

# COVER NOTE

**PROJECT TITLE: PHILIPPINES: CAPACITY BUILDING TO REMOVE BARRIERS TO RENEWABLE ENERGY DEVELOPMENT (CBRED)**  
**DATE: 24 OCTOBER 2001**

	Work Program Inclusion	Reference/Note:
<b>1. Country Ownership</b>		
<ul style="list-style-type: none"> <li>Country Eligibility</li> </ul>		<ul style="list-style-type: none"> <li>Cover Sheet Page i (Ratified UNFCCC 24 August 1994)</li> </ul>
<ul style="list-style-type: none"> <li>Country Drivenness</li> </ul>	Clear description of project's fit within: <ul style="list-style-type: none"> <li>National reports/communications to Conventions</li> <li>National or sector development plans</li> <li>Recommendations of appropriate regional intergovernmental meetings or agreements.</li> </ul>	<ul style="list-style-type: none"> <li>Paragraphs 1-14 describe national priorities and plans in the area of NRE, including potentials.</li> </ul>
<ul style="list-style-type: none"> <li>Endorsement</li> </ul>	<ul style="list-style-type: none"> <li>Endorsement by national operational focal point.</li> </ul>	<ul style="list-style-type: none"> <li>OFP endorsement is in Annex J.</li> </ul>
<b>2. Program &amp; Policy Conformity</b>		
<ul style="list-style-type: none"> <li>Program Designation &amp; Conformity</li> </ul>	<ul style="list-style-type: none"> <li>Describe how project objectives are consistent with Operational Program objectives or operational criteria.</li> </ul>	<ul style="list-style-type: none"> <li>Cover Sheet Page i, Section 2</li> </ul>
<ul style="list-style-type: none"> <li>Project Design</li> </ul>	<ul style="list-style-type: none"> <li>Describe:</li> <li>sector issues, root causes, threats, barriers, etc, affecting global environment.</li> <li>Project logical framework, including a consistent strategy, goals, objectives, outputs, inputs/activities, measurable performance indicators, risks and assumptions.</li> <li>Detailed description of goals, objectives, outputs, and related assumptions, risks and performance indicators.</li> <li>Brief description of proposed project activities, including an explanation how the activities would result in project outputs<sup>1</sup></li> <li>Global environmental benefits of project.</li> <li>Incremental Cost Estimation based on the project logical framework.</li> <li>Baseline and alternative scenarios</li> <li>Describe project outputs (and related activities and costs) that result in global environmental benefits</li> <li>Describe project outputs (and related</li> </ul>	<ul style="list-style-type: none"> <li>Sector issues are concisely described in Paragraph 22. Root causes, threats, and barriers are described in Annex F.</li> <li>The logical framework matrix is presented in Annex B.</li> <li>The project rationale is described in Paragraph 23 and the project objectives are described in Paragraph 32. Risks are described in Paragraph 41. Descriptors of objectives and activities (OVIs, MOVs, and assumptions) are described in Annex B. The project benefits are described in Paragraphs 25-30.</li> <li>Baseline and alternative scenarios are described in Paragraphs 17-20.</li> <li>Project components are described in Paragraphs 33-40.</li> <li>Global environmental benefits of the project are summarized on Paragraphs 25-27 while national and consumer benefits of the project are</li> </ul>

<sup>1</sup> A project/program could undertake detailed design (specification of project outputs) during the first phase of implementation, with clear benchmarks for approval of the subsequent phase. A project could also be an adaptable program loan with several phases, where achievement of the clear benchmarks at the end of each phase is a necessary condition for approval of the next phase. In such projects, describe in detail the project output for the first phase and describe briefly the project activities for that phase.

