

**PROJECT
ON
SUSTAINABILITY IMPROVEMENT OF RENEWABLE ENERGY
DEVELOPMENT
IN VILLAGE ELECTRIFICATION
IN THE PHILIPPINES**

PROJECT DOCUMENT

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ABBREVIATION

ANEC	Affiliated Non-Conventional Energy Centers
EC	Electric Cooperative
EPIMB	Electric Power Industry Management Bureau
EPIRA	Electric Power Industry Restructuring Act
EUMB	Energy Utilization Management Bureau
DOE	Department Of Energy
LGU	Local Government Unit
MEDP	Missionary Electrification Development Plan
MTPDP	The Medium-Term Philippine Development Plan
NEA	National Electrification Administration
NPC	National Power Corporation
PCM	Project Cycle Management
PDM	Project Design Matrix
PEP	Philippine Energy Plan
PIOU	Private Investor Owned Utility
PNOC-EDC	Philippine National Oil Company - Energy Development Corporation
QTP	Qualified Third Party
RE	Renewable Energy
SHS	Solar Home System
SPUG	Small Power Utilities Group

ANNEX

1. PROJECT DESIGN MATRIX (PDM)
2. PLAN OF OPERATION (PO)
3. ORGANIZATION CHART OF ADMINISTRATION OF THE PROJECT

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Chapter 1. Preface

The Philippine Government has a policy to implement a transition from fossil fuel sources to renewable forms of energy (RE) to ensure a sustainable energy sector. The increased use of RE system likewise promotes wider access to basic energy services, especially in remote areas outside the reach of electricity grids and distribution networks. The Department of Energy (DOE) has identified long-term goals for RE development, namely: (i) increased RE-based capacity by 100 percent by 2013; and (ii) increased non-power contribution of RE to the energy mix by 10 MMBFOE in the next ten years. In 2002, RE provided the biggest share in total primary energy consumption supplying 43.4 percent or 108.8 MMBFOE (Table 1). Based on the PEP 2003-2012, RE will continue to account for about 40 percent, on the average, in the country's primary energy consumption during the ten-year planning period, with biomass, micro-hydro, solar and wind as the biggest contributors with an average share of 27.5 percent.

On the other hand, the Philippine Government has been promoting rural electrification since it contributes to poverty alleviation by improving living standards of people in rural areas and creating new sources of income. The government targeted 41,999 barangays¹ to be energized by 2006 through the O' Ilaw Program. The combined accomplishment of barangay level electrification under the program by the end of December 2002 was 87.1 percent. However, as rural electrification progresses, the remaining number become more difficult to accomplish. Hence, the Expanded Rural (ER) Electrification Program was launched in 2003 to help attain 100% barangay electrification target by 2006 and 90% household electrification target by 2017.

Most of the unenergized areas are located in isolated barangays where grid extension is more expensive due to difficulty of accessibility. Off-grid or decentralized electrification utilizing renewable energy, like hydropower and solar systems, becomes the alternative option in accomplishing the said target. The DOE has led this undertaking through its Barangay Electrification Program (BEP) wherein, micro-hydro and solar home systems have been installed for rural electrification. However, many of those installations have developed operational problems.

Under these circumstances, the Philippine Government has requested support from the Japanese Government for sustainability improvement of RE systems in village electrification as a new proposal in FY 2003. Several factors, such as, changes of implementation system in the long history of rural electrification, complicated scope of work, a growing number of contributing institutions, and unregulated supports by donors from different countries, however, have made it difficult for the Japan International Cooperating Agency (JICA) to grasp the current situation and future direction of rural electrification in the Philippines.

¹ Barangay: Minimum administrative unit in the Philippines. Administrative boundary consists of region, province, city, municipality and barangay in the Philippines.

In order to develop an effective project plan, JICA implemented the following: (i) "Dispatch of (primary) preparatory study mission (June - July, 2003);" (ii) "Donor trend survey by Japanese consultants (September, 2003);" and (iii) "Investigation of parties concerned by local consultant (July - October, 2003)." These activities were aimed at understanding the current situation in rural electrification in the Philippines. In addition, it also implemented "Dispatch of (secondary) preparatory study mission (November 8 - 20, 2003)" based on the results. The study mission team visited electrified rural areas (micro hydropower and photovoltaic battery charging stations), held Project Cycle Management (PCM) workshop to develop a draft Project Design Matrix (PDM) and had interviews and meetings with concerned agencies and institutions. These activities led to the preparation of the envisioned project basic plan with DOE, identification of the responsible organizations of the project, and signing and exchange of consensus documents and minutes of meetings (including PDM draft as attached document).

This project document describes the project background to clarify relevant issues in politics, economy and the society in the Philippines. This also provides a review on the current situation of RE development and rural electrification. It likewise describes the strategy and basic plan of this project and lastly, discusses the ex-ante evaluation of project from viewpoint of five evaluation items of DAC and the comprehensive relevance of the project based on the results.

Chapter 2. Background of Project Implementation

2-1 Social Situation in the Philippines

2-1-1 Political Situation

The Philippines experienced political and economic difficulties until the early 1990's after collapse of Marcos administration through a "People's Power Revolution" in 1986. It became relatively stable afterwards and is one of the countries where democracy is firmly established in Asia. Since 1990's, the Government of the Philippines has promoted significant privatization and decentralization in many fields.

2-1-2 Economic Situation

The Asian economic crisis that occurred in July, 1997 affected the Philippines and the droughts caused by El Nino caused major economic losses to agricultural production. The Gross Domestic Product (GDP) growth became negative, the trade surplus and treasury budget became worse and the Philippine peso has depreciated. The country has recovered in the succeeding years and became economically stable thereon.

The economic policies, such as deregulation, privatization and liberalization introduced by Ramos administration, were inherited by the succeeding Estrada and Arroyo administrations.

2-1-3 Social Situation

The major constraining factors of development specific to the Philippines are the following:

(1) Existence of rebel force

The reconciliation was established with Moro National Liberation Fronts (MNLF), one of Muslim rebel forces, in September, 1996. The Japan Government and other donor countries/agencies have supported the development of Southwestern Mindanao. However, the behavior of some former MNLF soldiers and other Muslim anti-government groups remain as potential destabilizing factors. Moreover, the Abu Sayyaf, one of Islamic fundamentalism extremist groups, continues their terror campaign centered on Western Mindanao and the communist force is still an impediment to national reconciliation and peace even though it is apt to be weakened.

(2) Geographical condition and frequent occurrence of natural hazard

The Philippines have about 7,100 islands including 11 major islands. It hosts several active volcanoes and has frequent occurrence of earthquakes. In addition, Visayas and Luzon are in the path of typhoons which cause serious damages, such as torrential rains, windstorms, floods and landslides every year.

The geographical conditions, numerous solitary islands and mountainous districts, make an integrated national grid network construction difficult from the electric power aspect.

2-2 Situation of Entire Sector

The Aquino administration in 1986 started to deal with institutional reforms and economic reconstruction. The Philippines achieved steady economic growth from then. However, it suffered a chronic shortage of power supply in the late 1980's and natural disasters, such as catastrophic drought and Baguio earthquake, happened frequently. so the early 1990s was an epoch of power crisis. In order to react to the electric power shortage, the government allowed Independent Power Producers (IPPs) to enter the power generation sector in 1987 and enforced BOT law in 1990. Under the BOT law, IPPs are allowed to construct ambitious projects with high transaction prices but without restriction on fuel-use, thereby promoting deregulation in the power generation industry. The power supply shortage was solved in 1994. On the other hand, the introduction of IPP with emphasis on solving the power shortage has caused escalation of price of electricity, increase in National Power Corporation's (NPC) debt and increase in government's burden with the depreciation of the Philippine peso.

The principle of competition in the electric power industry and the privatization of NPC were examined over many years. These came as the next agenda of the Philippine Government to lower the electricity price and reduce the government burden after the power crisis. In June, 2001, the Philippines Government promulgated Republic Act No. 9136 (RA 9136), otherwise known as the "Electric Power Industry Reform Act (EPIRA)" to take a big step toward full liberalization of power generation industry, which is the first among developing countries.

However, the main pillars of the power industry reform, such as privatization of National Power Corporation (NPC) and foundation of Wholesale Electricity Spot Market (WESM) are long delayed and the future of the industrial reform is still opaque. Under these circumstances, the power crisis in Panay has occurred and emergency measures became necessary including a continuous development electric power sources and refurbishment and expansion of interconnection between major islands. The fragilities of electric power transmission capacity and power feeding system, which have caused long-time massive power outages a few times a year over several years, remain unsolved. These initiatives are feared to be delayed along with the transfer of power transmission equipment management to private companies.

Rural electrification on the other hand has been actively promoted as a key policy to contribute to poverty eradication. The barangay level electrification (rural electrification) has reached 89% and the number of villages that have no access to electricity was reduced to 4,197 by the end of 2003 that advances toward achieving 100% barangay level electrification by 2006. However, household level electrification still remains 68% and many people have not benefited from electricity.

The attainment of "total electrification" requires infusion of various electrification

technologies and huge budget. The participation of the private sector becomes inevitable but faces numerous difficulties and investment barriers. Thus, technical and financial supports are indispensable and necessary to achieve the targeted 100% barangay level and 97% household level electrification by 2006 and 2017, respectively.

2-3 Strategy of the Government of the Philippines

2-3-1 Energy Policy

As stipulated in Republic Act No. 7638 (RA 7638), otherwise known as the "DOE Law," and strengthened by RA 9136, DOE shall develop the Philippine Energy Plan (PEP) every year and indicate the energy policy and strategies. According to 2003-2012 PEP, the energy policy and the strategies are as follows:

2-3-1-1 Securing of Energy Supplies

There is a need to raise the energy self-sufficiency ratio to secure the stability of energy supply in the country that corresponds to the promotion of indigenous energy resources development. There are uncontrollable external factors, such as the Middle East crisis, thus securing 50% or more in energy self-sufficiency ratio is an absolute program toward 2012. This program includes the development of natural gas industry, domestic oil and the maximum use of other domestic energies, e.g., coal, geothermal, water and other renewable energies. Similarly, the Philippine Government aims to strengthen diversification in alternative energy sources and fuels, as well as energy technologies, and energy efficiency and conservation with utmost consideration in a balanced cost, supply and safety.

2-3-1-2 Expansion of Access to Energy Service

The expansion of access to energy services requires an accelerated rural electrification program and spread of energy facilities. The current government efforts in rural electrification provide the rural areas various opportunities, which are expected to contribute to poverty reduction. However, conventional electrification by expansion of distribution lines is too costly for energization of the backwoods in the future and utilization of renewable energy systems proved to be the more viable option.

2-3-1-3 Securing of Fair and Reasonable Energy Price

The attainment of fair and reasonable electric power price is an important subject for the current administration. In accordance with EPIRA, securing reasonable electric power charge is an important factor in promoting the necessary reform of electric power sector steadily. The DOE takes important responsibilities for promoting and monitoring the different provisions of EPIRA, monitoring and ensuring transparency and improvement of power supply efficiency. In addition, the current administration has announced a 10-point program that ushers to the mechanism of EPIRA. This program includes the immediate establishment of WESM promoting competitive electricity exchange,

acceleration of open access to the transmission sector for commercial-scale utility customers, reflection of true service cost to electric power charge and reduction of debt caused by Power Purchase Agreements (PPA) between NPC and IPP.

2-3-1-4 Clean and Efficient Energy Development and its Infrastructure

The DOE continuously and critically promotes clean and efficient energy development and related infrastructures. It aims increased usage of clean energies, e.g., natural gas, renewable energies, and alternative clean energy that will result to the improvement of the environment and reduction of greenhouse gases. The DOE also positively promotes energy efficiency and conservation, wherein companies and industries are strictly monitored on their compliance with those concepts.

2-3-1-5 Promotion of Consumer Protection

The DOE maintains consumer welfare and protection and adheres to the principle that market-base reforms succeed only if consumers have the power of choice. The Consumer Welfare and Protection Office (CWPO) was set up in DOE to achieve this. Monitoring is likewise important to confirm the progress of reforms in the oil industry and the electric power sector, thus, information, education and communication campaign, including in the tri-media, have been progressively initiated.

2-3-1-6 Technology Transfer and Personnel Training

Globally-minded energy sector needs globally-minded personnel and technologies. DOE staff should deeply understand and get trained for upstream oil development, downstream natural gas infrastructure, investment promotion to privatization of NPC and data maintenance of indigenous and renewable energy resources.

2-3-1-7 Creation of New Employment Opportunities in the Business Related to Energy

The DOE missions include the creation of new employment opportunities in the energy sector. To increase those opportunities, DOE launches an investment promotion campaign in related industries to solicit participation from overseas. It also gives a joint venture support with multinational companies and/or economy-related companies. DOE likewise encourages Livelihood Activities as a part of its rural electrification program. The utilization of electricity is envisioned to generate income and ultimately contribute to the national development. The Investment Promotion Office (IPO) was newly set up to perform activities related to investment promotion in the energy sector.

2-3-2 Renewable Energy Framework

2-3-2-1 Objectives, Goals, Policies and Strategies

Renewable energy (RE) is now rising fast to prominence as a sustainable energy source. Many economies are now exploring every possibility of harnessing RE to secure energy supply in the long term realizing that fossil fuel is an exhaustible resource. RE is indigenous, abundant, replenishable and environment-friendly making it a viable and competitive fuel option. In the Philippines, this is evident in the power sector where increased generation from geothermal and hydro resources has lessened the country's dependence on imported and polluting fuels. Maximum RE utilization comprises a critical component of the government's strategy to provide stable energy supply in support of its overall vision to reduce the country's dependence on imported energy and broaden the country's resource base with indigenous, inexhaustible and environmentally desirable option.

It is the government's policy to implement a transition from fossil fuel sources to renewable forms of energy to ensure a sustainable energy sector. The increased use of RE system likewise promotes wider access to basic energy services especially in the remote areas outside the reach of electricity grids and distribution networks. In pursuit of this policy, the government is pursuing the enhancement of existing programs and strategies, realization of higher production targets, establishment of market-based industry which could be augmented by the availability of new international financing schemes such as the Clean Development Mechanism (CDM).

The DOE has identified long-term goals for RE development, namely: (i) increase RE-based capacity by 100 percent by 2013; and (ii) increase non-power contribution of RE to the energy mix by 10 MMBFOE in the next ten years. In support of these general goals, the government shall aim to: (i) be the number one geothermal energy producer in the world; (ii) be the number one wind energy producer in Southeast Asia; (iii) double hydro capacity by 2013; and (iv) expand contribution of biomass, solar and ocean energy by about 131 MW. These goals serve as concrete benchmarks for government to advance its vision of a sustainable energy system with RE taking a prominent role in the process.

2-3-2-2 Situationer

In 2002, RE provided the biggest share in total primary energy consumption supplying 43.4 percent or 108.8 MMBFOE (Table 1). Based on the PEP 2003-2012, RE will continue to account for about 40 percent, on the average, in the country's primary energy consumption during the ten-year planning period, with biomass, micro-hydro, solar and wind as biggest contributors with an average share of 27.5 percent. Hydro and geothermal resources will continue to be significant sources of electricity and are expected to increase their combined generation from 20.4 terawatt-hours (TWh) in 2003 to 23.1 TWh in 2012.

Table 2-3-1 Primary Energy Consumption, 2002 vs. 2001 (in MMBFOE)

	2002	2001	Percent Change	Share Relative to Total Energy	
				2002	2001
RENEWABLE	108.8	107.4	1.3	43.4	43.2
Geothermal	17.7	18.0	-1.9	7.0	7.2
Hydro	12.1	12.2	-1.0	4.8	4.9
Biomass	78.8	77.0	2.4	31.4	31.0
Wood/Woodwaste	44.7	43.7	2.3	17.8	17.6
Bagasse	11.2	11.0	2.2	4.5	4.4
Charcoal	5.5	5.4	1.3	2.2	2.2
Agriwaste	17.5	16.9	3.1	7.0	6.8
Others	0.2	0.2	28.3	0.1	0.1

To date, there are two new geothermal power plants scheduled to be onstream by 2005 and 2006, respectively, which are PNOC EDC's 40-MW Northern Negros plant in Negros Occidental and the 20-MW Optimization Project in Palinpinon. Meanwhile, the country's hydro capacity is expected to increase by 819.4 MW in 2004, as two large hydropower plants will be commissioned in 2003 and 2004. These are the 400 MW hydro plant in San Roque, Pangasinan and the 419.4 MW Kalayaan plant in Laguna.

2-3-2-3 Existing Incentives

Providing the additional incentives for further exploration, development and utilization of the country's RE sources is an important component of the 2002 Investment Priorities Plan (IPP). It provides fiscal and non-fiscal entitlements to promote foreign investments such as recovery of operating expenses, income tax holidays, tax credit on domestic capital equipment, easy repatriation of capital investments and remittance of earnings and other packages of benefits.

