Appendix I

議事録

Highlights of the Kick-off Meetings on February 14, 2011 (JICA Manila Office and the DBP)

- **14 February 2011 (Kick-off Meetings)**
  - With JICA Manila Office representatives. Discussed the implementation plan and schedule and activities to be performed for the 1st study mission as well as introduced study team members
    - Mr. Hamaguchi will attend and participate during the study presentation with the SP of PGI and SB of LGU Asipulo
    - JICA comments:
      - From the DBP - Disbursements already moving for the EDP. For RE there are biomass projects in the pipeline
      - Rephrase the word "stagnation" to a more positive tone in the materials
      - Consider the political dynamics – Ifugao (JBIC study) – common understanding
      - Cited as example case of Metro Iligan (health sector) – will only used revenues and not touch the IRA
      - Will effect changes in the word "stagnation" to be more positive prior to presentation with DBP
    - Comments from TEPSCO study team
      - PPDO staff visited the DBP branch in Solano to inquire
      - Office within the PGI – Conservation Fund Management and Provincial Ordinance
      - Willingness of PGI to implement the project
      - FS will reduce development cost as compare to the JBIC study (JGRP a bit expensive)
      - DBP (EDP rates between 9% to 11 %), cash flow and borrowing capacity
      - DBP clear with the procedures – standard screening and approval process
      - Account officers familiar with the sector, coordinate with other agency (DOE)
  - with the DBP (Mr. Jericho Martinez and Ms. Meriam Salvador of the bank's Project Development Department – Messrs. Paul Lazaro and Noli Cruz – attending a meeting/previous commitment)
    - Mr. Hamaguchi (JICA Manila Office) accompanied the TEPSCO study team
      - Study team discussed with DBP staff the project implementation plan and schedule of activities to be performed during the 1st field mission and introduced the study team members
      - Inquired from DBP regarding the EDP implementation and project appraisal guidelines
    - DBP funding RE projects (APL 1 – full release 2009, 30% utilization – 2nd tranche up to 2012)
      - DBP has a checklist of requirements

- DBP evaluation system – 2 approach
- Technical evaluation – Project Development Department) – (technical, social, environmental) – to be coordinated with the nearest DBP branch network
- Financial evaluation – marketing group – credit application
- Consultant for EDP – consultants from GHD
  - Submitted FS & Detail Design and Engineering (DDE) consultant with project unit conduct a walkthrough – interviews
  - Project evaluation – endorsement report – to be submitted to the branch to complete the credit appraisal
  - EDP – no mini-hydro project/RE project yet
  - WB consultants provided a checklist – used for checking guidelines on RE applications
  - 45 working days – complete submission for project evaluation and loan processing
  - DBP staff provided TEPSCO study team with the banks' guidelines for reference
- Presented to the DBP staff the Ambangal mini-hydro project video documentation

R. Cabazor

Noted:

Engr. Mitsuru Shimizu
Team Leader
TEPSCO EDP Project

Implementation Plan

Republic of the Philippines
Study
for
Promoting Implementation
of
Environmental Development Project

Contents

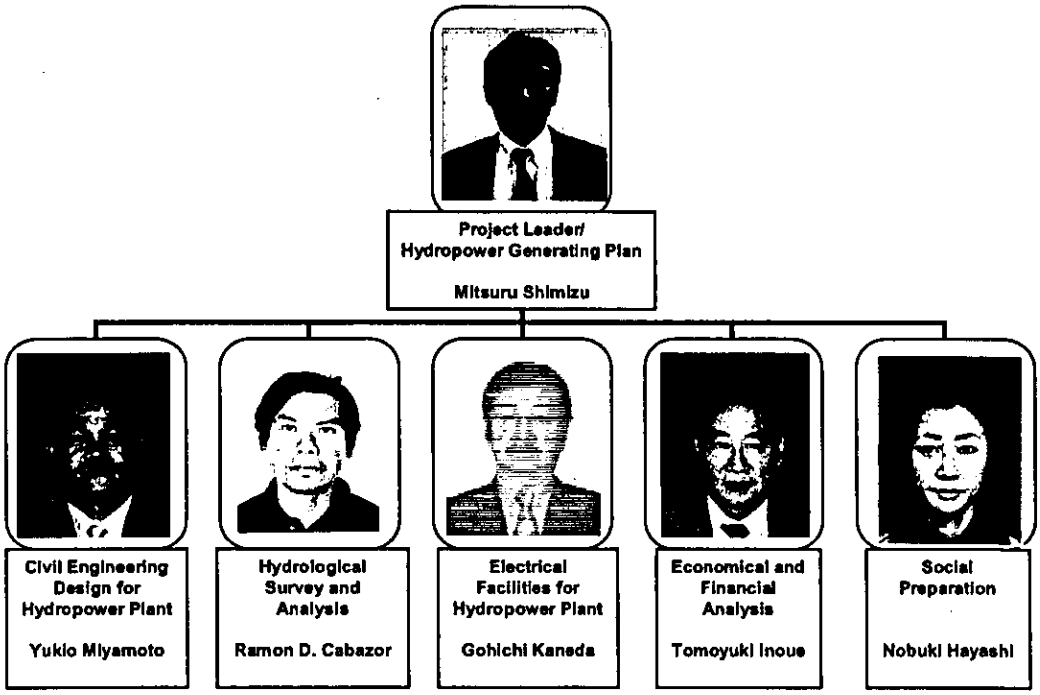
Outline of the Project

- Objectives:
  - To promote the implementation of the Environmental Development Project
  - To formulate "Guideline for Evaluating Mini-hydro Project" trough implementation of Feasibility Study on Cotcot Mini-Hydropower Development in Ifugao
  - Enhancement of "World Heritage's Terrace Conservation Fund" by making use of electricity sales from Cotcot MHP
  - To show good practice of a rural vitalization by Mini-hydropower development and aims to expand the application of the Environmental Development Project.
- Counterpart:
  - Development Bank of the Philippines (Guideline)
  - Provincial Government of Ifugao (Case Study)

Outline of the Project

- Duration:
  Feb. 2011 – Aug. 2011 (7 months)
- Related Agencies:
  - Department of Energy Renewable Energy Management Bureau
  - Ifugao Cultural Heritage Office
  - Municipal Local Government of Asiplo
  - Ifugao Electric Cooperative (IFELCO)

Project Team Members (Experts)



Background of the Project

Improve the room of EDP utilization for Mini-Hydropower Development

< Outline of EDP (Environmental Development Project) >

Date of Loan Agreement : Sep. 2008

Total Amount of EDP : 24,846 million yen (approx. 13,000 million pesos)

Target Sector :
- ☆ Water supply and sanitation
- ☆ Renewable energy
- ☆ Industrial pollution control
- ☆ Solid/health care/hazardous waste management

Present situation of EDP utilization : few application for Hydropower Project

Current Issues on Mini-hydropower Development

① Continual meteorological and hydrological observation system has not organized

② Inventory study for hydropower development has not completed

③ Appropriate technology for mini-hydropower development has not been established in the Philippines

④ Technical standard or guideline for mini-hydropower development has not been organized

⑤ The comprehensive/specific hydropower development plan has not formulated by the government

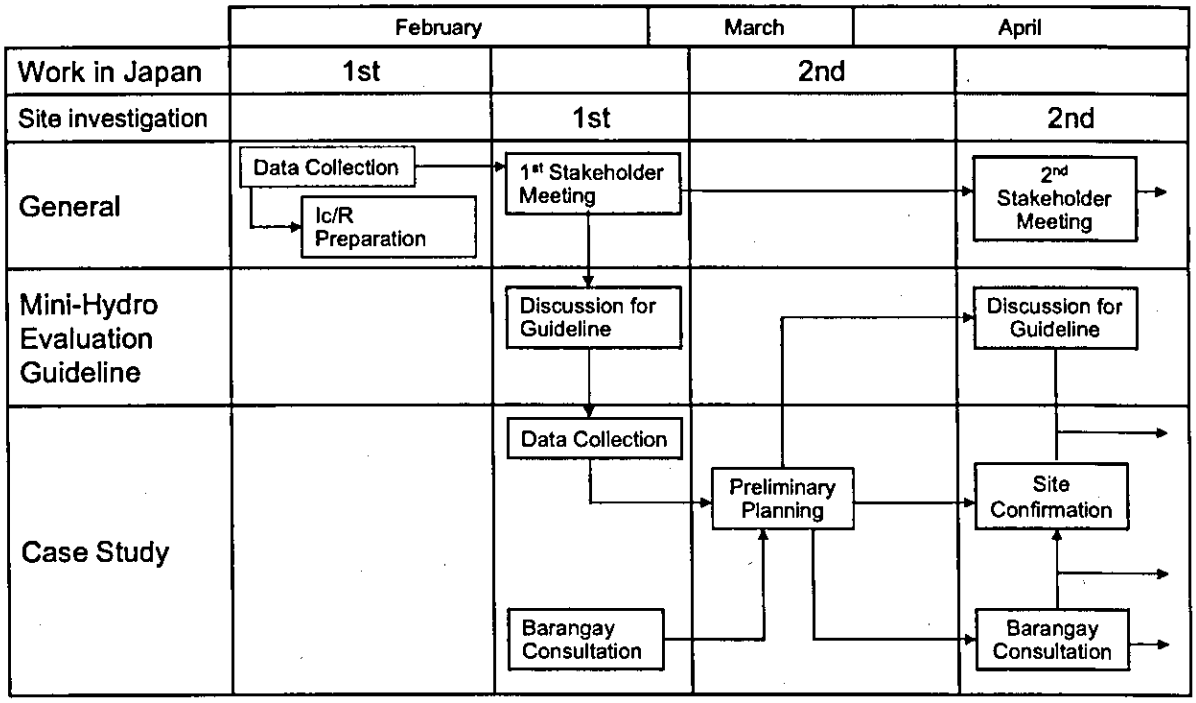
Concept of the Project

Basic Principle -1.	: The guideline for evaluating mini-hydro project will be prepared mainly on the technical aspects, and also consider the effectiveness/swiftness characteristics of the evaluation.
Basic Principle - 2.	: The guideline will make checkpoints clear and set criteria quantitatively as much as possible for objective evaluation.
Basic Principle -3.	: The Stakeholders Meeting/s will be held and the discussion will be disclosed in Barangay Consultation/s. The proper understanding of the project is acquired by the residents and their opinions are reflected for the project planning.
Basic Principle -4.	: The Cotcot mini-hydropower development planned in the case study has a purpose for the expansion of the conservation fund in the world heritage rice terraces.

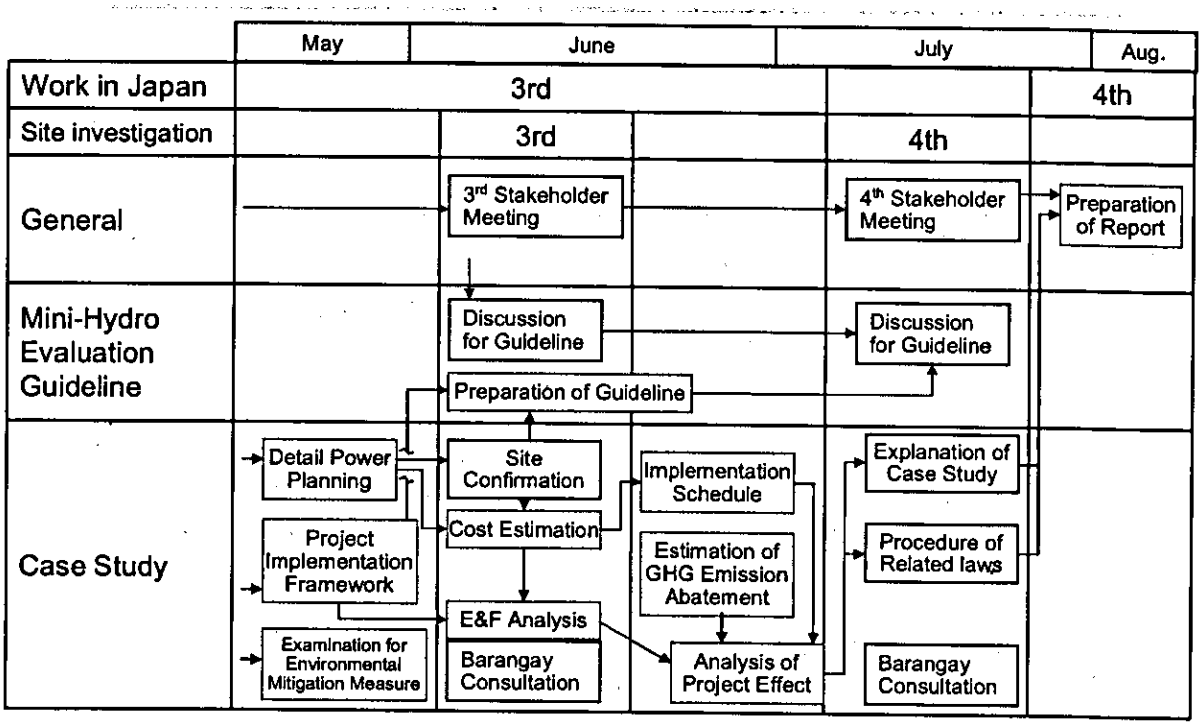
Concept of the Project

Basic Principle -5.	: The planning of the Cotcot mini-hydropower plant will be conducted taking contents into consideration which the Provincial Government could easily make tender documents.
Basic Principle -6.	: Operation system of the Cotcot MHP and management of the rice terraces conservation fund (RTCF) shall be same with the e8 Ambangal MHP Project.
Basic Principle -7.	: In the site survey for the case study, necessary information for safety / security will be acquired from the Provincial Government and the related agencies.

Action Flow



Action Flow



Action Plan

Item	Schedule	Work Item	Remark
1st Works in Japan	Beginning of February, 2011	Collection and analysis of the related data/ information	
		Preparation of Inception Report(Ic/R)	
		Preparation of Specifications for the field survey, etc	
1st Site Investigation	From the beginning of February	Discussion for the guideline for evaluating mini-hydro project	Explanation and discussion for Ic/R
		1st Stakeholder Meeting	
		2nd Barangay Consultation	Explanation for the study
		Collection of the related data and information	
		Contract with local consultants	
2nd Work in Japan	From the beginning of March	Examination of the available plant discharge	Preliminary power planning
		Examination for the selection criteria of the optimum development plan	
		Examination for the resident opinion reflection	
		Examination of the optimum waterway route	

Action Plan

Item	Schedule	Work Item	Remark
2nd Site Investigation	From the middle of April	Discussion for the guideline for evaluating mini-hydro project	Discussion for EDP issues
		2nd Stakeholder Meeting	Explanation for the project outline and opinion hearing
		2nd Barangay Consultation	
		Site confirmation for preliminary power planning	Instruction of the waterway route for the local consultant
		Additional survey for the current situation of the rice terrace conservation	
		Discussion for the transmission and distribution facilities	Meeting with IFELCO
		Confirmation of IEE progress	
3rd Works in Japan	From the beginning of May	Detailed power planning	
		Examination for the environmental mitigation measures	Interim Report of IEE
		Design for civil, electrical and mechanical facilities	
		Examination for the project implementation framework	
		Construction planning	
		Project cost estimation	
		Economical and financial analysis	
		Project implementation schedule	
		Analysis for the project effect	
		Preparation of the guideline	

Action Plan

Item	Schedule	Work Item	Remark
3rd Site Investigation	From the beginning of June	Discussion for the guideline for evaluating mini-hydro project	
		3rd Stakeholder Meeting	Explanation of detailed power planning and facility design
		3rd Barangay Consultation	
		Site confirmation for detailed development plan and facility design	
		Survey for the economical/ financial condition	
4th Site Investigation	Middle of July	Discussion for the guideline for evaluating mini-hydro project	Explanation and discussion for the guideline
		Final Stakeholder Meeting	Explanation and discussion for the study results
		Final Barangay Consultation	
		Adjustment for the related low procedure	
4th Works in Japan	From the end of July	Preparation and submission of Draft Final Report (DF/R) and Final Report (F/R)	

Manning Schedule

Expert		2011							
Name	Field in Charge	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.
Mitsuru Shimizu	Supervision / Hydropower Generating Plan		3 20		10	5 17 3		8	3
Yukio Miyamoto	Civil Engineering Design for Hydropower Plant		3 16	4	6 10	30			
Ramon D. Cabazor	Hydrological Survey and Analysis		1 7 7	7	5		3		
Gohichi Kaneda	Electrical Facilities for Hydropower Plant		12		10	20			
Tomoyuki Inoue	Economical and Financial Analysis						5 10		
Nobuki Hayashi	Socio-environmental Preparation and Consideration		3 20		5 10	10	7 7	8	

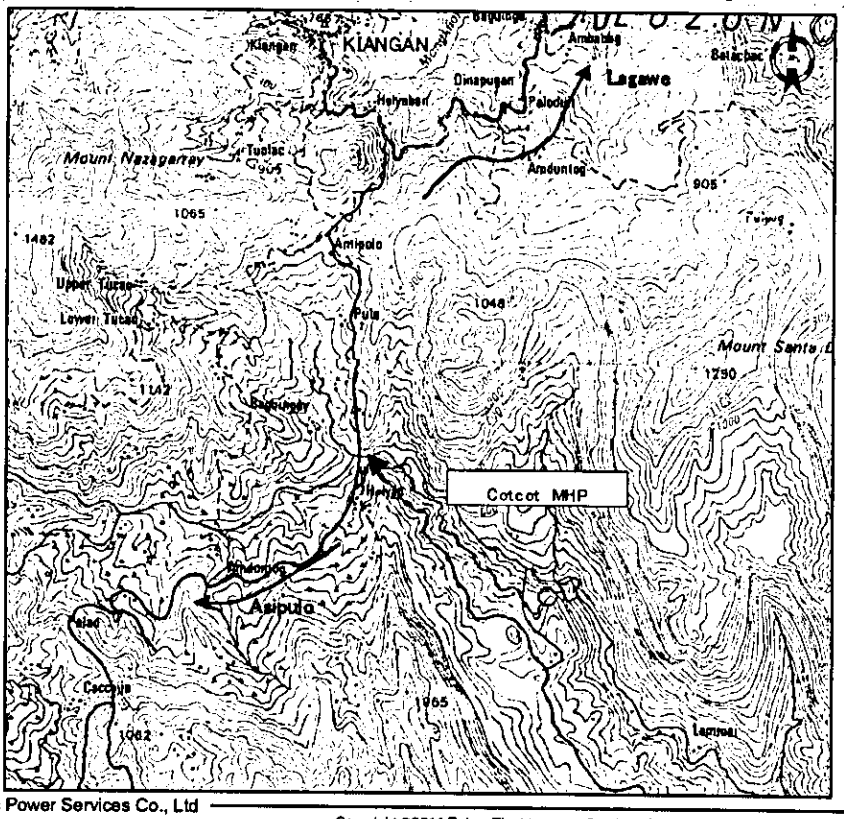
Legend

: Work in the Philippines

: Work in Japan

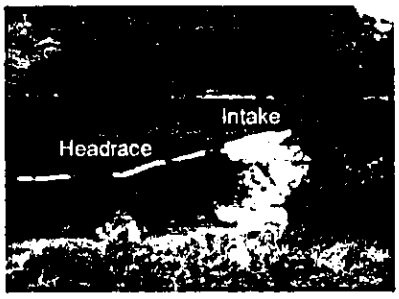
: Partially engaged during the period

Overview of Cotcot Mini-hydropower Project Site

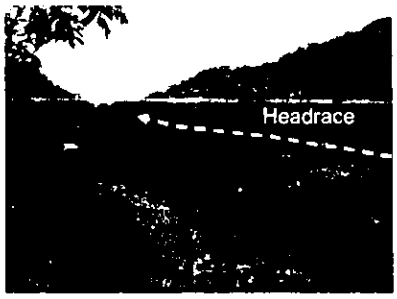


Overview of Cotcot Mini-hydropower Project Site

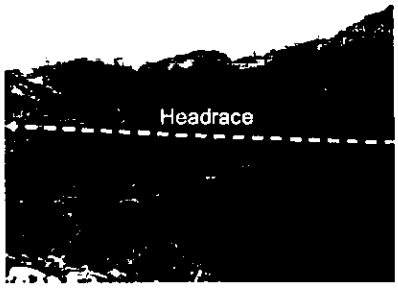
Overview of Cotcot Mini-hydropower Project Site



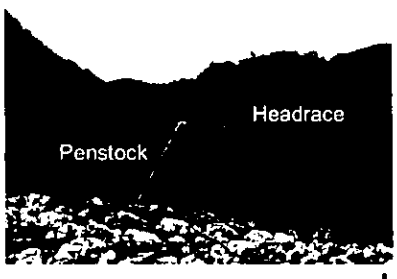
Proposed Intake Site



Proposed Headrace Route 1



Proposed Headrace Route 2



Proposed Penstock Route

Experience of e8 Ambangal Mini-hydro Project

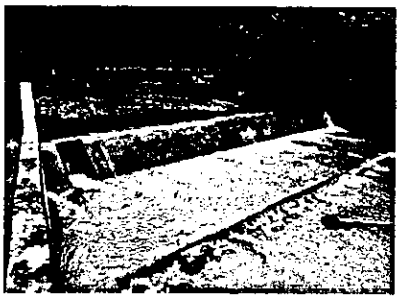
Construction of Intake Weir

Construction of Headrace Channel

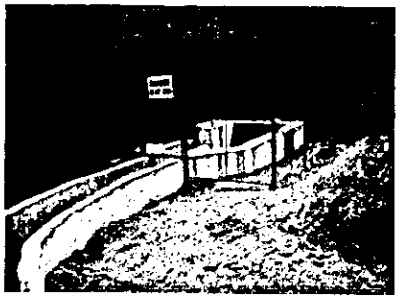
Construction of Penstock

Construction of Powerhouse

Experience of e8 Ambangal MHPP Construction



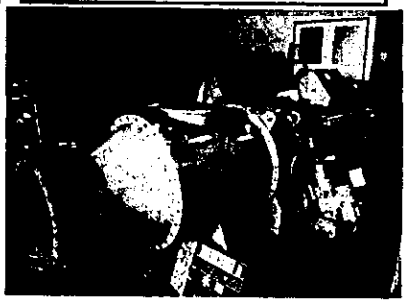
Intake Weir



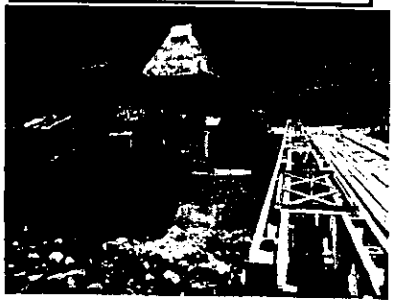
Settling Basin

Headrace Channel

Penstock Route (Underground)



Turbine and Generator



Powerhouse

Experience of Barangay Consultation

Steering Committee Meeting

Barangay Consultation in Hapao

Barangay Consultation in Boklawan

PCM Workshop for Stakeholders

End

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 Kiangan 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 Kiangan 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 to15 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

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

Background

"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

(1) Scaling up of Mini-hydro Projects

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

Background

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

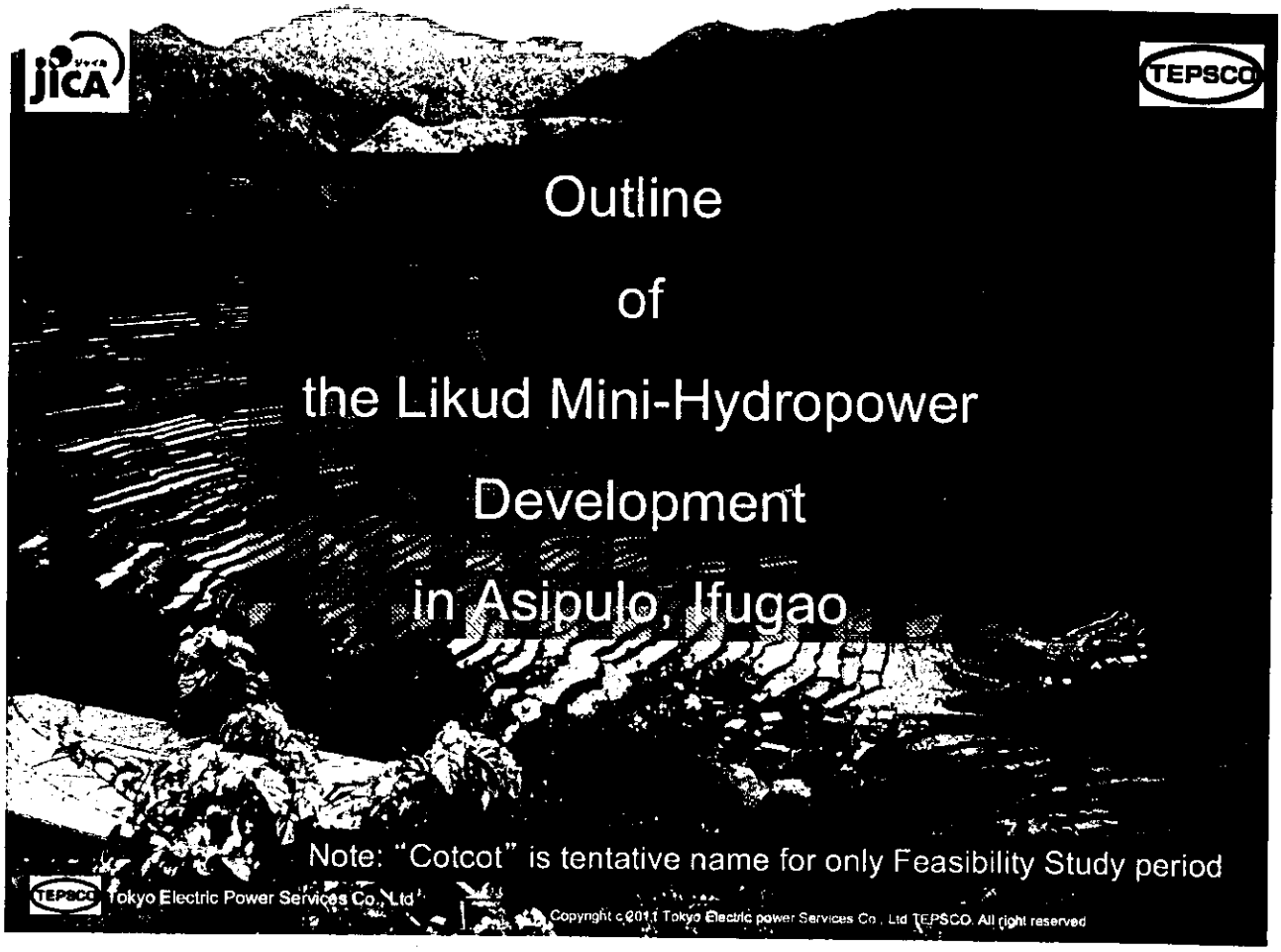
Objectives

To support Provincial Government to manage RTCF

Duration

2 years

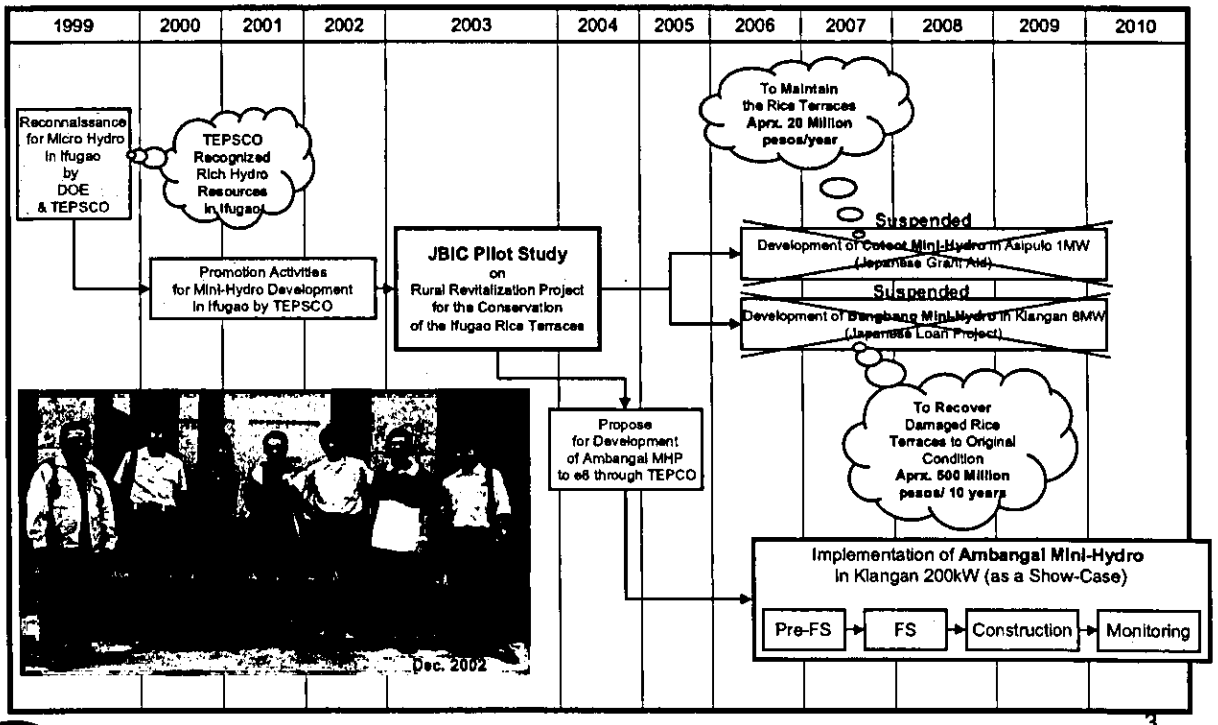
Thank You.



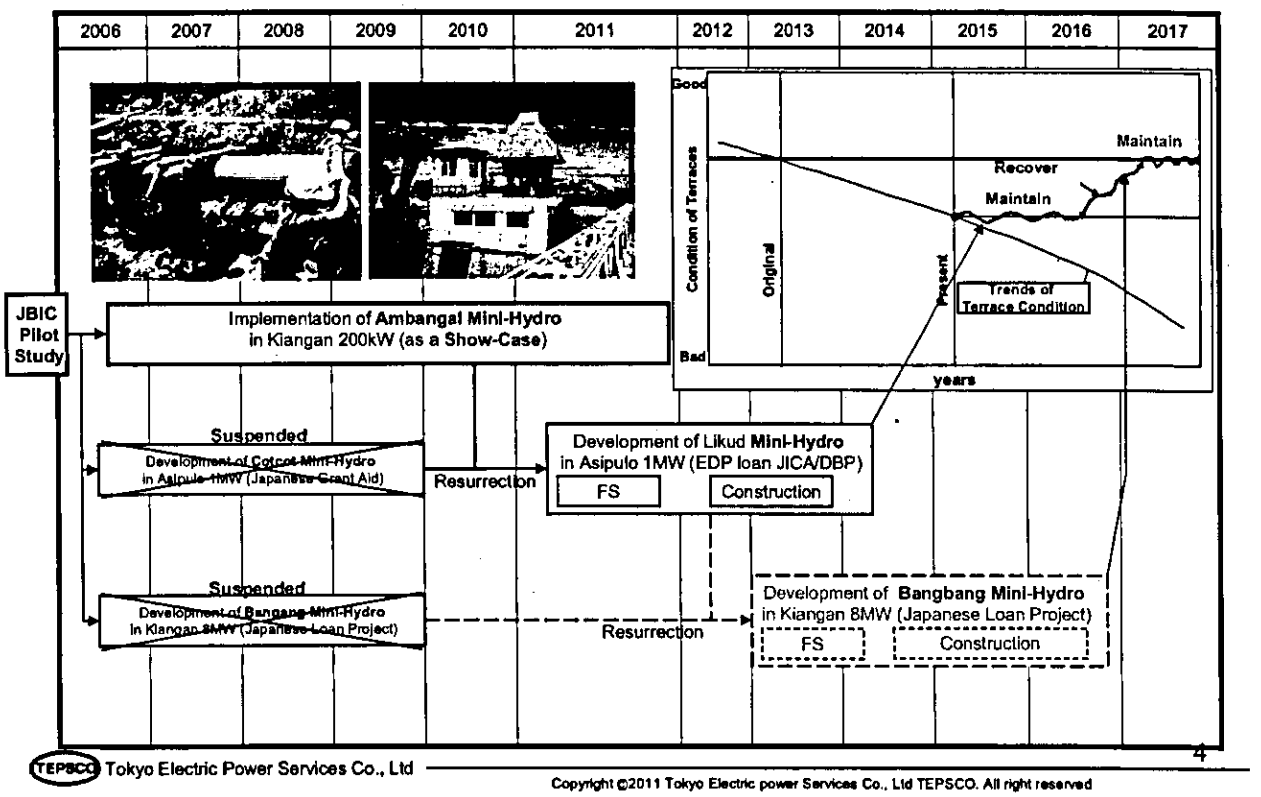
Project Objectives

- 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



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- Micro Finance
- Reforestation, etc.