	Work Program Inclusion	Reference/Note:
	<p>activities and costs) that result in joint global and national environmental benefits.</p> <ul style="list-style-type: none"> <li>Describe project outputs (and related activities and costs) that result in national environmental benefits.</li> <li>Describe the process used to jointly estimate incremental cost with in-country project partner.</li> <li>Present the incremental cost estimate. If presented as a range, then a brief explanation of challenges and constraints and how these would be addressed by the time of CEO endorsement.</li> </ul>	<p>described in Paragraphs 28-30.</p> <ul style="list-style-type: none"> <li>Annex A provides a discussion and an estimation of incremental costs.</li> <li>Table A1 of Annex A, the Incremental Cost and Benefits provides information on the distinction between global and national benefits including the costs of the alternative and the baseline.</li> <li>Incremental costs were calculated by cooperating with project stakeholders in estimating baseline &amp; the project increment. The commitment of other agencies to the project is reflected in the strong baseline co-financing. A description of the modality of work with the project stakeholders is provided in Paragraphs 47-52. The corresponding co-financing arrangements are described in Paragraph 53. Table A-3 details the co-financing scheme of the project.</li> </ul>
<ul style="list-style-type: none"> <li>Sustainability (including financial sustainability)</li> </ul>	<ul style="list-style-type: none"> <li>Describe proposed approach to address factors influencing sustainability, within and/or outside the project to deal with these factors.</li> </ul>	<ul style="list-style-type: none"> <li>Sustainability is discussed in Paragraphs 42-46, and as an integral element of all project activities, which were redesigned to replace subsidy by setting up pilot financing and delivery mechanism fund and the one-stop shop Market Service Center.</li> </ul>
<ul style="list-style-type: none"> <li>Replicability</li> </ul>	<ul style="list-style-type: none"> <li>Describe the proposed approach to replication, (for e.g., dissemination of lessons, training workshops, information exchange, national and regional forum, etc) (could be within project description).</li> </ul>	<ul style="list-style-type: none"> <li>Throughout project/project design: especially capacity strengthening, information dissemination and financial and delivery mechanism. Paragraph 45 describe how the replication of NRE projects will be ensured /enhanced.</li> </ul>
<ul style="list-style-type: none"> <li>Stakeholder Involvement</li> </ul>	<ul style="list-style-type: none"> <li>Describe how stakeholders have been involved in project development.</li> <li>Describe the approach for stakeholder involvement in further project development and implementation.</li> </ul>	<ul style="list-style-type: none"> <li>Paragraph 47 mentions the participation of stakeholders in the preparation of the project and describes all the relevant stakeholders. Implementation arrangements are described in Paragraphs 48-52.</li> </ul>
<ul style="list-style-type: none"> <li>Monitoring &amp; Evaluation</li> </ul>	<ul style="list-style-type: none"> <li>Describe how the project design has incorporated lessons from similar projects in the past.</li> <li>Describe approach for project M&amp;E system, based on the project logical framework, including the following elements:</li> <li>Specification of indicators for objectives and outputs, including intermediate benchmarks, and means of measurement.</li> </ul>	<ul style="list-style-type: none"> <li>Paragraph 21 describes findings and complementation efforts that have influenced project design, and Annex E presents a summary of lessons learned from previous and ongoing NRE projects.</li> <li>Indicators for objectives and outputs are listed in Annex B, Log Frame Matrix.</li> <li>The monitoring and evaluation</li> </ul>

	Work Program Inclusion	Reference/Note:
	<ul style="list-style-type: none"> <li>Outline organizational arrangement for implementing M&amp;E.</li> <li>Indicative total cost of M&amp;E (maybe reflected in total project cost).</li> </ul>	<p>approach proposed and the organizational approach for implementation is described in Paragraphs 57-60.</p> <ul style="list-style-type: none"> <li>The indicative total cost of M&amp;E is incorporated in the Project Implementation Cost as listed in Table A-2.</li> </ul>
<b>3. Financing</b>		
<ul style="list-style-type: none"> <li>Financing Plan</li> </ul>	<ul style="list-style-type: none"> <li>Estimate total project cost</li> <li>Estimate contribution by financing partners.</li> <li>Propose type of financing instrument</li> </ul>	<ul style="list-style-type: none"> <li>Cover page, section 3; Costs, contributions and financing arrangements are covered in Tables A-2 &amp; A-3 and Paragraphs 53-55. Proposed financing schemes to be employed is the set-up of pilot funds for project preparation, loan guarantee and micro-financing. Paragraph 37a describes these schemes. Paragraphs 11-13 of Annex A provide details of these schemes.</li> </ul>
<ul style="list-style-type: none"> <li>Implementing Agency Fees</li> </ul>	<ul style="list-style-type: none"> <li>Propose IA fee</li> </ul>	<ul style="list-style-type: none"> <li>Fees are assumed to be the standard fees for Full Projects according to the new guidelines. This is not stated explicitly in the document.</li> </ul>
<ul style="list-style-type: none"> <li>Cost-effectiveness</li> </ul>	<ul style="list-style-type: none"> <li>Estimate cost effectiveness, if feasible.</li> <li>Describe alternate project approaches considered and discarded.</li> </ul>	<ul style="list-style-type: none"> <li>Alternate modalities of contingent financing, risk guarantee mechanism, varying debt: equity ratio models were explored extensively during PDF B activities and preparatory activities of the full brief.</li> </ul>
<b>4. Institutional Coordination &amp; Support</b>		
<u>IA COORDINATION AND SUPPORT</u> <ul style="list-style-type: none"> <li>Core commitments &amp; Linkages</li> </ul>	<p>Describe how the proposed project is located within the IA's:</p> <ul style="list-style-type: none"> <li>Country/regional/global/sector programs.</li> <li>GEF activities with potential influence on the proposed project (design and implementation).</li> </ul>	<ul style="list-style-type: none"> <li>Paragraphs 15-16 and the lessons learned from previous and ongoing NRE projects as presented in detail in Annex E.</li> </ul>
<ul style="list-style-type: none"> <li>Consultation, Coordination and Collaboration between IAs, and IAs and EAs, if appropriate.</li> </ul>	<ul style="list-style-type: none"> <li>Describe how the proposed project relates to activities of other IAs (and 4 RDBs) in the country/region.</li> <li>Describe planned/agreed coordination, collaboration between IAs in project implementation.</li> </ul>	<ul style="list-style-type: none"> <li>Paragraph 15 addresses this issue. ADB is co-financing part of the capacity building activities.</li> </ul>
<b>5. Response to Reviews</b>		
Council	Respond to Council Comments at pipeline entry.	
Convention Secretariat	Respond to comments from Convention Secretariats.	
GEF Secretariat	Respond to comments from GEFSEC on draft project brief.	
Other IAs and 4 RDBs	Respond to comments from other IAs, 4RDBs on draft project brief.	