2-3-2-4 Challenges and Gaps

The following major constraints have been identified: (i) insufficient fiscal and financial incentives; (ii) lack of public awareness of the benefits of RE projects (socio-environmental concerns); (iii) absence of commercially viable market for RE systems; and, (iv) relatively high cost of technology. As the government moves to aggressively address these obstacles and attain its identified targets, programs and projects have been formulated to mobilize private sector investments, promote RE technologies as viable and competitive energy options and maximize the use of RE potentials.

2-3-2-5 Targets

Within the next ten years the DOE is targeting an additional installation of 1,200 MW or about 60 percent increase of geothermal capacity to maintain, if not improve, the country's ranking of being the second largest geothermal producer in the world through increased private sector investments, as well as the adoption of modern and innovative technologies in exploration and development. For the hydro sector, some 2,950 MW of

additional capacity are aimed to be installed within the next ten years on top of the 2002 level of 2,518 MW, reaching a total of 5,468 MW by 2013. Finally, the DOE will push for the installation of up to 548 MW from RE sources by 2013. About 417 MW will come from wind-based power while the remaining 131 MW will be sourced from solar, ocean and biomass (Table 2).

Table 2-3-2 Installed RE Generating Capacity (in MW)

RESOURCE	INSTALLED CAPACITY AS OF 2002	TARGET INSTALLED CAPACITY	TOTAL INSTALLED
Geothermal	1,931	1,200	3,131
Hydro	2,518	2,950	5,468
Wind	0	417	417
Biomass, Solar & Ocean	0	131	131
Total	4,449	4,698	9,147

To promote wide-scale use of RE and complementing the government's program on rural electrification, 30 islands are targeted to be energized using hybrid power systems, possibly wind-diesel systems. In addition, 1,500 barangays are programmed to be electrified using RE systems.

2-3-3 Expanded Rural Electrification

In April, 2003, DOE completed O' ILAW Program that accelerated barangay electrification rate and newly established the Expanded Rural Electrification Program (ER Program) to integrate and efficiently manage the overall rural electrification program. The new program initiative aims to build deeper cooperation between public and private institutions in accordance with the provisions of EPIRA (or RA9136).

The ER program integrates electrification efforts of DOE, NEA, NPC-SPUG and PNOC, solicits participation of private companies (front-loaded expenditure of ER 1-94 charge), integrates overseas aid projects into programs, sets up a short-term target to achieve electrification target, sets up assigned targets of each institution concerned to achieve the electrification target, and supervises, monitors and evaluates them. While the conventional O' ILAW program focused on barangay level electrification, the ER program focuses not only in barangay level electrification but also in sitio (village) level or households level electrification and has set up a new target of 90% household level electrification by 2017.

2-4 Project Related to Targeted Field that Government and Other Groups Have Implemented Past and Present

2-4-1 Efforts by the Government of Japan

Japan has provided numerous financial supports in the energy sector since the first yen loans in 1971, especially for the electric power sector such as power generation industry, power line network infrastructure and rural electrification. After the power crisis in 1987, JBIC (former OECF) has provided financial support for construction and repair of power plants: 52 billion yen for construction of Calaca coal power plant, 10 billion yen for construction of Palinpinon geothermal power plant, seven billion yen for repair of Tiwi geothermal power plant, 6.6 billion yen for repair of Macban geothermal power plant, 10.7 billion yen for construction of Labo geothermal power plant and 14.5 billion yen for construction of Northern Negros geothermal power plant. It has also provided financial support: 2.9 billion yen for expansion of other substations, 2.3 billion yen for infrastructure of power grid, 8.1 billion yen for infrastructure of Leyte Bohol power line connection, 15 billion yen for infrastructure of power line for Luzon system private-sector support and 11.4 billion yen for rural electrification project. Lately, 5.9 billion yen of financial support for the North Luzon wind power project has been decided as a development of domestic clean energy resource. The total amount of financial support from Japan has reached 286.6 billion yen for the electric power since the first yen loans to date. Japan has contributed 8% of entire power generation capacity and 4% of entire power line extension by the yen loans and also contributed greatly to victory over the power crisis in the early 1990s.

On the other hand, Japan has also extended significant number of supports to the energy fields technically through JICA. JICA's supports by Development Study scheme on new power plants and maintenance of existing power plants are such as the "Coal-Fired Thermal Electric Power Development Project (1988-1990)", "Kalayaan Pumped Storage Plant Development Project Stage II (1989-1990)", "Rehabilitation / Renovation and Operation / Maintenance Improvement of Power Facilities in Luzon Grid (1990-1992)" and "Feasibility Study on Malaya Power Plant Reliability Improvement Project (1993-1995)". Recently, "F/S on the Transfer of Facilities and Management of the 69KV Transmission Lines and Systems from the National Power Corporation (NPC) to the Private Distribution Utilities (1996-1998)" has been conducted to support the management shift from National Power Corporation (NPC) to the rural electrification cooperative along with structural reforms of power industry. In addition, "DOE capacity building development and investigation for structural reforms for power industry (2002-2003)" has been implemented. For fields other than electric power, utilization of natural gas gathers momentum with natural gas exploitation in Camago, Malampaya, off-shore of Palawan Island and "Viability Study on Natural Gas Industry Development (M/P) (200-2001)" was implemented as a master plan investigation for development of natural gas industry in the future. Moreover, "The Study on the Institutional Capacity Building for the DOE under a Restructured Philippine Electric Power Industry (2002-2003)" has been implemented. This project mainly supports planning of power development for entire Philippines. On the other hand, "The Master Plan Study of Power Development In Palawan Province (2003-2004)" is being

Implemented to support planning of state level power development.

In addition, JICA has been conducting Technical Cooperation mainly by dispatch of experts, such as in the geothermal resource development ("Undeveloped geothermal resource development (1997-2001)") and in support of rural electrification ("Rural Electrification Utilizing "Mini-/Micro-scale hydropower (2001-)").

2-4-2 Efforts of Other Countries' Donors and International Institutions

2-4-2-1 World Bank (including WB/GEF Project)

World Bank has continuously given support to the electric power sector in the Philippines and has financed projects in the electric power sector after 1990 as shown in Table 2-4-1. GEF (Global Environment Facility) selected three organizations: the United Nation Development Program (UNDP), World Bank and IFC; for project implementation and some projects of World Bank have been conducted relative to the climate change programs of GEF.

Table 2-4-1 List of World Bank's Financing Projects for Electric Power Sector

Project name	Time of approval	Financial support from:	Amount	Status
Rural Electrification Revitalization Project	Feb. 1992	NEA	91.3	Completed
Power Transmission and Rehabilitation Project	June, 1993	NPC	110	Completed
Leyte Cebu Geothermal Project	Feb., 1994	NPC PNOC	211	Completed
Leyte Luzon Geothermal Project	June, 1994	NPC PNOC	227 (30)	Completed
Transmission Grid reinforcement Loan Project	April, 1996	NPC	250	In operation
CEPALCO Distributed Generation PV Power Plant		CEPALCO	(7.26) (4.03)	
Electric Cooperative System Loss Reduction Project		NEA	(62.5) (12.35)	
Rural Power Project	-	DBP DOE	(284) (10.35)	

Note: The number in parentheses at the lower row shows amount of financial support from GEF. The number in parentheses at the lower row shows cost of entire project, not the amount of the financial support from World Bank.

(1) Rural Power Project

This project is prepared by World Bank with support from GEF. The entire project takes 12 to 14 years and is divided into four (4) phases. The first term is a 4-year plan. The project consists of investment and technical cooperation. The investment budget is 264.4 million dollars for off-grid electrification and reform of NEA/EC and the technical cooperation budget is 19.2 million dollars for eliminating the obstacles caused by energy introduction and reform of electrification corporation. The summary of this project is as follows:

1) Investment (264.4 million dollars)

This investment fund aims the electrification of 1,000 barangays and provision of electricity services to customers in electrified barangay. 100 barangays will be energized in the first term. The mini-grid electrification with centralized power generation (generally, diesel, hydraulic or biomass power generation) is implemented for customers living in the center of villages electrified (10 to 30%) and SHS electrification is implemented for customers living in the backwoods.

● Mini grid electrification

This scheme energizes a number of nearby barangays as one package (project unit supplied with mini-grid from one small hydraulic power plant) to make the demand scale commercially available. The Qualified Third Party (QTP), as introduced by electric industry reform law, is assumed as the electrical power supplier. Pilot projects are implemented for models, such as private RESCO, NGO and corporations established for electrification and the best project model will be selected. In concrete terms, 6,000 households will be provided with electricity services by six packaged mini-grid electrification projects, with an overall target of 60,000 households and up to 30,000kW capacity throughout the entire project. At least 5,000kW will be supplied with independent renewable energy or diesel renewable energy hybrid system. Some 66 million dollars of cost is projected including 200,000 dollars of funding from GEF.

● Solar Home System(SHS) credit line

There are currently 2.5 million households that have no access to electricity in the Philippines. Even if all barangays are energized by 2006, one million or more of households will still be left behind with no access to electricity. Therefore, private suppliers and NGOs will supply small-scale (20-60Wp) SHS to those households in the backwoods with program support such as capacity building of GEF. World Bank also provides resources so that local banks and microfinance institutions can offer personal loans to customers and dealers purchasing SHS. Training will be offered to those financial institutions utilizing funds from GEF and partial credit is guaranteed to customers and dealers. It aims at electrification of 200,000 households with PV system such as SHS throughout the entire project period and 11,000 households in the first term. The expenses required for this project is 131 million dollars and 700,000 dollars of GEF funds will be provided in the first term.

● Partial credit guarantee fund

One obstacle to the diffusion of renewable energy is lack of mid-and-long term financing by private financial institutions. This problem is recognized by Capacity Building to Remove Barriers to renewable Energy Development (CBRED) of UNDP/GEF and the pilot project of partial credit guarantee for introduction of renewable energy is scheduled by CBRED, but SHS is not included. Therefore, the credit guarantee system for the loans of SHS buyers is forged based on the result of

UNDP/GEF project. This fund will be sponsored by GEF; 1 million dollars in the first term and 3.4 million dollars throughout the entire project period.

- Investment related to reform

The World Bank implements NEA reform (mainly personnel cut) and maximizing management vitality of the electrification corporation (investment for rehabilitation of power line network and reduction of power distribution loss). About 30 electrification corporations are targeted throughout the entire project period. About 40,000 households will be electrified with this investment.

2) Technical cooperation (19.2 million dollars)

Technical support for removing obstacles of renewable energy development that is suitable for off-grid electrification and organizational and political reforms related to reform of electrification corporations have to be implemented. For removing obstacles of renewable energy development, various types of capacity building projects of DOE, NEA, ERC, financial institutions (DBP, LBP, local banks, microfinance institutions, etc.) and private companies (PV companies, electrification corporations and NGO), reduction of investment risks based on detailed analysis of market structure and policymaking related to subsidies, electric charge and regulations will be supported.

3) Rural Electrification Subproject
(World Bank: 10 million dollars, UNDP/GEF: 10million dollars)

A part of Rural Power Project. It will be implemented in the first term. The content is the same as above-mentioned 1) and 2). World Bank provides financing to DBP.

(2) Electric Cooperative System Loss Reduction Project
(GEF: 12 million dollars)

This project will be implemented by World Bank with aid money from GEF as a 7-year project from 2004 to 2010 aiming at improving energy efficiency with reduction of power distribution loss of the electric distribution utilities / rural electric cooperatives. The financial conditions of distribution utilities are divided by four classes presented in Table 2-4-2. This project targets type B and C of the distribution utilities, establishes the partial guarantee fund for borrowings and offers technical cooperation on capacity-building on administrative improvement and investment process to allow private investment and financing for those types of distribution utilities. The purpose of establishing the partial guarantee fund is to complement private investment from Investment Management Contracts (IMCs) for type B and private financing risk for type C. The investment by IMC is a contract system wherein private investors manage and operate the electric cooperatives on long-term result basis. This project complements Rural Power Project of World Bank/GEF.

(3) CEPALCO Distributed Generation PV Power Plant
(GEF fund: 4.025US\$m)

This project interconnects 80,000 kW power distribution system of Cagayan de Oro Power & Light Company (CEPALCO) with 1,000-kW photovoltaic generation facility in Mindanao Island. The photovoltaic facility will be operated in tandem with a 7,000-kW hydropower plant. This project increases the rated power output of generation and distribution systems of CEPALCO and reschedules the construction of substations and other power plants. This project is the first system-interconnection type pilot project introducing photovoltaic generation in the Philippines.

Table 2-4-2 Financial Condition of Electrification Corporation

Classification of electric cooperatives / distribution utilities	Financial condition	Number of electrification corporations	Direction of improvement
Type A	It has debt ability, and is financially independent.	About 30 (25%)	Secure independence and cut public funding in stages. Improve 90% of electrification corporations up to this situation in the long term.
Type B	Though debt ability is not complete, great efficiency improvement can be expected from the viewpoints of the demand scale and the load density.	About ten (8%)	Employ IMC model and cut public funding in stages to achieve complete independence. Grade up all ECs to type A in the long term.
Type C	It is management limit and ineligible for private investment.	44 (37%)	Public financing or credit enhancement is required. Try to grade up to type A in the long term.
Type D	It manages in the region with low load density and is hard to be independent.	35 (29%)	Subsidy of investment stage from the government is required. Raise EC ratio of this type to about 10% in the long term.

2-4-2-2 UNDP/GEF

The GEF selected three organizations, UNDP, World Bank and IFC as project implementing agencies, wherein UNDP and World Bank have worked on many projects. Among these projects, the UNDP implements the "Capacity Building to Remove Barriers in Renewable Energy Development (CBRED)," which was started in April, 2002. The CBRED project is a 5-year plan that is expected to be the core project of promoting renewable energy development in the Philippines, complementing the Rural Power Project of the World Bank and the overall rural electrification program.

For other projects, UNDP/GEF has supported Palawan Island alternative energy and livelihood support projects and activities related to renewable energy rural electrification project on community basis as a small-scale grant program. It has also implemented technical cooperation (FINESSE) in improving technical capacities in

evaluating and managing projects needed in providing financial packages to renewable energy projects..

(1) CBRED (Capacity Building to Remove Barriers to Renewable Energy Development)

This project aims to remove obstacles in renewable energy development, promotion of renewable energy technologies and mitigate greenhouse gas emissions. The total financial support amounts to 5.448 million US dollars in 5 years. Details are the following six (6) items and the Energy Utility Management Bureau (EUMB) of DOE is the counterpart institution:

1) Set up renewable energy policy and planning ability.

This component deals on the establishment of network among agencies and institutions concerned with renewable energy. It supports the formulation of renewable energy law, analysis of existing renewable energy policies, capacity building in renewable energy project planning model utilization, development of energy planning model for various renewable energy projects and capacity building in monitoring policies.

2) Organize renewable energy market service.

A big obstacle of the renewable energy development is the lack of mechanism in coordinating necessary operations for expanding rural markets. To overcome this obstacle, the CBRED project will establish a Market Service Center (MSC) as a non-profit organization and develop it through direct participation in projects implemented with financial support from GEF. MSC will be involved in project preparation and packaging, organizing of communities for generating income, providing loan guarantee fund and micro-financing fund for barangays, and project evaluation and monitoring. MSC provides the function of a one-stop-shop needed for market development of renewable energy.

3) Renewable energy introduction promotion and information service

This component deals with the establishment of RE database and information exchange, which shall be made available to all RE stakeholders. It will also involve the formulation of a comprehensive information, education and communication (IEC) campaign for all potential costumers of renewable energy systems and technologies.

4) Demonstration of renewable energy initiative supply mechanism

There will be three (3) funds for demonstration to support renewable energy development. The MSC will manage the Project Preparation Fund (PPF) to support project packaging and subsidizes 50% of expenses for preparation of projects. The total fund amounts to 321,300 dollars. Under the supervision of DOE, the MSC will also manage a Loan Guarantee Fund in the amount of 1.606 million dollars. The NRE Micro Finance Fund will likewise be available to provide a long-term fund facility to

renewable energy projects through Philippine rural bank network with a total fund amount of 535,000 dollars that will cater to 500-kW level electrification projects. (In the Philippines, Village Power Fund managed by Energy Sector Management Assistance Program (ESMAP) of World Bank makes a loan with 100,000 dollars scale.)

5) Renewable energy training program

Implement the following training:

Table 2-4-3 Renewable Energy Training Plan

Object	Content of training	Frequency
DOE/NPC/REAP	Purchasing contract and negotiation of renewable power	1
Financial institutions, DBP and LBP	Financing plan of renewable energy	2
Renewable energy equipment manufacturers, NGO and DOE	Cooperation of private companies and NGO in renewable energy projects, advantages and subjects, business plans, FS and project preparation	2
NGO, private companies and government	Marketing of local communities - Means of better living	2
NGO, private companies and government	Early adoption technique of renewable energy projects	2
Technical instructors of renewable energy	Development and organizing of renewable energy technician's training module under TESDA program and ANEC extension activities	3

6) Renewable energy technical support

This technical support setup is designed for renewable energy standard and improvement of local equipment manufacturing technology. It will provide test equipment of SHS peripherals to laboratories and establish the mechanism of performance test implementation. For this purpose, the project aims to introduce good examples of experiences in existing renewable energy projects, prepare standards of renewable energy system components and develop testing method of renewable energy system. This component will further prepare technical development plans and establish quality evaluation techniques to improve capacity of renewable energy equipment manufacturers.

