents	×	○	
	Construction Supervision by the Consultant	△	○	except Cost for Supervision by Recipient Country (DOE, NIA, PGI etc)
	O&M Training & Preparation of Guidelines	×	○	
Construction Cost	Direct Cost	×	○	Sub-Contractor : Civil & Transmission will be Local
	Indirect Cost	×	○	
	Main Electrical & Mechanical Equipment	×	○	Including Marine Transportation
	Contingency Cost	—	—	Basically Contingency dose not allowed *2
Operation and Maintenance Cost		○	×	

Note: Cost Sharing between DOE and Implementation Agency should be clearly specified in the MOA

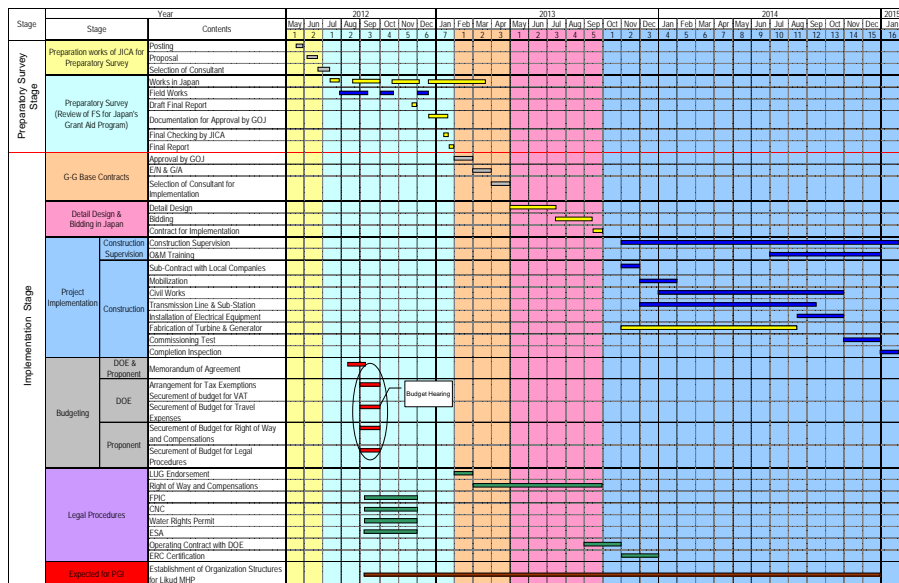
\*1:For Japan's grant aid program in the Philippines, VAT is not treated as tax exemption, the governmental organization of the Philippines such as DOE should pay VAT whenever it is required from the contractor which is specified in the E/N & G/A

\*2:Since the contingency costs are included in the Direct Cost, JICA will not accept Any Claim/Change Order from the Contractor

## 2. Project Site



## 3. Overall Schedule of Japan's Grant Aid Program



Note: The original project schedule, which is defined by GIA must be complied strictly. A Grant Aid Project will surely be completed within two years from ERN.



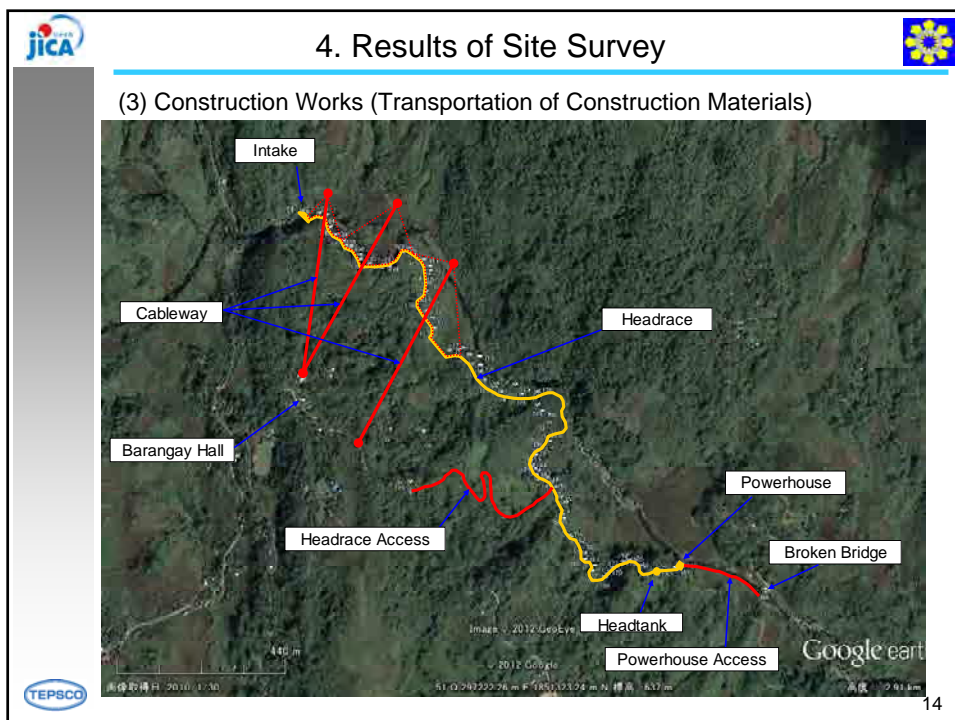
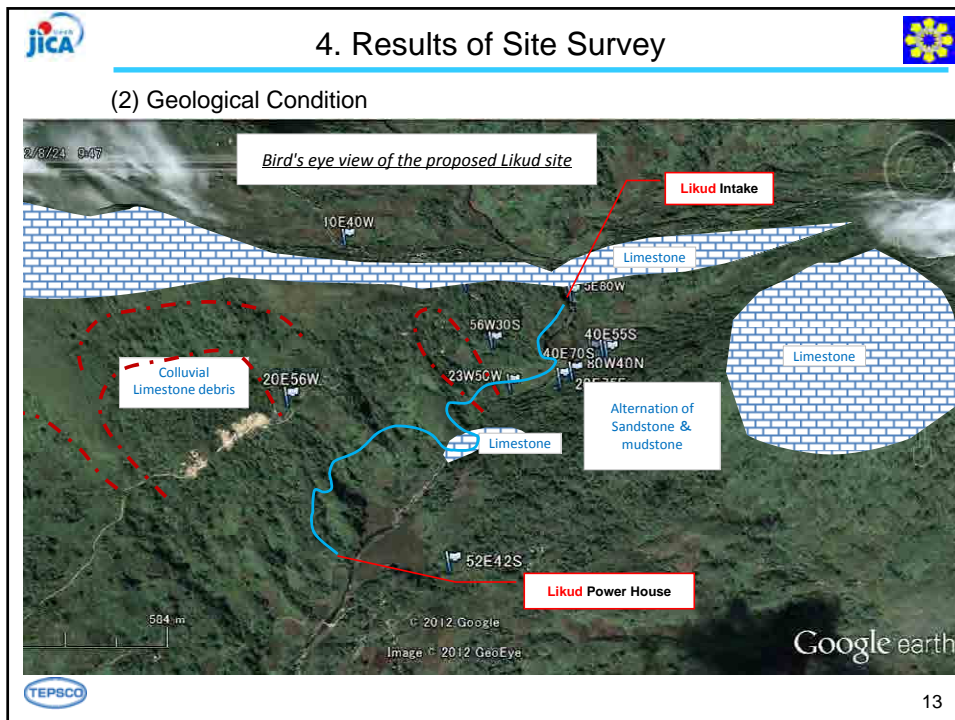
### (1) Detail Survey for Route of Water Way



### (1) Detail Survey for Route of Water Way

#### Comparison of Headrace and Penstock between Preparatory Survey and F/S

Item	Unit	Preparatory Survey	F/S
<b>Headrace</b>			
Total length	m	1,833.9	1,875.3
Channel	m	1,704.3	1,841.5
Flume	m	118.0	22.2
Overflow spillway	m	11.6	11.6
<b>Penstock</b>			
Total length	m	160.0	118.5





### (4) Affected Land Area (Including Access Road)

Name of Land Owner	Total Land Area (m <sup>2</sup> )	Affected Land Area (m <sup>2</sup> )	Affected Percentage (%)	Remark
REPUBLIC OF THE PHILIPPINES	4,833	508	10.5	
JOSE BIMMUCAL, et. al.	15,954	96	0.6	Replaced by Anita Dalanag, et. al.
NIDO LUMAHO	5,872	395	6.7	
LEON DONATO	73,228	1,128	1.5	
BENITA DAMMIT	12,488	622	5.0	
MOD-E PAD-E	12,602	307	2.4	
BEN POH NAC	10,393	0	0.0	
ERNESTO PALUA	2,582	172	6.7	
RAMON APOY	8,345	599	7.2	
LAGGUY NAD-UG	30,874	720	2.3	
CHRISTOPHER CATAMA	20,507	1,003	4.9	
ROGELIO CATAMA	12,470	914	7.3	
CALIXTO CATAMA	18,073	1,178	6.5	
CARLOS CATAMA JR.	22,633	519	2.3	
CONSTANCIO CATAMA	19,011	398	2.1	
ALVIN CATAMA	24,721	580	2.3	
JOSE BIMMUCAL, et. al.	11,387	93	0.8	Replaced by Linda Pitpitunge
JOSEPH OTAHA	8,254	245	3.0	
ANTONIO TIMOTEO	2,405	199	8.3	
BENITO BAGTO	5,676	325	5.7	
JOSE BIMMUCAL, et. al.	18,145	437	2.4	Replaced by Jimmy Bimmucal
ALEX PELLOG	1,585	58	3.6	
JOSEPHINE OCAMPO	9,733	1,737	17.8	
UNKNOWN (Penstock)		128		
UNKNOWN (Pwerhouse Access)		538		
UNKNOWN (Headrace Access)		2,107		
<b>Total</b>	<b>351,772</b>	<b>15,007</b>	<b>4.3</b>	



### (5) Interview with Affected Land Owners

Number of the affected landowners	23
Number of the interview with the affected landowners :	22
<ul style="list-style-type: none"> <li>➤ All affected landowners knew about the project.</li> <li>➤ 20 out of 22 respondents positively accept the project.</li> <li>➤ 2 respondent accepted with condition of employment during the construction stage and/or officer of LGU.</li> <li>➤ All affected landowners can offer their lands for the Project                             <ul style="list-style-type: none"> <li>4 respondents said to donate the land with conditions. (rehab of CIS and employment opportunity as LGU officers.)</li> <li>18 respondents said to negotiated purchase.</li> </ul> </li> <li>➤ Compensation by the project will not make their daily life change since the affected area will be small.</li> <li>➤ 16 respondents take tax clearance annually, but 6 have not transferred the land title officially thus no tax pay. They need to update the official land title.</li> </ul>	



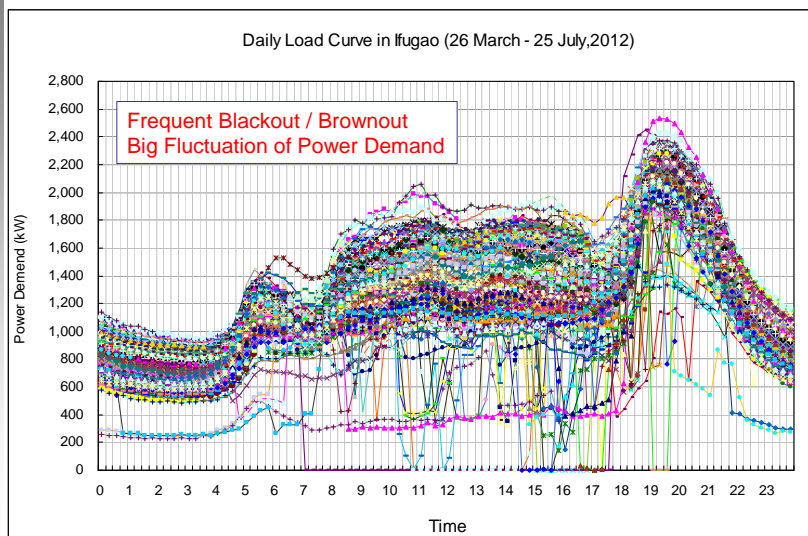
### (5) Interview with Affected Land Owners

#### Basic information of the affected land owners

No. of family members:	Minimum: 1, Average : 4.7, Maximum : 8
Living years in present house:	19 respondents have been living the present house since they were birth.
Ownership of the house	19 respondents owned the houses.
No. of family members earning income	Minimum: 1, Average: 2, Maximum: 6
Annual Income of 2011	Minimum : P 5,000 , Mean: P 30,900 Average : P 74, 641 , Maximum: P309,075
Major source of cash income	<ul style="list-style-type: none"> <li>• Some of family members work as teacher and/or LGU officer, the family 's income is stable.</li> <li>• The family income less than 30,000 pesos, they are subsistence farming farmers and/or daily wage workers.</li> </ul>
No. of electrified household	• 16 HHs electrified , 6HHs have no electricity

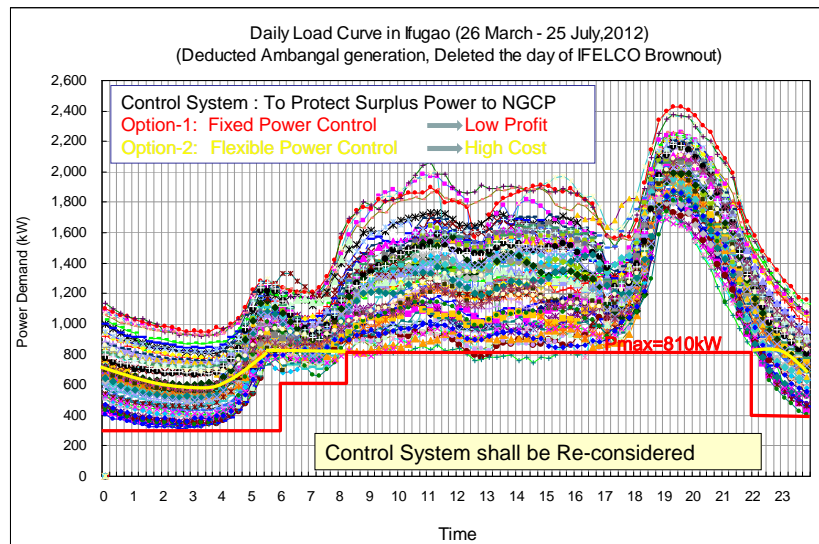


### (6) Electric Power Demand in Ifugao

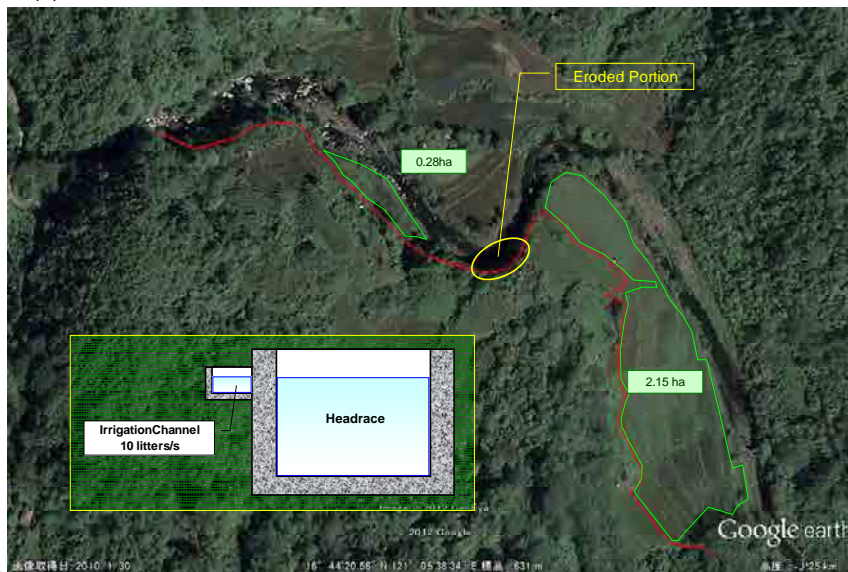




#### (6) Electric Power Demand in Ifugao



#### (7) Rehabilitation of Cot-Cot CIS



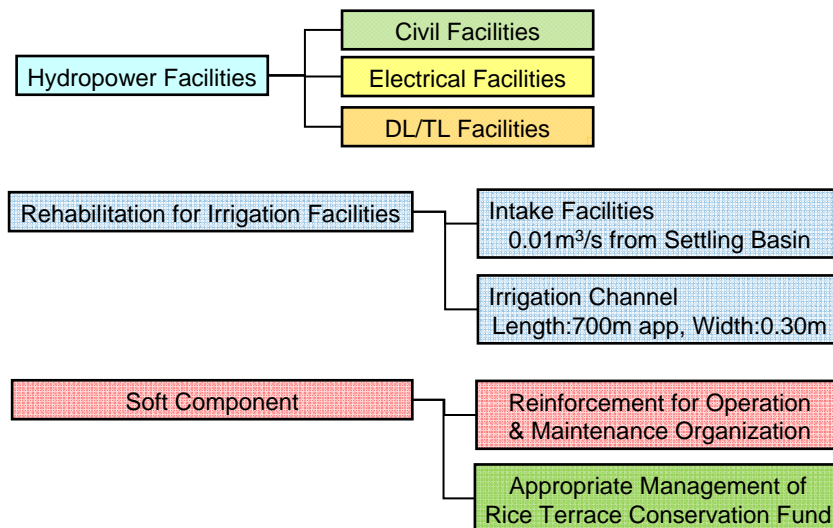
## 5. Action Plan of PGI



### PGI's Action Plan prepared by PPDO

Areas of Concern	Time Frame	Lead Office	Remarks
1. Settle right of way	Nov. 2012 to January 2013	Office of the Provincial Assessor	Fund is proposed in the 2013 Provincial AIP
2. Acquisition of the following permits & licenses:			
a. Certificate of Pre-condition with NCIP Provincial Office	Sep. to Dec. 2012	PPDO	Request forwarded to NCIP on Aug. 9, 2012
b. Water Permit with NWRB	Sep. to Dec. 2012	PPDO	Application submitted on Aug. 13, 2012 through JRS speed mail
c. Environment Compliance Certificate with Regional DENR Office	Sep. to Dec. 2012	PPDO	Application e-mailed on Feb. 1, 2012 at DENR Office, La Trinidad, Benguet
d. Memorandum of Agreement with DOE	Sep. 10, 2012	PPDO	MOA being reviewed by Provincial Legal Office

## 6. Project Component







## 7. Concerns / Issues



Items	Present	Concerns / Issues for Likud MHP	Remarks
RTCF Regulation	Fund Source from Ambangal MHP only	It shall be consider New Source from Likud MHP	Technical Working Grope will be established by PGI DOE/JICA will support
Energy Seles Agreement	2.58 peso/kWh e8 require 4.00/peso kWh ERC has not approved	ERC issues shall be solved ESA for Likud MHP shall be established	
Plant Management System	Plant Management System is only for Ambangal MHP	Comprehensive Management System shall be established	
O & M Training Program	It was leaded by DOE & e8	Collaboration with Japanese consultant and Ambangal MHP Team <b>Who will be Trainees ?</b>	



## Minutes of the Stakeholder Meeting

Date:	10 <sup>th</sup> December 2012, 10:40-12:30
Venue:	GAZEBO, Municipality of Lagawe
Participants:	Provincial Government of Ifugao: PPDO, PAO, Legal, PAENRO, PEO Municipal Government of Asipulo: Vice Mayor, Assessor's Office IFELCO, DOE, TEPSCO study team 22 participants in total
Agenda:	<ol style="list-style-type: none"> <li>1. Final Design of the Likud Hydropower Development Project</li> <li>2. Implementation Schedule</li> <li>3. Status of documentary Requirements for the Province of Ifugao</li> <li>4. Final list of affected land owners</li> </ol>

## Highlights:

1. Opening and welcome statement by Ms. Buyuccan of Provincial Planning Development Coordinator (PPDC) who is the head of executing office of the Likud hydropower project.(20 minutes)
2. Mr. Shimizu presented the final design of the Likud Hydropower Development Project, and informed the implementation schedule of the Project (1hour).
3. Ms. Nany of Provincial Planning Development Office (PPDO) informed the present status of preparation of the required documents for the Likud hydropower development project, such as acquiring the land, Environmental clearance, social acceptability for the project and so on. The following table shows each status.
4. The PGI together with TEPSCO will hold the BRGY consultation to explain the final design of the Likud hydropower development project and to confirm the final affected area by the Project at 9am on 13<sup>th</sup> Dec. 2012. The PGI asked MLGU to attend the BRGY consultation on 13<sup>th</sup> Dec. 2012.
5. Closing statement was presented by the Vice Mayor of Asipulo to hope realizing the project in Ifugao, and promising the assistance of the land acquisition.

The status of the required documents by DOE for the Project

	Activity	Status/Time Frame
1	Checking of Land Titles	by Dec-13(Thu)
2	Right of Way for finalizing the affected area	Discuss on Dec-13
3	Brgy Consultation	Dec-13 @Halip Brgy Hall
4	Baseline Evaluation (value of land)	PPDO to evaluate and provide all needed documents to TEPSCO after discussion w/ land owner on Dec-13
5	Certification from JICA	submitted to PLGU
6	MOA btw PGI and DOE	Consult w/ Legal and Accountant to finalize until Dec-14
7	Certificate of Endorsement from DOE	After signing MOA (between DOE and PGI)
8	Certificate of Registration from DOE	After signing MOA (DOE & PGI) and Hydro Service Contract
9	Certificate of Non-Coverage/ECC	Pending Certificate of Endorsement/Registration
		Submit PDP and Certificate of No-objection
10	FPIC	FBI:completed
		FPIC:to be scheduled later
11	Water Right Permit	Pending Certificate of Endorsement/Registration
12	MOD btw JICA and DOE	Shall be concluded on Dec-20
13	Energy Sales Agreement	Drafted, to be finalized after ERC approval

PROVINCE OF IFUGAO  
ATTENDANCE SHEET

2012.12.10

Office: **Provincial Local Government of Ifugao**  
 Title of meeting/ seminar/ workshop: **Meeting of Stakeholders of the Likud Mini-hydro Power Project**  
 Venue: **Gazebo Garden Restaurant, Poblacion West, Lagawe, Ifugao** Date: **December 10, 2012**  
 Expected Number of participants: \_\_\_\_\_ Scheduled time: **10:00 A.M.**

NO.	NAME	MALE	FEMALE	OFFICE	CONTACT NO.	SIGNATURE
1	Nobuki HAYASHI		✓	TEPSLO		<i>[Signature]</i>
2	Mitsuro SHIMIZU	✓		TEPSLO		<i>[Signature]</i>
3	Hiroshi KOBAYASHI	✓		TEPSLO		<i>[Signature]</i>
4	Conchita B. Binyocan		✓	PPDO		<i>[Signature]</i>
5	Honorio T. Bimohya	✓		PEO		<i>[Signature]</i>
6	Ignacio Buno Ina	✓				<i>[Signature]</i>
7	BENJAMIN LUNAG JR.	✓		PAENRS		<i>[Signature]</i>
8	IGNACIO B. BANUYA	✓		ASIPULO		<i>[Signature]</i>
9	ROBERT PINKIHAN	✓		ASIPULO		<i>[Signature]</i>
10	DEBNO K-NAMINGIT	✓		ITASSO		<i>[Signature]</i>
11	GARY B. GUYGUYON	✓		PLD		<i>[Signature]</i>
12	Ephraim G. Gacusan, Jr.	✓		DOE-REMB	4792800	<i>[Signature]</i>
13	CELE MADDUL	✓		IFELCO		<i>[Signature]</i>
14	JAI ME PE BENTIVI	✓		IFELCO		<i>[Signature]</i>
15	James Pulley	✓		V.M	092738639112	<i>[Signature]</i>
16	CHARLES BAGUILAT	✓		PACCO		<i>[Signature]</i>
17	Jonathan F. Padua	✓		PPDO		<i>[Signature]</i>
18	ARNEL CARAMEL	✓		TEPSUO		<i>[Signature]</i>
19	Macario Galotia	✓		PASSO		<i>[Signature]</i>
20	FIDEL MAQUILAN	✓		TEPSCO		<i>[Signature]</i>
21	Mano Balawa	✓		PPDO		<i>[Signature]</i>
22	DERICK HUMIGAT	✓		PACCO		<i>[Signature]</i>
23	GRIC OBTALL	✓		IFELCO		<i>[Signature]</i>
24	Kristine Kuaya		✓	PPDO		<i>[Signature]</i>
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CERTIFIED CORRECT:  
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**LIKUD MINI-HYDRO POWER DEVELOPMENT PROJECT**  
**STAKEHOLDERS' MEETING**  
10 December 2012, Monday 10:00 A.M.  
Gazebo Garden Restaurant  
Dullagan, Poblacion West, Lagawe, Ifugao

**PROGRAM**

**I. OPENING**

- a. Prayer :
- b. Acknowledgement of Participants : Secretariat
- c. Opening and Welcome Statement : **Engr. Carmelita B. Buyuccan**  
PPDC & AMHPP Plant Manager

**II. DISCUSSION PROPER**

- : **Mr. Mitsuru Shimizu**  
Grant-Aid Survey Mission Leader
- a. Final Design of the Likud Hydro Power Development Project
- b. Implementation Schedule
- c. Documentary Requirements
- d. Final List of Lot Owners
- e. Others

**III. CULMINATING**

- a. Wrap-up and Next Steps : Secretariat
- b. Closing Statement : **Hon. Eladio H. Bang-ud**  
Municipal Mayor, Asipulo, Ifugao
- c. Closing Prayer : **Hon. Fedelito A. Rendon**  
Barangay Kagawad, Haliap, Asipulo

Republic of the Philippines  
Preparatory Survey for  
Mini-Hydropower Development  
in the Philippines  
(Mini Hydropower Project in the Province of Ifugao)

*Draft Preparatory Survey Report*

December 2012

1

*Overall Goal*

The overall goal to be to make a contribution towards realizing the goals of the *RE Act, the National Renewable Energy Program* and the *Ifugao Province Mini Hydro Electric Power Plant Development Program Ordinance*

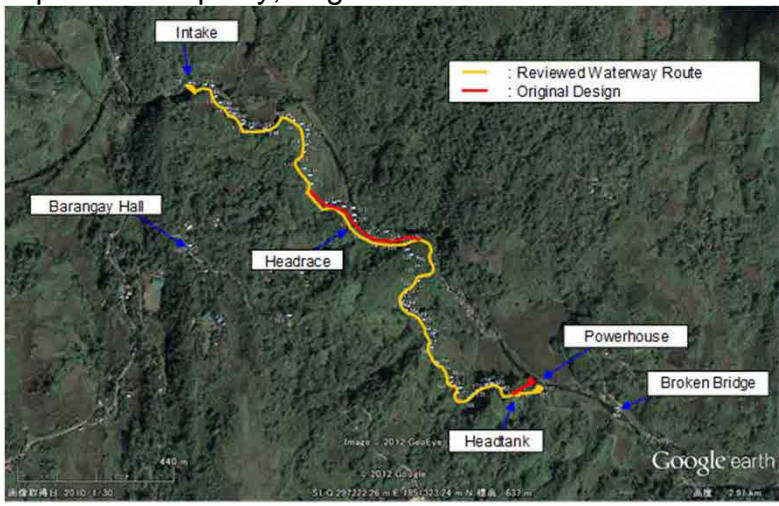
*Project Purpose*

The Project will be implemented with the purpose of *Expanding the RTCF* for preservation of the rice terraces, *Stable energy supply with lower electric tariff rate* in Ifugao.

2

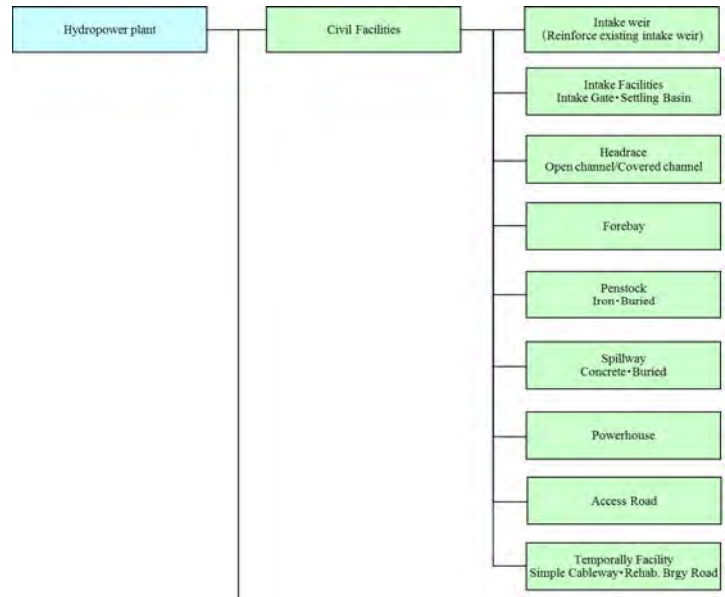
### Outline of the Project

The Project intends to construct *Likud mini hydropower plant (maximum output 820 kW)* in Barangay Haliap in Asipulo Municipality, Ifugao Province.



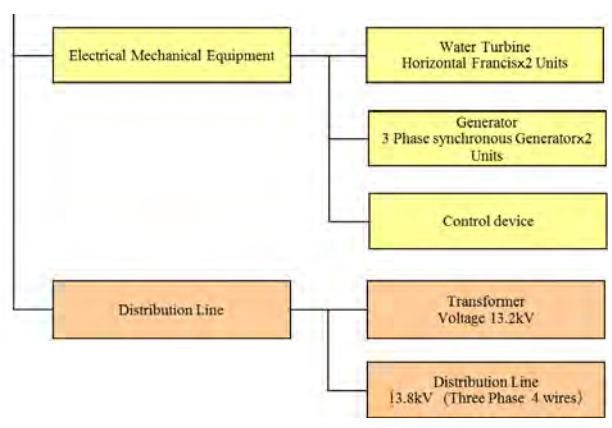
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### Project Components (Likud MHP)



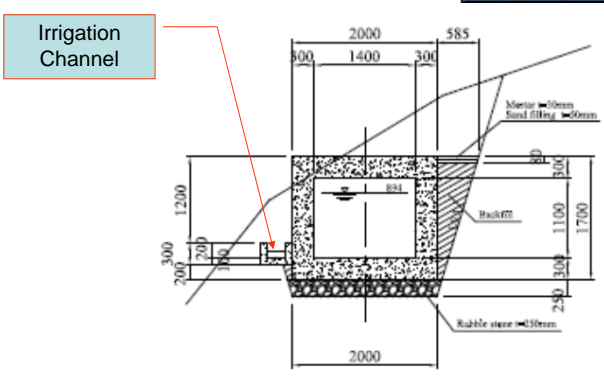
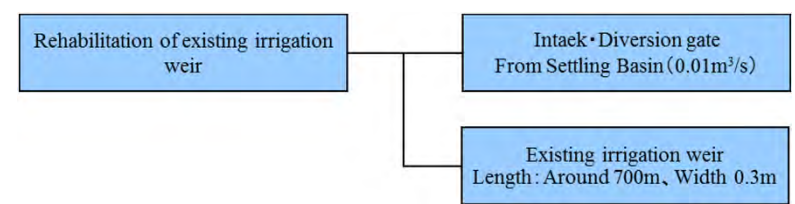
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### Project Components (Likud MHP) Cont.



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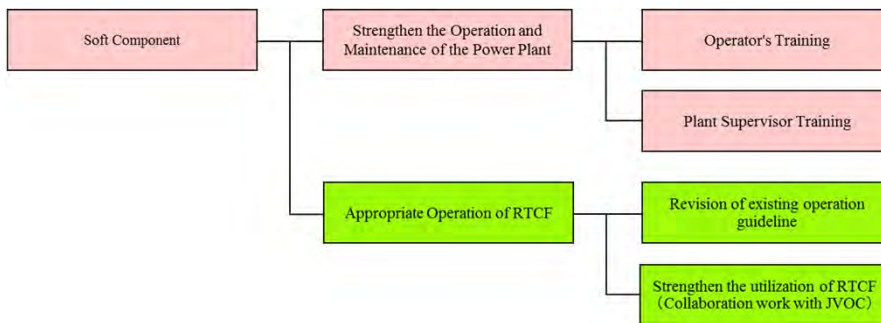
### Project Components (Rehab. Cot-Cot CIS)



6



### Project Components (Soft Component)



7

### Project Schedule

Japanese Financial Year	2012				2013				2014			
	Dec.	Jan	Feb	Mar	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
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Submission of the Documents to the Cabinet		■										
Approval by Japanese Cabinet			▲									
Exchange Note GOP & GOJ				▲								
Grant Agreement DOE & JICA				▲								
Detail Design					■							
Bidding for Main Contractor in Japan						■						
Construction									■	■	■	■
Soft Components (O&M training)									■	■	■	■
Commissioning												▲
Basic Agreement of Land Acquisition	▲											
FPIC	▲											
CNC	▲											
Endorsement of DOE	▲											

8

## *Cost Burdening*

### Cost burden on the Japanese side

Cost for Consultant and Construction (Except VAT, Land acquisition etc.)

### Cost burden on the Philippine side

- (1) Value added tax on locally procured equipment and materials
- (2) Land acquisition cost
- (3) Authorization procedural fees
- (4) Operation – Maintenance and Management Cost

9

## *Operation – Maintenance and Management Cost*

(Draft)

Power Plant Operation and Maintenance Cost Php/year

Type	Personnel	Numbers	Monthly Unit Cost (Php)	Annual Cost (Php)
Power plant operation	Plant supervisor	2	18,000	432,000
	Operator	6	15,000	1,080,000
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	Office staff	1	10,000	120,000
	Subtotal			1,776,000
Repair cost				2,980,000
Total				4,756,000

10

### Highlights of the Community Consultation Meeting at Haliap, Asipulo held on December 13, 2012

#### PRESENT:

Calixto Catama	Lot owner	Fedelito Rendon	Kagawad
Leon Donato	Lot Owner	Rodrigo Guelmi	Kagawad
Romeo Apoy	Lot Owner	Basilio Bayaona	Brgy. Captain
Benito Duppong	Representative	Maria Ladao	Kagawad
Christopher Catama	Lot Owner	Rosemarie Daquel	Kagawad
Carlos Catama Sr.	Lot owner	Nancy Addangna	Secretary
Nido Lumaho	Lot Owner	Estela Basilio	Treasurer
Jose Bimmucal	Lot Owner	Robert Pinkihan	Municipal Assessor
Agusta Otana	Representative	Arnold Guyguyon	MPDC- Asipulo
Josephine Ocampo	Lot Owner	Christopher Tenenan	LGU Staff- Asipulo
Ben Pohnac	Lot Owner	Julita Bahingawan	Agriculturist
Baltazar Dammit	Representative	Tomas Pulupul	Vice Mayor-Asipulo
Susan Pillog	Representative	Herman Tenenan	IFELCO
Pedro Namingit	Prov'l Assessor	Epiphanio Gacusan Jr	DOE
Gary Guyguyon	Prov'l Legal Officer	Hiroshi Kobayashi	Study team
Carmelita Buyuccan	PPDC	Nobuki Hayashi	Study team
Nancy Gano Nalunne	PPDO	Mitsuru Shimizu	Study Team Leader
Kristine Guazon	PPDO		

- The meeting started at 10.0'clock A.M with a prayer led by Kagawad Fedelito Rendon who also acted as facilitator.
- Engr.Carmel Buyuccan of the PPDO introduced the participants starting of with the members of the study team, representative of the Department of Energy, the representatives of the municipal local government of Asipulo and the provincial local government of Ifugao. Kagawad Fedelito Rendon introduced the members of the barangay council present and the Lot owners.
- Barangay Captain Basilio Bayaona gave the welcome remarks . He apologized for the use of the vernacular and the incomplete attendance from the lot owners as the letters were distributed Just a day before. He expressed hope that the project will push through and reiterated his warmest welcome to everyone.
- Engr. Shimizu presented the final design of the project, implementation schedule and documentary requirement necessary for project approval by the Japanese cabinet who will meet in February 2013. He said that the project documents will be submitted on January 2013 and therefore all the requirements needed be done within this month of December.

Engr. Arnold Guyguyon was asked to translate in the vernacular what was presented for better understanding.

- Engr. Carmel Buyuccan briefly recalled the previous activities undertaken especially regarding the determination of lot owners affected, the lot to be acquired and the vegetation that maybe affected. She informed that they already proposed in the provincial budget for 2013 the money to be utilized for the compensation of land to be acquired. For the vegetation and properties that will be damaged, this will be taken with whoever will be the contractor of the project. In the meantime, the documents needed for land acquisition should start.

At this point, the secretariat together with Provincial assessor and legal officer reviewed the contents of the land titles submitted and checking it with the report that was presented. Since there were inconsistencies and errors, the report presented was corrected and updated. ( See updated records) It was also proposed that a final walk through with the presence of all lot owners be undertaken again to finalize the listing and the area affected per lot. After the correction, Engr Carmelita Buyuccan asked if the lot owners are now ready to commit to sell a portion of their lot to the project.

- Leon Donato and other lot owners said they are willing to sell depending on the buying price. Atty Gary Guyguyon and Mr. Pedro Namingit explained the position of the provincial government based on approved ordinance. The schedule of rates for all types of land was presented and converted into per square meter rates. The lot owners however were not happy saying the rates are very very low.
- Since there were no counter offers, the PPDC after conferring with legal officer and provincial assessor offered a higher price based on the Ambangal land acquisition valuation. The lot owners bargained that the price should be increased . After some discussion the lot owners and the representatives of the provincial government agreed on the prices, as follows:

Irrigated Riceland	- Php 85.00 per square meter
Unirrigated	70.00 per square meter
Others	50.00 per square meter

- After the parties agreed on the price, the PPDC asked if the lot owners are now ready to sign the promise to sell. The document was given to the vice mayor who informed the lot owners that this is not yet the deed of sale but just to get their commitment to sell in case the project will have the money and assured them that it is safe for them to sign. MPDC Arnold Guyguyon read the content of the paper. The lot owners proceeded then to sign the document.
- Activities agreed to be undertaken are the following:
  1. Barangay Captain to submit Lot Titles or Tax Declarations on or before January 4, 2013 (Except those already submitted) to the PPDO
  2. Barangay Captain to have the other lot owners sign the promise to sell document and to submit the same to the PPDO on December 18,2012
  3. Undertake the final walk through on January 2013. Exact date will be communicated to the lot owners before the schedule date.
- Closing Remarks was given by the Honorable Tomas Pulupul, Vice Mayor. He expressed gratitude to the members of the study team, to JICA and DOE for the project. He also thanked the provincial government and expressed hope that the project will be approved, implemented for the benefit of Asipulo and the province. He assured of the support of the municipal government.
- The meeting was adjourned at 12.40 PM

PREPARED BY:



IGNACIO N. BUNOLNA

PROVINCE OF IFUGAO  
ATTENDANCE SHEET

2012. 12. 13

Office: Provincial Local Government of Ifugao

Title of meeting/ seminar/ workshop: Barangay Consultation Meeting re. the Likud Mini-hydro Power Project

Venue: Haliap Barangay Hall, Haliap, Asipulo, Ifugao

Date: December 13, 2012

Expected Number of participants: \_\_\_\_\_

Scheduled time: 9:00 A.M.