	Work Program Inclusion	Reference/Note:
STAP	Respond to comments by STAP at work program inclusion	
Review by expert from STAP Roster	Respond to review by expert from STAP roster. <sup>2</sup>	Annex C addresses the STAP reviewer's comments.

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<sup>2</sup> STAP Roster Review, and IA response, is a required annex of the project brief.

## PROJECT BRIEF

### 1. IDENTIFIERS:

PROJECT NUMBER	PHI/XX/XX
PROJECT NAME	<b>Philippines: Capacity Building to Remove Barriers to Renewable Energy Development</b>
DURATION	5 years
IMPLEMENTING AGENCY	United Nations Development Programme (UNDP)
EXECUTING AGENCY	Department of Energy
REQUESTING COUNTRY	The Philippines
ELIGIBILITY	UNFCCC Ratified, August 1994
GEF FOCAL AREA	Climate Change
GEF PROGRAMMING FRAMEWORK	Operational Programme No. 6

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### 2. SUMMARY:

In order for the Philippines, a) to reduce a growing dependence forecast on fossil fuels; b) to meet ambitious targets for reliable, economic supplies of grid electricity; and, c) to realize widespread electrification and poverty relief in remote communities, new and renewable energy (NRE) sources of energy will have to be tapped over the next ten years. These are abundant throughout the country but relatively under-utilized. Innovative financing and market delivery mechanisms will play a central role in providing the capital and access to the market required to meet expansion targets. The UNDP-GEF PDF-B work that lead up to this proposal identified multiple barriers to the rapid market expansion of NRE. This project removes key market, policy, technical and financial barriers through a rationalized program. The project components include: a) strengthening the capacity of the GOP agencies to enact and implement sound NRE policies; b) providing information for targeted audiences to build an NRE market; c) creating a "one-stop-shop" market service center for preparing and promoting NRE projects; d) increasing coordination among organizations concerned with NRE; e) assisting the market penetration of NRE in remote, off-grid communities by providing incentives for innovative market delivery and financing mechanisms; f) improving the quality of NRE technologies and systems through assistance with standard setting. The project has been designed to be complementary to ongoing and planned NRE and rural electrification sponsored by the GOP. In particular this capacity building project will lay important groundwork for future NRE-related projects in the country.

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### 3. COSTS AND FINANCING (MILLION US \$):

GEF:	5.143
CO-FINANCING:	
-Dutch Government (MFA)	6.000
-Other International	0.180
-Government	3.735
-Private	8.306
TOTAL PROJECT COSTS:	23.364
+ PDF-B (GEF + CO-FINANCING)	0.410
TOTAL PROJECT COSTS INCL. PDF-B	<b>23.774</b>

**4. OPERATION FOCAL POINT ENDORSEMENT:**

Name: Gregorio V. Cabantac  
Organization: DENR

Title: GEF Operational Focal Point  
Date: 28 September 2001

**5. IMPLEMENTING AGENCY CONTACT:**

- a) Dr. Nandita Mongia, GEF Regional Manager - Climate Change, UNDP, Regional Bureau for Asia and the Pacific      Tel: 1-212-9065833; Fax: 1-212-9065825  
E-mail: [nandita.mongia@undp.org](mailto:nandita.mongia@undp.org)
- b) Manuel L. Soriano, GEF Regional Coordinator – Climate Change, UNDP, Regional Bureau for Asia and the Pacific      Tel: 60-3-2515153; Fax: 60-3-2552870  
E-mail: [manuel.soriano@undp.org](mailto:manuel.soriano@undp.org)

## LIST OF ACRONYMS

ADB	Asian Development Bank
ALGAS	Asia Least Cost GHG Abatement Strategy
APL	Adjustable Program Loan
ANEC	Affiliated Non-Conventional Energy Center
BAPA	Barangay Power Association
BOI	Board of Investment
CAR	Cordillera Autonomous Region
CHP	Combined Heat and Power
CRREE	Center of Renewable Energy and Energy Efficiency
CPC	Community Power Corporation
DA	Department of Agriculture
DAR	Department of Agrarian Reform
DBP	Development Bank of the Philippines
DENR	Department of Environment and Natural Resources
DILG	Department of Interior and Local Government
DOE	Department of Energy
DOF	Department of Finance
DOST	Department of Science and Technology
DTI	Department of Trade and Industry
EC	Electric Cooperative (see also REC)
EED	Energy Efficiency Division (DOE)
EIES	Environmental Improvement and Economic Sustainability
ENMAP	Energy Management Association of the Philippines
ERB	Energy Regulatory Board
ERDC	Energy Research and Development Center
ESMAP	Energy Sector Management Assistance Program
EUMB	Energy Utilization and Management Bureau
FINESSE	Financing Energy Services for Small Scale End-Users
GEF	Global Environmental Facility
GHG	Greenhouse Gases
GIS	Geographic Information System
GOP	Government of the Philippines
GTZ	German Technical Cooperation Agency
IACCC	Inter-Agency Committee on Climate Change
ICEE	Institute of Climate, Energy and Environment
IPP	Independent Power Producers
LBP	Land Bank of the Philippines
LGF	Loan Guarantee Fund
LGU	Local Government Units