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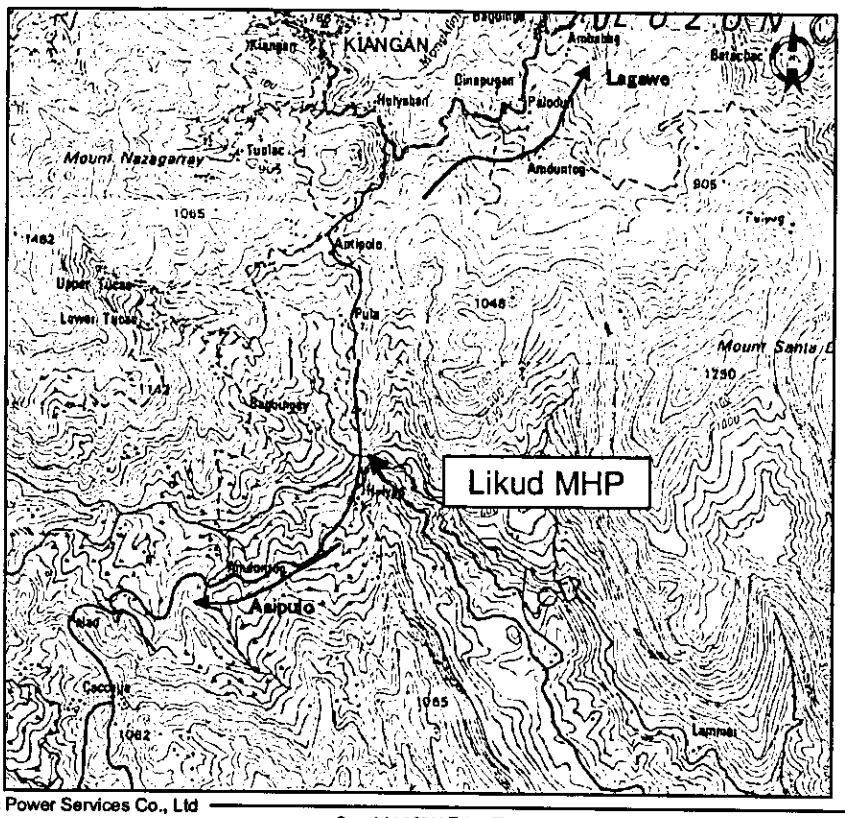

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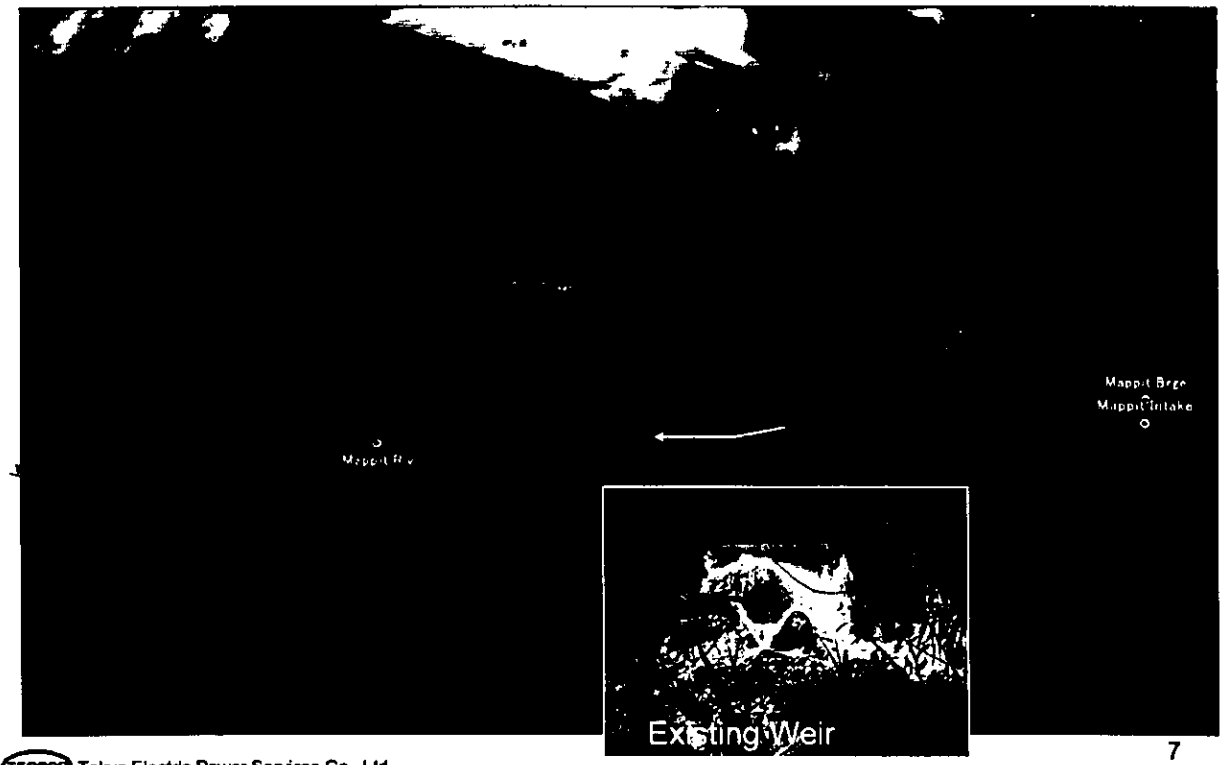

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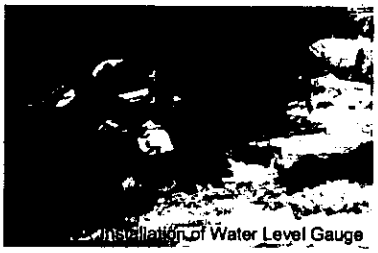

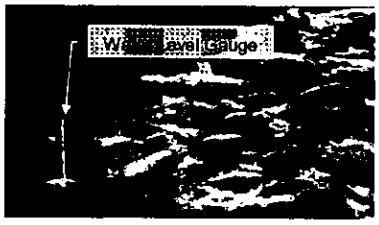

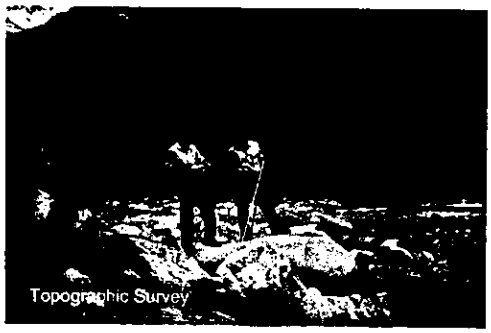

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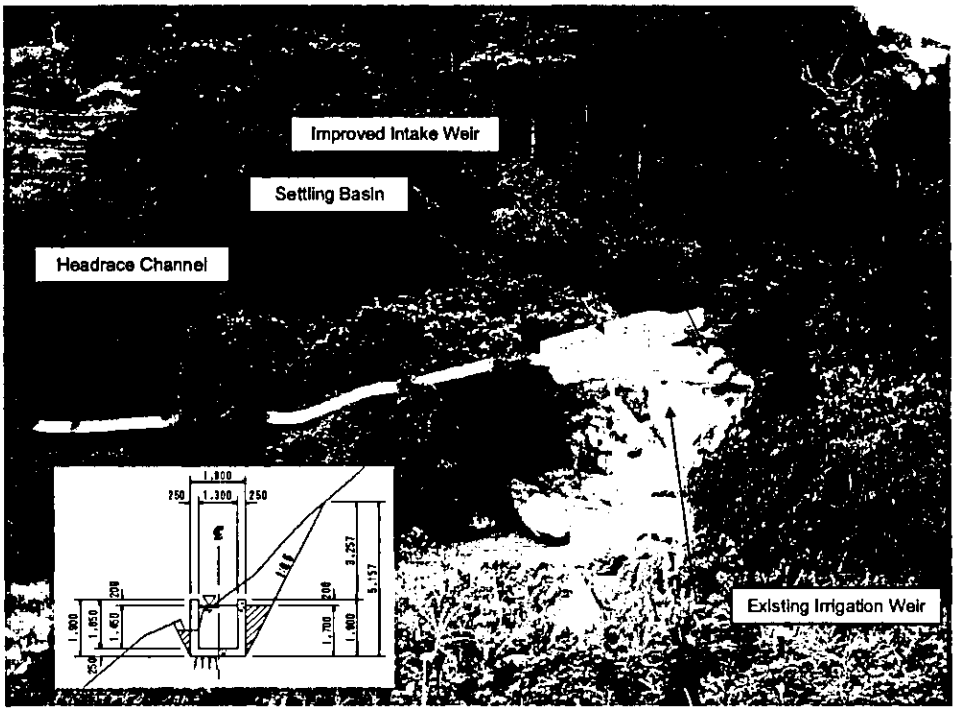

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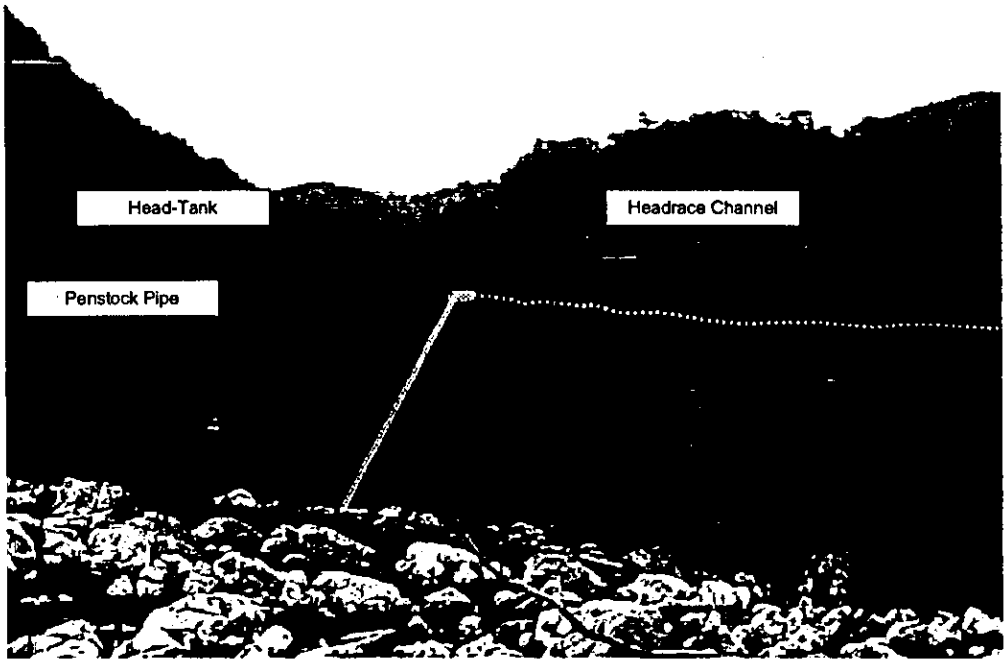


People's Comment about Ambangal MHP

(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

Project Leader/ Hydropower Generating Plan

Mitsuru Shimizu

Civil Engineering Design for Hydropower Plant

Yukio Miyamoto

Hydrological Survey and Analysis

Ramon D. Cabazor

Electrical Facilities for Hydropower Plant

Gohichi Kaneda

Economical and Financial Analysis

Tomoyuki Inoue

Social Preparation

Nobuki Hayashi

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
Wilie 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 Sangguiniang 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 Hallap 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

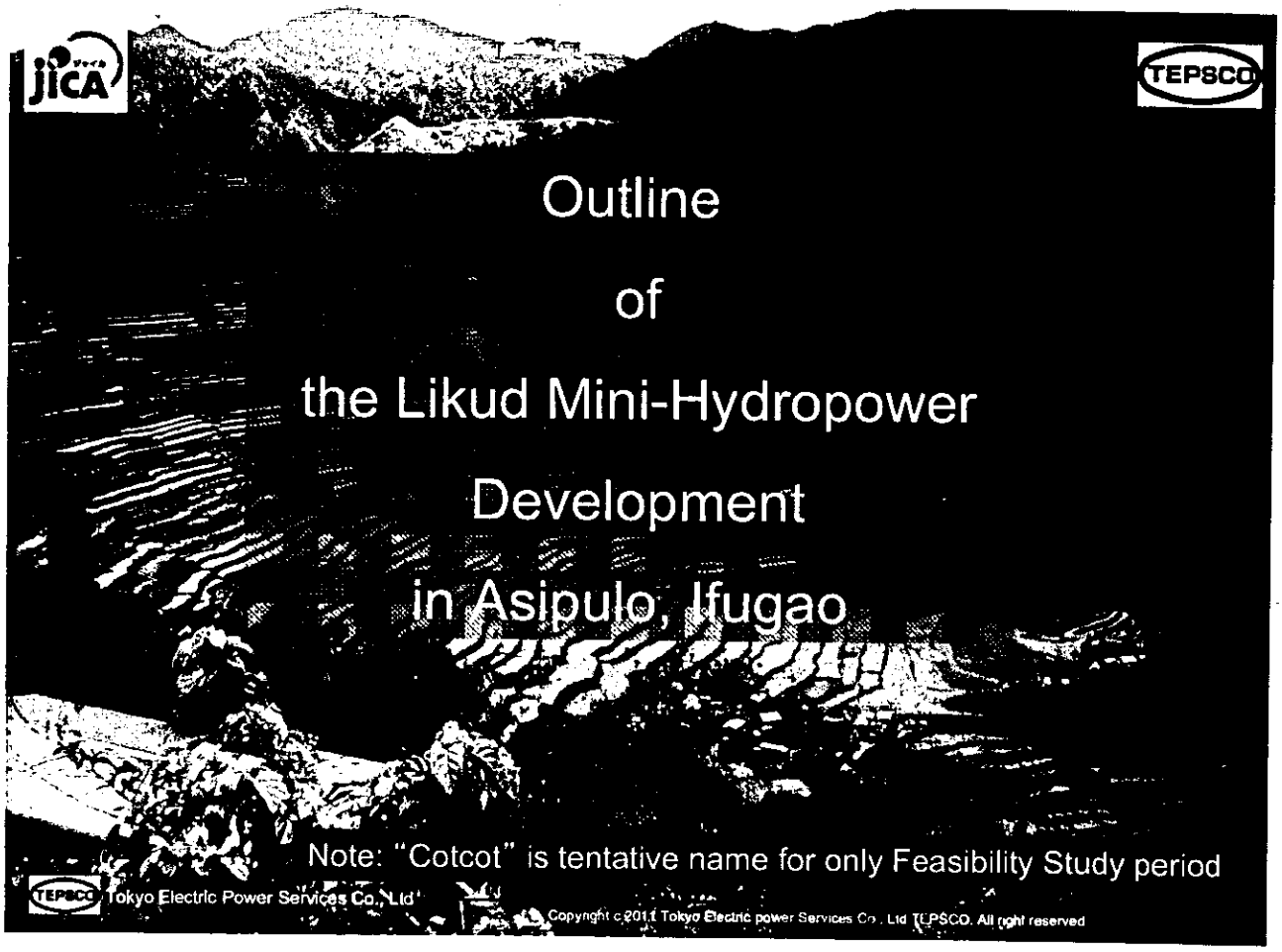
ATTENDANCE

	Name	Position	Office/Barangay	Signature
1.	OSCAR AHYO	Brgy Capt.	Panubtuban	[signature]
2.	Josephine N. Butil	Brgy. Kagawad	Panubtuban	[signature]
3.	MOISES B. DILHG	Kgwd.	PANUBTUBAN	[signature]
4.	Agnes B. Guimi	Kgwd	Panubtuban	[signature]
5.	Basilio Bayadon	Kgwd	Haliap	[signature]
6.	Ernesto Fagtag	Kgwd.	Panubtuban	[signature]
7.	CLEMENTE TENINAN	BRGY KAGAWAD	HALIAP	[signature]
8.	ROSEMARIE DACQUEL	BRGY Kagawad	Haliap	[signature]
9.	Francis N. Bummgc	"	Panubtuban	[signature]
10.	FEDELITO A. RENDON	BRGY. kagawad	Haliap	[signature]
11.	CONSTANCIO Catama	BRGY Kagawad	Haliap	[signature]
12.	Estela P. Baltu	Brgy. Treasurer	Haliap	[signature]
13.	NANCY D. ADDANGNA	Barangay Secretary	Haliap	[signature]
14.	MARIA L. LAD-AG	Barangay ~~Haliap~~ Kagawad	Haliap	[signature]
15.	Ernesto L. Nalliw	Brgy kgd	Panubtuban	[signature]
16.	Donato B. Khablinan	brgy kgd	panubtuban	[signature]
17.	Willy Palencz	AECOM Consultant	AECOM	[signature]
18.	Martin Morales	AECOM Consultant	AECOM	[signature]
19.	Benjamin Panganiban		Haliap	[signature]
20.	Alfredo Biltuwon		Haliap	[signature]
21.	Jason Magayanes	surveyor		[signature]
22.	Mitsuro SHIMIZU	TEPSCO	Tokyo	[signature]
23.	Yukio MIYAMOTO	TEPSCO	Tokyo	[signature]
24.	Carmelita B. Buyucan	PPDC	PPDO	[signature]
25.	Antonio Linglingan	PPDO Staff		[signature]
26.	Nobuki Hayashi	~~TEPSCO~~ SP	TEPSCO	[signature]
27.	MA. CECILIA U. GARCIA	PROJ. MGR./GEODETIC ENGR	URIARTE-GARCIA SURVEYING	[signature]
28.	~~JASON MAGAYANES~~	~~CHIEF OF PARTY~~	"	
29.	Ignacio Bunolra			[signature]
30.	JAMES SAWEY			[signature]

CONSULTATION MEETING

ATTENDANCE

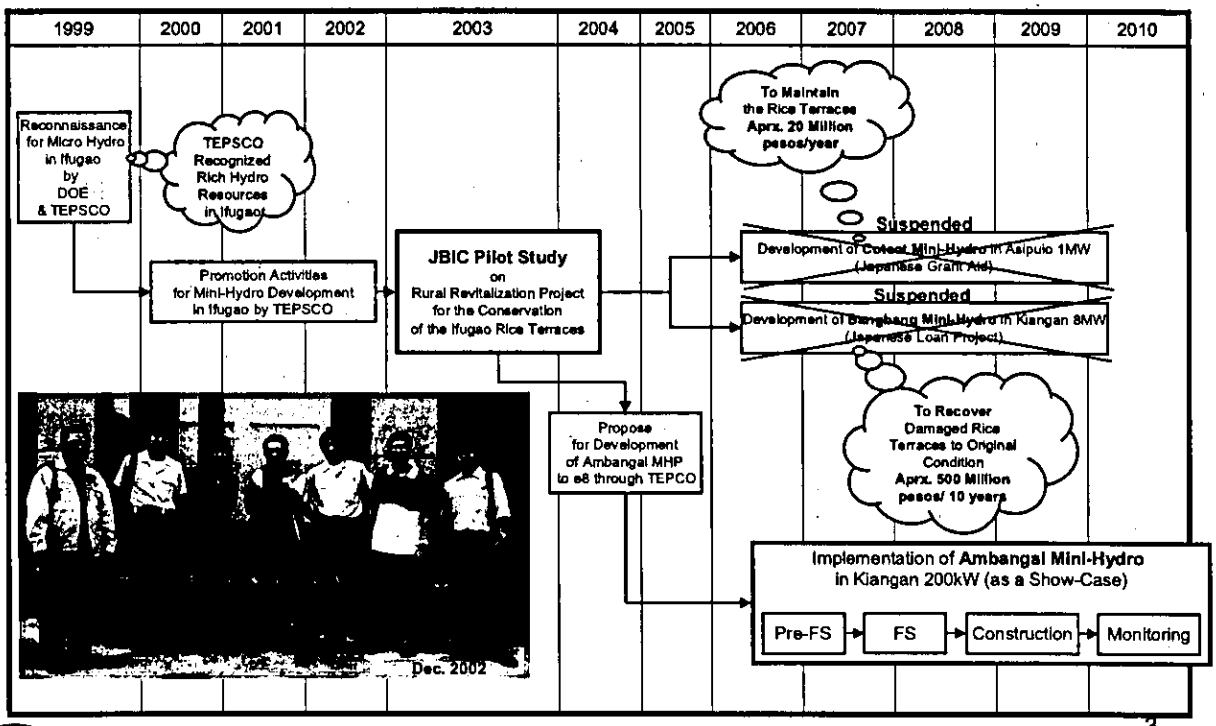
Name	Position	Office/Barangay	Signature
ROGER M. MANGAY	BRGY CAPTAIN	HALIAP	[signature]



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



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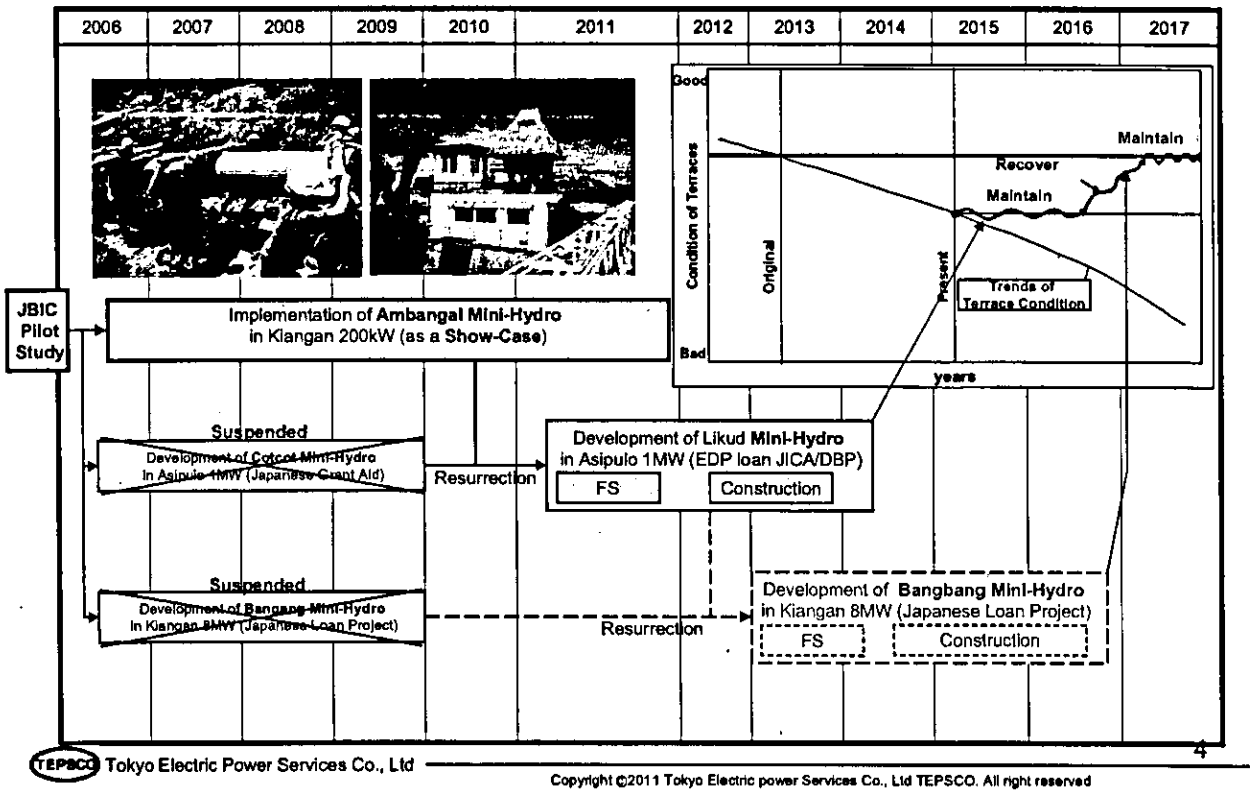

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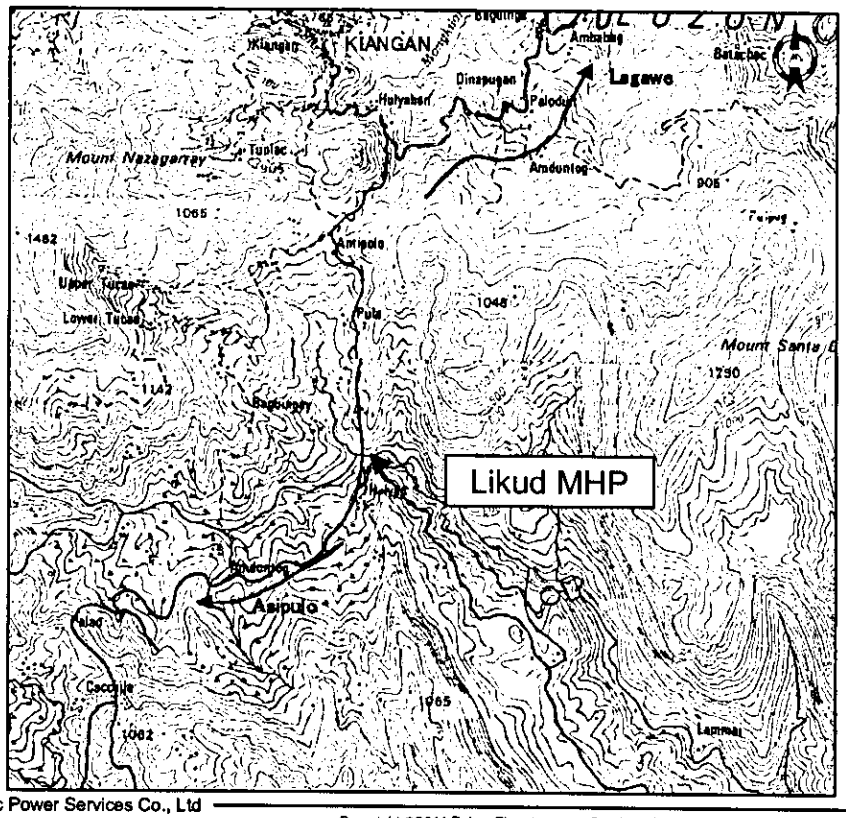

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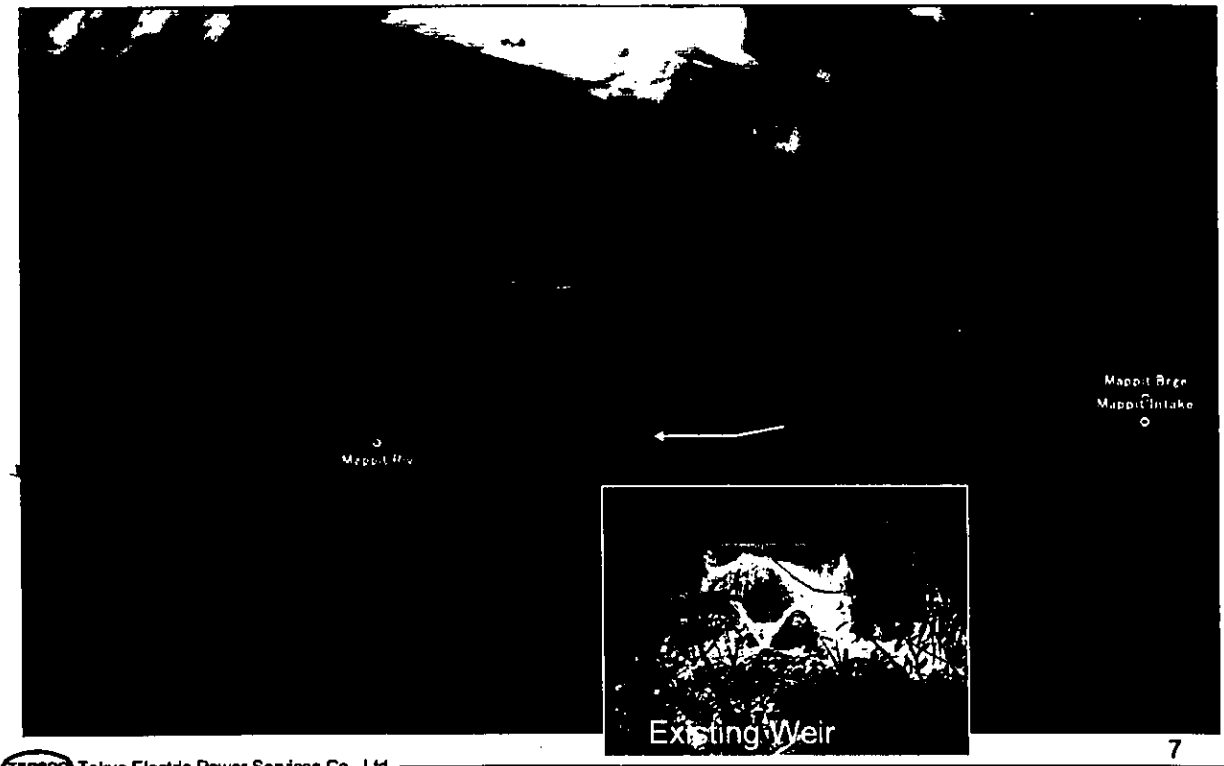

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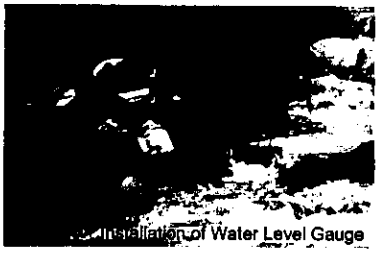

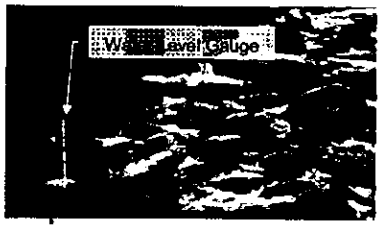

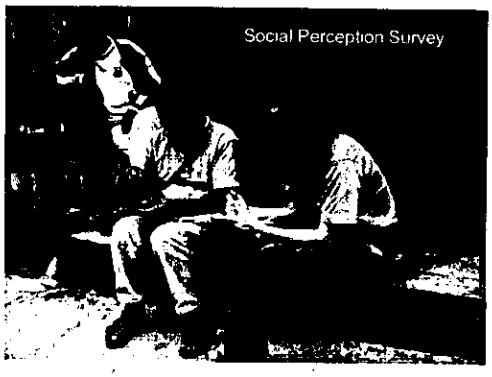

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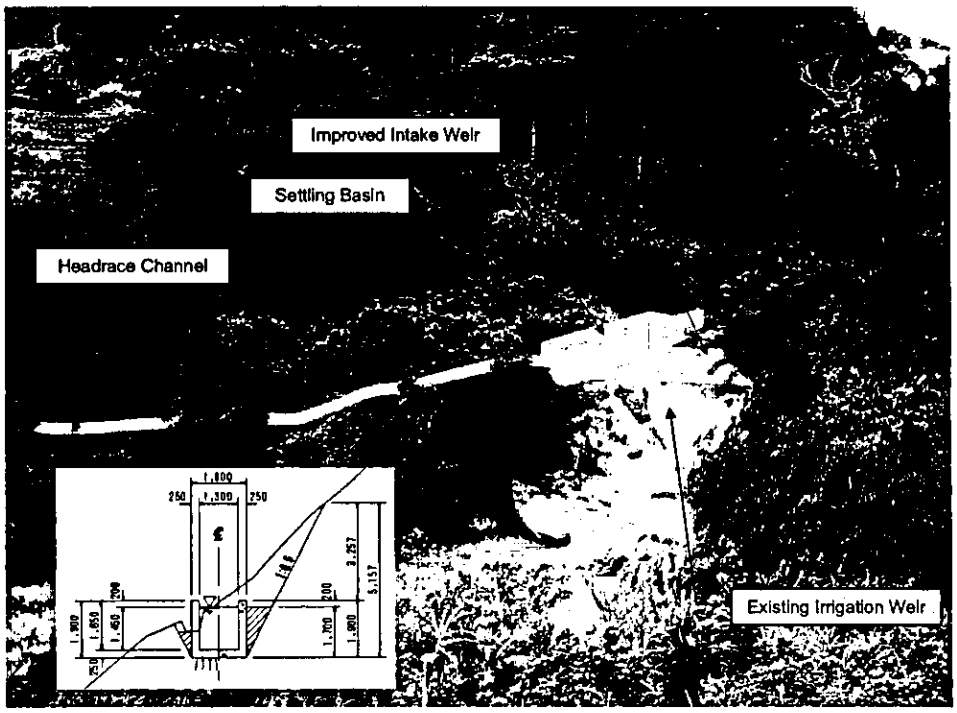

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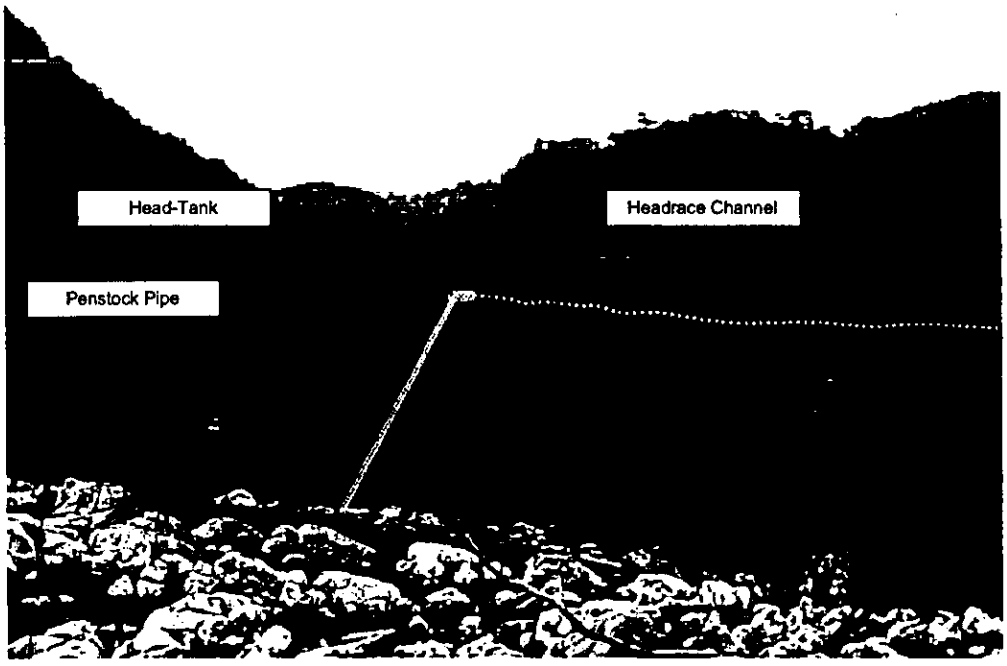

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Yukio Miyamoto

Hydrological Survey and Analysis

Ramon D. Cabazor

Electrical Facilities for Hydropower Plant

Gohichi Kaneda

Economical and Financial Analysis

Tomoyuki Inoue

Social Preparation

Nobuki Hayashi

Haggiyo !!!

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.

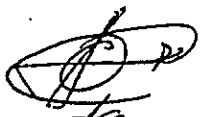
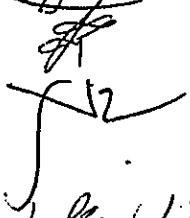
Overall, the plant visit was successful in carrying out its objective of raising positive understanding and appreciation on mini-hydro power plant. I would like however to make an observation. The Operators on duty and who conducted the briefing did well and were helpful. But I suggest that next time 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. 23, 2011
ATTENDANCE SHEET

e8 TOKYO Summit 2010

	Name	Barangay/Office	Signature
1.	Rosemarie m. Dacquel	Haliap	[illegible]
2.	Jedda P. Basilio	Haliap	[illegible]
3.	Josephine V. Bistel	Panubtuban	[illegible]
4.	Ernesto L. Nallin	Panubtuban	[illegible]
5.	Ernesto Taqtaq	Panubtuban	[illegible]
6.	CLEMENTE TENENAN	HALIAP	[illegible]
7.	Maria Lad-oo	Haliap	[illegible]
8.	MOISES B. DULIG	PANUBTUBAN	[illegible]
9.	Fedelito Ausiton	Haliap	[illegible]
10.	Basilio Bayuona	Haliap	[illegible]
11.	Agnes Gucini	Panubtuban	[illegible]
12.	Francis N. Bunimal	"	[illegible]
13.	NELSON DINO	Panubtuban	[illegible]
14.	Donato Khablinan	panubtuban	[illegible]
15.	Marvin Lat-oo	Panubtuban	[illegible]
16.	OSCAR LAU-O	"	[illegible]
17.	[illegible]	panubtuban	[illegible]
18.	Joe NAW-it	Panubtuban	[illegible]
19.	Joseph Lay-o	Panubtuban	[illegible]
20.	BASAHID HGUHIT	panubtuban	[illegible]
21.	Regie Baching	panubtuban	[illegible]
22.	Jimmy Lod-oo	Panubtuban	[illegible]
23.	Lawrence Putac	Haliap	[illegible]
24.	Alfredo B. [illegible]	Haliap	[illegible]
25.	ELIAS DOUMYAO	Haliap	[illegible]
26.	Nancy [illegible]	Haliap	[illegible]
27.	Pedro [illegible]	Panubtuban	[illegible]
28	JONATHAN K- PADDUKAO	PPDO	[illegible]

9	Ananayo	Rodolfo	OPERATOR	
1	JONATHAN	TAMERAY	OPERATOR	
	Ignacio	Bunoha		
2	Mitsuru	Shimizu	TEPSCO	
3	Nobuki	Hayashi	TEPSCO	
4	Fidel	Karaquiz	TEPSCO	

Highlights of the Meeting with DBP April 26, 2011
DBP Office 3rd Fl. Meeting Room 9:30-11:00am

Objective:

- Confirmation on the DBP checklist of EDP
- Technical issue on the mini-hydropower development in the Philippines

Participants:

Paul D. Lazaro (DBP Vice President)
Rustico Noli D. Cruz (DBP Manager)
Jericho N. Martinez (DBP Officer)
Arturo F. Torralba, Jr. (DOE REMB Hydro Div. Officer)
JICA Study Team (Shimizu and Hayashi)

〈EDP〉

- There are some questions on the DBP's regular checklist of requirement. Questions and Answers were noted in attached document.