NO.	NAME	MALE	FEMALE	OFFICE	CONTACT NO.	SIGNATURE
1	CALIXTO N. CATAMA	/			09069711899	<i>[Signature]</i>
2	LEON DONATO	/				<i>[Signature]</i>
3	ROMEO APOY	/			09058064126	<i>[Signature]</i>
4	ESTELA P. BASILIO		/		09069014582	<i>[Signature]</i>
5	JUAN I. PILLOO		/		09062709715	<i>[Signature]</i>
6	BENITO DUDDOG	/				<i>[Signature]</i>
7	CHRISTOPHER Catama				09058607964	<i>[Signature]</i>
8	Carlos T. Catama SR					<i>[Signature]</i>
9	CHRISTOPHER T. HAN	/		LGU-XIPULO	09358881699	<i>[Signature]</i>
10	Federico Rendon	/		BLGU	09262709077	<i>[Signature]</i>
11	Rodrigo Quanni	/		BLGU		<i>[Signature]</i>
12	Nido Lumako	/			09353069489	<i>[Signature]</i>
13	Basilio Bayanona	/		BLGU	09068823195	<i>[Signature]</i>
14	Jose D. Dimual	/				<i>[Signature]</i>
15	Dausta Otana		/		09066007426	<i>[Signature]</i>
16	JOSEPHINE D. OCMO		/		09057312433	<i>[Signature]</i>
17	Robert Pmihan	/		LGU		<i>[Signature]</i>
18	Arnold G. Guggayon	/		LGU		<i>[Signature]</i>
19	Rosemarie M. Daquid		/	BLGU		<i>[Signature]</i>
20	NANCY D. ADDANGNA		/	BUGU		<i>[Signature]</i>
21	Maria L. L. L. L.		/	BLGU		<i>[Signature]</i>
22	DEONO K. NAMINGIT	/		PASSO	09054162673	<i>[Signature]</i>
23	ERNESTO J. NGATIYON	/		PASSO	09057961651	<i>[Signature]</i>
24	GARY B. GUYAYON	/		PLO		<i>[Signature]</i>
25	EAR Ben Pothiac	/				<i>[Signature]</i>
26	ALAN BALTHAZAR DAMMIT					<i>[Signature]</i>
27	KRI Enr. Epifanio Gacusan, Jr.	/		DOE-HOESMO	09167824568	<i>[Signature]</i>
28	HERMAN TENENTAN	/		IFELCO	09178671244	<i>[Signature]</i>
29	CARMELITA BUYUCAN		/	PPDO		<i>[Signature]</i>
30	NANCY GAND NALUNNE		/	PPDO		<i>[Signature]</i>

CERTIFIED CORRECT:

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NO.	NAME	MALE	FEMALE	OFFICE	CONTACT NO.	SIGNATURE
31	<i>Ignacio Buroker</i>	✓				<i>[Signature]</i>
32	KRISTINE GUAZON			PPDO		<i>[Signature]</i>
33	BENIE LUNAG	✓		PAENRO		<i>[Signature]</i>
34	MARIO BALAWO	✓		PPDO		
35	NOBUKI HAYASHI		✓			<i>[Signature]</i>
36	MITSURU SHIMIZU	✓				
37	HIROSHI KUBAYASHI	✓				<i>[Signature]</i>
38	ARNEL	✓				
39	FIDEL	✓				
40	MACARIO GALATIA	✓		PASSO		
41	<i>Teresa Pulgar</i>	✓		L. B. U. C. / M. Agri.		<i>[Signature]</i>
42	JULITA BAHINGAWAN		✓			<i>[Signature]</i>
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CERTIFIED CORRECT:

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**LIKUD MINI-HYDRO POWER DEVELOPMENT PROJECT**  
**BARANGAY CONSULTATION MEETING**  
13 December 2012, Thursday 9:00 A.M.  
Haliap Barangay Hall, Haliap, Asipulo, Ifugao

**PROGRAM**

**I. OPENING**

- a. Prayer : Hon. Fedelito A. Rendon  
Barangay Kagawad
- b. Acknowledgement of Participants : PPDO
- c. Opening and Welcome Statement : **Hon. Basilio B. Bayaona**  
Barangay Captain, Haliap, Asipulo

**II. DISCUSSION PROPER**

: **Mr. Mitsuru Shimizu**  
Grant-Aid Survey Mission Leader

- a. Final Design of the Likud Hydro Power Development Project
- b. Implementation Schedule
- c. Documentary Requirements
- d. Final List of Lot Owners
- e. Prices of Lots and Vegetation
- f. Others

**III. CULMINATING**

- a. Schedules/ Next Steps : PPDO
- b. Closing Statement : **Hon. Eladio H. Bang-ud**  
Municipal Mayor, Asipulo, Ifugao
- c. Closing Prayer :

**PROMISE TO SELL**

**WE**, Anita Dalanag, Nido Lumaho, Leon Donato, Benita Dammit, Miguel Mabbin, Ben Ponhac, Ernesto Palija, Ramon Apoy, Lagguy Nad-ug, Christopher Catama, Rogelio Catama, Calixto Catama, Carlos Catama Sr., Constancio Catama, Victor Basilio, Linda Pitpitungue, Joseph Otaha, Antonio Timoteo, Robert Apoy, Jimmy Bimmucal, Pablo Bittuwon, Alex Pillog, Josephine Ocampo, Tessie Pinkihan, Joseph Ngigit, Jose Bimmucal, Clarence Catama and Calixto Catama are owners of land located at Haliap, Asipulo, Ifugao. We have been recently informed that the Provincial Government of Ifugao, in cooperation with other agencies, will be constructing a Mini-Hydro Project at Haliap, Asipulo, Ifugao and that portions of our land would be affected by the development.

For purposes of allowing the smooth construction of the project, we express our willingness to cooperate and hereby promise to sell portions of our land which will be directly affected by the said project to the Provincial Government of Ifugao in the following amounts:

Irrigated Riceland-----P85.00 per square meter  
 Unirrigated Riceland P70.00 per square meter  
 Cornland / Rootland / Coffee land-----P50.00 per square meter  
 Grassland & others P50.00 per square meter  
 Forested land P50.00 per square meter

This \_\_\_ day of December 2012 at Haliap, Asipulo, Ifugao.

Anita Dalanag

Leonato  
Leon Donato

Miguel Mabbin

Ernesto Palija *represented by Victoria Sandoe*

Lagguy Nad-ug

Rogelio Catama

Constancio Catama

Linda Pitpitunge

Antonio Timoteo

Jimmy Bimmucal

Alex Pillog

*r*  
Nido Lumaho *represented by* NOEL BAS-ILAN

*B. Dammit*  
Benita Dammit *represented by* BALTZAR DAMMIT

*B. Ponhac*  
Ben Ponhac

*Ramon Apoy*  
Ramon Apoy

*Christopher Catama*  
Christopher Catama

*Carlos Catama Sr.*  
Carlos Catama Sr.

Victor Basilio

Joseph Otaha

Robert Apoy

Pablo Bittuwon

*Josephine Ocampo*  
Josephine Ocampo



Tessie Pinkihan

*(Signature)*  
Jose Bimmucal

Clarence Catama

Joseph Ngitit

Charise Catama

*(Signature)*  
Calixto Catama

Signed in the presence of:

\_\_\_\_\_

\_\_\_\_\_

Republic of the Philippines  
Preparatory Survey for  
Mini-Hydropower Development  
in the Philippines  
(Mini Hydropower Project in the Province of Ifugao)

*Draft Preparatory Survey Report*

December 2012

1

*Overall Goal*

The overall goal to be to make a contribution towards realizing the goals of the *RE Act, the National Renewable Energy Program* and the *Ifugao Province Mini Hydro Electric Power Plant Development Program Ordinance*

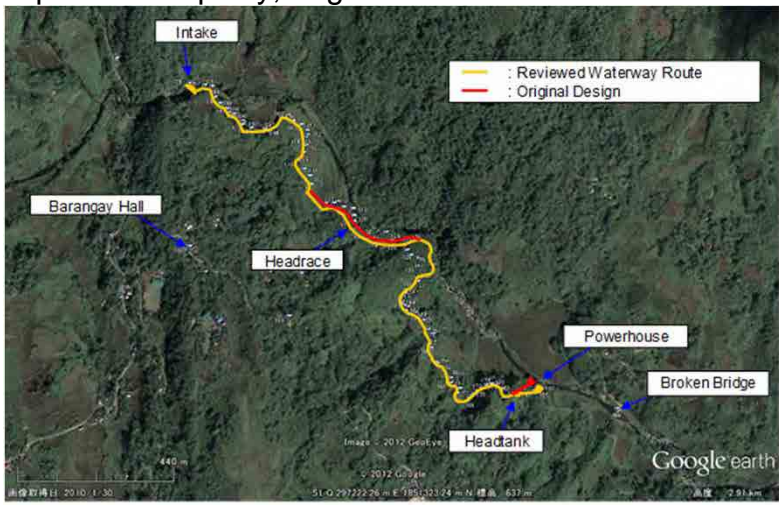
*Project Purpose*

The Project will be implemented with the purpose of *Expanding the RTCF* for preservation of the rice terraces, *Stable energy supply with lower electric tariff rate* in Ifugao.

2

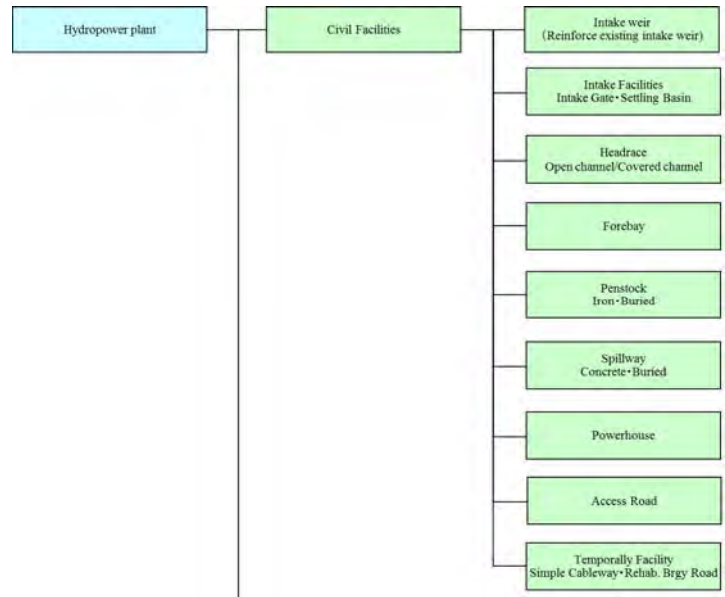
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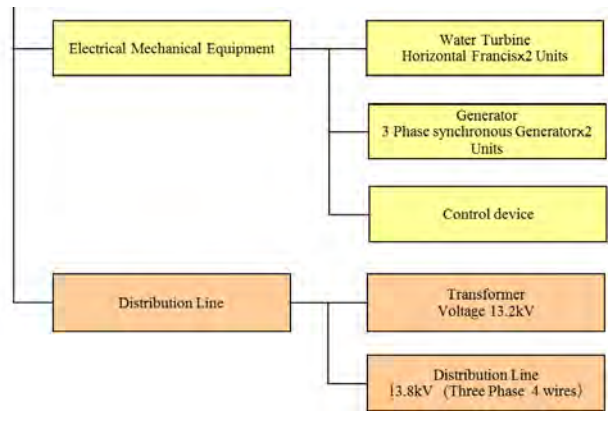
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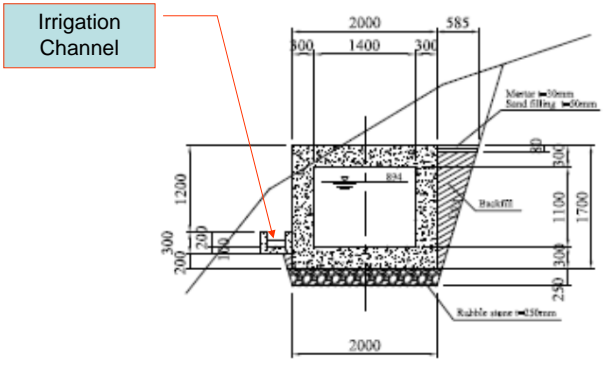
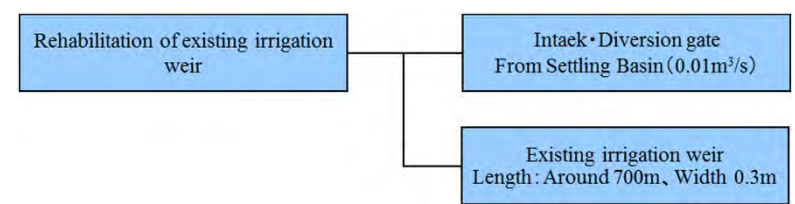
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### Project Components (Likud MHP) Cont.



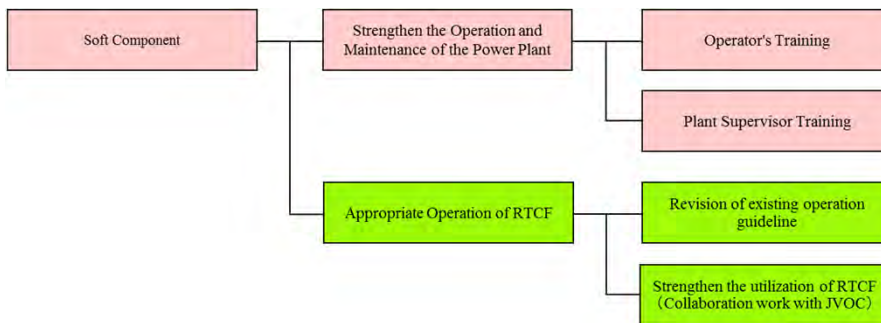
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### Project Components (Soft Component)



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Detail Design					■							
Bidding for Main Contractor in Japan						■						
Construction									■	■	■	■
Soft Components (O&M training)									■	■	■	■
Commissioning												▲
Basic Agreement of Land Acquisition	▲											
FPIC	▲											
CNC	▲											
Endorsement of DOE	▲											

8

## *Cost Burdening*

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## *Operation – Maintenance and Management Cost*

(Draft)

Power Plant Operation and Maintenance Cost Php/year

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Total				4,756,000

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### 1.1.1 Landscape and Visual Assessment

“Cultural landscapes reflect the interactions between people and their natural environment over space and time. Nature, in this context, is the counterpart of human society; both are dynamic forces shaping the landscapes. In some regions of the world, cultural landscapes stand out as models of interaction between people, their social system and the way they organize space. A cultural landscape is a complex phenomenon with a tangible and intangible identity. The intangible component arises from ideas and interactions which have an impact on the perceptions and shaping of the landscape, such as sacred beliefs closely linked to the landscape and the way it has been preserved over time. Cultural landscapes mirror the cultures which created them.”<sup>1</sup>

The World Heritage Convention<sup>2</sup> became the first international legal instrument to recognize and protect cultural landscapes. In 1992 World Heritage Committee acknowledged that cultural landscapes represent the “combined works of nature and man” that are illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and successive economic and cultural forces.

Cultural landscapes, as explained by the World Heritage Secretariat, often reflect specific techniques of sustainable land use, considering the characteristics and limits of the natural environment they are established in, and a specific relation to nature. Protection of cultural landscapes can contribute to modern techniques of sustainable land use and can maintain or enhance natural values in the landscape. The continued existence of traditional forms of land use supports biological diversity in many regions of the world.

“Cultural landscapes – cultivated terraces on lofty mountains, gardens, sacred places – testify to the creative genius, social development, and the imaginative and spiritual vitality of humanity.”

Rice terraces cover an extensive area encompassed by the five highland provinces of Kalinga-Apayao, Abra, Mountain Province, Ifugao, and Benguet, covering an area of approximately 20,000 square kilometers that equals 7% of the total landmass of the Philippines. However for purpose of World Heritage inscription, the nominated area included only five small terrace clusters in Ifugao province because these were the sites with adequate legal protection existing during inscription time.

The location and exact coordinates of the five terrace clusters inscribed in the cultural landscape category of the World Heritage List in 1995 are<sup>3</sup>:

- a. Rice Terrace Clusters of Banaue: Batad – N16 56 02, E121 08 12
- b. Rice Terrace Clusters of Banaue: Bangaan – N16 55 28, E121 03 56
- c. Rice Terrace Clusters of Mayoyao: Mayoyao Central – N16 57 49, E121 13 19
- d. Rice Terrace Clusters of Kiangan: Nagakadan – N16 46 13, E121 03 38
- e. Rice Terrace Clusters of Hungduan – N16 50 13, E120 58 17

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<sup>1</sup> Plachter, Harald and Rössler, Mechtild, “Cultural Landscapes: Connecting Nature and Culture” in *Cultural Landscapes of Universal Value: Components of a Global Strategy*, von Droste, Bernd and Rössler, Mechtild. Stuttgart, 1995

<sup>2</sup> Operational Guidelines (1992), the World Heritage Convention, UNESCO, Paris

<sup>3</sup> Villalón, Augusto, Nomination Dossier, Rice Terraces of the Philippine Cordilleras, 1994

The inscription citation from the World Heritage Committee reads, “The Committee decided to inscribe the property [Rice Terraces of the Philippine Cordilleras] under criteria (iii), (iv), and (v)<sup>4</sup>, based on the joint evaluation of ICOMOS<sup>5</sup> and IUCN<sup>6</sup>. The Rice Terraces of the Philippine Cordilleras are outstanding examples of living cultural landscapes. They illustrate the traditional techniques and a remarkable harmony between humankind and the natural environment.”

Furthermore, the Report of the World Heritage Committee Meeting of 1995 declared, “The Committee also congratulated Philippine authorities for having proposed this example of a cultural landscape, thereby contributing towards improving the representative nature of this type of property on the World Heritage List”. This statement is further collaborated by the ICOMOS-IUCN evaluation that “...the Rice Terraces of the Philippine Cordilleras qualify as cultural landscapes in the terms set out in the Operational Guidelines is fully substantiated: they conform precisely with the intentions of the Committee and its advisers in defining the subcategory of continuing landscape”. Both statements clearly signify the significance of the property as the first living (or continuing) cultural landscape inscribed on the World Heritage List. Further noting its fragile nature and the precarious balance that must be sustained between man and nature to assure future existence of the site, its maintenance procedure is of high interest to the World Heritage Committee and academic circles. It is a pity that national, provincial, and local authorities do not appreciate the high level of international interest in the property.

Adding further significance and honor to the site is the 2001 declaration of the *Hudhud*, a traditional Ifugao chant recited during sowing and harvesting of rice, at funeral wakes, and in other traditional Ifugao rituals as a “Masterpiece of the Oral and Intangible Heritage of Humanity” by UNESCO, a declaration that confirms further the intertwining of natural and cultural heritage in the Rice Terraces of the Philippine Cordilleras.

The terraced Cordillera landscape is one of the few nationally recognized sites that bestows Filipinos, typically so unaware of their own culture, that elusive pride of place ingrained from childhood days when most schools taught young, impressionable Filipino students the hyperbole that their Rice Terraces are the “eighth wonder of the world.” Further demonstrating its importance to the Filipino nation, the rice terraces are engraved on 1,000-peso bills acknowledging its national treasure status.

Due to concerns of the World Heritage Committee regarding the property’s state of conservation, they voted in 2001 to include the Rice Terraces of the Philippine Cordilleras in the World Heritage In Danger List, an action signifying that more intensive conservation methods had to be undertaken by the Philippines with detailed technical assistance of UNESCO experts. Rather than be regarded as an embarrassment to the host country, the “In Danger” listing simply signifies that a period of intensive care must be carried out to assure in-depth conservation of the ailing property and its nursing back to health. Once conservation is back on track, the property is subsequently removed from the “In Danger List” and once again returned to the regular World Heritage List.

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<sup>4</sup> refer to Operational Guidelines, World Heritage Convention

<sup>5</sup> International Council for Monuments and Sites (ICOMOS), advisory body to the World Heritage Committee on cultural heritage matters

<sup>6</sup> International Conservation Union (IUCN), advisory body to the World Heritage Committee on natural heritage matters



Its “In Danger” inscription brought much-needed attention to the property’s alarming state of conservation that was continually taken for granted by most Filipinos. Fanned by media sensationalism, a rumor that the property was facing delisting spread quickly. The misconception is still difficult to correct to this day. On the positive side, the National Commission for Culture and the Arts granted USD1 million to finance conservation and rehabilitation programs for the World Heritage terraces. In 2006, UNESCO, ICOMOS, and IUCN performed a Joint Reactive Monitoring Mission<sup>7</sup> that established conservation benchmarks for corrective measures to be achieved by national and local authorities in order to remove the property from the “In Danger List”.

Benchmarks established by the Reactive Monitoring Mission and their indicators relevant to the proposed project is shown in **Table 10**.

**Table 1. Conservation benchmarks established by the Reactive Monitoring Mission, relevant to the project.**

<b>Conservation Benchmarks</b>	<b>Indicators</b>
<p><b>Benchmark B</b></p> <p>Immediate implementation of the Conservation Management Plan for the Rice Terraces of the Philippine Cordilleras with focus on community-based land use and zoning</p>	<p>Establishment of community-based land use and zoning plans of the barangays hosting rice terrace clusters included in the World Heritage Site adopted by Municipal Ordinance by end 2007</p>
<p><b>Benchmark C</b></p> <p>Development of a resource strategy at the national, provincial, municipal, and village (<i>barangay</i>) levels according to the management objectives determined in the Conservation Management Plan. Top priority should be given to the maintenance and stabilization of the rice terraces and lifeline irrigation systems to reverse their deterioration.</p>	<p>Poverty alleviation of the local communities with considerable household income increase by end 2008.</p> <p>Conservation trust fund to be established and managed by the Ifugao Heritage Conservation Council by December 2007.</p>
<p><b>Benchmark D</b></p> <p>Establish appropriate procedures for development projects in the Rice Terraces of the Philippine Cordilleras</p>	<p>Rice terraces watershed and forest areas of Ifugao declared as environmental critical areas by December 2006 through an Executive Order.</p> <p>Introduction of Environmental Impact Assessment (EIA) for any development and infrastructure project by June 2007.</p> <p>The property exempted from standard contracting and design rules and procedures of national government agencies by December 2006.</p>

<sup>7</sup> Joint Reactive Monitoring Mission, April 2006

The proposed project will generate a modest 200kW of electricity, sufficient to power 200 households. Power generated by the project shall be sold to the provincial power supplier for retail distribution, and a percentage of proceeds are marked for terrace conservation purposes. e8 and TEPCO foresee yearly proceeds amounting to approximately PhP 3.14 million to be available for conservation projects that will include those specified as UNESCO benchmarks that ultimately will lead to removal of the site's "In Danger" inscription. With existing financial constraints in both national and provincial governments resulting in the low priority for conservation funding, the additional budget infusion from the Ambangal Mini-Hydropower Project is a welcome contribution to the attainment of the UNESCO-specified benchmarks.

Project location was originally at Hungduan, a UNESCO-inscribed terrace cluster. UNESCO authorities recommended relocation since a mini hydroelectric project in Hungduan would seriously compromise the integrity of the World Heritage Site. In "Report on River Control in the Property of the World Heritage Center" [sic] Mario Greppi, UNESCO expert, reported in 2005 "In this area [Hungduan] where river control walls have been constructed, a mini hydro power plant has also been projected. Mini hydropower plant is important for the development of Ifugau [sic], but there are many possible sites to construct hydropower plants. For a natural heritage, this construction will completely change the site and destroying [sic] its heritage view. The local government is very determined to realize this construction ... " TEPCO responded to the objection of Mr Greppi and relocated its project to the slower-flowing Ambangal River in Kiangan Municipality, another of the many highland rivers and streams forming a massive, untapped water distribution network in Ifugao Province.

The proposed facility taps the Ambangal River as it flows in a valley between Ambabag and Pindungan, two barangays reached by a steep, difficult 1.7 km foot mountain path beginning in sparsely populated Barrio Ambabag. Project characteristics include a floating-type diversion weir equipped with a flushing gate and settling basin located in Sitio Ba-ay From the Ambangal intake, the open 0.6 m wide headrace extends 1.4 km downriver to the open-type head-tank leading to a steel pipe penstock of 0.5m diameter x 225.7m length leading to the project power house of 3mx6.2m x2.5m dimension.



The difficulty with the proposed project facilities is that even though it is located within the imposing rice terrace landscape of the Cordillera Mountain Range, it is outside protected area boundaries and not governed by any guidelines or legislation for landscape protection.

Although it is clearly outside the World Heritage Nagakadan Terrace Cluster boundary, there exist no measured surveys that indicate exact core and buffer zone boundaries for Nagakadan or any of the other four World Heritage clusters in Ifugao so that its distance from the buffer zone boundary can be established. The annotated map on page 37 of the UNESCO-ICOMOS-IUCN Reactive Monitoring Mission Report (2006) indicates no definite surveys indicating core or buffer zone boundaries for each of the five World Heritage clusters. Furthermore, it shows Barangays Ambabag and Pindongan are located within an ambiguous “Candidate Site” area with undefined boundaries. “Candidate Site” status is undefined as well. Is the site officially declared as a Candidate Site and if so, under what authority? What are its exact boundaries? What legal framework protects heritage within the site and what are the guidelines? Will it be nominated as an extension of an existing World Heritage property? What is the difference between a Candidate Site and the Buffer Zone? For the purposes of the project, what cultural, environmental, landscape, and construction regulations prevail over the proposed project located within the Candidate Site? If regulations do exist, then who enforces them?

In partial compliance with Benchmark B imposed by UNESCO, the Municipality of Kiangnan recently concluded stakeholder consultations resulting in a community-based zoning plan, specifically including the Nagakadan – Julongan terrace cluster but not going as far as Barangays Ambabag and Pindongan. Therefore, the proposed project located outside the area covered by new municipal zoning laws is not covered by zoning restrictions.

Recommendation No. 3 of the 2005 Reactive Monitoring Mission has relevance to the project, suggesting to authorities to look into “prevention of future infrastructure projects from degrading the fragile World Heritage Site and the encouragement of the Philippine Government and its agencies to be flexible in imposing national design standards on infrastructure projects within Philippine World Heritage Sites, and the mitigation or minimization of negative impact of infrastructure within Philippine World Heritage Sites.” In support of this recommendation, in 2006 the UNESCO National Commission of the Philippines drafted a Presidential Proclamation “Declaring UNESCO World Heritage Sites in the Philippines as Environmentally Critical Areas and Within the Scope of the Environmental Impact Statement System.” No mention is made in the draft proclamation of the equally important cultural impact assessments for sensitive heritage sites. The President has not signed the proclamation. Nor have there been new design guidelines drawn for any new construction within World Heritage sites.

Although outside of the legal jurisdiction of local, national, or UNESCO authority, the proposed project is located in the mountainous rice terrace landscape of the Cordillera range that includes five small areas designated as World Heritage Sites. How, then, could a modern facility that provides much-needed improvement of stakeholder living standards insert itself quietly and sustainably into such a strong landscape? The answer is definitely that the new structure should blend into its cultural landscape surroundings by not calling attention to itself.

Although the project site is outside World Heritage site boundaries, its setting possesses practically the same landscape qualities as the inscribed terrace clusters. The terraces at Ambabag and Pindungan, although not as extensive or dramatic as the World Heritage clusters, are likewise the result of a long interaction between man and nature, objects of beauty, and therefore qualifying without a doubt as part of the vast Cordillera cultural landscape that covers a 20,000 square kilometer area of mountain peaks. Although no protective legislation covers the entire Cordillera area, in respect of its status as a national icon, it is right to ensure that the proposed hydroelectric facility is built in total consonance with the nationally and internationally

acknowledged cultural landscape protective measures and fit into the cultural landscape as seamlessly as possible.

Barangays Ambabag and Pindongan are so isolated, sparsely populated, and far removed from the remote Kiangnan adventure tourism circuit only accessed by the hardest of tourists. It is reached with difficulty through narrow barangay roads that disintegrate into a mountain foot trail system stitching together the few houses, open areas and rice fields that make up the landscape. Existing concrete or wood houses are nondescript, roofed with rusty corrugated galvanized iron sheets. Despite the magnificent landscape, there are no postcard-pretty picturesque villages unlike those sometimes seen in other Cordillera terraced landscapes or especially in the World Heritage clusters. Although a beautiful landscape, it feels like the back door to the more magnificent terraces, a back-of-the-house area where service facilities can be hidden.

Unlike the sweeping vistas framing World Heritage clusters, views in this area are cramped. The topography of the Ambabag and Pindongan area confines sight lines and views to the ring of mountains surrounding the barangays. The proposed facility, located in a valley behind the first mountain ring, is completely hidden from public view. Despite its not being a designated World Heritage area, the organically evolved Ambabag and Pindongan landscape nevertheless strongly demonstrates inherent qualities of authenticity and integrity, achieving a balance between culture and nature just as the five inscribed clusters do which is reason enough for the facility's intrusion into the landscape be as gentle as possible. The cultural significance of the Cordilleras must not be trivialized.

On the other hand, the cultural significance of harnessing water for progress resonates with age-old Ifugao traditions that revere water as a primary life force, a belief figuring importantly in cultural, religious, agricultural, and hydrological practices. Water is a natural resource harnessed by Ifugaos for agriculture but also as an engineering tool to help build terraces, dams, and to move large rocks.

[REDACTED]

The proposed project is a pioneering project in the cultural landscapes sphere. Questions arise: How should a landscape beyond a World Heritage area be protected when no controls exist? Can heritage be used sustainably as a resource for income generation? How can heritage serve its host community? Responding to these questions may bring about a long-awaited paradigm shift in local perception of heritage.

Presently many Ifugao stakeholders view World Heritage inscription negatively. A common feeling is that UNESCO inscription hinders progress by imposing conservation restrictions that impinge on personal freedom and curtails rights of private landowners, many of whom see the

terraces as bondage to poverty and to the past. It is further believed that UNESCO should fund conservation requirements imposed despite the fact that the World Heritage Convention clearly indicates that it is the State Party responsible for conservation of its inscribed monuments. It is hoped that the Ambangal example will encourage stakeholders to initiate their own innovative projects using heritage as a means for additional income to not only sustain their daily existence and to be able to contribute in the maintenance of their heritage.

The long interface of man and nature results in a unique landscape illustrating how each influenced the other. A cultural landscape does not mark man's triumph over nature or vice versa. It shows the close, sustainable, and mutually beneficial relationship developed by man with his environment or vice-versa. Following the UNESCO definition, the Ambangal Mini-Hydropower Project could be regarded as a sustainable 21<sup>st</sup> century mutually beneficial relationship of man with his environment.

Although this project is clearly outside any World Heritage Site or its buffer zone, during its community consultation procedure and in the course of all other studies, it has complied with all of the stipulations of the ICOMOS Document, "Xian Declaration on the Conservation of the Setting of Heritage Structures, Sites, and Areas"<sup>8</sup>.

Respected Kiangon scholar Manuel Dulawan perceptively writes, "A culture or society needs to adapt and adopt in order to continue to exist. The Ifugao culture has been able to adapt to natural and man-made conditions ... through the process of acculturation, many good and beneficial changes like farming technologies, centralized governance, Christianized religion, formal education, etc. But in spite of all this, the Ifugaos in Kiangon have maintained their distinctive cultural identity which distinguishes them from other cultures or ethnic groups. There has been a *balancing of the old and the new* in Kiangon, and the process is continuing."

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<sup>8</sup> Please refer to **Annex E**

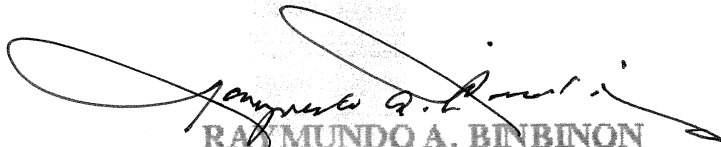
**SOCIO CULTURAL IMPACT OF THE LIKUD MINI-HYDROPOWER  
DEVELOPMENT PROJECT IN HALIAP, ASIPULO, IFUGAO**

The Likud Mini-Hydropower Development Project located at Haliap, Asipulo, Ifugao is proposed for development to generate funds for the conservation and preservation of the Ifugao Rice Terraces.

The activities and processes involved during the preparatory surveys include a wide range of consultations with all stakeholders, barangay, municipal and provincial officials, affected landowners, members of farmers/Irrigators Association and the community to ensure participation and acceptance.

It is my honest belief and conviction that the project has no major negative impact on the social and cultural heritage of the community, and if there are any negative impacts as in any development project, the positive impact of contributing to the improvement of the quality of life is still larger.

The proposed project is thus socially and culturally acceptable.

  
RAMUNDO A. BINBINON  
Executive Assistant/Community Elder

August 29, 2012

資料 7 初期環境影響評估報告書(IEE)

# Likud Mini-hydropower Development Project

Initial Environmental Examination





# Likud Mini-hydropower Development Project

Initial Environmental Examination

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## Abbreviations

°C	Degree Celsius
ANSI	American National Standards Institute
B	Bill (horny projecting mouth of a bird)
BOD	Biological Oxygen Demand
C	Dominance Index
CAA	Clean Air Act
CAR	Cordillera Administrative Region
CIS	Communal Irrigation Systems
cm	Centimeter
DAO	DENR Administrative Order
dBa	A-weighted decibels
DBH	Diameter at breast height
DENR	Department of Environment and Natural Resources
DOE	Department of Energy
DO	Dissolved oxygen
e	Evenness index
E	Ear
e8	Emerging 8
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EL	Elevation
EMP	Environmental Management Plan
FA	Forearm for bats
FS	Feasibility Study
G	gape
H'	Shannon diversity index
H	hour
HF	Hind foot
HH	Household
IFELCO	Ifugao Electric Cooperative
IRTCHO	Ifugao Rice Terraces Cultural Heritage Office
ICOMOS	International Council for Monuments and Sites
IUCN	International Conservation Union
km	kilometer
km <sup>2</sup>	Square kilometer
kW	Kilowatt
LGU	Local Government Unit
LTO	Land Transportation Office
m	meter
m <sup>3</sup>	Cubic meter
masl	Meter above sea level
mg/L	Milligrams/liter
mL	milliliter
mm	Millimeter
m/s	Meter per second
MBN	Municipal Basic Need
MPN/100mL	Most probable number per 100 milliliter
PET	Polyethylene terephthalate
MW	Megawatt
NAAQG	National Ambient Air Quality Guidelines
NO <sub>2</sub>	Nitrogen dioxide
NPCC	National Pollution Control Commission
PAC	Project-affected Community
PPE	Personal Protective Equipment

ppm	Parts per million
PWRC	Philippine Wildlife Resources Conservation (Act of 2001)
RA	Republic Act
SE	Southeast
SEP	Socio-economic Profile
SO <sub>2</sub>	Sulfur dioxide
T	Tarsus
TEPCO	Tokyo Electric Power Corporation
TL	total length
TV	tail-vent length
TSP	Total Solid Particulates
TSS	Total Suspended Solid
TWG	Technical Working Group
ug/NCM	Microgram per normal cubic meter
UNESCO	United Nations Educational, Scientific and Cultural Organization
UPLB-CFNR	University of the Philippines – College of Forestry and Natural Resources
WC	Wing cord
WT	Weight

## 1.0 Executive Summary

The project site is approximately 334 km away from Metro Manila. It is in Barangay Haliap, Municipality of Asipulo and Province of Ifugao.

The components of the project include:

- Diversion weir
- Intake and Settling Basin
- Headrace
- Headtank
- Penstock and Spillway
- Powerhouse
- Switchyard
- New access road to the power house
- Distribution line

Ifugao Province is well known for its extensive rice terraces. In 1995, UNESCO had included the Cordillera rice terrace in their World Heritage List of Cultural Landscapes. However, in 2001, UNESCO included them on the List of World Heritage in Danger because of its continuous deterioration primarily due to the decline of the traditional balance as a result of out-migration, slow but continuous disappearance of the old culture and leadership, and indiscriminate deforestation. In addition, there is no effective and comprehensive rice terraces conservation plan.

This project is primarily being developed to create funds from the sales of electricity that will be generated. These funds will be used in the rehabilitation programs, conservation projects for the rice terraces in Ifugao Province. It also envisioned that the funds generated will help in improving the quality of lives of the people engaged in terrace farming and removal of the Rice Terrace from the List of the UNESCO World Heritage in Danger.

### **Brief Summary of Project's IEE Process**

The Initial Environmental Examination (IEE) conducted for the 810kW Likud Mini Hydropower Plant Project is consistent with the Revised Procedural Manual for Department of Environment and Natural Resources (DENR) Administrative Order (DAO) 2003-30 of August 2007. The Terms of Reference used for this study was based on environmental impacts identified for a hydropower project.

The baseline environmental conditions were assessed through the conduct of rapid site assessments and field observations from February 2011 until June 2011. Supplemental secondary information was collected from government agencies and institutions.