LPAC	Local Project Appraisal Committee
MFF	Micro Finance Fund
MMBFOE	Million Barrels of Fuel-Oil-Equivalent
MO	Manila Observatory
MOA	Memorandum of Agreement
MSC	Market Support Center
MSIP	Municipal Solar Infrastructure Project
MSP	Medium-Size Project
NEA	National Electrification Administration
NEDA	National Economic and Development Authority
NCED	Non-Conventional Energy Division
NGO	Non-Government Organizations
NPC	National Power Corporation
NRE	New and Renewable Energy
NREL	National Renewable Energy Laboratory (US)
NWRB	National Water Resources Board
PAG	Policy Advisory Group
PCCI	Philippine Chamber of Commerce and Industry
PCCIC	Philippine Climate Change Information Center
PCIERD	Philippine Council for Industry and Energy Research and Development
PDF-B	Project Development Facility – Block B
PEI	Preferred Energy, Inc.
PEP	Philippine Energy Plan
PMO	Project Management Office
PNOC	Philippine National Oil Company
PO	People’s Organizations
PPA	Power Purchase Agreement
PPF	Project Preparation Fund
PPM	Project Planning Matrix
PSES	Philippine Solar Energy Society
PV	Photovoltaic
RRA	Rapid Rural Appraisal
REAP	Renewable Energy Association of the Philippines
REC	Rural Electric Cooperative
REN	Renewable Energy Network
RET	Renewable Energy Technologies
RESCO	Renewable Energy Service Company
R&D	Research and Development
Shell	Shell International Renewables Ltd.
SHS	Solar Home System
SIBAT	Sibol ng Agham at Teknolohiya (Wellspring of Science and Technology)
SPOT	Solar Power Technology Support Project
TESDA	Technical Education and Skills Development Authority
TA	Technical Assistance



UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UP	University of the Philippines
USAID	United States Agency for International Development
WB	World Bank

## BACKGROUND AND CONTEXT

1. As described in Presidential Decree No. 1068 (13 January 1977), new and renewable energy (NRE) resources are regarded as the energy resources that do not have an upper limit on the total quantity which can be used, are renewed on a regular basis, and whose renewal rate is so rapid that they are considered as available over an indefinite period of time. These include biomass, solar, wind, geothermal, hydro and ocean energy, and other emerging energy sources using new technologies such as fuel cells and hydrogen fuels. NRE systems refer to energy systems, which use NRE resources applying new energy conversion and/or utilization technologies. The NRE systems that are being supported by the Government of the Philippines (GoP) are the following:
  - Biomass Energy Systems (Anaerobic Digestion, Direct Combustion, Gasification, Pyrolysis)
  - Solar Energy Systems (Solar Photovoltaic Systems, Solar Water Heaters)
  - Wind Energy Systems (Wind Turbine Generators, Water Pumping Units)
  - Hydro Power Systems (Mini-Hydropower, Micro-Hydropower)
  - Advanced NRE Systems (OTEC systems, Tidal Energy systems, Wave Energy systems, Current Energy system, and Hydrogen-based Fuel System)
2. NRE research, development and demonstration activities in the country started in the early 70's. Efforts in various facets of NRE development have been extensively pursued by the public sector. With meager resources, however, the government alone cannot sustain the development of the industry. Recent years have witnessed the growth in private sector participation in NRE development. There have been significant studies and projects, which have been undertaken on this area. However, despite these previous studies and projects, there exist both substantive and procedural barriers in the country's policies and laws, which inhibit private sector participation and public-private sector partnership necessary for sustainable NRE development. This general assessment leads to the conclusion that effective private sector involvement and partnership with Government and other sectors of civil society can take place on a broad and commercialized scale only if these barriers are adequately addressed.
3. The UNDP/GEF project, Asia Least-Cost GHG Abatement Strategy (ALGAS) highlighted the important role of the energy sector can play in reducing future GHG emissions in the Philippines and identified renewable energy technologies (RETs) as a priority area in the country's GHG abatement strategy. Furthermore, the Philippines Agenda 21 identified the need to develop and utilize RETs as the country's priority strategy. The National Action Plan on Climate Change proposed the gradual shift from the current fossil fuel-dominated energy mix towards NRE.
4. The national NRE policies are to (a) pursue large-scale use of NRE systems; (b) enhance energy self-sufficiency through continuous exploration, development, and exploitation of indigenous energy resources; and c) encourage greater private sector investment and participation in NRE activities. Currently, the national priority in NRE development is the promotion of off-grid NRE systems to achieve the goal of improving people's livelihood in the rural areas by providing adequate and sustainable energy services.
5. The present foreign currency crisis experienced by the Philippines is traceable to the needs of importers, including the players in the energy industry. To help improve the country's US dollar reserves, balance-of-payments and decrease its over-dependence on imported oil, a bill was proposed in Congress in 1999 entitled "*An Act to Further Promote the Development, Utilization*