- The form of Information sheet and Customer Information Report that a developer has to submit to DBP will be provided later.

- EDP's term and condition: 5 years grace period
  A borrower starts to repay from the 6th year after the DBP starts financing. Nothing happens for the first five years, even the interest is not necessary to repay for the first five years. But the borrower has to repay including the interest for remaining 10 borrowing years. The grace period depends on the project's feasibility and borrowing capacity of the borrower.

- DBP usually finances every quarter basis.

- About transferring major deposits from existing bank to DBP, it shall be fair between a borrower and a lender to pledge as a security to the borrower. Not necessary deposit all money but some percentage of money shall be deposited in the DBP account.

〈The Likud mini-hydropower project〉

- Mr. Shimizu presented preliminary power planning of Likud Mini-hydropower using a power point material. The study team examined 4 cases of waterway routes, and the case B is technically, environmentally and financially viable.

- DBP observed many of FS report received from developers said that the generation cost is around Php 4-6/kWh, but in case of the Likud mini-hydro is around Php 2/kWh, it must be very attractive project.

- During the next mission, DBP officer will join to go to Ifugao to initiate discussion with the PGI.

〈Technical Issues on mini-hydropower development〉

- In Japan, any developer can easily get basic data, such as river flow rate and rainfall from national government. The number of gauging station in Japan is 815. The number of rainfall observing station (AMEDAS) is 1307. These data is very important for hydrology and meteorology analysis for hydropower development. On the other hand, in case of the Philippines, the number of gauging station 751 established by DPWH, but operational number is only 272. And the purpose of DPWH is for flood control, they need high river flow date, not low level. NIA installed 178 gauging station in the past but only 1 station is operational. Due to their luck of fund, stop the observation. DOE has no such basic data.

- History of hydropower development in the Philippines, it was started in 1930, in 1970's large hydropower project was trend and focused to develop. However development of small and mini hydro power was not so popular, only 9 sites (Total capacity was 900kW) were developed. In 1990's DOE put Mini-Hydroelectric Power Incentive Act (RA No. 7156) in force, but still large scale of hydropower development was focused. If the scale size is different, different technical skill and/or knowhow are required. Not all are same methods for hydropower development. And JICA study team believes that promotion and improvement of small and mini hydropower development technique is necessary and shall be established in the Philippines.

- Examination of hydrological condition and accurate river flow estimation is very important for the hydropower development project, especially run-of-river type. But there is few case that the developer conducted observation of river flow level and measurement of river flow rate. And that makes the cause of plant factor is low. Low plant factor means that even the power plant capacity is big, but actual power generation outcome is very small. In other word, despite of having big output capacity of the power plant, you can not operate the power plant with maximum output for long period of time due to lack of water. So when you validate the FS report on mini-hydropower project.

Regular Checklist of Requirements

A. THE COMPANY	
☑	Letter of intent to apply for a loan w/ signed Acknowledgement of Transparency (attached)
☐	Company profile, corporate mission/vision, highlights of past achievements and/or corporate milestone → Can the PGI make LGU profile? Or they usually make an accomplishment report every year, so could that report treat as company profile? A: Annual report of PGI shall be submitted → What does "corporate milestone" mean? A: Based on their work program, the accomplishment shall be stated
☑	SEC Registration/Articles of Incorporation (3 copies all pages certified correct/signed originally by Corporate Secretary).
☐	Board of Investments (BOI) Registration, if applicable → Can LGU organize such board? Or no need for LGU? A: LGU used to do it. PGI shall coordinate with DOE to fill in the form and submit to BOI through DOE. DOE will endorse it to BOI.
☐	Accomplished Customer Information Report (See attached form) → Could you provide this form to us? See Attachment-1 that DBP provided
☑	Secretary's Certificate and Board Resolution authorizing the borrowings and designating the authorized signatory/ies to negotiate, borrow, mortgage, sign and enter into a loan agreement with DBP (include specimen signatures). Copy of 2 valid IDs and 3 1x1 colored pictures of the authorized signatories.
☐	List of affiliates and/or subsidiary/ies with the proponent's percentage share of interest → If the PGI only is the proponent, no need the list A: No need. This is for a private company
☐	Statement of assets and liabilities of major stockholders/authorized signatory/ies. → In case of the PGI, describe LGU's assets and liability? A: No need.
☐	Certified list of Directors and Key officers and their bio-data with 2 pcs. ID pictures each, TIN and residence certificates. Each should accomplish Confidential Information Sheet (attached form can be photocopied) → In case of the PGI, Can the Governor and the SP members be admitted as certified officers for the mini-hydro power project? A: No need
☑	List of banks with current dealings with the company and its major shareholders.
☐	Types of bank accommodations. → What does it mean? A: Credit information that the LGU has

B. FINANCIAL ASPECT	
☐	Income Tax Returns of the company and major stockholders for the past 4 years → In case of the PGI, no need this? A: If the PGI has
☑	Financial statements for the last 4 years (Audited and In-house). Kindly detail components of cost of sales, operating expenses, fixed assets and depreciation. ➢ Balance Sheet including supporting schedules for each balance sheet item

Regular Checklist of Requirements

	➢ Income Statement ➢ Cash Flow
☑	Financial projections over the life of the loan, including detailed assumptions. ➢ Diskette copy of financial projections ➢ Hard Copy of financial projections

C. MARKETING ASPECT/OPERATIONS – this maybe included in the feasibility

☐	Profile of the market/target area. → Can I say profile of the mini-hydro project area? A: Item C is about Market project, no need.
☑	Present and projected demand and supply condition.
☐	Position in the industry. → How to express in case of LGU? Generating power as public enterprise? A: No need
☑	Description of present operations to include facilities and system capacity
☐	List of major contracts (old and new) → In case of the PGI, what contract can be listed? Economic Service Sector? Contract to whom? A: No need

D. THE PROJECT

☑	Feasibility Study/Description of project to be financed including fund source and uses (amount of equity contribution and debt); timetable by phases, and current project status.
☑	List of required government approvals and status of compliance such as Environmental Compliance Certificate
☑	For projects involving construction – feasibility study, cost estimates, plans and specifications, bill of materials and work program.
☑	For acquisition of machinery and equipment – list of machinery and equipment and estimated cost based on firm quotations and guarantee from the dealers/suppliers as to the availability of spare parts in the local market.

E. COLLATERAL

☑	The loan shall be secured by any or a combination of the following as collateral: ➢ Real estate mortgage; ➢ Assignment with Hold out provision on deposits equivalent to at least three (3) months' amortization; and ➢ Chattel mortgage.
☐	In case of real estate mortgage, A: As long as IRA shall be deposited in DBP account, No problem. ➢ Certified True Copy of TCT on file with the Register of Deeds; → What is TCT? A: Transfer Certificate Title ➢ Latest Tax Declaration and Tax Receipt; → No need for the PGI? ➢ Location Plan with Vicinity Map, **duly certified by a Geodetic Engineer, blue print, standard size.** The vicinity map should show the name of street/s and distance from one point of the lot to the nearest street intersection or landmark; ➢ Road right-of-way contract (if land is an interior lot) or documents to show proof that the lot is with established access; ➢ Building Plans, Bill of Materials complete with specifications duly certified by a licensed architect/engineer.

Regular Checklist of Requirements

F. OTHERS	
☑	Transfer of major deposits from existing bank to DBP. A: Negotiable
☑	Identified risks to which the project is sensitive to, and its proposed mitigates.
☑	Developmental Impact Assessment – benefits of the project to the Philippine economy in general and to the specific location of the project in particular.

DBP's Financing Program Checklist of Requirements (Solano Branch)

Standard Requirement for all types of projects

1. Application letter duly signed by Chief Local Executive
2. Bio-data of the Chief Local Executive and LGU Treasurer
3. Resolution passed by the appropriate Sanggunian (Panlalawiga, Panlunsod or Pambayan)
4. Duly accomplished Customer Information report (DBP Form)
5. Audited Financial Statement for the last three (3) years ←Regular checklist provided by DBP head office stated 4 years. Which is true? A: 3 years is OK
6. Statement of Internal Revenue Allotment (2000 to present) duly certified by the LGU Chief Executive of Treasurer
7. Socio-economic profile of the LGU
8. Certification of the Municipal Treasurer that the annual amortization of the existing loan or indebtedness are being paid regularly in accordance with the approved amortization schedule thereof and that the total amortization for all credits inclusive of the loan under negotiation shall not exceed 20% of the total IRA
9. Copy of the LGU's approved Comprehensive Development Plan
10. Certificate of Net Debt Service from DBM ←What does "DBM" mean? A:Dept. Budget Management
11. List of other creditors (state name of institution, nature/purpose of accommodation, amount granted, date granted, maturity, outstanding principal balance)

Additional Requirements:

For Revenue-Generating Projects:

1. Project Feasibility Study
2. Building plans and specification, bill of materials, cost estimates, detailed engineering plan and location plan
3. Projected financial statements, including cash flow statement throughout the term of the loan

For Revenue Enhancement/Non-revenue Generating Projects/Form to Market Roads (ARC Projects)

1. Project Feasibility Study
2. For Infrastructure
   a. Building/Road plans/designs specifications
   b. Bill of materials/cost estimates
   c. Location plan
3. For Acquisition of Equipment
   d. Name and Address of Supplier
   e. Complete technical specification of equipment
   f. For second hand equipment, certification on the remaining economic life from the supplier
4. For refinancing
   a. Photocopy of Transfer certificate of Titles, tax declaration, if applicable
   b. Building plans, if applicable
   c. Survey plans duly signed by the Provincial/City/Municipal Engineer, if applicable
   d. Statement of Account from existing financial institutions
   e. Background/status of original project financed

Preliminary Power Planning of Likud Mini-Hydropower

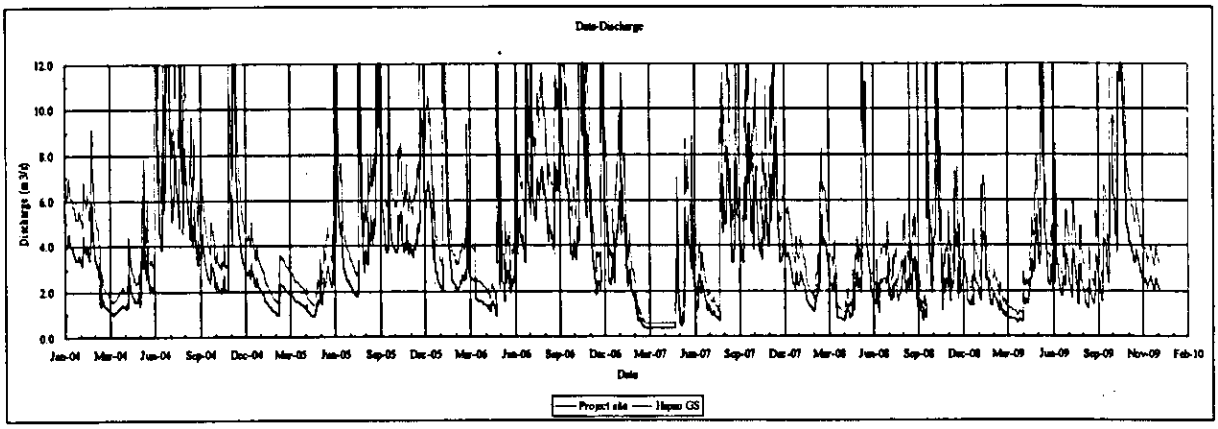
Contents of Preliminary Power Planning

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 facilitates
   - Comparison study between waterway routes

3. Next examination
   - Site works
   - Internal Works

Estimation for the available plant discharge

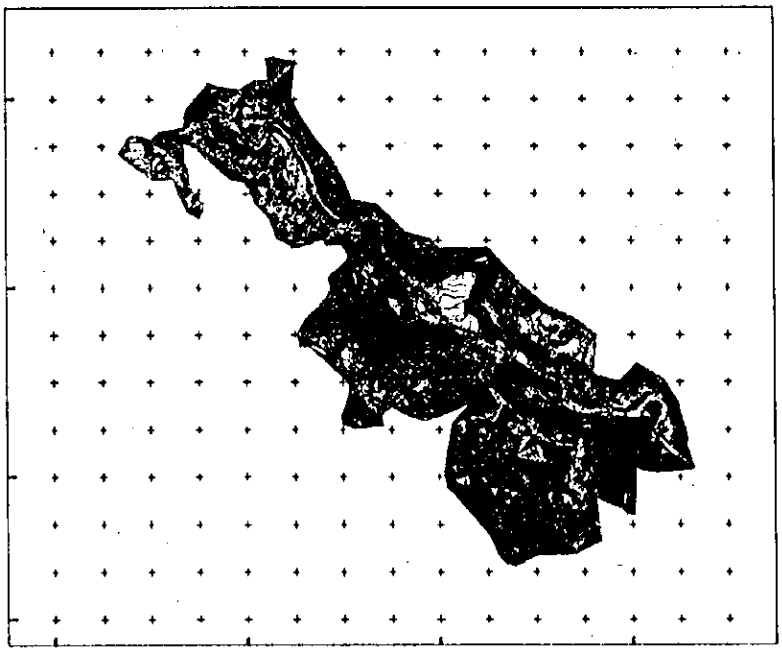


1. Observation record of the daily river flow
   Hapao gauging station: 6 years from Jan. 2004 to Dec. 2009

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: 44km² / Hapao GS: 45km² = 0.978

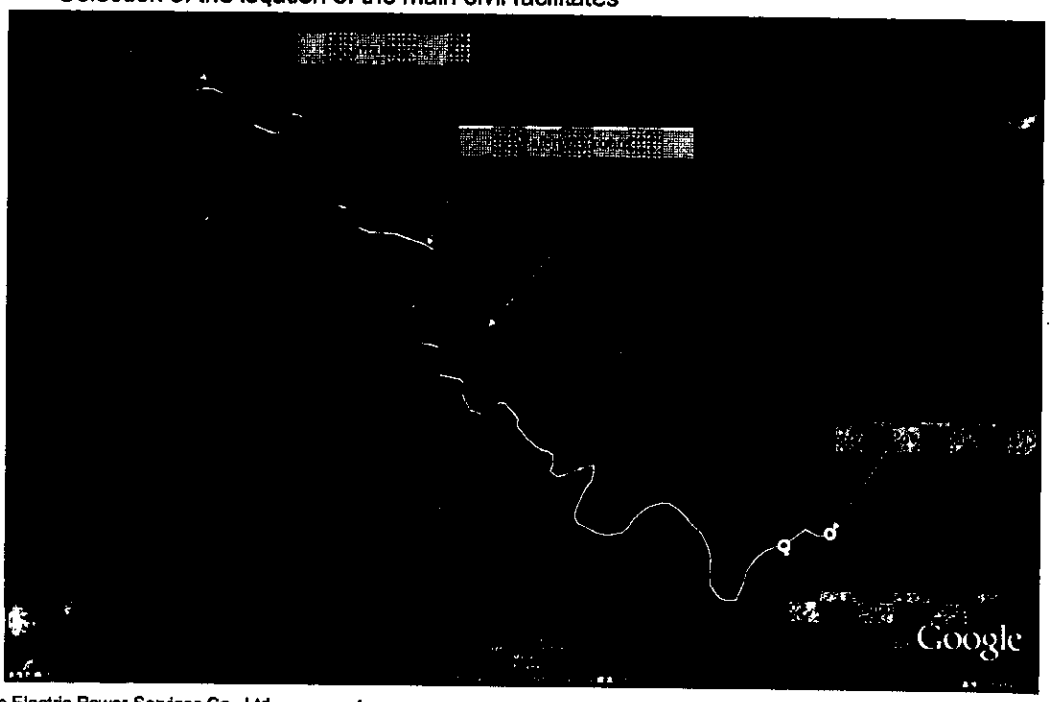
Examination and selection of the general layout

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

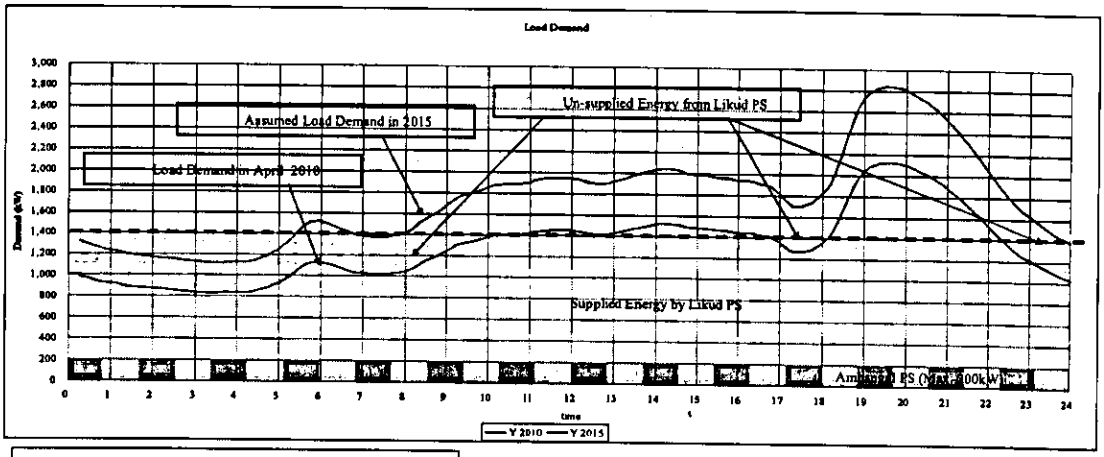


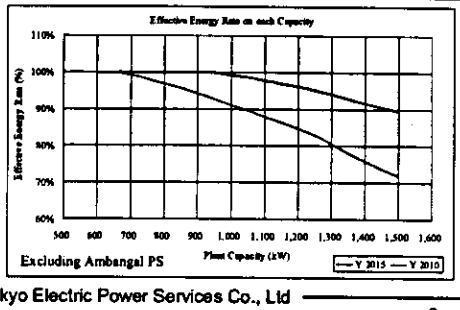
Examination and selection of the general layout

✓ Selection of the location of the main civil facilitates



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.

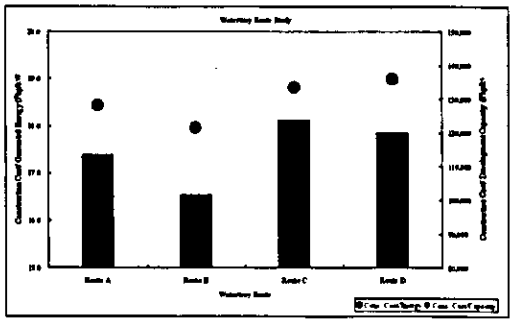
Effective energy : 91% in 2011, 99% in 2015 (1,000kW)

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^3/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^3/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	102,564,000	132,137,000
	Unit Cost	Pesos/kWh	17.4	16.5	18.1	17.8
Feasibility	Technical Issues	-	Non Length of Access Road: 0.61km	Non Length of Access Road: 0.33km	Non Not Necessary Access Road	Long Distance Access Road:
	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

Current Issues on Mini-hydropower Development

Current Issues on Mini-hydropower Development

1. Continuous meteorological and hydrological observation system has not organized
2. Inventory study for hydropower development has not completed
3. Appropriate technology for mini-hydropower development has not been established
4. Technical standard or guideline for mini-hydropower development has not been organized
5. Comprehensive state hydropower development plan has not formulated

Hydro Power Development Design

[Formula to estimate the plant capacity of hydropower]

$$P=9.8\ Q\ H\ \eta$$

P: Plant Capacity
Plant capacity is calculated by the factor of Q, H and η.

Q: Plant Discharge
Plant discharge is estimated based on the river flow discharge data in the intake site. These data are required to observe in several years due to the reliability of the development. 10 years data is generally required in Japan.

H: Design Head
Run-of-river type: created by the topography passing through the waterway
Dam type: created by the dam height

η : Turbine and Generator Efficiency
Type of turbine and generator is selected based on the project features such as Q, H and economy.

9.8: Gravity acceleration

1. Continuous meteorological and hydrological observation system has not organized

The observation of long term river flow discharge is essential to estimate the development plan.

[The Philippines]

DPWH: 751 stations, NIA: 178 stations (Total: 929 stations) in 1970s

Many stations was stopped the observation in 1980s due to the limitation of budget.

DPWH: 272 stations, NIA: 1 station (Total: 273 stations) at present

Main purpose observed by DPWH is to make the data for the flood control and missed several observations in a low flow discharge.

Almost mini-hydro power is designed utilizing the limited data from 1970s to 1980s with the defective data.

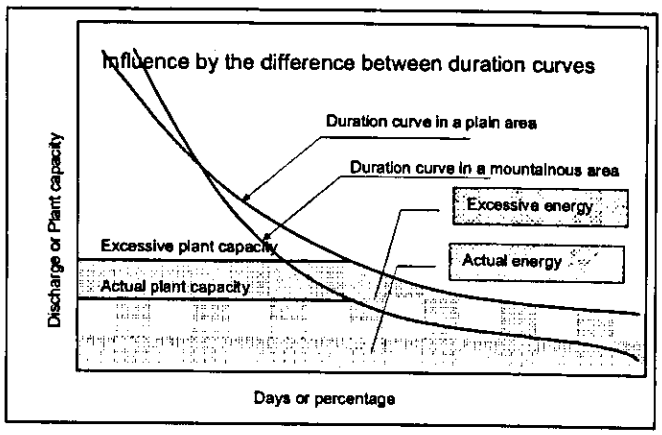
[Japan]
Discharge observations have been carried out in 815 gauging stations designated by the Government and continued over 100 years.

Mountainous area

It has a steep topography, the river flow has high fluctuations.
Mini-hydro power sites generally locate in a mountainous area.

Plain area

It has a gentle terrain, the river flow has low fluctuations.
Gauging stations of DPWH are generally located in a plain area.



Application of the river flow data observed in a plain area has a possibility which caused an overestimation of a plant capacity and an energy.

The establishment for discharge observation system is required.

2. Inventory study for hydropower development has not completed

Mini-hydro project under the registration/application are based on the database prepared by NPC. It was compiled to gather study documents conducted by DOE, NPC and NEA respectively.

[Issues]

- Database has several lacks of content.
- Not evaluated on the same point of view.
- Design source such as a river flow discharge data or an examined material of the optimum development capacity are not attached.
- Not attached drawing for the project plan. (Site locations aren't clear.)

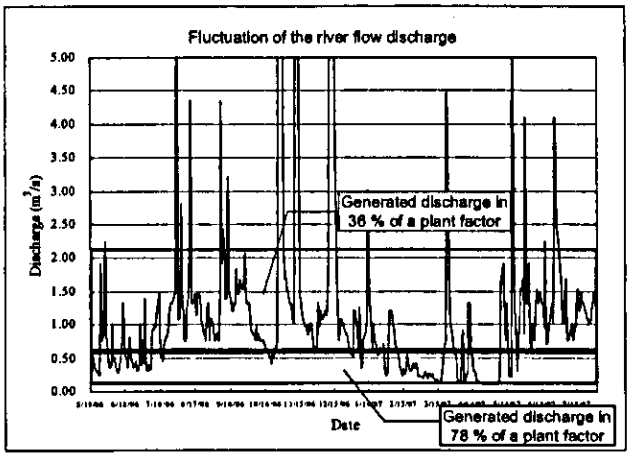
Database has low reliability and developers are required the review of the study.

Hydropower inventory study covering the whole country is required with the evaluation on the same point of view.

3. Appropriate technology for mini-hydropower development has not been established

Average Plant Factor (PF) in the Philippines : 36% (in Japan: 78%)

Plant factor = Actual Generated Energy / Possible Generated Energy (Plant Capacity (kW) x 24hours x 365 days)



Low plant factor → High plant capacity

⇩

➢Operation days in a maximum output
P/S with 36% PF < with 78% PF

➢Operation suspended days
P/S with 36% PF > with 78% PF

➢High fluctuation of an energy supply
→ Influence for a grid

⇩

Comprehensive examinations are required in the design stage.

⇩

Appropriate technology for the mini-hydro power development should be spread in the Philippines.

4. Technical standard or guideline for mini-hydropower development has not been organized

RE contracts under the registration and the application: 338 projects

⇩

[Issues]

➢Formats and contents on documents submitted by developers are not unified.

➢Review works by the regulatory authority, DOE are enormous.

➢Participation of the developer which intend only rights reserved.

⇩

Unified technical standards, guideline and regulation are necessary.

5. Comprehensive state hydropower development plan has not formulated

Lack of the state hydropower development plan considering

- Power demand and supply plan
- Transmission line development plan
- Definition of roles between a public and a private developer
- Cooperation in the project area

It causes an overexploitation or inconsistent development.

For example,

- ➢Overlapped development of access roads or transmission lines in adjacent projects
- ➢Unconformity with the plan of the transmission line, the infrastructure and the watershed management

Formulation of comprehensive state hydropower development plan is expected.

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	Nancy Gano - Uhalunue	PPDO - PO-I	[signature]
2	Winifredo Malabanan	DOE - HOEMD	[signature]
3	Rey V. Salvania	DOE - HOEMD	[signature]
4	GOICHI KANEDA	TEPSCO TEAM	[signature]
5	DOOIT CABAZON	STUDY TEAM	[signature]
6	YPZ TUGUINAY	IFELCO	[signature]
7	NELSON FAJARDO	DOE- LFO	[signature]
8	RUSSELLE C. [illegible]	DOE - LFO	[signature]
9	Nobuki Hayashi	TEPSCO	[signature]
10	Yukio Miyamoto	TEPSCO	[signature]
11	MA. CECILIA GARCIA	UGSES (SURVEY TEAM)	[signature]
12	JASON MAGAYANES	UGSES (SURVEY TEAM)	[signature]
13	Masoru SHIMIZU	TEPSCO	[signature]
14	Ignacio Bunoha		[signature]
15	RICARDO BUTALE JR		[signature]
16	KATHRINE ANN CAGAT	SITHo	[signature]
17	KRISTINE N. GUAZON	PPDO	[signature]
18	Margie Ngitit	PPDO	[signature]
19	Jeanmarie Dulawan	PPDO	[signature]
20	Brian John Tubaban	PPDO	[signature]
21	Manuel Luwayan	PPDO	[signature]
22	Epifania D. Nangtgon	PPDO	[signature]
23	Gemma B. Tayaban	PPDO	[signature]
24	CARMELITA B. BUYUCCAN		[signature]
25			

CERTIFIED CORRECT:

29

______
Activity Secretariat

Preliminary Power Planning of Likud Mini-Hydropower

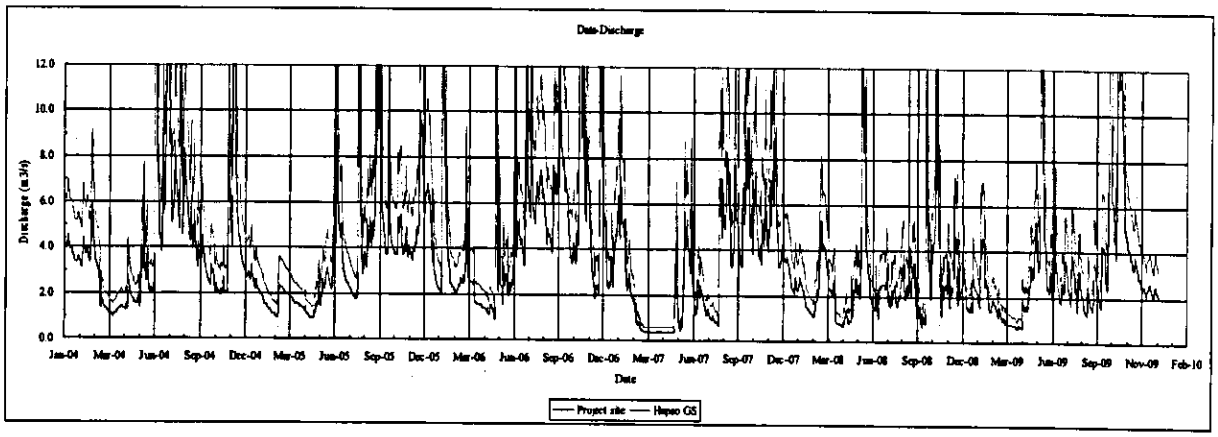
Contents of Preliminary Power Planning

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 facilitates
   - Comparison study between waterway routes

3. Next examination
   - Site works
   - Internal Works

Estimation for the available plant discharge



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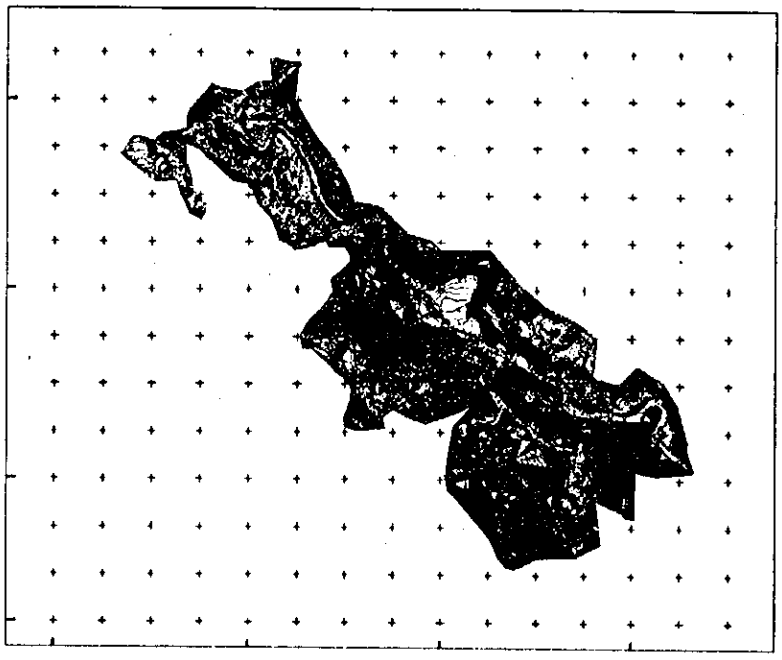
   Project site: 2,125mm / Hapao GS: 3,219mm = 0.660
   Catchment area
   Project site: 44km^2 / Hapao GS: 45km^2 = 0.978

Examination and selection of the general layout

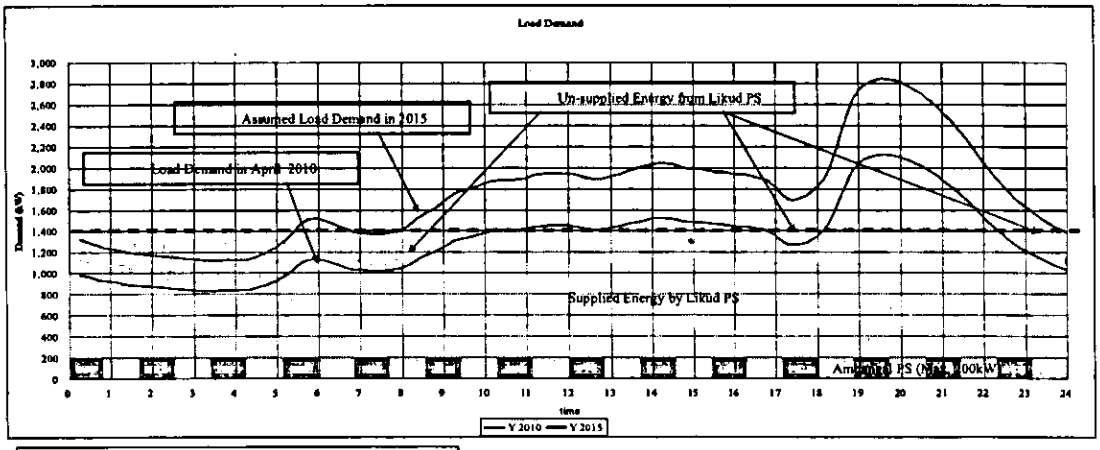
✓ Result of the Topographical Map (1/2,000)

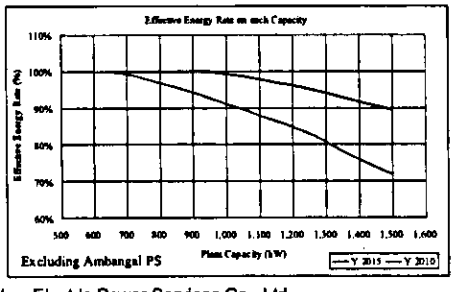


Examination and selection of the general layout

✓ Selection of the location of the main civil facilitates

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.