(2) Palawan alternative rural energy & livelihood support project
(GEF medium-scale project: 0.75US\$m)

The Provincial Government of Palawan prepares Palawan Energy Master Plan (1997-2021) aimed at increasing the power generation capacity on the island up to 250,000 kW by 2021 and achieving 100% barangay level electrification. The purpose of this project is to examine the possibilities of utilizing the income paid to the Provincial Government of Palawan from the natural gas project off Palawan Island in order to support the renewable energy developed and supplied by a Rural Energy Service Company (RESCO). This project has been implemented since 1999 with funds of: 750,000 dollars from GEF, 1.4 million dollars from Shell and 300,000 dollars from the Provincial Government of Palawan.

(K)

(S)

The main contents of the project are the following four items:

- Capacity building of state government and electrification corporations
- Educational activity for diffusion of renewable energy to residents
- Establishment of Renewable Energy Development Center
- Design of risk sharing mechanism to support Rural Energy Service Company (RESCO)

(3) GEF small-scale grant program

GEF operates a small-scale grant program to support activities in the fields of cross-border water issues such as biological diversity, climate change and river management on community basis. In the Philippines, the pilot stage program was implemented (1992-1995) followed by the first stage program (1996-1998) and the second stage program (1999-). For rural electrification with renewable energy systems, the following projects have been implemented in response to the climate change issue, among others:

Table 2-4-4 RE rural electrification project in small-scale grant program

Project name	Place	Implemented by:
Installation of Hydropower Plant	Cateel, Davao Oriental, Mindanao	Sidlakang Davao Development Foundation, Inc.
New and Renewable Energy Systems State of the Art Study	Cordillera, Luzon	SIBAT
Solar Powered Water Pumping System for Purok Takilay	Takilay, Koronadal, South Cotabato, Mindanao	ASPD
Technical/Social Feasibility Study on Micro-Hydropower Generation for Rural Electrification and Agri-Processing	Caraga, Davao Oriental, Mindanao	Caraga Development Foundation
Solar-Powered Water Pumping System	Tubungan, Iloilo, Bisayas	Offers-Panay
NGO-PO Consultation on Renewable Energy for Visayas and Mindanao	Bisayas Mindanao	SIBAT
Binosawan Micro-Hydropower Development Project for Electrification and Livelihood	Papu-Rapu, Albay Luzon	Sagip Isla Sagip Kapwa
PV-Powered Pumping System for Blaan Communities and Watershed Management Enhancement	Koronadal and Banga, South Colabato, Mindanao	KAHULAKU and ASPDI
Mindanao-wide Conference on Renewable Energy	Davao City Mindanao	YAMOG
Visayas-wide Conference on Renewable Energy	Iloilo City Bisayas	YAMOG

2-4-2-3 Asia Development Bank (ADB)

The Asia Development Bank has continuously implemented financial support to the electric power sector in the Philippines. It supported mainly NPC hydroelectric development project in 1970s, NPC power distribution facilities improvement project in 1980s and thermal power project and power distribution facilities project in 1990s. It has implemented intensive support to reform of the electric power sector since the late 1990s.

For rural electrification, it has implemented intensive support to two points: capacity building of government agencies based on reform of the electric power sector and rural electrification project to help people overcome poverty. In concrete terms, there is no financing plan implemented currently and the project aiming at renewable energy development and better living utilizing JFPR (Japan Fund for Poverty Reduction) has been implemented in Negros Occidental.

For capacity building of government agencies, the Technical Assistance (TA) related to enhancement of rural electrification organization was implemented in 2000 and the TA related to the promotion of good administrative management for the electric power sector after the reform will be implemented from this year to build capacity of rural electrification planning. A TA related to enhancement of rural electrification organization was implemented aimed at capacity building in financial, technological and economical aspects of new/renewable energy technology for DOE, NEA and rural electrification companies. This TA also developed techniques to integrate better living program with rural electrification program. The contents of TA include: 1) Evaluation of personnel and functions needed for the central government and local governments to implement rural electrification and identification of needs for capacity building, 2) Implementation of training at central and local governments and communities, 3) Preparation of guidelines for roles of the central government agencies and NGO related to rural electrification and 4) Advices to unite rural electrification and sustainable better living program to help people overcome poverty. The pilot project based on the advice of this TA was not implemented.

Following the above TA, a new TA related to promotion of good administrative management for the electric power sector after the reform will be implemented from 2003 (Consultant will be selected within the year.). The purpose of this TA is to: 1) improve the planning ability of DOE through capacity building of Electric Power Industry Management Bureau (EPIMB) of DOE and 2) clarify roles of DOE and ERC after the reform and improve ability of administrative management with preparation of 5-year MEDP in order to promote cooperation with public institutions such as government and private companies from the viewpoint of rural electrification promotion.

The contents of TA are as follows:

- (1) Implement the following projects as capacity building of DOE/EPIMB.
 - 1) Prepare evaluation and proposal of administration management to avoid conflicts of interest between policy decision function of DOE regulation of ERC.
 - 2) Prepare evaluation and proposal of the system so that EPIMB can correspond to the new business after the reform of the electric sector.
 - 3) Prepare implementation plan of power generation and power supply consistent with electric sector reform strategy.

4) Prepare database of existing power generation, power supply and power distribution facilities through workshops, field survey and hearing from interested parties.

5) Provide software needed for national database development including systems that can obtain information needed for examination and preparation of PDP, TDP and MEDP through on-line and offer training to EPIMB staff.

6) Establish a partnership with counter part institutions of other countries to learn the experience of the electric power sector reform.

7) Develop monitoring and management systems of electrification and related better living project and offer training to EPIMB staff.

8) Provide equipment needed for preparation and operation of database such as computers and offer training to EPIMB staff.

(2) The following works are implemented to prepare MEDP.

1) Provide advice regarding cooperation between public institutions and private companies to accelerate and sustain rural electrification.

2) Examine the definition of rural electrification and put the related advice into MEDP.

3) Select barangay having no access to electricity that should be put into MEDP and develop energy database available at barangay.

4) Select proper index that should be considered such as technology, financing and socioeconomic impact of project.

5) Examine progressing rural electrification project at existing SPUG region and appropriate promotion scheme to MEDP.

6) Develop financing and technical evaluation model to determine the priority of MEDP project and project expense evaluation technique.

7) Prepare model business case at existing SPUG service area suitable for privatization and a standard timetable.

The rural electrification project was implemented in 2000 as TA related to promotion of rural electrification project to help people overcome poverty. The purpose of this TA is to make operation of existing facilities more efficient, improve electrification ratio and look for projects seeking cooperation with better living and regional development in franchise areas of electric cooperatives. In concrete terms, it examines investment plan of the electric distribution utilities for the next 4 years and specifies projects suitable for

support from ADB.

The purpose of the restoration/renewable energy project for rural electrification and better living started since 2003 is to help poor people utilizing renewable energy in a village with no access to electricity. The purpose of this TA is to show the possibilities of overcoming poverty by rural electrification as a locomotive.

Table 2-4-5 List of Support to Philippines Electric Power Sector of ADB (Financing Plan after 1990)

Approval year	Supported by:	Content of project	Amount
1990	NPC	Masinloc thermal power plant (the 1st term)	200
1992	Meralco	Meralco distribution line	138
1993	Hopewell	Pagbilao 700,000 kW coal-fired power plant	40
1993	NPC	Pinamucan 123,000 kW oil-fired power plant	26.5
1993	NPC	Luzon and Mindanao power line	164
1995	NPC	Northern Luzon part power supply and power generation	244
1996	NPC	Leyte and Mindanao link power line design	5.3
1997	NPC	Enhancement of power line	191.4
1998	The Ministry of Finance	Electric power sector reform	300
2002	TRANSCO	Power market and power line maintenance	40
2002	Government or PSALM	Granting of credit guarantee (support of electric power sector privatization)	400
2003	DOE	Renewable energy and better living for poor people in Negros Occidental (JFPR project)	1.5

TRANSCO: National Transmission Corporation. Unit: One million dollars

Table 2-4-6 List of Support to Philippines Electric Power Sector (TA Plan after 1990)

Approval year	Plan name	Amount
1990	Review of NPC asset reevaluation	96
1990	Environmental management of coal-fired power plant	636
1993	Investigation of long-term electric power system planning	600
1995	Foundation of power distribution subsidy	500
1996	Leyte and Mindanao link power line design	575
1998	Electricity charge design and restriction technique in competitive market	600
2000	Evaluation of consumer impact forecast	720
2000	Strengthening of rural electrification organization	750
2000	Rural electrification project	600
2001	Competition policy of electric power sector	990
2003	Restoration/Renewable energy project for rural electrification and better living	450
2003	Promotion of good administrative management for electric power sector after the reform	1,150

Unit: 1,000 dollars

2-4-2-4 The United States (USAID)

1) Philippines renewable energy project

This project implemented technical support related to RA 9136 or EPIRA, development and training of renewable energy planning software and preparation of the renewable energy resource endowment map.

2) AMORE (Alliance for Mindanao Off-Grid Renewable Energy Program)

This project targets to energize the former guerrilla region in Mindanao with photovoltaic power generation aimed at improving the quality of life in war-torn areas. This project started in February, 2002 to provide electricity services to 160 barangays within a 30-month project period. Mirant Philippines, the biggest IPP company in the Philippines and other private companies contribute the electrification fund and USAID organized the technical cooperation from planning stage to project implementation and capacity building. Under USAID, Winrock International, an American NGO consultant institution, provides consulting service.

This project installs battery-charging stations and provides the battery-charging service to each participant twice a month. Each participant has 2 electric lamps and one other equipment such as radio-cassette recorder (TV is not included) and power demand per house is about 200Wp. The battery-charging charge is 50 peso per month and operation and maintenance expenses of the facilities will be covered. The feature of this project is to establish barangay Renewable Energy Community Development Association in each barangay as an electrification operating body to implement the community participatory electrification. It provided sufficient explanation of electrification and offered sufficient training to residents. It is also active in pursuing consumptive-end use of electricity that leads to their better living conditions. Some 1,000 households have been energized to date.

2-4-2-5 Germany (GTZ)

1) Rural Photovoltaic Electrification Project (RPE)

GTZ implemented the Philippine-German Special Energy Programme (SEP) with NEA and DOE starting in 1987. As part of this project, NEA implemented nationwide Rural Photovoltaic Electrification Project (RPE) aimed at distributing SHS since 1991 in conjunction with GTZ. The project was implemented from 1991 to 1997 with three stages, which were all completed in 1997.

In this project, NEA granted credit (loan funds) to the electric cooperatives with financial support from GTZ and other donor agencies. The electric cooperatives installed PV panels with lease contract (or installment contract) to certain number of members (normally 25 systems). The members purchased peripherals such as batteries and electric lamps at their own expenses. The electric cooperatives collected the rental revenue every month during the lease period and refunded the borrowings to NEA.

(Table 2-4-7 Outline of RPE)

The experience obtained in the first term and the second term of this project is summarized as the following 3 points:

Table 2-4-7 Outline of Rural Photovoltaic Electrification (RPE)

Item	The first term (1992-1995)	The second term (1996-1997)	The third term (1999-)
Number of SHS installed	850	2-4-2-5	-
Output (Wp)	50	75	75
Battery capacity (Ah) and type	100 (for import/heavy loading)	100 (for domestic productions/cars)	100 (for domestic productions/cars)
Main usage	2 lamps, radio-cassette recorder/TV	2 lamps, radio-cassette recorder/TV	2 lamps, radio-cassette recorder/TV
Installer	Electrification corporation (EC)	Electrification corporation	Electrification corporation
Total equipment cost (PHP) US\$ is in parentheses.	16,000 (620)	16,000~25,000(620)	30,000 (750)
Conditionality from NEA to EC	10 1/4 years (41 installments per quarter year) Repayment period: one year	15 1/4 years (61 installments per quarter year) Repayment period: one year	20 1/4 (81 installments per quarter year) Repayment period: one year
Credit amount from EC to customers US\$ is in parentheses.	6000 (250) Generating equipment (Solar generator, SG) only	12,000 (500) Generating equipment (Solar generator, SG) only	25,000 (625) Generating equipment (Solar generator, SG) only
Subsidy or grant money	50% of SG and 40% of other purchased equipment	None	Low-interest financing
Term of credit repayment US\$ is in parentheses.	Initial payment: 3,000 (2-4-2-5) Interest rate: 12% Amount of monthly repayment: 190 (7.60)	Initial payment: 5,000 (125) Interest rate: 12% Amount of monthly repayment: 178 (7.10)	Initial payment: 5,000 (125) Interest rate: 6.71 Amount of monthly repayment: 209 (5.20)

Technical problems and lowering of collect rate

Since quality of local parts such as fluorescent lamps and charge controllers is poor, the actual lifetime was shorter compared with the projected lifetime. The unsatisfied customer-members discontinued their payment of the rental revenue; the electric cooperatives had to purchase spare parts at its own expense and resulted to difficulties in repaying NEA. The 10% of monthly rental revenue was for maintenance expense, but was not collected from the amount paid. The maintenance expense depended on localities of installation and nationwide uniform rate is not appropriate. The expenditure for maintenance expense was not regularly paid. Therefore, expenditure situation was not properly understood and was uncertain for the electric cooperatives.

External influences regarding subsidy

Customers normally should procure equipment other than SHS at their own expenses, but sometimes power generators are provided through government subsidy at the initiatives of politicians. Those disorderly subsidies obstructed the sustainability of projects. SHS electrification project that is heavily dependent on subsidy at the initiative of politicians is also a factor obstructive to sustainable SHS distribution project.

The NEA and the electric cooperatives gave SHS the status of a preliminary electrification method prior to grid electrification. Therefore, SHS were installed in areas where electrification was programmed and has to be moved to another area after extending the distribution line. In fact, SHS often worked only for a very short time compared with the estimated period. The image that SHS is a preliminary electrification system cannot be erased until the reliability of SHS improves and high grid electrification cost (with long distance from existing grid and low load density) is recognized by customers or the electric cooperatives.

2) Philippines-German photovoltaic water pumping project for Visayas and Mindanao.

The photovoltaic water supply facilities were installed in Cebu, Mindanao and Leyte. Some 13 photovoltaic water supply equipment were installed in gardening facilities and movable water supply systems. The project was implemented for four years.

2-4-2-6 Australia

1) Davao del Sur rural electrification project

The Australian Government and the Business Center Davao (BCD) have implemented this project to show economic feasibility of SHS. In Davao del Sur, 500 units of SHS and 35kW generators were installed at general households and facilities of United Farmers and Fishermen Association.

2) Municipal Solar Infrastructure Project

The photovoltaic equipment was installed at outland public facilities in the Visayas and Mindanao regions through the Department of Interior and Local Government (home affairs and local government ministry). This project had a 5-year plan and about 30 million dollars was invested to electrify public facilities such as medical institutions, schools, water supply facilities with photovoltaic in 425 or more barangays. Under this assistance program, training of local government and public utilities was offered and necessary charges for operation and maintenance were collected from the customers. A total of 910 units of photovoltaic equipment have been installed at public facilities in 49 cities selected by the Social Reform Agenda Provinces since the project started in 1997.

2-4-2-7 The Netherlands

1) Belsolar project

SHS and photovoltaic streetlights were installed in Dupax, Nueva Viscaya, Northern Luzon Island. The DBP lent money to the cooperative and the cooperative provided SHS to the members under lease contract agreements. Some 95 units of SHS were installed and 91 units still work even now. This project was implemented from 1993 to 1994.

2) Environmental Improvement for Economic Sustainability (2002-2006)

A total of 15,000 units of SHS are distributed by the Philippine National Oil Company (PNOC) as the implementing institution in Region 1 to 6 and CAR (Cordillera Autonomous Region). The SHS (50Wp) are provided by Shell Solar (Netherlands). This project is an export promotion project that Dutch Government grants 60% of the equipment expense. Shell Renewable Philippines identifies the customers and gives technical guidance based on the contract with PNOC. This project includes two after-sales services within 6 months after installation of the SHS. Beyond the after-sales service period, the maintenance is charged and provided according to the contract with the installer. The prepaid system is demonstrated in the pilot project. This project also includes battery recycling and PNOC established an agreement with Philippine Recycling Inc. for this purpose. SHS were installed at more than 1,000 households as of May, 2003.

3) Technical Assistance to the Development Bank of Philippines for Capacity Building to increase RE lending (FINESSE)

This project is a technical cooperation project implemented by UNDP with funds from Dutch government. This project was implemented aimed at enhancing financing capability (screening ability) for renewable energy projects funded by DBP (Development Bank of Philippines) and was already completed.