### **Summary of Baseline Characterization**

Ecosystem	Findings
Land	<p>The project site falls under the classification alienable and disposable land with some locations outside the proposed facility falling under the forest/timber land classification. The municipality of Asipulo covers a land area of 29,043 hectares. Of this, 490 hectares is covered by barangay Haliap. Alienable and disposable land covers for the 98% of the total land area of barangay Haliap while the remaining 2% is forest and timber land.</p> <p>Previous studies and correlation with outcrops of the neighbouring mountain ranges indicate that the stratigraphy of the basin is largely composed of deep marine sediments and extrusive igneous</p>



Ecosystem	Findings
	<p>rocks (Hipol et al., 2001).</p> <p>There are four main vegetation communities within and along the immediate surroundings of the project. These are agricultural land (planted mainly to rice, winged beans, and sweet potato), shrubland/grassland (dominated by various species of grass and woody shrubs), tree plantation (planted to Gmelina), and patches of forest (secondary growth and original vegetation restricted to the very steep portions of the river stretch).</p> <p>A total of 12 bird species were observed and confirmed present along the entire stretch of project site. Except for the white-eared brown-dove (<i>Phapitreron leucotis</i>), Philippine bulbul (<i>Hypsipetes philippensis</i>), and Philippine coucal (<i>Centropus viridis</i>), all recorded species are resident breeding but are non-endemic. None are considered under any threat categories based on PWRC 2001 and IUCN Red List of Threatened Species 2010.</p>
Water	<p>The project has a catchment area of 44.02 km<sup>2</sup>. There is no historical stream flow data available for the Lamut River. Probable flood discharges for various return periods for Lamut River is calculated using the Dimensionless Hydrograph.</p> <p>The Lamut River is identified in the DENR Memorandum Circular No. 07 series of 1993 Additional List of Classified Rivers and Bays (DMC 1993-07) as a Class C fresh surface water body. Based on the classification guidelines of DAO 1990-34, Class C waters are used for aquaculture, recreational activities such as boating, and industrial water supply. In terms of pH, samples from the two stations along Lamut River were both alkaline. The DO levels at the Intake and Powerhouse are above the minimum limit in the DAO 1990-34 for Class C waters. BOD levels in the two stations both passed the DAO 1990-34 maximum allowable limit for Class C. Surface water stations have undetected levels of TSS. Elevated levels of total and fecal coliform were noted in the Intake and Powerhouse stations.</p> <p>In general, the entire reach of the proposed project area is in good condition. Other than the man-made weir bridge at Station LH-8, the stream reach experiences no significant perturbation that would likely impact the freshwater habitats and organisms thriving in the area.</p>
Air	<p>The prevailing climate in the project area falls under Type II of the Modified Corona's Classification of the Philippines. Under this classification there is a very short dry season with pronounced maximum rain during summer months.</p> <p>Using DAO 2000-81 air quality indices, the air quality of the project area based on the 24-hour concentrations of TSP and SO<sub>2</sub> can generally be classified under good condition.</p>
People	<p>The municipality of Asipulo has 12 barangays and a total land area of 29,043.1533 ha. It has a total population of 13,100 and population density of 2.18 hectares per person (CBMS, 2007).</p> <p>The project site is within the administrative area of Barangay Haliap. As of 2007, the National Statistics Office (NSO) reported a population of 1,013 for the barangay with an average household size is 4.7. According to the 2007 CBMS survey, the total population is 979 with a 1.84% population growth rate.</p> <p>Agriculture and forestry are the main sources of livelihood. Beans, tomato and palay are the major crops planted in the barangay primarily used for subsistence while the remaining harvests are for cash crops.</p>

### Summary of Impact Assessment and Environmental Management Plan

Project Phase / Environmental Aspect (Project Activity Which Will Likely Impact the Environmental Component)	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation or Enhancement
<b>I. PRE- DEVELOPMENT PHASE</b>			
Development of project facilities	Biological Resources	Various facilities may disturb vegetation.	<ul style="list-style-type: none"> <li>Vegetation along the project stretch is heavily disturbed and</li> </ul>

Project Phase / Environmental Aspect (Project Activity Which Will Likely Impact the Environmental Component)	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation or Enhancement
			<p>will only entail clearing of limited areas.</p> <ul style="list-style-type: none"> <li>All clearing activities will be carried out in a manner such that damage or disruption to vegetation is minimized.</li> <li>All trees that will be cut will be properly compensated.</li> <li>Relevant permits will be secured from concerned agencies prior to cutting.</li> </ul>
	Biological Resources	Disturbance of wildlife.	<ul style="list-style-type: none"> <li>A “No Hunting” policy from the contractor to minimize the potential increase for wildlife hunting and poaching due to temporary increase of workers in the area.</li> </ul>
	Socio-economic Cultural Conditions	Displacement of agricultural and land properties may cause apprehension on the community regarding the acquisition of land as project site.	<ul style="list-style-type: none"> <li>Conduct IEC to explain the project in terms of land acquisition and land use.</li> </ul>
	Socio-economic Cultural Conditions	Expectation of lower cost of electric service.	<ul style="list-style-type: none"> <li>Conduct IEC on effects of project on the cost of electric service to level-off expectations.</li> </ul>
<b>II. CONSTRUCTION PHASE</b>			
Construction of the key project facilities	Physical Resources	Potential degradation of water quality due to the generation of wastes during the construction period.	<ul style="list-style-type: none"> <li>Proper housekeeping will be initiated by the proponent and contractors during the construction phase.</li> </ul>
	Physical Resources	Possible soil erosion from digging activities and increased sedimentation.	<ul style="list-style-type: none"> <li>Establishment of sediment traps during the construction stage.</li> </ul>
	Physical Resources	Construction of the hydropower plant will alter the natural landscape of the project site.	<ul style="list-style-type: none"> <li>The dimensions of the facilities indicates that with a small project its impact will not be of alarming proportions and can be managed through:</li> </ul>
Construction of the key project	Socio-economic Cultural Conditions	<ul style="list-style-type: none"> <li>Creation of employment (about 200 workers will be employed during the construction of the plant).</li> <li>Increased local labor pool and skills base.</li> <li>Pressure on existing public services.</li> <li>Possible peace and order problems.</li> <li>Possible informal settlements that could eventually become permanent settlement</li> </ul>	<ul style="list-style-type: none"> <li>Priority will be given to qualified local residents; A “local first” hiring policy will be implemented.</li> <li>Develop a clear, precise, and well-defined employment policy and transparent procedures as part of the workforce management strategy to make clear what the process for employment in the project will be, what opportunities are available, and what the minimum skills requirements are in due coordination with concerned LGUs.</li> </ul>
	Socio-economic Cultural		

Project Phase / Environmental Aspect (Project Activity Which Will Likely Impact the Environmental Component)	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation or Enhancement
facilities	Conditions	unless regulated.	<ul style="list-style-type: none"> <li>• Adequate provision of company provided medical and health services.</li> <li>• Increase in community policing (e.g. barangay tanods or barangay security officer, etc.) and registration of workers for identification purposes with local authorities.</li> <li>• Workers will be provided with PPEs.</li> <li>• Noisy activities will be limited during the daytime to avoid annoyance to the community.</li> </ul>
<b>III. OPERATIONS PHASE</b>			
General Operation	Physical Resources	Water pollution by domestic effluent from the administration building.	Effluent will be treated in a conventional septic system.
	Physical Resources	Potential increase of sedimentation.	Regular cleaning of the settling pond will be conducted to prevent siltation and to remove large organic debris before any incipient decomposition occurs.
	Physical Resources	There will be competition on water resource as a result of the plant operation.	<ul style="list-style-type: none"> <li>• Water use for irrigation will be prioritized over power generation to avoid any water competition. The power plant will be shut down during summer months when the river flow is at its minimum to prioritize irrigation requirements.</li> </ul>
	Socio-economic Cultural Conditions	Threat to public health if domestic solid waste generated from the operation will not be properly disposed of.	A Solid Waste Management Plan which includes recycling, proper housekeeping and waste disposal will be formulated and implemented.
	Socio-economic Cultural Conditions	<ul style="list-style-type: none"> <li>• Six to seven operators will be hired for the plant operation</li> <li>• Potential to stimulate business as a result of improved supply of electricity.</li> <li>• Potential supply/enterprise development in relation to the project include: <ul style="list-style-type: none"> <li>➢ Supply of food for the project's</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Establish "local first" hiring policy for qualified applicants.</li> <li>• Provide a clear, precise, and well-defined employment policy and transparent procedures as part of the workforce management strategy.</li> <li>• Continue to implement enhancement measures to facilitate equity and fairness in access to employment and to maximize opportunities for local participation.</li> </ul>
General Operation		<ul style="list-style-type: none"> <li>➢ workforce and employees</li> <li>➢ Building maintenance</li> <li>➢ General consumables</li> <li>➢ Transportation</li> </ul>	

Project Phase / Environmental Aspect (Project Activity Which Will Likely Impact the Environmental Component)	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation or Enhancement
		<p>➤ Tourism</p> <p>The number of available jobs will decrease modestly but will remain above the expected number of jobs to be created. Each year, the number of jobs is directly tied to constructing the facility.</p>	<ul style="list-style-type: none"> <li>• Prioritize employment to qualified locals.</li> <li>• Carry out activities consistent with TEPSCO and Provincial Government of Ifugao commitment to equal and fair employment opportunity.</li> </ul>
	Socio-economic Cultural Conditions	<p>Host communities will receive benefits indicated in Sections 4 and 66 of EPIRA 2001 (The Generation Company and/or energy resource developer should set aside one centavo per kilowatt hour (P0.01/kWh) of the total electricity sales as financial benefits to host communities). This is in relation with Sec. 5(i) of R.A. 7638 which states that DOE shall devise ways and means of giving direct benefits to the province, city, or municipality, especially the community and people affected, and equitable preferential benefit to the region that hosts the energy resource and/or energy-generating facility provided, however, that the other provinces, cities, municipalities, or regions shall not be deprived of their energy requirements.</p>	<ul style="list-style-type: none"> <li>• Closely coordinate with the local govt. units to monitor the use of the allocated Funds generated from the EPIRA benefits.</li> </ul>
General Operation	Socio-economic Cultural Conditions	<p>The project will generate funds for conservation programs and projects.</p>	<ul style="list-style-type: none"> <li>• Proceeds of the project will be used to fund projects for the conservation of the terraces, thus maintaining heritage.</li> <li>• The additional budget generated from the project is a welcome contribution to achieve the UNESCO's recommendations to the conservation of the Rice Terraces and eventually removal of which from the List of World Heritage In-Danger.</li> </ul>

## 2.0 Introduction

### 2.1 Terms of Reference of the IEE Study

The Terms of Reference of this study is consistent with the Revised Procedural Manual for DAO 2003-30 (August 2007), based on environmental impacts identified for renewable energy (hydro power plant) project. The Study Plan was circulated to the stakeholders for their comments prior to implementation.

### 2.2 The Study Team

Name	Role
Jess Bayrante	Project Director
Mike de Guia	Project Manager/ Wildlife Specialist
Rene Cruz	Hydrologist
Wilfrido Palarca	Sociologist/ Stakeholder Consultation Specialist/ Landscape/ Cultural/ Heritage Assessment Specialist
Kathy Hipol	Geologist
Abba Grace Sanchez	Vegetation Specialist
Larry Padilla	Freshwater Biota Specialist
Martin John Morales	Environmental Scientist
Sheryl Gutierrez	Water Quality Specialist
Michael Andrew Manalili	GIS Specialist
Llore Juanico	Environmental Assistant
Kathleen Anne Cruz	Peer Reviewer

## 2.3 The Project Schedule

The propose work program for the project study started from February until July 2011.

Activities	Feb.			March				April				May				June				July				
	w2	w3	w4	w1	w2	w3	w4	w1	w2	w3	w4	w1	w2	w3	w4	w1	w2	w3	w4	w1	w2	w3		
Notice to Proceed / Contract		●																						
Review of related literatures, laws, and regulations			→																					
Site visit and field investigations				→																				
Social Environmental Influence during Construction/Operation Phase								→																
Identification of Mitigations and Monitoring Plan														→										
Field Survey Reports											●													
Draft Report																						●		
Final Report																							●	
Submission of IEE checklist																							●	
Barangay Consultation (reference)			■								■												■	

## **2.4 Project Location**

The proposed 810kW Mini-Hydro Power Plant project is in the northern Philippine island of Luzon, under Cordillera Administrative Region (CAR). The Mini-Hydro Power Plant project is sited on the northern part of Luzon, province of Ifugao, in the municipality of Asipulo and falls within the Barangay of Haliap. Asipulo is in the lower Southern portion of the Cordillera Mountain range and is about 334 kilometers away from Manila (Figure 2-1). It is bounded on the north by Kiangan, south by Ambaguio, Nueva Vizcaya Province and east by Lamut.

Asipulo has 12 barangays. The proposed project is in Barangay Haliap. Haliap is bounded to the north by Barangay Duit, the south by Pula, the east by Panubtuban and Mappit and west by Amduntog (Figure 2-2) The host barangay is approximately nine kilometres away and is accessible by tricycles (a three-wheeled vehicle consisting of a motorcycle attached to a sidecar) via a one lane concrete-paved road.

The proposed intake along Lamut River is in Barangay Haliap. Access to the weir site is by foot, either through a 150m trail from an existing concrete bridge or through another paved trail about 100m long. Both trails are rarely travelled. The powerhouse in Barangay Haliap is about nine kilometres from the Poblacion and is accessible by tricycle. The open type headrace which will start near the intake will run parallel with the river following existing contours and will extend for 1.8 km up to the head-tank. From the head-tank, water will flow through a steel pipe all the way through the powerhouse.

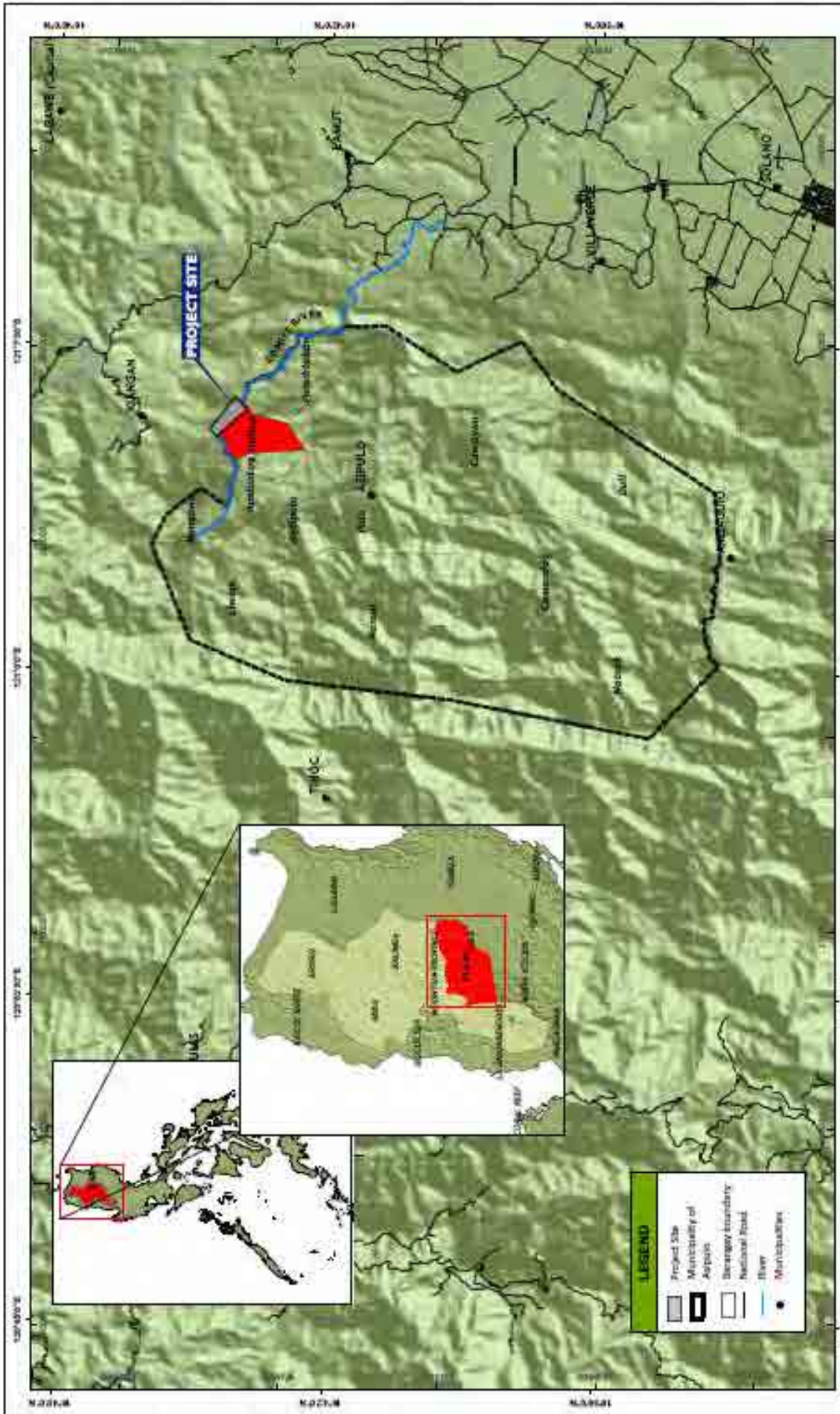


Figure 2-1 Location Map of Ifugao Province and Aspulo Municipality

IEE - 810 kW Likud Mini Hydropower Plant Project  
 Aspulo, Ifugao, Municipality of Aspulo  
 Province of Ifugao

**Legend**

- Project Site
- Municipality of Aspulo
- Strategic boundary
- National Road
- River
- Municipalities

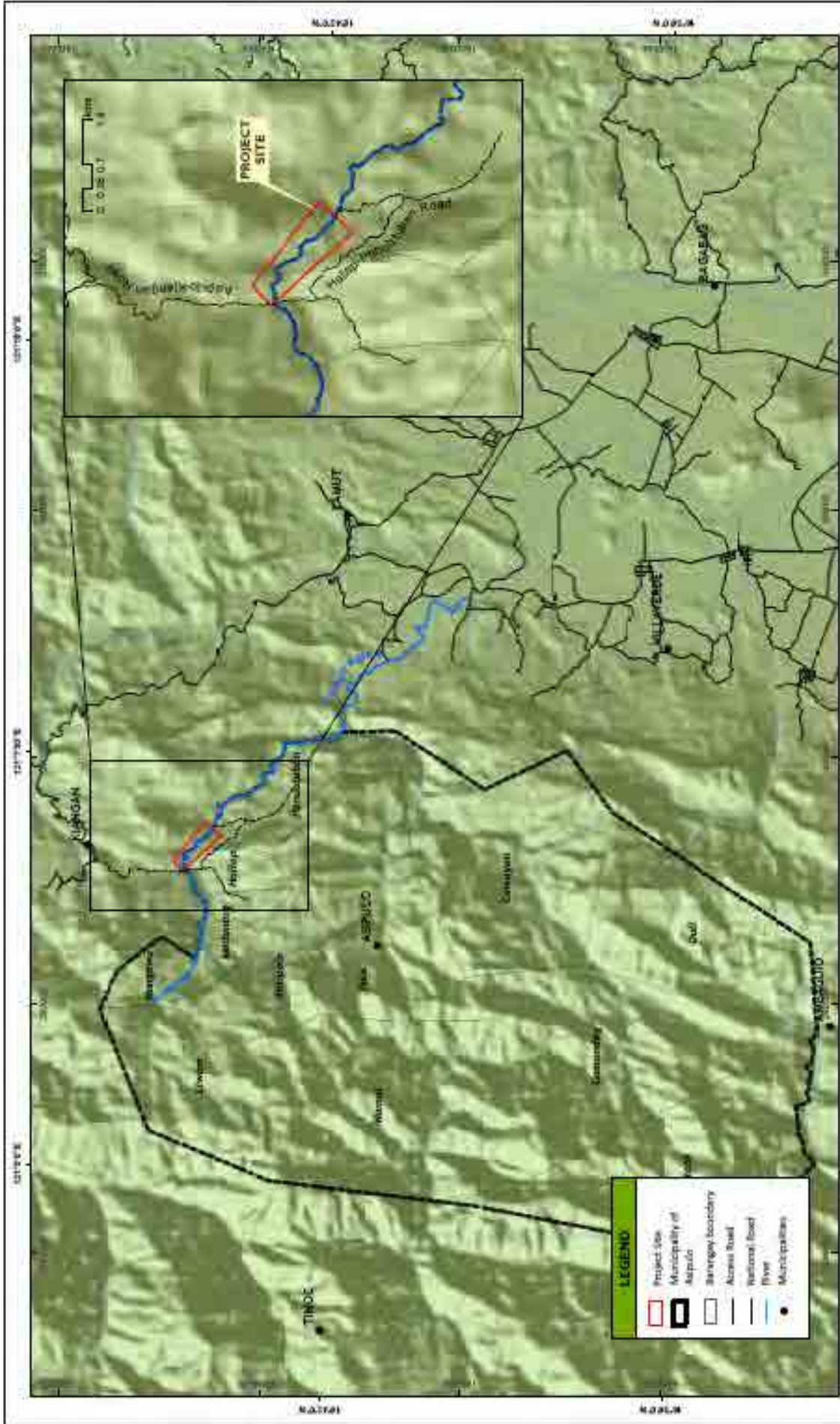
**Scale**  
 Graphic Scale: 1:50,000  
 0 100 200 300 400 500 Meters

**Source of Information**  
 1. Topographic Map of Ifugao Province  
 2. Aerial Photographs  
 3. Field Survey  
 4. GPS Data

**Revision**  
 Rev 2

**Logos**  
 TESPCO, AECOM, ArcGIS





<p>Figure 2-2</p>	<p>The Vicinity Map of the Project</p>	<p>Rev 2:</p>	<p>DATE: 04/2018          PREPARED BY: ACCOM          CHECKED BY: ACCOM          APPROVED BY: ACCOM</p> <p>NO WARRANTIES ARE MADE BY ACCOM FOR THE ACCURACY OF THE INFORMATION PROVIDED IN THIS MAP. ACCOM IS NOT RESPONSIBLE FOR ANY ERRORS OR OMISSIONS. THE INFORMATION IS PROVIDED AS IS. ACCOM IS NOT RESPONSIBLE FOR ANY DAMAGES, INCLUDING CONSEQUENTIAL DAMAGES, ARISING FROM THE USE OF THIS MAP. ACCOM IS NOT RESPONSIBLE FOR ANY DAMAGES, INCLUDING CONSEQUENTIAL DAMAGES, ARISING FROM THE USE OF THIS MAP.</p>	<p>SOURCE OF INFORMATION</p> <p>ACCURACY OF INFORMATION: 1:50,000          DATE: 04/2018          PREPARED BY: ACCOM          CHECKED BY: ACCOM          APPROVED BY: ACCOM</p>
<p>TEPISCO</p> <p>IEE - 810 MW Likud Mini Hydropower Plant Project</p> <p>San José Triac, Municipality of Aspijoco, Province of Hgo.</p>	<p>ACCUM</p> <p>San José Triac, Municipality of Aspijoco, Province of Hgo.</p>	<p>ARC</p> <p>GIS</p>		

## **2.5 Project Rationale**

The Cordillera Mountain region of Northern Luzon is almost synonymous to the rice terraces. Rice terracing is practiced throughout the whole region of Pacific Asia but those found in the Cordilleras are said to be the most unique in the world. In 1995, UNESCO included the Cordillera rice terraces in their World Heritage List of cultural landscapes. However, the region is also considered as one of the poorest provinces in the country. The situation is made worse by a number of factors such as the deterioration of the traditional balance due to out-migration, slow but continuous disappearance of the old culture and leadership and indiscriminate deforestation. These factors together with the absence of an effective and comprehensive rice terraces conservation plan led to the slow but continuous degradation of the rice terraces. Hence in 2001, UNESCO included the Cordillera rice terraces on the List of World Heritage in Danger. The Cordillera rice terraces are one of the most unique in the world but also one of the most threatened.

In response to the above problem, the Philippine Government tapped the Provincial Government of Ifugao to lead the rice terraces conservation efforts. Thus, the Ifugao Cultural Heritage Office (ICHO) under the office of the Governor was created.

In 2009, the Tokyo Electric Power Company (TEPCO) implemented the 200KW mini-hydro power plant as a demonstration project providing a model of locally sustainable energy-based development, regional vitalization and promoting the development of sustainable mini-hydro power resources in the rural areas.

Currently, the Provincial Government of Ifugao is running the Ambangal power Plant and manages the Rice Terraces Conservation Fund (RTCF). Despite effort of the provincial government, the funds to conserve the Ifugao Rice Terraces is still not enough to accomplish its goal while the terraces remain in the Endanger List of UNESCO.

This project is developed, primarily, to create funds from the sales of the electricity. The funds will be utilized in the rehabilitation programs and conservation projects for the rice terraces and hopefully to improve the quality of lives of the people engaged in terrace farming.

## **2.6 Project Component**

The proposed project features a run-of-river hydropower plant with a maximum capacity of 810kW and will tap the Lamut River traversing Barangay Haliap. The river system has a catchment area of 44.02 km<sup>2</sup>. The project site has a total land area of 1.61ha. Figure 2-3 shows the location of the project main components.



**Figure 2-3**  
**Location of the Main Project Component**

**TEPICO** IEE - 810 kW Likud Mimi Hydropower Plant Project **AECOM**  
 Barangay Halap, Municipality of Abotibo  
 Province of Ifugao

**REVISIONS**  
 Rev 2:

**GRAPHICAL SCALE**  
 North Arrow  
 (All elevation shown are in meters above sea level (ASL))

**NOTES**  
 1. All drawings shall be prepared in accordance with the following:  
 - Project Name: \_\_\_\_\_  
 - Project No.: \_\_\_\_\_  
 - Date: \_\_\_\_\_  
 - Scale: \_\_\_\_\_  
 - Drawing No.: \_\_\_\_\_  
 - Revision: \_\_\_\_\_  
 2. The Engineer and his representatives, professional engineers and other duly licensed persons shall be held responsible for the accuracy and reliability of the data and information furnished to them and for the design and construction of the project. The Engineer shall not be held responsible for the accuracy and reliability of the data and information furnished to him by the client or other persons.

**SOURCES OF INFORMATION**  
 1. Aerial Photographs  
 2. Topographic Maps  
 3. Field Notes  
 4. Other Sources



### 2.6.1 Diversion Weir

The intake weir will be constructed in Barangay Haliap. The intake weir is of the floating type which has a length of 20m, height of 3m and width of 0.8m. The body will be of the masonry concrete type while the surface will be covered with rain faced concrete. Access to the weir is by foot trail. Geographical and geological conditions on both sides of the river bank and river bed will be considered in constructing the structure along with the priority use of local raw materials and local manpower during construction.

### 2.6.2 Intake and Settling Basin

The intake is designed as the side intake type. The dimensions were designed to allow a smooth inflow of maximum discharge and irrigation water (Plate 2-1).

The settling basin is designed to ensure the capture of sediments with a diameter of 0.1mm (Figure 2-4). A spillway will be installed to prevent the inflow of excess water from the intake into the headrace during floods (Plate 2-2).

There are two existing irrigation Communal Irrigation System (CIS) between the intake and the powerhouse, so a valve will be provided on the side wall of the settling basin for water diversion into the nearby irrigation systems, to comply with the Philippine Water Act, where irrigation water is a priority use over power.

### 2.6.3 Headrace

The headrace will be of the open channel type with the interior design to ensure a smooth flow of maximum discharge, with a dimension of 1.4m width by 1.2m depth (Figure 2-5). It will have a distance of 1.8 km from the intake to the head tank and an inclination of 1/500, following the contour line of the right bank of the Lamut River (Plate 2-3).

### 2.6.4 Head-tank

The head-tank will be an open type, with a dimension of 4.8 m width and 11.8m length (Figure 2-6). This project structure will ensure that the output capacity is stable even with fluctuations in power demand, compatibility with increase and decrease in the volume of the river water, ultimate removal of sediments and other foreign particles, and ability to discharge surplus water during a stop in the operation of the power station (Plate 2-4).

### 2.6.5 Penstock and Spillway

The penstock will facilitate the water transport from the head-tank to the powerhouse (Plate 2-5). Steel pipes will be used with a dimension of 0.85 m diameters and 118.5 m length (Figure 2-7). All of it will be constructed as an underground type in consideration of the existing landscape.

### 2.6.6 Powerhouse

The location of the powerhouse is 230 m upstream from the watershed-out concrete overflow crossing where it is relatively flat. . The structure has 12.7 length, 3.5 height and 6.9 width. The base of the powerhouse is 4 m up from the river basin (Figure 2-8). A new access road to the powerhouse with a total length of 230 m will be constructed.



**Plate 2-1 Intake Weir<sup>1</sup>**



**Plate 2-2 Settling and Basin<sup>1</sup>**



**Plate 2-3 Headrace<sup>1</sup>**



**Plate 2-4 Headtank<sup>1</sup>**



**Plate 2-5 Penstock and Spillway<sup>1</sup>**

---

<sup>1</sup> The image photos of the civil structure. All pictures, except Plate 2-1, are image picture of each civil structure. .

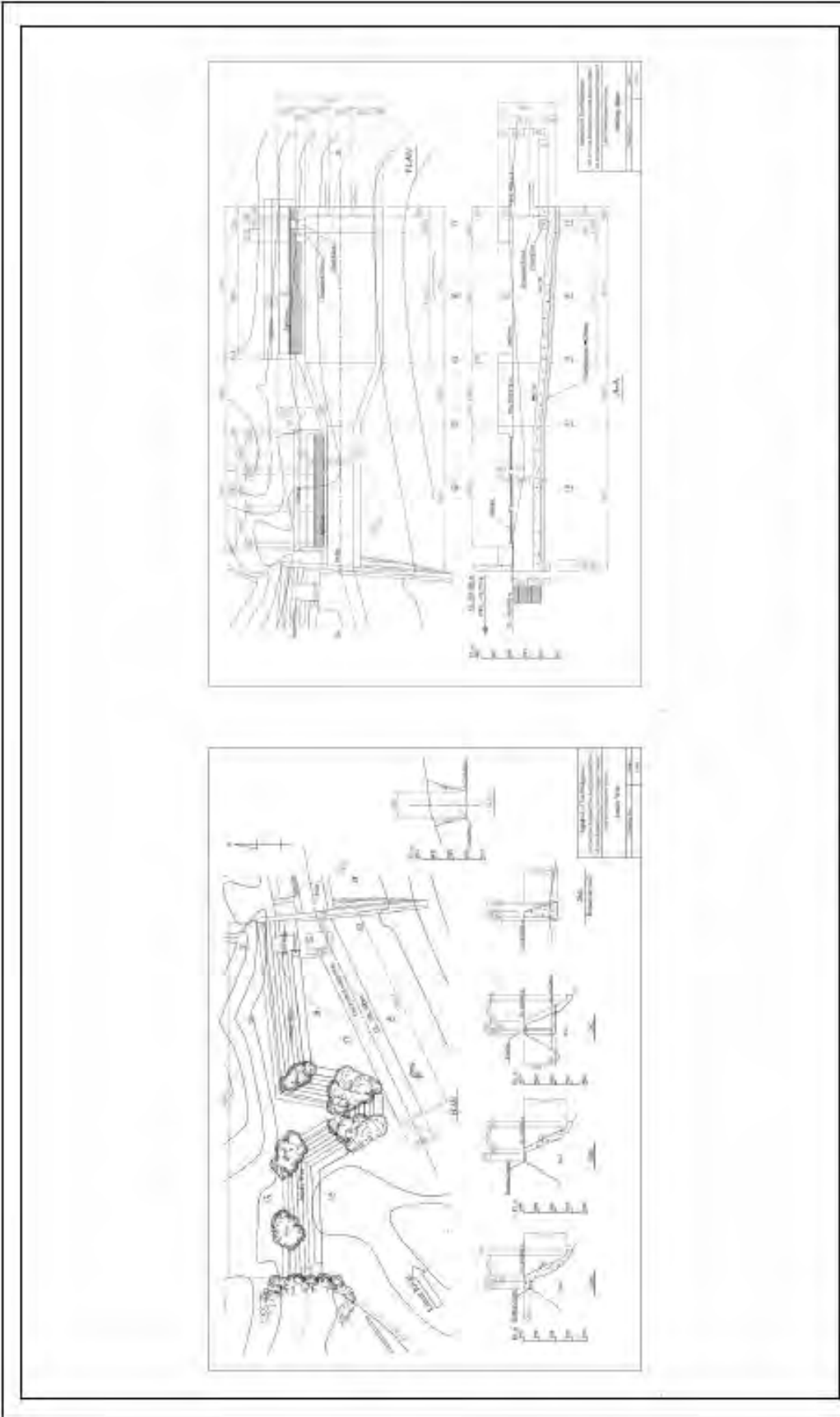


Figure 2-4

Lay-out of Intake and Settling Basin


**IEE - 810 KW Likud Mint Hydropower Plant Project**  
 Barangay Itap, Municipality of Aguilid  
 Province of Ifugao

**AECOM**  
 1000 Town Center Drive  
 Suite 1000, San Ramon, CA 94583

REVISIONS

REV 2

GRAPHICAL SCALE

Not to scale

NOTES

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.  
 2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.  
 3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.  
 4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.  
 5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.

SOURCES OF INFORMATION

Aerial Photographs: 2010  
 Topographic Map: 1:50,000  
 Project: IEE-810 KW  
 Date: 2010



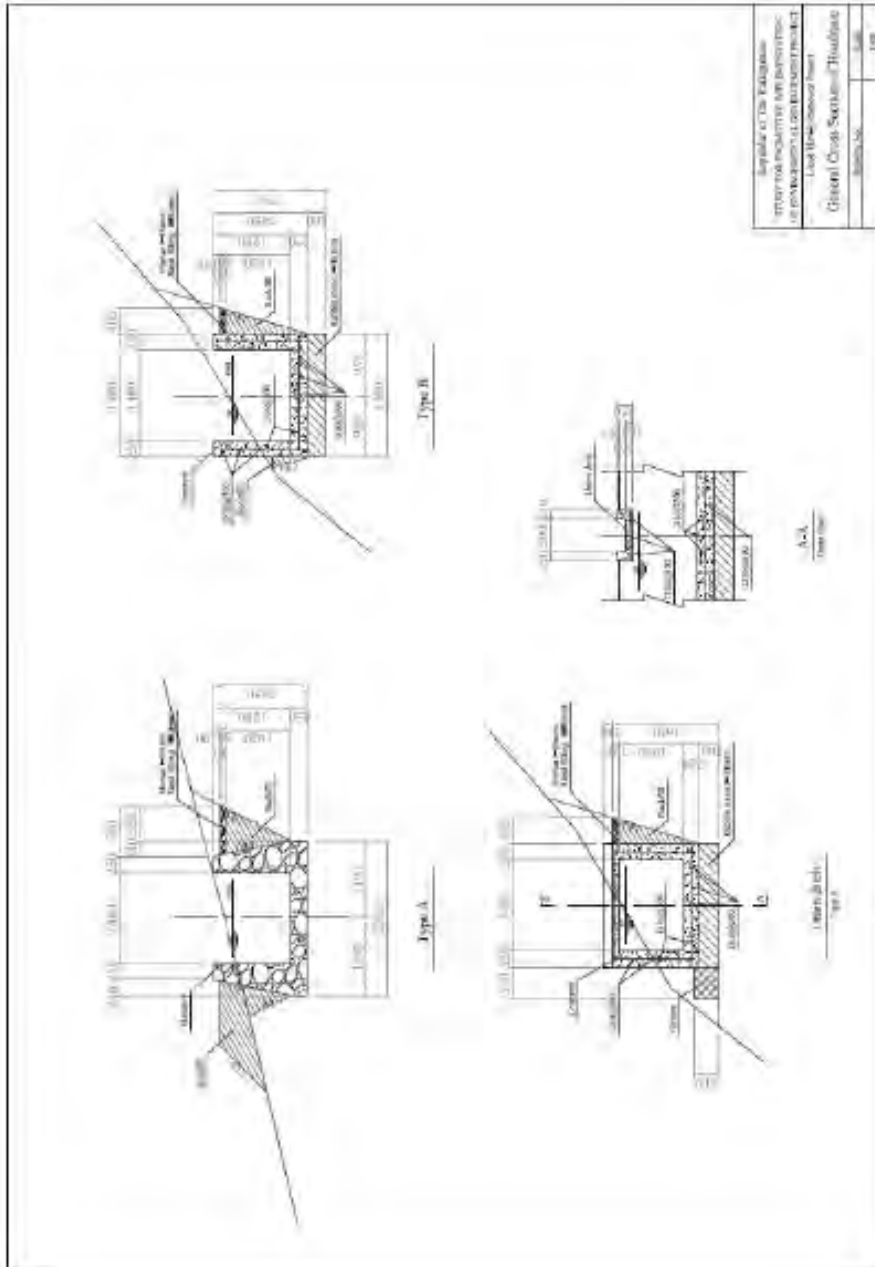


Figure 2-6

Layout of Headrace

**ESPICO**  
Engineering & Planning  
Sustainable Solutions

**IEE - 810 kW Likud Mini Hydropower Plant Project**  
Strategy Study: Feasibility of Aspis  
Province of Iligao

**AICOM**  
Architectural & Interior  
Construction Management

REVISIONS	REV 2
DATE	Not to scale

DATE	2014/05/05
BY	101/101/101
CHECKED	101/101/101
APPROVED	101/101/101

**ArcGIS**

Approved by the Engineer for the Determination of the Materials to be used in the Project.