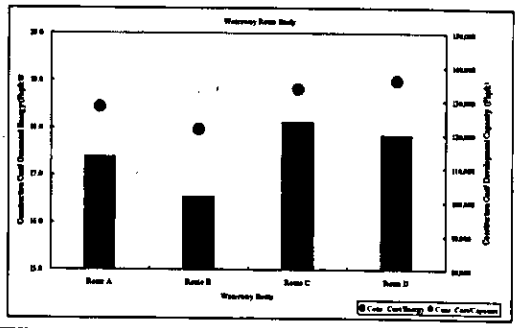
Effective energy : 91% in 2011, 99% in 2015 (1,000kW)

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^3/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^3/s	2.0	2.0	2.0	1.7
	Install Capacity	kW	730	800	770	970
	Total Length of Waterway	m	1,784	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	Peso	93,186,000	97,132,000	102,554,000	132,137,000
	Unit Cost	Peso/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 Distance Access Road:
	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 FEASIBILTY 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: Haliap Brgy. Hall
Date: April 28, 2011
Expected number of participants:______ Scheduled time: ______

	Name	Male	Female	Agency, Position	Signature
1	Oscar Hago	✓		Brgy Capt. - P	[signature]
2	NANCY GANUC. NALUNNE		✓	PO - I	[signature]
3	Ramon Cabazor	✓		STUDY TEAM	[signature]
4	NELSON FAJARDO	✓		DOE-LFO	[signature]
5	[illegible]		✓	DOE- LFO	[signature]
6	Ignacio Bunuka	✓		[illegible]	[signature]
7	Winifredo Malabanan	✓		DOE-HOEMD	[signature]
8	Rey V. Salrania	✓		DOE - HOEMD	[signature]
9	MA. CECILIA H. GARCIA		✓	NGSES - SURVEY	[signature]
10	Jason Macayanes	✓		UGSEC - SURVEY	[signature]
11	NANCY ADDANGDA	✓	✓	Brgy. Secretary - H	[signature]
12	Maria Ladao		✓	Brgy. Kagawad - H	[signature]
13	RICARDO L. DUTALE	✓			[signature]
14	ERNESTO B. TAGTAG	✓	✓	Brgy. Captain Kagawad.	[signature]
15	LEONI DONATO	✓		HFA - PRES. P	[signature]
16	DILLAG, MOISES B.	✓		Brgy. Kgwd. P	[signature]
17	BALTAZAR DAMMIT	✓		H	[signature]
18	Rosemarie Dogwil			Brgy. Kgwd	[signature]
19	Fedelito Rindon	✓		Brgy. Kagawad	[signature]
20	Jose R. Bennecat	✓		Farming	[signature]
21	Pepito Angihan	✓		"	[signature]
22	Jokquline N. Butal		✓	Brgy Kgwd	[signature]
23	Donato Habliman	✓		Kgd	[signature]
24	Tony Linglingon	✓			[signature]
25	Roger N. Mangshi	✓		Captain	[signature]

CERTIFIED CORRECT:

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 Nagabt		F	Farmer	
2	SHIMIZU Mitsuru	M		JEPSCO/JICA	
3	Yuko MIYAMOTO	M		Tepsco / JICA	
4	Nobuki Hayashi	✱	V	Tepsco / JICA	
5	GOICHI KANEKO	V		Tepsco/JICA	
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CERTIFIED CORRECT:

_____
Activity Secretariat

Preliminary Power Planning of Likud Mini-Hydropower

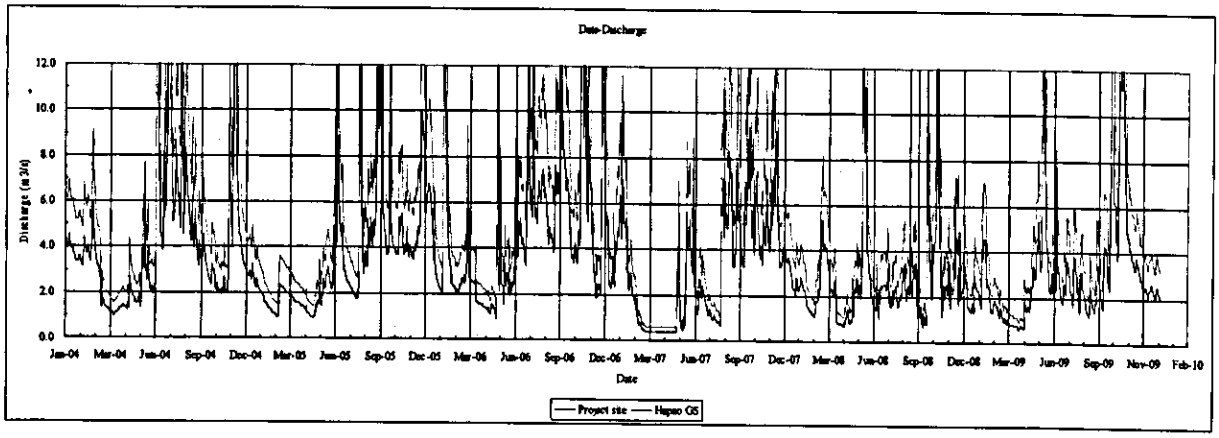
Contents of Preliminary Power Planning

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 facilitates
   - Comparison study between waterway routes

3. Next examination
   - Site works
   - Internal Works

Estimation for the available plant discharge

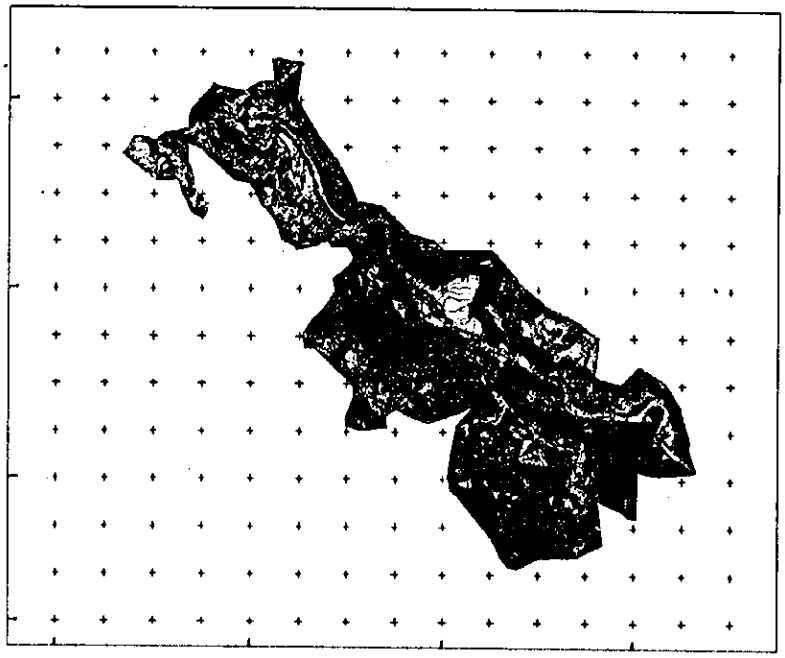


1. Observation record of the daily river flow
   Hapao gauging station: 6 years from Jan. 2004 to Dec. 2009

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^2 / Hapao GS: 45km^2 = 0.978

Examination and selection of the general layout

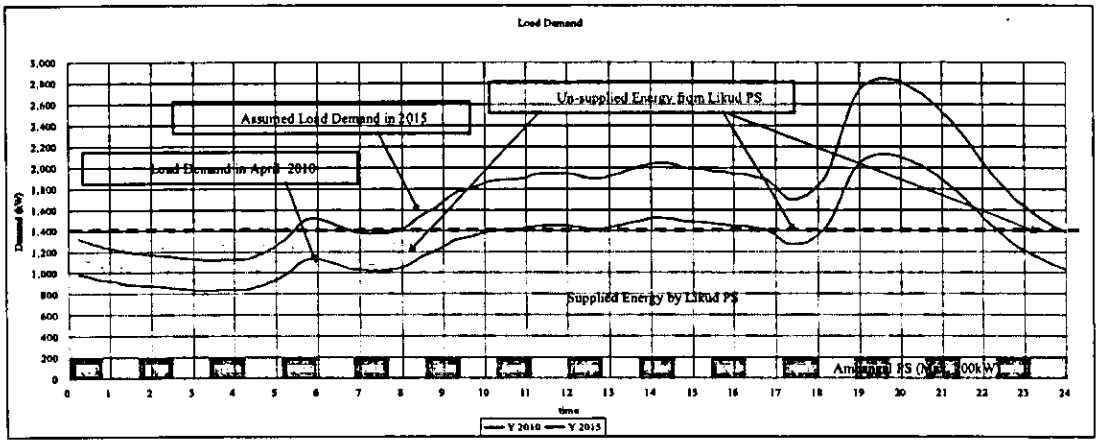
✓ Result of the Topographical Map (1/2,000)

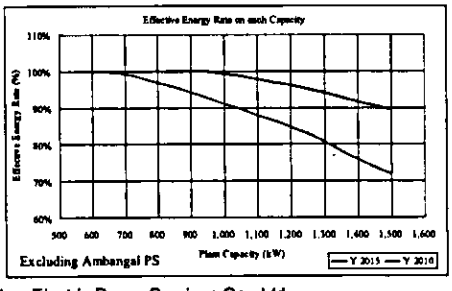


Examination and selection of the general layout

✓ Selection of the location of the main civil facilitates

Examination and selection of the general layout





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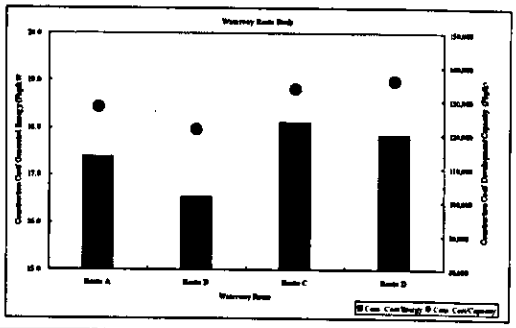

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- Internal works
  - Examination for the optimum development capacity

⇩

Facility Design
Construction Plan and Schedule, etc

Reference Information : About Development Bank of Philippines

1. Functions of DBP

DBP works hand-in-hand with key players from both the private and public sectors such as local government units, national agencies, private corporations, multilateral and bilateral lending institutions, private banks, rural banks, cooperatives, amongst others, in carrying out its various development programs and initiatives.

- Infrastructure and Logistics
- Environment Initiatives
- Social Services
- Micro, Small and Medium Enterprises

2. Environment Initiatives

DBP vigorously pursues its commitment to environmental protection and sustainable development. DBP is one of the first Philippine banks to integrate environmental considerations in all aspects of its operations. DBP provides financing as well as technical assistance to projects that are environmentally sound. The Bank also plays an active role in encouraging clients, and its participating financial institutions under its wholesale lending program, to include environmental considerations in their businesses and thrusts.

- Environmental Policy Statement
- Environment Protection and Management Facility
- Climate Change and Carbon Financing Facility
- Water Supply and Sanitation Services
- New and Renewable Energy Projects

3. New and Renewable Energy Projects

- Priority projects in this project are as follows;
  - Power Generation (Renewable Energy and Conventional)
  - Power Transmission and Distribution
  - Energy Efficiency
  - Alternative Fuels
- Eligible Borrowers are as follows;
  - Private corporations (at least 70% Filipino owned)
  - Local Government Units
  - Electric Cooperatives
  - Private Financial Institutions

Government-owned-and- controlled corporations

- Financing period and grace

  Up to 15 years inclusive of up to 5 years grace period based on cash flow

  (the information comes from DBP internet)

- Interest rate and conditions

  In 2011, the interest rate of long term loan is 8 % to 10 %, and borrowers need 1% as front end fee.

  (the information comes from Mr.Noli)

- Negotiation items

  Finance period, grace and interest rate are negotiation items.

  (the information comes from Mr.Noli)

- Project Managers in DBP

  Mgr. Rustico Noli D. Cruz

  8939745/8189511 Loc. 2340

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  Mariam Isolde G. Salvador

  8403435/8189511 Loc. 2340

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2011-6-20

Questionnaires to DBP

Chapter & Session	NO.	Questionnaires	Answers
1.1 Methods of economic preconditions	1	GDP growth rate 2015-25 5.0%, 2025-35 4.0% 2035-45 3.0%?	OK
	2	Inflation rate is 3%?	OK
	3	Exchange rate 50Php/USD in future?	OK
1.2 Discount rate	4	Discount rate 10% ?	OK
1.3Components of Likud small hydro power	5	**O/M expenses** is 1% of Construction cost *Escalation ?	OK
	6	Loses is 5% to10% referred by the past	OK

		experiences, therefore it is 8% ?	
1.4 diesel price of diesel power plant as alternative	7	**43 Php/kg in 2014** ?	OK
1.5 Conditions of long term loan and depreciation	8	**Equity** is 10% of construction cost ?	OK
	9	**Interest rate of LTL** : Nominal interest rate is 11% by 10% of EDP+1% of Front End fee.	DBP is 8% to 10%, 9% is average. And 1% of Front End fee. The rate is10%
	10	**Nominal interest rate** is not real interest rate, it is nominal interest rate with 11% of LTL in IRR calculation?	Nominal interest rate is OK
	11	**Depreciation conditions:** Depreciation term 30 years after operation ? Residual rate of assets 5% of construction cost ?. Depreciation method is straight line ?	Depreciation term is 25 years, because the contract is 25 years. (Mr. Kawazor comment)

1.5 Conditions of long term loan and depreciation	12	Equity is 10% of construction cost ?	OK
1.6 Short term loan (STL) for working capital	13	**Interest rate** of STL is 70% of Interest rate of LTL ? It is 7.7%	OK
	14	**Deposit rate** is 50% of STL rate. It is 3.8% ?	OK
1.7 Calculation methods for tax and dividend	15	**Fixed asset** tax is 1% of booked assets?	OK
	16	**Electricity tax** is 10% of Income but deferred term is 7 years ?	OK
	17	**Business tax** is 0.5% to Sales ?	OK
	18	**Corporate tax** is 10% to profit before tax , but deferred term is 7 years ?	OK
	19	Target of the **dividend** is 100% for rice terrace protection fund, but it is decreased during	OK

		none profit term ?.	
1.8 Electric tariffs (FIT scenarios)	20	Low case is 3.0 Php/kwh ?	OK
	21	Middle case is 4.0 Php/kwh ?	OK
	22	High case is 5.0 Php/kwh ?	OK
1.12 Evaluation indicators of financial analysis	23	**FIRR** is More than double of capital cost (more than 15%) ?	OK
	24	**PBP** is No longer than repayment term of long term loan ?	OK
	25	**B&C ratio** is Larger than 1 .0 ?	OK
	26	**NPV** is Positive value ?	OK

	27	**LLCR**>1.5 ?	OK
1.14 Indicators and procedures of economic analysis	28	More than 15% of **EIRR** is effective under comparison to diesel power generator ?	OK
3.1 Costs and Benefits for small hydro power	29	Effect of CO2reduction is 53 million Php, because CO2 credit prices is assumed by $10/CO2-ton.	OK
3.4 Neighboring grid tariff	30	The neighboring grid tariff for residential use ?	8 Php/kWh in Manila Existing Ifugao project 3.5php/kWh

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

Date:	15:00-17:00, 30 June 2011
Venue:	GAZEBO, Lagawe, Ifugao
Participants:	Budget office, Account office and Treasury Office of the Provincial Government of Ifugao, PPDO, DOE, JICA Study Team, 9 participants (See attendance sheet)
Agenda:	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. Farro		✓	PBO	[signature]
2	Stewart B. Dacha	✓		PTO	[signature]
3	Tony Linglingon	✓			[signature]
4	Marina B. Liyab		✓	PAcO	[signature]
5	Carmelita B. Buyuccan		✓	PPDO	[signature]
6	Nobuki Hayashi		✓	TEPSCO/JICA	[signature]
7	Mitsuru SHIMIZU	✓		TEPSCO/JICA	[signature]
8	ARNEL CARACUEL			〃	[signature]
9	Ray V. Salvama	✓		DOE	[signature]
10	Ignacio Bunola	✓			[signature]
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Highlights of the Meeting with the Sangunian Panlalawigan members who are in charge of Public Works & Utilities

Date:	9:30am-12:30pm, 30 June 2011
Venue:	Provincial Livelihood Center, Lamut, Ifugao
No. of Participants:	The PGI officials include PPDO staff, DBP officer, DOE, and JICA study team. Total number is 12 (See attendance list)
Agenda:	a. Progress update on the feasibility study on the Likud mini-hydropower project by TEPSCO b. Environmental Development Project (EDP) scheme by Development Bank of the Philippines (DBP Solano branch)

[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 luck 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 sprit 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 MHPP
Venue: PLC, LAMUT, IFUGAO
Date: July 1, 2011
Expected number of participants:
Scheduled time: ____________

	Name	Male	Female	Office	Signature
1	Catalina Lumauig		✓	Prov'l Liga office	[illegible]
2	SHIMIZU Mitsuki	✓		TEPSCO/JICA	清水道
3	Rey V. Saramia	✓		DOE - REMB	[illegible]
4	Carmelita B. Bongnuccin		✓	PPDO	[illegible]
5	Ignacio Buruka	✓			[illegible]
6	Nobuki Hayashi		✓	TEPSCO/JICA	[illegible]
7	EMIL CALIMAG	✓		DBP	[illegible]
8	IMELDA F. EISMA		✓	DBP	[illegible]
9	Jordan T. Gullitiw	✓		S.P	[illegible]
10	Robert K. Hamrave	✓		SP	[illegible]
11	Nancy Nalunne		✓	PPDO	[illegible]
12	Kristine Guazon		✓	PPDO	[illegible]
13	Noly Balmores	✓		PLC	[illegible]
14	Clifford Baliwang	✓		PLC	[illegible]
15	Rosito Tuguinay			PLC	[illegible]
16	Jacinto Mariano	✓		PLC	[illegible]
17	Orly Wadu		✓	" "	[illegible]
18	Nora M Martinez		✓		[illegible]
19	Vangie Batangay		✓	PLC	[illegible]
20	JOEL TALAGO	✓		PLC	[illegible]
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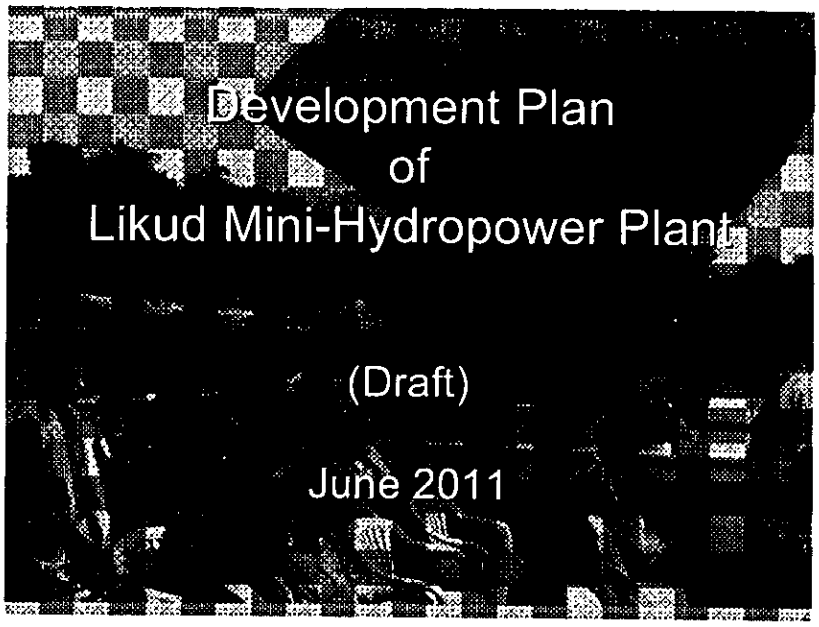
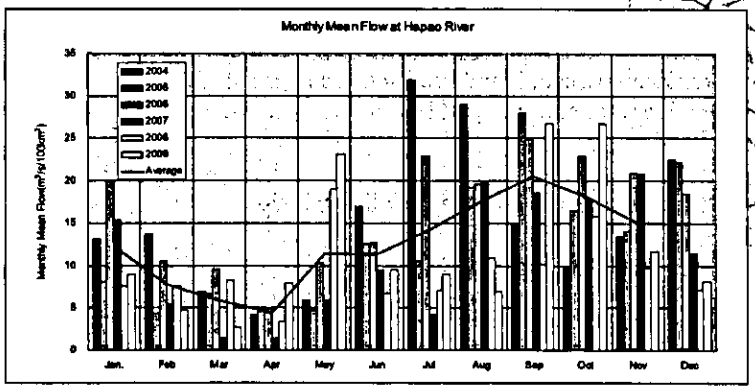


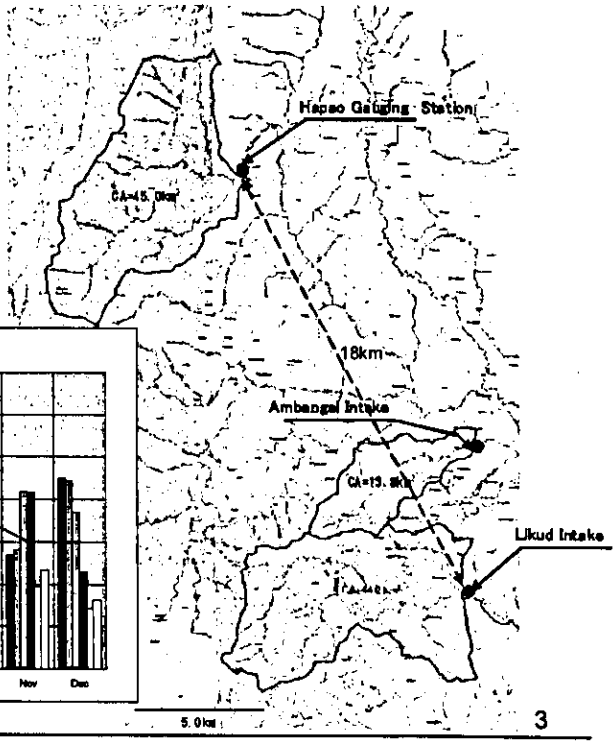
Contents of Presentation

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 ; 45.0km²
Observed by ; TEPSCO

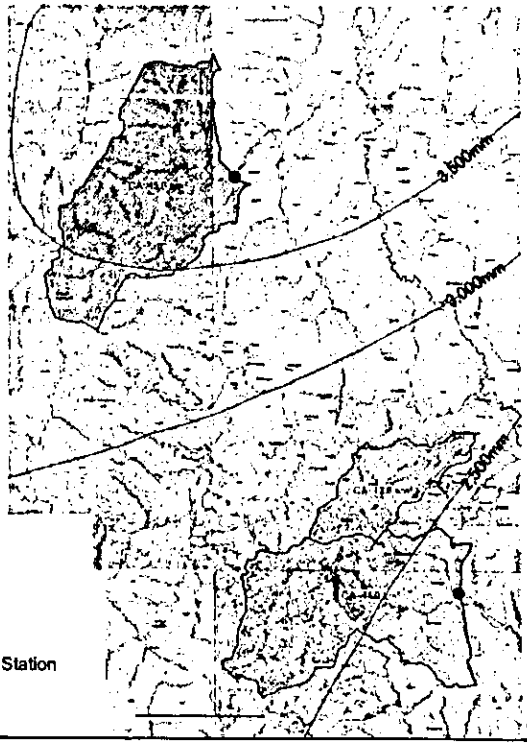




Annual Rainfall and Effective Precipitation at Project Site

Items	Hapao	Likud
Catchment Area	45.01 km²	44.02 km²
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



Estimation of Flow Duration at Project Site

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 (Apri.30, 2011)

Hapao GS ; 2.40 m³/s
Project Site ; 1.83 m³/s

1.83 / 2.40 = 0.763

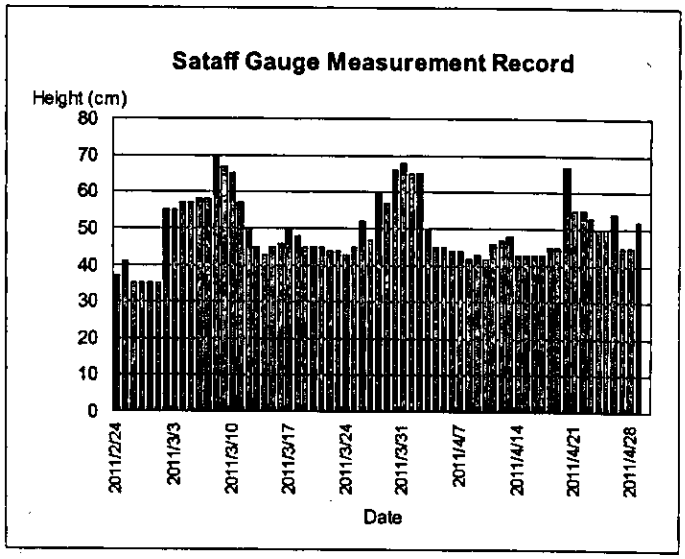
3. Variation of Conversion Ratio in the Study

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 3rd mission

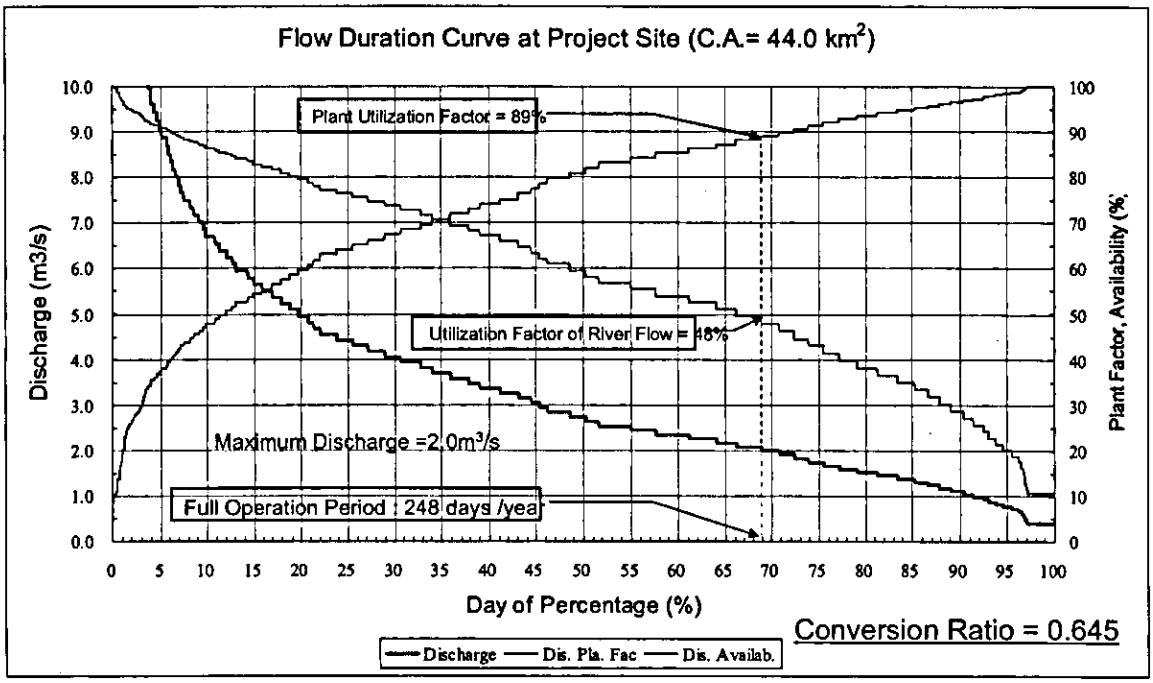
4. Water Volume for Irrigation will be considered in the Study

0.645 was selected in this Report

Installation of Staff Gauge and Measurement of River Water Level



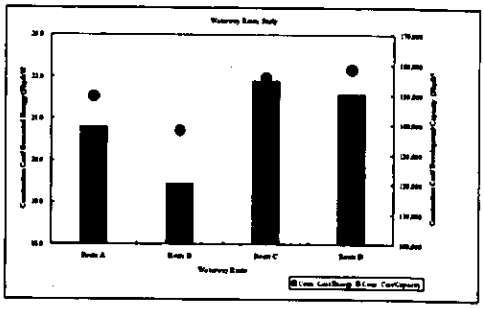
Flow Duration Estimated (Draft)



Examination on general layout

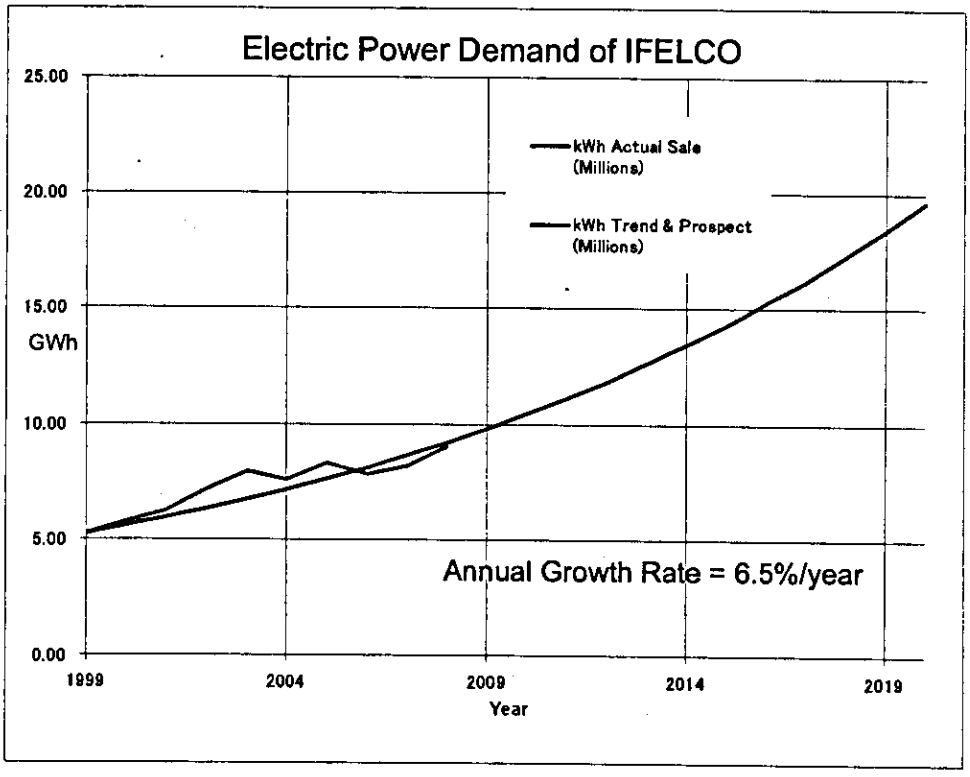
Comparison study of Waterway Routes

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^3/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

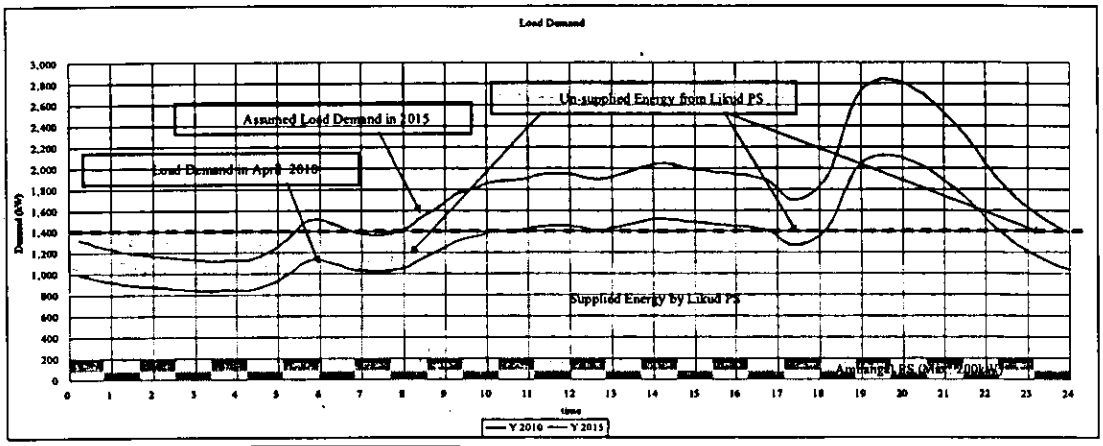


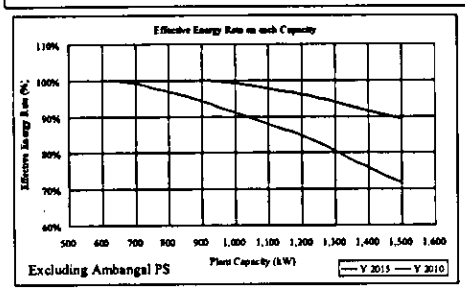
Items		Unit	A	B	C	D
Feature of Generation Plan	Gross Head	m	55.0	59.0	60.0	90.0
	Effective Head	m	48.1	52.9	50.8	75.7
	Plant Discharge	m^3/s	2.0	2.0	2.0	1.7
	Install Capacity	kW	740	820	790	1,000
	Total Length of Waterway	m	1,764	2,050	2,812	4,038
	Length of Waterway /	-	36.7	38.8	51.4	53.3
	Annual Generated Energy	MWh	5,317	5,826	5,616	7,345
	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
	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

Condition of Electric Power Demand in Ifugao



Condition of Electric Power Demand in Ifugao





Issue on the load demand

For example; Likud PS has 1,200kW capacity.

Total supply capacity including Ambangal PS : 1,400kW

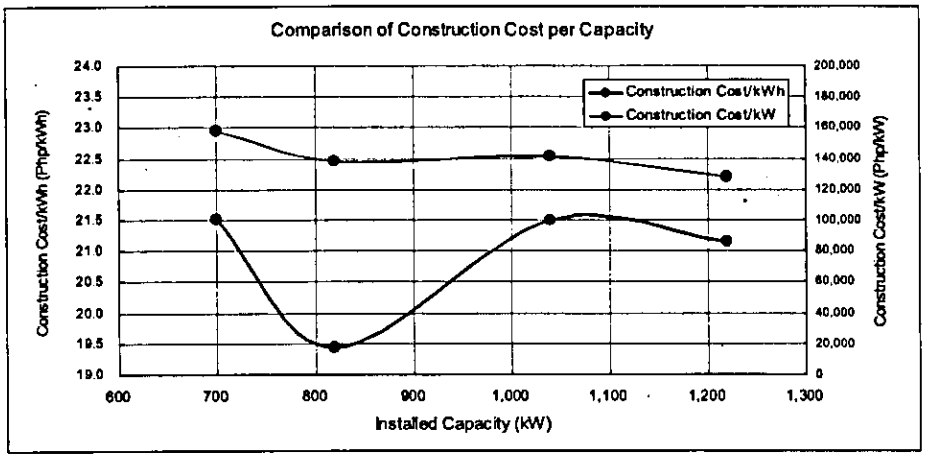
Load demand from 22:30 to 10:00 is lower than total supply capacity.