*and Commercialization of New and Renewable Energy Sources and for Other Purposes*” (referred to as the NRE Bill). It seeks to provide the needed incentives for the development of NRE sources, including biomass, solar, wind, geothermal, micro-hydro, and ocean energy, among others. Specifically, the NRE Bill proposes new policy measures that would address the market failure for NRE projects aside from other proposed institutional and financial incentives to encourage private sector investment.

6. However, the proposed NRE Bill has been pending for more than 10 years with the legislative branch of the government. It is uncertain when this bill will be finally enacted. Such a protracted delay will prevent the establishment of a much needed policy environment that provides a healthy interplay of the institutional, information, financial, market and technical issues essential for the growth of the NRE industry in the country. This is despite the political and social imperatives inherent in supporting and facilitating NRE development, the community and socio-economic benefits it could bring about, and need for viable energy generation options.

## ENERGY AND NRE SECTORS IN THE PHILIPPINES

### NRE Contribution in the Philippine Energy Mix

7. The use of fossil fuel dominates the Philippine energy mix. In 2000, it is estimated that about 58% of the country’s total energy consumption (256.31 MMBFOE) is supplied from imported oil and coal. Of the 42% indigenous energy used in the country, 28% comes from NRE excluding large-scale hydro and geothermal. The total NRE contribution is estimated at 72.12 MMBFOE. As in the past, fuel wood used mainly in households and commercial activities is the biggest NRE contributor followed by agriwastes such as rice hull, coco wastes and bagasse, which are generally used for meeting both power and heat requirements in industries. Other NRE resources such as solar, wind and micro-hydro make up the NRE consumption mix. (Table 1)

**Table 1. NRE Contribution in the Philippine Energy Mix, 2000\***

Energy Form	Volume (MMBFOE)	% Share
Fuel wood	40.29	55.9
Bagasse	10.68	14.8
Charcoal	4.56	6.3
Agriwaste	16.48	22.8
Others (Solar Wind etc.)	0.11	0.2
Total	72.12	100

\*In Million Barrels of Fuel Oil Equivalent, MMBFOE Source: Philippine Energy Plan. 2000-2009

### Potential and Status of Renewable Energy

8. During the period 2001-2010, it is expected that there will be a rapid growth in energy use of about 60%. Forecasts predict that imported fossil fuels will still play a big role in the country’s energy supply, but there will also be additional extraction of indigenous fossil fuels like natural gas. It is also projected that during the same period, the average annual growth rate of NRE consumption is about 5.5%. By 2010, the estimated NRE consumption in the country is about 90.91 MMBFOE. Biomass fuels, mainly fuel wood, bagasse, rice hull and coconut residues; will continue to account for the largest share of the demand for NRE. However, the annual growth rate in consumption will be in the use of wind, solar and micro/mini-hydro, in that order.

9. The forecast increase in NRE consumption until 2010 is based on the expectation of accelerated development of large-scale NRE systems generally suited for grid connection. This however, is in contradiction to the current thrust on off-grid NRE system applications. The commercial technologies expected to provide this increase include micro-, and mini-hydro, solar, wind turbine generators and their hybrids. The total installed capacity to be provided by NRE during the next 10 years is expected to reach about 410 MW. The NRE resource potential in the Philippines is very good but to date exploitation of these resources has been limited. Table 2 summarizes the potentials for NRE in the country, based on resource assessments in 1998 carried out under the Wind Energy Mapping Project conducted by NREL (National Renewable Energy Laboratory) and the USAID-funded Philippine Renewable Energy Project.

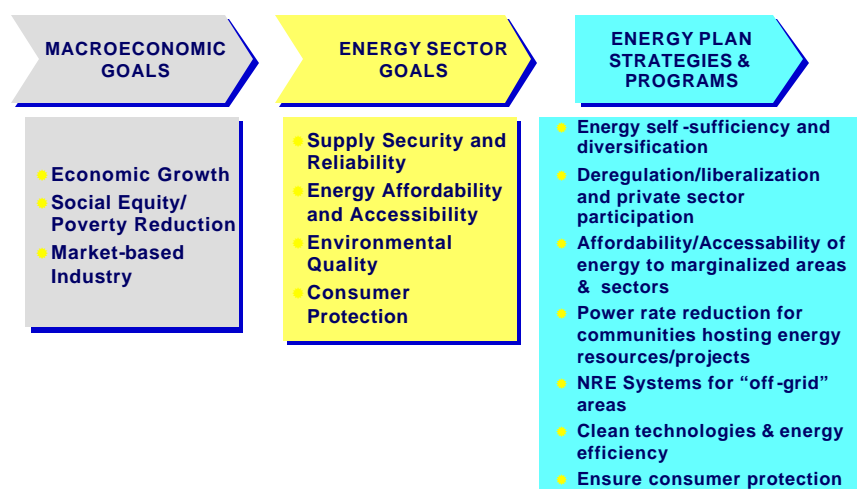
**Table 2: NRE Potentials in the Philippines**