Layout Engineer:  
Gibson Cross Section Headrace

Sheet No. 100  
Scale 1:100

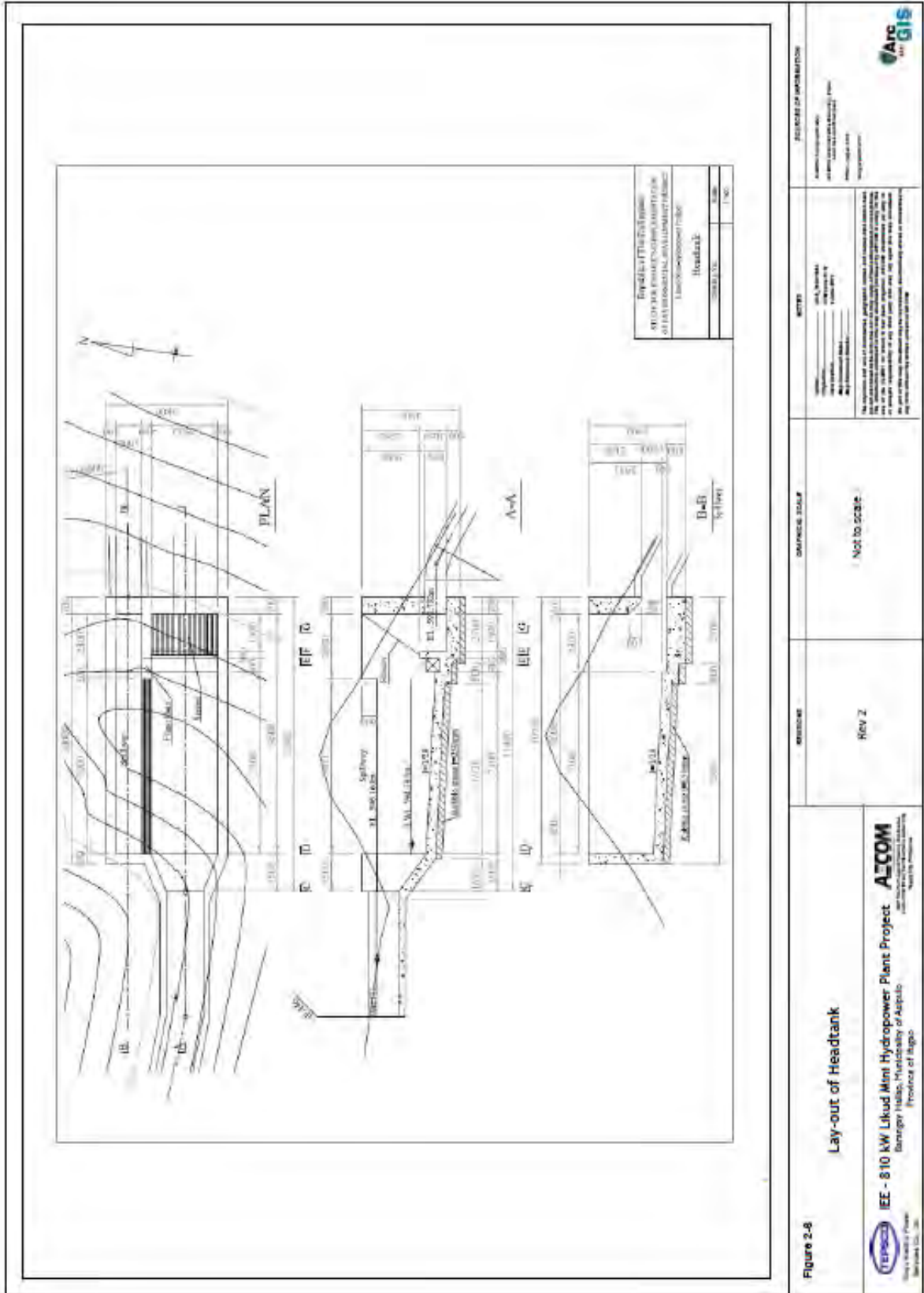


Figure 2-8

Lay-out of Headtank

EE - 810 kW Likud Mini Hydropower Plant Project  
 Sanjour Iturbide, Municipality of Asipolo  
 Province of Ajoagué

**TEPCE**  
 Tamaulipas Electric Power Company  
 S.A. de C.V.

**AECOM**  
 Environmental & Infrastructure  
 10000 North Central Expressway  
 Suite 1000, Dallas, TX 75243



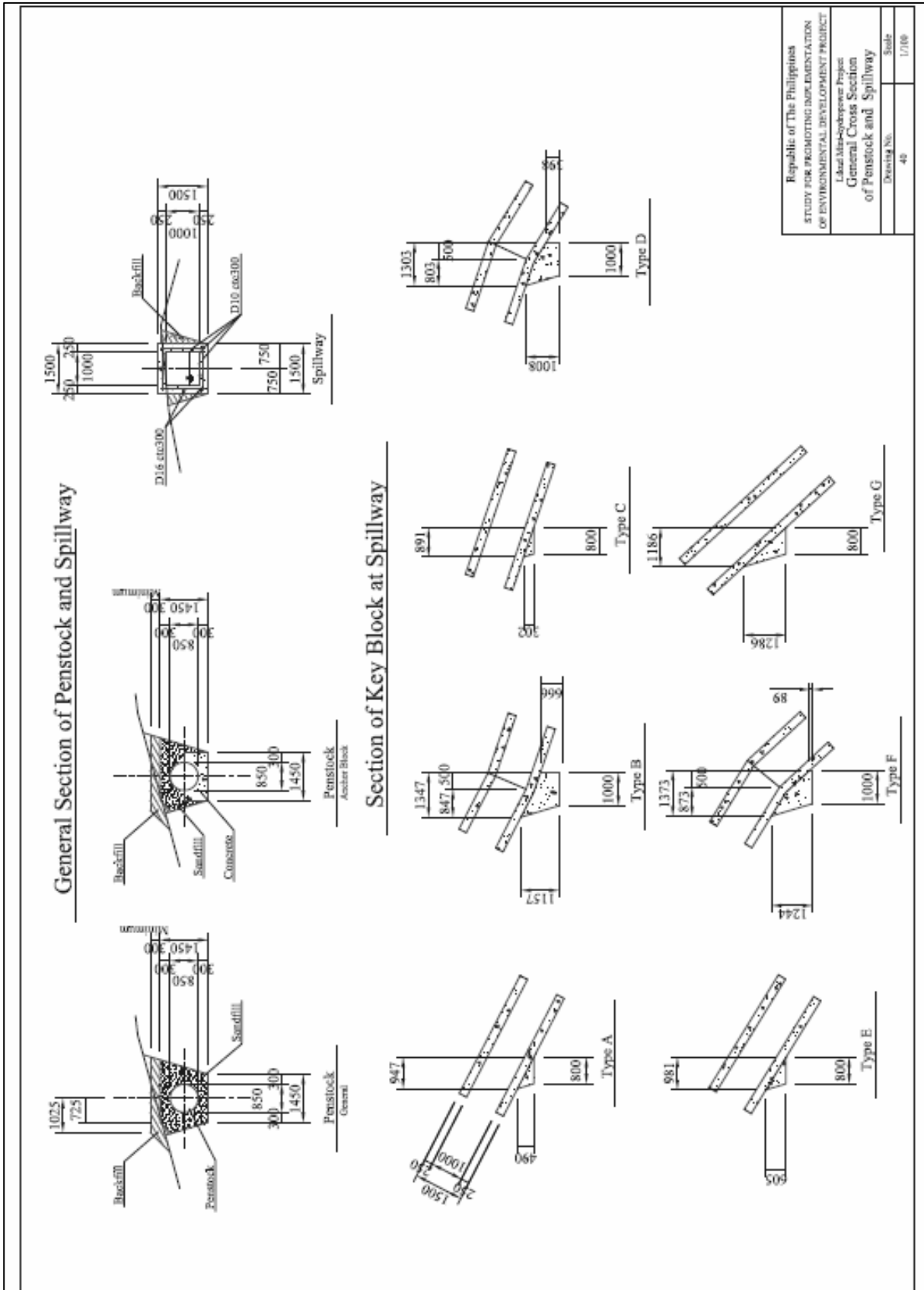


Figure 2-7 Lay-Out of Penstock and Spillway

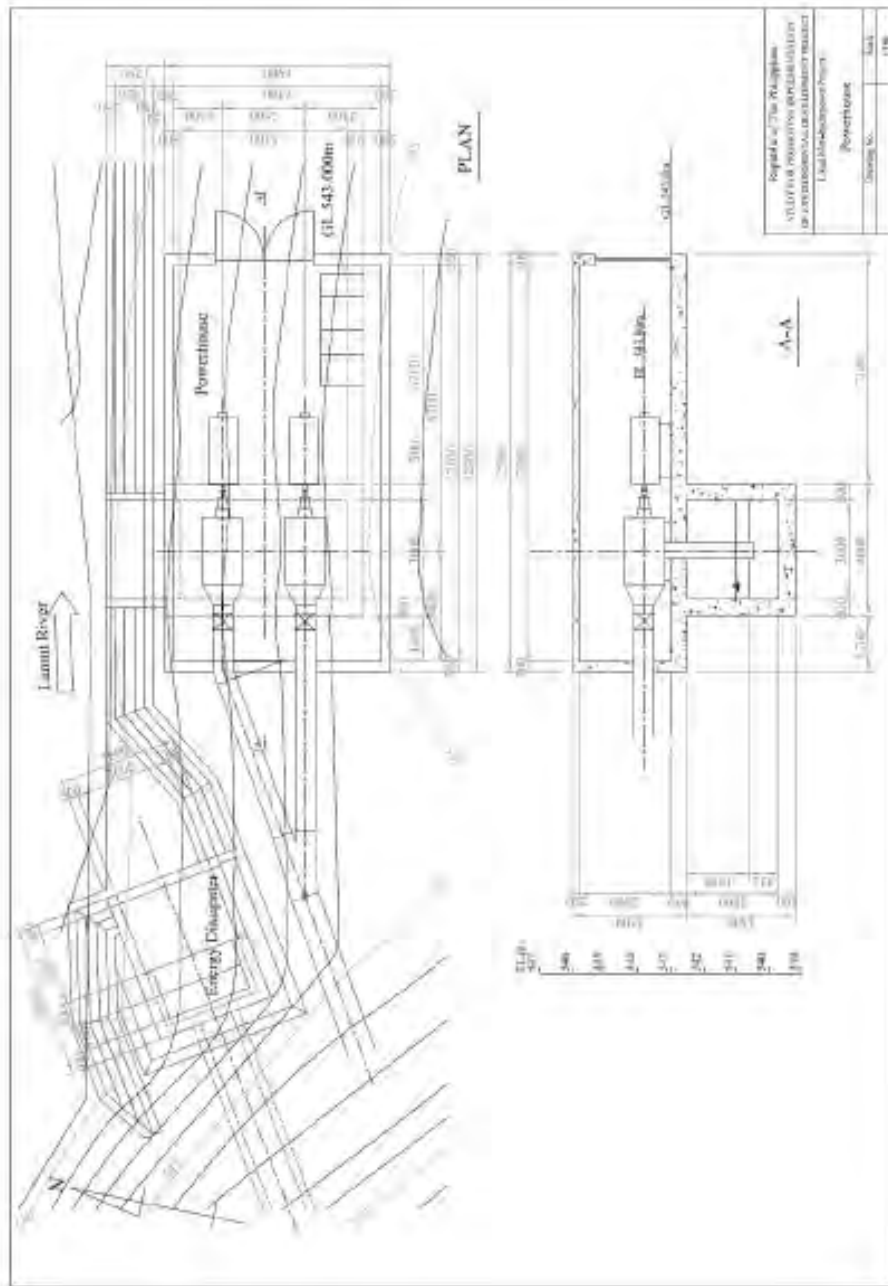


Figure 2-8

Lay-Out of Powerhouse


  
 Energy Utility, Municipality of Asipulo  
 Province of Ifugao

REVISIONS

Rev 2

DATE OF SCALE

Not to scale

NOTES

1. The contractor shall be responsible for providing all necessary permits and clearances for the construction of the powerhouse and related structures. The contractor shall also be responsible for obtaining all necessary permits and clearances for the construction of the powerhouse and related structures. The contractor shall also be responsible for obtaining all necessary permits and clearances for the construction of the powerhouse and related structures.

PROJECT INFORMATION

PROJECT NAME: Lilud Mini-Hydro Project  
 PROJECT NO.: 1190  
 DRAWING NO.: 1190  
 DATE: 11/10/10  
 SCALE: 1:100



### 3.0 Survey Methodology

The approach and methodology were based on the Revised Procedural Manual of DAO 2003-30 specific to renewable energy projects. The study team conducted both primary and secondary data collection from February 2011 until June 2011. Published and unpublished information was supplemented with primary data obtained through actual field reconnaissance. The details of methodology used are discussed in each chapter of the report.

## 4.0 Administrative and Regulatory Framework in the Philippines

### 4.1 National Legal and Administrative Framework

The Philippine Government has enacted a number of Acts and Rules to safeguard the environment in the country. The details of these Acts and Rules and their applicability to the Mini-hydropower Project are provided below.

#### 4.1.1 Legislation for the Development of the Project

##### 4.1.1.1 Power and Energy Policies

The Philippines Electric Power Industry Reform Act of 2001 (RA 9136) declaration aims to ensure and accelerate the total electrification of the country and to ensure the quality, reliability, security and affordability of the supply of electric power. It also promotes the utilization of indigenous and new and renewable energy resources in power generation in order to reduce dependence on imported energy wherein details are covered in the Renewable Energy Act of 2008.

The Renewable Energy Act of 2008 (RA 9513) describes the framework for accelerated development and advancement of RE sources, and promotes the development of strategic programs to increase its utilization. It aims to attain the following:

- Accelerate the exploration and development of renewable resources to achieve energy self-reliance through the adoption of sustainable energy development strategies;
- Increase the utilization of renewable energy by institutionalizing the development of national and local capabilities in the use of renewable energy systems and promoting efficient and cost-effective commercial application; and
- Encourage the development and utilization of renewable energy resources to effectively prevent or reduce harmful emissions and thereby balance the goals of economic growth and development with the protection of health and environment.

#### 4.1.2 Legislation for the Environmental Protection

This IEE has been prepared and in compliance to Presidential Decree 1586 (PD 1586) or the Philippine Environmental Impact Statement System which provides that no person, partnership or corporation shall undertake or operate any project declared as environmentally critical or is located within an environmentally critical area without first securing an Environmental Compliance Certificate (ECC) issued by the President or his duly authorized representative. This aims to balance the socio-economic growth that will be brought about by a project and the environmental protection for the benefit of the future generations. The DENR Administrative Order No. 2003-30 (DAO 2003-30), the implementing rules and regulations of PD 1586, defines the scope and guidelines of the EIS system.

Administrative Order No. 42 of 2002 streamlined the EIS processing system and delegated the ECC approving authority to the Secretary of the Department of Environment and Natural Resources

(DENR) and the Director and Regional Directors of the Environmental Management Bureau (EMB) of the DENR.

The IEE process is also guided by the following environmental legislations:

- Republic Act 9275, An Act Providing for a Comprehensive Water Quality Management and for Other Purposes (Philippine Clean Water Act of 2004);
- Republic Act 8749, An Act Providing for a Comprehensive Air Pollution Control Policy and for Other Purposes (Philippine Clean Air Act of 1999);
- Republic Act 9003, An Act Providing for an Ecological Solid Waste Management Program, Creating the Necessary Institutional Mechanisms and Incentives, Declaring Certain Acts Prohibited and Providing Penalties, Appropriating Funds Thereof, and for Other Purposes (Ecological Solid Waste Management Act of 2000); and
- Republic Act 6969, An Act to Control Toxic Substances and Hazardous and Nuclear Wastes Providing Penalties for Violations Thereof, and for Other Purposes (Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990).

#### 4.1.3 Other Relevant legislation

##### 4.1.3.1 National Integrated Protected Areas System (NIPAS)

Republic Act 7586 or the NIPAS Act of 1992 provides for the establishment and management of national protected areas, whether terrestrial, wetland or marine, protected areas, areas that shall encompass outstanding remarkable areas and biologically important public lands that are habitats of rare and endangered species of plants and animals, biogeographic zones and related ecosystems.

##### 4.1.3.2 Indigenous People Rights Act (IPRA)

Another important legislation taken into consideration in this assessment is the Indigenous People Rights Act (IPRA) of 1997 (RA 8371). This act recognises and promotes the rights of indigenous peoples to ancestral domains and lands; the right to self-governance; economic and social rights; and cultural integrity, including indigenous culture, traditions and institutions.

## 5.0 Description of the Environment of the Project Site

### 5.1 Physical Resources

#### 5.1.1 Land Use and Classification

This section describes the existing land classification and land uses within the project site, and includes mitigating measures that address identified impacts by the project. Under Philippine Law, the implementation of a project within a specific area is covered by an official declaration of land classification. Certain specific exclusions also exist as a matter of national interest, such as those under the Philippine Constitution (1987) or as local interest under the Philippine Local Government Code (1991), together with other associated laws. Since the project will involve a significant change to the current land use, it is important to determine and understand the existing land use, and compare this to what was legally classified both by the local and national government.

##### 5.1.1.1 Methodology

The study of land use for the project involved a review of published literature and maps sourced primarily from the provincial, municipal, and barangay land use and development plans. Additional information was obtained from National Mapping Resources Information Agency (NAMRIA) maps for base referencing of key areas within the project site.

### 5.1.1.2 Baseline Environment

#### Land Classification

The project site falls under the classification alienable and disposable land with some locations outside the proposed facility falling under the forest/timber land classification. The distribution of these land classifications are presented in detail in Table 5-1 and illustrated in Figure 5-1.

**Table 5-1 Barangay Haliap Land Classification**

Land Classification	Area (ha)	Percent of Project Site
Alienable and Disposable Land	165	98%
Forest/Timber Land	3	2%
<b>Total</b>	<b>168</b>	<b>100</b>

Source: PPDO-Ifugao, 2010

#### Land Use

The distribution of actual land use/cover within Brgy.Haliap is presented in Table 5-2 and Figure 5-2. Agricultural land encompasses majority of the project site. Other uses include shrubland/grassland and built-up areas.

**Table 5-2 Project Site Land Use Distribution**

Land Use Category	Area (ha)	Percent of Barangay Land Area
Brushland	137	29
Agricultural	335	71%
<b>Total</b>	<b>472</b>	<b>100</b>

Source: PPDO-Ifugao, 2010





## 5.1.2 Geology, Geomorphology and Geohazards

This section presents information on the baseline assessment of the geologic characteristics of the project site, focusing on the geo-structural conditions and natural geologic hazards that may potentially occur in the project site with or without project implementation.

### 5.1.2.1 Methodology

Discussions on geology, geomorphology, and geohazards are mainly based on the latest available geologic maps from the Mines and Geosciences Bureau (MGB) unit of the DENR and Philippine Institute of Volcanology and Seismology (PHIVOLCS). Published data on the province and the region were also used. Geomorphologic assessment was made using topographic maps from the National Mapping and Resource Information Authority (NAMRIA). In addition to the provision of basic geological and geomorphic information, interpretative maps generated from GIS post-processing were utilized in the evaluation of existing natural geological hazards at the project site.

### 5.1.2.2 Baseline Environment

#### 5.1.2.2.1 Regional and Local Geology

The project site is located within the Cagayan Valley Basin which separates the Central Cordillera in the west and Sierra Madre mountain ranges to the east. The basin is bounded in the south by the Caraballo Range. The basin was formed from successive volcanism and uplift of the Central Cordillera from the Late Oligocene to Pleistocene (Caagusan, 1981). Previous studies and correlation with outcrops of the neighbouring mountain ranges indicate that the stratigraphy of the basin is largely composed of deep marine sediments and extrusive igneous rocks (Hipol et al., 2001).

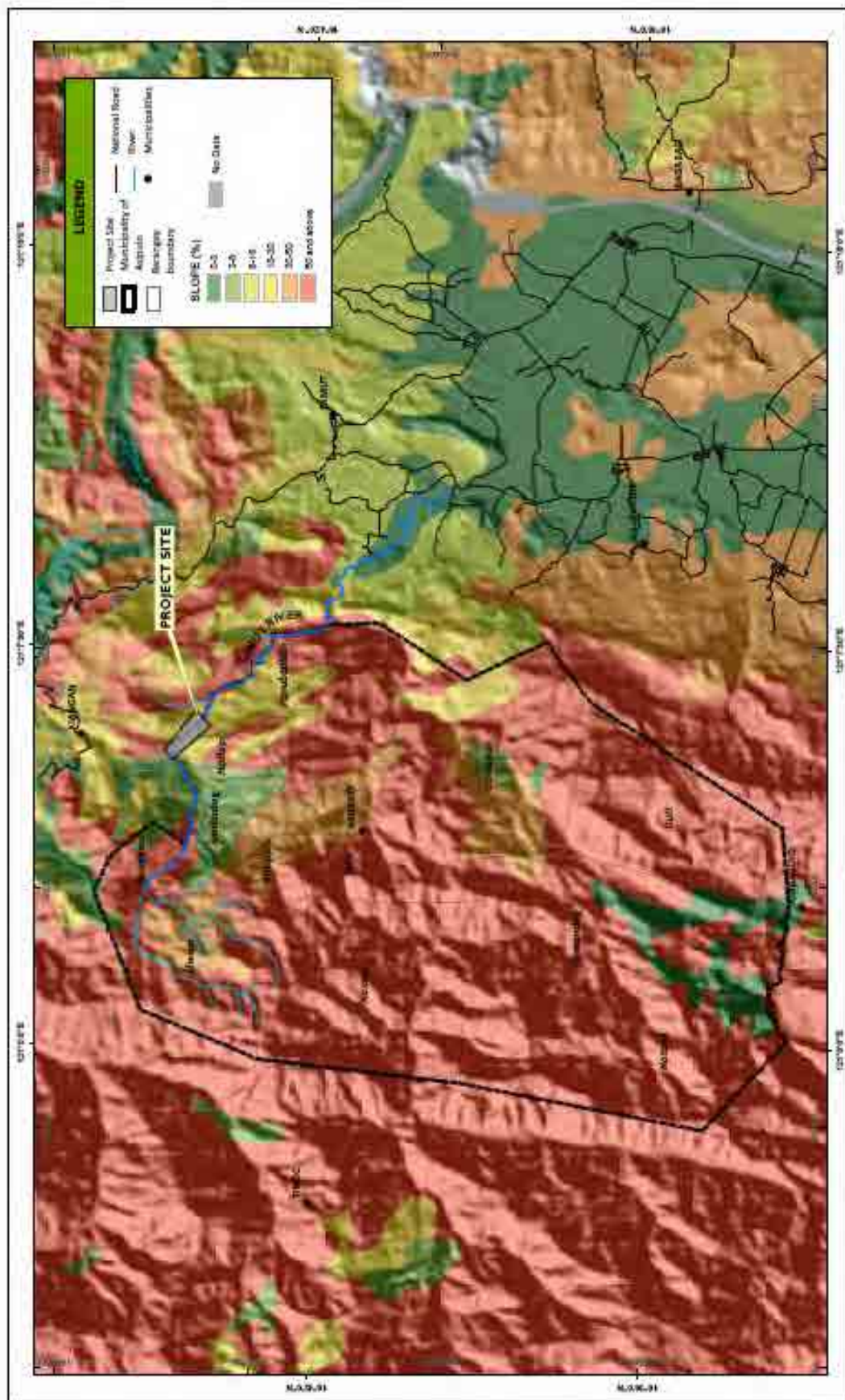
The oldest units are represented by the Late Oligocene Dumatata Formation, equivalent to the Zigzag Formation, characterized by highly fractured and well indurated sandstone-mudstone interbeds and breccia inter-tonguing with volcanic breccia and andesite flow. Unconformably overlying this formation is the Early Miocene Ibulao Limestone composed of reefal limestones. It is generally massive to very thickly-bedded but becomes medium-bedded towards the top. The type locality is found in the Ibulao Gate. Conformably overlying the Ibulao Limestone is the Early Miocene Lubuagan Formation. This formation is composed mainly of sandstone-siltstone interbeds with alternating sequences of sandstones and conglomerates towards the top of the formation. The sandstone-siltstone sequence shows structures typical of turbidites indicating deposition in a subaqueous environment. The Lubuagan Formation is unconformably overlain by the Balbalan Formation. It is composed of andesite flows, fossiliferous sandstones, shales, conglomerates, alternating sandstones and conglomerates, and minor limestones. The Late Middle Miocene to Pliocene period is marked by a break in the rock record as no rocks of these ages are seen in the area. Unconformably resting on the older formations is the Pleistocene Tabuk Formation consisting of volcanic plugs in lower sections and tuffaceous sand deposits, autobreccia, lahar deposits, and terrace gravel deposits in upper sections. Recent alluvial deposits cap the deposits. The main exposures in the municipalities of Asipulo and Kiangán are characteristic of the sedimentary deposits of the Dumatata Formation and the Lubuagan Formation.

During the Early Miocene, NE-SW compression and extension directions are inferred based on fault array analysis. Strike-slip and reverse faults indicate that during the Middle Miocene, the primary stress direction slightly changed to the NNE-SSW direction. During the Quaternary, a NW-SE compressive stress is occurring. This force is associated with the movements along the left lateral strike-slip Philippine fault.



#### 5.1.2.2.2 Geomorphology and Geologic Structures

The project site lies on rolling to steep terrain with elevations ranging from less than 450 m to 1935 m above sea level (masl) (Figure 5-3). The project site's terrain is steep characteristic of the mountainous area with river terraces and gorges bounding the headwaters. Near vertical slopes and gullies also run parallel to the river.



**Figure 6-3**  
**Slope Map of the Project Site**

**REVISIONS**  
 Rev 2

**SOURCES OF INFORMATION**  
 Surveying Data: 1:50,000 Scale Topographic Map (1970s)  
 Aerial Photographs: 1:25,000 Scale Aerial Photograph (2010)  
 GPS Data: GPS Data (2010)

**NOTES**  
 1. The map is a derivative of the project data and is not a final product.  
 2. The map is for informational purposes only and should not be used for any other purpose.  
 3. The map is subject to change without notice.  
 4. The map is not to be used for any other purpose.

**TEPSCO**  
 Terna Energy Services Company Limited  
 10th Floor, Terna House, 10th Avenue, Victoria Island, Lagos State, Nigeria  
 Tel: +234 1 271 1000  
 Email: info@terpsco.com

**AECOM**  
 AECOM Infrastructure & Construction  
 10th Floor, Terna House, 10th Avenue, Victoria Island, Lagos State, Nigeria  
 Tel: +234 1 271 1000  
 Email: info@aecom.com

**ArcGIS**

### 5.1.2.2.3 Geohazards

This section presents the assessment of various geological hazards that may affect the project. Hazards discussed are the natural hazards occurring as a consequence or part of the natural geological processes operating within the project site. The discussion also attempts to present useful information that can be included as part of the detailed design criteria that are both site and infrastructure-specific, to reduce, if not completely eliminate, the impact of natural environmental risks both to the proposed structures and their surroundings.

The influence of slope gradients on the generation of potential geologic hazards is presented in Table 5-3. The types of geohazards presented pertain only to surficial processes and excludes hazards in relation to seismicity. In addition, gradient values at 18% and above (usually characterized as steep) are subdivided further into three sub-categories to better characterize geohazard responses in each sub-category.

**Table 5-3 Geohazard in Relation to Slopes and Percent Coverage of the Project Site**

Slope Gradient	Geohazard	Soil Slope Class	Percent of Project Site	Area (ha)
Level to Nearly Level (0 to 3 %)	0	0	0	0
Nearly Level to Undulating (3 to 8%)	72%	341.791	72%	341.791
Undulating to Rolling (8 to 18 %)	Low susceptibility to slope failure and erosion			
Rolling to Moderately Steep (18 to 30%)	28%	129.39	28%	129.39
Very Steep (30 to 50%)	Highly susceptible to slope failure and erosion			
High Angle/Very Steep (>50%)	Highly susceptible to slope failure and erosion			
<b>Total</b>			<b>100</b>	<b>471.181</b>

A summary of identified geologic hazards that may affect the project site and proposed facilities is presented in Table 5-4. The table outlines the specific hazards, possibility/frequency of occurrence, and the potential impacts to the project as well as proposed mitigating measures to address the identified geohazard limitations.

**Table 5-4 Geohazards, Corresponding Risks, and Mitigating Measures**

Geohazard	Specific Hazards	Likelihood of Occurrence (prior to mitigation)	Potential Areas to be Affected	Risks to Project	Mitigating Measure
Seismic hazards	<ul style="list-style-type: none"> <li>Ground shaking</li> </ul>	Possible	All areas within the project site	<ul style="list-style-type: none"> <li>Structural failure or collapse</li> <li>Landslides and slope failure</li> </ul>	<ul style="list-style-type: none"> <li>Detailed investigation of engineering, geological, and foundation properties for the structures</li> <li>Appropriate design parameters to be taken into consideration in the design and reinforcement of the structures</li> <li>Application of suitable ground preparation prior to erection of structures</li> </ul>

Likelihood of occurrence are as follows: rare, unlikely, possible, likely, and probable; arranged from least occurring to most frequently occurring. The frequency/probability rating for the geohazards is subject to change in the future as the Philippines has no officially established hazard rating matrix comparable to established frequency/probability rating systems such those of FEMA and USGS. However, the probability rating presented is referenced from locally published literature and recognized by EMB and MGB as a sound rating system pending the establishment of a published local geohazard ratings guideline.

## Seismic Hazards

Structures such as lineaments and joints indicate a NW-SE compressive stress within the general area of Ifugao as surveyed for the municipalities of Asipulo and Kiangan in 2001 (Hipol et al., 2001). This force is associated with the movements along the Philippine fault. The province of Ifugao is ranked by PHIVOLCS as 7<sup>th</sup> in terms of vulnerability to earthquakes and 1<sup>st</sup> in terms of earthquake-induced landslide among 10 provinces in the country. This was based on assessment of historic hazards within the province. Though Ifugao experiences less earthquakes than the eastern margin of Northern Luzon, the generally steep topography of the province and the project site make it susceptible to landslides and slope failures that may be induced by earthquakes of significant magnitude.

Based on the most recent regional active faults map defined by PHIVOLCS, the nearest known active faults are splays of the Philippine Fault Zone found 26 km south of Lagawe.

## Ground Shaking

While the major earthquake-generating structures are outside the project site, the possible generation of a significant ground movement during an earthquake is the major concern for the project site. The actual ground acceleration g-values specific to the project site, as per relative distance from different earthquake generators in the region is calculated using the formula of Fukushima and Tanaka (August 1990, in Thenhaus, 1994) below,

$$\text{Log}_{10}A = 0.41M - \log_{10} (R + 0.032 \times 10^{0.41M}) - 0.0034R + 1.30$$

Where:

- A = mean of the peak acceleration from two horizontal components at each site (cm/sec<sup>2</sup>)
- R = shortest distance between site and fault rupture (km)
- M = surface wave magnitude

Ground acceleration values are represented as the unitless function g. The average g is calculated from the resulting mean of peak acceleration represented by A, divided by the computed acceleration due to gravity. The mean of peak acceleration generally decreases for a particular area as its distance increases from the potential epicenter of an earthquake which, for the purpose of this study, is treated as the project site's distance to the fault concerned. Variations in the mean value of g is calculated based on the type of subsurface material underlying a particular place or area, as different materials have different responses to the transmission of the earthquake energy. Four general categories, namely Rock, Hard Soil, Medium Soil and Soft Soil, are used to recalculate the g as presented in **Table 5-5**. The summarized table presents the fault defined by PHIVOLCS, all calculated from a theoretical maximum credible earthquake of 7.5 with pre-determined distance from the project site to the nearest contact with the identified fault.

**Table 5-5 Calculated G-values for Defined Faults and Seismic Responses per Subsurface Material**

Parameters	26 km north of the identified trace of the Philippine Fault Zone. (In this report, PHIVOLCS, 2010)
Radius (km)	26.000
Magnitude (M)	7.500
Acceleration (cm/sec <sup>2</sup> )	302.136
Acceleration due to gravity (cm/sec <sup>2</sup> )	981.000
Average g (ground acceleration)	0.308
Rock (60% of g)*	0.185
Hard Soil (107% of g)*	0.330

Parameters	26 km north of the identified trace of the Philippine Fault Zone. (In this report, PHIVOLCS, 2010)
Medium Soil (87% of g)*	0.268
Soft Soil (139% of g)*	0.428

\* Based on Fukushima and Tanaka - Bulletin of Seismological Society of America, August 1990

### 5.1.3 Land Suitability Classification

In the absence of a detailed assessment involving actual sampling and analysis, land suitability within the project site is assessed with respect to specific uses.

The project site is suitable for cultivated crops and production forests as shown in Figure 5-4.

The area is also moderately to severely susceptible to erosion as shown in the Erosion Potential Map below. This is attributed to the steep topography of the area and the utilization of the land for agricultural use.

### 5.1.4 Surface Water Quality

### 5.1.5 Methodology

#### 5.1.5.1 Sampling Stations

The water quality sampling was conducted in March 2011. Two stations were established in the areas that could possibly be affected by the project. Samples were collected along the upstream and downstream of Lamut River, covering the intake area and powerhouse of the proposed project site, respectively. Table 5-6 describes each water quality station, while Figure 5-5 and Plate 5-1 and Plate 5-1 illustrate the locations

**Table 5-6 Surface Water Quality Stations**

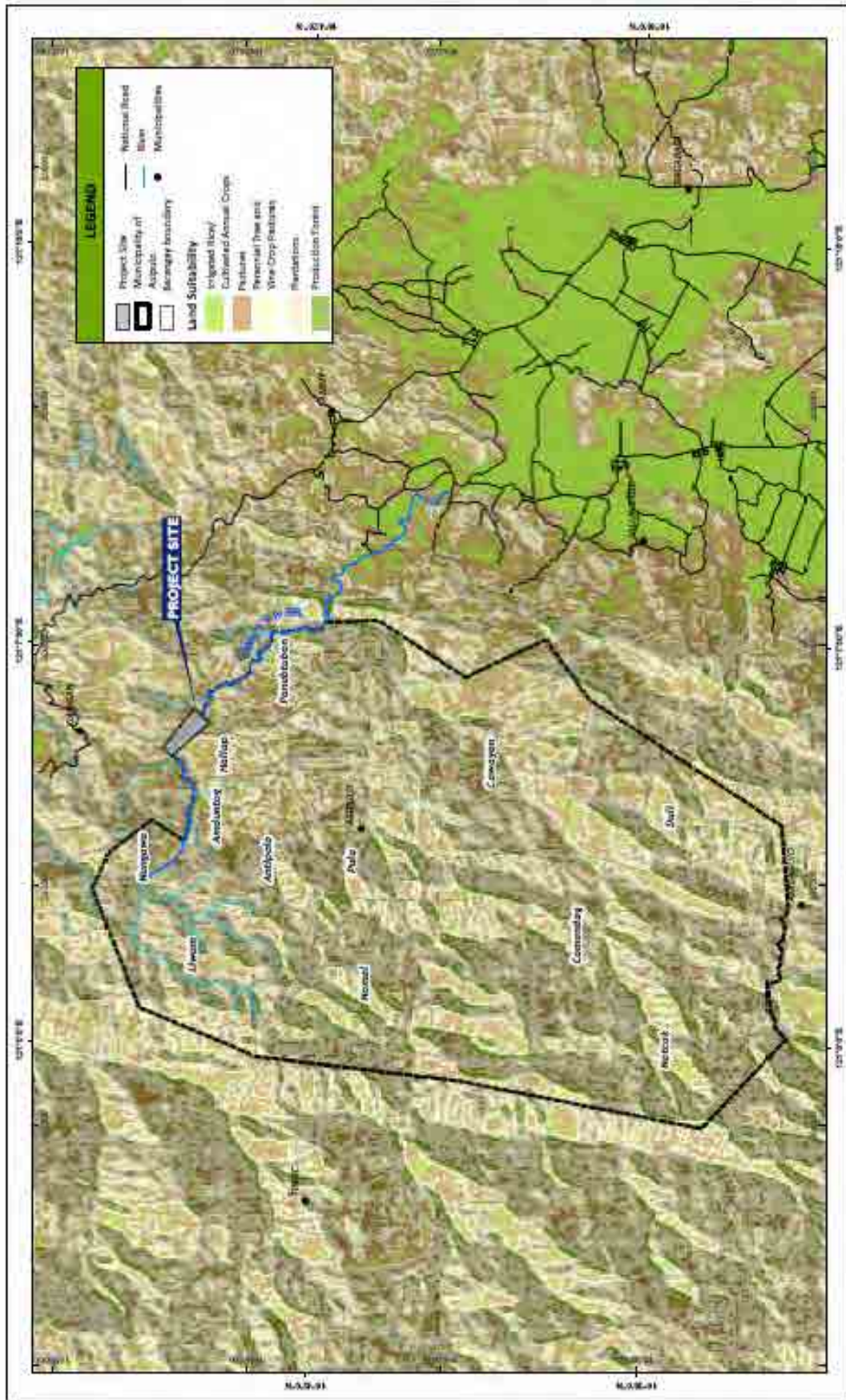
Station ID	Name of Water Body	Location of Water Body	Description of Station	Coordinates	Elevation
Intake	Upstream of Lamut River (local name: <i>Itum River</i> )	Sitio Lower Haliap, Brgy. Haliap, Asipulo	Station is located at the proposed intake area and downstream of Itum Bridge. This station is also downstream of the Lamut River and an unknown river confluence.	16°44'24.5" N 121°05'30.5" E	631 m
Powerhouse	Downstream of Lamut River (local name: <i>Guihinon River</i> )	Sitio Guihinon, Brgy. Makppit, Kiangan	Station is located at the proposed powerhouse, in-between Barangays Makppit and Panubtuban. It is downstream of Lamut River and its confluence with an unnamed river.	16°43'48.1" N 121°06'36.0" E	541 m



**Plate 5-1 Water quality station at the intake area upstream of Lamut River**



**Plate 5-2 Water quality station at the proposed powerhouse downstream of Lamut River**



**Figure 6-4**  
**Land Suitability Classification**  
 IEE - 810 kW Mini Hydropower Plant Project  
 Ampatuan, Zamboanga City, Zamboanga Peninsula, Philippines

**Legend**

- Project Site
- Municipality of Ampatuan
- Municipality of Zamboanga
- Municipality of Zamboanga City
- Land Suitability:
  - Irrigated Rice
  - Cultivated Annual Crops
  - Pasture
  - Perennial Tree crop
  - Wet Crop Pasture
  - Barandans
  - Production Forest

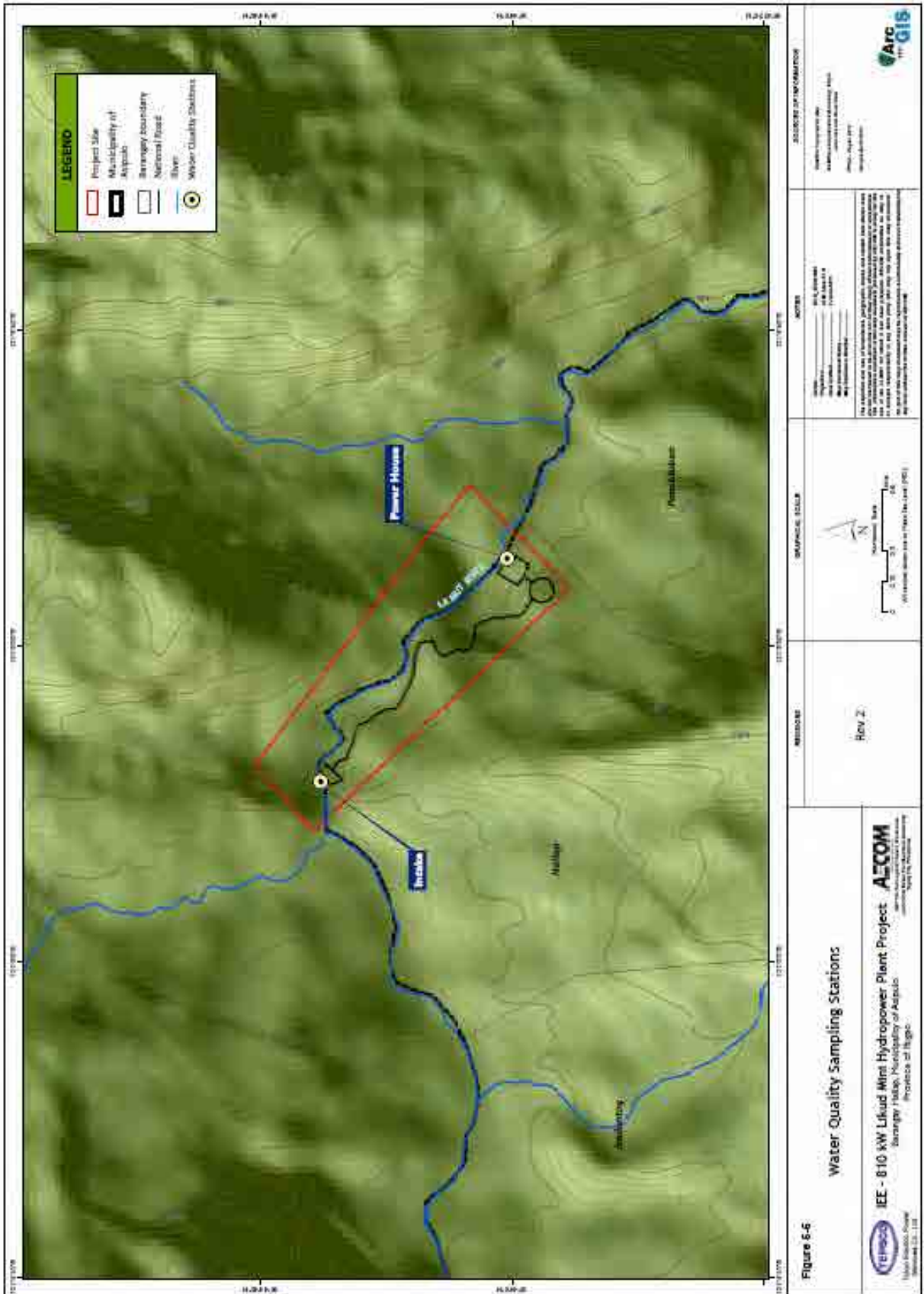
**Scale:** 1:50,000  
 0 100 200 300 400 500 Meters

**Source of Information:**  
 1. Satellite Imagery  
 2. Topographic Map  
 3. Aerial Photograph  
 4. Field Survey  
 5. GPS Data

**Notes:**  
 The suitability analysis is based on the project site location and the land use/cover data. The suitability analysis is based on the project site location and the land use/cover data. The suitability analysis is based on the project site location and the land use/cover data.