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)

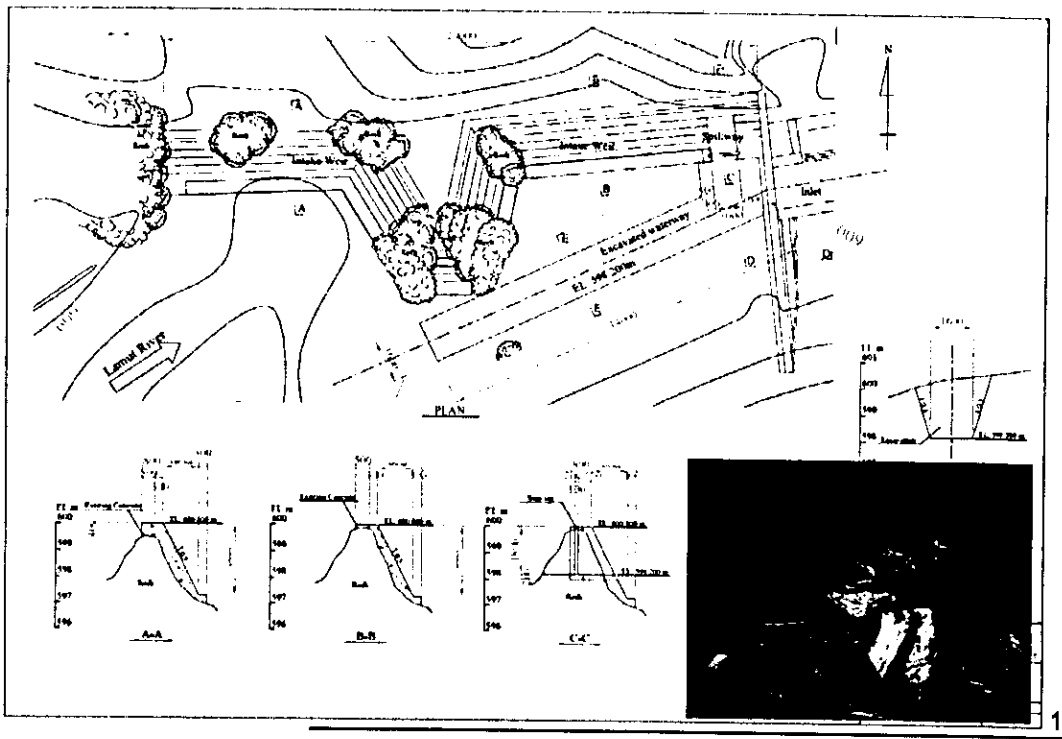
Appropriate Development Scale (Optimum Installed Capacity)



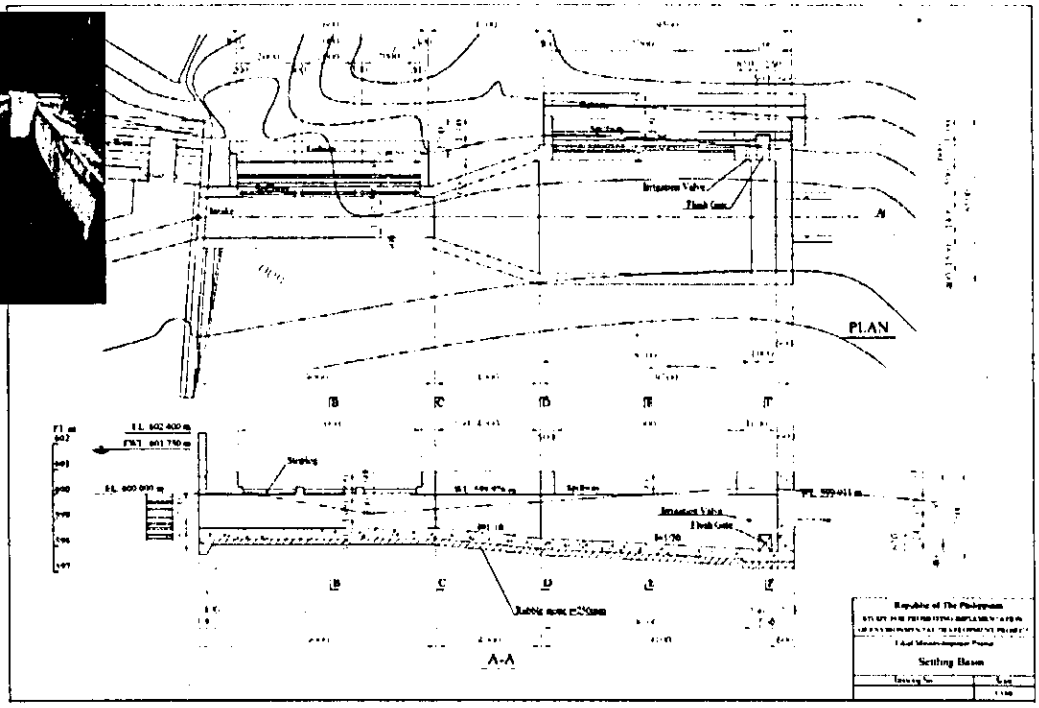
Installed Capacity	kW	700	820	1,040	1,220
Maximum Discharge	m^3/s	1.70	2.00	2.55	3.00
Number of Turbine Unit	Unit	2	2	3	3
Annual Effective Generation	MWh	5,142	5,826	6,821	7,377
Effective Plant Factor	%	83.9	81.1	74.9	69.0
Construction Cost	M.pesos	110.684	113.250	146.608	156.057
Unit Construction Cost / 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

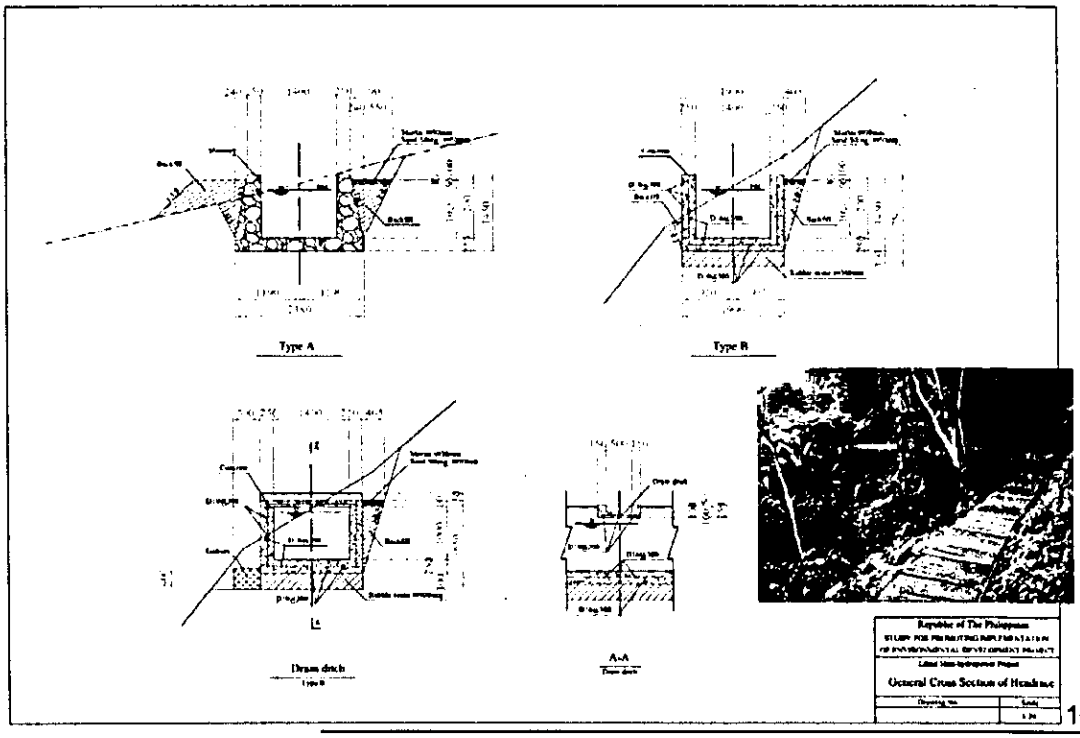
Intake Weir (Improvement of Existing Weir for Irrigation) :Height=about 3.0m



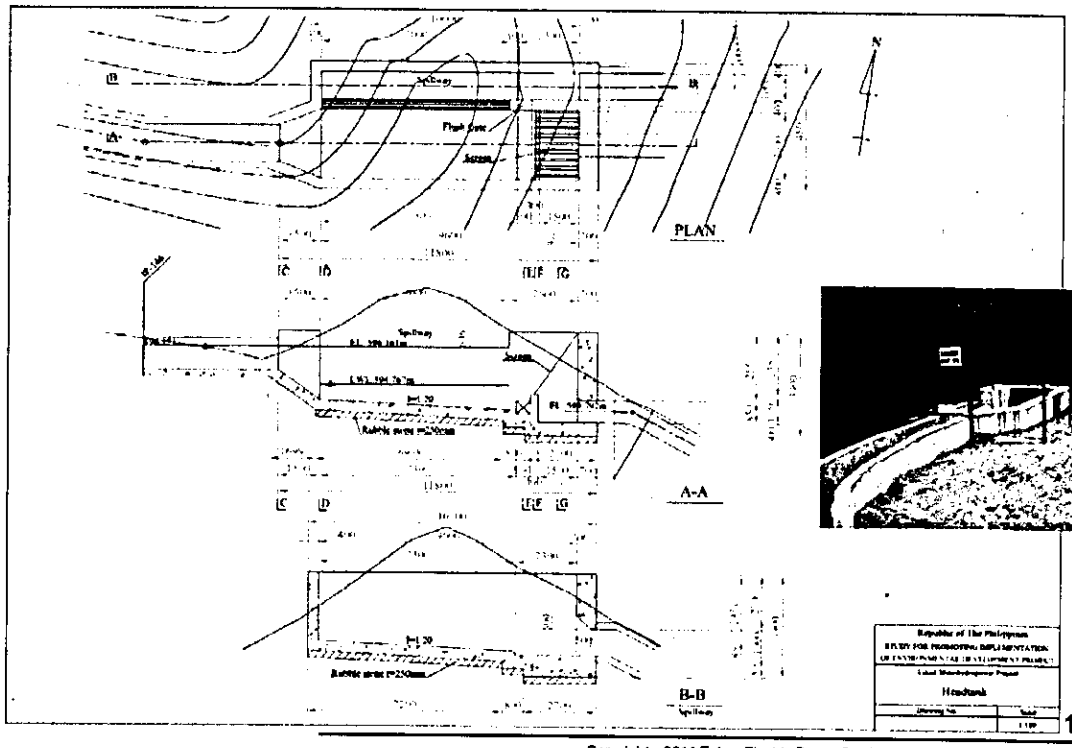
Settling Basin

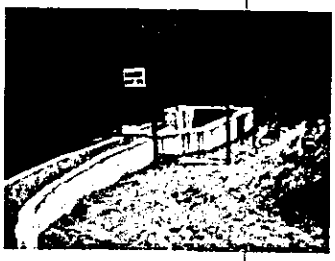


Headrace Channel Total Length=1,875 m

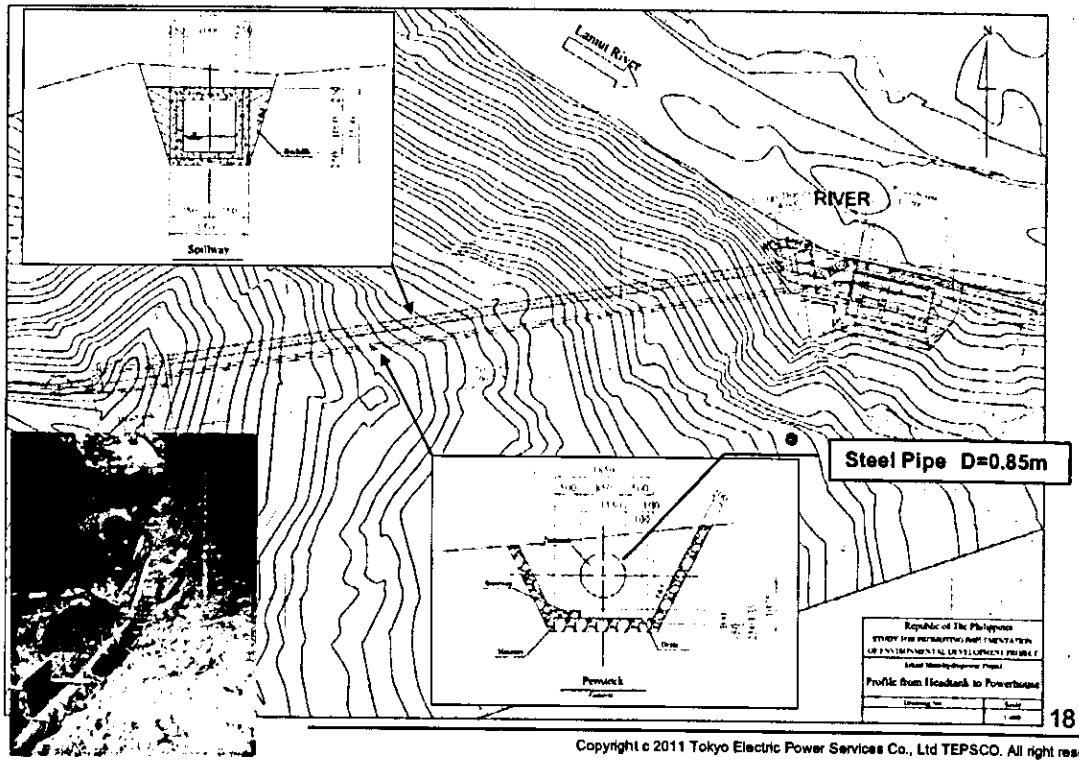


Head-Tank

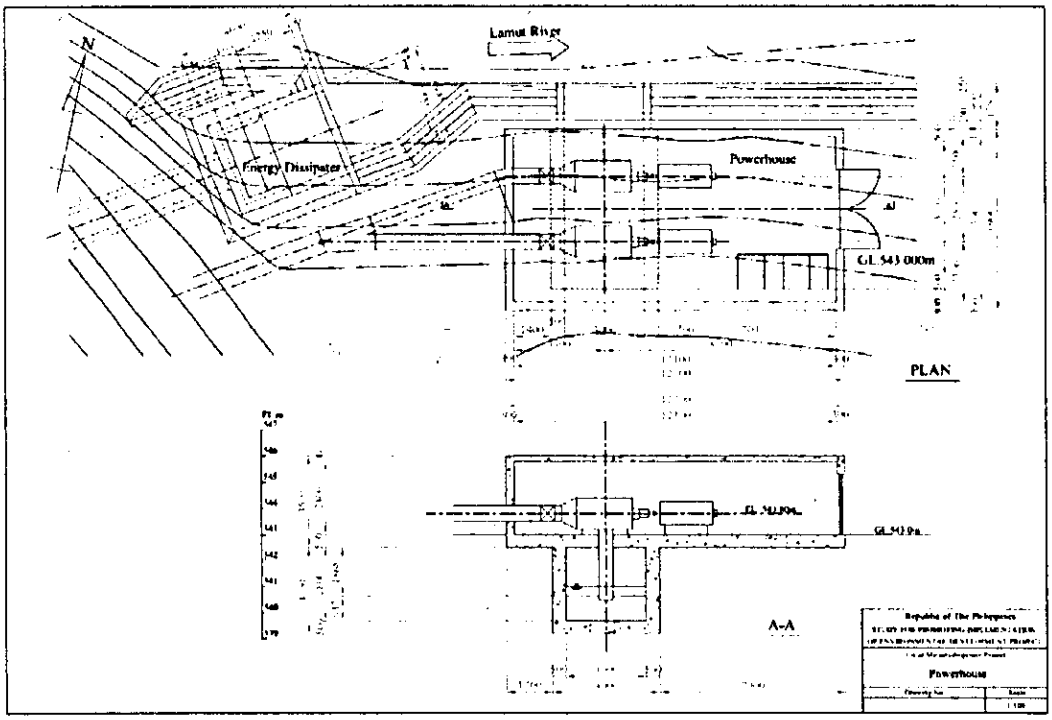




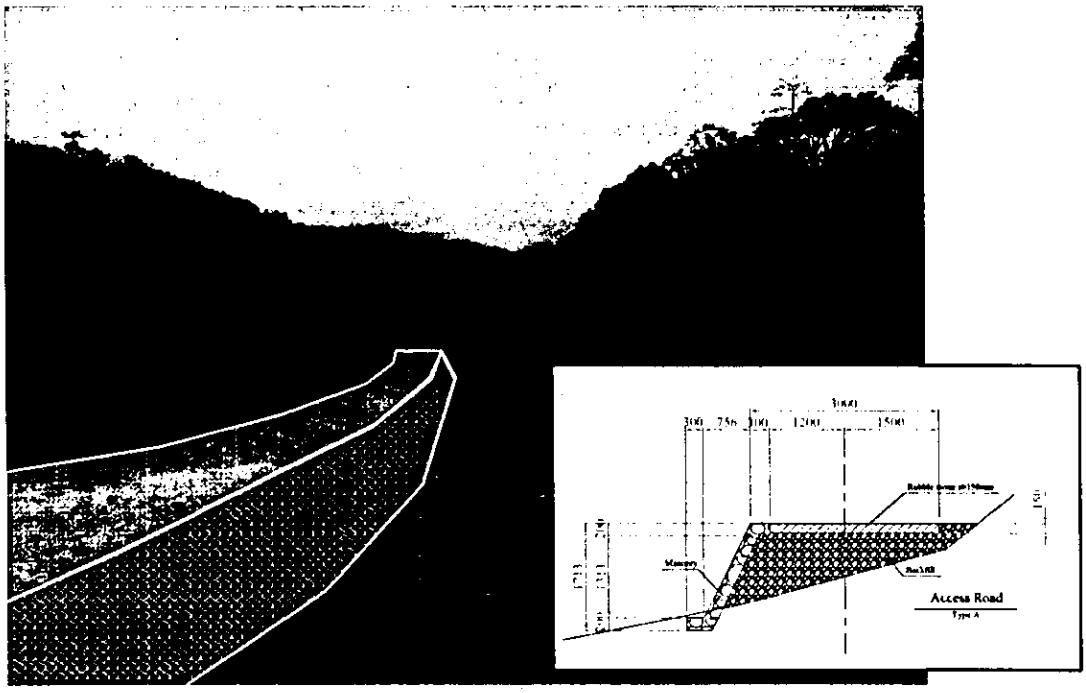
Penstock ; Length=116.5m Spillway ; Length=106.5m



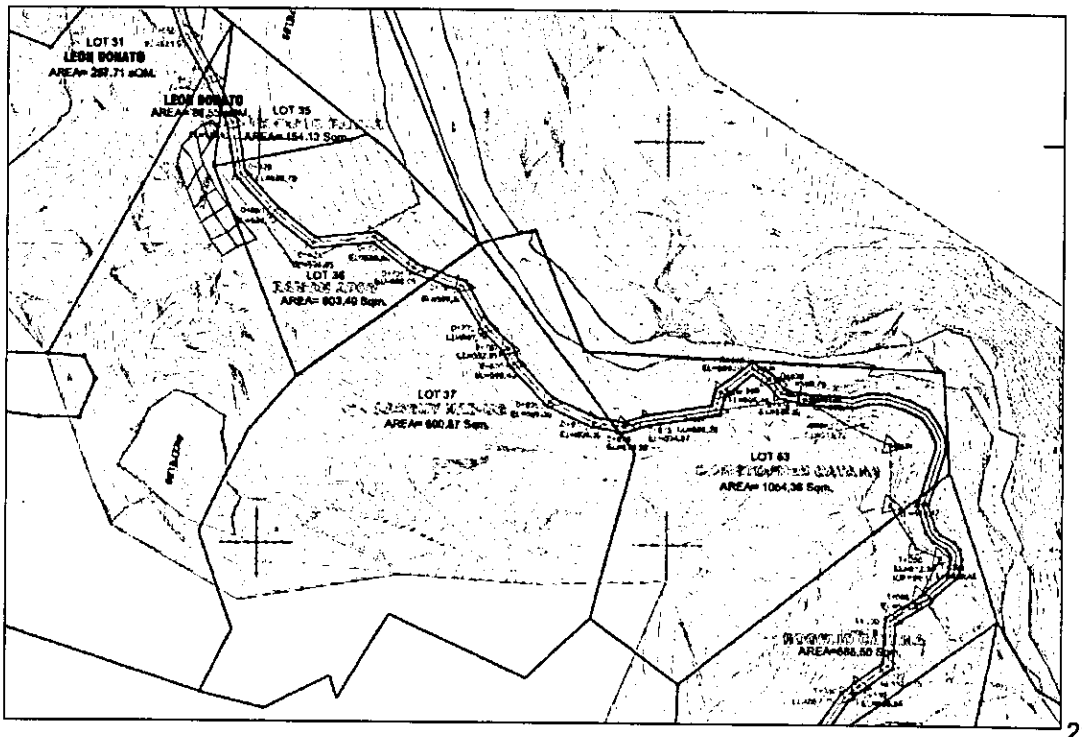
Powerhouse



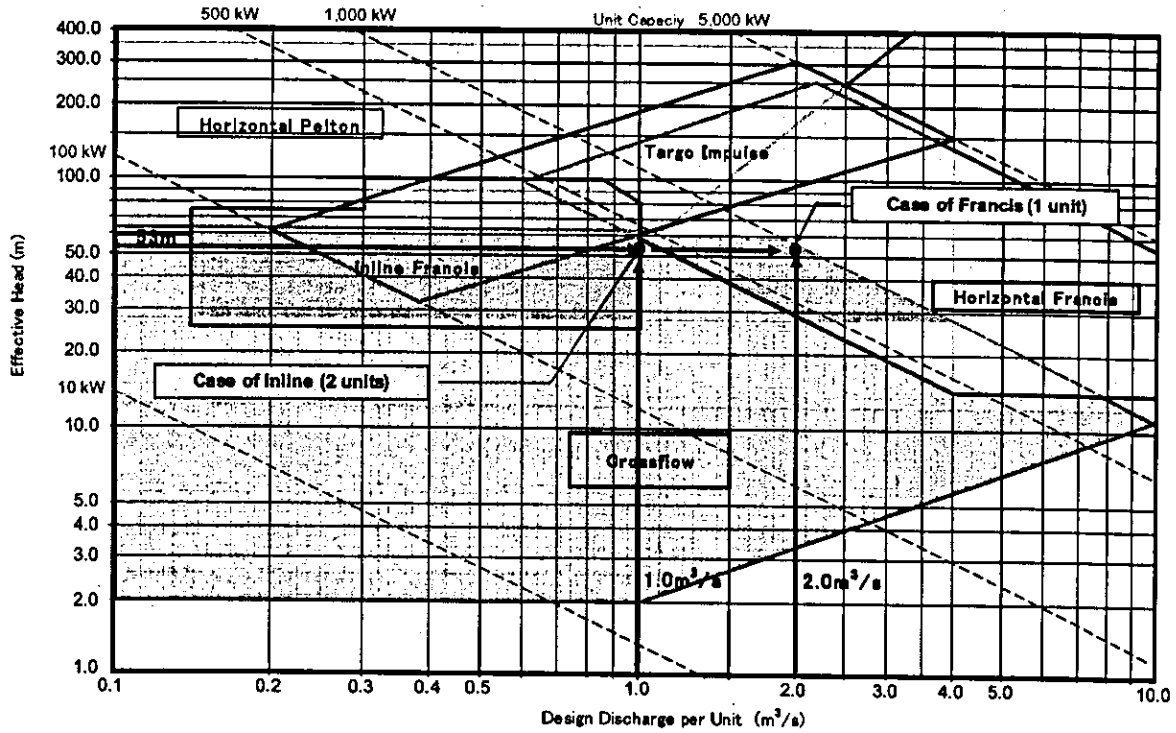
Access Road to Powerhouse from Washed-out Bridge



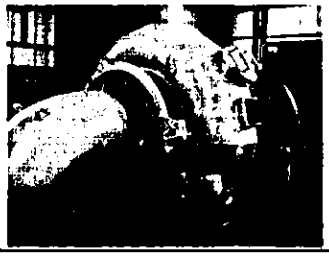
Affected Area (Result of Parcellary Survey)



Selection of Turbine Type

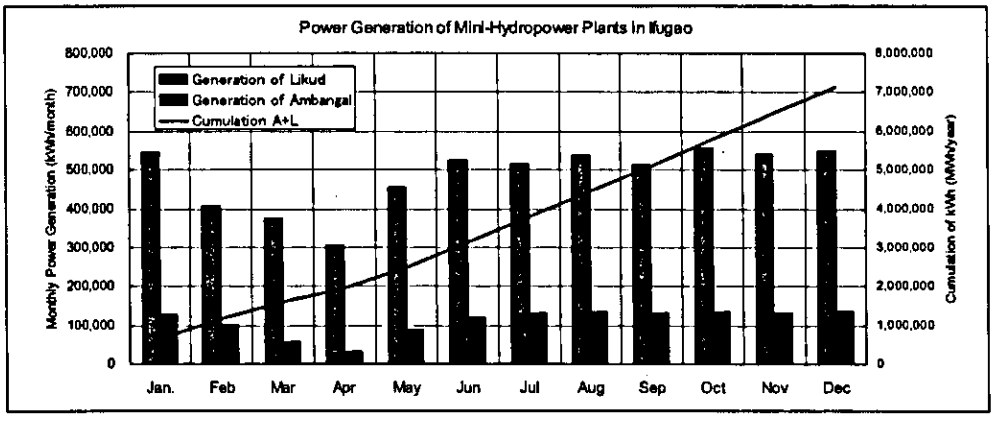


Selection of Turbine Type

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 Ambamgal MHP
Maintenance	Complex During maintenance work, the operation should stop completely	Easy During maintenance work, 1 unit can be operated
Result	-	Selected for Likud MHP

Power Generation

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



Development Cost (Draft)

Contents	Quantity	Unit	Cost (Peso)	Remark
Direct Cost				
Civil Works				
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	
Electro-mechanical Works				
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	
Indirect Cost				
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	
Others				
Right of Way	1.0	Ls	659000	
Total			113250000	

Financial Analysis

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

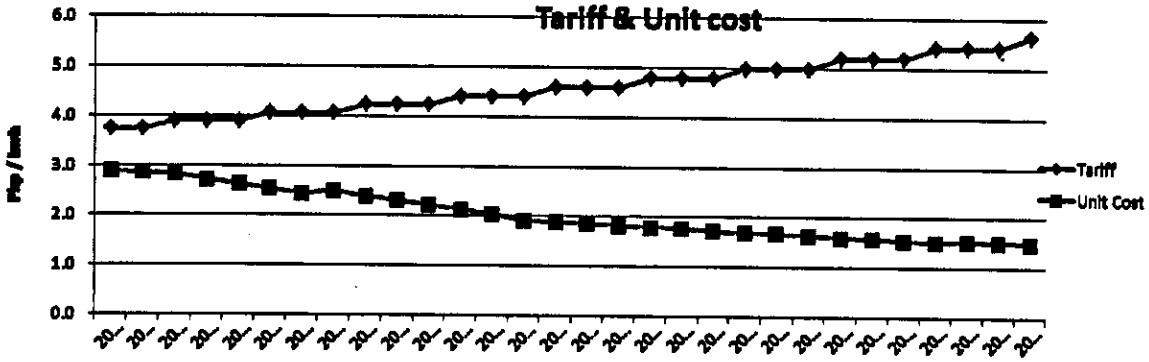
Note) O/M expenses: According to "Q&A small hydro power business(March 2005)" edited by Study panels for Clean Energy, O/M expenses (including overhaul cost, operation detection system) is calculated with 0.9% to the construction cost.

Items	Decision process	Values
Equity	10% of construction cost	12.1 million Php
Long term loan	90% of construction cost	109.0 million Php
Interest rate of LTL	Nominal interest rate is 8% to 10%. Therefore it is the average of 9% with fix interest rate.	9%
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	30 years after operation
	Residual rate	5% of construction cost
	Depreciation method	Straight line

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

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%.

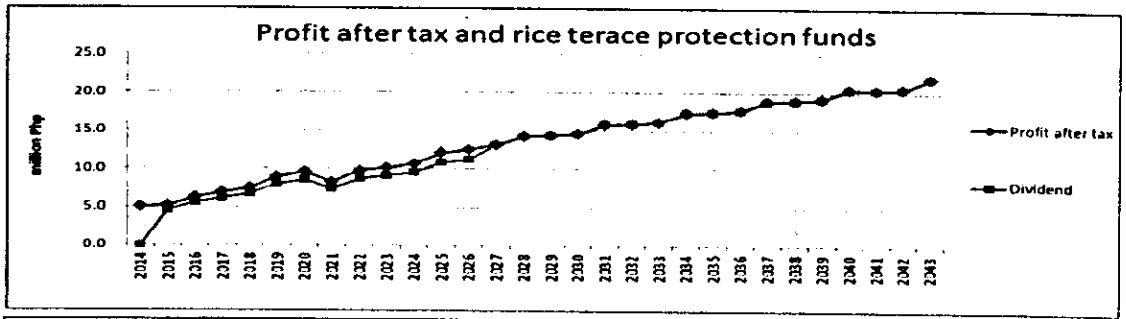
And the generation unit cost is 2.9 Php/kWh at the first year. The average generation cost in the calculation term is 2.4 Php /kWh due to increase wages and O/M expenses.

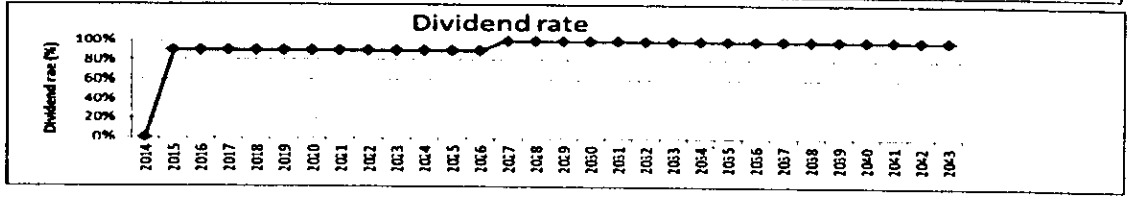


Rice terrace conservation fund is appropriated by dividend of the project, the dividend is decided by profit after tax and dividend ratio.

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, Asipulo

Attendance

	Name	Position	Office/Barangay	Signature
1	[illegible] M. Dacuag	BRGY KGWD	HALIAP	
2	CHRISTOPHER CAYAMS		HALIAP	
3	Constancio Catamo	Brgy. Kag.	HALIAP	
4	Basilio Bayaoas	Brgy Kagwad	Haliap	
5	ROGER MANGHI	BRGY KGWD	do	
6	NANCY ADDANGNA	Brgy. Secretary	Haliap	
7	NANCY GANO-NAWANE	PO-1	PPDO	
8	Carmelita B. Bayuccan	PPDC	PPDO	
9	Maria L. Lad-ao	Brgy Kgwd	Brgy. Haliap	
10	BALTAZAR DAMMIT	Irrigator	MAPPIT	
11	Julia P. Basilio	Brgy. Treasurer	Haliap	
12	Jonathan K. Portuguez	PPDO	Lagawe	
13	Lilian Tenenan		Hlwap	
14	Tony Linglingon		PPDO	
15	Ignacio Bunobra		TEPSCO-Local	
16	Rey V. Salvana	DOE		
17	SHIMIZU Mitsuru		TEPSCO/JICA	
18	Nobuki Hayashi	TEPSCO/JICA		
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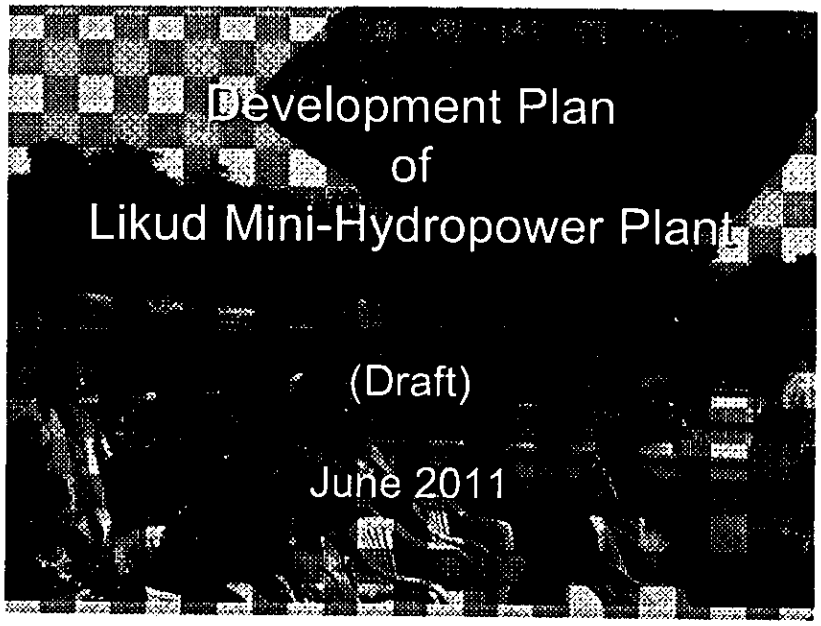
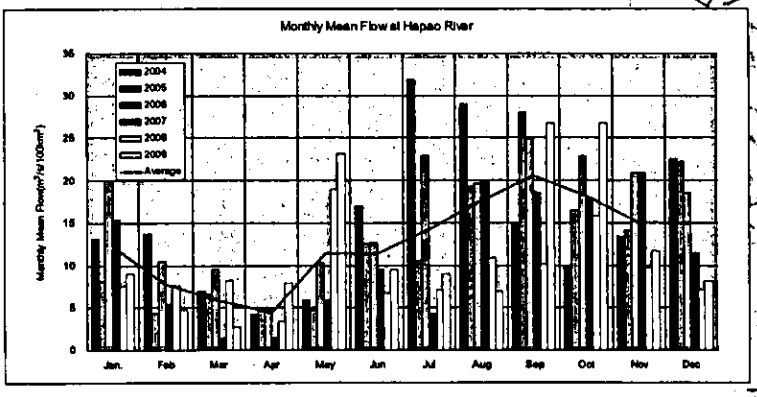


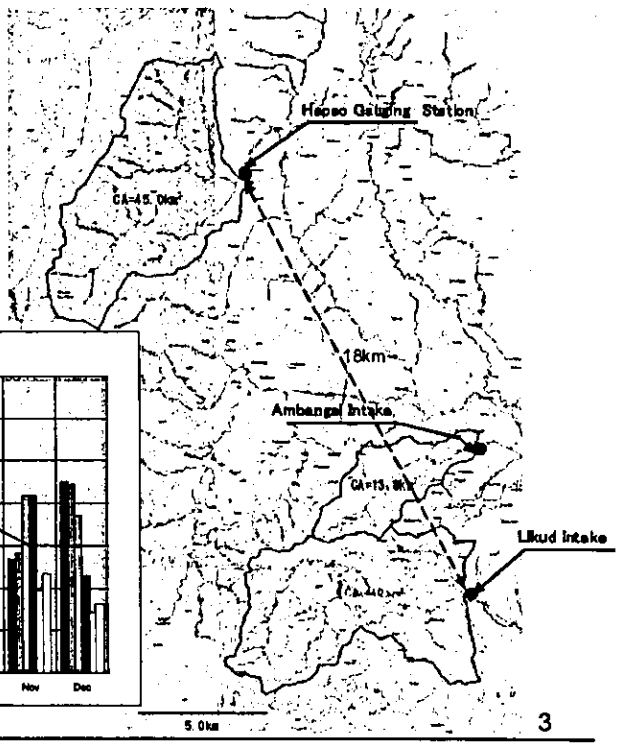
Contents of Presentation

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. Next Activities

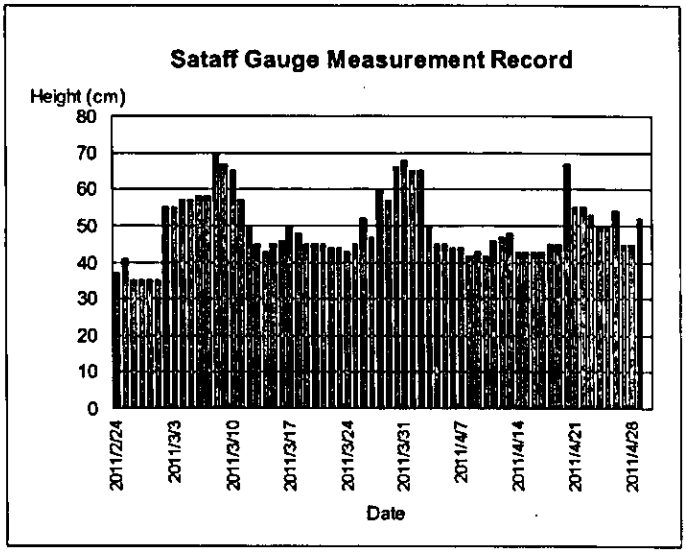
Reliable River Flow Data: Hapao Gauging Station in Municipality Hungduan