<b>Renewable Energy Form</b>	<b>Potential</b>	<b>Utilization</b>	<b>Gap</b>
Wind	76 GW	100 kW and about 368 operating wind pumps	75.9 GW
Solar	Unlimited (162 W/m <sup>2</sup> average solar radiation)	500 kWp and about 400 solar thermal installations	Unlimited
Micro-hydro	28 MW	500 kW	27.5 MW
Mini-hydro	1,780 MW	82 MW	1,698 MW
Biomass	150 MW (new installations)	Minimal	150 MW

10. Considering the current thrust of supporting off-grid NRE systems (in line with the goal of total electrification of all barangays in the country by end 2004), it is forecast that the total NRE consumption will rise modestly to 95.91 MMBFOE by 2010. The additional consumption considers the utilization of NRE in off-grid power and non-power applications. In this regard, the average annual NRE consumption growth rate would be about 8%.

### **National Renewable Energy Priorities**

11. Figure 1 below shows that economic growth with social equity and poverty alleviation is the macroeconomic goal of the Philippine Energy Plan (PEP). The PEP promotes energy as a major input to the process of achieving this goal since it opens up opportunities where economic activities may germinate and gain a permanent foothold. A basic tenet of the PEP is that electricity should be available nationwide to open up opportunities for income generation and the resulting poverty reduction. Both on-grid and off-grid areas must be electrified. Particularly for off-grid areas, electrification projects must be packaged with economic programs in coordination with relevant government agencies and sectors.
12. The national NRE policies are to:
- Pursue large scale use of NRE systems;
  - Enhance energy self sufficiency through continuous exploration, development and exploitation of indigenous energy resources;
  - Encourage greater private sector investment and participation in NRE activities; and,
  - Promote NRE for off-grid electrification



**Figure 1. The Philippine Energy Plan Framework**  
(Source: Philippine Energy Plan 2000-2009)

13. As of end 2000, about 80% of the total number of barangays (41,955) in the country has been electrified. Fifty percent of the remaining unelectrified barangays or about 4,152 have been initially identified to be suited for NRE electrification due to their distance from the main tapping point and low population density. The number of households in a barangay varies from a few tens to several hundreds.
14. The Non-Conventional Energy Division (NCED) under the Energy Utilization Management Bureau (EUMB) of the Department of Energy (DOE) is tasked to develop and manage a national New and Renewable Energy Program (NREP) for the acceleration of the development, promotion and commercialization of NRE systems.

#### **Previous, On-going and Pipeline NRE Projects**

15. The recently completed UNDP-GEF PDF-B work (and as cited in the PDF-B proposal of the World Bank) has identified the significant role of earlier and on-going bilateral and multilateral assistance in supporting NRE project development. Annex E provides a list of completed, ongoing and pipeline projects related to NRE development in the country. The UNDP-GEF PDF-B exercise found out that most of the previous and even the ongoing NRE initiatives have some drawbacks, constraints and limitations. These, collectively highlight specific barriers not only to the development and commercialization of NRE in the country, but also barriers to the implementation of interventions that would facilitate the country's NRE development efforts and the growth of the local NRE market/industry. Moreover, from these previous and ongoing projects are derived some important lessons learned and gaps identified. *Essential long-term interventions have been lacking to provide the policy framework, and the focused sustainable approach to barrier removal required in the Philippines at this juncture.*

16. With some notable exceptions, the on-going and proposed donor activities continue to be technology and region specific. This proposed project would support and tie together national, as well as regional efforts to broaden the market base and support policy development that would create a conducive environment for the widespread commercial applications of NRE. More importantly, for those ongoing and planned projects that espouse capacity building, institutionalization and market barrier removal for NRE, this project is designed to complement and support their work. These complementary projects include:
- a) The World Bank's proposed GEF/PDF-B and long term Adjustable Program Lending (APL) finance program for rural electrification.
  - b) The USAID/NREL project, which provides wide support for NRE technology development and resource information.
  - c) UNDP/FINESSE project for developing the Development Bank of the Philippines (DBP) technical capability in evaluating NRE projects as well as a modest relaxed finance program for off-grid Village Power.
  - d) ADB technical assistance to NEA and RECs to better link livelihood activities with provision of electricity.