**Revision:** Rev. 2

**Logos:** AECOM, IEE, and other project-related logos.





### 5.1.5.2 Sampling and Analytical Procedures

The temperature and dissolved oxygen (DO) were measured in-situ using the WTW® Oxi 3210 DO meter, while the in-situ measurements of pH levels were determined using a pen type pH meter, Eutech® pH Testr 30. These equipment were calibrated prior to the sampling activity to confirm the validity and accuracy of the readings.

The sampling techniques, preservation and handling procedures were according to the *Australian/New Zealand Standard® Water Quality Sampling Guidance: AS/NZS 5667 series*. Grab samples were collected by submerging the containers against the flow or drift at a depth of 20 cm, as practicable or whenever the depth of the stream permits<sup>2</sup>. The samples were cool stored at approximately 4°C and were immediately brought to the accredited laboratory of OSTREA Mineral Laboratories, Inc. (OMLI) for analysis. Table 5-7 summarizes the parameters analyzed in the laboratory and their corresponding container, minimum volume, holding time, and preservation requirements. The analytical procedures used by OMLI are the approved methods described in the *DENR Administrative Order No. 34, series of 1990: Revised Water Usage and Classification/Water Quality Criteria Amending Section Nos. 68 and 69, Chapter III of the 1978 NPCC Rules and Regulations (DAO 1990-34) for water quality criteria (Table 5-8)*.

**Table 5-7 Water Quality Sampling Protocols**

Parameter	Volume Required	Container	Preservation	Maximum Allowable Holding Time Prior to Analysis
pH, temperature, DO	Parameters measured <i>in-situ</i>			
Biological Oxygen Demand (BOD)	1 L	Polyethylene washed with phosphate-free detergent and distilled water	Cool stored at 1°C to 4°C	24 hours
Total Suspended Solids (TSS)	500 mL	Polyethylene washed with phosphate-free detergent and distilled water	Cool stored at 1°C to 4°C	24 hours
Total and Fecal Coliform	250 mL	Glass, sterilized	Cool stored at 1°C to 4°C	24 hours

**Table 5-8 Methods of Analysis**

Parameter	Method
Temperature	<i>In situ</i> measurement (Thermistor)
pH	<i>In situ</i> measurement (Glass Electrode)
DO	<i>In situ</i> measurement (Membrane Electrode)
BOD	Azide Modification (Dilution Technique)
TSS	Gravimetric (Filtration and Drying at 103°C -105°C)
Total coliform	Multiple Tube Fermentation Technique or Membrane Filter
Fecal coliform	Multiple Tube Fermentation Technique or Membrane Filter

<sup>2</sup> Grab sampling refers to collecting a water sample at one time from a single point. A grab sample represents only the composition of the water at the time and place the sample was collected (Environmental Management Bureau, Department of Environment and Natural Resources, 2008. Water Quality Monitoring Manual: Volume I Manual on Ambient Water Quality Monitoring).

### 5.1.6 Baseline Environment

The Lamut River is identified in the DENR Memorandum Circular No. 07 series of 1993 Additional List of Classified Rivers and Bays (DMC 1993-07) as a Class C fresh surface water body. Based on the classification guidelines of DAO 1990-34, Class C waters are used for aquaculture, recreational activities such as boating, and industrial water supply<sup>3</sup>. Table 5-9 presents the results of the baseline study covering the parameters that contribute to the aesthetic quality and oxygen demand in freshwaters, as well as their corresponding DAO 1990-34 Class C limits. Laboratory results are attached in Annex 1.

**Table 5-9 Water Quality Sampling Results**

Parameter	Water Quality Stations		DAO 1990-34 Class C limits <sup>b</sup>
	Intake	Powerhouse	
	16 March 2011 10:01 am <sup>a</sup>	16 March 2011 1:24 pm <sup>a</sup>	
Temperature (°C)	20.1	21.9	3C maximum rise
pH	8.5	8.4	6.5 to 8.5
DO (mg/L)	8.1	7.9	5.0
BOD (mg/L)	2	2	10
TSS (mg/L)	<1	<1	Not more than 30 mg/L increase
Total coliform (MPN/100mL)	5,400	16,000	5,000 <sup>c</sup>
Fecal coliform (MPN/100mL)	3,500	9,200	-

a. Date and time of sampling;

b. Maximum limits unless otherwise specified;

c. The value refers to the geometric mean of the most probable number of coliform during a 3-month period, without exceeding in 20% of the samples taken during the same period.

- No prescribed limit

#### Temperature

The temperature levels during the time of sampling in the Lamut intake and powerhouse were 20.1°C and 21.9°C, respectively. The low temperature readings could be attributed to the cold climate in Kiangnan, along with the cloudy to slightly rainy weather condition during the time of sampling. The shade provided by the large boulders surrounding the Intake station and the lush vegetation cover along the river banks of the Powerhouse station could have also contributed to the colder temperature measurements, at a lesser extent. Since there are no sources of thermal effluent in the area, the DAO 1990-34 Class C limit is no longer applicable for the purposes of this baseline study.

#### pH

Samples from the two stations along Lamut River were both alkaline, with values ranging from 8.4 to 8.5. Thus, both surface water stations conformed to the Class C range limit specified in the DAO 1990-34.

#### DO

The DO levels in the Intake and Powerhouse are above the minimum limit in the DAO 1990-34 for Class C waters. The high DO levels in the Intake (8.1 mg/L) and Powerhouse (7.9 mg/L) could have been influenced by the cold temperature and fast current flow of Lamut River, observed during the course of sampling. The low organic content of the river, which is reflected in the low BOD

<sup>3</sup> Beneficial use of Class C fresh waters include: (1) Fishery Water for the propagation and growth of fish and other aquatic resources; (2) Recreational Water Class II (Boatings, etc.); and Industrial Water Supply Class I for manufacturing processes after treatment (DAO 1990-34).

measurements of both stations, also contributed to the high DO levels, as these two parameters are inversely proportional.

### **BOD**

BOD levels in the two stations both registered at 2 mg/L, which pass the DAO 1990-34 maximum allowable limit for Class C. This indicates that the surface water stations within the proposed project sites have low organic pollutant load, as BOD is the measurement of the amount of oxygen consumed by microorganisms in the process of biological degradation of organic matter in water.

### **TSS**

Both surface water stations have undetected levels of TSS (<1 mg/L). Clear waters were collected from the upstream (Intake) and downstream (Powerhouse) sampling stations despite the partly raining weather condition during the time of sampling. The TSS concentration, for monitoring purposes, should not have an increase of more than 30mg/L.

### **Total and Fecal Coliform**

Elevated levels of total and fecal coliform were noted in the Intake and Powerhouse stations. Measured values in the two surface water stations are higher compared to the 3-month geometric mean Class C limit for total coliform. The DAO 1990-34 has no specific guidelines for fecal coliform for Class C freshwaters. Possible sources of total and fecal coliform include human and animal wastes due to lack of domestic sewage and septage treatment facilities and widespread hog-raising activities in the area.

#### 5.1.7 Hydrology

The project has a catchment area of 44.02 km<sup>2</sup>. There is no historical stream flow data available for the Lamut River. Probable flood discharges for various return periods for Lamut River is calculated using the Dimensionless Hydrograph which is described below:

#### **The Dimensionless Unit Hydrograph Method**

The magnitude of flood from a catchment area depends on intensity, duration, and distribution in time and space of the rainfall over the catchment area and on the physiographic parameters that would affect the runoff viz. drainage basin area, its shape, slope, land use pattern, surface infiltration characteristics of the soil, vegetation cover and initial wetness of the soil. The problem of estimation of design flood actually reduces to selection of the minimum number of parameters that truly represent the drainage basin's response to the storm and to account for the complexities of the patterns of rainfall storms.

The magnitude of flood is the net result of all factors mentioned above acting individually and collectively, thereby suggesting the need to carry out probability and frequency analysis to calculate probable flood for a given return period. (a statistical parameter used in frequency analysis as a measure of most probable time interval between occurrence of a given event and that of an equal or greater event). With the availability of the RIDF data (Rainfall Intensity Duration Frequency) from PAGASA, the frequency analysis was simplified and the methodology as described in the DPWH Design Guidelines, Criteria and Standards, Vol. 2 was applied. The RIDF data of Baguio City was used in the calculation of probable flood discharge as it has similar climatological characteristics with Ifugao and being the nearest station of PAGASA. The RIDF of Baguio City is shown below.

#### ***Equations Used to Express the RIDF***

The equation below was used to express the relationship between rainfall intensity and duration. The equation is expressed as:

$$I_p = a \cdot (t + b)^m$$

Where:  $I_p$  = Rainfall Intensity

$t_c$  = Rainfall Duration

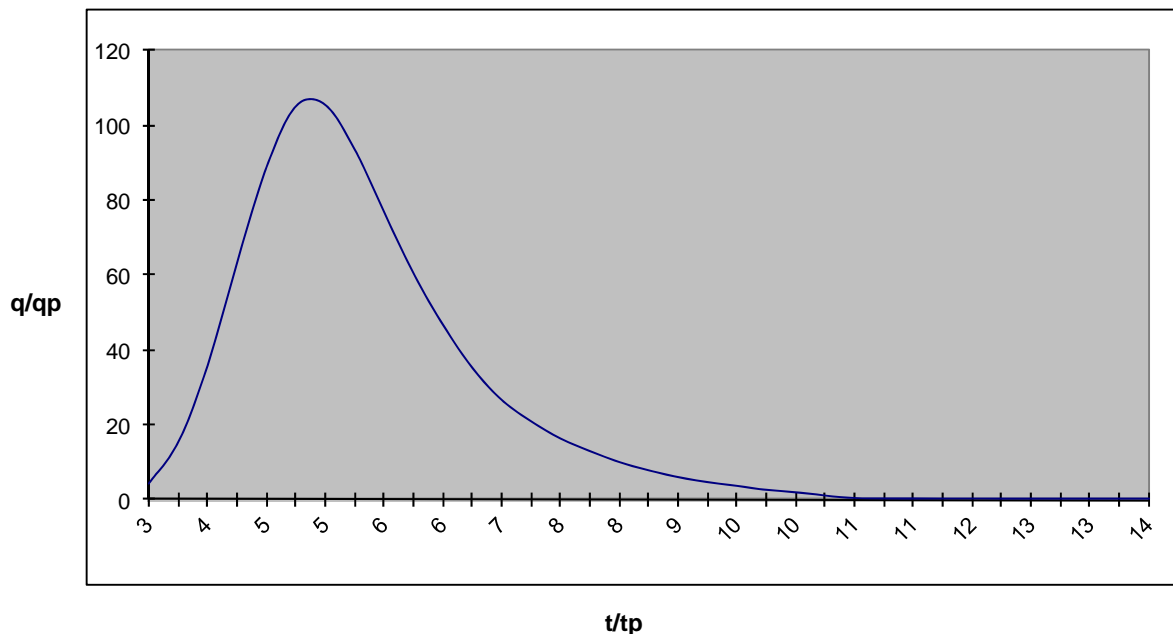
$a, b, m$ : are constants

Constants of the RIDF equation were estimated by least square regression analysis giving relationship between probable rainfall intensities and corresponding rainfall duration.

The dimensionless unit hydrograph shown in Figure 5- masks the effect of basin size and essentially eliminates the effect of shape, except as they are reflected in the estimate of basin lag  $t_p$  and runoff volume<sup>4</sup>.

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<sup>4</sup> Linsley, Kohler and Paulhaus, Hydrology for Engineers, 1988



**Figure 5-6 Dimensionless Unit Hydrograph**

The general expression for basin lag used in the project take the following form:

$$t_p = C_t (LL_c / S^{1/2})^{0.38}$$

Where:  $t_p$  = lag time in hours

$C_t$  = Coefficient varying from 0.35 to 1.2

$L$  = Main stream distance from outlet to divide, in km.

$L_c$  = Stream distance from outlet to a point perpendicular to the basin centroid, in km.

$S$  = Average channel slope

The Model Hyetograph of each catchment area was created by the method of Soil Conservation Service (US-SCS).

The cumulative runoff is determined by the following equation:

$$Q = (P - I_a)^2 / (P - I_a + S)$$

Where:  $Q$  = cumulative runoff (mm)

$P$  = Cumulative rainfall (mm)

$F$  = Cumulative infiltration (mm)

$I_a$  = Initial abstraction

$S$  = Potential maximum abstraction

$CN$  = Curve number. (Curve number used is for Antecedent Moisture Condition III).

The  $CN$  used is 80.

Calculated flood discharge at various return periods for Lamut River is shown in Table 5-10 below.

**Table 5-10 Calculated Flood Discharge of Lamut River**

Return Period	Calculated Discharge (cms)
2 years	165.85
5 years	367.45
10 Years	508.36
25 Years	698.55
50 Years	840.33
100 years	978.53

### **Weir Site**

Access to the weir site is by foot, either through a 150 m trail from an existing concrete bridge or through another paved trail about 100 m long. Both trails are rarely travelled. The project site is at elevation 633 m from sea level with limestone rock outcrops at both sides of the riverbanks. Sheer vertical cliffs are at both sides, with moss and some small plants and trees that appear to be remnants of the original forest cover. The river at the weir site is about 8m wide with water flowing at a depth of about 500 mm. Locals describe flooding to occur after about two full days of continuous rain at the upstream part of the river and surrounding mountains. Floods usually makes the water level at the site rise to about 1 to 1.5 m high and also making the river flow wider to about 12 m. A flash flood was reported to have occurred in the past due to a dike collapse upstream of the project site after a fairly long downpour. Flow along the river was reported to have risen to about 3 to 4 m high (Annex 2).

### **Along the River**

An irrigation weir was observed at about 50m from the proposed weir site. This was reported to have been constructed about 20 years ago to serve small rice paddies and vegetable orchards along the river. Access to the irrigation weir is through an existing paved footpath at the left side of the bank facing the downstream direction. There were signs of “kaingin” at some slopes not far from the river. Small slides and erosion have also been observed (Annex 3).

During the site visit, water levels at different river crossings were just above the knees (500-600 mm) with small boulders lining the river bed. There are four streams / gulleys that flow into the river along the stretch of the project area, some of which are also being used for irrigation. Three of these streams are on the left side of the river when facing the downstream direction, and one is on the other side of the river. These streams have well vegetated slopes. A washed-out concrete overflow crossing was also seen along the river. This structure reportedly collapsed during the onslaught of Ondoy – Pepeng storms.

### **Powerhouse**

The site for the powerhouse is 230 m downstream from the washed-out concrete overflow crossing. The elevation of the river near the powerhouse was taken as 541m above sea level. The river width at the powerhouse site was about 16 m. Trees, shrubs and small plants abound on the site (Annex 4).

The elevated flat area near the river was considered for the powerhouse and appurtenant structures. Floodwater rises to about 2 m during flood events but local guides informed that the area has not been flooded from past storms.

### 5.1.8 Air Quality, Noise and Vibration

This section presents the results of the ambient air quality and noise assessments for the project. Secondary data were used to characterize the baseline conditions of the project site with regard to its climate, air quality and noise levels.

### 5.1.9 Methodology

The meteorological conditions in the project site were described using the long-term data obtained from the nearest Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) located in Baguio City.

The other relevant data and information gathered are contour map, climate map and typhoon frequency map. Contour maps were procured from the NAMRIA while the climate map and the typhoon frequency map of the whole Philippines were also sourced from PAGASA.

### 5.1.10 General Climate

The prevailing climate in the project area falls under Type II of the Modified Corona's Classification of the Philippines (Figure 5-7). The Type II climate is characterized by a very short dry season with pronounced maximum rain during summer months.

The threshold value which defines the dry and wet period is 50mm: value less than 50 mm represents the dry period while values greater 50 mm represents the wet period. The climatological normals (Annex 5) show that the dry period covers the month of January, February, March and December. The highest rainfall was recorded for the month of August at 905.0 mm. Further, climatological extremes (Annex 6) show that the highest daily rainfall occurred on July 4, 2001 at 1085.8 mm.

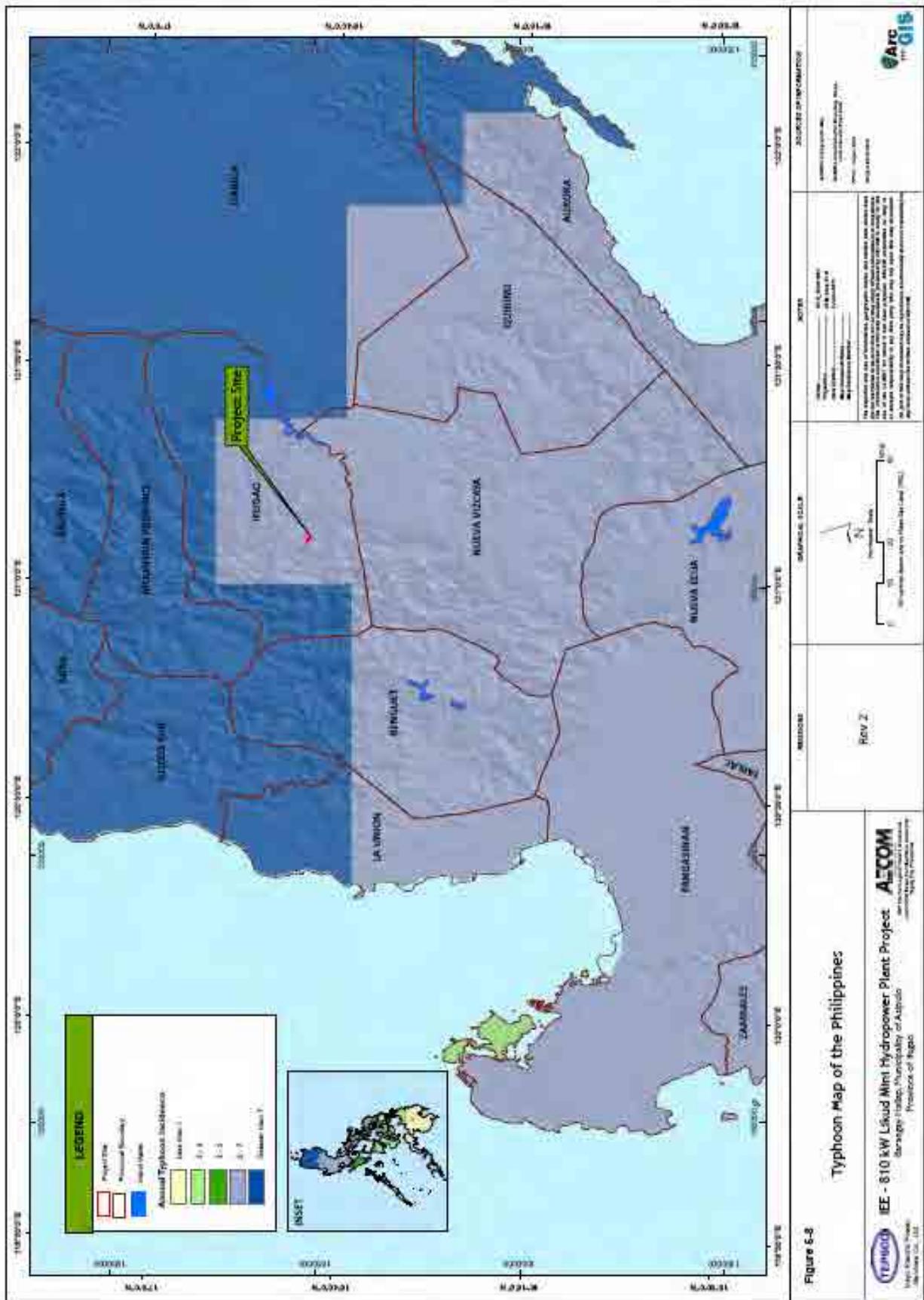
Southeasterly wind predominantly occurs at a rate of 2 m/s winds during the entire year. Climatological extremes show that the highest wind speed recorded was at 47 m/s in July 20, 1974, with wind direction of SE.

The monthly average temperature ranges from 18.1 to 20.8 °C while relative humidity, which factors in the amount of water vapour available in the atmosphere, ranges from and 83 to 93%. These parameters influence the moisture content of the ambient air which in effect affects the evaporation rate of the moisture content of the soil.

Typhoons also influence the climate and the weather of the country. Approximately 20 typhoons pass through the Philippine Area of Responsibility (PAR) each year. Figure 5-8 shows that the project site is within the area frequently visited by typhoon at an average annual incident of 5-7 typhoons.







### 5.1.11 Ambient Air Quality

#### 5.1.12 Methodology

The ambient air quality of the project area has been characterized using the data gathered in March 2008 by the Tokyo Electric power Company Inc. (TEPCO) in cooperation with the e8 group, the Department of Energy (DOE) and the Provincial Government of Ifugao for a 200kW mini hydropower project in Barangays Ambabag and Pindongan, Municipality of Kiangan, Province of Ifugao. The two stations used in the EIA of the 200kW mini hydropower project were adopted for the assessment of the air quality of the project site. Figure 5-9 shows the locations of these stations relative to the project site. The location of the sampling stations is about 5.7 km north of the project site. There is also a mountain range north of the project site, between Kiangan and Haliap, with elevation ranging from 902 to 1042 meters above sea level.

#### 5.1.13 Baseline Environment

The analytical results of the 24-hour sampling are shown in Table 5-11. For the purpose of comparison, the prescribed limits, i.e., the National Ambient Air Quality Guidelines Values (NAAQGV), under the Philippine Clean Air Act (CAA) are shown in the last rows of the tables. The NAAQGV are the 24-hour air pollutant concentration limits published by the DENR intended for protection of public health, safety and general welfare. The NAAQGV are typically used in the assessment of the air quality of an airshed or a region/locale.

The TSP levels recorded at station AQ-1 and station AQ-2 are 7 µg/NCM and 12 µg/NCM, respectively. SO<sub>2</sub> concentrations in both stations are below the detection limit while NO<sub>2</sub> concentrations were 1.6µg/Ncm for Station AQ-1 and below detection limit for Station AQ-2. All the pollutants levels recorded are way below their respective NAAQGV standards.

**Table 5-11 Results of Ambient Air Quality Monitoring**

Station ID	Location	Coordinates	TSP (µg/NCM)	SO <sub>2</sub> (µg/NCM)	NO <sub>2</sub> (µg/NCM)
Station AQ-1	Powerhouse of the 200 kW mini hydropower plant	N 16° 47' 29.6" E 121° 06' 22.32"	7	ND*	1.6
Station AQ-2	Community (Sitio Bae) near the Intake weir	N 16° 47' 0.18" E 121° 05' 28.38"	12	ND	ND
Detection Limit			~**	4	0.2
DENR NAAQGV			230	180	150

Note: \* ND – not detected

\*\*not specified by the laboratory

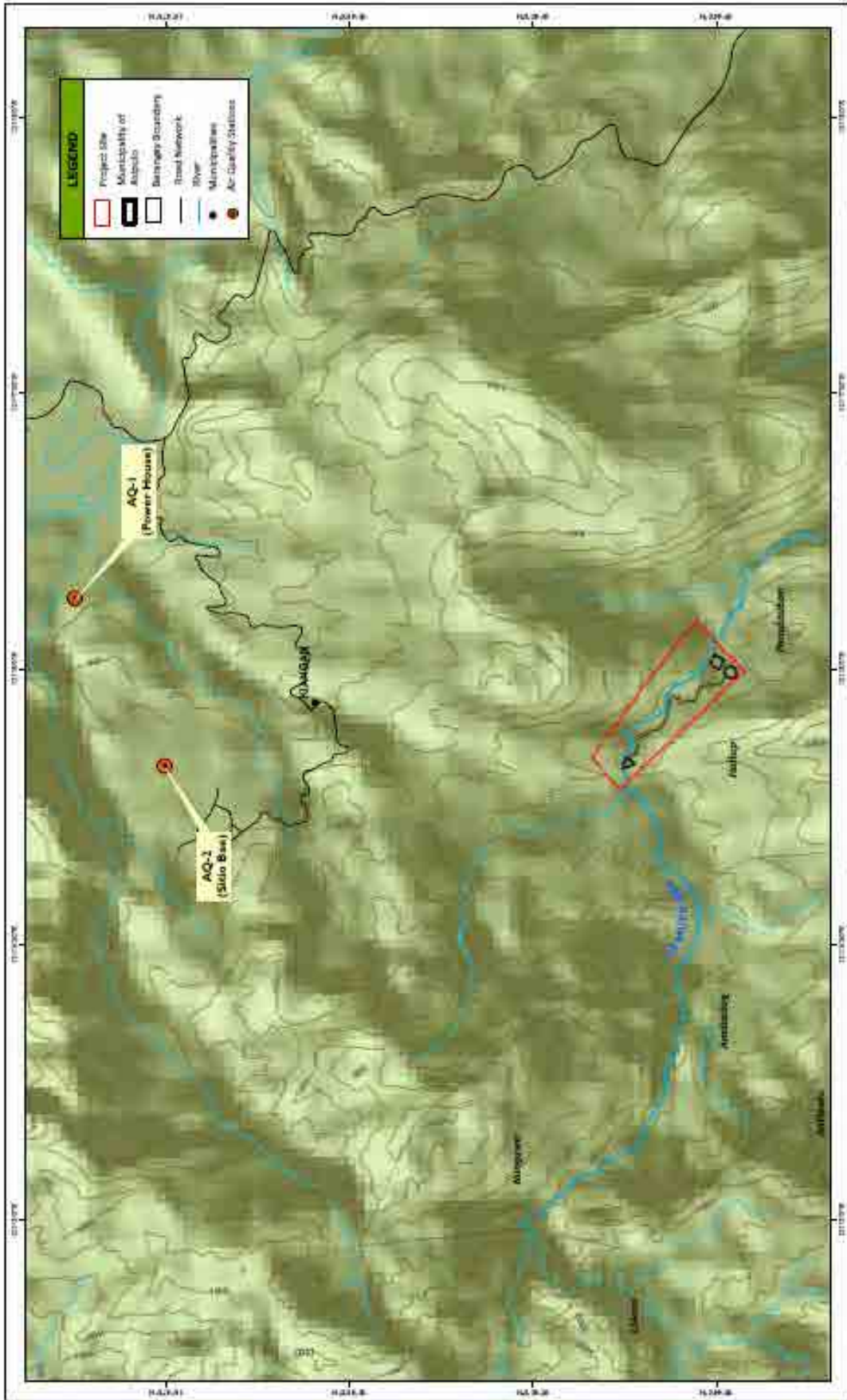
Compared with the DAO 2000-81 air quality indices, the air quality of the project area based on the 24-hour concentrations of TSP and SO<sub>2</sub> can generally be classified under good condition (Table 5-12).

**Table 5-12 Air Quality Indices (Source: Annex A of DAO 2000-81)**

Type	TSP, µg/NCM (24-hour average)	SO <sub>2</sub> , ppm* (24-hour average)	NO <sub>2</sub> , ppm* (24-hour average)
Good	0 to 80	0.000 to 0.034 (0 to 88.8)	**
Fair	81 to 230	0.035 to 0.144 (91.4 to 376.2)	**
Unhealthy for sensitive groups	231 to 349	0.145 to 0.244 (378.8 to 637.4)	**
Very unhealthy	350 to 599	0.225 to 0.304 (587.8 to 794.2)	**
Acute unhealthy	600 to 899	0.305 to 0.604	0.65 to 1.24

Type	TSP, µg/NCM (24-hour average)	SO <sub>2</sub> , ppm* (24-hour average)	NO <sub>2</sub> , ppm* (24-hour average)
		(796.8 to 1577.9)	(1220.5 to 2328.3)
Emergency	900 and above	0.605 to 0.804 (1580.5 to 2100.3)	1.25 to 1.64 (2347.0 to 3079.3)

Note: \* Values in parenthesis are expressed in units of µg/NCM, conversion factor for SO<sub>2</sub>: 1 ppm=2,612.4 µg/NCM; NO<sub>2</sub>=1877.6 µg/NCM.



**Figure 6-8**

**Air Quality Stations**

**IEE - 810 kW Likid Mint Hydropower Plant Project**  
**AECOM**  
 Barraje, Utao, Municipality of Aspielo  
 Provincia de Itzapa

**REVISIONS**

Rev 2:	
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**SCALE**

Graphic scale bar showing 0, 0.5, 1.0, 1.5, 2.0 kilometers.

**NOTES**

1. This map is a technical drawing and should not be used for any other purpose without the written consent of the author.

2. The author is not responsible for any errors or omissions in this drawing.

3. The author is not responsible for any damage or injury resulting from the use of this drawing.

**APPROVED FOR CONSTRUCTION**

Author: [Name]

Date: [Date]

**ARC GIS**

## 5.2 Biological Resources

### 5.2.1 Freshwater Ecology

The study was undertaken to assess the potential impacts of the project to the freshwater ecology and to identify appropriate mitigation measures needed to address these impacts. The findings of the baseline assessment, the identified potential impacts, and the mitigation measures proposed for the project are presented below and the following sections.

### 5.2.2 Methodology

Rapid freshwater habitat assessment through field observations was conducted on March 16, 2011 to characterize and assess the general condition of the instream habitats along the proposed project area. Ten observation points were established at irregular intervals along the stream and banks to represent the freshwater habitat condition for the entire reach of the freshwater stream. Table 5-13 shows the coordinates and details of the observation points established during the field survey.

**Table 5-13 Instream habitat observation points**

Station ID	Description	Coordinates (WGS 84)	
		Longitude	Latitude
LH-IN	Proposed Intake	121° 05' 30.4"	16° 44' 24.5"
LH-1	Small Waterfall	121° 05' 33.0"	16° 44' 26.3"
LH-2	Onhill-overview of the rice fields	121° 05' 39.8"	16° 44' 28.0"
LH-3	Onhill-overview of the stream	121° 05' 44.6"	16° 44' 23.6"
LH-4	Onhill-overview of the rice fields	121° 05' 47.5"	16° 44' 20.6"
LH-5	Midstream	121° 05' 47.3"	16° 44' 17.3"
LH-6	Cascade Stream	121° 05' 51.3"	16° 44' 12.0"
LH-7	On Hanging bridge	121° 05' 58.4"	16° 44' 07.0"
LH-8	Portion of midstream habitat	121° 06' 15.7"	16° 43' 54.6"
LH-PH	End of sampling point	121° 06' 35.9"	16° 43' 48.1"

The freshwater habitat assessment has been conducted in reference to the US-EPA Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers (Barbour et al. 1999). Characterization of freshwater habitats is important in defining the biological integrity and diversity of streams and other water bodies. Parameters considered in the habitat assessment were:

- Epifaunal substrate
- Embeddedness
- Pool substrate characterization
- Velocity/depth combination
- Pool variability
- Sediment deposition
- Channel flow status
- Channel alteration
- Frequency of riffles
- Channel sinuosity
- Bank stability
- Bank vegetative protection

### 5.2.3 Baseline Environment

In general, the entire reach of the proposed project area is in good condition. Other than the man-made weir bridge at Station LH-8, the stream reach experiences no significant perturbation that would likely impact the freshwater habitats and organisms thriving in the area. The entire reach of the surveyed section of the stream is characterized by various types of freshwater habitats (Figure 5-1). The habitat channel types vary from small waterfalls and cascades to riffles and glides lined and covered with boulders, cobbles, pebbles and sand. Substrate embeddedness in most areas was low with layered cobbles providing diversity of niche space. A variety of riparian vegetation ranging from sedges and tall grasses (e.g. Station LH-5) to shrubs and small trees (e.g. LH-3 and LH-7) comprised the reach of the proposed project area. Few aquatic plants, snags, plant and tree debris, however, was observed during the survey. Most sections of the stream was shallow (<1m depth) with relatively deep sections observed mostly at pooling areas. The entire reach of the stream appears to be clear and well-oxygenated thereby allowing freshwater organisms to thrive in the area. Freshwater fishes (i.e. catfishes and tilapia) and small crabs are reportedly caught upstream and in some midstream section of the surveyed area for sustenance and home consumption. Fishing is usually done via damming during summer months when water level is low. Aquatic insects that are likely to inhabit such instream habitat include pollution sensitive taxa such as mayflies (Ephemeroptera), stoneflies (Plecoptera), and caddisflies (Trichoptera). Nematodes and oligochaetes (aquatic worms) are unlikely to be abundant in such areas because fine and organic-rich sediments were not that apparent in and along the stream. Nonetheless, high freshwater fauna biodiversity is expected in the area as the instream habitat features an array of good to optimal habitat characteristics. On a study conducted by Maunsell AECOM (2007) at Ambangal River in the municipality of Kiangnan, Ifugao, the most common aquatic insects collected were mayflies and caddisflies which are indicative of a good instream habitat. Few fishes inhabit Ambangal River as attested by the interviewed locals in the area. Only two fishes (i.e. goby and halfbeak) were caught during the sampling. Other freshwater fishes reportedly caught in Ambangal River, and possibly in Itum River, are small-sized murrels (dalag), tilapia, freshwater catfishes (hito), and carps (karpa).

The stretch of freshwater stream where the project site will be established also has several agricultural farmlands cultivated for rice and crops. The local guide who assisted during the freshwater survey cited the use of fertilizers and pesticides in some of these farmlands. The use of these chemicals should be regulated and maintained to prevent contamination of the streams and other water resources. The water quality section summarizes the general water quality condition of the stream section where the proposed intake and powerhouse will be established. Detailed notations of the observations made during the site assessment are detailed below.

#### ***Station LH-IN (Proposed Intake)***

Station LH-IN where the proposed intake of the project will be established is an upstream section of Itum River located at Sitio Lower Haliap, Barangay Haliap. The observation point was accessed by foot using the narrow trail near Itum Bridge some 150 meters upstream. Both banks in this area are characterized by fluvial slope landforms with relatively steep sides similar to ravines. Short intermittent bends of the outcrop wall indicating high degree of channel sinuosity bounds the upstream section of the stream. Optimal channel sinuosity provides diverse habitat for various aquatic fauna and allows better protection from water surges during storms and torrential rains. The vegetation protection in this area is located on top of the limestone outcrop with sparse cover of shrubs, herbs and small trees. Moss patches on the outcrop wall were also observed indicating a humid environment and possible flooding in this stream section due to continuous rain. The instream substrate and banks were composed mostly of bedrocks, cobbles and pebbles with minimal sediment deposition at the time of the sampling. Moderate stream flow rate characteristic of runs and glides along the stream gushes into the small waterfall located a few meters downstream. There was no apparent aquatic vegetation present in this area as the substrate appeared to be loose and possibly have low nutrient levels.