Location ; 18km away from Likud project Site
Brgy. Hapao, Hungduan
Observation Period ; Jan. 2004 – Dec.2009
6years
Catchment Area ; 45.0km²
Observed by ; TEPSCO





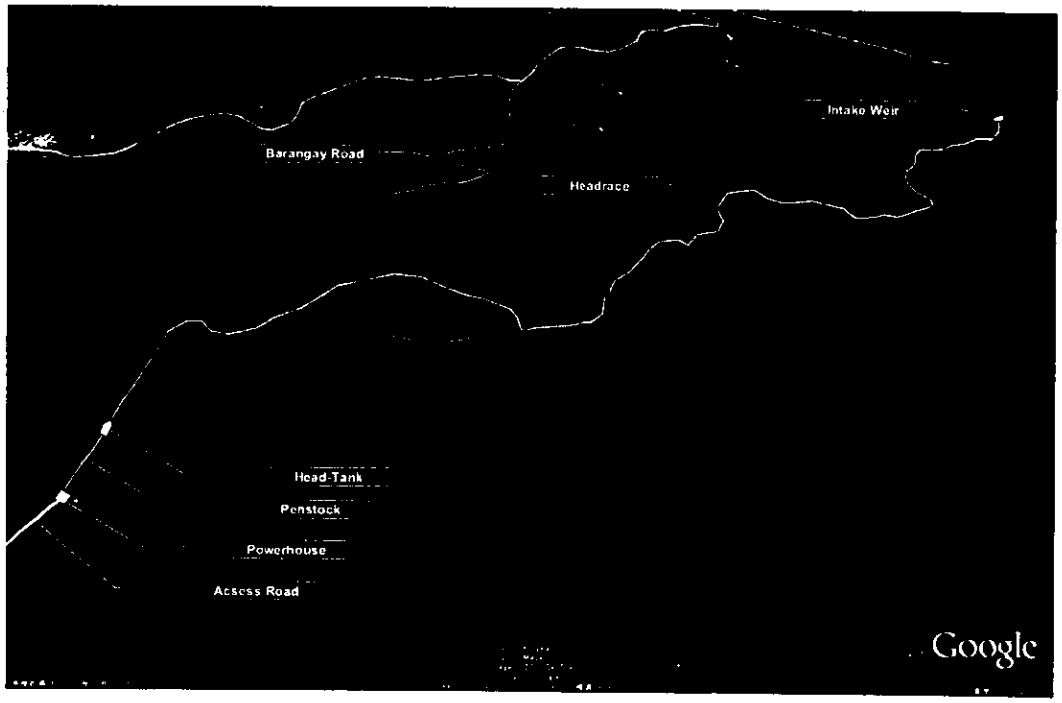
Installation of Staff Gauge and Measurement of River Water Level



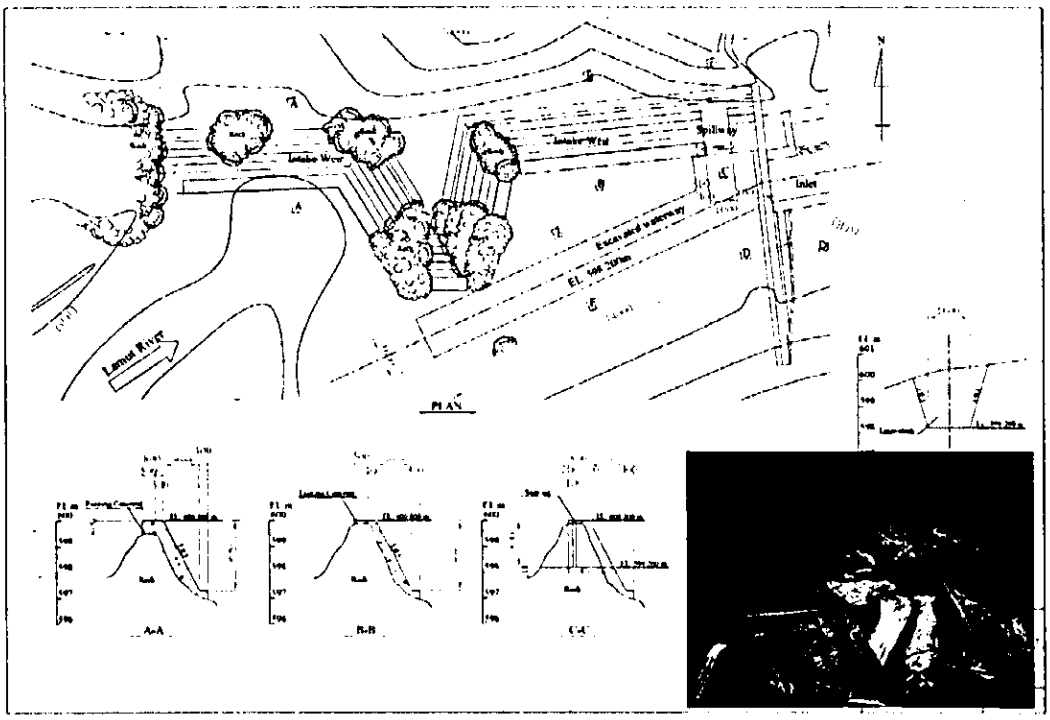
Examination on general layout

Outline of the Structures

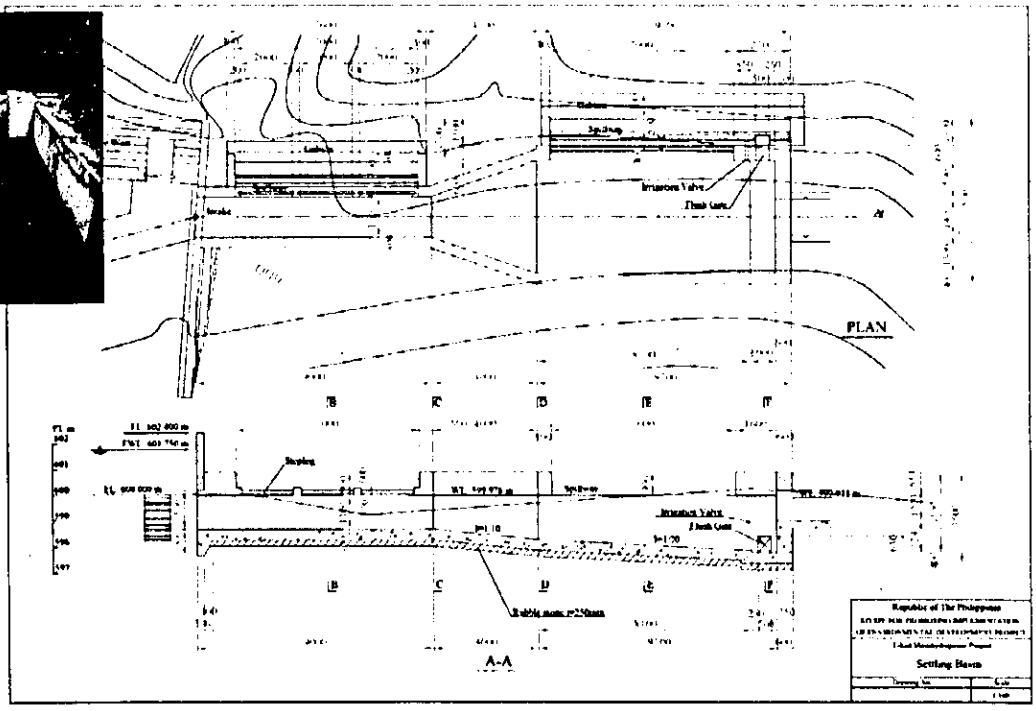
General Layout



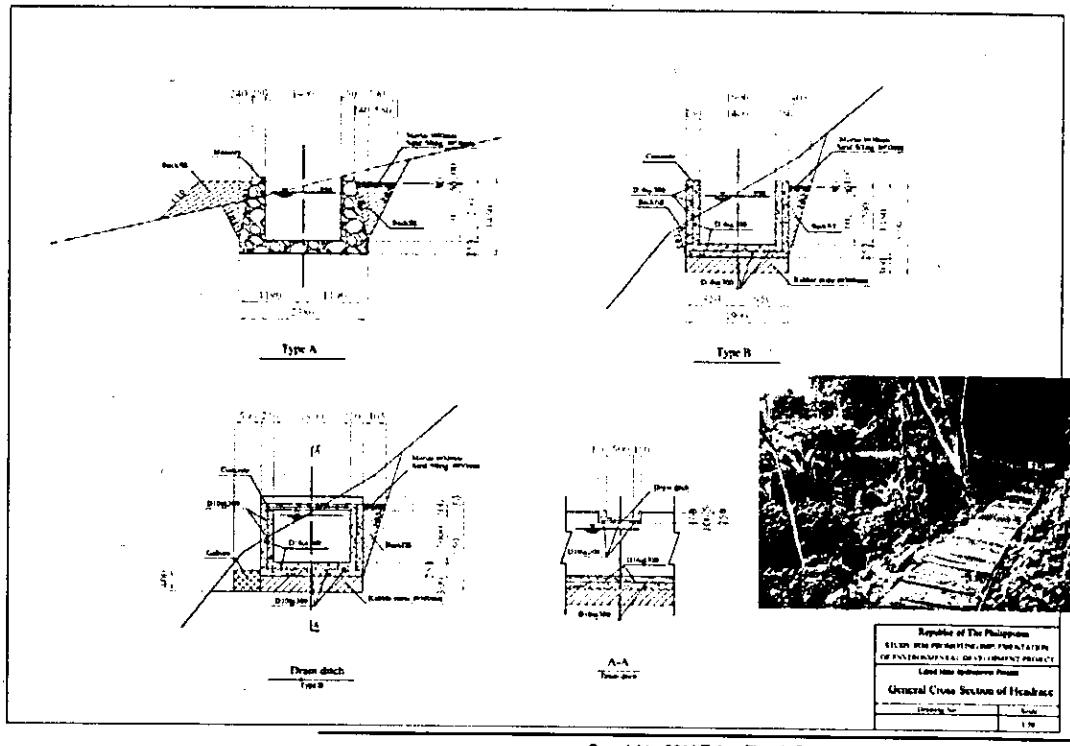
Intake Weir (Improvement of Existing Weir for Irrigation) :Height=about 3.0m



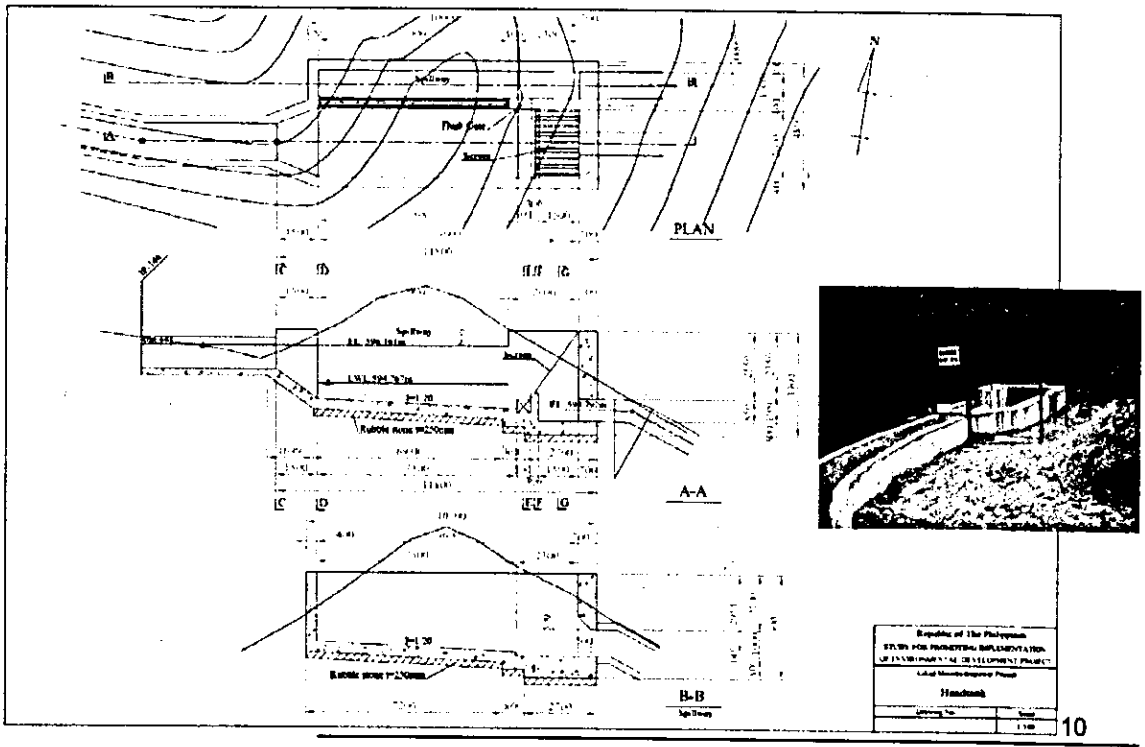
Settling Basin



Headrace Channel Total Length=1,875 m

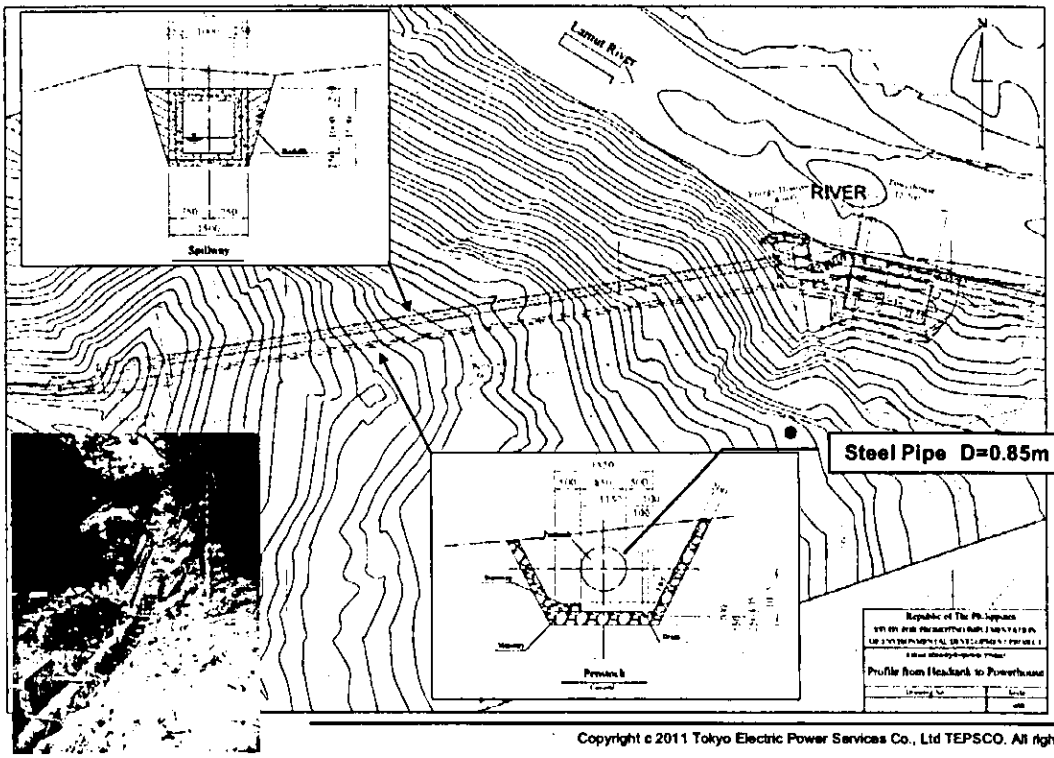


Head-Tank



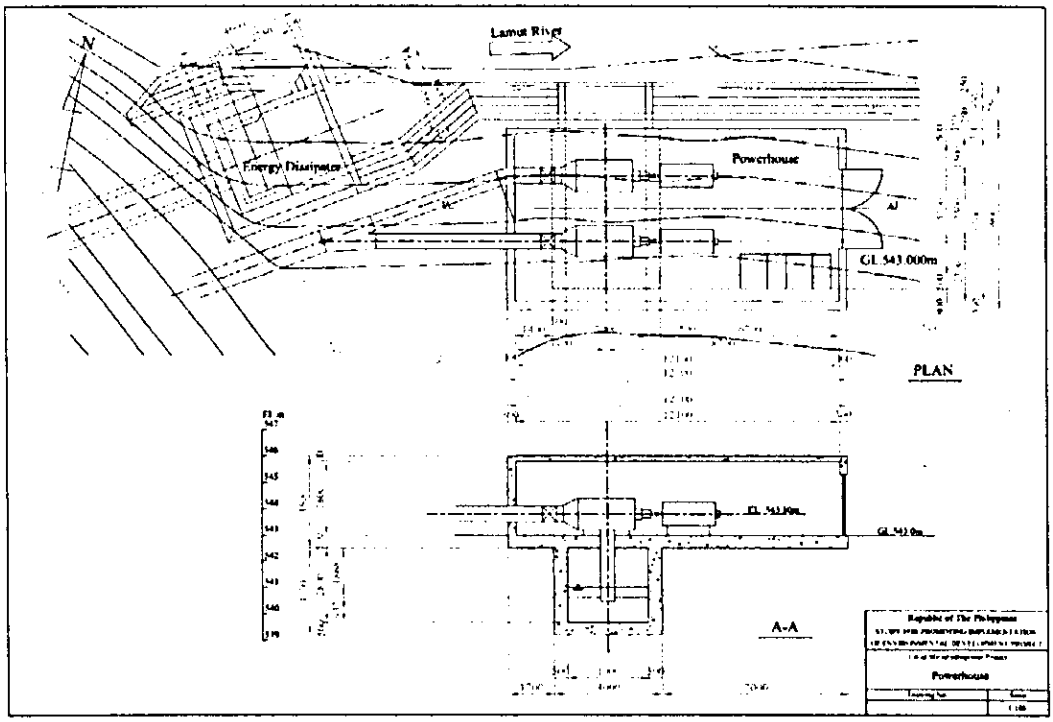
Outline of the Structures

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

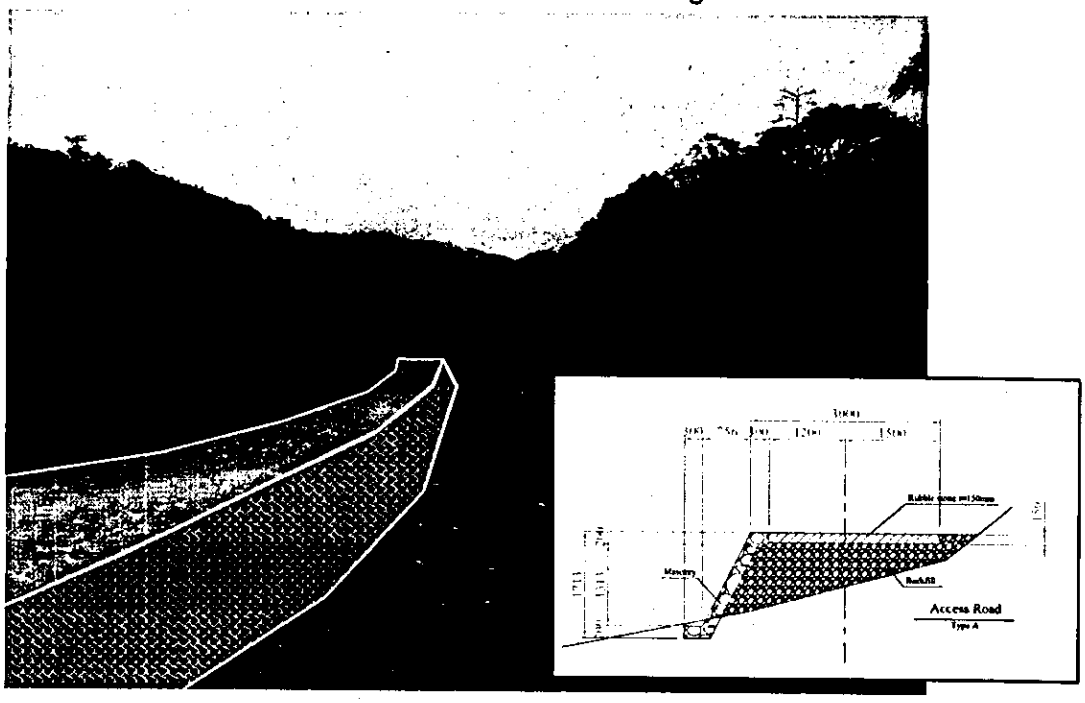


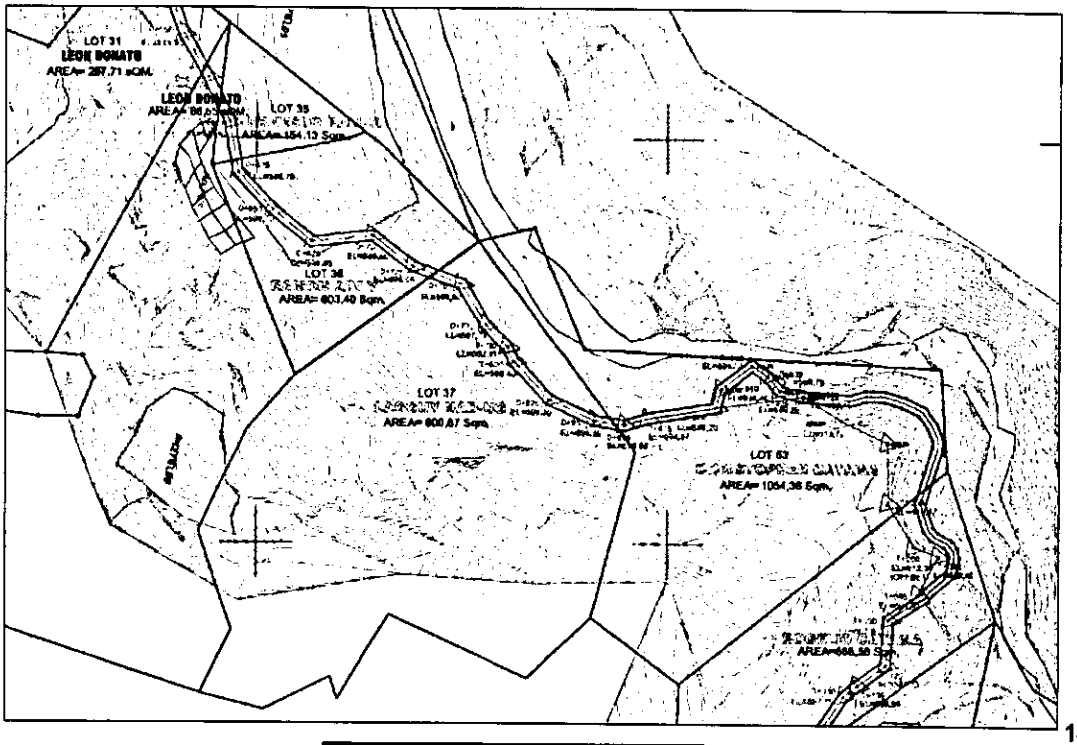
Outline of the Structures

Powerhouse

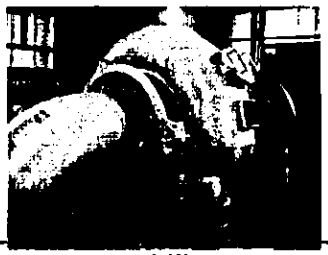
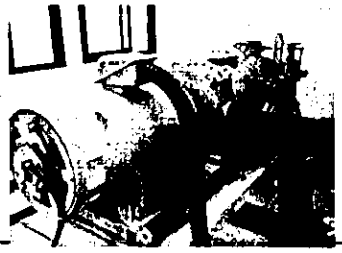


Access Road to Powerhouse from Washed-out Bridge



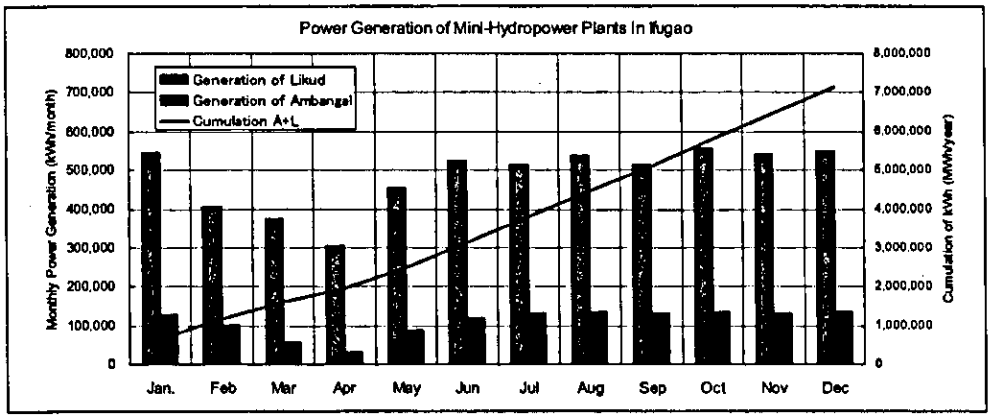


Selection of Turbine Type

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 Ambamgal MHP
Maintenance	Complex During maintenance work, the operation should stop completely	Easy During maintenance work, 1 unit can be operated
Result	-	Selected for Likud MHP

Power Generation

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



Development Cost (Draft)

Contents	Quantity	Unit	Cost (Peso)	Remark
Direct Cost				
Civil Works				
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	
Electro-mechanical Works				
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	
Indirect Cost				
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	
Others				
Right of Way	1.0	Ls	659000	
Total			113250000	

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 !!

Highlights of the Meeting with DBP

Date:	9:00- 10:00, 5th August 2011
Venue:	PD Conference Room, 3rd Floor, DBP
No. of Participants:	DBP: 3, DOE: 1, TEPSCO: 2
Agenda:	The guideline for mini-hydropower (run-of-river type) project

[Highlights]

- Mr. Shimizu provided the guideline for mini-hydropower (run-of-river type) project how to check and evaluate the quality of FS documents. He added to explain that the feasibility study report of the Likud mini-hydropower project can be referred as case study for the DBP's evaluation. There are some cases not fully explained all necessary information, for example, some are explained the hydrology matter in detail but no data of topographic survey nor drawings. How they estimate the construction cost without drawings?

- He also explained the result of the feasibility study on the Likud mini-hydropower project.

[Q&A]

- Mr. Noli Cruz said the guideline is very helpful and useful for DBP

- DOE also does not have such guideline, it would be good for DOE officer

- Mr. Noli Cruz asked if the PGI has already applied the pre-development contract for the Likud.

  → Yes, they applied. DOE is now processing the evaluation of application.

- Mr. Noli Cruz asked if the Feed-in-Tariff (FIT) case examined for the Likud project?

  → No, since the FIT regulation has not yet put in force, and we don't know when it would be started, that is why JICA study team didn't analyze.

- Mr. Noli Cruz asked that since the feasibility study of the Likud is finished, how is the stance of DBP? Should DBP start to examine the financial matter of the PGI?

  → Mr. Shimizu answered that the PGI would review this FS report, and decide to implement the project or not. When the PGI contacts DBP, that is the time DBP move on.

Highlights of the Sangunian Bayan member

Date:	13:50-15:30 , 8th August 2011
Venue:	Municipal Hall, Asipulo, Ifugao
No. of Participants:	Sangunian Bayan (SB) members:9 PPDO: 2 JICA: 1 TEPSCO: 3
Agenda:	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&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

ce: Ifugao Provincial Government
e of meeting/seminar/workshop: ______
ıue: ASIPULO
Date: ______
ected number of participants: ______ Scheduled time: ______

Name	Male	Female	Office	CP Number	Signature
TOMAS B. PULLUPUL	✓		SP		
DENNIS P. GUMANGAN	✓		-do-		
CLARENCE P. BAHINGAWAN	✓		-do-		
ROMEL D. PALLAY	✓		-do-		
CHRISTINE D. HUMNGAT		✓	-do-		
FLORENCE B. PIGGANGAY		✓	-do-		
FERNANDO D. DUPINGAY	✓		-do-		
ROBERT P. ULLANI	✓		-do-		
CHARLES T. HUMMINAT (ABC)	✓		-do-		
CLARENCE D. DUPINGAY	✓		-do- ([illegible])		
JANE B. ANUDON (SKF Pres)		✓	-do- ([illegible])		

CERTIFIED CORRECT:

______
Activity Secretariat

Highlights of the Meeting with Sangunian Panlalawigan members

Date:	10:30-12:30, 8th August 2011
Venue:	3rd floor, Sangunian Panlalasigan conference room, Lagawe, Ifugao
No. of Participants:	SP members: 11 PPDO: 2 JICA: 1 TEPSCO: 3
Agenda:	The result of the feasibility study on the Likud mini-hydropower project

[Highlights]

- Mr. Shimizu presented the results of the feasibility study around 40 minutes, the 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

[Q&A]

- Mr. Robert Humiwat asked which is true that the maximum capacity of the power plant was 810kW, on the other hand 2 units of water turbine total capacity 820kW.

  → Mr. Shimizu said 810kW is correct. The unit capacity of water turbine was wrong. We will revise it later.

- (Mr. Robert Humiwat) Regarding the selling rate P4.1/kWh, the PGI will have to examine the rate in more carefully; otherwise the Energy Regulatory Commission (ERC) will reduce the rate like the case of the Ambangal. Even though both of PGI and IFELCO agreed the rate P4 pesos/kWh, the ERC reduced the rate as P3.6pesos /kWh. If we cannot get any profit from the project, it will waste to invest.

  → According to the ERC provisional approval, the PGI need to justify and submit the proper complete documents to support the establishment of the RTCF. The ERC understood the necessity of RTCF and its amount, but there's no document how to utilize

the fund. The PGI has to submit additional information documents.

- Hon. Victor Bunnol Jr. asked if DOE allow to the other mini-hydro developer such as Hedcor to apply Renewable Energy contract. Most of the potential sites in Ifugao were applied by TEPSCO.

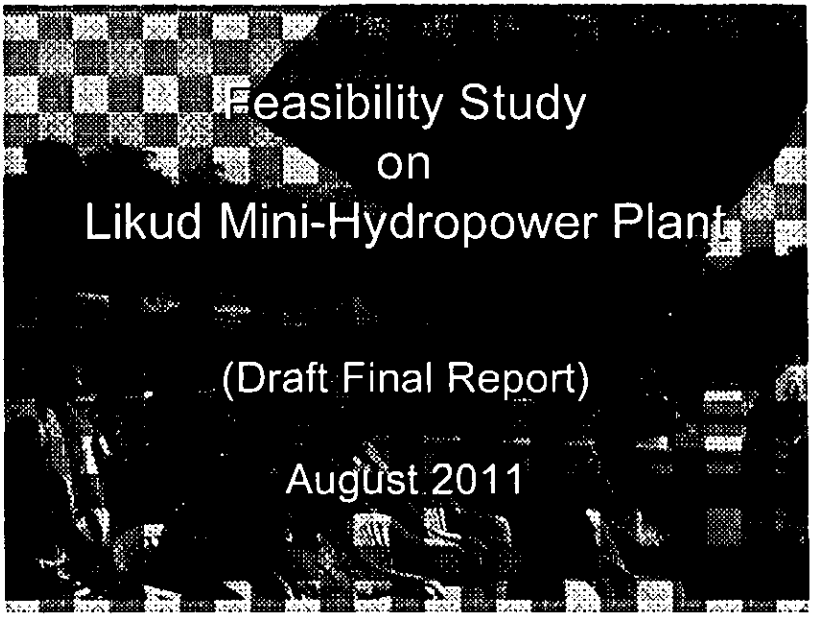
  → Engr. Rey Salvania, DOE representative answered that anybody could apply unless there's no conflict of development areas. TEPSCO conducted a master plan to identify the potential sites in Ifugao before, but they cannot apply the RE contract but the PGI was the one for pre-development contract of the Likud mini-hydro power.

- Mr. Jordan Gullitiw asked if the ERC approves only P2.5 peso/kWh for the Likud mini-hydropower project, does the project worth to implement?

  → If the ERC approves only the generation cost, the project does not accomplish the goal which generates the fund for the Rice Terrace Conservation activity. We cannot say it is feasible if the case is like that.

- (Mr. Robert Humiwat) Despite of reducing the Ambangal selling rate from the proposed set with P4 peso/kWh to P2.58 peso /kWh, the electricity tariff of end consumer of Ifugao does not decrease. Only IFELCO get profit from the Ambangal. He asked if DOE can coordinate with ERC for setting the rate for the Likud project.
  He also asked the representative of DOE if they have copy of the power rates in the country.

  → DOE representative answered the ERC is independent body from DOE. DOE cannot control anything. And IFELCO is a non-profit organization, if the cost of IFELCO decreases, the consumer's rate also decreases. IFELCO has another reason not to reduce the electricity rate. And DOE has copy of the power rates in the country, but you can access the DOE website to check the rate. DOE representative agreed to send a copy to the board member.



Contents of Presentation

1. Purpose of the Study
2. Restrictions of the Development
3. Hydrological Analysis
4. Generation Plan (General layout and Optimum Capacity)
5. Outline of the Structures
6. Development Cost
7. Financial Analysis
8. Conclusion
9. Recommendations

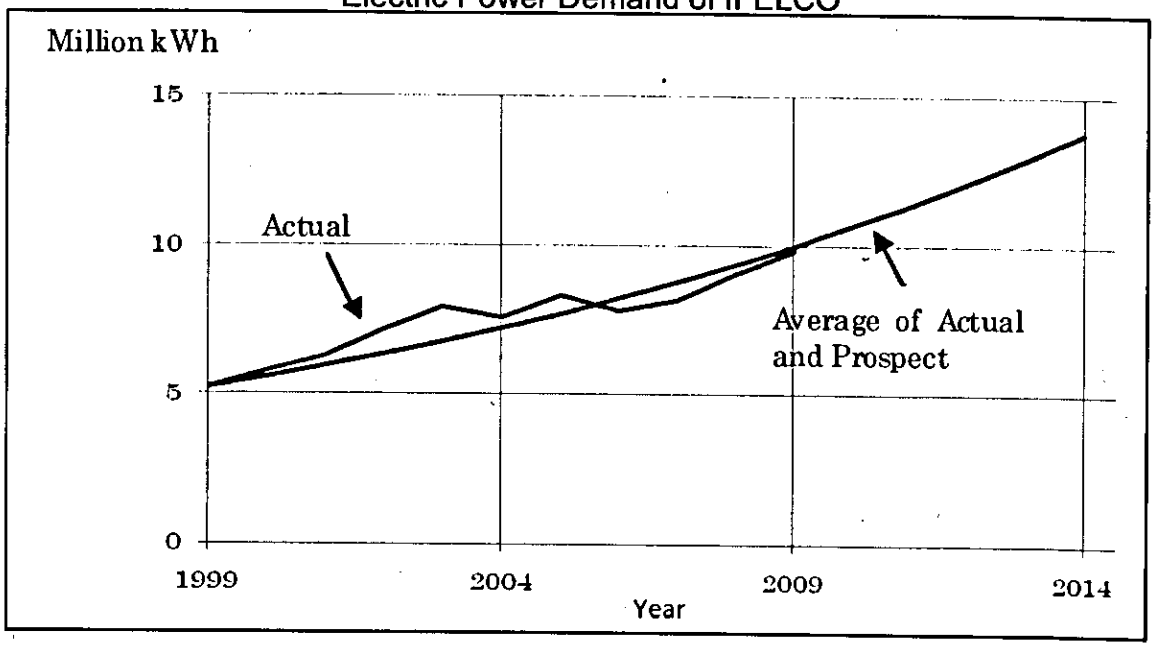
Purpose of The Study

The mini-hydropower development site is Likud Site, Asipulo Municipality, Ifugao Province. The development of Likud Site shall contribute to create "Rice Terrace Conservation Fund" by making use of electricity sales.