2-4-2-8 France

1) Photovoltaic Rural Electrification Service project

This project installs photovoltaic equipment at the energized villages in the Visayas and Mindanao regions only and FS investigations are being implemented. This project will provide electricity services to 18,000 households of 128 barangays with combination of mini-grid with the solar-diesel hybrid system generations and SHS electrifications. The electricity charge will be set equivalent to the present energy consumption cost to cover system operation, maintenance and procurement of spare parts. This project is implemented in cooperation with a non-profit organization, TSPI Development Corporation, supporting micro-finance and small-scale firms directly.

2-4-2-9 Spain

1) Solar Power Technology Support to Agrarian Reform Communities (SPOTS)

This project electrifies agrarian reform communities (ARCs) in Mindanao through photovoltaic systems as a part of the governmental policy to help people overcome poverty. The Spanish Economic Ministry will grant 25 million dollars of soft loan to this project from March, 2003 to September, 2004. The Department of Agrarian Reform serves as the implementing agency with the DOE providing technical support on energy supply. The supported areas are: Region9 (Zamboanga Peninsula), Region10 (Northern Mindanao), Region2-4-2- (Davao Region), Region12 (Soccsksargen) and Region13 (Caranga Region) in Mindanao. The project design is developed locally with equipment and materials to be supplied by BP-Solar, Spain. The operation management of photovoltaic system and the collection of charges will be implemented by each ARC. This project consists of two components: PV electrification project of public facilities, schools, clinics, water supply facilities, agricultural production facilities and houses and project development of agriculture/agricultural products processing business.

2) Integrated Rural Development and Solar Energy Management Community Project

This project was implemented as a technical cooperation project by a Spanish international cooperation agency in Palawan Island in 1996. This project was a two-year plan and provided 645,000US\$ of financial support to an NGO, the Philippine Rural Reconstruction Movement. This project implemented SHS electrification for 300 households in 2 barangays and PV electrification for public facilities in 14 barangays in El Nido City, Palawan Island. Popular energy association was established by the customers as a mechanism that implemented and operated the project. The equipment and materials of PV system manufactured by BP-Solar, Spain were used.

2-4-2-10 Belgium

Pangan-an island solar electrification project

This project installed a centralized photovoltaic facility to improve quality of life in Pangan-an Island, Cebu. A total amount of 22 million Belgium francs (550,000 Euro) in financial support was provided. The project was started in 1997 and has been operated since 1998. The 25-kW facility is planned to provide power supply to 250 households. However, due to solvency problem of electricity charge, the number of customers decreases. The Pangan-an Island Cooperative for Community Development was established for the operation management and the collection of charges. The financial support for battery replacement has been requested to Belgian government as an extension of the project.

Chapter 3. Target Development Agenda and Current Situation

3-1 Institutional Framework for Current Development Agenda

3-1-1 History of Rural Electrification, Future Effort and the Institutional Framework

3-1-1-1 History of Rural Electrification

The rural electrification in the Philippines has been a governmental key policy to alleviate poverty improving the living standards of people in rural areas and creating new sources of income. The Government of the Philippines declared the implementation of rural electrification as a national policy in 1960 and established Electrification Administration (EA). EA was reorganized into the now National Electrification Administration (NEA) as a government agency for promotion of rural electrification in 1969 and the electrification approach in regional basis by the electric cooperatives (ECs) was introduced. The household electrification rate at that time was only 22.9%.

Two ECs were established as model electric distribution utilities from 1970 to 1971 and 36 ECs were established in 1972. There were 42 ECs and the household electrification rate was about 50% in 1975. One million households gained access to electricity services and the number of ECs became 116 in 1979. Some 10,000 barangays were energized and the number of EC became 119 same as at present in 1980.

All domestic Municipalities were energized in 1997, but barangay level electrification was still at 72%. Since the progress of electrification was slow at an average rate of 500 barangays per year before 1997, DOE started the Accelerated Barangay Electrification Program (ABEP) to accelerate electrification with NEA, NPC-SPUG and PNOC-EDC in 1999. In addition, ABEP was renamed to O' ILAW Program in 2000 and the activities have been expanded. As a result, the O' ILAW Program Team was established. It decided on policies regarding the overall barangay electrification including projects using the ER 1-94 fund, promoted private sectors' participation in rural electrification and obtained the participation of 3 IPP: PNOC-EDC, Mirant Philippines and Kepco Ilijan Corporation. Foundation for Rural Electrification for Economic Development (FREED) was also established and the introduction of private capital utilization mechanism was attempted (This function has been suspended now). A Project Management Office (PMO) was established at DOE in 2001 to act as the O' ILAW Program coordinating office or the network center. As a result, barangay level electrification attained 87.1% as of the end of 2002 and the average electrification achievement rate has reached more than 1,200 barangays per year.

The O' ILAW Program was completed in April, 2003 and the Expanded Rural Electrification Program (ER Program) started instead. The purpose of this program is to build deeper cooperation between public and private institutions in accordance with the provisions EPIRA (or RA9136), to achieve 100% barangay level electrification by 2006 (the same target of O' ILAW Program), and achieve 90% household level electrification by 2017.

Table 3-1-1 Barangay Electrification Performance

Year	Target	Annual number of electrified villages	Total number of electrified villages	Electrification rate (%)
1997	-	854	30,254	72.0
1998	-	1,272	31,526	75.1
1999	900	755	32,281	76.9
2000	1,621	1,366	33,547	80.1
2001	1,353	1,253	34,900	83.1
2002	1,636	1,699	36,590	87.1

Source: O'ILAW Program Terminal Report

3-1-1-2 New Institutional Framework of Rural Electrification Along with Power Industry Reform

According to RA 9136 or EPIRA of 2001, the rural electrification system was revised as follows:

- 1) Revision related to organization of rural electrification
 - Electric cooperatives shall select their respective reorganization, either into a stock corporation based on Corporation Development Law or a stock company based on Companies Act. (Article 57 of Law)
 - NPC (National Power Corporation) shall continuously take the responsibility for power generation business for rural electrification through SPUG (Small Power Utilities Group). The sales in energized areas and the universal charge approved by ERC (Energy Regulatory Commission) shall be credited to funds for rural electrification. SPUG shall try to privatize its power generation facilities and power line facilities. (Article 70 of Law and first clause of Article 13 of IRR)
 - NEA shall develop and implement programs that rural electric cooperatives can operate the business under the competitive environment after the reform as a subordinate agency of DOE. (Article 58 of Law and third clause of Article 3 of IRR)

- 2) Revision related to opening of electrification business in non-electrified area to the third party
 - If existing power supplier cannot energize the villages in its supply area, Qualified Third Party (QTP) approved by ERC may implement the electrification business. For this reason, DOE shall announce the area where QTP may implement the electrification business on behalf of existing supplier every September. If power supplier cannot energize such areas by itself, it must make a power supply contract with QTP that implements electrification business in the area. (Thus, this allows QTP implement electrification business by a contract with licensed power supplier without any change of power supplier's business area. QTP may implement power generation business only or both power generation and power supply. With this system design, QTP shall

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not have the license area of power supply business.) (Article 59 of Law and Article 14 of IRR)

- If existing power supplier cannot provide electricity services in villages within its franchise area, it may ask other power supplier from outside its franchise area to implement the electrification business. (In this case, business area of power supplier shall not change.) (Article 23 of Law)
- The Congress shall have the authority to allocate business areas of power distribution and power supply. Therefore, the authority of business area allocation for rural electrification shall be transferred from NEA to the Congress, but NEA shall still have the authority of renewal and suspension of business license for electric cooperatives until five years after enactment of law. (Article 27 of Law)

3) Other revised matters

- Power distributor must prepare a 5-year power distribution development plan and submit to DOE by every March 15. Electric cooperatives must submit power distribution development plan to NEA and NEA must prepare National Electric Cooperative Distribution Development Plan and submit to DOE by March 15. (fourth clause of Article 7 of IRR)
- DOE shall prepare MEDP (Missionary Electrification Development Plan). (13th clause of Article 13 of IRR)
- All commitment of electric cooperatives under NEA shall be transferred to newly established PSALM (Power Sector Assets and Liabilities Management Corporation). (Article 60 of Law)

3-1-1-3 Performance Target of Rural Electrification

The foremost target of current ER program is the achievement of 100% barangay level electrification by 2006, same as that of the O' ILAW Program. However, according to the definition of barangay electrification, when power line reaches to the center of barangay or in case of independent power source, when 10 or more households are connected, the barangay is regarded as "electrified", and even if the power supply is disconnected or the number of connected households becomes lower than 10, it is still regarded as "electrified". Therefore, it can be considered that even if high electrification rate appears, actual electrification rate wherein people actually enjoy the power service is lower.

At present, the achievement of household level electrification is roughly 68%. Even if 100% barangay level electrification is achieved by 2006, one million or more of households would still be left behind with no access to electricity. Therefore, the improvement of household level electrification rate should also be considered. ER program team sets up therefore a new target, the achievement of 90% household level electrification by 2017.

3-1-1-4 Promotional Method and Framework of Rural Electrification

In April, 2003, the DOE completed O' ILAW Program that accelerated barangay electrification rate and newly established Expanded Rural Electrification Program (ER Program) to integrate rural electrification programs and manage efficiently. The purpose of this program is to build deeper cooperation between public and private institutions in accordance with Articles of EPIRA (or RA9136).

The ER team consists of over-site committee (ER Team-OC), technical working group (ER Team-TWG) and the secretariat.

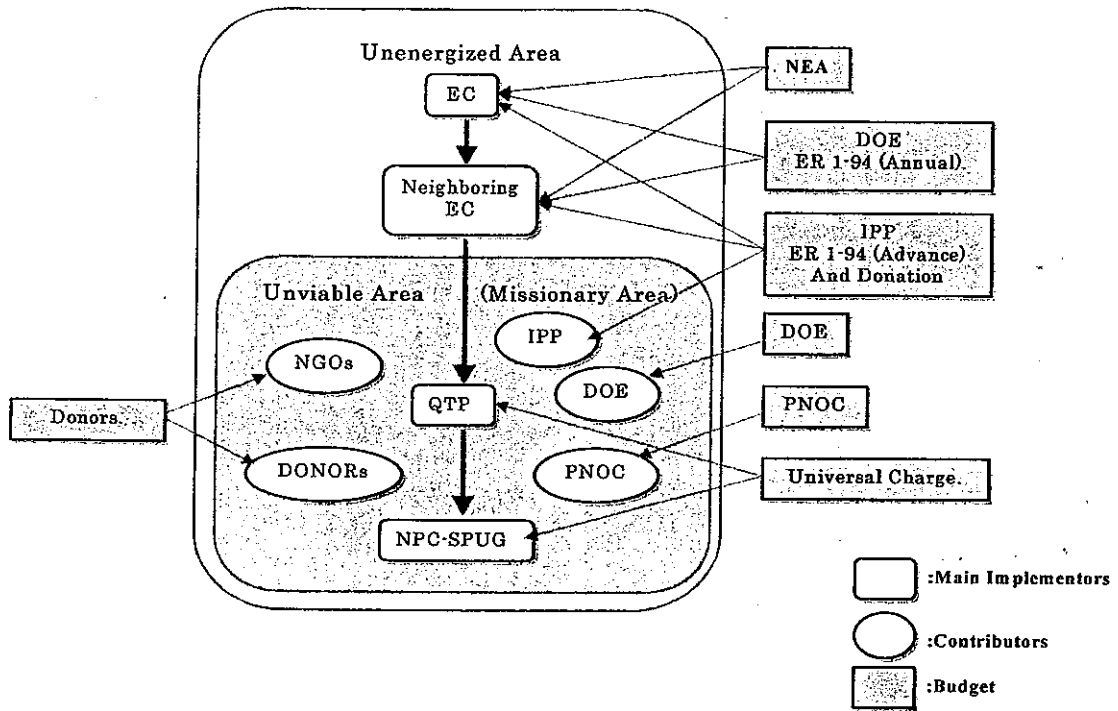
The ER Team-OC consists of an undersecretary of DOE as a chairman, one program manager each from DOE, NEA, NPC-SPUG and other members including PNOC, NEDA and DOF. It supervises ER program, monitors and evaluates the progress and results, feedbacks the results and reviews the target.

On the other hand, the ER Team-TWG supports the ER Team-OC as a working group. It consists of NEA as a chairman and members include the DOE, NEA and NPC-SPUG. The main job of the TWG is to manage related data of the ER program, integrate rural electrification programs of each concerned institution, evaluate program achievement and problems regularly, and prepare reports.

The ER program integrates electrification efforts of DOE, NEA, NPC-SPUG and PNOC, asks private companies to actively participate (front-loaded expenditure of ER 1-94 charge), integrates overseas aid projects into programs, sets up a short-term target to achieve electrification target, sets up assigned targets of each institution concerned to achieve the electrification target, and supervises, monitors and evaluates them. Though the conventional O' ILAW program focused on barangay level electrification, the ER program focuses not only in barangay level electrification but also in sitio (village) level or households level electrification and has set up a new target, the achievement of 90% household level electrification by 2017.

The framework of rural electrification under the new system is shown in Figure 2-7. The main implementor is the EC in the area. If the EC in the area cannot provide electricity services by itself, neighboring EC is allowed to implement such services. If neighboring EC cannot energize the area either due to low profitability or the area is regarded as a missionary electrification area, the same is opened to QTP. The QTP can then provide the appropriate electricity services in the area. In this case, QTP receives the subsidy on initial investment from the universal charge. If no QTP shows interest, NPC-SPUG must proceed with the electrification. DOE, PNOC, NGOs and donor institutions are supposed to support rural electrification, and missionary electrification supplementarily.

Figure 2-7 Rural Electrification Framework



There are two electrification methods: extension of power distribution line that is mainly left to ECs and independent power source by individual implementation through renewable energy technologies (micro hydropower, photovoltaic system, small wind power and hybrid) and diesel generations. In general, it is preferable to electrify by extension of power distribution line from the viewpoint of stable supply and maintenance. However, if the area is quite far from the existing grid or extension of power distribution line is technically and/or economically not feasible (due to geographical factor), independent power source will be introduced.

Since site of electrification needs to be shifted to more difficult areas, such as mountainous lands and small inlands in the future, the ratio of the independent power resource will increase and introduction of renewable energy systems with low operational cost is given priority over diesel generator with high fuel cost. The number of renewable energy systems has increased gradually in recent years and 648 barangay were electrified by renewable energy within 4 years from 1999 to 2002.

Table 3-1-2 Number of Energized Barangays per Type of Power Supply

Power Supply Schemes	1999	2000	2001	2002	Total
Grid Extension	713	1,078	1,010	1,358	4,159
Off-Grid	42	288	245	348	923
Solar	42	56	212	310	620
Micro-hydro	-	15	3	6	24
Hybrid	-	2	2	-	4
Generator set	-	215	28	32	275
Total	755	1,366	1,255	1,706	5,082

3-1-1-5 Current Status of Existing Independent Power Source Equipment

To understand the current status of existing equipment, a systematic monitoring or follow-up check is required. Unfortunately, the DOE has limited resources in implementing such activity. Isolated RE system installations, as well as power lines, are not monitored. The community-based project administration, including operation and maintenance are not supervised because of accessibility problems. JICA mission surveys and interviews on rural electrification projects with RE installations yielded the following observations/findings:

1) Micro hydropower generation equipment

There are 106 micro-hydropower generation / equipment installations as of the end of 2002. Ninety-two (92) of these installations are used for electrification purposes and the rest are designed for non-power applications, such as rice milling and coffee processing. Among those for electrification purposes, 37 equipment and installations have capacities of 1kW or lower and only 17 have 10kW or higher. Therefore, in most installations, power supply is insufficient.

Some 19 installations are currently not operable and about 50% of the installations are not fully operational due to problems, such as low power output and low voltage. In addition, in some operable equipment, the waterwheels are utilized in direct applications without a generator and are not normally operated as power sources.

The problems encountered on the above RE projects have both technical and management factors. The technical factors include lack of or insufficient flow rate, topographic and community / village surveys, excessive design and/or lack of sufficient (or planned) power generation is obtained. In addition, low-cost locally-fabricated waterwheels and/or generators with unsatisfactory quality are often used leading to frequent breaks down.

Lack of or insufficient budget or high subsidies (sometimes total grants) are among the management factors. The beneficiary communities do not have the sense of ownership such that recipients consider the supplied power is also free resulting to minimum collection of electricity charges or lack of it. Therefore, the fund for normal maintenance or troubleshooting cannot be secured in many cases.

Recently, the importance of community organization was recognized as a sustainability factor for such projects. The Barangay Alternative Power Association (BAPA) is introduced in the DOE's Barangay Electrification Program, the grass-root free projects and demonstration projects (joint implementation with New Energy Foundation (NEF) of Japan).

2) PV system

The use of solar technology systems, such as Solar Home System (SHS) and battery charging stations (Solar BCS) are widely used in rural electrification program. Some 620 barangay were energized with solar applications 1999 to 2002. Since solar system applications can be easily installed and serve 10 to 30 households, as well as satisfy criteria of barangay electrification, foreign contributions and supports abound for the introduction of such technology. However, there was no monitoring implemented as in the case of micro hydropower installations and no compilation of data showing current operational status.