Freshwater fishes thrive in the upstream section of this observation point according to the locals who accompanied the team during the survey. Bank erosion was not evident during the survey but may possibly occur after heavy rainfall events. The municipalities of Kiangang and Asipulo where the stream traverses experiences slight erosion with few areas predicted to have moderate to severe erosion (PDPFP). Slash and burn was reported at the upstream section of the project area that may promote land erosion at the upstream section of Itum River.

### ***Stations LH-1 to LH-8 (Midstream Habitats)***

At least two sections of instream habitats are apportioned at the midstream section of the surveyed area. The first section runs from the view at Station LH-2 towards Station LH-5 and the other runs near Station LH-7 towards LH-8. The small waterfall at Station LH-1, a cascade at Station LH-6, and the weir bridge at Station LH-8 bisect these sections from the proposed intake, the midstream areas and the proposed location of the powerhouse, respectively.

The first section has several rice fields near both banks spanning from the downstream areas of the proposed intake and small waterfall at LH-2 and extending towards the proposed powerhouse station. Minimal use of fertilizer and pesticide has been reported in these fields but may still potentially contribute to organic and contaminant levels in the water resources around the area. Most portion of the stream section is generally shallow with cobbles and boulders distributed within the reach of the stream. The stream is generally narrow in some areas with widths spanning to ~3 meters that widens to as much as ~10 meters in several portions. Riparian vegetation including overhanging vegetation, shrubs and grasses are also common in the area. Other than mosses clinging to cobbles and boulders and few microalgal patches in entrained and pooled waters, aquatic vegetation such as submerged, floating, or emergent species were not observed in the area. Residual part of a cut tree was observed on one portion of the stream (Station LH-5). The channel flow status varied from slow to fast flowing waters with riffles present on stream sections creased with boulders and cobbles.

The second portion of the midstream section is lined with huge boulders on both banks and on instream areas (i.e. Station LH-7). Stream water depth varies from knee level in shallow areas (e.g. run and backwaters) to around a meter in pool areas. The water level may reach approximately one meter above the presently observed depth as indicated by the demarcation on the boulders at the banks (i.e. Station LH-7). Flooding has been reported in the area especially during frequent and strong rainfall events. A steel-cable hanging foot bridge approximately 5 meters above the water level has been constructed to replace the torn down wooden hanging foot bridge lying below. Several overhanging vegetation have been observed in the area. Further downstream of the observation point (Station LH-8), uniform distribution of cobbles and pebbles with few boulders were observed. There was no indication of aquatic vegetation throughout the observed portion of the stream. A dilapidated irrigation weir-bridge previously constructed obstructs water flow, thus modifying the instream habitat in these areas.





### ***Station LH (End of Sampling Point)***

The stream is characterized by several channel habitat types with rapids, riffles and runs interspersed within the reach of the observation point. Both banks appeared to have high stability with gently sloping banks and good riparian vegetation. The upstream section is lined with sedges, tall grasses, and shrubs on both banks whereas the downstream section have an assortment of woody shrubs, grasses and small trees that in some cases overhang the stream. A few snags and submerged aquatic plants at the instream habitat were also sited during the survey. The instream substrate had numerous boulders and cobbles with riffled fast flowing waters especially at the downstream section. An island bar bisecting the stream (where the observations was also done) composed variably from boulders to sand was formed. Although the stream water was clear, sediment deposition at certain section of the banks have also been observed. A temporary weir made up of cobbles was placed at the right

upstream section of the stream that results to flow impediment at the fork stream. Freshwater fauna likely to dominant such instream environments are aquatic insects clinging or burrowed under the substrate. Small fishes were seen around pooling areas of the stream at the time of the survey.





Figure 5-1 Photos of Observation Points



Station ID	Upstream View	Downstream View
LH-IN	 A photograph showing a river flowing through a narrow, rocky canyon. The water is clear and turbulent, with white foam visible as it moves over the rocks. The canyon walls are composed of large, light-colored boulders and are partially covered in moss.	 A photograph showing a river flowing through a rocky canyon. The water is clear and turbulent, with white foam visible as it moves over the rocks. The canyon walls are composed of large, light-colored boulders and are partially covered in moss.
LH-1	 A photograph showing a waterfall cascading over a series of large, light-colored boulders. The water is white and turbulent, creating a misty spray at the base. The surrounding area is lush with green vegetation.	 A photograph showing a river flowing through a rocky canyon. The water is clear and turbulent, with white foam visible as it moves over the rocks. The canyon walls are composed of large, light-colored boulders and are partially covered in moss.

Station ID	Upstream View	Downstream View
<b>LH-2</b>	 A photograph showing a vibrant green field in the foreground, likely a rice paddy. In the background, a steep hillside is covered in dense, lush green forest. The sky is overcast with grey clouds.	 A photograph showing a vibrant green field in the foreground, similar to the upstream view. The background features a forested hillside, but the perspective is from a different angle, showing more of the field's expanse. The sky is overcast.

Station ID	Upstream View	Downstream View
<p><b>LH-3</b></p>	<p>Upstream view covered with dense vegetation</p>	
Station ID	Upstream View	Downstream View

Station ID	Upstream View	Downstream View
<b>LH-4</b>	 A photograph showing a river flowing through a rocky, forested area. The water is turbulent, creating white rapids as it flows over a bed of large, light-colored rocks. The surrounding vegetation is dense and green, with trees and bushes lining the banks.	 A photograph showing a river flowing through a lush, green landscape. The river is in the foreground, and the background features terraced fields, dense forest, and a small structure on a hillside. The overall scene is a vibrant, rural landscape.


Station ID	Upstream View	Downstream View
<b>LH-5</b>	 A photograph showing an upstream view of a river. The riverbed is composed of numerous grey and white rocks of various sizes. A large, thick, fallen log is partially submerged in the water, with several smaller branches and twigs protruding from it. The surrounding area is lush with green vegetation, including tall grasses and dense trees on a hillside in the background.	 A photograph showing a downstream view of the same river. The water is flowing smoothly over a bed of rocks. The river is flanked by steep, forested hillsides covered in dense green vegetation. The sky is overcast with grey clouds.

Station ID	Upstream View	Downstream View
<b>LH-6</b>		

Station ID	Upstream View	Downstream View
<b>LH-7</b>	 A photograph showing a stream flowing over a series of large, light-colored rocks. The water is turbulent, creating white foam and rapids. The surrounding area is lush with green vegetation, including bamboo and other tropical plants.	 A photograph showing a stream flowing through a dense forest. The water is clear and reflects the surrounding greenery. The stream is bordered by large rocks and is surrounded by thick tropical vegetation, including bamboo and other plants.

Station ID	Upstream View	Downstream View
<b>LH-8</b>	 A photograph showing an upstream view of a river. The water is clear and flows from the upper left towards the lower right. The left bank is a mix of dirt and small rocks, with green grass and some trees. The right bank is a steep, rocky slope with dense green vegetation. The sky is overcast.	 A photograph showing a downstream view of the same river. A concrete structure, possibly a dam or weir, is visible in the middle ground, with water flowing over it. The foreground is dominated by a large pile of rocks and boulders in the river. The background shows a lush green hillside with dense vegetation. The sky is overcast.



Station ID	Upstream View	Downstream View
<b>LH-PH</b>	 A photograph showing a river flowing through a rocky, forested landscape. The water is clear and flows over numerous large, light-colored boulders. The surrounding area is lush with green vegetation, including tall grasses and dense trees. The background shows a hilly, forested terrain under a bright sky.	 A photograph showing a river flowing through a rocky, forested landscape. The water is turbulent and white with foam, indicating rapids. The river is surrounded by dense green vegetation, including bamboo and other tropical plants. The rocks are large and light-colored, creating a series of cascades and rapids.

#### 5.2.4 Terrestrial Ecology

The study was undertaken to assess the potential impacts of the project to terrestrial vegetation and wildlife and to identify appropriate mitigation measures needed to address these impacts. The findings of the baseline assessment, the identified potential impacts, and the mitigation measures proposed for the project are presented below and the following sections.

#### 5.2.5 Methodology

A rapid site assessment was undertaken to have a general picture of the vegetation and wildlife assemblage that will potentially be affected by the project. Methodology included walk-through survey, photo-documentation and interview of locals encountered during the site visit. Conservation status of each identified plant and wildlife species were determined from DENR Administrative Order (DAO) 2007-01 known as the “National List of Threatened Philippine Plants and their Categories, and the List of Other Wildlife Species” and International Union for Conservation Nature (IUCN). The IUCN’s Red List of Threatened Species was also referred to since it provides the global assessment of the conservation status.

#### 5.2.6 Baseline Environment

Based on the rapid site assessment, four vegetation communities within and along the immediate surroundings of the project site were identified. These are agricultural land (planted mainly to rice, winged beans, and sweet potato), shrubland/grassland (dominated by various species of grass and woody shrubs), tree plantation (planted to Gmelina), and patches of forest (secondary growth and original vegetation restricted to the very steep portions of the river stretch). More than 90% of the river stretch (about 10 m from both sides of the banks) is heavily disturbed as represented by the agricultural land, shrubland/grassland, and tree plantation. The remaining forest patches were most likely untouched either because of their very steep location and/or stunted structure rendering them without economic value. A general assessment was conducted to determine the suitability of these vegetation communities as a potential habitat for wildlife species.

A total of 12 bird species dominated by the yellow-vented bulbul (*Pycnonotus goiavier*), chestnut munia (*Lonchura malacca*), and Pacific swallow (*Hirundo tahitica*) were observed and confirmed present along the entire stretch of project site. Except for the white-eared brown-dove (*Phapitreron leucotis*), Philippine bulbul (*Hypsipetes philippensis*), and Philippine coucal (*Centropus viridis*), all recorded species are resident breeding but are non-endemic. None are considered under any threat categories based on PWRC Act of 2001 and IUCN Red List of Threatened Species 2010.

Table 5-14 presents the key findings and conclusions of the terrestrial ecology assessment.

**Table 5-14 Key Findings and Conclusions - Terrestrial Ecology**

Baseline Information *	Key Findings and Conclusion
Habitat	<ul style="list-style-type: none"> <li>The entire stretch of the project site is heavily disturbed and modified caused by past anthropogenic activities such as land clearing for agriculture. The host and neighbouring barangays have been utilized as agricultural land and settlement areas.</li> </ul>
Vegetation communities	<ul style="list-style-type: none"> <li>There are four vegetation communities within the project site namely: agricultural land, shrubland/grassland, tree plantation, and forest patches.</li> </ul>
Endemicity and conservation status of plant species identified	<ul style="list-style-type: none"> <li>None of the plant species recorded within the actual stretch of the project site is included within the DENR Administrative Order (DAO) 2007-01 list known as the “National List of Threatened Philippine Plants and their Categories” and the International Union for Conservation Nature (IUCN). Majority of the species recorded are introduced while some are native but non-endemic.</li> </ul>
Wildlife species inventory and their conservation status	<ul style="list-style-type: none"> <li>A total of 12 bird species were recorded. Of which, only three species are considered endemic while the rest are resident breeding but non-endemic. This low species turn-out was expected due to the highly disturbed vegetation condition of the project area. None are</li> </ul>

Baseline Information *	Key Findings and Conclusion
Habitat	<ul style="list-style-type: none"> <li>The entire stretch of the project site is heavily disturbed and modified caused by past anthropogenic activities such as land clearing for agriculture. The host and neighbouring barangays have been utilized as agricultural land and settlement areas.</li> </ul>
	considered under any threat categories based on PWRC Act of 2001 and IUCN Red List of Threatened Species 2010.

### 5.3 Socio-Economic Cultural Conditions

#### 5.3.1 Socio-Economic Profile

The project site is within the administrative area of Barangay Haliap in Asipulo Municipality. Formerly a part of Kiangan, Ifugao Province, Asipulo was created a separate jurisdiction by Republic Act 7173 in 1992. Asipulo covers a land area of 29,043 hectares with a total population of 13,100 and population density of 2.18 hectares per person (CBMS, 2007).

The following structures are envisioned to be constructed in Haliap.

Structure	Haliap
Diversion Weir	✓
Intake and Settling Basin	✓
Headrace	✓
Head-Tank	✓
Pension and Spillway	✓
Powerhouse	✓

Haliap is bounded to the north by Barangay Duit, the south by Pula, the east by Panubtuban and Mappit, and west by Amduntog. Haliap has nine sitios and a total land area of 490.0848 ha. According to the 2007 CBMS survey, the total population is 979 with a 1.84% population growth rate.

##### 5.3.1.1 Household Composition and Structure

The average household size is 4.7. Haliap has 194 households, the largest being in Purok Lower Haliap, Gulun and Tangngadon (31 each) and the smallest in Taaw (2). Table 5-15 shows the population distribution, household population and number of families per sitio.

**Table 5-15 Population Distribution by Purok (CBMS, 2007)**

Purok	No. of HH	Population	No. of Males	No. of Females
Likud	23	137	73	64
Upper Haliap	26	136	69	67
Lower Haliap	31	151	78	73
Nadonglaan	5	37	21	16
Mayubba	29	121	62	58
Gulun	31	174	85	89
Taaw	2	11	6	5
Tangngadon	31	133	67	66
Panakligan	16	79	37	41
<b>Total</b>	<b>194</b>	<b>979</b>	<b>498</b>	<b>479</b>

### 5.3.1.2 Labor Force

Forty percent of the population (15-64 years old) is of working age. Household members who are working total 388. The employed labor force for males is at 230 compared to females at 158. Haliap has no record of unemployment rate as per 2007 CBMS. Table 5-16 shows the labor force 15 years and over by sex.

**Table 5-16 Labor Force 15 years and over by Sex (CBMS, 2007)**

Purok	Labor Force	Male	Female
Likud	51	32	19
Upper Haliap	45	25	20
Lower Haliap	58	36	22
Nadonglaan	13	9	4
Mayubba	61	35	26
Gulun	64	39	25
Taaw	3	2	1
Tanggadon	57	34	23
Panakligan	36	18	18
<b>Total</b>	<b>388</b>	<b>230</b>	<b>158</b>

### 5.3.1.3 School-Age and Educational Profile

Eighty-six percent of Haliap's population (10 years old and above) are literate. The illiteracy rate is almost equal for males and females at 12.81% and 12.08%, respectively. In 2007, 31% of the population is of school age (6-21years old). The participation rate for elementary is at 97.1% and high school at 87.23%. Table 5-17 demonstrates the school age population and enrolment rate.

**Table 5-17 School Age Population and Enrolment Rate (CBMS, 2007)**

Education Level	Number	Enrollment Rate
Elementary School-going age	186	181
Secondary School-going age	119	104

### 5.3.1.4 Ethnicity and Religion

The overwhelming majority of the population in Barangay Haliap is indigenous (Ayangan-Ifugao). Ayangan is one of the two ethno-linguistic subgroups in Ifugao province. Manuel Dulawan, local historian and noted authority on Ifugao culture, states that the Ayangan dialect are distinguished for the phonemes *ch*, *f*, *sh* and *j* which sounds are not uttered in Tuwali, another dialect in Ifugao that is spoken in the area surrounding Asipulo. Haliap barangay officials claim that more than half of the households are Roman Catholics followed by various Protestant denomination (United Methodist, Bible Methodist, Baptist and Evangelical).

### 5.3.1.5 Income and Livelihood

The main sources of livelihood and income in Haliap are agriculture and forestry. Key informants cited beans, tomato and palay as major crops in the barangay. Harvested crops from small land holdings are primarily for family consumption, while the remaining produce are marketed in Kiangon and Lagawe for additional income. Table 5-18 shows the income and livelihood source by sex.

**Table 5-18 Income and Livelihood Source by Sex (CBMS, 2007)**

Industry	Total	Male	Female
Agriculture mining and Forestry	300	179	121

Industry	Total	Male	Female
Fishing	2	2	0
Manufacturing	1	0	1
Electricity, Gas and Water Supply	1	1	0
Construction	8	8	0
Wholesale and Retail Trade, Vehicle Repair	14	4	10
Transportation, Storage & Communication	8	8	0
Financial Intermediation	1	1	0
Real Estate, Renting and Business Activities	3	2	1
Public Administration and Defense	12	11	1
Education	10	2	8
Health and Social Work	2	0	2
Other community, Social or Personal Activities	21	12	9
Private Households with Employed Persons	5	0	5
Number of Employed Persons	388	230	158

Asipulo is a 5<sup>th</sup> class municipality according to the Department of Finance classification in terms of fiscal revenues. This is reflected in the household incomes of the host barangays and the largely subsistence agricultural economy. Incomes are generally low and majority of people are dependent on subsistence farming. The range of household income in the barangay is approximately 3000Php-7,000Php per month, as per interview with the barangay officials. Table 5-19 demonstrates the number of households by quintile.

**Table 5-19 Number of households (CBMS, 2007)**

Quantile	Magnitude	Proportion
Poorest	38	19.59
Lower middle	38	19.59
Middle	38	19.59
Upper middle	38	19.59
Richest	42	21.65

Households augment incomes by taking out loans from local lenders, mostly cooperatives. The community is also characterized by strong family and affinity ties evidenced by neighbours willing to lend help, both monetary and in kind, in times of financial scarcity. Identified as one of the poorest in the province, Asipulo also started receiving aid from KALAHI-CIDDS since 2003. The government's poverty alleviation project provides interventions to host barangay, such as human development services.

#### 5.3.1.6 Physical-Cultural Resources

#### 5.3.1.7 Land Resources

The 490.0848 ha land area of Barangay Haliap will be classified to agricultural, industrial, commercial and residential areas. The agricultural area is mainly devoted to crop cultivation, livestock and grazing. Industrial and commercial areas are locations for non-agricultural employment and activities such as public markets and offices. The residential areas in Barangay Haliap are scattered and are found in relatively remote locations.

### 5.3.1.8 Water Resources

The Lamut River stretches on a southeast-northwest direction fed by two tributaries, the Pambingan River from the Asipulo side and the Bagnit River from the Kiangan area. Both tributaries emanate from thickly forested watersheds adjacent to each other. These watersheds ensure sufficient water volume on the Haliap River needed by the mini-hydro electric plant even during the dry months of the year. There are private and communal irrigation systems supplying irrigation water in all rice fields throughout the municipality. The systems, however, are easily destroyed during rainy seasons and calamities.

Almost all barangays in Asipulo have with Levels I (point source) and II (point source with public faucet) water systems. However, several households still fetch water from a distance beyond 250 meters, which is beyond the MBN (Minimum Basic Need) norm. The water sources are also reported to be poorly constructed often prone to contamination by wandering animals. Table 5-20 shows the type of source of drinking water.

**Table 5-20 Types of Source of Drinking Water (CBMS, 2007)**

Type of Source of Drinking Water	Magnitude	Proportion
Community water system-own	56	28.87
Community water system-shared	98	50.52
Deep well-own	2	1.03
Deep well-shared	1	0.52
Artesian well-own	2	1.03
River, stream, lake, spring	35	18.04
<b>Number of Total Households</b>	<b>194</b>	

### 5.3.1.9 Power

Ifugao Electric Cooperative (IFELCO) provides Haliap with electric service. Haliap is not completely energized. A still significant portion of the households is without electric service. The households without access to or could not afford the services of IFELCO use kerosene lamps, gas lanterns (petromax) and pinewood for their lighting needs. Alternative source of electricity, such as solar panel, are also offered by IFELCO.

### 5.3.1.10 Communication

Presently, wireless/mobile telecommunications service in Haliap is provided by the GLOBE and SMART. However, there are still selected portions of the barangay that are not accessible to mobile phone signals.

### 5.3.1.11 Historical and Cultural Value

Interviews with key informants and field observation suggest that there are no sites of historic, cultural, archaeological or religious significance. The testimonial of Manuel Dulawan, local historian and noted authority on Ifugao culture, also claimed that no site of cultural, historic, or religious significance will be negatively impacted by the hydro power plant project. Testimonial of Mr. Dulawan is appended in this report (Annex 7)

### 5.3.1.12 Settlement and Infrastructure

### 5.3.1.13 Land Acquisition and Settlement Pattern

Based on key local informants (land owners and organization heads) and barangay council, there are no settlements within the project site. The settlement and built-up areas are concentrated along the national highway and the low-lying puroks or sitios. However, a total of 1 ha of agricultural land will be converted for the project. Local owners with legal rights to land and assets within the vicinity of the

project site will be directly impacted by the proposal. The project will also affect the ability of the adjacent agricultural landowners to continue farming. The local land owners require monetary compensation in exchange of land and property. Potential right of way conflict is also expected within the project site.

The proponents will estimate the economic implications of the project proposal, including impacts to the agricultural sector in Haliap, productivity changes, impact on land values and property taxes and the potential effect on agricultural lease rents. The proponents will provide prompt and adequate monetary compensation for the change in land ownership within the project site.

#### 5.3.1.14 Existing Infrastructures and Industries

Haliap has three government-owned schools, one each for day care, complete elementary and high school. The elementary school has a total of nine classrooms, seven other buildings and three makeshift latrines. The Haliap National High School is built with two to three classroom buildings; one Home Economics Building; one faculty building, teachers cottage, one Administration Building and a two-storey library building with three Latrines. The HNHS has two annexes located at Natcak and Camandag, Asipulo.

Retail trade and cooperative lending are the most common types of business establishments in Haliap. On the other hand, cottage industries include beans as product.

Haliap also has one barangay station accessible to all the households in need of medical and health assistance.

#### 5.3.1.15 Health and Safety

##### 5.3.1.16 Public Health and Sanitation

Sixty-eight households (35%) have no sanitary toilets (closed pit or water-sealed), while 35 households are without access to safe water. The barangay health center has no record of the illnesses caused by water borne diseases. On the other hand, total of 20 incidences of maternal mortality has been recorded per 2007 CBMS.

Colds and diarrhea are the most common illnesses in the barangay host. Irregular weather condition and cases of pollution are the leading causes of these illnesses. CBMS data, however, record, no cases of malnutrition Table 5-21 demonstrates the barangay's nutrition status by sex.

**Table 5-21 Nutrition Status by Gender (CBMS, 2007)**

	<i>Total (Base: 117)</i>	<i>Male (Base: 57)</i>	<i>Female (Base: 60)</i>
Above Normal	0.85	0	1.67
Normal	99.15	100	98.33
Below Normal (moderate)	0	0	0
Below Normal (severe)	0	0	0

#### 5.3.1.17 Community Health and Safety

Haliap has one barangay station accessible to all the households in need of primary health care. A midwife is in charge of the health station. Small budget for medical supplies and health concerns are cited among the most common problems on community health.

The barangay has a single case of homicide based on 2007 CBMS. In general, however, the key informants (barangay officials) claim that Haliap is still a peaceful and safe community.

#### 5.3.1.18 Social Protection

The largest membership among the community associations are Women's Organization and Religious Groups, with 25 members each. The Active Males Movement against Violence also ensures the prevention of violence against women and children in the community.

## 6.0 Land Compensation and Its Implementing Procedure

The Land Compensation section describes the principles, entitlement and implementation procedures on land acquisition and resettlement for I.2 MW Likud Mini-hydropower Plant Project. Relevant laws and regulation of the Philippine Constitution are detailed to ensure that (a) landownership concerns on the project site are addressed thru a legally binding land use agreement (b) the economic implications of the project proposal, including impacts on Haliap agricultural sector, productivity changes, impact on land values and property taxes and the potential effect on agricultural lease rents are accurately assessed (c) adequate funds are allocated, based on detailed valuation of properties and assets, for disbursement of compensation on impacted land properties.

### 6.1 The Policy Framework of Land Ownership

The policy framework of land ownership is based on the relevant laws and regulations of the Philippine Constitution. Specifically, Section 19 of RA 7160 (Local Government Code of 1991) and Section 17 of RA 6657 (Comprehensive Agrarian Reform Law of 1988) shall serve as the primary policy guidelines for the land compensation scheme of the project.

Section 19 (Eminent Domain) of RA 7160 acknowledges the inherent political right of a local government unit to exercise the power of eminent domain for public use upon payment of just compensation pursuant to the provisions of the Constitution provided however:

- (i) That the power of eminent domain may not be exercised unless a valid and definite offer has been previously made to the owner, and such offer was not accepted
- (ii) That the local government unit may immediately take possession of the property upon the filing of the expropriation proceedings and upon making a deposit with the proper court of at least fifteen percent (15%) of the fair market value of the property based on the current tax declaration of the property to be expropriated
- (iii) That, the amount to be paid for the expropriated property shall be determined by the proper court, based on the fair market value at the time of the taking of the property.

In addition, Section 17 of RA 6657 or the Comprehensive Agrarian Reform Law of 1988, which is particularly relevant in the determination of just compensation, stated as follows:

“In determining just compensation, the cost of acquisition of the land, the current value of like properties, its nature, actual use and income, the sworn valuation by the owner, the tax declarations, and the assessment made by government assessors shall be considered. The social and economic benefits contributed by the farmers and the farm-workers and by the Government to the property as well as the non-payment of taxes or loans secured from any government financing institution on the said land shall be considered as additional factors to determine its valuation.”

Another important legislation taken into consideration in this assessment is the Indigenous People Rights Act (IPRA) of 1997 (RA 8371). This act recognises and promotes the rights of indigenous peoples to ancestral domains and lands; the right to self-governance; economic and social rights; and cultural integrity, including indigenous culture, traditions and institutions.



## 6.2 Land Acquisition Procedure

The stretch of freshwater stream where the project site will be established has several agricultural farmlands cultivated for rice and crops. The impacted stakeholders of the Mini-hydropower Plant Project are agriculture landowners from Barangay Haliap for the construction of hydropower plant. The primary stakeholder's interests involve land acquisition procedure and the disbursement of just compensation for the affected properties. Other stakeholders are local residents of the host barangay and nearby communities, and local government units, whose interests are related to the implementation of the project and availability of reliable power at a reasonable cost.

Necessary data collection were undertaken to understand project's site development plan, project description, and related laws and regulations pertaining to land acquisition and just compensation.

Consultations for the project were conducted to inform landowners and institutional stakeholders (i.e. LGU's and other affected government agency) that a hydropower plant project has been chosen by the proponent to be established in Haliap. The objective of these consultations were to (i) discuss scope of the proposed hydro power plant; (ii) identify land users and landowners of the proposed site; and (iii) discuss guidelines and procedures on land acquisition and compensation scheme in accordance to customary and regulatory laws. The list of initial consultations conducted is shown in Table 6-1.

**Table 6-1 Key Consultation Activities**

Public/ Stakeholder Consultation	Date	Place	Participants	Topic of discussion
Public Consultation	February 22, 2011	Barangay Hall, Barangay Haliap, Asipulo	<ol style="list-style-type: none"> <li>1. Barangay Council of Haliap</li> <li>2. Barangay Council of Panubtuban</li> <li>3. Provincial Planning and Development Office</li> <li>4. TEPSCO</li> <li>5. AECOM</li> </ol>	Discussed project objectives, history and goal of the mini-hydro development in Ifugao, location of the project, schedule and items of the feasibility study and basic considerations in the planning and designing of the project.
Plant visit to Ambangal Dam	February 28, 2011	Ambangal, Kiangan	<ol style="list-style-type: none"> <li>1. Barangay Council of Haliap</li> <li>2. Barangay Council of Panubtuban</li> <li>3. TEPSCO</li> <li>4. Ambangal Dam operators</li> </ol>	Discussion on the structures and the daily operations of the Ambangal Minihydro Power Plant.
Public Consultation	April 28, 2011	Barangay Hall, Barangay Haliap, Asipulo	<ol style="list-style-type: none"> <li>1. Barangay Council of Haliap</li> <li>2. Barangay Council of Panubtuban</li> <li>3. Farmers</li> </ol>	<ul style="list-style-type: none"> <li>• Selection of the location of the main facilities.</li> <li>• Comparison study between waterway routes</li> </ul>
Public/ Stakeholder Consultation	Date	Place	Participants	Topic of discussion

Key Informant Interview	June 23, 2011	Haliap Barangay Hall, Haliap, Asipulo	Kgd Rosemarie Doque	Discussed project background, their concerns and how they will benefit or experience negative impacts. (i.e. Opinion on the establishment of hydro power plant; Perceived Impacts on the establishment of hydro power).
Consultation with Haliap Barangay Council and Sector Leader	June 23, 2011	Haliap Barangay Hall, Haliap, Asipulo	1. Kgd Basilio Fedelito 2. Basilio Bayawna 3. Christina Ngabit 4. Nancy Addab	Discussed project background, their concerns and how they will benefit or experience negative impacts. (i.e. Opinion on the establishment of hydro power plant; Perceived Impacts on the establishment of hydro power).
Consultation with Panubtuban Barangay Council	June 23, 2011	Panubtuban Barangay Hall, Panubtuban, Asipulo	1. Brgy Captain 2. Kgd Josie 3. Brgy Treasurer 4. Brgy Secretary 5. Brgy Staff	Discussed project background, their concerns and how they will benefit or experience negative impacts. (i.e. Opinion on the establishment of hydro power plant; Perceived Impacts on the establishment of the hydropower plant)
Landowners' Focus Group Discussion	June 23, 2011	Haliap	Landowners	Discussed project background, their concerns specific to land ownership and how they will benefit or experience negative impacts. (i.e. Opinion on the establishment of hydro power plant; Perceived Impacts on the establishment of hydro power).
Public Consultation	July 1, 2011	Barangay Hall, Barangay Haliap, Asipulo	1. Barangay Council of Haliap 2. Barangay Captain of Haliap	<ul style="list-style-type: none"> <li>• General Lay-out of the hydropower plant</li> <li>• Development Scale</li> <li>• Outline of civil structure</li> <li>• The result of parceally survey to identify potential affected landowners</li> </ul>

### 6.3 Social Acceptability

The level of social acceptability of this project was assessed through a series of consultations and focus group discussions conducted in the project affected community and the lot owners. The barangay council of Barangay Haliap gave their approval upon presenting the primary objectives of the projects and its positive impacts to the community and the entire province as well (Annex 8).

Whereas, the most cited reason of lot owners for objecting to the project is “might affect the flow of water for irrigation.” Upon thorough presentation of the project vis-a-vis their objection, the lot owners approved of the project.

### 6.4 Land Ownership of the Potentially Project- Affected Area

Based on key local informants (land owners and organization heads) and barangay council, there are no settlements within the project site. The settlement and built-up areas are concentrated along the

national highway and the low-lying puroks or sitios. The project does not require displacement of community host residents. There are no physical structures on the proposed site (historic, cultural, archaeological or religious site). The project will however need to acquire a total of 1 ha of land.

Local owners with legal rights to land and assets within the vicinity of the project site will be directly impacted by the project. The project site covers 22 land owners from Barangay Haliap. The acquisition of land is also expected to affect the livelihoods and income of the adjacent agricultural landowners.

Affected landowners have been consulted during feasibility study. They are generally supportive of the project, but are also concerned of the land acquisition and compensation procedure. The local land owners require monetary compensation for affected land and assets including right of way conflicts. The stakeholders also cited concerns on activities during construction with potential negative impacts on proposed project site. This includes apprehensions on the removal of vegetative cover and trees and fear of the excavation and drilling of land for the installation of facilities.

## **6.5 Land Acquisition for the Project**

The proponent will estimate the implications of the project proposal, including impacts to the agricultural sector in Haliap, productivity changes, impact on land values and property taxes and the potential effect on agricultural lease rents. The proponents will provide prompt and adequate monetary compensation for the change in land ownership within the project site.

Discussion with the landowners will continue, to reach a legally binding land use agreement on land acquisition. The landowner clan leaders will be informed of the policies and implementation procedures regarding compensation for land and assets. This will include specific details on compensation rates and entitlements with careful details on the mode and schedule of compensation payment.

A model for land compensation is presented in Annex 9. This model is applied in a similar project in Ambangal mini-hydro power project.

## **7.0 Impacts due to the Project and Mitigation Measures**

### **7.1 Soil**

There is a potential for topsoil loss during construction. As mitigation, topsoil that will be disturbed during construction will be gathered and properly stockpiled. Gathered topsoil will be used for revegetation of cleared or affected areas. These cleared or affected areas will include but not limited to areas used for temporary storage of construction materials and campsite.

### **7.2 Water Quality and Wastes**

During construction, possible soil erosion from digging/excavation activities may result to increased sedimentation particularly at the intake weir and the headrace area. Furthermore, potential degradation of water quality due to the generation of wastes that may indiscriminately be disposed of by the workers may eventually find its way into the water body. As mitigation, the contractor will be required to adhere to best construction practices including proper housekeeping and this will be stipulated in their contract. Non-adherence to the said provisions will render non-payment of their fees. If practicable, the weir will be constructed during the dry season when the water level is low. Sediment traps will be placed along the headrace alignment to prevent, if not to minimize, the transport of the excavation spoils to Lamut River. The temporary camps for workers will be positioned away from the river. This will be provided with adequate and properly maintained sanitation systems. Good housekeeping measures (including waste segregation and proper disposal) will be strictly enforced.

### **7.3 Hydrology**

The project requires for a 2.0 m<sup>3</sup> maximum discharge and a 0.4 m<sup>3</sup> minimum discharge to able to operate. As such, lower than this amount, the Plant will stop operation.

Potential impact might be the non-priority of the irrigation requirements. Based on the Water Code of the Philippines (PD 1067), priority of water use is given to irrigation prior to power generation energy.

### **7.4 Air Quality**

Potential air quality impacts will be exhibited during construction and operation stages. During construction, there will be generation of particulate matters from excavation works and movement of vehicles. Furthermore, nitrogen oxides and sulfur oxides from fuel combustion of vehicles and engine/generator set will be generated. There will be no big equipment to be used but manual labor will be extensive, thus, sources of dust will be limited from excavation works and vehicular movements of delivery trucks. To mitigate exposure to increased level of dusts, proper Personal Protective Equipment (PPE), such as mask will be provided to workers, when applicable. Most of the barangay roads, although very narrow are cemented, thus build up of dust will also be negligible.

During the operational phase, there will be generation of nitrogen oxides and sulfur oxides from fuel combustion of back-up generator. This will be mitigated by employment of regular maintenance.

### **7.5 Noise**

During construction, noise and vibration will be generated from vehicular movements, sand and aggregates processing, excavation and other construction noise including workers. The main potential impact of the increased noise levels and vibration will be to the construction workers since there are no communities within the immediate environ of the construction sites. Mitigation will include standard occupational health and safety practices such as use of ear mufflers and enforcement of exposure duration restrictions. Construction activities will also be limited during daytime (if practical) to contain noise during daytime and assure a quiet and peaceful night in the area.

During operational phase, there will be generation of noise from operation of turbine and back-up generator set. This will be mitigated by regular maintenance and enclosure of the powerhouse to minimize noise.

### **7.6 Vegetation**

The construction of the different facilities will require vegetation clearing. The vegetation following the entire stretch of the project site is already heavily disturbed (more than 90%) due to past anthropogenic activities represented by the agricultural land, shrubland/grassland, and tree plantation. The remaining forest are restricted to small patches that were most likely untouched either because of their very steep location and/or stunted structure rendering them without economic value.

Vegetation clearing activities of the project will adhere to all Philippine statutory requirements. Harvesting of timber and timber products require a tree cutting permit issued by the Department of Environment and Natural Resources (DENR). A Private Land Timber Permit (PLTP) is issued to harvesting of naturally grown forest while a Special Private Land Timber Permit (SPLTP) is issued to harvesting of premium hardwood species. This permit is issued by the DENR Regional Director if volume is less than 10m<sup>3</sup>, while it goes up to the DENR Secretary if more than 10m<sup>3</sup>(DAO 2000-21).

As mitigation, reforestation/revegetation areas will be at least equivalent to the area cleared to give way to the project's facilities. Reforestation/revegetation areas will be located in the immediate vicinity of the project site.

## **7.7 Wildlife**

The main group of vertebrate fauna that will be potentially susceptible to the impacts of the project will be the amphibians and reptiles due to their limited and localized mobility. The construction of the headrace will affect the movement of these groups specifically, those that are distributed along its entire length since this would act as a barrier for individuals trying to move perpendicularly across the river. Their regular movement patterns (i.e., foraging, breeding, etc.) might be affected. A possible solution is to put a covering on strategic locations to serve as a bridge which would facilitate their crossings. Simultaneously, these coverings would also prevent the entry of too much litter into the headrace.

Neither birds nor mammals are expected to be negatively impacted by the different facilities of the project. Vegetation clearing will be mainly limited to the already disturbed habitats; birds and mammals could easily migrate to similar nearby areas. The foreseeable negative effect is during the construction phase specifically when workers and other personnel will be present in the area. Noise and other disturbances brought by their presence will definitely drive them away but they are expected to slowly return as soon as the disturbance source is eliminated. Hunting will also be strictly prohibited and enforced among the workers as some of them might resort to this activity which could result to further decrease of already limited species.

## **7.8 Freshwater Ecology**

The project will cause minimal impacts on the freshwater ecology of the project site. This will be experienced during the construction of the intake and headrace only. The potential increase in sedimentation/erosion, due to clearing and digging activities may smother the benthic organisms thriving in the river. This can have similar effect to fisheries.

Mitigating measures to minimize erosion/sedimentation in the river will include the establishment of protection wall in the intake area, which will also prevent flooding in the nearby farm, use of riprap/stonewall in strategic locations, and re-vegetation of cleared areas.

The maintenance of the minimum river flow during the dry season would also maintain aquatic life in the river.

## **7.9 Socio-Cultural and Heritage**

The project is expected to bring positive economic benefits to the host community. Jobs will be created as a result of the construction and operation of the project. About 200 local residents will be hired at the peak of construction. During operations, seven local residents will be employed to manage and maintain the mini-hydro power plant. The host communities will receive benefits indicated in Sections 4 and 66 of EPIRA 2001 (The Generation Company and/or energy resource developer should set aside one centavo per kilowatt hour (P0.01/kWh) of the total electricity sales as financial benefits to host communities). The project will also generate funds for the conservation programs of the Ifugao rice terraces.