The study will show Philippines good reference of a regional contribution by Mini-hydropower development and aims to expand the application of the Environmental Development Project (EDP).

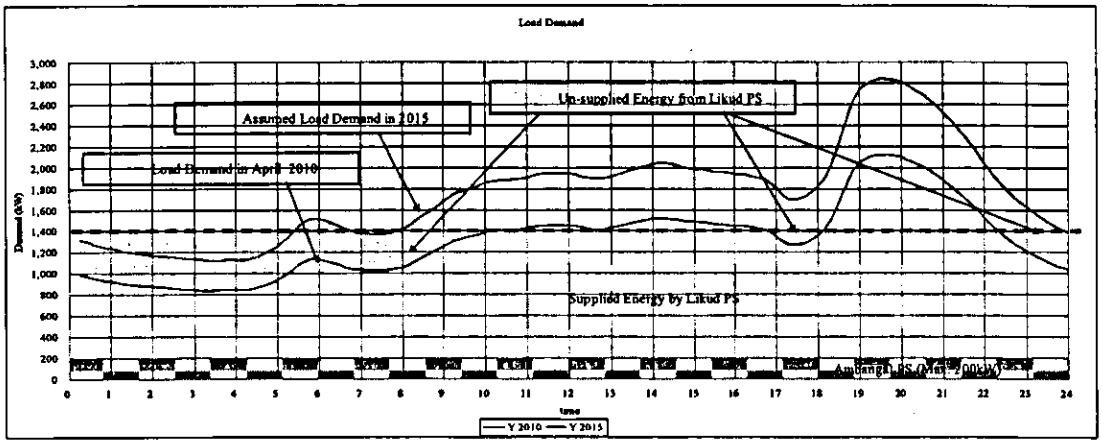
Restrictions on Scale of Development

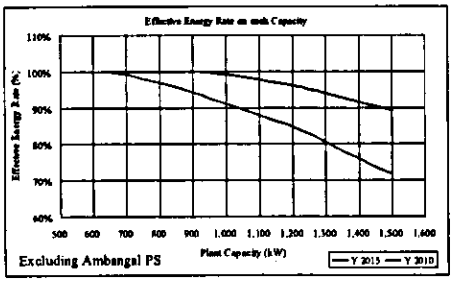
Electric Power Demand of IFELCO



Annual Growth Rate = 6.5%/year

Restrictions on Electric Power Demand in Ifugao





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)$_5$

Legal Restrictions

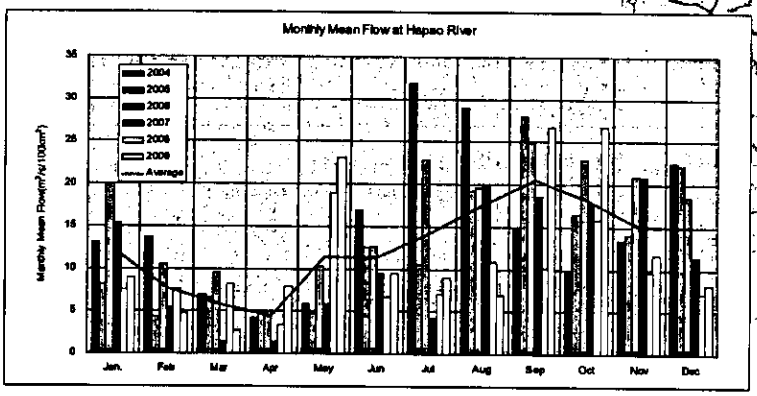
In the Republic Act No.7156 "An Act Granting Incentives to Mini-hydro-electric Power Development Developers and for Other Purposes", the development scale is specified as follows;. "Sec.8; Non-exclusive Development- Development of less than fifty percent (50%) of the hydroelectric power potential of the proposed site shall be non-exclusive. The Office of Energy Affairs OEA, after a through review and evaluation of its technical and economic viability, may grant the first option development of the site to its full power potential to any qualified developer: Provided, that first option shall be given to the original developer: Provided, further, That, in case the original developer forfeits his option to pursue development of the hydroelectric power resource to its full potential, it shall be reimbursed by the successor-developer of the value of its investment based on the declared value of the development for real estate tax purposes over the immediately preceding three (3) years or, in case the declared value over said period differs, on the average value thereof".

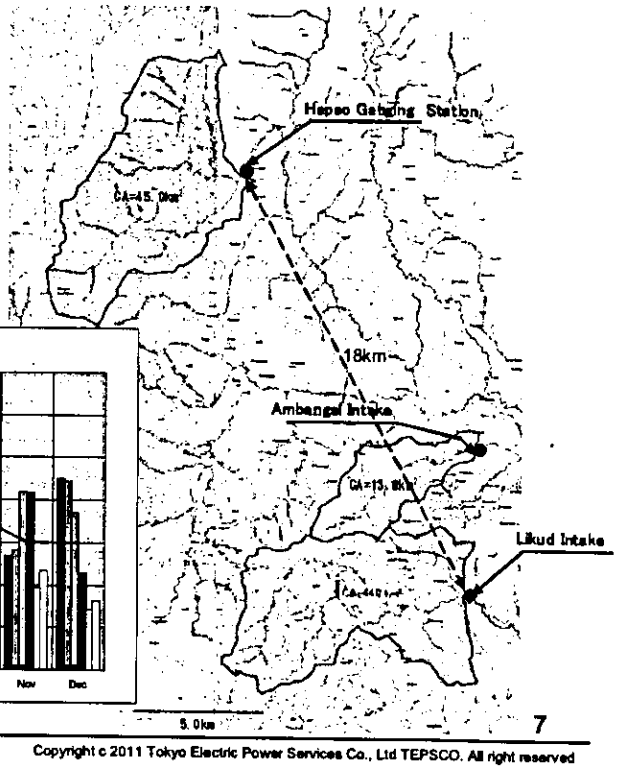
The hydroelectric power potential of Likud = 880kW (JBIC Study)

Installed Capacity of Likud MHP > 440 kW

Reliable River 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 ; 45.0km²
Observed by ; TEPSCO

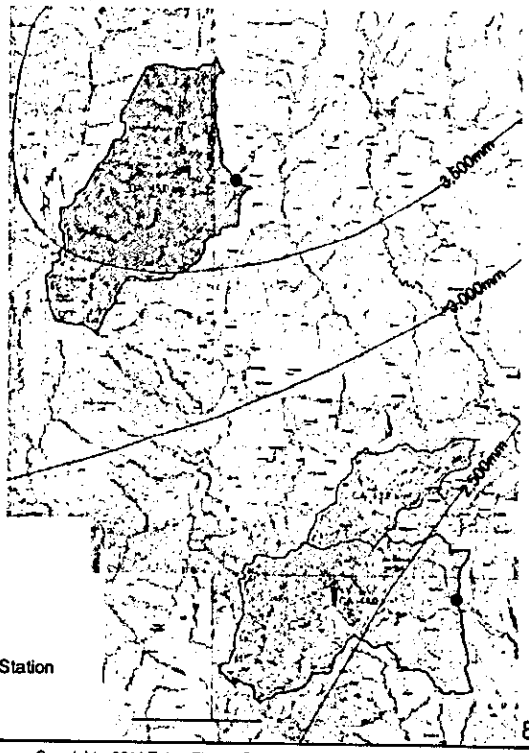




Annual Rainfall and Effective Precipitation at Project Site

Items	Hapao	Likud
Catchment Area	45.01 km²	44.02 km²
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

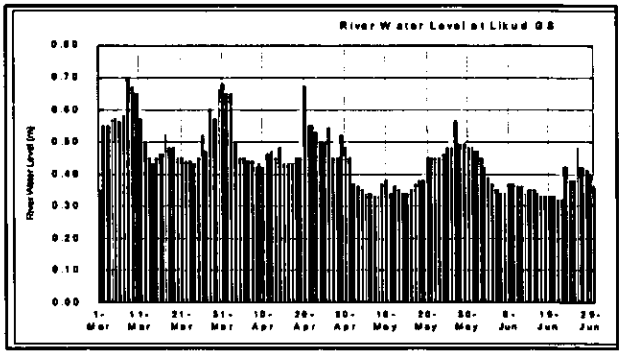


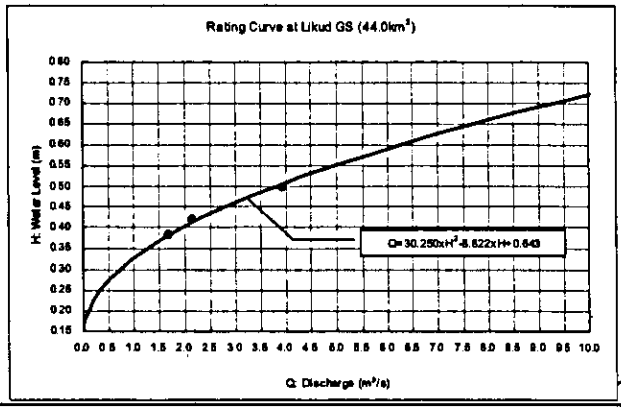
Conversion from Hapao GS to Project site

River Flow of Project Site = CR1 x CR2
x River Flow of Hapao GS

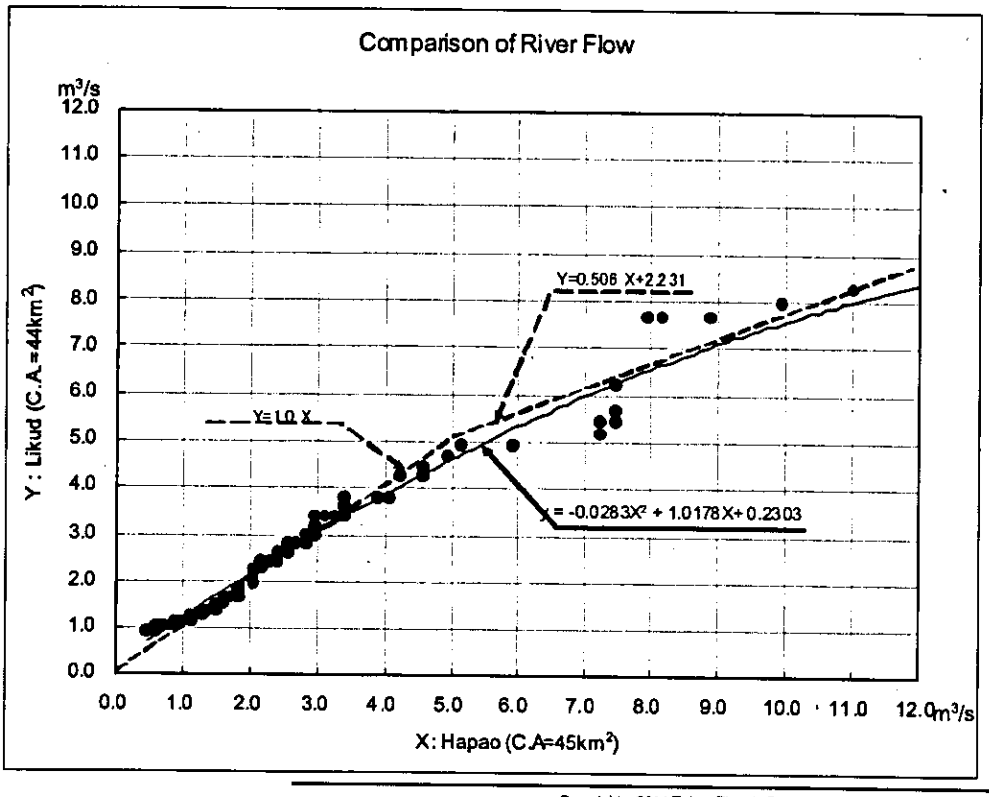
} = 0.978 x 0.660
x River Flow of Hapao GS

= 0.645 x River Flow of Hapao GS

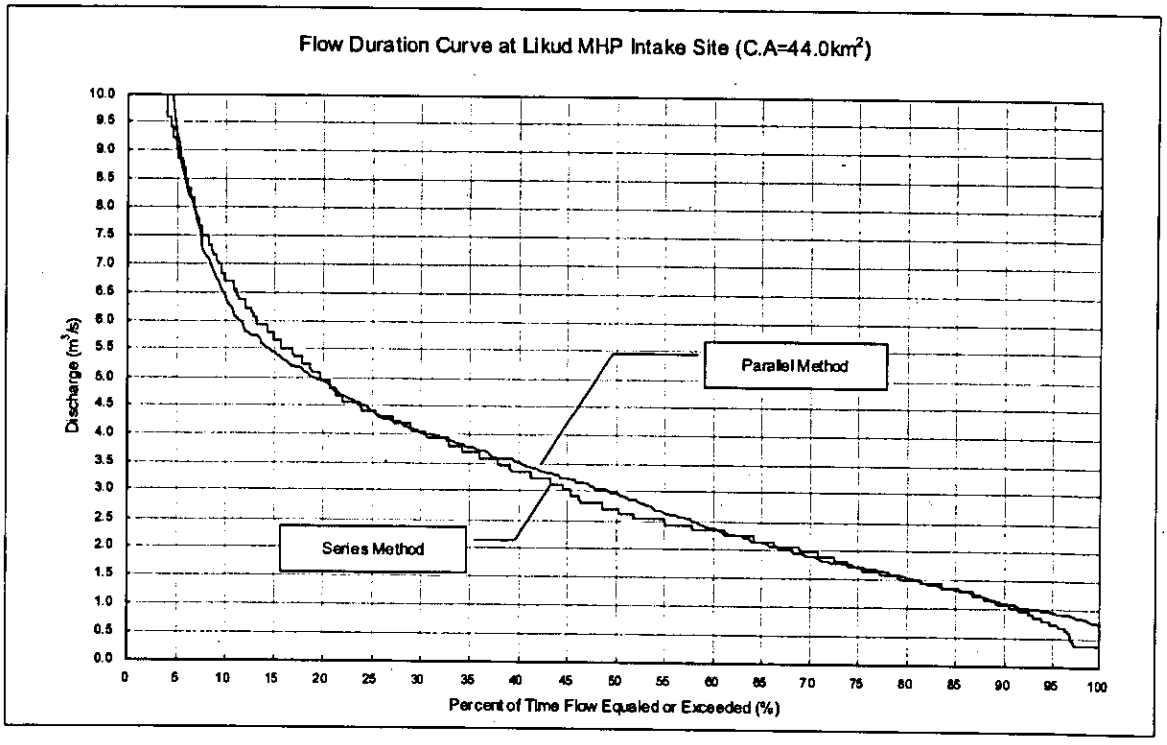




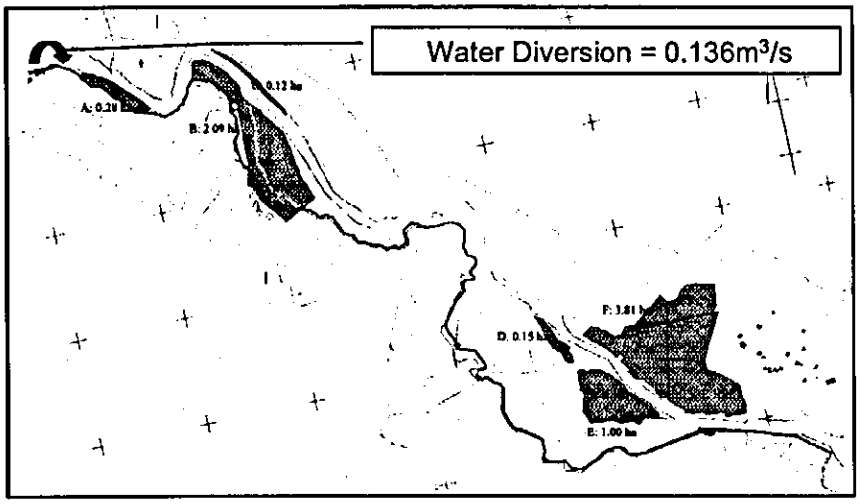
Comparison of Flow Duration between Likud GS and Hapao GS



Flow Duration Estimated (Draft)



Water Diversion from Intake Weir



Area of related paddy fields

A: 0.28ha B: 0.12ha C: 2.09ha D: 0.15ha

E: 1.00ha F: 3.81ha Total: 7.45ha

Irrigation discharge

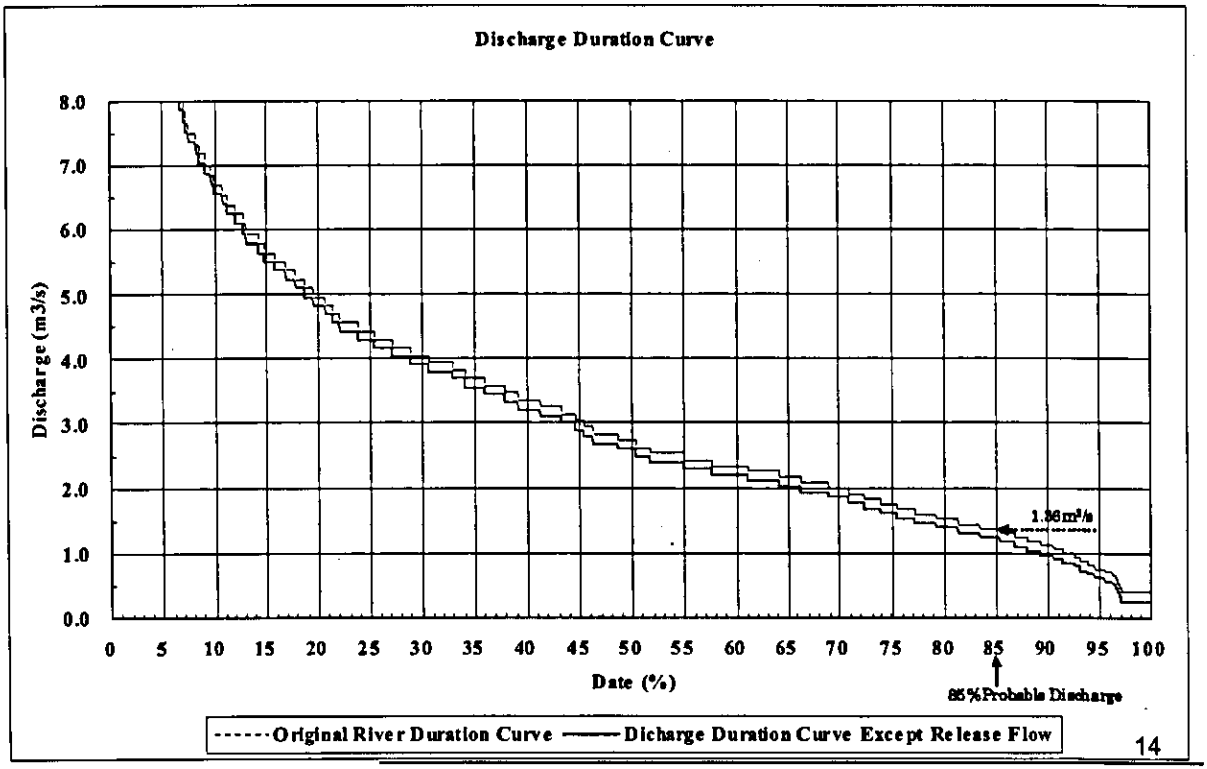
Qi2=2.0 liter/ha x 7.45 ha = 14.9 liter = 0.02m3/s

NWRB rule in the Philippines demands that 10% of 85% probable discharge in the flow duration must be discharged as the river maintenance

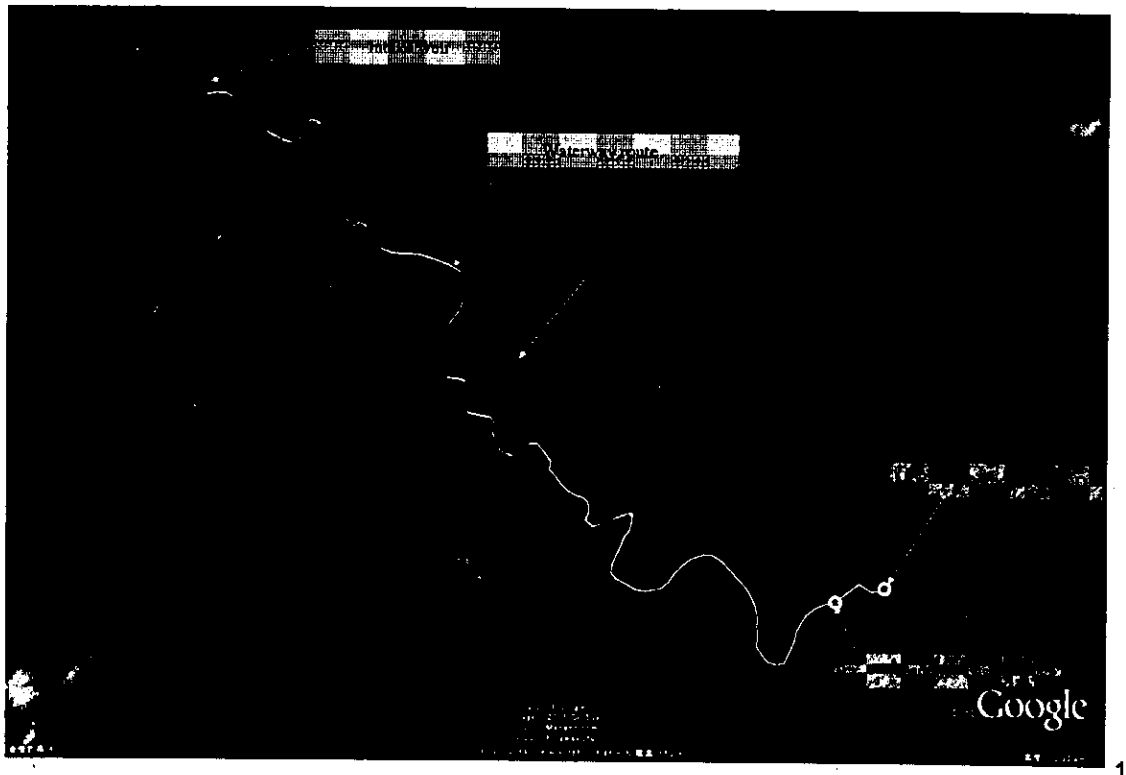
85% probable discharge in the flow duration : Q85 = 1.360 m3/s

10% of 85% probable discharge : Qi1 = 0.136 m3/s

Usable River Flow Rate for Power Generation



Examination on general layout

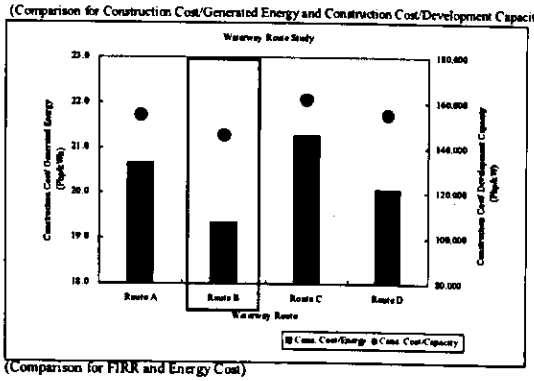


Examination on the general layout

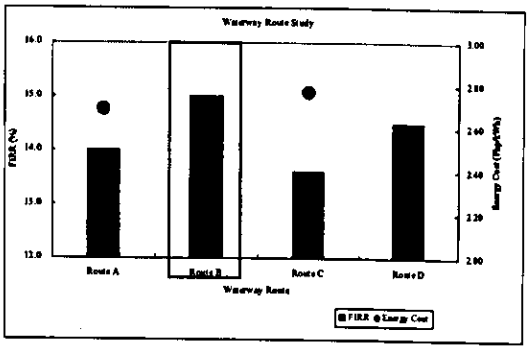
Comparison study of Waterway Routes

Item	Unit	Route A	Route B	Route C	Route D
Project Feature					
Installed Capacity	kW	740	810	770	990
Plant Discharge	m^3/s	2.00	2.00	2.00	1.70
Gross Head	m	55.0	59.0	60.0	90.0
Effective Head (H)	m	47.8	52.4	50.1	75.4
Annual Generated Energy	MWh/yr	5,529	6,092	5,833	7,622
Total length of Waterway (L)	m	1,850	1,994	2,740	4,240
L/H	-	38.7	38.1	54.7	56.2
Estimated Cost and Economic Indices					
Project Cost	Mil. Peso	114.22	117.81	124.10	153.06
Project Cost per kW	Peso/kW	154,355	145,440	161,174	154,605
Project Cost per kWh	Peso/kWh	20.660	19.339	21.276	20.081
FIRR	%	14.0	15.0	13.6	14.5
Energy Cost	Peso/kWh	2.69	2.49	2.77	2.57
Feasibility					
Technical Issue (Length of access road and Headrace)	-	Access road: 0.51km	Access road: 0.23km	Access road: Not necessary	Long headrace, long access road of 2.2km
Environmental Issue	-	No significant impact	No significant impact	No significant impact	Wide affected area for rice field
Financial Aspect	-	Low feasibility caused by small scale	No. 1 feasibility	Low feasibility caused by big L/H	Low feasibility caused by long headrace

(Comparison for Construction Cost/Generated Energy and Construction Cost/Development Capacity)



(Comparison for FIRR and Energy Cost)

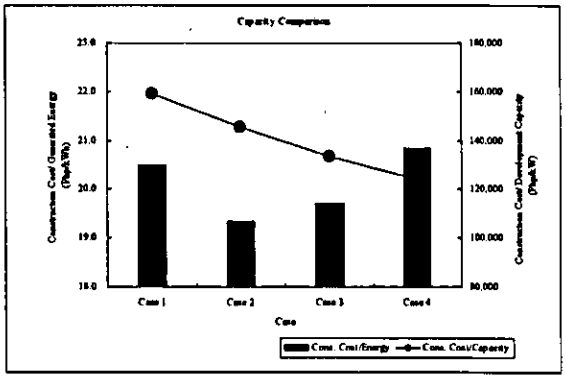


General Layout

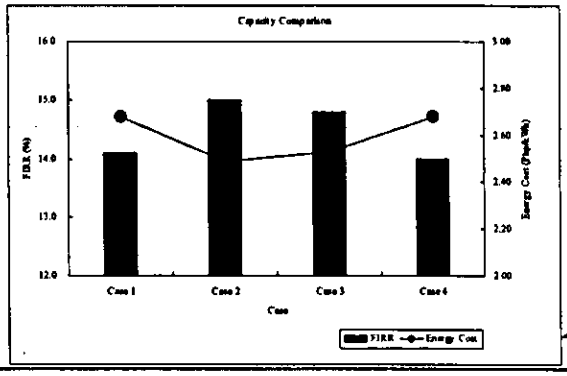
Appropriate Development Scale (Optimum Installed Capacity)

Item	Unit	Case 1	Case 2	Case 3	Case 4
Project Feature					
Installed Capacity	kW	690	810	1,000	1,200
Plant Discharge	m^3/s	1.70	2.00	2.50	3.00
Gross Head	m	59.0	59.0	59.0	59.0
Effective Head (H)	m	52.4	52.4	52.1	51.8
Annual Generated Energy	MWh/yr	5,360	6,092	6,820	7,427
Effective Supply Energy	MWh/yr	5,360	5,604	6,772	7,137
Turbine Type	-	Inline Francis (2units)		Francis (1unit)	
Estimated Cost and Economic Indices					
Project Cost	Mil. Peso	109.77	117.81	133.49	148.75
Project Cost per kW	Peso/kW	159,093	145,440	133,494	123,958
Project Cost per kWh	Peso/kWh	20.479	19.339	19.712	20.841
FIRR	%	14.1	15.0	14.8	14.0
Energy Cost	Peso/kWh	2.68	2.49	2.53	2.68

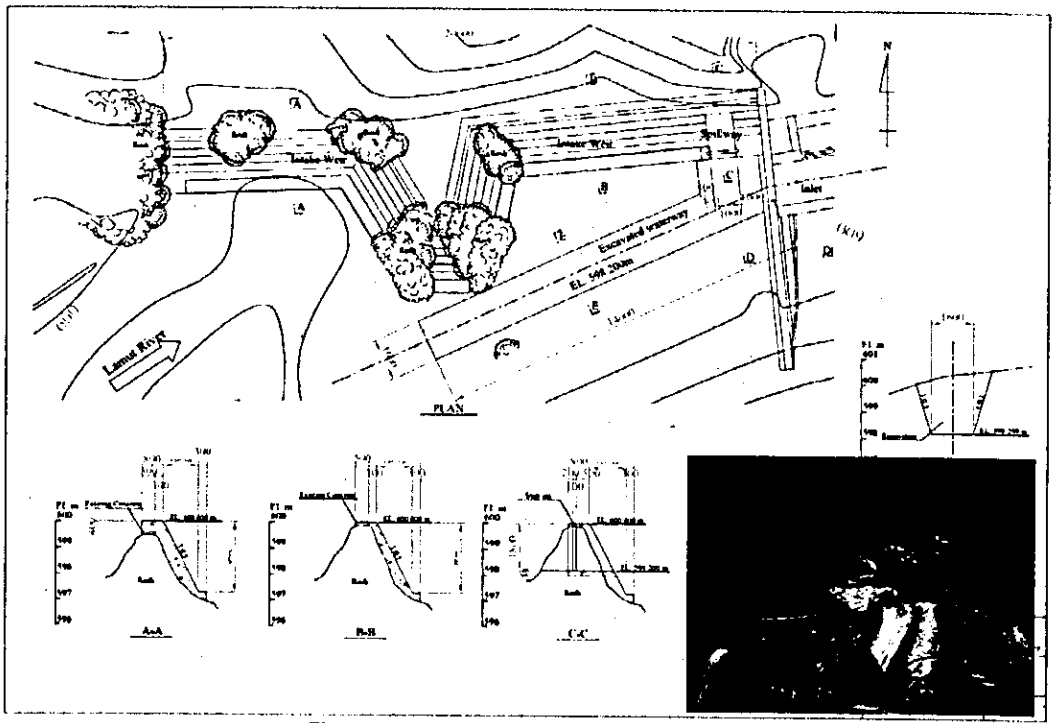
(Comparison for Construction Cost/Generated Energy and Construction Cost/Development Capacity)



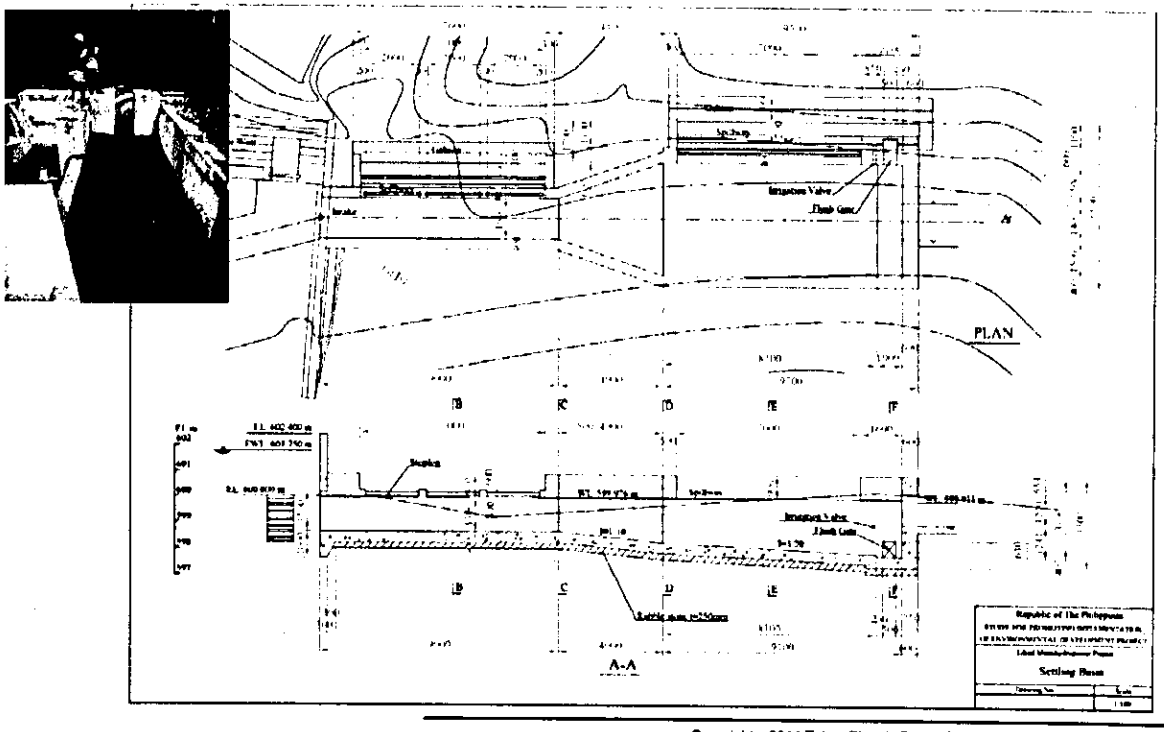
(Comparison for FIRR and Energy Cost)



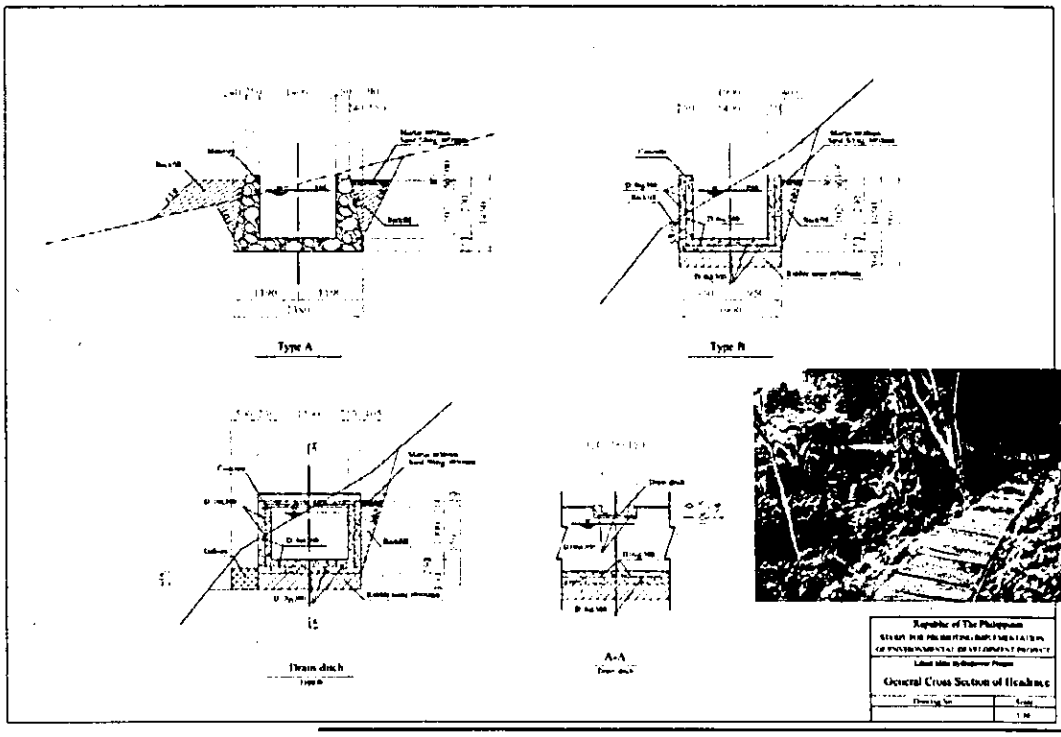
Intake Weir (Improvement of Existing Weir for Irrigation) :Height=about 3.0m