Site interviews and survey of JICA mission team revealed that numerous solar systems / equipment have broken down (perhaps with battery problem) and left derelict after the introduction. In addition, some recipients have considered these equipment as personal properties and have transferred the same out of the respective barangays. The capacity and willingness to pay of the beneficiaries therefore have become big concerns and electricity charges were not collected to maintain and replace the equipment. In one highly subsidized installation of a centralized PV system, many beneficiary members have discontinued receiving the services due to extremely high electricity charge. Moreover, the generated electricity is not properly utilized or some installations are not used beneficially.

3) Others

Diesel generator is another common independent power source. However, the biggest problem is that fuel expense is more expensive in inland and it works mostly for nighttime and special occasions only. The Government of the Philippines tries to avoid the introduction of diesel generators and gives priority on the introduction of domestic renewable energy.

3-1-2 Development of Renewable Energy

3-1-2-1 Effort of Renewable Energy Development

The first effort of promoting renewable energy introduction in the Philippines came through the Executive Order 1068, the "Non-Conventional Energy Development Program for research, development and demonstration of NRET technologies" in 1977. The then Ministry of Energy was in charge of this program and mainly implemented capacity building of renewable energy in the first five years. In addition, government

agencies other than Ministry of Energy implemented the commercialization policies investing massive subsidies to dendro power generation, biomass gasification and small hydropower. However, these efforts were speed-before-quality and mostly resulted in failures.

The DOE started "Renewable Energy Power Program (REPP)" for 200kW-25MW photovoltaic, wind power, biomass and small hydropower in 1993. DOE set up a task force by DOE, NPC, NEA, PNOC-ERDC and PCIERD to implement this program. The PNB, LBP and DBP extended financial support to the projects and DOE guaranteed to purchase the electric power to be generated by these projects. Though this program had large expectations, it could not produce adequate results either.

The DBP has extended a loan facility to renewable energy development projects that are socially important but have too huge risk to borrow from normal bank. However, there were limited availments of this facility. Therefore, UNDP/FINESSE program has given supports to activate this loan system including training of DBP staff. Many renewable energy introduction projects centered on photovoltaic power generation have also been implemented by donor agencies, but those projects have not always produced the expected results.

The Mini-Hydroelectric Power Incentives Act (RA.7156) was enacted in 1991 to accelerate private sector participation in renewable energy development. This law mandates DOE the sole and exclusive authority on the development and operation of mini-hydropower projects with output from 101kW to 10,000kW. It also gives preferential treatment concerning taxes, but only three projects were developed in eight years after the enactment of the law. Among the identified barriers, licensing procedures, including those of the National Water Resources Board, National Commission of Indigenous People and Department of Environment and Natural Resources, are considered tedious and expensive. The Executive Order No. 462, entitled "Enabling Private Sector Participation in the Exploitation, Department, Utilization and Commercialization of Ocean, Solar and Wind Energy Resources for Power Generation and Other Energy Uses" was enacted in 1997. This statute stated that a part of income from these renewable energy power generations shall be paid to the government and it became an obstacle to renewable energy development. It was revised in accordance with the advice from the National Renewable Energy Laboratory of the United States Department of Energy in 2000, wherein: equipment with output less than 1MW shall be exempted from the ordinance, even equipment with output 1MW or more, subject to taxation shall be limited and equipment acquisition shall be given financial support.

In 1999, "An Act to Further Promote the Development, Utilization and Commercialization of New and Renewable Energy Sources and for Other Purposes" (NRE Bill) was proposed in the parliament, but was not enacted yet. The purpose of this law is to support the development of photovoltaic, wind power, biomass, geothermal, micro hydropower and ocean energies.

The "Strengthening the Non-Conventional and Rural Energy Development Program in the Philippines: A Policy Framework and Action Plan" prepared by World Bank's

Energy Sector Management Assistance Program (ESMAP) in August, 2001 proposed many things.

3-1-2-2 Current Status of Renewable Energy Development

The installed power generation capacity from renewable energies is 4,450MW, with geothermal at 1,932 MW and hydropower at 2,518 MW as of 2001.

The Philippines is a second-biggest country in geothermal development following the United States and the geothermal energy is expected as a national important energy resource in the future. The geothermal power generation accounts for 14.4% of the installed power generation capacity and 22.2% of total output as of 2001. The geothermal development has mainly been implemented by PNOC-EDC and considered to continuously lead the development in the future.

On the other hand, the hydropower generation development accounts for 18.8% of the installed power generation capacity and 15.1% of the total energy mix. The water-power resources in the Philippines are estimated to be 13,097MW, with 85% as large hydropower (10,000MW or more), 14% as mini-hydropower (101-10,000kW) and the rest as micro hydropower. The current development level, however, remain only at 19.2%.

PNOC-EDC is currently developing wind power resources with an initial capacity 40MW and North Wind Power Corporation with 25-MW capacity in Ilocos Norte with a loan from JBIC and Danida, respectively.

3-1-2-3 Policy of Renewable Energy Development Promotion

The basic energy policies in the Philippines are focused on securing stable energy supply and energy security, expansion of access to energy with reasonable price and development of clean and efficient energy resources. In order to supply stable energy and ensure energy security, it is important to improve self-sufficiency ratio in the energy supply and diversify energy resources and promote indigenous and renewable energy resource development. The utilization of renewable energy for rural electrification in mountains, inlands and islands is expected as an independent power source. The development of renewable energy is also considered as environment-friendly and emits no pollution.

In promoting reforms in the electric power sector, the government reviews the development target of renewable energy, aims for a two-fold increase in development over a decade and provides the following targets according to energy source:

Targets

- 100% Increase in renewable energy installed capacity in 2002 by 2012.
- Be the number one geothermal energy producer in the world.
- Be the number one wind power developer in Asia.

- Double the installed capacity of run-off type hydropower plant.
- Develop photovoltaic, biomass and ocean energies
- Set up the strategies and incentives for the promotion of renewable energy development.

Table 3-1-3 Renewable Energy Installed Capacity (MW)

	Installed Cap (2002)	Additional Cap.	Committed Cap.	Target In 2013
Geothermal	1,932	1,200	230	3,132
Hydro	2,518	2,685	827	5,203
Wind	0	415	237	415
Solar & Others	0	250	50	250
Total	4,450	4,550	1,344	9,000

The Renewable Energy Bill (RE Bill) was revived in Congress and is currently under deliberation of the Energy Committee. In addition, the Capacity Building to Remove Barriers to Renewable Energy Development (CBRED) has been implemented with support from UNDP including legislation of the proposed law.

3-2. Target Development Issue and Agenda

3-2-1 Problems Related to Rural Electrification Promotion

3-2-1-1 Database

The location, name, number of households and electrification plan of unenergized villages or areas are essential data in rural electrification. In the utilization of renewable energy systems, particularly hydropower and wind power, information on the potential, distance of unenergized area, potential demand, and accessibility are required.

The ER Team, which is now the focal group in rural electrification, does not have complete information of unenergized villages and its list does not reconcile with other government data. The database of villages and colonies is inaccurate and inadequate, thus, development of a comprehensive database, including sitios and households, is indispensable.

3-2-1-2 Rural Electrification Funds

The availability of funds is the most critical factor in rural electrification. These funds are primarily sourced from the government allocation for concerned energy agencies, contribution of IPPs based on ER 1-94, and financial support from various donors. However, the generated amount is limited, which cannot cope with the rapid progress of rural electrification. The 90% household level electrification target may therefore be difficult to achieve if nothing is done.

The EPIRA or RA 9136 has provided a portion of the universal charge to missionary

electrification, wherein operation and maintenance of existing isolated / mini-Grid is included limiting the utilization of such funds for electrification of new areas. The government expects QTP to enter to the missionary electrification program, but missionary areas are originally unprofitable and subsidies on initial investment, may not be prospective for QTPs to participate positively.

The Missionary Electrification Development Plan solicits the participation of the private sector as QTPs. The NPC-SPUG, on the other hand, is tasked to undertake missionary electrification in areas without QTP participation. In some cases, community-based non-profit organizations may take active involvement while the Local Government Units (LGUs) may take regional administration and management. The LGUs, however, have limited fund resources and know-how in providing electricity services. One possible solution for such scenario is the LGUs having access to the universal charge with the NPC-SPUG providing the technical and managerial supports. This could be further augmented with the ER 1-94 funds and availment of low-interest micro-financial assistance. These concepts are critical in achieving the electrification target of the government.

3-2-2 Problem with Durability of Independent Power Source Equipment

3-2-1-1 Rural Electrification Project Development Method

Rural electrification projects utilizing independent renewable energy systems are primarily implemented through the DOE's Barangay Electrification Program (BEP). First, candidate barangays are selected and prioritized primarily from the list missionary areas. Second, the DOE, through the Affiliated Non-conventional Energy Centers (ANECs), conducts a Rapid Rural Appraisal which includes field survey and energy resource identification, socio-economic profiling and preparation of project proposal. After the proposal is evaluated and approved, DOE concludes a Memorandum of Agreement (MOA) with the project implementer and most of the project expenses are provided as subsidies. In some cases, NGO's or LGUs prepare the project proposals and apply as project developers for inclusion in the BEP.

The shift to Sitio (colony) level electrification in the future may pose difficulties for DOE and NGOs and the active requests from beneficiaries are required. Therefore, comprehensive information, education and communication campaign on BEP or any alternative project development is necessary. This would enable demand-side project development, accelerate sustainable sitio level electrification and ensure active involvement of beneficiaries.

3-2-2-2 Quality Assurance

The lack of appropriate knowledge on distributed power generation of project developers poses problems in rural electrification. The proposed projects generally lack the necessary field investigation on available renewable energy potential, topographic survey, local skills and capability. In some cases, the equipment are

insufficiently designed to meet the demand or the equipment cannot generate the expected output. Most equipment breakdown due to quality problems. Therefore, capacity building of project developers becomes necessary before initiating project development.

On the other hand, cheap domestic waterwheels and generators made in China are often used in project installations. The locally-fabricated waterwheels are often not reliable qualitatively with low performance and low efficiency and cannot maintain the designed output. The most commonly used generators from China have poor quality and sometimes end-of-life-used generators are utilized. These equipment breakdown easily and such problems could be attributed to limited project funds. It is therefore necessary to guarantee a minimum quality of equipment by training local manufactures in the Philippines and introducing an authentication / standardization system to ensure sustainability of the project.

3-2-2-3 Operating, Maintenance and Organizational Operation

One factor on sustainability of independent renewable energy installations is the proper operation and maintenance of the facilities. The community beneficiaries are not properly organized and trained to manage and administer such projects. There were no sufficient fund generation from collection of electricity fees / charges, which should be used for the procurement of spare parts and payment of the operators' salaries, among others. The operators are likewise not sufficiently trained leading to poor operation and maintenance of the facilities and equipment.

To solve these problems, DOE started to establish an operating and maintenance organization called BAPA (Barangay Alternative Power Association) at the start of the project and the diffusion of this method is now required.

On the other hand, insufficient electricity charge collection results from the lack of paying capacity of the beneficiaries / community residents. This is aggravated by the lack of willingness to pay such charges on the misconception that electricity services are added burdens. Therefore, integration of livelihood activities and introduction of consumptive end-use of electricity become absolutely indispensable in rural electrification. The participation and cooperation of LGUs are likewise important in such concept.

Monitoring

A lot of independent power sources have been installed with financial support from DOE, NEA, NGOs and overseas donor agencies. However, the current situation such as operating and maintenance conditions after the installation is understood very little. This is because DOE has not monitored the implemented projects diligently due to lack of or limited resources.

The DOE should monitor the operating condition after the installation as long as the electrification project is sponsored by the national budget and feedbacks / experiences

from past projects are important for further promoting rural electrification. For that purpose, it is necessary to develop a reportorial system, monitoring system and database relating to the RE installations. By achieving these, it is expected that the installed power facilities are maintained properly and the organizational operation is implemented properly.

3-2-3 Agenda Related to Renewable Energy Development

The basic energy policies in the Philippines include securing of stable energy supply and energy security, expansion of access to energy with reasonable price and development of clean and efficient energy resources. For that purpose, it is important to improve self-sufficiency ratio in the energy supply and diversify energy resources and it is essential to promote domestic clean renewable energy resource development.

The agenda related to renewable energy development is as follows:

1) Competitiveness and Incentive in Electric Power Market

The weakest points of renewable energy are high initial investment cost compared with conventional energy resources in general, weak competitiveness in the electric power market and long repayment period. Therefore, it leads to decline in people's motivation to invest. Specifically, wind power, photovoltaic and run-off type hydropower supplying unstable electric power depending on time and season are undesirable for power purchasers. Therefore, the promotion of development cannot be expected as long as the incentives to compete with other power sources are not amply provided.

The fiscal incentives provided for by the Mini-hydroelectric Power Incentives Act of 1991 (RA 7156) are considered by most developers insufficient. This could be related to only three new mini-hydropower projects implemented after the passage of such law. In order to promote all renewable energy developments, the Renewable Energy Bill (draft) has been submitted to Congress and the discussion about the incentives has begun. Approval and enactment of enhanced fiscal and non-fiscal incentives in the proposed law will provide a big boost to private investors' participation in renewable energy development. The passage of this legislative proposal has gained supports from different donor agencies, such as the UNDP and the USAID.

2) Energy Resource Endowment Information and Related Basic Data

The DOE has developed the resource endowment data of wind power, photovoltaic energy and hydropower and prepared Renewable Energy Atlas of the Philippines with support from USAID. However, those are meant for theoretical potential energies and are greatly different from the potential that can be actually developed, depending on the local condition, especially for the wind power and hydropower. It is necessary to collect the comprehensive information of candidate locations and disclose such data

to investors in promoting renewable energy development.

For hydropower, the water observation data and actual data collection are very limited. The hydrologic and meteorological data were observed at many points before 1980s, but most of data collection have suspended. Therefore, the basic data used in power generation capacity estimation are applicable for Pre-feasibility studies (F/S) and the survey accuracy is low. There are a lot of reports of F/S and Pre-F/S prepared in the Philippines but many of them are obviously poorly designed. In addition, those plans are often unrealistic and are not referable. Therefore, it is also necessary to review the existing reports and potential hydropower.

For wind power, since the wind condition depends a lot on the geography, it is desirable to start measuring the wind condition at particular promising points and construct the basic data.

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Chapter 4. Project Strategy

4-1 Project Selection

For the rural electrification in the Philippines, the Government of the Philippines declared the promotion of rural electrification as a national policy in 1960 as mentioned in Chapter 3, and it has consistently been treated as a key policy of the government since then. As a result, 100% municipality level electrification was achieved in 1997, Accelerated Barangay Electrification Program (renamed to O'ILAW Program in 2002) started since 1997 aiming to achieve 100% barangay electrification level by 2006 and 87% of barangay was electrified at the end of the program period, April, 2003. After the completion of O'ILAW Program, Expanded Rural Electrification Program (ER Program) was reinforced to achieve 100% barangay level electrification by 2006 and 90% household level electrification by 2017.

As above, the history of rural electrification project in the Philippines is long. Ample knowledge and experiences on "how to energize areas having no access to electricity" have been acquired among concerned institutions. Since the past activities are focused on political targets, the achievement of 100% barangay electrification level by 2006" depends on:

- a) The electrification plan (object areas, number of households, electrification method, etc.) of each fiscal year was decided and implemented by the central government unilaterally due to political reasons or ease of implementation without any survey of residents' needs, socioeconomic conditions, geography or climate.
- b) When 10 out of hundreds of households are electrified, the barangay is regarded as energized. Therefore, the electrification method was selected to energize 10 households and barangay level electrification rate has deviated from that of household level.
- c) Once a barangay is regarded as energized, it remains counted even if the power output becomes less-than-expected due to equipment breakdown or resource shortage. Therefore, implementers tend to focus on unenergized barangays to meet the criteria of barangay electrification and lack sustainable operation and maintenance system after the electrification. As a result, the system somewhat failed in many of areas. Although accurate information on installed equipment is not available, about 20% of installed micro hydropower equipment is found not operable and about half of equipment may not achieve the desired performance due to technical reasons such as water shortage.

The achievement of the longstanding target, elimination of unenergized village (100% barangay level electrification), is coming in sight and the next target, the achievement of 90% household level electrification by 2017 has been set up. With this target, improving the sustainability of electrification system has been getting more of concerns. Although it was not emphasized in the past, the maintenance and sustaining abilities of beneficiaries are low, and the need for improving such capabilities was recognized.

The Government of the Philippines has recommended the utilization of renewable energy for village electrification from the viewpoint of environmental conservation and domestic energy resource utilization. Based on above backgrounds, a project, "Improving sustainability of RE systems in rural electrification by improving the capabilities of implementers (DOE and ANECs)." was selected after due consultation with the Philippines agencies. The title "The Capacity Building for Sustainable Village Electrification Utilizing Renewable Energy in the Philippines" is agreed tentatively.