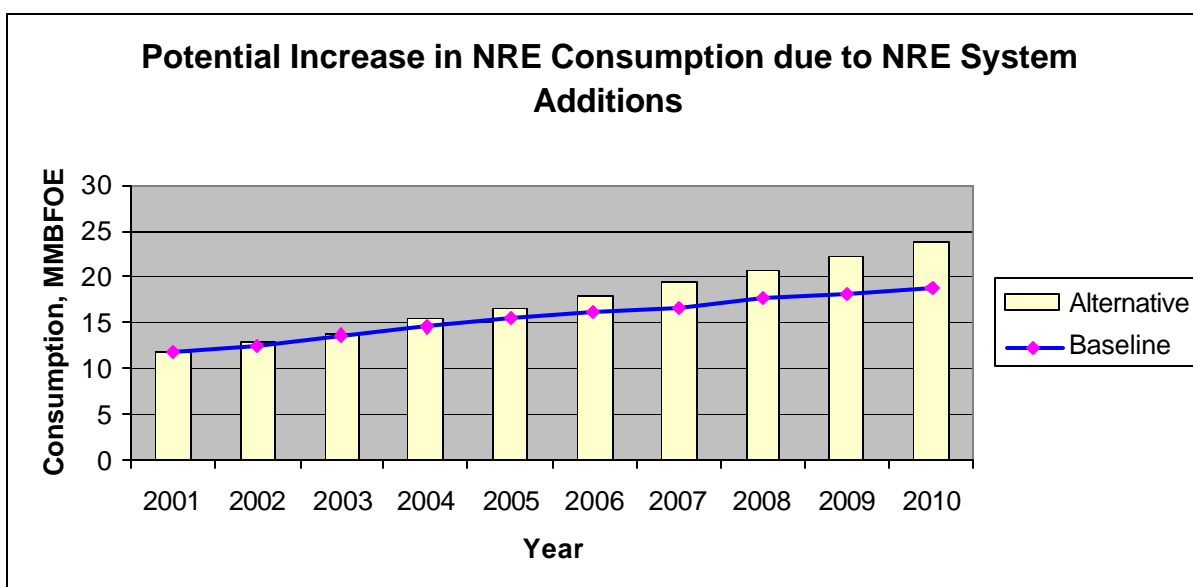
The project has been designed taking into consideration the lessons learned from, and identified gaps in, previous and ongoing rural electrification projects in the country such as the WB/Japan PHRD I & II projects (See Annex E). For example, the results of, and identified gaps from, the NRE market and resource assessments of the PHRD I were the bases for the design of the related incremental activities that will be carried out in Component No. 3 of the CBRED Project.

### **Baseline and Alternative Scenarios**

17. The forecast increase in annual NRE consumption during the period 2000-2010 is in line with the objectives of assuring energy supply security, affordable energy prices, and energy infrastructure compatible with broader social and environmental objectives. However, due to lack of capacity and other persistent barriers/issues in the development of NRE in the country, the government's approach to achieving its NRE goals would remain as in the past ("business-as-usual scenario"), which is characterized by:
- Addressing NRE policy issues on a reactive basis as energy supply issues arise (i.e., non-proactive policy development)
  - Dispersed market development services for NRE particularly in remote communities
  - Inadequate support for meeting NRE development requirements of potential proponents
  - Non-integrated NRE information data banking and dissemination
  - Inadequate awareness raising and advocacy campaigns on NRE utilization
  - Limited uptake of NRE project opportunities – mainly grid-connected NRE systems only
  - Limited local NRE system manufacturing capacity upgrading
  - Implementation of non-sustainable NRE systems
  - Provision of subsidies for NRE system applications in rural areas
  - Implementation of heavily technology-demonstration focused, donor-driven and sub-optimal in scale NRE projects.
18. Considering the experience from several large and small NRE that have been carried out in the country over the last two decades by both the public and private sectors, the present strategy of

implementing projects/programs that are "on-off", donor-driven, of sub-critical mass, and lacking the financial or technical resources for sustained operation and maintenance, will not contribute significantly to NRE development. The true commercialization of NRE will remain elusive. Some of the previous and ongoing efforts done (involving the granting of subsidies to mainly "equipment demonstration" type projects), if continued, will keep distorting the market as well as consumer expectations and interests. NRE development will remain hindered by various policy, institutional, market, information, and financial and technical barriers. It should be noted that previous efforts to address some of these barriers were also saddled with problems that now add up to the barriers themselves.

19. The proposed GEF-supported alternative to the "business-as-usual" scenario in the area of NRE development and commercialization in the Philippines is intended to contribute in realizing the country's sustainable development objectives and its goal of reducing the annual growth rate of GHG emissions through the promotion and facilitation of the widespread use of NRE. The CBRED project will build on the present capacity and existing NRE program of the government as well as on lessons learned from previous and ongoing NRE initiatives in the country (Annex E). It will comprise a range of interventions that will address major specific policy, institutional, market, information, financing, and technical barriers that have persists since the country embarked on NRE development in the 70s (Annex F).
20. The proposed alternative will bring about a modest increase in the utilization of NRE displacing fossil fuels, at least up to the year 2010. Beyond that, when the persistent barriers to NRE development and market penetration would have been removed, the share of NRE in the country's energy mix will become more significant. The comparison of the NRE consumption in the baseline and alternative scenarios is shown below:



With the NRE consumption in year 2000 as the basis, the "business-as-usual" efforts of the GoP in the NRE sector would bring about an increase of around 19 MMBFOE consumption of NRE by year 2010. The proposed GEF alternative will result in an estimated increase in NRE consumption of about 24 MMBFOE by year 2010. The details of these estimates are in Annex I.