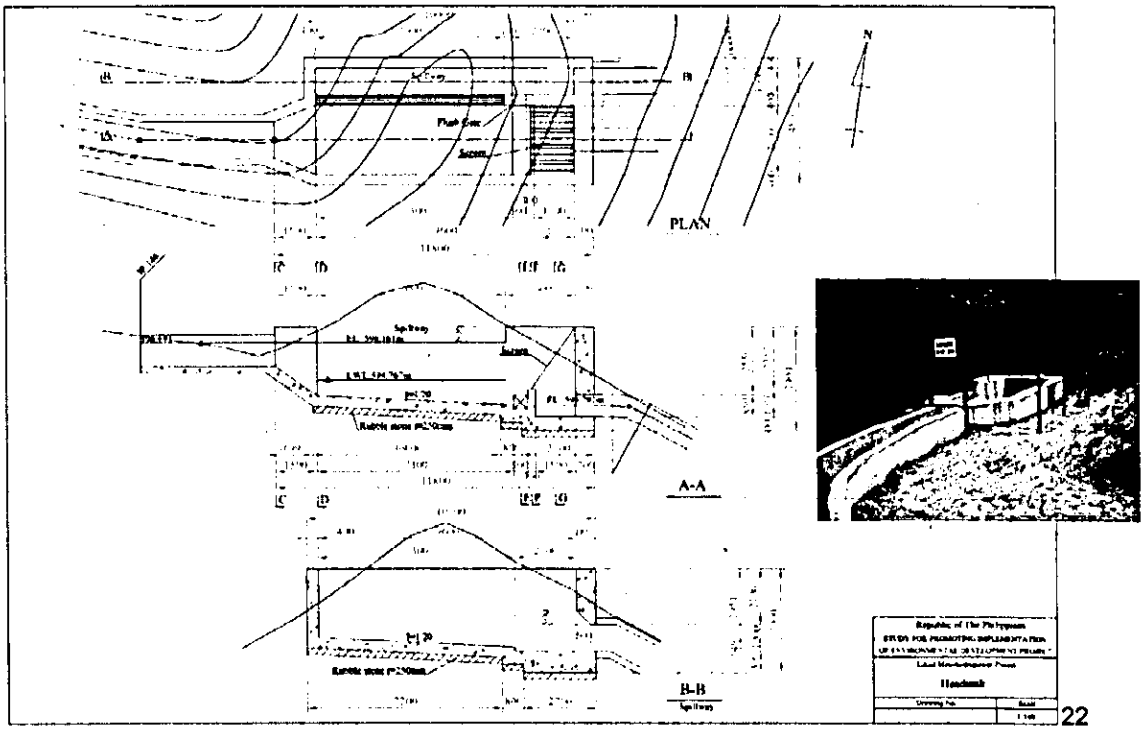
Settling Basin



Headrace Channel Total Length=1,875 m

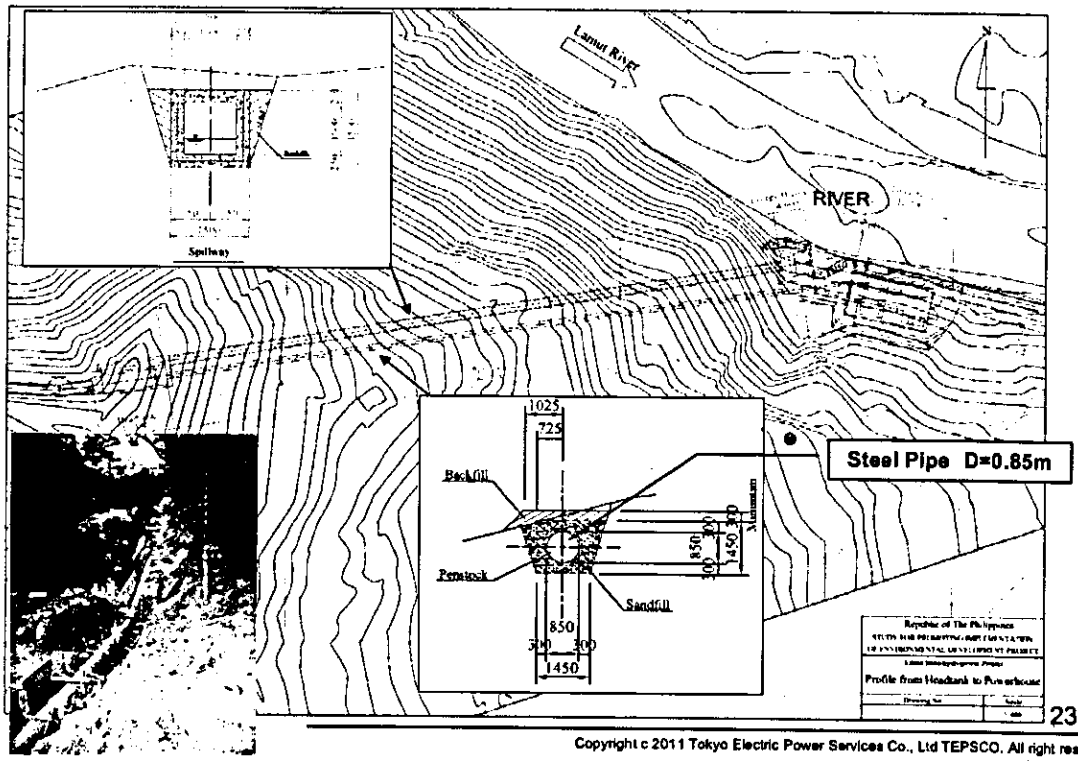


Head-Tank



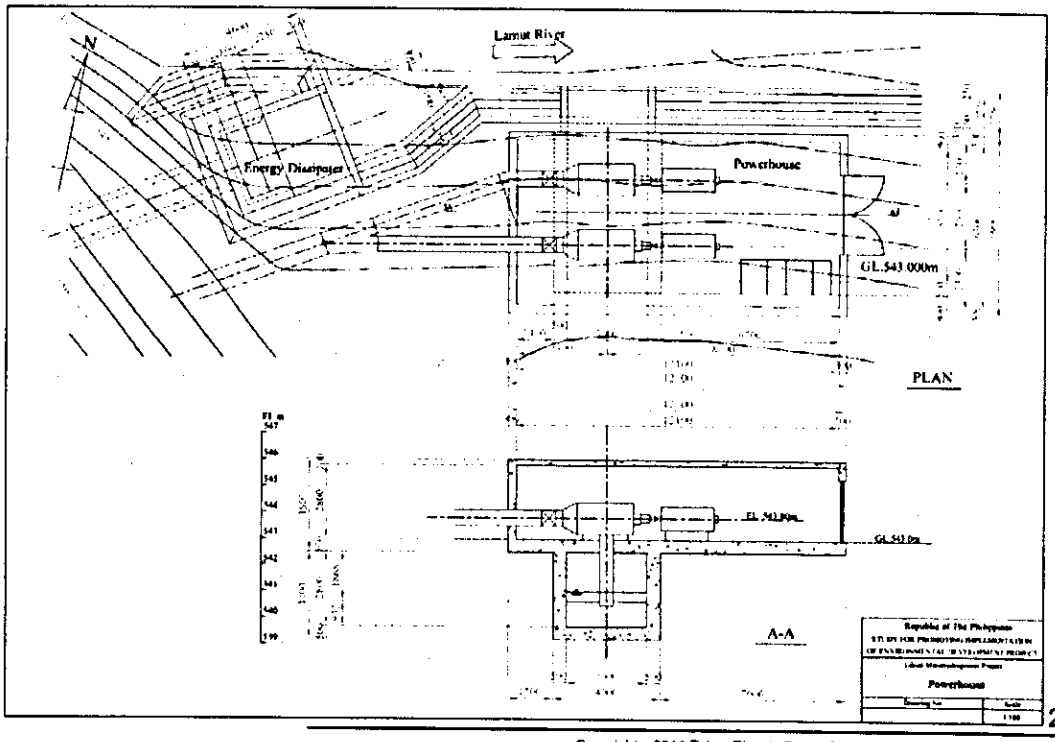
Outline of the Structures

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

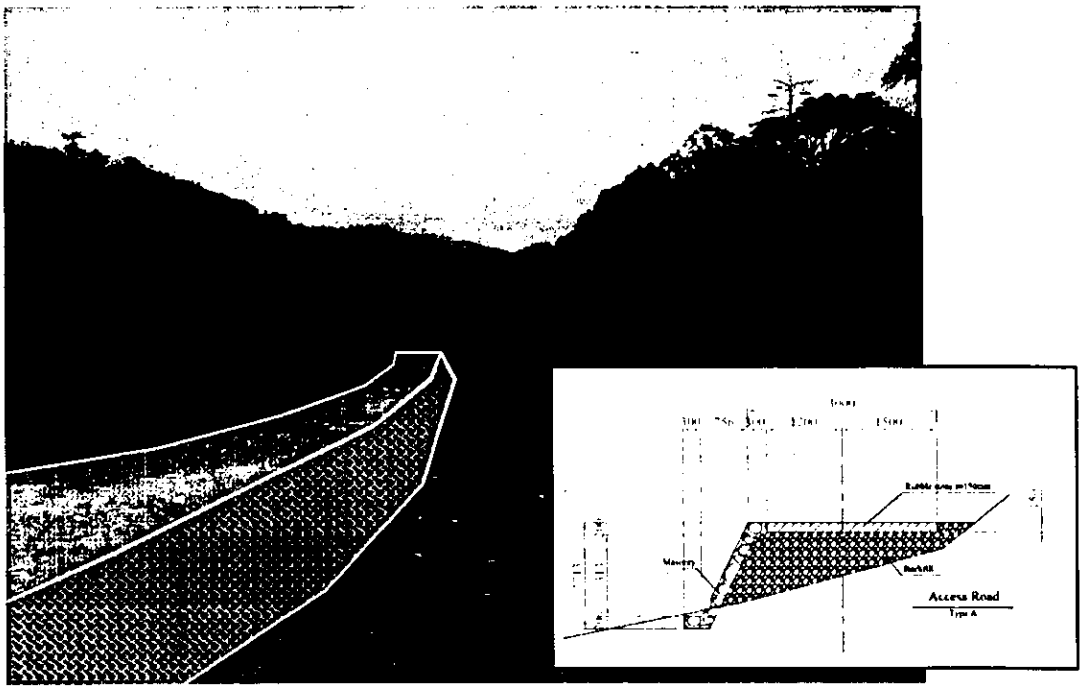


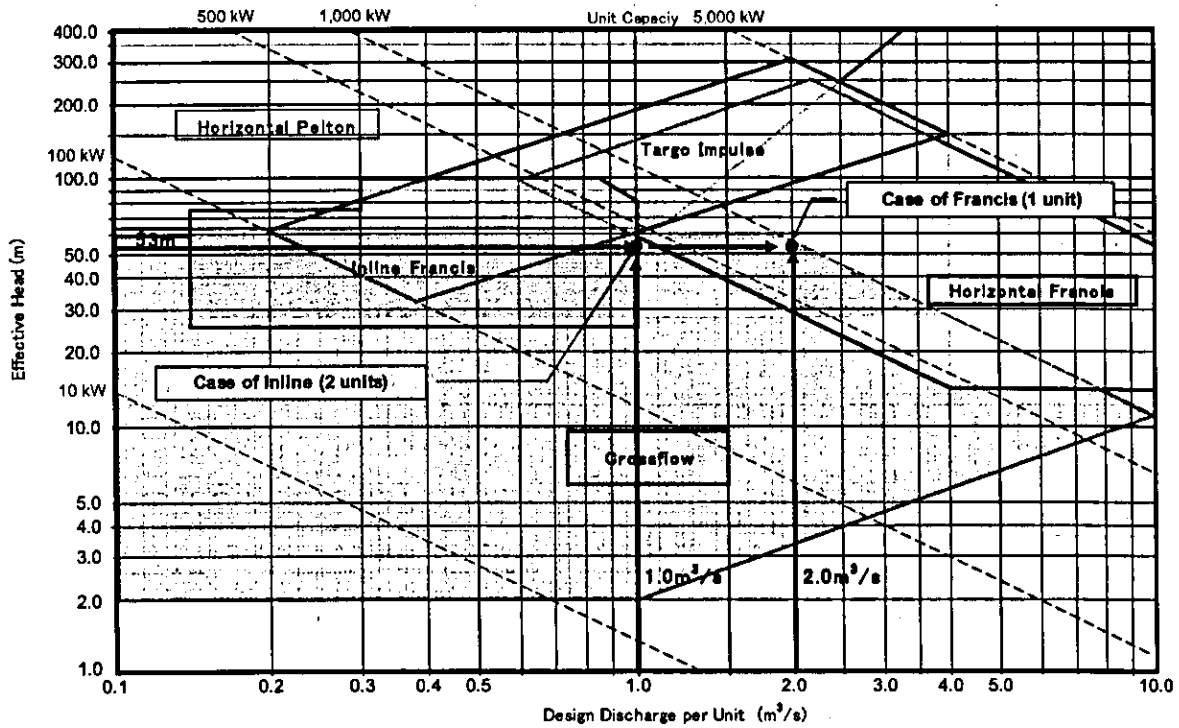
Outline of the Structures

Powerhouse

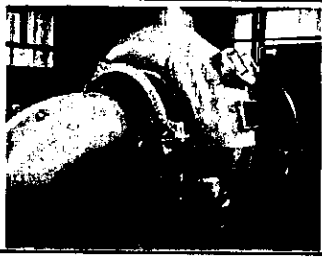
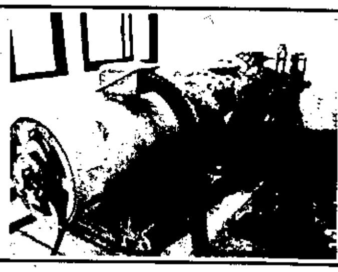


Access Road to Powerhouse from Washed-out Bridge





Selection of Turbine Type

Items	Francis Turbine	Inline Francis Turbine
Outline		
No. of Unit	1	2
Maximum Output	810kW	810 kW
Firm Output	318 kW	405 kW
Annual Effective Generation	5,536 MWh	5,604 MWh
Cost of T&G&C	Php 69,039,000	Php 67,968,000
Unit Cost T&G&C	12.5 Php/kWh	12.1 Php/kWh
Operation	Easy But newly training will be necessary	Easy Already Trained in Ambamgal MHP
Maintenance	Complex During maintenance work, the operation should stop completely	Easy During maintenance work, 1 unit can be operated
Result	-	Selected for Likud MHP

Construction Cost

Construction Cost of Likud Mini-hydropower Project

Contents	Quantity	Unit	Cost (Peso)	Remark
Direct Cost				
Civil Works				
Intake Weir	1.0	Ls	471,000	
Settling Basin	1.0	Ls	1,191,000	
Headrace	1.0	Ls	22,479,000	
Headtank	1.0	Ls	1,110,000	
Penstock, Spillway	1.0	Ls	4,921,000	
Powerhouse	1.0	Ls	1,730,000	
Access road	1.0	Ls	945,000	
Sub total			32,797,000	
Architectural Works				
Powerhouse	1.0	Ls	449,000	
Sub total			449,000	
Electro-mechanical Works				
Turbine	1.0	Ls	33,984,000	
Generator	1.0	Ls	16,461,000	
Controller	1.0	Ls	12,744,000	
Transformer	1.0	Ls	3,100,000	
Others	1.0	Ls	7,170,000	Water level Gauge, etc
Sub total			73,459,000	
Transmission				
Transmission Line	1.0	Ls	4,000,000	
Reinforcement of Substation	1.0	Ls	210,000	Lagawe S/S
Sub total			4,210,000	
Direct Cost Total	1.0	Ls	110,915,000	
Indirect Cost				
Engineering Cost	1.0	Ls	2,624,000	8% of Civil Works
Administration	1.0	Ls	328,000	1% of Civil Works
Contingency	1.0	Ls	3,280,000	10% of Civil Works
Indirect Cost Total	1.0	Ls	6,232,000	
Others				
Right of Way	1.0	Ls	659,000	
Total			117,806,000	

Exchange rate as of June 2011	JPY	US$	Peso
JPY (1.0 Yen)	1.000	0.012	0.531
USD (1.0 US$)	81.300	1.000	43.170
Peso (1.0 Peso)	1.883	0.023	1.000

Bill of Quantity

	Unit	Intake Weir	Settling Basin	Headrace	Headtank	Penstock Spillway	Power house	Access Road	Total
(1) Clearing and Grubbing	m²	0.00	199.51	10,404.53	72.79	788.06	559.10	1,433.14	13,345.21
Excavation									
(2) Clay Sand Cobbles	m³		141.49	4,145.75	131.38	454.58	71.08	131.49	5,076.11
(3) Boulder	m³	88.42	111.15	3,310.00	65.40	367.06	119.47	12.87	4,079.66
(4) Rock	m³	15.34	28.29	829.15	21.90	90.92	47.79	0.00	1,033.37
(5) Backfill	m³	0.00	49.99	1,492.49	37.92	298.84	505.75	471.82	2,466.54
(6) Stone Masonry	m³			1,893.74		5.37	100.13	105.41	2,104.65
(7) Concrete	m³	47.00	101.00	1,000.00	49.40	195.40	120.84	3.92	1,517.21
(8) Reinforce Bar	kg	1,079.27	4,457.35	29,129.22	4,031.64	5,437.52	8,798.49	161.77	53,297.31
(9) Form Work	m²	134.03	270.49	5,383.71	236.97	819.45	438.50	25.12	7,199.79
(10) Gabion	m³		7.04	12.52		2.40			21.96
(11) Sloping	m²	2.10	1.90						0.00
(12) Rubble Stone	m³		50.49	500.75	13.81		26.29	93.54	671.88
(13) Sand Filling	m³			53.67		225.94			279.62
(14) Mortar	m³			31.36					31.36
(15) Plastering	m²			7,126.16					7,126.16
(16) Guard Fence for Rock	m			934.91					934.91
(17) Guard for Excavation	m			934.91					934.91
(18) Top Board	m			934.91					934.91
(19) Penstock Steel Pipe	kg					14,908.30			14,908.30
(20) Steel Pipe (D=250mm)	m		1.00						1.00
(21) Steel Pipe (D=200mm)	m					6.00			6.00
(22) Irrigation Valve	unit		1.00						1.00
(23) Sand Flush Gate	unit		1.00		1.00				2.00
(24) Screen	unit				1.00				1.00
(25) Steel Door	unit						1.00		1.00
(26) Steel Window	unit						2.00		2.00

Components of Likud Mini-hydropower Project

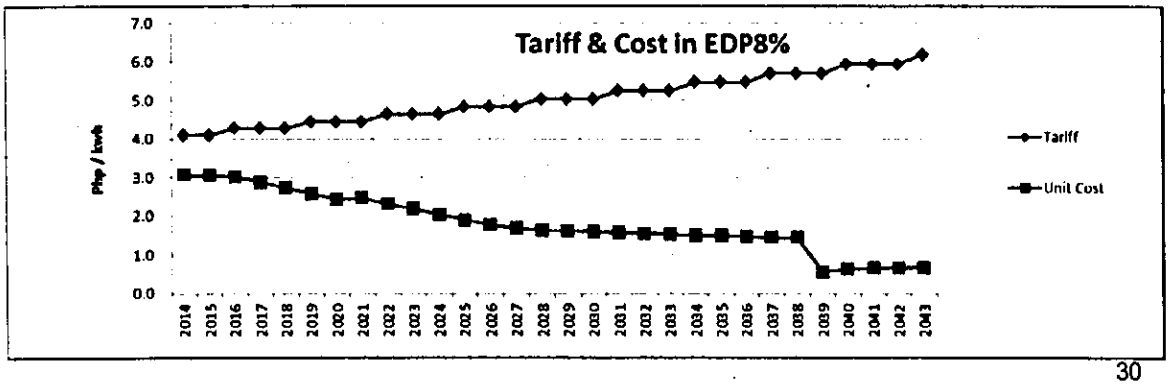
Items	Decision process	Values
Construction	Direct cost + indirect cost + other expenses	117.806 million Peso
O/M expenses	1% of Construction cost ＊Escalation	1.178 million Peso
Wages	Operators:6 ersons*8,000Php/month*12months*Escalation Engineer:1persons*12,000Php/month*12months*Escalation	0.720 million Peso at operation start
Capacity		810 kW
Power generation		6,091.73 MWh/year
Losses	5% to10% referred by the past experiences	8%
Power sales	Generation ＊ (1 －Losses)	5,604 MWh/year

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.
Note) Power losses 8% includes 5% in Generation and 3% in T/D line.

Tariff for FIRR 15%

Electric tariffs are calculated due to make FIRR reach 15% under the tariffs escalated with 4.2 % per every three years.

	Case	Initial tariffs Peso/kWh	Average tariffs Peso/kWh	Average costs Peso/kWh
Interest 8% from EDP	EDP8	4.10	4.55	2.33
Interest 9% from EDP	EDP9	4.12	4.63	2.48
Interest 10% from EDP	EDP10	4.14	4.65	2.64



Rice Terrace Conservation Fund in Each Case

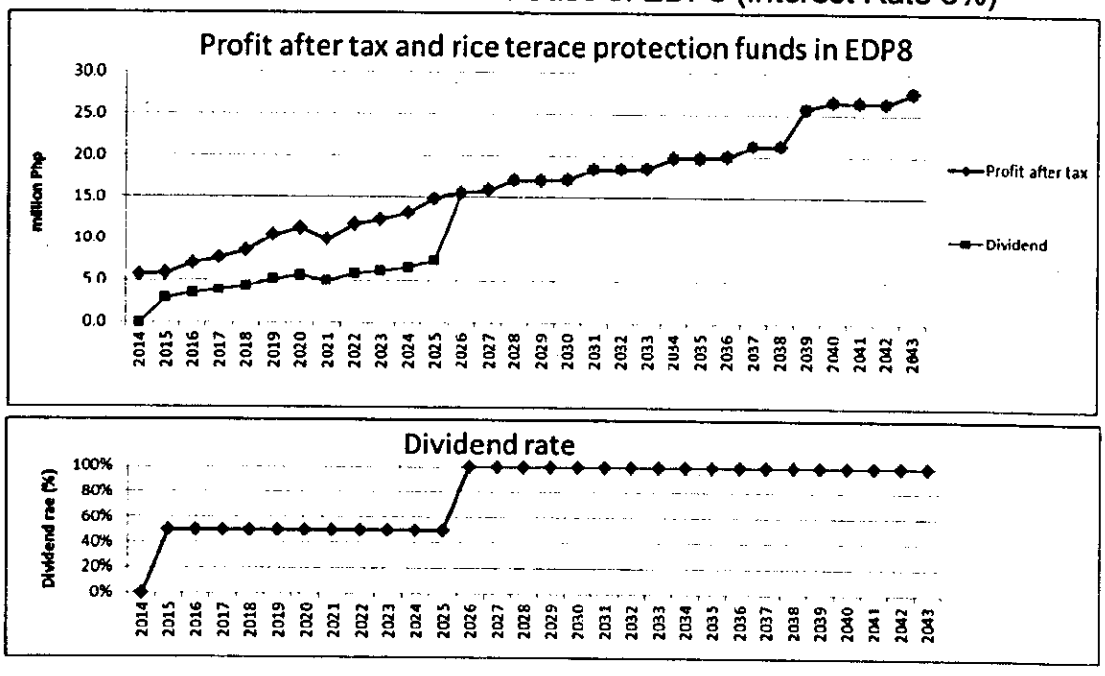
Unit : million Peso

Case	Items	2015-2019	2020-2024	2025-2029	2030-2-34	2035-2039
EDP8	Dividend in 5 years	19.8	29.2	72.7	92.2	107.9
	Applied fund in 5 years	17.8	26.3	65.5	83.0	97.1
	Annual fund	3.6	5.3	13.1	16.6	19.4
EDP9	Dividend in 5 years	17.1	27.7	65.1	92.9	108.6
	Applied fund in 5 years	15.4	24.9	58.6	83.6	97.8
	Annual fund	3.1	5.0	11.7	16.7	19.6
EDP10	Dividend in 5 years	14.3	26.0	56.9	93.6	109.4
	Applied fund in 5 years	12.8	23.4	51.2	84.2	98.5
	Annual fund	2.6	4.7	10.2	16.8	19.7

Note) Applied fund in 5 years= =Dividend in 5 years*90% Yearly cash balance is considered.

Annual fund = Applied fund in 5 years ÷5years

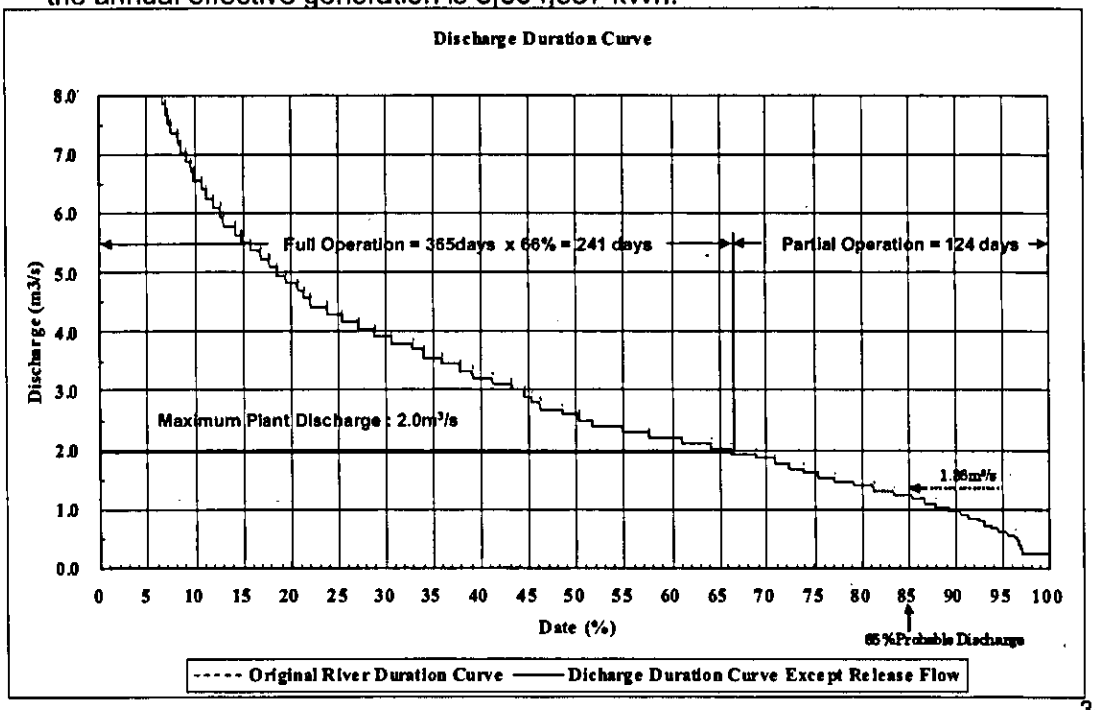
Rice Terrace Conservation Fund in Case of EDP8 (Interest Rate 8%)



Sensitive Analysis of Electric Tariff

	Items	Unit	Scenario of electric tariffs			
EDP8	Initial tariff	Php/kWh	4.1	4.5	5.0	5.5
	Average tariff	Php/kWh	4.6	5.1	5.6	6.2
	Average cost	Php/kWh	2.3	2.3	2.3	2.3
	FIRR	%	15.0%	16.7%	18.4%	20.5%
EDP9	Initial tariff	Php/kWh	4.1	4.5	5.0	5.5
	Average tariff	Php/kWh	4.6	5.1	5.6	6.2
	Average cost	Php/kWh	2.5	2.5	2.4	2.4
	FIRR	%	15.0%	16.5%	18.3%	20.2%
EDP10	Initial tariff	Php/kWh	4.1	4.5	5.0	5.5
	Average tariff	Php/kWh	4.7	5.1	5.6	6.2
	Average cost	Php/kWh	2.6	2.6	2.6	2.6
	FIRR	%	15.0%	16.3%	18.2%	20.0%

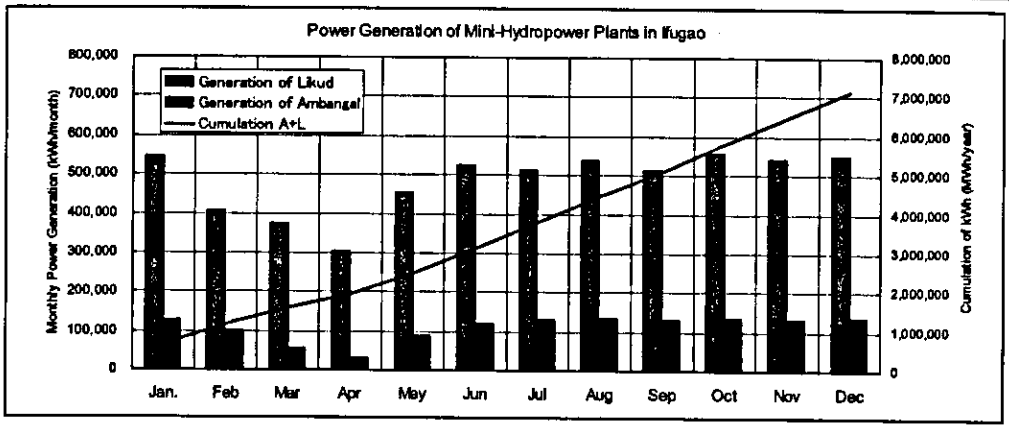
- The maximum capacity of the Likud mini-hydropower development is 810kW and the annual effective generation is 5,604,387 kWh.



Conclusion

- The annual effective generation of Likud MHP is equivalent to 55% of the total power demand of Ifugao in 2010

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	%	12.5	54.7	67.1	Demand 10,657 MWh
	as of 2015	%	9.0	39.6	48.6	Demand 14,713 MWh



Conclusion

- There is no significant problem concerning development on the technology and the environment.
- The total construction cost is around 118 million pesos, and equity of the PGI (10% of total cost) is around P12 million pesos if the PGI applies EDP.
- The IRA of the PGI in 2009 was about P387 million pesos. The ceiling is P77 million pesos (20% of P387 million Pesos) for the Project which could afford to release P12 million pesos of 10% equity.
- If the selling rate sets P4.55 pesos/kWh (Average rate during operation period: 25 years), annual average net profit (the dividend) is P11.6 million pesos/year which could utilize for RTCF, in case of EDP interest rate is 8%. (FIRR=15%,ROE=52%)
- The above net profit (P11.6 million pesos) combines with the net revenue of the Ambangal mini-hydropower could cover around 75% of the annual necessary RTCF (P20 million pesos/year).
- However, during repayment period of the first 13 years starting from the operation, the annual average RTCF is around P7.3 million pesos/year.
- If the Likud mini-hydropower project is approved as CDM project, the PGI could receive additional around P1.5 to P2 million pesos per year as CDM credit which could add to RTCF.

Recommendation

- The Likud MHP development project is in line with the higher plans/programs set forth by the national, regional and provincial authorities, at the same time the Project will contribute to expand the RTCF activities which the PGI aims to remove the Ifugao Rice Terrace from the UNESCO danger's list. This is why early realization of the Project is expected.
- PGI should take necessary legal permit and license, such as FPIC and RE-contract for implementation of the Project.
- The RTCF increases gradually as the EDP repayment advances, thus the PGI needs to consider it when the long term plan of RTCF utilization.
- The PGI needs to secure the expert engineer for engineering, procurement, and construction (EPC) and, supervision of construction work.
- The time limit for CDM application approval by the United Nations Framework Convention on Climate Change (UNCCCF) is up to 2012, therefore the early preparation of the Project Design Document (PDD) and its procedure is necessary.

Thank You Very Much !!

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 Palija, 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 TEPSCO, 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

fice: Ifugao Provincial Government
le of meeting/seminar/workshop: Community Consultation
nue: Haliap, Asipulo
Date: August 9, 2011
pected number of participants: 30
Scheduled time: 9:30 a.m.

	Name	Male	Female	Office	CP Number	Signature
1	ROGER M. MANGHI	✓		BRGY HALIAP	09156715261	[illegible]
2	Constancio Catama	✓		〃	09265856922	[illegible]
3	Benito Duppog	✓		Haliap		[illegible]
4	[illegible] Palije	✓		Pamplata,		[illegible]
5	Hool Bas-ilan	✓		Tang-ngadan		[illegible]
6	Romeo Apoy	✓		Licud Haliap		[illegible]
7	CHRISTOPHER CATAMA	✓		Licud, Haliap	09262866460	[illegible]
8	Anita Vaggoy		✓	Licod, Haliap		[illegible]
9	Mila P. Bahit		✓	Tangadan	09069014582	[illegible]
10	Calixto Catama	✓		Licod	09069711899	[illegible]
11	Pablo Bitnuwm	✓		Tangadan		[illegible]
12	MAXIMO PAD-O	✓		MAPPIT, Kiangan		[illegible]
13	ALFREDO LOBYOC Sr.	✓		Haliap, Elder		[illegible]
14	Rosemarie M-Dacquig		✓	Haliap		[illegible]
15	NANCY ADDANGNA		✓	Haliap		[illegible]
16	Roy V. Salvama	✓		DOE-MLA		[illegible]
17	Basilio Bayoona	✓		HALIAP		[illegible]
18	CLEMENTE TERENAN	✓		Haliap, Kaguwad		[illegible]
19	PEPE UNGIHAN	✓		MAPPIT		[illegible]
20	Joseph Otano	✓		Tangadan		[illegible]
21	Maria Lad-oo		✓	Kagawad		[illegible]
22	BALTAZAR DAMMIT	✓		MAPPIT		[illegible]
23	Felipe ADDANGNA	✓		Elder, Haliap		[illegible]
24	Rogelio Catama			Licod Haliap		[illegible]
25	Susan Pillog	✓	✓	Tangadan, Haliap		[illegible]
26	Jimmy Bimmucal	✓		MAPPIT, Kiangan		[illegible]
27	Robert Apog	✓		MAPPIT Kiangan		RA

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[illegible 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 Bunolan	✓				
29	Mitsuru Shimizu	✓		TEPCCO		
30	Nobuki Hayashi		✓	TEPSCO		
31	Carmelita Bunyuccan		✓	PPDO		
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