4-2 Project Strategy

4-2-1 Emphasis on Demand-Side-Approach

The past rural electrification businesses had been planned and implemented by the central government unilaterally in the Philippines. However, it is difficult for the central government to understand the scale of electrification needs and supervise each village's power supply smooth operation after the project implementation. The demand side (rural area) approach calls for positive participation from the beginning so that beneficiaries have a sense of ownership and the sustainability is improved. Therefore, this project emphasizes on demand-side-approach and tries to spread this idea in planning, implementing and operating the project. There should be a local branch in the rural area to emphasize on demand-side-approach.

The DOE does not have any local branch in the rural area but designates universities in various places as ANECs and delegates the guidance to BAPA (Barangay Power Association village feeding power business implementation organization) and municipalities to those ANECs. Therefore, ANECs are also regarded as quasi-counterpart institutions in addition to DOE.

4-2-2 Consider micro-hydropower and photovoltaic generations as central technical cooperation subjects.

There are renewable energies such as photovoltaic, micro-hydropower, biomass, biogas, wind power and hybrid. The micro-hydropower and photovoltaic have been established technically as individual power source equipment for village electrification. The purpose of this project is to cultivate planning and implementation abilities of DOE and ANECs for village electrification, while utilization of established technologies and improvement of substantial household level electrification are required. Therefore, renewable energies that are not developed in the Philippines such as centralized photovoltaic, wind power, biogas and hybrid are not considered as priority subjects.

4-2-3 Aim to Improve Household Level Electrification Rate.

An important policy issue of the Philippines is the elimination of unenergized barangays by 2006. The Government of the Philippines has made considerable efforts in this subject and this target seems to be achievable. The next subject is to improve household level electrification rate and the Government of the Philippines has already

implemented efforts toward the solution of this subject. Therefore, the goal of this project is "Improvement of household level electrification rate".

4-2-4 Emphasis on Technology Transfer and Capacity Building by Collaboration

This project aims capacity building of DOE and ANECs. The basic strategy is that the DOEs' capacity building is cultivated through working directly with specialists assigned in this project at the same office. DOE has received support from World Bank and UNDP in the renewable energy field. This project is expected to build DOE's capacity to respond as counterpart in World Bank and UNDP's projects by the collaboration in this project. This project emphasizes complementary supports on DOE's implementation of measures proposed by World Bank and UNDP through reports and builds the capacity of DOE and ANECs in the process. Manuals would be prepared by DOE staff, not JICA specialists directly. The central issue of this project is to provide indirect support such as advices for DOE staff to improve their capacity.

4-2-5 Information Exchange with Other Donors in Rural Electrification and Renewable Energy Fields

JICA specialists will work with DOE staff in DOE during the project implementation period and many of works will be related to other donor-centered projects of World Bank and UNDP. JICA's technical cooperation project should form a productive complementary relationship with other donors so it is necessary to hold regular meetings between donors on-site.

4-2-6 Capacity Building of the Philippines side and Socialization Renewable Energy

The effective utilization of renewable energy for improvement of household level electrification rate is an important subject for the Philippines having many islands and secluded places in the mountains. The technical features of micro-hydropower and photovoltaic generation used for village electrification are that the beneficiaries (village people) have to use and maintain relatively advanced techniques which are essential to the success of village electrification utilizing renewable energy. The renewable energy technology will be accepted and utilized by communities in the Philippines, thus, it is necessary to build the capacity of wide-ranging concerned parties including communities and private companies. This project provides training programs to DOE and ANECs to enhance technical capabilities, monitors them afterward and supports new technologies that are granted to the communities.

Chapter 5. Basic Plan of Project

JICA dispatched "Philippines rural electrification project Japanese preparatory study mission No. 2" to the Philippines from November 8 to 20, 2003. It surveyed sites, held PCM workshop among concerned parties, discussed and agreed on the basic plan of this project with the Philippines as indicated in Appendix 1. Draft Project Design Matrix (PDM draft). This PDM draft is based on the results of the workshop and was agreed after due consultation between Japan and the Philippines. This agreement remains a draft because the details of activity plans and inputs can not be decided only by consultation attendances. It should be revised or changed based on the survey and evaluation in the future, if necessary.

5-0 Name of Project

- a) Name of project:
Project on Sustainability Improvement of Renewable Energy Development in Village Electrification in the Philippines
- b) Project implementation area : Whole of the Philippines
- c) Target group : DOE and ANECs staff
- d) Implementing agency : DOE (Department of Energy)
- e) Project period : From June, 2004 to 2009

5-1 Project Target

The project target shall be "Improvement of sustainability of renewable energy systems in village electrification". The index shall be the "Number of renewable energy systems operated properly" and the measurements (obtaining means) shall be in the form of "ER Reports" that DOE prepares and releases quarterly on the progress of the Expanded Rural Electrification Program promoted by the Government of the Philippines and "Monitoring Report" implemented by the Energy Utilization Management Bureau (EUMB) of DOE.

5-2 Goal

The "Improvement of household level electrification rate" was set up as a goal and "Achievement of 90% household level electrification by 2017" was set up as the index. This goal and index are the same as that of Expanded Rural Electrification Program promoted by the Government of the Philippines. The obtaining means of the index shall be annual reports of DOE and NEA.

The "Current government policy about the rural electrification shall be continued." and "Necessary budget shall be distributed." were set up as external conditions.

The Government of the Philippines has promoted the rural electrification plan under the

numerical target, "Achievement of 90% household level electrification by 2017", developed annual plan and allocated budgets. The implementing section develops the annual plan based on the assumption that existing equipment and equipment to be installed are all operated properly. In fact, many pieces of equipment are not operated properly. The sustainability of equipment/system is an important issue for household level electrification rate regardless of barangay level electrification rate. That is, the target can be achieved only if the electrification promotion section keeps installing new equipment smoothly and the equipment is sustainable and the goal can be achieved only if new equipment is installed widely and the sustainability of installed systems is improved.

5-3 Outputs and Activities

As a result of the workshop, there are many reasons that are given as to what caused the inoperability of existing equipment and those reasons were summarized in the following five points: "Lack of management abilities for village power supply entity", "Lack of technical capabilities for proper implementation of forming subjects, planning and construction supervision", "Technical, equipment and construction malfunction", "Intentional interference by antigovernment elements" and "Disasters such as typhoon and earthquake". The responses to the latter two points are inadequate in the form of technical cooperation project, thus, the responses to the former three points were set up as results and the solutions for each result were examined. The results of mutual agreement are as follows:

(1) Output 1 and the Activities

Build the capacity of DOE and ANECs to implement the social preparation (formation of local organization, strengthening of organization, etc.) for village electrification utilizing sustainable renewable energy.

Activities:

- Monitoring and evaluation of electrified barangay utilizing renewable energy
- Preparation of manuals
- Training of parties concerned
- Implementation of social preparation (formation of local organization, strengthening of organization)

(2) Output 2 and the Activities

Build the technical capacity of DOE and ANECs to recognize, form, plan and implement the subjects.

Activities:

- 2-1 Monitoring and evaluation of electrified barangay utilizing renewable energy
- 2-2 Preparation of manuals
- 2-3 Training of parties concerned

2-4 Construction supervision of implementing subjects

(3) Output 3 and the Activities

Build the capacity of domestic equipment manufacturing and construction through an evaluation systems / testing procedures and establishment of standards.

Activities

- 3-1 Monitoring and evaluation of electrified barangay utilizing renewable energy
- 3-2 Monitoring and evaluation of the capacity of domestic manufacturers and installers
- 3-3 Establishment of micro-hydro technological standard
- 3-4 Enforcement technological standard
- 3-5 Evaluation of certification/verification system for renewable energy

As indicators of above results, the items that are available in DOE and the measures of achievement for the results were set up. It is required to obtain each baseline, review whether the items are realistic as indicators of the results and set up the target value for adopting items as indicators.

5-4 Implementation Strategy of Activities

The purpose of this project is to improve the sustainability of rural electrification by building the capacity of counterparts that occupy a position of leadership on parties concerned with rural electrification, such as communities, equipment manufacturers and installers, among others. Therefore, the direct purpose is to build the capacity of counterparts, and it also aims to build the capacity of wide-ranging parties concerned in the ultimate sense. Many of the constructed rural electrification systems currently seem not to work sufficiently and the causes are dependent on each local condition. Therefore, training for counterparts by lectures alone is not so effective. It is under consideration that the counterparts go to many sites with specialists, conduct surveys, analyzes and examines working situations, identify problems and factors at each site through site inspection and interview with local parties concerned, prepare manuals under leadership of the specialists, and plan and implement the training for parties concerned with rural electrification.

JICA specialists have been asked for flexible solution and methods in village electrification utilizing renewable energy in the Philippines. Since Japan has already achieved 100% electrification and usage of micro-hydropower and photovoltaic are different from the Philippines, the technical standards used in Japan cannot be applied to the Philippines directly. It is essential for dispatched JICA specialists to conduct survey and study what for and how to use micro-hydropower and photovoltaic and which technological level can be used at the beginning as training measures for themselves. Then the important subject is how to select the best recommendation in the interrelation between power supply reliability, construction expense and ease of maintenance. JICA specialists should also exchange information and views of not only hardware but also software utilization, having a close connection to available hardware, such as electricity

(A)

(B)

charge and electrification corporations closely with specialists of related fields.

Specifically, this technical cooperation project is asked for a flexible and quick response on the technical cooperation needs depending on the situation and it is also required to revise PDM if necessary.

5-5 Inputs

For inputs from Japan and the Philippines, only the following items were agreed. The details and quantities were not examined.

(1) Inputs from Japan

Training for long-term and short-term specialists, domestic and foreign parties concerned (including not only training for direct counterparts but also training for other parties concerned with local power supply, depending on the situation), necessary equipment provision and running cost

(2) Inputs from the Philippines

Personnel, office space with furniture and utility, traveling expenses during site visits and part of training cost

5-6 Organization for the project management and implementation

ANNEX III illustrates the structure of the project implementation. In addition, a joint coordinating committee will be formulated to meet at least once a year for effective management of the project.

5-7 Prior Obligation and Requirements

The prerequisite shall be DOE commitment to the goal, "Achievement of 90% household level electrification by 2017". This means that DOE will keep implementing necessary measures to achieve the goal in this project and others.

Chapter 6. Comprehensive Relevance of Project

6-1 Relevance

(1) Development Policy, Target of Project and Consistency with Goal

The Government of the Philippines declared the implementation of rural electrification as a national policy in 1960 and established Electrification Administration. Since the Marcos Administration collapsed in 1986, the Philippines experienced several changes of the governing parties. The electrification policy has consistently been treated as a national key policy to date with strengthening and reorganization of the institution and revision of numerical targets to contribute to poverty eradication by improving living standards of people in rural areas and creating new source of income regardless of the change of governing parties. The goal of this project is the same as numerical targets of Expanded Rural Electrification Program developed in July, 2003 and the direction of this project is consistent with that of the development policy of the Philippines.

(2) Consistency with Japanese aid policy

The Japanese "General Framework of Official Development Assistance" was revised for the first time in a decade by the cabinet decision on August 29, 2003. The five basic policies include; 1) "Support of developing countries' independent efforts", 2) Viewpoint of "Human security" and 3) Securing of fairness and the four priority subjects are; 1) Poverty reduction, 2) Sustainable growth, 3) Efforts toward global problems and 4) Creation of peace.

This project aiming at "Improvement of rural electrification business sustainability utilizing renewable energy" contains elements to contribute to poverty reduction, sustainable growth, efforts toward global problems and creation of regional peace (village having no access to electricity becomes dangerous easily.).

According to "Country-by-country aid programs (the Philippines)" on August 3, 2000, the emphasized fields of aid for the Philippines are the following four fields:

- a) "Strengthening economic vitality for sustainable growth and overcoming of growth control factor"
- b) "Correction of gaps (poverty alleviation and correction of regional gaps)"
- c) "Environmental conservation and disaster prevention"
- d) "Training of personnel and achievement of new system (Consider improvement of executive's ability (especially, syndic's ability)."

The detailed implementation policy of each field includes the following:

- a) "Strengthening economic vitality for sustainable growth and overcoming of growth control factor"
 - For energy and power development fields, examine the aid to maintenance of power line network, rural electrification and resource development that is

difficult with funds from private sectors or government funds of other than ODA. Since insufficient maintenance and aging of existing power generation and power line network equipment result in lowering of power generation efficiency and unstable power supply, promote the contribution to restoration of existing power equipment and training of maintenance personnel.

- b) "Correction of gaps (poverty alleviation and correction of regional gaps)"
 - Improve village basic society and economic infrastructure.
 - Restore and renew existing aged facilities.
 - Promote resident participation to planning and maintenance of facilities.
- c) "Environmental conservation and disaster prevention"
 - Examine technical and financial cooperation for environmental conservation and regeneration continuously.
- d) " Training of personnel and achievement of new system"
 - The improvement of governmental capacity and achievement of new system are important for effective acceptance of support from overseas including Japan. Japan continuously supports under the "Japan-ASEAN Program for Comprehensive Human Resources Development" that especially aims to develop executives and syndics in the fields contributing economic sustainable growth. Under the promotion of decentralization, the improvement of local governmental capacity is also considered.

It can be said that the purpose and activities of this project are in accordance with above four priority fields.

(3) Relation to Aid from Other Aid Agencies

As mentioned above, international organizations such as UNDP, World Bank and Asian Development Bank and donor agencies from many nations such as the United States, Germany, Spain, Australia and France have implemented various aids to the rural electrification plan that is a priority field of the development policy in the Philippines. The technology that has mainly been used in these aid projects is photovoltaic. The aid strategy of World Bank and UNDP is to create the photovoltaic (Solar Home System) market, develop the market environment and propose business models with installation standards and design standards to diffuse Solar Home System by private initiative. However, it is up to the Philippines side to monitor the system after the installation in accordance with these models. Therefore, JICA's technical cooperation is required to develop the monitoring system of the Philippines side after the installation and it is confirmed that Japanese consultant implements the survey of other donors as part of preparatory study at this point.

For micro-hydropower, German GTZ has supported it before and the assistance program has already terminated. Other donors are not planning to support it so the support by this technical professional becomes important to promote the village electrification utilizing micro-hydropower efficiently in the Philippines in the future.

Especially, it is necessary for increasing the achievement of household level electrification to maintain and operate installed Solar Home Systems and micro power generation equipment properly and secure sustainable power supply. For that purpose, the monitoring plan of this project is also important for aids from other donors. Therefore, this project has a complementary relationship with projects of other donors and it is essential to utilize and strengthen this complementary relationship for achieving the end desired of this project.

Therefore, the relevance of this project is high from all angles.

6-2 Effectiveness

The results included in the basic plan of this project cover countermeasures to all major factors that were thought to lower "sustainability of rural electrification system utilizing renewable energy" and have come up in the workshop, except two factors: disasters such as typhoon and earthquake and intentional interference by antigovernment elements that are not suitable to technical cooperation. It is considered that the effectiveness is high.

6-3 Efficiency

This project prefers the system that the counterparts visit many individual sites with specialists to conduct surveys, analyze and examine the current situation, identify problems, factors and countermeasures, and prepare manuals under leadership of the specialists rather than lectures to improve the capacity of counterparts. This method might be judged as less efficient compared with other activity methods such as aid donors themselves analyze problems and submit reports with only results by hiring consultants or submit only completed manuals. However, such judgment is rough-and-ready conclusion. It is necessary to note that the final purpose of technical cooperation is that counterparts themselves build their capacities by accumulating experiences. It will be required to show the improved counterparts' capacities in the interim assessment. Therefore, it is necessary to implement technical assessment to individual counterpart at the beginning of this project, record it as a baseline of the project, implement similar assessment in the interim assessment to show the capacity building of this project expressly and build the measures showing the effectiveness and efficiency of the project expressly in the project at the beginning of the project.

6-4 Impact

(1) Chance of Achieving Goal

The goal is the national target itself and the achievement is expected in 2017 according to the national plan. It is hard to say whether the goal can be achieved at this stage, but if the project target is achieved and problems of external conditions are not present, the

overall goal can be achieved.

(2) Impact on Environmental Conservation Aspect

If the area utilizing kerosene for lighting is energized utilizing photovoltaic or mini-hydropower, it contributes to the reduction of CO₂ emission. If micro-hydropower alternates diesel power generation instead of forming mini-grid to provide electricity services through diesel power generation, it also contributes to the reduction of greenhouse gas emission.

The mini-hydropower has few submerged areas unlike in the case of reservoir system and does not have a big impact on the social environment. Since the driving channel is possible to block the movement of animals, the environmental assessment should be implemented if necessary. Such environment-friendliness should be conveyed to the counterparts of the Philippines side.

(3) Impact on Poverty Reduction

The Government of the Philippines has strongly promoted the rural electrification as a solution of poverty reduction. However, people can live without electricity unlike in the case of water and therefore electricity is not BHN (Basic Human Needs). However, the quality of people's lives is totally different in having electricity from without electricity. The quality of social services such as medical care and education is also totally different when electricity service is not available. The potential of village industry development such as processing of agricultural products is also totally different whether electricity can be used or not. Therefore, the poorest sector of society is a difficult subject for the benefits of electrification directly, but there are indirect benefits by improving the social services. The poorest society would never start to utilize the electricity unless the people who can pay the electricity charge start to utilize the electricity. It has an impact on the poverty reduction from this standpoint.