Mr. Manuel Dulawan, a noted local historian and cultural worker in Ifugao, states that given the scale of the mini-hydro power plant project in Barangay Haliap, no site of cultural, historical or religious significance will be negatively impacted. He also concluded that no intangible aspects such as cultural practices, rituals, taboos of Ifugao culture will be affected. Moreover, the proposed mini-hydro power plant project in Barangay Haliap, will promote cultural significance of harnessing water for progress and this resonates with age-old Ifugao traditions that venerate water as a primary life force. Water is a natural resource used by Ifugao for agriculture and also had been used as an engineering tool in building terraces, dams and move larger rocks.

## 8.0 Environmental Monitoring Plan (EMoP)

### 8.1 Self-Monitoring Plan

The framework for environmental compliance monitoring and environmental performance indicators is described in this section. The primary purpose of the self-monitoring plan is to ensure that the project complies with relevant regulatory requirements through the proposed management measures identified to address project impacts. There will be two types of monitoring report that will be submitted to EMB.

- ECC Compliance Monitoring Report– A semi-annual report of the project’s compliance with the ECC conditionalities; and
- Self-Monitoring Report – A quarterly report of the project’s compliance to environmental standards and other requirements specific to four environmental laws under the direct mandate of the EMB on air quality (Republic Act (RA) 8749), water quality (RA 9275), toxic substances and hazardous waste management (RA 6969), and solid waste management (RA 9003).

Table 8-1 presents the Monitoring Plan that will be undertaken by the Provincial Government of Ifugao and ECC Compliance Monitoring Report will be submitted to EMB-CAR. A notarized completed Project Environmental Monitoring and Audit Prioritization Scheme Questionnaire is presented in Annex 10. The questionnaire serves as a guide for EMB to determine the monitoring strategy and to rank/classify projects based on their priority in terms of monitoring.

**Table 8-1 Environmental Monitoring Plan (EMoP)**

Key Environmental Aspects per Project Phase	Potential Impacts Per Env't Sector	Parameter to be Monitored	Sampling & Measurement Plan			Lead Person	Estimated Cost (PhP)	EQPL Management Scheme			
			Method	Frequency	Location			EQPL Range		Management Measure	
								Action	Limit	Action	Limit
<b>Construction Phase</b>											
Water	Water Pollution	TSS, TDS, coliform, BOD, COD	AS/NZS 5667.1	Semi-Annual	Four water stations in Lamut River	Environmental Officer	50,000/sampling		DAO 1990-34		
Air	Generation of dust and gaseous pollutants	TSP, NO <sub>2</sub> , SO <sub>2</sub>	USEPA 40 CFR, Part 50	Semi-Annual	Two stations within the project site	Environmental Officer	50,000/sampling		NAAQS		
Noise	Increase in noise levels	Noise levels	AS 1055.1-1998	Semi-Annual	Concurrent with the Air Quality Stations	Environmental Officer	5,000/sampling		NPCC Guidelines		
Health and Safety	Exposure of employees and to some degree, the local community to health and safety risks as a result of construction activities	Safety and health committee meeting agreements; accident investigations/reports; and periodic hazards assessment with the corresponding remedial measures/action for each hazard.	Included in the Health and Safety Plan of the proponent	Daily	Project site	Health and Safety Officer	50,000/monthly reporting			DOLE DO 13 of 1998	
<b>Operation Phase</b>											
Water	Water Pollution	TSS, TDS, coliform, BOD, COD	AS/NZS 5667.1	Quarterly for the first year; will be adjusted as necessary	Four water stations in Lamut River	Environmental Officer	50,000/sampling		DAO 1990-34		
Aquatic Biota	Loss of habitat and		Scientifically	Quarterly for		Environmental	100,000/				

Key Environmental Aspects per Project Phase	Potential Impacts Per Env't'l Sector	Parameter to be Monitored	Sampling & Measurement Plan			Lead Person	Estimated Cost (PhP)	EQPL Management Scheme			
			Method	Frequency	Location			EQPL Range		Management Measure	
								Action	Limit	Action	Limit
	aquatic biota.		accepted methodologies; photo transect and visual census	the first year; will be adjusted as necessary especially if there's no perceived impacts after a year		Officer	sampling				
Air	Generation of dust and gaseous pollutants	TSP, NO <sub>2</sub> , SO <sub>2</sub>	USEPA 40 CFR, Part 50	Quarterly	Two stations within the project site	Environmental Officer	40,000/sampling		NAAQS		
Noise	Increase noise levels	Noise levels	AS 1055.1-1998	Quarterly	Two stations within the project site	Environmental Officer	5,000/sampling		NPCC Guideline		
Health and Safety	Exposure of employees and to some degree, the local community to health and safety risks as a result of operations activities	Safety and health committee meeting agreements; accident investigations/reports; and periodic hazards assessment with the corresponding remedial measures/action for each hazard.	Included in the Health and Safety Plan of the proponent	Daily	Project site	Health and Safety Officer	50,000/monthly reporting			DOLE DO 13 of 1998	



## 9.0 Conclusion and recommendations for the Initial Environmental Assessment

It is expected that given the scale of the proposed mini hydro-electric power plant project, the limited facilities proposed to be established, the already heavily disturbed vegetation in the area, and the strategic mitigations provided, that negative impacts to the environment will be very minimal. Proposed mitigation for the different modules will minimize if not totally eliminate negative impacts to the surrounding environment of the project site. With the proper implementation of the different mitigation, the project is considered unlikely to pose major impacts to the environment of the project site. Benefits to the host communities in the form of a fund which will conserve and protect the rice terraces will heavily outweigh possible impacts.

## 10.0 Annexes

## 11.0 References

Climate Data Section, 2010. Climatology and Agro-meteorology Branch, PAGASA/DOST

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Maunsell Philippines Inc. 2007. Baseline Environmental Report for 200kw Kiangon Mini-Hydro Electric Power Project. Internal Report.

# Annex

**Annex 1 Laboratory Results**



# OSTREA MINERAL LABORATORIES, INC.

Assaying and Environmental Testing Specialist

Barangay Road, Bo. Mamplasan, Biñan, Laguna, Philippines 4024  
Tels. : (02) 889-9058; (049) 539-0102; (02) 848-6951  
Fax : (02) 520-9189  
Email : omilone@yahoo.com / omlimarketing@yahoo.com

No **59705**

## AECOM

23<sup>rd</sup> Floor, Fort Legend Towers, 3<sup>rd</sup> Ave. corner 31<sup>st</sup> St.  
Bonifacio Global City, Fort Bonifacio, Taguig City  
**Attention: MS. SHERYL JOY ANNE GUTIERREZ /  
MR. LARRY PADILLA**

DATE March 24, 2011

R.A. No 57664

INVOICE No

PAGE 1 OF 2 PAGES

## CERTIFICATE OF ANALYSIS

Date received : March 17, 2011

Date analyzed : March 17 – 22, 2011

	<u>Cot. Intake</u>	<u>Cot. Powerhouse</u>	<u>Method/Technique</u>
BOD, mg/L	2	2	Azide Modification (Dilution Technique)
TSS, mg/L	<1	<1	Gravimetric (dried at 103-105°C)
**** O V E R ****			

Total Samples : 2 Total Analysis : 8

### Reference/Remarks :

Standard Methods for the Examination of Water and Wastewater, 21<sup>st</sup> ed.

Certified Correct by:   
LUISITA GRESINDA V. MENDOZA  
PRC No 0006312

Approved Signatory:   
GINA B. MARITAN  
Environmental Section Head

Noted by:   
LORNA G. SY  
President

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DENR ACCREDITED  
Source Emission Testing Firm  
SAT No 2008-13  
SAT No 2009-21-T2



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Water Testing Laboratory  
Accreditation No 117

Uninterrupted Total Quality Service  
Since 1976



# OSTREA MINERAL LABORATORIES, INC.

Assaying and Environmental Testing Specialist

Barangay Road, Bo. Mamlasan, Biñan, Laguna, Philippines 4024  
Tels. : (02) 889-9058; (049) 539-0102; (02) 848-6951  
Fax : (02) 520-9189  
Email : omilone@yahoo.com / omilmarketing@yahoo.com

No **59705**

## AECOM

23<sup>rd</sup> Floor, Fort Legend Towers, 3<sup>rd</sup> Ave. corner 31<sup>st</sup> St.  
Bonifacio Global City, Fort Bonifacio, Taguig City  
**Attention: MS. SHERYL JOY ANNE GUTIERREZ /  
MR. LARRY PADILLA**

DATE **March 24, 2011**

R.A. No **57664**

INVOICE No

PAGE 2 OF 2 PAGES

## CERTIFICATE OF ANALYSIS

Date received : March 17, 2011

Date analyzed : March 17 – 22, 2011

	<u>Cot. Intake</u>	<u>Cot. Powerhouse</u>	<u>Method/Technique</u>
Total Coliform, MPN/100ml	54 x 10 <sup>2</sup>	16 x 10 <sup>3</sup>	Multiple Tube Fermentation
Fecal Coliform, MPN/100ml	35 x 10 <sup>2</sup>	92 x 10 <sup>2</sup>	Multiple Tube Fermentation

\*\*\*\* NOTHING FOLLOWS \*\*\*\*

The test results pertain only to the samples submitted by the customer.

Total Samples : 2 Total Analysis : 8

### Reference/Remarks :

Standard Methods for the Examination of Water and Wastewater, 21<sup>st</sup> ed.

Certified Correct by:   
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**Annex 2 Photos of Observation at Weir Intake**



Looking upstream at weir site



Looking upstream at weir site



Looking downstream at weir site



Looking downstream at weir site

**Annex 3 Photos of Observation Along the River**



**Stream flowing into Lamut River**



**Surrounding slope**



**Slide**



**Slopes and slides**



**Washed out bridge**



**Lamut River**



**Annex 4 Photos of Observation in the Powerhouse**



**River near Powerhouse**



**River near powerhouse**



**River near powerhouse**



**River near powerhouse**

**Annex 5 Climatological Normals**

## NORMAL VALUES

Station Name : BAGUIO CITY, BENGUET  
 Period : 1981 - 2010

Latitude : 16°24'36" N Elevation: 1500 m  
 Longitude: 120°36'00" E

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Month	Rainfall		Temperature						Wind			No. Days w/			
	Amount	No.	Max	Min	Mean	Dry	Wet	Dew	Vapor	Rel.	MSLP	DIR	SPD	Cloud	TSTM
	(mm)	RD	(°C)	(°C)	(°C)	Bulb	Bulb	Pt.	Pressure	Hum.		(16 pt)	(mps)	Amount	
						(°C)	(°C)	(°C)	(mbs)	%	(MBS)			(okta)	
JAN	15.2	3	23.3	12.9	18.1	17.1	15.5	14.5	16.5	85	1011.7	SE	2	5	0
FEB	23.4	3	24.1	13.4	18.7	17.7	16.0	15.0	17.0	84	1011.3	SE	2	5	1
MAR	46.0	5	25.2	14.5	19.9	18.9	17.0	15.9	18.1	83	1010.3	SE	2	5	3
APR	104.1	9	25.8	15.9	20.8	20.0	18.2	17.3	19.7	84	1008.9	SE	2	5	9
MAY	341.1	20	25.0	16.4	20.7	19.8	18.4	17.7	20.2	88	1007.7	SE	2	6	17
JUN	475.8	22	24.4	16.5	20.5	19.6	18.4	17.8	20.3	89	1007.0	SE	2	7	16
JUL	781.9	26	23.4	16.3	19.8	19.0	18.1	17.6	20.2	92	1006.6	SE	2	7	15
AUG	905.0	27	22.6	16.2	19.4	18.7	17.9	17.5	20.0	93	1006.3	SE	2	7	13
SEP	570.9	24	23.4	16.0	19.7	18.9	17.9	17.3	19.8	91	1007.1	SE	2	7	13
OCT	454.3	17	23.9	15.7	19.8	19.0	17.8	17.1	19.6	89	1008.0	SE	2	6	8
NOV	97.4	8	24.1	15.1	19.6	18.7	17.2	16.4	18.6	86	1009.3	SE	2	5	3
DEC	26.2	4	23.5	13.7	18.6	17.7	16.0	15.0	17.0	84	1011.0	SE	2	5	0
ANNUAL	3841.4	168	24.0	15.2	19.6	18.8	17.4	16.6	18.9	87	1008.8	SE	2	6	98

### Definition of Terms:

Climatological Normals ————— Period averages computed for a uniform and relative long period comprising at least three (3) consecutive 10-year period.

Rainfall (mm) ————— The amount of precipitation (rain, hail, etc.) expressed in millimeters depth, of the layer of the water which has fallen.  
 (column 2)

Rainy days (RD) ————— A rainy day is defined as a period of 24 hours beginning at 8AM to 8 AM of the next day during which 0.1 mm of rain is recorded.  
 (column 3)

Maximum Temperature (°C) ————— The maximum temperature in °C recorded for the day, usually occurring in the early afternoon.  
 (column 4)

Minimum Temperature (°C) ————— The minimum temperature in °C recorded for the day, usually occurring during early hours of the morning (before sunrise)  
 (column 5)

Mean Temperature (°C) ————— Mean Temp. = Maximum + Minimum / 2  
 (column 6)

Dry Bulb Temperature (°C) ————— It gives the air temperature in °C at the time of observation.  
 (column 7)

Wet Bulb Temperature (°C) ————— It gives the temperature in °C that an air parcel would have if cooled adiabatically to saturation at constant pressure by evaporating water in it.  
 (column 8)

Dew Point Temperature (°C) ————— The temperature in °C at a given pressure, to which the air must be cooled to become saturated. It is the temperature when atmospheric moisture begins to condense to liquid forming "dew" upon objects.  
 (column 9)

Vapor Pressure (mbs) ————— Denotes the partial pressure of water vapor in atmosphere. As the water evaporates, additional water vapor is introduced into space above and pressure increases slightly as the new vapor is added. The increasing pressure is due to an increase in the partial pressure of water vapor.  
 (column 10)

Relative Humidity ————— The ratio of the amount of water vapor actually in the air to the maximum amount the air can hold at that temperature.  
 (column 11)

Mean Sea Level Pressure (mbs) ————— The force exerted by the weight of the atmosphere on a unit area at the mean sea level. It is also the atmospheric pressure at mean sea level.  
 (column 12)

Prevailing Winds (mps) ————— The prevailing wind direction most frequently observed during a given period while the average wind speed in meters per second is the arithmetic average of the observed wind speed.  
 (column 13 & 14)

Cloud (oktas) ————— The amount of cloud present in the sky, expressed in oktas of the sky cover. (Okta is the function used in denoting cloud amount and is equal to 1/8 of the whole sky.  
 (column 15)

Days with Thunderstorm ————— A thunderstorm day is defined as an observational day during which thunder is at station.  
 (column 16a)

**Annex 6 Climatological Extremes**



Republic of the Philippines  
 Department of Science and Technology  
**Philippine Atmospheric, Geophysical and Astronomical Services Administration**  
**Climatology and Agrometeorology Branch**  
**CLIMATE DATA SECTION**

PAGASA Science Garden Complex, Agham Road, Diliman Quezon City, Philippines  
 Telefax: (632)-434-2698

### CLIMATOLOGICAL EXTREMES

**STATION: BAGUIO CITY**

**YEAR: AS OF 2009**

MONTH	TEMPERATURE (°C)				GREATEST DAILY RAINFALL (MM)		HIGHEST WIND (MPS)			SEA LEVEL PRESSURES (MBS)			
	HIGH	DATE	LOW	DATE	AMOUNT	DATE	SPD	DIR	DATE	HIGH	DATE	LOW	DATE
JAN	29.7	01-31-1978	6.3	01-18-1961	107.4	01-25-2006	20	SE	01-25-1975	1021.7	01-18-1959	1001.9	01-01-1950
FEB	28.7	02-10-1978	6.7	02-01-1963	58.4	02-26-2008	15	ESE	02-13-1974	1020.6	02-01-1962	1002.3	02-07-1985
MAR	30.4	03-15-1988	7.4	03-01-1963	80.6	03-27-2001	17	ESE	03-28-1996	1019.6	03-07-2006	1000.6	03-05-1999
APR	29.3	04-28-1995	10.0	04-01-1923	147.7	04-08-1967	25	SW	04-25-1976	1018.0	04-05-1998	992.4	04-21-1956
MAY	29.4	05-09-2003	7.7	05-30-1989	730.3	05-15-1980	32	ESE	05-07-2009	1014.0	05-02-1978	987.8	05-23-1976
JUNE	28.7	06-03-1991	11.8	06-20-2014	538.4	06-29-2004	35	WNW	06-26-1993	1014.0	06-27-1993	985.9	06-10-1974
JULY	27.9	07-04-1983	12.5	07-08-1925	1085.8	07-04-2001	47	SE	07-20-1974	1012.8	07-12-1979	981.0	07-04-2001
AUG	27.7	08-30-1988	12.8	08-12-1936	969.8	08-04-2008	31	S	08-07-1964	1014.0	08-18-1963	985.3	08-06-1964
SEP	28.0	09-04-1981	12.6	09-01-1990	799.8	09-27-1911	38	S	09-11-1970	1013.8	09-28-1982	988.7	09-23-1955
OCT	27.7	10-08-1980	11.3	10-26-1913	994.6	10-14-1998	41	WNW	10-27-1974	1015.8	10-26-2008	978.9	10-24-1988
NOV	28.2	11-19-1987	9.2	11-30-1989	698.7	11-05-1980	41	SE	11-04-1967	1018.2	11-30-1978	978.4	11-08-1954
DEC	28.2	12-28-1929	7.6	12-13-1991	148.8	12-04-1936	30	SSE	12-02-2004	1019.7	12-19-1994	974.1	12-14-1964
ANNUAL	30.4	03-15-1988	6.3	01-18-1961	1085.8	07-04-2001	47	SE	07-20-1974	1021.7	01-18-1959	974.1	12-14-1964
Period of Record	1909-2009				1902-2009		1950-2009			1949-2009			

PREPARED BY: CADS/CAD/PAGASA

**Annex 7 Testimonial of Mr. Manuel Dulawan**

## A Wit-up for the Mini-hydro Electric Plant to be Constructed at Tica on the Haliap River

Cisipulo was once a part of Kiangnan. By virtue of R.A. 7173 signed into law by then Pres. Corason Aquino on January 13, 1992, the nine barangays of southern Kiangnan (Haliap, Panububan, Nungawa, Amdurtag, Antipalo, Pula, Cawayan, Naval and Camandag) were separated from the mother municipality to constitute the new municipality of Cisipulo.

The boundary separating the two municipalities is the Haliap River stretching on a southeast-northwest direction. The Haliap River is fed by two main tributaries, the Pamhingan River from the Cisipulo side and the Paynit River from the Kiangnan area. Both tributaries originate from thickly forested watersheds adjacent to each other. These watersheds ensure sufficient water volume on the Haliap River needed for the mini-hydro electric plant even during the dry months of the year.

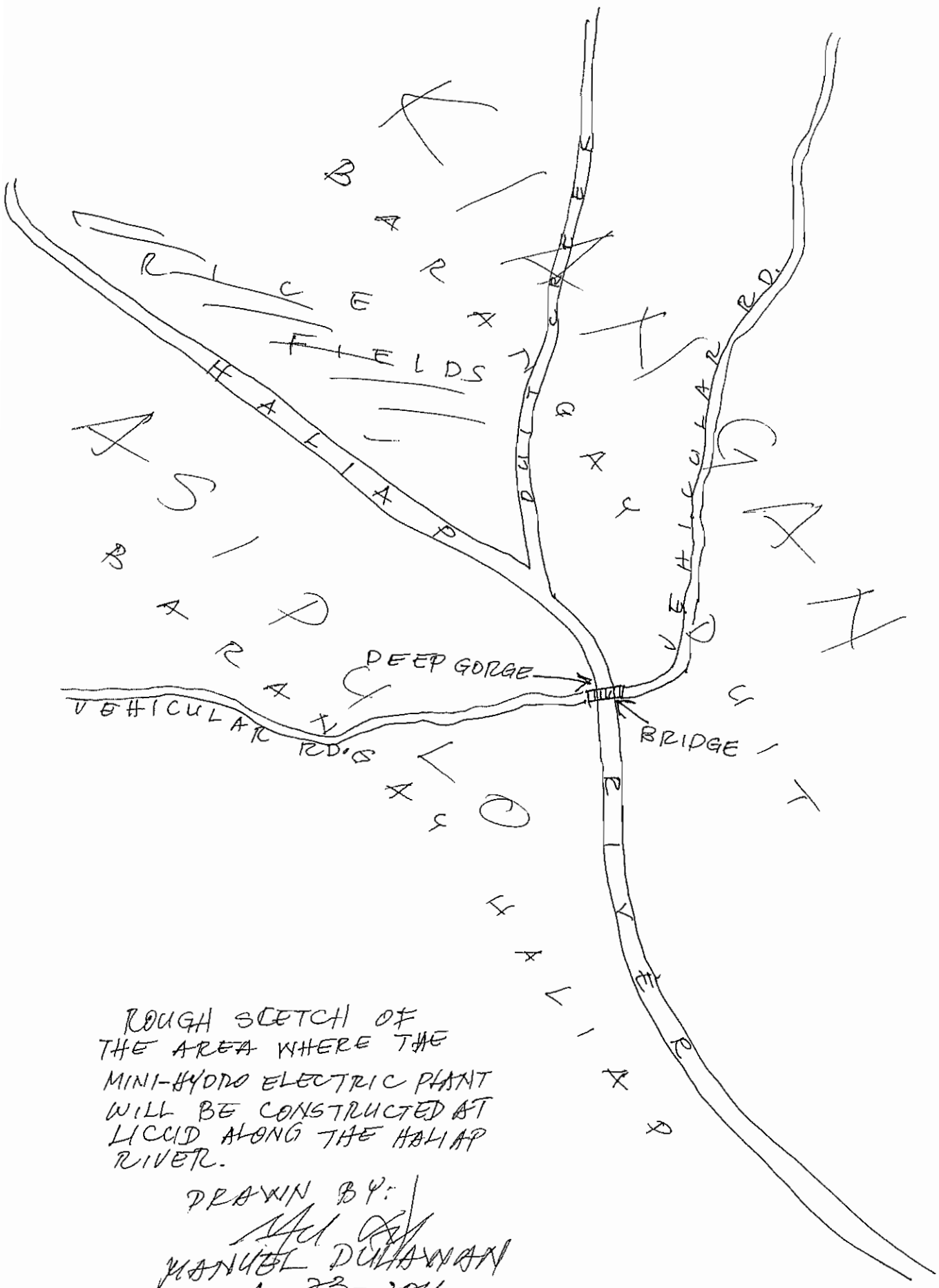
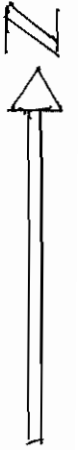
The site of the mini-hydro dam has to be at least 100 meters below the ~~the~~ location of the bridge. This will prevent the possible inundation of the rice fields above the bridge even when the river gets swollen

during heavy rains

As far below as a kilometer from the bridge on both sides of the banks of the river, there are no places that may pose any problem. There are no sacred places nor properties either on the Añipulo or Kiaragan side that may be damaged in the course of the construction of the mini-hydro electric plant

MAJ  
written by Manuel Delawan  
6-23-2011





ROUGH SKETCH OF  
THE AREA WHERE THE  
MINI-HYDRO ELECTRIC PLANT  
WILL BE CONSTRUCTED AT  
LICUD ALONG THE HALIAP  
RIVER.

DRAWN BY:  
*Manuel Dulawan*  
MANUEL DULAWAN  
6-23-2011

## The Ayangan\*

The Ifugao ethnic group (not tribe) is composed of two subgroups, the Ayangan and the Tawali. The Ayangan subgroup occupies a wider area of the province of Ifugao and its members are more than that of the Tawali.

The Ayangan occupy the whole municipalities of Aquinaldo and Pangasinan and they are found in several barangays in Barau, Lagawe, Lamut, Kiangon and Asipula and a few places in Hingyon and Alfonso Lista. It is only in Timoc and Hungduan where no Ayangan community is found.

What distinguish the Ayangan and the Tawali subgroups are: (1) the way members of each speak the Ifugao language—the Ayangan dialect has the phonemes ch, f, sh and j which sounds are not uttered in Tawali; (2) the slight variation in the design and preference in color scheme of woven costumes; and (3) a slight difference in exoreligious rites.

At present permanent Ayangan and Tawali Ifugao migrant communities are found in the provinces of Nueva Vizcaya, Quirino, Isabela as well as Baguio City. In Quirino the Ifugao (Ayangan and Tawali) make up a significant number of the total population of the province. A number of barangays in the municipalities of Cabarroguis and Maddela, in fact, are inhabited wholly by Ifugao.

\* Based on the book An Ethnographic Mapping of the Ifugao Ethnolinguistic Subgroups by M. Dulawan, 1996.

**Annex 8 Minutes of Focus Group Discussion with Barangay Haliap and Panubtuban**

Public/Stakeholder Consultation	Date	Place	Participants	Consultation Minutes
Key Informant Interview	June 23, 2011	Haliap Barangay Hall, Haliap, Asipulo	Kgd Rosemarie Doque	<p>Topic of Discussion:</p> <ul style="list-style-type: none"> <li>i. Demographic data, sources of livelihood and household income; Sources and consumption of electricity and water;</li> <li>ii. Opinion on the establishment of hydro power plant;</li> <li>iii. Perceived Impacts on the establishment of hydro power</li> </ul> <p>Details:</p> <p>Major Sources of Livelihood and Income in the community:</p> <ul style="list-style-type: none"> <li>▪ Farming <ul style="list-style-type: none"> <li>- Major crops include rice, beans, tomato, squash, pepper</li> <li>- Majority of the households are into subsistence farming</li> <li>- Only sells excess harvest to Kiangon, Haliap and Bangbang kompradors</li> </ul> </li> <li>▪ Kaingin</li> <li>▪ Poultry and Livestock <ul style="list-style-type: none"> <li>- Encounters difficulty in water sourcing</li> </ul> </li> </ul> <p>Average Family Income 3000PHP-7000PHP</p> <p>Expenses:</p> <ol style="list-style-type: none"> <li>1. Food</li> <li>2. Children's School Allowance</li> <li>3. Electric Bill</li> <li>4. Poultry Supplies</li> <li>5. Medicine</li> </ol> <p>Knowledge of the Hydro electric Power Plant</p> <ul style="list-style-type: none"> <li>▪ Use of water to generate electricity</li> </ul> <p>Gained support from Kgd Duque on the proposed hydro power plant</p> <p>Cited the positive impacts in terms of energy supply and rice field irrigation.</p>
FGD	June 23, 2011	Haliap Barangay Hall, Haliap,	1. Kgd Basilio Fedelito	Demographic data, sources of livelihood and household income; Sources and consumption of electricity and water;

Public/Stakeholder Consultation	Date	Place	Participants	Consultation Minutes
		Asipulo	2. Basilio Bayawna 3. Christina Ngabit 4. Nancy Addab	<p>Opinion on the establishment of hydro power plant; Perceived Impacts on the establishment of hydro power</p> <p>Major Sources of Livelihood and Income in the community:</p> <ul style="list-style-type: none"> <li>▪ Farming               <ul style="list-style-type: none"> <li>- Major crops include beans, squash, rice, tomatoes</li> <li>- Subsistence farming</li> <li>- Sells excess produce but there are also some households who purposely farm to market their harvest</li> </ul> </li> <li>▪ Employed               <ul style="list-style-type: none"> <li>- Around 5% of labor force</li> </ul> </li> <li>▪ Poultry and Livestock</li> </ul> <p>*Government Assistance in the form of KALAHI-CIDDS (MSWDO)            *Cooperative loan, but mostly help are received from neighbors</p> <p>Average Family Income</p> <ul style="list-style-type: none"> <li>▪ 3000PHP-10000PHP</li> <li>- Income is not stable, based on harvest</li> </ul> <p>Peace and Order</p> <ul style="list-style-type: none"> <li>- Generally peaceful, no recorded crime</li> <li>- Active Males Movement against violence (on women)</li> </ul> <p>Main source of Water</p> <ul style="list-style-type: none"> <li>▪ Spring               <ul style="list-style-type: none"> <li>- Problem arises during dry season</li> <li>- Likud – continuous water flow</li> </ul> </li> </ul> <p>Ethnicity</p> <ul style="list-style-type: none"> <li>▪ 90-95% are Ayangan</li> <li>▪ 5% - Tawali (intermarriage)</li> <li>▪ Haliap is Ayangan's ancestral land</li> </ul> <p>Community Health</p>


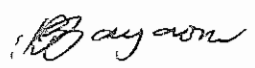

Public/Stakeholder Consultation	Date	Place	Participants	Consultation Minutes
				<ul style="list-style-type: none"> <li>▪ Health center with midwife</li> <li>▪ Common illnesses are cold and diarrhea</li> <li>▪ Small budget for medical supplies and health concerns</li> </ul> <p>Perceived Impacts on the establishment of hydro power</p> <p>Gained support from the Barangay Council on the proposed hydro power plant</p> <p>Cited the positive impacts in terms of energy supply and reiterated that the project should push through.</p> <p>Based on the results of Ambangal project, the respondents perceived the project to be beneficial to the community as well.</p> <p>Initial concerns on flooding, but has proven otherwise. Again, based on experience on Ambangal Dam.</p> <p>One major concern is the proponent's interest on the "hidden treasure." Others claimed however, that could be acceptable so long as the project is set.</p>
FGD	June 23, 2011	Panubtuban Barangay Hall, Panubtuban, Asipulo	<ol style="list-style-type: none"> <li>1. Brgy Captain</li> <li>2. Kgd Josie</li> <li>3. Brgy Treasurer</li> <li>4. Brgy Secretary</li> <li>5. Brgy Staff</li> </ol>	<p>Raised concern on the project site. Inquired on the benefits for the barangay. Also claimed that the access road will not be part of the Panubtuban.</p> <p>Major Sources of Livelihood and Income in the community:</p> <ul style="list-style-type: none"> <li>▪ Farming <ul style="list-style-type: none"> <li>- Major crops include beans, squash, rice, coffee, corn</li> <li>- Subsistence farming</li> <li>- Sells excess produce but there are also some households who purposely farm to market their harvest</li> <li>- Market to Kiangan, Lagawe, Bagabang</li> </ul> </li> <li>▪ Kaingin <ul style="list-style-type: none"> <li>- To plant corn</li> </ul> </li> <li>▪ Work abroad</li> </ul> <p>Average Family Income</p> <ul style="list-style-type: none"> <li>▪ 3000PHP-10000PHP <ul style="list-style-type: none"> <li>- Income is not stable, based on harvest</li> </ul> </li> </ul> <p>*Government Assistance in the form of KALAHI-CIDDS (MSWDO)</p>

Public/Stakeholder Consultation	Date	Place	Participants	Consultation Minutes
				<p>*Cooperative loan</p> <p>Expenses:</p> <ol style="list-style-type: none"> <li>1. Education</li> <li>2. Health</li> <li>3. Water</li> <li>4. Electricity</li> <li>5. Medicine</li> </ol> <p>Peace and Order</p> <ul style="list-style-type: none"> <li>- Theft</li> </ul> <p>Transportation</p> <ul style="list-style-type: none"> <li>▪ Jeepney (one trip a day), Motor</li> </ul> <p>Concerns Raised by the respondents:</p> <ul style="list-style-type: none"> <li>• Perceived interest of the proponents (gold)</li> <li>• Employment opportunities for barangay Panubtuban during construction</li> <li>• Health Impact</li> <li>• Effect on the water flow (water diversion)</li> <li>• Share of benefits with the host community</li> </ul>
FGD	June 23, 2011	Haliap	Haliap Landowners	<p>Issues and Concerns:</p> <ul style="list-style-type: none"> <li>• Effect on the flow of water for irrigation</li> <li>• Attention to Irrigation Source</li> <li>• Land Excavation</li> <li>• Compensation on Damages and Right of Way</li> <li>• Where to stock the Soil</li> <li>• Damages on Vegetation</li> <li>• During construction, increase in employment opportunities</li> </ul> <p>In favor of the project but Claimant and Proponent negotiation on Compensation should be clear and just.</p>

# Attendance




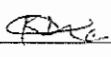
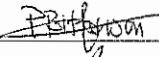
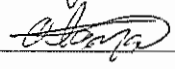
Focus Group Discussion: Licud Mini-Hydro Power Plant Project  
June 22, 2011; Barangay Council Haliap

Facilitator:

<u>Name</u>	<u>Designation</u>	<u>Signature</u>	<u>Phone</u>
1) Rosemarie Maguel	Progg. Hekegi		
2) Basilio Bayasona	Haliap		
3) Fedelito Rendou	"	Oed Red	09262709077
4) Christina Ngabit	Haliap		09269891698

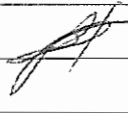


Lotowners Consultation (June 23, 2011)


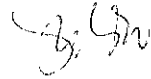



NAME	Signature	Contact #
1. Conrado Catama		09265656922
2. CHRISTOPHER Catama		09262866460
3. CALIXTO CATAMA		09069711899
4. Rogelio catama		09269163020
5. Pablo Bittuwon		
6. Joseph Otano		09066047425

June 24, 2011

Set owner

1. Ernesto Paliza 


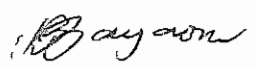
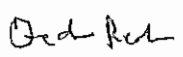

# Attendance

<u>Name</u>	<u>Position</u>	<u>Signature</u>	<u>Contact #</u>
1) DONATO Khablinan	Brig. Kagawad		090587016
2) Mary Lad.ao T.	Brig. Treasurer		
3) Josephine U. Bictal	Brig. Kagawad		09168840
4) OSCAR D. HAG-O	" Capt.		
5) Feliza K. Pah-gad	Brig. Secretary		0906155681




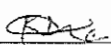
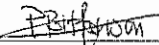
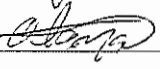
# Attendance

Focus Group Discussion: Licud Mini-Hydro Power Plant Project  
June 22, 2011; Barangay Council Haliap

Facilitator:

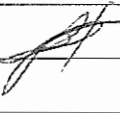
<u>Name</u>	<u>Designation</u>	<u>Signature</u>	<u>Phone</u>
1) Rosemarie Maguel	Progr. Hekeji		
2) Basilio Bayasona	Haliap		
3) Fedelito Rendou	"		09262709077
4) Christina Ngabit	Haliap		09269891698

Lotowners Consultation (June 23, 2011)

NAME	Signature	Contact #
1. Conrado Catama		09265656922
2. CHRISTOPHER Catama		09262866460
3. CALIXTO CATAMA		09069711899
4. Rogelio catama		09269163020
5. Pablo Bittuwon		
6. Joseph Otano		09066047425

June 24, 2011

Set owner

1. Ernesto Paliza 

**Annex 9 Land Compensation Procedures for Ambangal Mini-Hydro Power Plant**

**Land Acquisition Process for the e8 Ambangal mini-hydro power project**

1. The Provincial Government of Ifugao (the PGI, the proponent) together with DENR staff and the Provincial Engineering Office staff identified the potential affected area based on the result of topographic survey.
2. The PGI and the affected landowners went through along the proposed headrace and penstock for verifying. The PGI made the inventory list.
3. The PGI and the affected land owners took Memorandum of Agreement (MOA) for the land compensation.
4. Payment of the land area shall be made on cash basis before actual implementation of the project. Price of the land shall be based on the following table.

Land Classification	Agreed Price
Muyung (Forest)	Php 30.00
Rice field = idle	Php 60.00
Rice filed = cultivated	Php 75.00
Coffee Plantation	Php 30.00
Corn Plantation	Php 30.00

5. Payment of damaged trees, plants and other vegetation by reason of project implementation which shall be given on cash basis after construction based on actual damaged to be determined after the post inventory report to be conducted in the presence of the landowners. Price of vegetation shall be determined by the price quotation as follows.

(A) Forest Trees:

Common Name of Existing Vegetation	Price per tree (per board foot)
1) Dogwe, 2) Laglabong, 3) Alimit, 4) Binwa, 5) Kakawate, and 6) Madre de Cacao	Php 5.00
1) Tagisang Bayawak, 2) Dapadap, 3) Anattap, 4) Calcalpo, 5) Tuwol, 6) Anonang, 7) Saraisa, 8) Balanti, 9) Bunot, 10) Kurdodannum, 11) Upla, 12) Baccuwog, 13) Tagacalo, 14) Alagge, 15) Ilhit, 16) Hupok, 17) Pau,	Php 10.00

18) Tupngag, 19) Bini, 20) Ludping(Lubting), 21) Hanung, 22) Ppole, 23) Analdong, 24) Polallay, 25) Latbang, 26) Kalabakab, 27) Ipil0pil, 28) Takang, and 29) Dulnuan	
1) G-melino, 2) Acacia, 3) Bakan, 4) Paguringaon(Aliguyon), 5) Dalakan, 6) Halong, and 7) Mahogany	Php 15.00
1) Narra, 2) Kultib, 3) Tabak, 4) Putukan, 5) Pakak and 6) Banolan	Php 20.00

(B) Fruit Bearing Trees:

Name of Fruit Bearing Trees	Yield/Tree	Unit Cost
1) Excetsa Coffee		Php 100.00 /tree
2) Robusta Coffee		Php 100.00 /tree
3) Santol	150 pcs. Or 25 kgs / tree per year	Php 10.00 /tree
4) Betel Nut	Half can / tree per year	Php 300.00 / can
5) Avocado	150 pcs. or 38kgs / tree per year	Php 10.00 / kg
6) Lychee	7 kgs / tree per year	Php 35.00 / kg
7) Banana	7 bunches / tree per season	Php 24.00 /bunch
8) Cacao	20 pcs. / tree per year	Php 50.00 / pc.
9) Pomelo	80 pcs. / tree per season	Php 4.00 / pc.
10) Coconut		Php 300.00 / tree
11) Rattan	20kgs / vine	Php 20.00 / kg.
12) Papaya	20 fruits or 32 kgs / tree	Php 10.00 / kg.
13) Rambutan	7 kgs / tree	Php 35.00 / kg.
14) Chesa	50 pcs. Or 10 kgs / tree	Php 10.00 / kg.
15) Gayunan	80 pcs. Or 16 kgs / tree	Php 12.00 / kg

6. Immediate restoration of damages to rice and corn plantations

If immediate restoration is not possible, compensation shall be paid by the PGI which will be based on the actual produce per season. The basis for the computation for rice plantations shall be sixty five (65) cavans per hectare for the first cropping and forty five (45) cavans for the second cropping computed at twenty five (25) kilograms palay per canvan at Ten Pesos (Php 10.00) per kilogram and 0.35 kilogram per square meter at Five Pesos (Php 5.00) per kilogram for corm plantation.