(4) Other Impacts

Enhanced benefits can be expected by planning and implementing village electrification as part of the community development. Several research studies have already clarified that village electrification can have a great impact by providing information to farmers on the utilization of electricity for especial productive purposes, such as processing of agricultural products. Therefore, this project maintains cooperation with JICA's other projects and other donors in the implementing process and attempts such research studies. If only a part of residents can be provided with electricity services, it is necessary to determine the measures to make other community members access the benefits of electrification. Such case should be carefully considered from the planning stage so that the electrification does not bring discord into the village by inequality among residents. It is necessary to carry out thorough beneficiary-payment principle. It should be noted that this project provides the counterparts of the Philippines side the awareness on such problems and work on the solutions to such problems together with residents.

6-5 Sustainability

When the counterpart acquires skills from the experience by working with specialists, the counterpart promotes its own self-sustaining development as long as it continues the work in the same field even if the project is completed.

Under the new environment of Electric Power Industry Reform Act, the rural electrification is becoming the business that is not directly implemented by the government in the Philippines. However, it is still an important task of DOE to understand the progress of electrification and maintain sustainability after the electrification and take necessary measures to ensure the same. Therefore, this project aims to develop the ability of the Philippines side for the government to implement the work properly.

6-6 Comprehensive Implementation Relevance

This project strengthens the missing part of support from international institutions and donor agencies of the United States and Europe in the rural electrification sector, which is an important development subject in the Philippines and which many donor agencies have supported. This is a project with extremely high comprehensive implementation relevance that the great results are expected with relatively less inputs. The officials of UNDP and World Bank also place more expectations on it according to the interviews at the preparatory study stage.

ANNEX I. PROJECT DESIGN MATRIX

Project Title: Sustainability Improvement of Renewable Energy Development in Village Electrification in the Philippines.
 Project Site: Nationwide
 Target Group: Officials of DOE and ANECs
 Implementing Agency: Department of Energy (DOE)
 Project Period: June 2004- May 2009

Narrative Summary (Overall Goal)	Indicators/ Targets	Means of Verification	Important Assumptions
<p>Household level electrification rate is increased. (Project Purpose) Capability of DOE, ANECs is enhanced to improve sustainability of Renewable Energy Projects in village electrification.</p>	<ul style="list-style-type: none"> • 90% of households are electrified by year 2017 • Number of RE systems operating properly. 	<p>DOE /NEA report</p> <ul style="list-style-type: none"> • ER Program Report by DOE • Monitoring report by EUMB 	<ul style="list-style-type: none"> a. The present government policy on rural electrification will be sustained. b. Necessary budget will be allocated.
<p>(Outputs)</p> <ol style="list-style-type: none"> 1. Well organized social preparation is led by DOE and ANECs for sustainable RE development. 2. DOE's and ANECs' technical services from project identification to monitoring and evaluation are enhanced for sustainable RE development. 3. Capabilities in local manufacturing and installation are strengthened through testing application and standardization. 	<ul style="list-style-type: none"> • Number of well organized communities • Degree and quality of DOE and ANECs popularity among community. • Number of sustainable projects implemented. • Number of projects in operation. • Number of certified RE equipment locally produced. • Number of accredited local fabricators and installers of RE equipment.. 	<ul style="list-style-type: none"> • Monitoring report • Interview and survey • Monitoring report • Evaluation report • Record on RE equipment locally fabricated and installed. • Published list of accredited fabricators and installers. 	<ul style="list-style-type: none"> a. Trained counterparts will continue to work for rural electrification b. DOE/ANECs provide institutional and financial assistance to the stakeholders concerned.. c. National Government will allocate necessary funds .
<p>(Activities)</p> <ol style="list-style-type: none"> 1-1. Monitoring and evaluation of energized barangays using RE systems. 1-2. Preparation of manuals. 1-3. Training of stakeholders. 1-4. Social preparation (community organization and institutional development and other activities) 2-1. Monitoring and evaluation of energized barangays using RE systems 2-2. Preparation of manuals. 2-3. Training of stakeholders. 2-4. Supervision and administration of project implementation. 3-1. Monitoring and evaluation of energized barangays using RE systems. 3-2. Monitoring and evaluation of capabilities of local fabricators and installers. 3-3. Formulation of micro-hydro technology standards. 3-4. Implementation of RE technology standards. 3-5. Evaluation of existing accreditation and certification activities for RE technology. 	<p>(Inputs)</p> <p><u>JAPAN</u></p> <ul style="list-style-type: none"> A. Personnel <ul style="list-style-type: none"> a) Long-term Experts b) Short-term Experts B. Training in the Philippines and other countries. C. Provision of Necessary Equipment D.. Operating Expenses. 	<p><u>THE PHILIPPINES</u></p> <ul style="list-style-type: none"> A. Personnel B. Office Space with Furnitures and utility services C. Travel expenses for site visits D. Expenses for training. 	<ul style="list-style-type: none"> a. Trained C/P will not leave DOE/ANECs during the duration of the Project <p>(Pre-conditions)</p> <ul style="list-style-type: none"> • DOE's commitment to attain 90% of households electrified by 2017

ANNEX II. PLAN OF OPERATION(2004.6-2009.5)

Project on Capacity Building for Sustainable Village Electrification Utilizing Renewable Energy in the Philippines

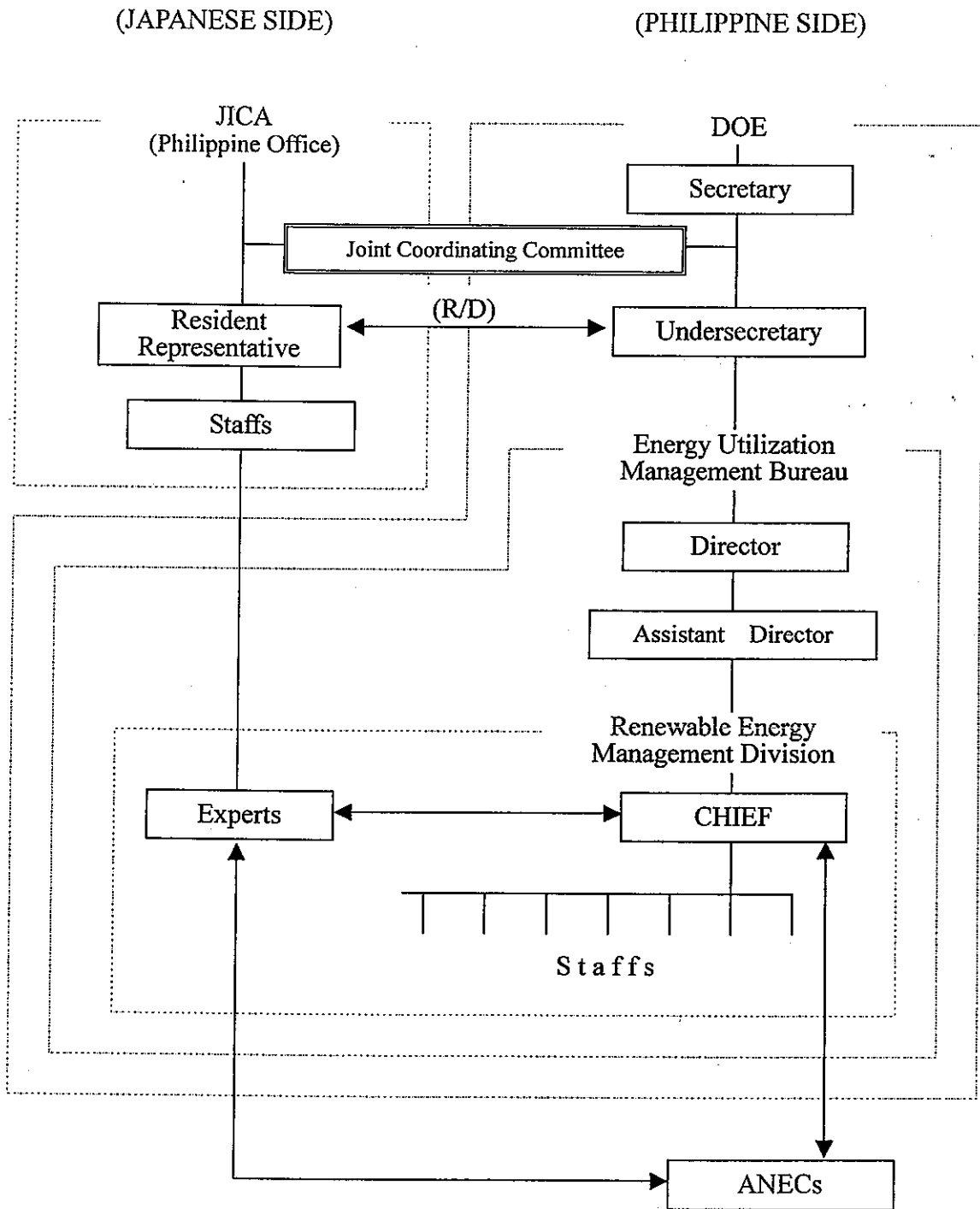
Activities	2003				2004				2005				2006				2007				2008				2009				Responsible Person		Input	
	Japanese Fiscal Year		Quarter		2004		2005		2006		2007		2008		2009		2008		2009		2009		2009									
	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	Japanese Side	Philippine Side		
0. Inauguration																																
0-1. Inauguration.					●																								PD	LE	CP	
1. Enhanced capability of DOE and ANECs in social preparation (community organizing, institutional development and other activities) for sustainable and renewable village electrification.																																
1-1. Monitoring and evaluation of energized barangays using RE systems.					●																								PD	SE	CP	
1-2. Preparation of manuals.					●																								PD	LE/SE	CP	
1-3. Training of stakeholders.						●																							PD	LE/SE	CP	
1-4. Social preparation (community organization and institutional development and other activities)							●																						PD	LE/SE	CP	
2. Enhanced technical capability of DOE and ANECs in project identification, preparation, planning and implementation including monitoring and evaluation.																																
2-1. Monitoring and evaluation of energized barangays using RE systems.					●																								PD	LE	CP	
2-2. Preparation of manuals.					●																								PD	LE/SE	CP	
2-3. Training of stakeholders.						●																							PD	LE/SE	CP	
2-4. Supervision and administration of project implementation.							●																						PD	LE/SE	CP	
3. Strengthened local manufacturing and installation capabilities through testing and standardization.																																
3-1. Monitoring and evaluation of energized barangays using RE systems.					●																								PD	LE	CP	
3-2. Monitoring and evaluation of capabilities of local fabricators and installers.					●																								PD	LE/SE	CP	
3-3. Formulation of micro-hydro technology standards.										●																			PD	LE/SE	CP	
3-4. Implementation of RE technology standards.											●																		PD	LE/SE	CP	
3-5. Evaluation of existing accreditation and certification activities for RE technology.					●																								PD	LE/SE	CP	

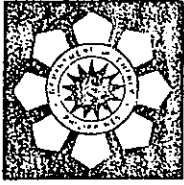
Philippine Side : PD-Project Director, PC-Project Cooperator, PM-Project Manager, CP-Counterpart personnel

Japanese Side : LE-Long Term Expert, SE-Short Term Expert

ANNEX III.

ORGANIZATION CHART OF ADMINISTRATION OF THE PROJECT





Republic of the Philippines
DEPARTMENT OF ENERGY

12 March 2004

Mr. REUBEN S. REINOSO, JR.
Director IV, Infrastructure Staff
National Economic Development Authority
Amber Avenue, Pasig City

Dear Mr. Reinoso:

We are submitting herewith the project proposal entitled "*Sustainability Improvement of Renewable Energy Systems Development in Village Electrification in the Philippines*". under Japan International Cooperation Agency (JICA). The project is geared toward the sustainability of existing renewable energy projects thru BAPA strengthening that will result to increased project efficiency and will contribute to the 90% target household electrification by 2017.

Project Profile:

- Overall Goal : Household electrification is increased
- Project Purpose : To enhance the capability of DOE and ANECs for the improvement of sustainability of renewable energy projects in village electrification.
- Project period : June 2004 – June 2009
- Project Site : Nationwide
- Main Objective :
1. Assessment of non-operational existing renewable energy projects and institute measures to sustain its operation and maintenance.
 2. Identify various gaps in implementation and formulate solutions to address the same.
 3. The design target beneficiaries are the households utilizing RE and not community as a whole.
- Implementing Agency : Department of Energy
- Outputs : 1. Well-organized social preparation led by DOE and ANECs for sustainable renewable energy development.

2. Enhanced technical capability of DOE and ANECs in project identification, monitoring and evaluation for sustainable renewable energy development.
3. Strengthened local manufacturing and installation capabilities through testing application and standardization.

For your review and possible approval.

J. V. Emmanuel A. de Dios

J. V. EMMANUEL A. DE DIOS
*Undersecretary and
Chair, DOE Project Review Committee*

(Handwritten initials)

(Handwritten initials)

APPLICATION FORM FOR THE JAPANESE GOVERNMENT'S
TECHNICAL COOPERATION

1. Date of Entry : Day: _____ Month: November Year: 2003
2. Applicant : The Government of the Philippines
3. Project Title : "Sustainability Improvement of Renewable Energy Systems Development in Village Electrification in the Philippines"
4. Implementing Agency: Department of Energy (DOE)
Address : Energy Center Merritt Road, Fort Bonifacio,
Taguig, Metro Manila
Contact Person: Teresita M. Borra
Designation: Bureau Director
Telephone No.: (+63-02) 840-2098 Fax No.: (+63-02) 840-2098
Web Site : <http://www.doe.gov.ph>

5. Background of the Project:

The Government of the Philippines through the Department of Energy's current projections show that renewable energy is foreseen to provide up to 40 percent of the primary energy requirements over the ten year period beginning in 2003. Other renewable sources such as biomass, micro-hydro, solar and wind will remain to be the largest contributors to the total share of renewable energy in the energy mix with an average share of 27.5 percent.

The Philippine government targeted 41,999 barangays to be electrified by 2006 through O' Hlaw Program. The combined accomplishment of barangay level electrification under the program by the end of December 2002 was 87.1 percent. However, as rural electrification progresses, the remaining number become more difficult to accomplished. Hence, the Expanded Rural (ER) Electrification Program was launched recently to help attain the 100% barangay electrification target by 2006 and 90% household electrification target by 2017.

Most of the unelectrified areas are located in isolated barangays where grid extension becomes more expensive due to difficulty of accessibility. Off-grid or decentralized electrification utilizing renewable energy like hydropower and solar systems will become an alternative option in accomplishing the said target.

6. Outline of the Project:

a. Overall Goal

Household electrification rate is increased.



b. Project Purpose

To enhance the capability of DOE and ANECs for the improvement of sustainability of renewable energy projects in village electrification.

c. Outputs

- 1) Well-organized social preparation led by DOE and ANECs for sustainable RE development.
- 2) Enhanced technical capability of DOE and ANECs in project identification, monitoring and evaluation for sustainable RE development.
- 3) Strengthened local manufacturing and installation capabilities through testing application and standardization.

d. Project Activities

1.1 Monitoring and evaluation of existing RE projects

- 1.1.1 Preparation of monitoring and evaluation plan.
- 1.1.2 Conduct site investigation of existing RE projects.
- 1.1.3 Collection of related data and information of RE projects.
- 1.1.4 Creation and update of RE project database.

1.2 Introduction of innovative methods in social preparation

- 1.2.1 Analysis of existing social preparation method.
- 1.2.2 Design social preparation manual.
- 1.2.3 Conduct trainor's training for DOE and ANECs for social preparation.
- 1.2.4 Application of social preparation to RE projects.

2.0 Conduct of technical services in RE project implementation

- 2.1 Analysis of implementation methods used in existing RE projects.
- 2.2 Review of project formulation mechanism.
- 2.3 Design manuals related to project preparation and/or implementation.
- 2.4 Conduct trainor's training for DOE and ANECs in project implementation.
- 2.5 Provide technical services for stakeholders.

(K)

Q

- 3.0 Application of testing and standards to local RE manufacturers
 - 3.1 Evaluation of existing RE systems.
 - 3.2 Evaluation of local capability in fabrication and installation of RE systems.
 - 3.3 Formulation of micro-hydro technology standards.
 - 3.4 Implementation of RE technology standards.
 - 3.5 Evaluation and review of accreditation and certification procedures for RE technology.

e. Input from Recipient Government

- 1. Personnel
- 2. Office space with furniture and utility services
- 3. Travel expenses for the site visits
- 4. Expenses for training

Note: The inputs of the Philippine Government are all regular activities

f. Input from Japanese Government

- a. Personnel
 - i. Long-term Experts
 - Expert for Micro-hydro Village Electrification
 - Expert for Photovoltaic Village Electrification
 - ii. Short-term Experts
- b. Training in the Philippines and other countries
- c. Provision of necessary equipment

g. Requested Amount of Japanese Inputs

- a. Equipment
 - less than 50 Million JPY

7. Implementation Schedule

From Month June Year 2004 to Month June Year 2009

8. Implementing Agency

- a. Mandate and function of the agency relative to the whole Philippine Government Bureaucracy

(142)

(142)

The DOE is mandated by the Republic Act No. 7638 to prepare, integrate, coordinate, supervise, and control all plans, programs, projects and activities of the Government relative to energy exploration, development, utilization distribution and conservation.

The newly-reorganized DOE structure, the former Mini-hydro Division (MhD) and the Non-conventional Energy Division (NCED) of the DOE were merged and named the Renewable Energy Management Division (REMD). The REMD's mandate is to promote and accelerate the development of all renewable energy sources like ocean, solar, wind, biomass and hydro.

b. Annual Budget Allocation of the Agency

a) Agency's annual budget PhP 560.2 Million (2002)

b) Agency's allocation for Foreign-Assisted Programs and Projects

None for the last three years

c. Proposed Implementing arrangement

A Memorandum of Agreement shall be executed based on the Terms of Reference which will be signed by the concerned parties.

d. Number of personnel who will be involved in the project as well as the level of technical capability

DOE-REMD - 3 Staff members presently involved in community organizing with at least five (5) years experience in the actual implementation of solar and hydropower projects.

9. Related Activities

The Barangay Electrification Program (BEP) which was conceptualized in 1999 is one among the major project that have been implemented by the DOE in terms of energy development to address poverty alleviation in rural areas. The BEP was subsequently transformed into the O' Ilaw Program in January 2000 to accelerate the implementation of electricity services to all barangays in the country.

The O' Ilaw Program integrates all electrification initiatives of the DOE and its attached agencies like the National Electrification Administration, the National Power Corporation and the Philippine National Oil Company's Energy Development Corporation, to attain 100 percent barangay electrification in 2006.

The integrated initiative has delivered a total of 36,590 electrified barangays as of February 2003 bringing the national barangay electrification level to 87 percent with 5,409 barangays still to be energized.

The barangay electrification project has provided an opportunity for the promotion and introduction of renewable energy sources in the rural communities particularly in areas where the grid extension is not economically feasible.

10. **Beneficiaries**

Various stakeholders of micro-hydro and solar systems development such as Non Government Organization (NGO), local government units (LGUs), Department of Energy (DOE)/ANECs, local installers of RE equipment and local communities.

11. **Security Conditions**

1. The DOE will coordinate with the concerned LGUs to assure the safety conditions of the area prior to the conduct of fieldwork activities.
2. Necessary security measures shall be carried-out.

12. In addition to the information provided in number 6 above, please fill out the attached Project Framework Matrix (ICC PE Form No. 6) which is a requirement of the NEDA Secretariat in its project evaluation, whether or not the project will be evaluated by the Investment Coordinating Committee) (Please see attached ICC PE Form No. 6)

13. **Other information which might assist the evaluation of the Project**

This project is a continuation of the activities conducted by the Expert Dispatch for rural electrification which are the following:

- 1) Enhancement of the DOE's capabilities in leading stakeholders of mini- and micro-hydropower
 - ✓ To advise the DOE in leading stakeholders of mini- and micro-hydropower on planning, designing, operation & maintenance, and management of the systems.
- 2) Formulation of O&M support framework
 - ✓ To assist in formulation of mechanism and network to promote micro-hydro development.
- 3) Formulation of monitoring system
 - ✓ To assist in formulation of monitoring system of rural electrification projects
- 4) Encouragement of stakeholders' participation in hydropower development in sustainable manner

(H)

PT

- ✓ To assist the DOE's enlightening activities for promotion of hydropower development.
- 5) Other activities adherent to the Agency's Barangay Electrification Program utilizing micro-hydropower technology
- ✓ To assist in preparation of Technical Cooperation Project for Rural Electrification by RE Systems
 - ✓ To assist Micro-hydro Technology Center at De La Salle University
 - ✓ To assist in Grant Aid for Grassroots Project

Undertakings of the Philippine Government

To facilitate the smooth and efficient implementation of the Project, the Government of the Republic of the Philippines shall take necessary measures:

1. The Government of the Republic of the Philippines will take necessary measures to ensure that the self reliant operation of the Project will be sustained during and after the period of Japanese technical cooperation, through full and active involvement in the project of all related authorities, beneficiary groups and institutions;
2. The government of the Republic of the Philippines will ensure that the technologies and knowledge acquired by the Philippine nationals as a result of Japanese technical cooperation will contribute to the economic and social development of the Republic of the Philippines;
3. The government of the Republic of the Philippines will grant in the Republic of the Philippines privileges, exemption and benefits to the Japanese Experts and their families (in case the project involves dispatch of experts), which are no less favorable than those accorded to experts of third countries working in the Republic of the Philippines under the Columbo Plan Technical Cooperation Scheme;
4. The Government of the Republic of the Philippines will ensure that the Equipment to be provided under the project (in case the project involves provision of equipment) will be utilized effectively for the implementation of the project in consultation of the Japanese Experts;
5. The Government of the Republic of the Philippines will take necessary measures to ensure that the knowledge and experience acquired by the Philippine personnel from the technical training will be utilized effectively;
6. In accordance with the laws and regulations in force in the Republic of the Philippines will take necessary measures to provide at its expense:
 - a. Services of the Philippine counterpart personnel and administrative personnel, as necessary;
 - b. Land, buildings and facilities as required;
 - c. Supply and replacement of machinery, equipment, instruments, vehicles, tools, spare parts and other materials necessary for the

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implementation of the project other than the equipment which will be supplied by JICA;

7. In accordance with the laws and regulations in force in the Republic of the Philippines will take necessary measures to meet:
 - a. Salaries and other allowances for the Philippine counterpart personnel;
 - b. Expenses such as electricity, water, gas, fuel and other contingencies as necessary;
 - c. Operational expenses for customs clearance, internal taxes, domestic transportation and other charges imposed in the Republic of the Philippines on the equipment (in case the project involves provision of equipment);
 - d. Expenses for maintenance of facilities and equipment, as necessary and,
 - e. Maintenance and operating expenses necessary for the implementation of the project.

On Behalf of the Philippine Government

Signed: _____

Designation: _____

Date: _____

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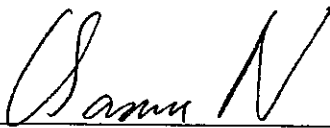
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**RECORD OF DISCUSSIONS
BETWEEN
JAPAN INTERNATIONAL COOPERATION AGENCY
AND
AUTHORITIES CONCERNED OF THE GOVERNMENT OF
REPUBLIC OF THE PHILIPPINES
ON
JAPANESE TECHNICAL COOPERATION
FOR
THE PROJECT ON THE SUSTAINABILITY IMPROVEMENT OF
RENEWABLE ENERGY DEVELOPMENT IN VILLAGE ELECTRIFICATION**

Japan International Cooperation Agency (hereinafter referred to as "JICA") had a series of discussions through the Resident Representative of JICA in the Republic of the Philippines (hereinafter referred to as "the Philippines"), with the Philippine authorities concerned with respect to desirable measures to be taken by JICA and the Government of the Philippines represented by the Department of Energy (hereinafter referred to as "DOE") for the successful implementation of the Project on "the Sustainability Improvement of Renewable Energy Development in Village Electrification" in the Philippines.

As a result of the discussions, JICA and the Philippine authorities concerned of the Project agreed to recommend to their respective Governments the matters referred to in the document attached hereto.

Manila, March 17, 2004



Mr. Osamu Nakagaki
Resident Representative
Japan International Cooperation Agency
Philippine Office
Japan



Mr. Eduardo V. Mañalac
Undersecretary
Department of Energy
Republic of the Philippines

THE ATTACHED DOCUMENT

I. COOPERATION BETWEEN JICA AND THE GOVERNMENT OF THE PHILIPPINES

1. The Government of the Philippines will implement the Project on "the Sustainability Improvement of Renewable Energy Development in Village Electrification" (hereinafter referred to as "the Project") in cooperation with JICA.
2. The Project will be implemented in accordance with the Master Plan which is given in ANNEX I.

II. MEASURES TO BE TAKEN BY JICA

In accordance with the laws and regulations in force in Japan, JICA will take, at its own expense, the following measures according to the normal procedures under the Colombo Plan Technical Cooperation Scheme.

1. DISPATCH OF JAPANESE EXPERTS

JICA will provide with the services of the Japanese experts as listed in ANNEX II.

2. PROVISION OF MACHINERY AND EQUIPMENT

JICA will provide with such machinery, equipment and other materials (hereinafter referred to as "the Equipment") necessary for the implementation of the Project as listed in ANNEX III. The Equipment will become the property of the Government of the Philippines upon being delivered C.I.F. (cost, insurance and freight) to the Philippine authorities concerned at the ports and/or airports of disembarkation.

3. TRAINING OF PHILIPPINE PERSONNEL IN JAPAN

JICA will receive the Philippine personnel connected with the Project for technical training in Japan.

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III. MEASURES TO BE TAKEN BY THE GOVERNMENT OF THE PHILIPPINES

1. The Government of the Philippines will take necessary measures to ensure that the self-reliant operation of the Project will be sustained during and after the period of Japanese technical cooperation, through full and active involvement in the Project by all related authorities, beneficiary groups and institutions.
2. The Government of the Philippines will ensure that the technologies and knowledge acquired by the Philippine nationals as a result of Japanese technical cooperation will contribute to the economic and social development of the Philippines.
3. The Government of the Philippines will grant in the Philippines privileges, exemptions and benefits to the Japanese experts referred to in II-1 above and their families, which are no less favorable than those accorded to experts of third countries working in the Philippines under the Colombo Plan Technical Cooperation Scheme.
4. The Government of the Philippines will ensure that the Equipment referred to in II-2 above will be utilized effectively for the implementation of the Project in consultation with the Japanese experts referred to in ANNEX II.
5. The Government of the Philippines will take necessary measures to ensure that the knowledge and experience acquired by the Philippine personnel from technical training in Japan will be utilized effectively in the implementation of the Project.
6. In accordance with the laws and regulations in force in the Philippines, the Government of the Philippines will take necessary measures to provide at its own expense as followings:
 - (1) Services of the Philippine counterpart personnel and administrative personnel as listed in ANNEX IV;
 - (2) Land, buildings and facilities as listed in ANNEX V;
 - (3) Supply or replacement of machinery, equipment, instruments, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than the Equipment provided by JICA under II-2 above.

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7. In accordance with the laws and regulations in force in the Philippines, the Government of the Philippines will take necessary measures to meet the followings:
 - (1) Expenses necessary for transportation within the Philippines of the Equipment referred to in II-2 above as well as for the installation, operation and maintenance thereof;
 - (2) Customs duties, internal taxes and any other charges, imposed in the Philippines on the Equipment referred to in II-2 above; and
 - (3) Running expenses necessary for the implementation of the Project.

IV. ADMINISTRATION OF THE PROJECT

1. Director, Energy Utilization Management Bureau (EUMB), DOE, as the Project Director, will bear overall responsibility for the administration and implementation of the Project.
2. Assistant Director, Energy Utilization Management Bureau (EUMB), DOE, as the Project Manager, will be responsible for the managerial and technical matters of the Project.
3. Chief, Renewable Energy Management Division, EUMB, DOE, as the Project Supervisor, will provide supervision on technical matters and actual implementation of the Project.
4. The Japanese Team Leader will provide necessary recommendations and advice to the Project Director and the Project Manager on any matters pertaining to the implementation of the Project.
5. The Japanese experts will give necessary technical guidance and advice to the Philippine counterpart personnel on technical matters pertaining to the implementation of the Project.
6. For the effective and successful implementation of technical cooperation for the Project, a Joint Coordinating Committee will be established whose functions and composition are described in ANNEX VI.

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V. JOINT EVALUATION

Evaluation of the Project will be conducted jointly by JICA and the Philippine authorities concerned, at the middle and during the last six months of the cooperation term in order to examine the level of achievement.

VI. CLAIMS AGAINST JAPANESE EXPERTS

The Government of the Philippines undertakes to bear claims, if any arises, against the Japanese experts engaged in technical cooperation for the Project resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions in the Philippines except for those arising from the willful misconduct or gross negligence of the Japanese experts.

VII. MUTUAL CONSULTATION

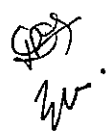
There will be mutual consultation between JICA and the Government of the Philippine on any major issues arising from, or in connection with this Attached Document.

VIII. MESURES TO PROMOTE UNDERSTANDING OF AND SUPPORT FOR THE PROJECT

For the purpose of promoting support for the Project among the people of the Philippines, the Government of the Philippines will take appropriate measures to make the Project widely known to the people of the Philippines.

IX. TERM OF COOPERATION

The duration of the technical cooperation for the Project under this Attached Document will be for five years from the date of the dispatch of the first expert from Japan.



ANNEXES

ANNEX I	MASTER PLAN
ANNEX II	LIST OF JAPANESE EXPERTS
ANNEX III	LIST OF MACHINERY AND EQUIPMENT
ANNEX IV	LIST OF THE PHILIPPINE COUNTERPART AND ADMINISTRATIVE PERSONNEL
ANNEX V	LIST OF LAND, BUILDINGS AND FACILITIES
ANNEX VI	JOINT COORDINATING COMMITTEE

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1. Title of the Project

The Sustainability Improvement of Renewable Energy Development in Village Electrification

2. Overall Goal

Household electrification rate is increased.

3. Project Purpose

The sustainability of rural electrification projects utilizing renewable energy is improved.

4. Outputs of the Project

- (1) Capability of DOE and ANECs in social preparation (community organizing, institutional development and other activities) for sustainable and renewable village electrification is enhanced.
- (2) Technical capability of DOE and ANECs in project identification, preparation, planning and implementation including monitoring and evaluation is enhanced.
- (3) Local manufacturing and installation capabilities through testing and standardization are strengthened.

5. Activities of the Project

- (1-1) Monitoring and evaluation of energized barangays using RE systems
- (1-2) Preparation of manuals
- (1-3) Training of stakeholders
- (1-4) Social preparation (community organization and institutional development and other activities)
- (2-1) Monitoring and evaluation of energized barangays using Renewable Energy (RE) systems
- (2-2) Preparation of manuals
- (2-3) Training of stakeholders
- (2-4) Supervision and administration of project implementation
- (3-1) Monitoring and evaluation of energized barangays using RE systems
- (3-2) Monitoring and evaluation of capabilities of local fabricators and installers
- (3-3) Formulation of micro-hydro technology standards
- (3-4) Implementation of RE technology standards
- (3-5) Evaluation of existing accreditation and certification activities for RE technology



ANNEX II LIST OF JAPANESE EXPERTS

1. Long-term experts

- (1) One Expert for Micro Hydropower Village Electrification (Team Leader of the Japanese side)
- (2) One Expert for Photovoltaic Village Electrification

2. Short-term experts

Short-term experts will be dispatched as necessary for the effective implementation of the Project.

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ANNEX III LIST OF MACHINERY AND EQUIPMENT

Equipment will be provided as necessary for the effective implementation of the Project.
Details shall be discussed during the Project.

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ANNEX IV LIST OF THE PHILIPPINE COUNTERPART AND ADMINISTRATIVE PERSONNEL

1. Counterpart personnel

- (1) Project Director : Director, EUMB
- (2) Project Manager : Assistant Director, EUMB
- (3) Project Supervisor : Chief, REMD
- (4) Mechanical Engineers : REMD Staff
- (5) Electric Engineers : REMD Staff

2. Support and Administrative personnel

Support and administrative personnel will be selected, if necessary.

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ANNEX V LIST OF LAND, BUILDINGS AND FACILITIES

1. Office space and necessary facilities for Japanese experts and Philippine counterparts
2. Buildings, facilities and space necessary for the installation and operation of the machinery, equipment and materials to be provided by JICA
3. Lecture rooms and meeting rooms necessary for the transfer of technology
4. Other facilities mutually agreed upon a necessary for the implementation of the Project

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ANNEX VI JOINT COORDINATING COMMITTEE

1. Function

The Joint Coordination Committee will meet at least once a year or whenever the necessity arises in order to fulfill the following functions;

- 1) To evaluate the annual work plan of the Project;
- 2) To review the progress of the annual work plan;
- 3) To review and discuss major issues that may arise during the implementation of the Project; and
- 4) To discuss any other issue(s) pertinent to the smooth implementation of the Project.

2. Provisional Composition

(1) Chairperson: Undersecretary, DOE

(2) Member of the Philippine side

- a. Director, EUMB
- b. Assistant Director, EUMB
- c. Personnel of REMD
- d. Possible personnel for the Project from NEDA
- e. Other personnel concerned to be assigned by JICA, if necessary

(3) Member of the Japanese side

- a. Experts
- b. Representative of JICA Philippine Office
- c. Other personnel concerned to be assigned by JICA, if necessary