(A) Rice.....yield/harvest

Average yield/harvest:

1<sup>st</sup> cropping= 65 cavans / hectare @ 25kgs/cavan@Php10.00/kg

2<sup>nd</sup> cropping= 45 cavans / hectare @ 25kgs/cavan@Php10.00/kg

(B) Corn.....yield/harvest

0.35 kg/m<sup>2</sup> @ Php 5.00 / kg



**Annex 10 Project Environmental Monitoring and Audit Prioritization Scheme questionnaire**

**PROJECT ENVIRONMENTAL MONITORING AND AUDIT PRIORITIZATION SCHEME (PEMAPS)  
QUESTIONNAIRE**

**Project Name** : 810kW Likud MiniHydropower Plant Project  
**Project Location** : Sitio Likud, Barangay Haliap, Asipulo, Ifugao  
**ECC Reference No.** : \_\_\_\_\_  
**Proponent** : Tokyo Electric Power Service Co., Ltd.  
**Pollution Control Officer** : \_\_\_\_\_  
**Tel. No./Fax No./Email** : \_\_\_\_\_  
**Project Type** : Hydro Power Project (Renewable Energy)  
**Project Status** : \_\_\_\_\_

**I. PROJECT CONSIDERATIONS**

Size and Type

Size based on number of employees

Specify number of employees: 200 workers during construction and 6-7 employees during operation

Type

ECP (in either ECA or Non-ECA) \_\_\_\_\_  
 Non-ECP but in ECA \_\_\_\_\_  
 Non-ECP and Non-ECA ✓

Waste Generation and Management

Enumerate Waste Type and Specify Quantity of Wastes generated in your facility. (Identify /Enumerate)

Category	Waste	Type		Quantity (Mt/yr)
		Hazardous	Non-Hazardous	
Air	Emissions <sup>1</sup>		TSP	Quantities were not estimated
			PM <sub>10</sub>	
			NO <sub>x</sub>	
			SO <sub>x</sub>	
Liquid	Effluent <sup>2</sup>			
Solid	Domestic Waste <sup>3</sup>			



**PROJECT ENVIRONMENTAL MONITORING AND AUDIT PRIORITIZATION SCHEME (PEMAPS)  
QUESTIONNAIRE**

---

Fresh Water

Classification of fresh water (select one and mark)

- AA \_\_\_\_\_
- A \_\_\_\_\_
- B \_\_\_\_\_
- C \_\_\_\_\_ ✓
- D \_\_\_\_\_

Size of fresh water body

Specify size: W = 17.7  
L = 1.7kms  
(within the  
project area)

Economic value of water use (may select more than one of the criteria below)

- Drinking \_\_\_\_\_
- Domestic \_\_\_\_\_
- Recreational \_\_\_\_\_ ✓
- Fishery \_\_\_\_\_ ✓
- Industrial \_\_\_\_\_ ✓
- Agricultural \_\_\_\_\_ ✓

Salt water

Classification of salt water (select one and mark)

- SA \_\_\_\_\_
- SB \_\_\_\_\_
- SC \_\_\_\_\_
- SD \_\_\_\_\_

Economic value of water use (may select more than one of the criteria below)

- Fishery \_\_\_\_\_
- Tourist zone or park \_\_\_\_\_
- Recreational \_\_\_\_\_
- Industrial \_\_\_\_\_

Ground Water

Distance to nearest recharge area (select one and mark)

- 0 to less than 0.5 km \_\_\_\_\_
- 0.5 to 1 km \_\_\_\_\_
- Greater than 1 km \_\_\_\_\_

Distance to nearest well used (select one and mark)

- 0 to less than 0.5 km \_\_\_\_\_
- 0.5 to 1 km \_\_\_\_\_
- Greater than 1 km \_\_\_\_\_

Groundwater use within the nearest well (may select more than one of the criteria below)

- Drinking \_\_\_\_\_
- Industrial \_\_\_\_\_
- Agricultural \_\_\_\_\_

ANNEX 2-7d

**PROJECT ENVIRONMENTAL MONITORING AND AUDIT PRIORITIZATION SCHEME (PEMAPS)  
QUESTIONNAIRE**

---

Land

Indicate current/actual land uses within 0.5 km radius: (may select more than one of the criteria below)

Residential	✓
Commercial/Institutional	_____
Industrial	✓
Agricultural/Recreational	✓
Protected Area	_____

Potential/proposed land uses within 0.5 km (may select more than one of the criteria below)

Residential	_____
Commercial/Institutional	_____
Industrial	✓
Agricultural/Recreational	✓
Protected Area	_____

Number of affected Environmentally Critical Areas within 1 km:

Specify number: 0

Distance to nearest ECA (select one and mark)

0 to less than 0.5km	_____
0.5 to 1 km	_____
Greater than 1 km	✓

**IV. ENVIRONMENTAL PERFORMANCE**

Compliance (pls. take note that this will be double-checked with PCD files)

Law	Violation (check if any)	Type (pls. specify number of times committed)				Type of Admin Violation	Additional Remarks/Status of Compliance
		STANDARD					
		Emission/Effluent/Discharge	Ambient	Human Impact	Admin/ECC		
RA 8749	NA						
RA 9275	NA						
RA 6969	NA						
PD 1586	NA						
RA 9003	NA						

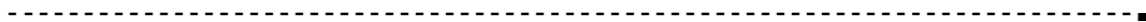
Number of Valid Complaints

Citizen and NGOs

Specify number: \_\_\_\_\_

Others (other Govt. Agencies, Private Institutions)

Specify number: \_\_\_\_\_



ANNEX 2-7d

**PROJECT ENVIRONMENTAL MONITORING AND AUDIT PRIORITIZATION SCHEME (PEMAPS)  
QUESTIONNAIRE**

---

(To be filled up by EMB Personnel)

**RECOMMENDATION/S:**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Assessed By: \_\_\_\_\_

Noted By: \_\_\_\_\_

**Annex 11 IEE Checklist**

# 810kW Likud Mini-hydropower Development Project

Initial Environmental Examination Checklist



## 810kW Likud Mini-hydropower Development Project

### Initial Environmental Examination Checklist

Prepared by

**AECOM Philippines Consultants Corporation**

23/F Fort Legend Towers, 3rd Avenue Corner 31st Street,, Bonifacio Global City,, Fort Bonifacio, Taguig City, Philippines 1634  
T +63 2 478 3266 F +63 2 478 3270 www.aecom.com

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## 1.0 GENERAL INFORMATION

### 1.1 Project Name/Title:

810kW Likud Mini- Hydropower Development Project

### 1.2 Proponent/Company:

The Provincial Government of Ifugao  
Provincial Capitol  
Lagawe, Ifugao

### 1.3 Project Location:

Barangay Haliap, Asipulo, Ifugao

### 1.4 Scheme of Hydro Development :

Run-of-water Scheme  Storage Scheme

### 1.5 Project Objective/s

Ifugao Province is well known for its extensive rice terraces. In 1995, UNESCO had included the Cordillera rice terrace in their World Heritage List of Cultural Landscapes. However, in 2001, UNESCO included them on the List of World Heritage in Danger because of its continuous deterioration primarily due to the decline of the traditional balance as a result of out-migration, slow but continuous disappearance of the old culture and leadership, and indiscriminate deforestation. In addition, there is no effective and comprehensive rice terraces conservation plan.

This project is primarily being developed to create funds from the sales of electricity that will be generated. These funds will be used in the rehabilitation programs, conservation projects for the rice terraces in Ifugao Province. It also envisioned that the funds generated will help in improving the quality of lives of the people engaged in terrace farming and removal of the Rice Terrace from the List of the UNESCO World Heritage in Danger.

### 1.6 Project Ownership:

Type of Owner(s):  Single Proprietorship  Corporation  
 Partnership/Joint Venture  Cooperative  
 Others, pls. Specify: Local Government Unit

### 1.7 List of Owners (in case of partnership/corporation) : N/A

## **1.8 Project Cost:**

Total Project Cost: PhP120, 300,000.00

## 2.0 PROJECT AREA DESCRIPTION

### 2.1 Project Area Coverage:

Watershed area (ha):

Above weir/ intake: 43.31 ha  
Total watershed area of river: 4538.1899

Area of project sites (m2 or ha): 4538.1899

Total area: 94.111ha

Structures: 28.381ha

Intake Weir: 60m<sup>2</sup>  
Settling Basin: 47.95m<sup>2</sup>  
Headrace: 2,250m<sup>2</sup>  
Head-tank: 46.02m<sup>2</sup>  
Powerhouse: 44.45m<sup>2</sup>

Others, please specify:

Tailrace: 20.13m<sup>2</sup>

See **Annex 2 Design of the project structures**

### 2.2 General Water Appropriation:

- |  |                                    |  |   |
|--|------------------------------------|--|---|
| <input type="checkbox"/> Domestic                    | <input type="checkbox"/> Municipal | <input checked="" type="checkbox"/> Irrigation | <input type="checkbox"/> Power Generation |
| <input checked="" type="checkbox"/> Fisheries        | <input type="checkbox"/> Livestock | <input type="checkbox"/> Industrial            | <input type="checkbox"/> Recreational     |
| <input type="checkbox"/> Others, pls. specify: _____ |                                    |  |   |

### 2.3 General Land Classification of project areas:

[  ] Public Land (ha): 4538ha  
[  ] A (applicable), (ha): \_\_\_\_ [  ] D (disposable), (ha) : 165ha

### 2.4 Present Land Use Classification

[ <input checked="" type="checkbox"/> ] Agriculture	[ <input type="checkbox"/> ] Residential	[ <input type="checkbox"/> ] Tourism
[ <input type="checkbox"/> ] Industrial	[ <input type="checkbox"/> ] Forest Land	[ <input type="checkbox"/> ] Institutional
[ <input type="checkbox"/> ] Commercial	[ <input type="checkbox"/> ] Open Spaces	
[ <input type="checkbox"/> ] Others, pls. Specify:		

## 3.0 PROJECT COMPONENTS

### 3.1 Relevant Dimensions

Dimension		Proposed Project
Plant Capacity	kW	810
Max. Plant Discharge	m <sup>3</sup> /s	2
Min Plant Discharge	m <sup>3</sup> /s	0.4
Max. Headwater Level	m.a.s.l	601,750 (flood)
Min. Operating Headwater Level	m.a.s.l	600,000
Tailrace Water Level	m.a.s.l	541,000
Estimated Net Head	m.a.s.l	59.000
Total Storage Volume	M3	

### 3.2 Structures and Buildings

#### 3.2.1 Description

Facility	Specifications/ Descriptions	Characteristics		
		Area [m <sup>2</sup> ]	Length [m]	Height [m]
Weir	Floating type with stop log for flushing	60	20	3
Intake Settling and Basin	Side intake type	47.95	13.7	3.5
Headrace	Open channel	2,250	1,875	1.2
Head tank		46.02	11.8	3.9
Penstock	Steel pipe (diameter 5cm)		118.5	
Powerhouse	Grand type	44.45	12.7	3.5
Tailrace	Open channel	20.13	6.1	3.3
Turbine and Generator	Inline Francis type turbine; induction type generator			
Switchyard	Outdoor	40.05	4.5	8.9

#### 3.2.2 Access

Facility	Access	Distance [km]	New or upgrading Access to Project Site		
			Max. allowable Weight on road [t]	Length [m]	Height [m]
Weir	Trail	170m			
Headrace	Trail	260m			
Surge Tank	Trail	1414m			
Penstock	Trail	1444m			
Powerhouse	Trail	1460m			
Other structures, pls. specify					

### 3.3 Transmission Line

Transmission from Switchyard to	New Transmission Line		
Location of next Substation/Tapping Point	Voltage [ V]	Length [km]	Right-of-way [m]
From powerhouse to existing IFELCO distribution line No. 24	13.2	1	n/a
From existing IFELCO distribution line No. 24 to Kiangang Tapping Point	13.2	5.46	n/a

### 3.4 Resource Requirements

Water Demand:

<b>Design Discharge (m<sup>3</sup>/s or l/s):</b>	<b>Maximum</b>	<b>2.0 m<sup>3</sup>/s</b>
	Minimum	0.4 m <sup>3</sup> /s
Other Resource Requirements (Specify): Irrigation		2 litter/ha
Minimum flow requirement set by NWRB (board Res. No.01-0901) which is set at 10% of dependable flow		0.136 m <sup>3</sup> /s

### 3.5 Water Treatment and Sewage Disposal

Is water used for other purpose than energy generation?

No  Yes, pls. specify: agricultural

If yes, is there provision for water treatment?

No  Yes, pls. describe: \_\_\_\_\_

N/A

If sewage disposal is required, what system is used?

Individual Septic Tank  communal Septic Tank

N/A

### 3.6 Handling and Disposal of Dangerous Substances

**What kind of dangerous substances ( e.g. oil, lubricants, chemicals; pls. Specify) are used during:**

- Pre)Construction Phase:  
None; No use of machineries,  
Very small fuel oil for vehicles;  
Very small Paints and Thinners
- Operation/Maintenance Phase:  
None; Oil-less facilities will be used



Is an oil water separator installed?

No       Yes, Location: \_\_\_\_\_

**What oil/Lubricants Collection and Disposal System are used?**

Collection System: Volume of storage containers(l):  
Storage Location:

Disposal System:

Recycled       Sold to Re-cyclers  
 Others, pls. Specify: \_\_\_\_\_

**3.7 Solid Waste Disposal System**

Collection System:

Association/project-maintained garbage collection system  
 integrated into municipal garbage collection system  
 Others, pls. Specify: \_\_\_\_\_

Disposal System :

Burning at open dumpsite       Open dumpsite in project site  
 Sludge cleaning       Municipality/City landfill site  
 Others, pls. Specify: \_\_\_\_\_

Location of waste disposal site:  
\_\_\_\_\_

**3.8 Manpower and Employment**

How many people will be employed by the proposed Mini Hydro Power Plant during:

- (Pre)Construction Phase:      200
- Operation and Maintenance Phase:      7

**3.9 Project Schedule**

**3.10 Pictures of Project sites**

See **Annex a**. Photo documentation

## 4.0 BASELINE ENVIRONMENTAL CONDITIONS

### 4.1 Natural and Physical Environment

**River characteristics (length of river between intake and tailrace, slope, waterfall, typical flow depths), pls. describe and attach maps/photographs:**

#### **Weir Site**

Access to the weir site is by foot, either through a 150 m trail from an existing concrete bridge or through another paved trail about 100 m long. Both trails are rarely travelled. The project site is at elevation 633 m from sea level with limestone rock outcrops at both sides of the riverbanks. Sheer vertical cliffs are at both sides, with moss and some small plants and trees that appear to be remnants of the original forest cover. The river at the weir site is about 8m wide with water flowing at a depth of about 500 mm. Locals describe flooding to occur after about two full days of continuous rain at the upstream part of the river and surrounding mountains. Floods usually makes the water level at the site rise to about 1 to 1.5 m high and also making the river flow wider to about 12 m. A flash flood was reported to have occurred in the past due to a dike collapse upstream of the project site after a fairly long downpour. Flow along the river was reported to have risen to about 3 to 4 m high (**Annex a**).

#### **Along the River**

An irrigation weir was observed at about 50m from the proposed weir site. This was reported to have been constructed about 20 years ago to serve small rice paddies and vegetable orchards along the river. Access to the irrigation weir is through an existing paved footpath at the left side of the bank facing the downstream direction. There were signs of “kaingin” at some slopes not far from the river. Small slides and erosion have also been observed (**Annex b**).

During the site visit, water levels at different river crossings were just above the knees (500-600 mm) with small boulders lining the river bed. There are four streams / gulleys that flow into the river along the stretch of the project area, some of which are also being used for irrigation. Three of these streams are on the left side of the river when facing the downstream direction and one is on the other side of the river. These streams have well vegetated slopes. A washed-out concrete overflow crossing was also seen along the river. This structure reportedly collapsed during the onslaught of Ondoy – Pepeng storms.

Length of river: 1.7kms

#### **Flood characteristics of the river:**

Return Period	Statistical flood discharge (as far as known)
[Years]	[m <sup>3</sup> /s]
2	165.85
5	367.45
10	508.36
25	698.55
50	840.33
100	978.53

**Are there areas in the site where indication of soil erosion occur?**

[  ] No

[  ] Yes, pls. specify and/or attach pictures: See **Annex b**.

**If yes, what causes the erosion? Pls. specify:**

Kaingin, loose top soil.

**Have any landslide occurred or still are occurring in the project area?**

No

Yes, pls. Specify and/or attach picture: See Annex b.

**What are the present uses of water bodies (ground water surface water) in the watershed of the proposed project area?**

Washing  Recreation (swimming, boating. Etc.)

Source of drinking water (body/ location / demand [l/s]):

Sanitation (body/location / demand [l/s]):

None

Irrigation (body/location / demand [l/s]): Agricultural land adjacent to river banks.

Fishing(body/location / demand [l/s]):

Others, pls. Specify:

**What is the present land use of the project wherein the structures and buildings of the proposed mini hydro power plant will be located?**

Facility	Area	Present Land Use
	[m <sup>2</sup> ]or[ha]	Categories see below
Weir/Intake		Others (forest)
Headrace		Agricultural / Others (forest)
Surge Tank		Agricultural / Others (forest)
Forebay		Agricultural / Others (forest)
Penstock		Agricultural / Others (forest)
Powerhouse		Agricultural / Others (forest)
Tailrace		River
Switchyard		
Others, pls. specify		

Categories:

(1) Prime agricultural land (productive/irrigated); (2) Prime agricultural land (idle/abandoned);

(3) Grassland; (4) Build-up; (5) Orchard; (6) Marshal/Mangrove; (7) Fishpond;

(8) Others (pls. Specify)

**Was the present water quality in the river assessed?**

No

Yes, pls. Insert results in table:

Parameter	Sample	Intake	Powerhouse
pH		8.5	8.4
Total Suspended Solids	ppm	<1	<1
Total Coliform	MPN/100ml	5400	16000
Oil and Grease	Mg/l Temp (Celsius)	20.1	21.9
Chlorides	Mg/l DO (mg/L)	8.1	7.9
Copper	Ppm BOC (mg/L)	2	2
Lead	Ppm		

Parameter		Sample	Intake	Powerhouse
Iron	Ppm Fecaliform (mpn/100ml)		3500	9200
Manganese	Ppm			
Total Hardness	Mg /l			
Alkalinity	Mg/l as CaCo3			
Pesticides, pls. Specify:				

**Pls. Describe methods and locations of sampling and attach chemical attests:**

The water quality sampling was conducted in March 2011. Two stations were established in the areas that could possibly be affected by the project. Samples were collected along the upstream and downstream of Lamut River, covering the intake area and powerhouse of the proposed project site, respectively. **Table 4-1** describes each water quality stations. See **Annex c** for illustration of locations.

**Table 4.1 Water Quality Stations**

Station ID	Name of Water Body	Location of Water Body	Description of Station	Coordinates	Elevation
Intake	Upstream of Lamut River (local name: Itum River)	Sitio Lower Haliap, Brgy. Haliap, Asipulo	Station is located at the proposed intake area and downstream of Itum Bridge. This station is also downstream of the Lamut River and an unknown river confluence.	16°44'24.5" N 121°05'30.5" E	631 m
Powerhouse	Downstream of Lamut River (local name: Guihinon River)	Sitio Guihinon, Brgy. Makppit, Kiangnan	Station is located at the proposed powerhouse, in-between Barangays Makppit and Panubtuban. It is downstream of Lamut River and its confluence with an unnamed river.	16°43'48.1" N 121°06'36.0" E	541 m

## 4.2 Biological Environment

**Are there flora and/or fauna of ecological or commercial significance to be found in the water bodies near within the project area that might be affected by the proposed project?**

No, pls. discuss probable reasons:

Based on the rapid site assessment, four vegetation communities within and along the immediate surroundings of the project site were identified. These are agricultural land (planted mainly to rice, winged beans, and sweet potato), shrubland/grassland (dominated by various species of grass and woody shrubs), tree plantation (planted to Gmelina), and patches of forest (secondary growth and original vegetation restricted to the very steep portions of the river stretch). More than 90% of the river stretch (about 10 m from both sides of the banks) is heavily disturbed as represented by the agricultural land, shrubland/grassland, and tree plantation. The remaining forest patches were most likely untouched either because of their very steep location and/or stunted structure rendering them without economic value. A general assessment was conducted to determine the suitability of these vegetation communities as a potential habitat for wildlife species.

A total of 12 bird species dominated by the yellow-vented bulbul (*Pycnonotus goiavier*), chestnut munia (*Lonchura malacca*), and Pacific swallow (*Hirundo tahitica*) were observed and confirmed present along the entire stretch of project site. Except for the white-eared brown-dove (*Phapitreron leucotis*), Philippine bulbul (*Hypsipetes philippensis*), and Philippine coucal (*Centropus viridis*), all recorded species are resident breeding but are non-endemic. None are considered under any threat categories based on PWRC Act of 2001 and IUCN Red List of Threatened Species 2010

Yes, pls. specify (water body/location/species/significance of the population):

**What methods and data sources were used to assess the flora and fauna in the water bodies? Pls. describe and/or attach documents:**

A rapid site assessment was undertaken to have a general picture of the vegetation and wildlife assemblage that will potentially be affected by the project. Methodology included walk-through survey, photo-documentation and interview of locals encountered during the site visit. Conservation status of each identified plant and wildlife species were determined from DENR Administrative Order (DAO) 2007-01 known as the "National List of Threatened Philippine Plants and their Categories, and the List of Other Wildlife Species" and International Union for Conservation Nature (IUCN). The IUCN's Red List of Threatened Species was also referred to since it provides the global assessment of the conservation status.

**Is there flora and/or fauna of ecological or commercial significance to be found outside the water bodies near within the project area that might be affected by the proposed project?**

No. A similar type of vegetation (mixed of secondary forest and orchard) is found outside the project jurisdiction, however, no vegetation will be affected by the hydropower plant. For the fauna, these will be temporarily disturbed and would be displaced during the construction stage due to increased activity in the area. Once construction is finished, the displaced wildlife will slowly turn up in the area.

Yes, pls. specify (location/location/significance):

### 4.3 Socio-Cultural, Economic and Political Environment

**Are there existing settlements in the watershed area of the proposed project?**

No

Yes, pls. specify(location/number of households, families and population):

**What methods and data sources were used to gain information on the existing settlements? Pls. describe and/or attach documents:**

Ocular Survey

Data Source: Community- Based Monitoring System

Methods Used: Key Informant Interviews and Focus Group Discussion (landowners, barangay council, community organization heads)

**What social infrastructures are located in or near the project area? Pls. describe.**

Facility	Location	Capacity	
		Number of persons	Sufficient (yes/no)
School(s)	1 Elementary School and 1 High School in Barangay Haliap	181 (elementary) 104 (high school)	Yes

Facility	Location	Capacity	
		Number of persons	Sufficient (yes/no)
Health Center(s)/Clinic(s)	1 Rural Health Unit in Nanduntog, Antipolo 1 Barangay Health Station (Haliap)	1 doctor 1 nurse 1 sanitary inspector 7 permanent 4 casual public health midwives.	Yes
Hospital(s)	Ifugao Provincial Hospital		
Others, pls. specify			

**Is the political situation (peace and order) stable in the near the project area?**

- Yes  
 No, pls. describe:

**What are the major employment and income sources in and around the project area?**

Livelihood	Percentage of Population living on
Farming	77%
Fishing	.5%
Backyard poultry and piggery	
Vending/Buy and Sell	3.6%
Sari-sari store	
Others, pls. specify: Real Estate, Education, Community and Social activities, etc.	18.9%

**Are there existing local non-governmental organizations in or around the project area?**

- No  
 Yes, pls. identify:  
a. Irrigator's association  
b. Women's association  
c. Cooperative  
d. Senior Citizen's Club

**Social acceptability of the project assessed (community, government, non-governmental organizations)?**

- No  
 Yes, pls. describe and/ or attach documents:

Focus group discussions/ key informant interviews in the affected barangay of Haliap, indicate general acceptance of the project. Kindly refer to Annex 8 of IEE report for minutes of the meeting and attendance sheets.

## 5.0 IMPACT ASSESSMENT / MITIGATION MEASURES

### 5.1 Project Location and Design

Impact	Evaluation		Mitigation Measures	Responsibility
	Relevant Subjects and Parameters	Magnitude of Impact		
Loss of species due to obstructions to movement of aquatic life	Height of the weir(m): <u>3m</u>	<input checked="" type="checkbox"/> none <input type="checkbox"/> low <input type="checkbox"/> moderate <input type="checkbox"/> high	<input checked="" type="checkbox"/> No mitigation measure <input type="checkbox"/> Fish way or by-pass planned. Pls. Describe design and arrangement of the proposed mitigation facility and attach plans:  <input type="checkbox"/> Further measures, pls. specify.	
Fish injuries due to passing through turbine or across sharp edged weir	Width of openings of screen or rack at intake (mm) : 1.6mm  Design of weir spillway (Intake weir is over-flow type on the weir crest because it is utilized for the existing irrigation weir).	<input checked="" type="checkbox"/> none <input type="checkbox"/> low <input type="checkbox"/> moderate <input type="checkbox"/> high	<input checked="" type="checkbox"/> No mitigation measure: No project structure will be constructed within the river channel <input type="checkbox"/> Planned measures, pls. Specify:	
Dying out of the riverbed between the intake and the outlet	Minimum residual flow with proposed project: -In m <sup>3</sup> /s or l/s: _____  In % of mean annual flow without proposed project: _____	<input checked="" type="checkbox"/> none <input type="checkbox"/> low <input type="checkbox"/> moderate <input type="checkbox"/> high	How is the residual flow provided? <input type="checkbox"/> With a residual flow section in the weir <input type="checkbox"/> By-pass pipeline <input type="checkbox"/> Other, pls. Specify  <input type="checkbox"/> Other measures, pls. specify:	
Downstream Erosion due to reduction or inhibition of bed load transport	Design and arrangement of the weir and the intake	<input checked="" type="checkbox"/> none <input type="checkbox"/> low <input type="checkbox"/> moderate <input type="checkbox"/> high	Design and arrangement of the weir and the intake? Pls. Attach drawing or plan: Project Component Main Section	
Sludge alluvial deposits, increased growth of algae, Reduction of capacity for self-cleaning of the water due to the transformation of a stream into an impoundment	Tot. storage volume (m <sup>3</sup> ): <u>0</u> Tot. surface area of the impoundment (m <sup>2</sup> ): <u>0</u>	<input checked="" type="checkbox"/> none <input type="checkbox"/> low <input type="checkbox"/> moderate <input type="checkbox"/> high	<input type="checkbox"/> No mitigation measure <input type="checkbox"/> Planned measures, pls. Specify:	

Impact	Evaluation		Mitigation Measures	Responsibility
	Relevant Subjects and Parameters	Magnitude of Impact		
Impairment on aesthetics or cultural heritage due to protruding structures	Architecture, size and construction materials of buildings and structures:	<input checked="" type="checkbox"/> none <input type="checkbox"/> low <input type="checkbox"/> moderate <input type="checkbox"/> high	Architecture, size and construction materials of major buildings? Pls. describe and attach plans:	
Erosion due to building of roads and/or structures on steep slopes	Maximum slope at construction site (% , N/A if tunnel ): -Weir and intake structure: ____ -Headrace____ -Surge tank/Forebay:____ _____ -Penstock:____ -Powerhouse:____ -Tailrace:____ -Others, pls. Specify: _____ _____ _____	<input checked="" type="checkbox"/> none <input type="checkbox"/> low <input type="checkbox"/> moderate <input type="checkbox"/> high	<input type="checkbox"/> No mitigation measure <input type="checkbox"/> Slope stabilization with methods of bio-engineering, pls. Specify : <input checked="" type="checkbox"/> Other slope stabilization measures, pls. Specify  <input type="checkbox"/> Other measures, pls. Specify: Refer to IEE Report	
<b>Construction Phase</b>				
Construction work in sensitive environment	Estimated duration of noisy and dust provoking activities during construction at all major project sites (days or months)?  Estimated duration and volume of major transport traffic to construction sites (days and trucks per day)?  Kind and number of machinery used at major construction sites? Truck	<input checked="" type="checkbox"/> none <input type="checkbox"/> low <input type="checkbox"/> moderate <input type="checkbox"/> high	<input type="checkbox"/> No mitigation measure <input type="checkbox"/> General guidelines for construction work (safety, health, and environment ). Pls. Attach guidelines and implementing procedures. <input type="checkbox"/> Restricting of hours during which the offending activities are carried out. Pls. Specify: <input type="checkbox"/> Use of blast mats <input type="checkbox"/> Maintenance of equipment exhaust system <input type="checkbox"/> Removing and disposal of trees and any vegetation pushed or felled into watercourses <input type="checkbox"/> Inhibition of illegal settlement and housing of wild animals as well as logging around the construction work <input type="checkbox"/> Introduction of speed limits on access roads <input type="checkbox"/> Other measures, pls. Specify:	TEPSCO, Provincial Government of Ifugao and Contractor
Contamination of soil and water due	Storage, handling and disposal of	<input type="checkbox"/> none <input checked="" type="checkbox"/> low	<input checked="" type="checkbox"/> following of the regulation of RA 6969	



Impact	Evaluation		Mitigation Measures	Responsibility
	Relevant Subjects and Parameters	Magnitude of Impact		
to spilling of dangerous substances (fuel, oil, lubricants, chemicals)	dangerous substances	[ ] moderate [ ] high	[ <input checked="" type="checkbox"/> ] Other measures, pls. Specify: Regular maintenance of construction heavy equipment will be observed.	
Loss of habitat due to excavation work in watercourses	Volume of excavation in or at watercourses (m3): <u>10,190m<sup>3</sup></u> ; there will be no excavation of existing watercourses.	[ <input checked="" type="checkbox"/> ] none [ ] low [ ] moderate [ ] high	[ ] No mitigation measure. [ ] Erosion control measures with methods of bio-engineering, pls. Specify:  [ ] Other erosion control measures, pls. Specify:  [ ] Protection measures for fish populations, pls. Specify:  [ ] Other measures, pls. Specify:	
Erosion and sedimentation due to disposal of spoil from excavation work	Estimated volumes of spoil from excavation work at construction sites (m3): 5,382m <sup>3</sup>	[ ] none [ <input checked="" type="checkbox"/> ] low [ ] moderate [ ] high	[ ] No mitigation measure [ ] Disposal of spoil from excavation works at dedicated spoil and stockpile location, pls. Specify location(s):  [ ] Related measures (drainage, re-vegetation )at stockpile location, pls. Specify:  [ <input checked="" type="checkbox"/> ] Other measures, pls. Specify. Disposal site will be identified. Excavated spoils may be used as fill materials and may be given out free to interested individuals.	
<b>Operation and Maintenance</b>				
Obstruction to movement of aquatic life due to insufficient functionality of the migration facility	Functionality of mitigation facilities	[ <input checked="" type="checkbox"/> ] none [ ] low [ ] moderate [ ] high	[ ] No mitigation measure [ ] Frequent maintenance of fishway or by-pass, pls. Describe measures:  [ ] Other measures, pls. Specify:	
Loss of aquatic life due to surges as a consequence of	Estimated maximum variation of downstream	[ <input checked="" type="checkbox"/> ] none [ ] low [ ]	[ ] No mitigation measure [ ] operation guidelines	

Impact	Evaluation		Mitigation Measures	Responsibility
	Relevant Subjects and Parameters	Magnitude of Impact		
intermittent operation of the hydro scheme	discharge (m <sup>3</sup> /s) during normal plant operation within a period of 5 Minutes: ____ 10 Minutes: ____ 60 Minutes: ____	moderate <input type="checkbox"/> high	to limit surges, pls. describe:  <input type="checkbox"/> Other measures, pls. specify:	
Loss of aquatic life due to flushing of the impoundment	Volume of life storage, that will be maintained during plant operation phase (m <sup>3</sup> /s): ____	<input checked="" type="checkbox"/> none <input type="checkbox"/> low <input type="checkbox"/> moderate <input type="checkbox"/> high	<input type="checkbox"/> No mitigation measure <input type="checkbox"/> Flushing during natural floods <input type="checkbox"/> Provision and Implementation of flushing guidelines, pls. specify or attach flushing guidelines:  If flushing during natural floods is not successful, what other strategies are planned to maintain the live storage? <input type="checkbox"/> Dredging <input type="checkbox"/> Flushing outside natural floods <input type="checkbox"/> Others, pls. specify:	
Accumulation of floating debris at the intake	Design of intake	<input type="checkbox"/> none <input checked="" type="checkbox"/> low <input type="checkbox"/> moderate <input type="checkbox"/> high	<input type="checkbox"/> No mitigation measure <input checked="" type="checkbox"/> Measures to reduce or avoid accumulations of floating debris at the intake, pls. describe: Regular cleaning of the settling pond will be conducted to prevent siltation and to remove large organic debris before any incipient decomposition occurs.	
Loss of habitats due to de-watering of basins and channels during revision and maintenance work		<input checked="" type="checkbox"/> none <input type="checkbox"/> low <input type="checkbox"/> moderate <input type="checkbox"/> high	<input type="checkbox"/> No mitigation measure <input type="checkbox"/> Relocation of fish population prior to de-watering of basins and channels <input type="checkbox"/> Other measures, pls. specify:	
Abandonment and Rehabilitation Phase				
Contamination of soil and water due to abandoned equipment	Abandonment of plant facilities including all equipment	<input checked="" type="checkbox"/> none <input type="checkbox"/> low <input type="checkbox"/> moderate <input type="checkbox"/> high	<input type="checkbox"/> No mitigation measure <input type="checkbox"/> Abandonment plan including cost	

Impact	Evaluation		Mitigation Measures	Responsibility
	Relevant Subjects and Parameters	Magnitude of Impact		
	(machinery, electro-mechanical equipment)		estimate, pls. describe and attach plan:  [ ] Other measures, pls. specify:	
Flooding due to blocking of abandoned dam or weir				

## 5.2 Risk Assessment

Risk	Evaluation		Mitigation Measures	Responsibility
	Relevant Subject and Parameters	Magnitude of Impact		
Downstream flooding due to failure of the dam or weir	Dam or weir stability	<input checked="" type="checkbox"/> none <input type="checkbox"/> low <input type="checkbox"/> moderate <input type="checkbox"/> high	<input type="checkbox"/> No mitigation measure necessary <input type="checkbox"/> Monitoring of dam or weir stability; pls. include monitoring plan (refer to paragraph 6.3.) <input type="checkbox"/> Other measures, pls. specify:	
Upstream flooding due to high head water level	Maximum flood water level in impoundment if sluice gate is blocked (m.a.s.l.): _____	<input checked="" type="checkbox"/> none <input type="checkbox"/> low <input type="checkbox"/> moderate <input type="checkbox"/> high	<input type="checkbox"/> No mitigation measure necessary <input type="checkbox"/> Restricting activities near impoundment, pls. specify:  <input type="checkbox"/> Other measures, pls. specify:	

## 6.0 ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

### 6.1 Environmental Management and Protection Plan

Subject	Activity
Watershed Management and Protection	The community and the entire Ifugao practice a communal forest system called <i>muyong</i> . This system somehow effectively controlled swidden ( <i>kaingin</i> ) farming, which largely the cause of forest degradation in the Cordillera region. Integration of this practice in the watershed management and protection plan will assure the preservation of the forest. A detailed watershed management plan will also be prepared during the implementation of the project.
Protection of significant flora and fauna in or near the project area	Protection of significant flora and fauna will be incorporated in the Watershed Management Plan to be established

### 6.2 Disaster Preparedness Plan

Subject	Activity
Flood Alarm System	Alarm System provided? <input checked="" type="checkbox"/> Not necessary <input type="checkbox"/> Yes, please describe or attach plan:
Evacuation Plan	Evacuation Plan provided? <input checked="" type="checkbox"/> Not necessary <input type="checkbox"/> Yes, please describe or attach plan:
Others, pls. specify:	

### 6.3 Monitoring Plan

Subject	Parameter, Location, Frequency of Monitoring	Responsibility	Cost Estimated
Water Quality	The 2 baseline stations can be assigned as monitoring stations. Monitoring will be conducted quarterly. Monitoring parameters include ph; temperature; DO; BOD;TSS; Total and Fecal Coliform; Oil and Grease; Chlorides;	Proponent	PhP 50,000.00 per quarter

Subject	Parameter, Location, Frequency of Monitoring	Responsibility	Cost Estimated
	Copper; Lead; Iron; Manganese; Total Hardness; Alkalinity and Pesticides		
Fish Mitigation	None		
Soil Erosion	Restoration of vegetation within the vicinity of the structures (i.e. headrace)	Proponent	-
Dam or weir stability	N/A Dam weir is only		
Waste disposal	none	Proponent	-
Others, pls. specify:			

**Annex a. Photo documentation (Weir Site)**



**Stream flowing into Lamut River**



**Surrounding Slope**



**Looking upstream at weir site**



**Looking upstream at weir site**



**Looking downstream at weir site**



**Looking downstream at weir site**

**Annex b. Photo documentation- Along the River and Eroded Area**



**Lamut River**



**River near powerhouse**



**River near powerhouse**



**Washed out bridge**



**Erosion**



**Slopes**

**Annex c. Water Quality Stations**



**Water quality station at the intake area upstream of Lamut River**



**Water quality station at the proposed downstream of Lamut River**