## BARRIERS TO THE WIDESPREAD DEVELOPMENT, APPLICATION AND MARKET PENETRATION OF NRE

21. Workshops, conferences, meetings and roundtable discussions have been conducted with different stakeholders in the Philippines including government agencies, NGOs, private sector, academe and financial institutions to identify and assess the various barriers to the widespread development, utilization and market penetration of NRE. The stakeholder consultations during the UNDP-GEF PDF-B exercise have further added to information reinforcing barrier identification. Annex E, which lists different completed, on-going and pipeline projects cites specific situations and experiences where most of the persistent barriers listed below were also encountered. This points to the fact that while a good number of NRE projects had been implemented in the past, no concrete efforts have been undertaken to squarely address the barriers which until now continue to dampen efforts for more widespread use of NRE technologies.
22. Collectively, the barriers listed below may be referred to as any of the contributing factors or problems getting in the way of efforts to establish a favorable business environment for NRE to flourish. There is an active interplay of institutional, policy, marketing, financial and technical problems that impedes the development and commercialization of NRE in the country. See Annex F for details about these persistent barriers.
  - a) *Non-comprehensive development plan on NRE* - Despite the not-so-favorable experience in previous NRE initiatives, the government sticks to its policy of focusing on large-scale NRE projects in its energy development efforts. This is attributed to inadequate information on NRE, lack of an integrated development framework on NRE, and unclear role of stakeholders and their minimal participation in planning process
  - b) *NRE projects are not directed towards sustainability and real market approach* - The government's NRE efforts show heavy reliance on technology-driven projects implemented by or for government agencies with little stimulation of private sector activity.
  - c) *Lack of coordination and non-integrated programs on NRE* - Relevant institutions in the energy sector and economic development have been pursuing their respective plans and programs on NRE in an uncoordinated manner as a result of the absence of an NRE development framework.
  - d) *Lack of clear policies and appropriate legislation on NRE applications* - Specific regulatory and policy barriers to NRE in the country take the form of the absence of appropriate policies, and the existence of conflicting, vague or non-responsive policies.
  - e) *Lack of appropriate incentives for NREs* - Incentives from the Board of Investments (BOI) have not been accessed by a lot of NRE proponents because of the lack of clear guidelines and their "NRE-unfriendly nature."
  - f) *Uneven playing field in the area of NRE* - NRE finds itself competing in an uneven playing field where there is no mechanism allowing for the inclusion of externalities in energy pricing. Moreover, there is the issue of distortion in the price structure due to donations and subsidies, which unintentionally pose competition to the private sector



- g) *Utility regulations are not favorable to renewable energy development.* - The requirements to be complied with by NRE project investors/developers, including those set by NPC for selling power to the grid, are very rigid.
- h) *Difficulty in establishing a power contract* - This has been the current case highlighted by frustrations of developers to negotiate contracts with NPC, both for small- and large-scale projects.
- i) *Difficulty in accessing traditional financing windows* - This barrier is specifically due to the limitations in project size, markets and balance sheets of project proponents. Project proponents are aware of the available financing schemes and they are also aware that they are not able to avail of most of these NRE-unfriendly financing packages.
- j) *Lack of support from Government Banks* - Under the FINESSE project, the Development Bank of the Philippines (DBP) is supposed to relax its lending procedures and terms for projects like those catering to NRE. However, the private sector in general still believes that more relaxed terms and conditions are needed and consequently, there are few takers of the financing facility that DBP offers.
- k) *Lack of capacity in project packaging and presentation among NRE project proponents* - While there is a modest level of knowledge in doing technical and economic studies, there is inadequate capacity in packaging projects and in presenting bankable projects.
- l) *Inadequate knowledge of NRE market conditions* - Unavailable and segregated information on NRE market conditions and status results in the lack of reliable technical information to showcase NRE systems.
- m) *Lack of private sector involvement in small to medium scale NRE projects* - In this regard, the government's rural electrification efforts have not fully and successfully taken advantage of NGOs and private developers to derive new and innovative approaches to NRE development that supports countryside economic development.
- n) *Inadequacies in the area of NRE technology development*
  - Lack of competence - Local technicians and end-users are still largely unfamiliar with the application of NRE technologies.
  - Lack of product standards, quality control measures, testing and verification - The quality of materials and other components of NRE technologies are not adequately monitored, allowing the entry of sub-standard equipment.
  - Reliance on imports - The market for NRE is underdeveloped, thus making the local production of NRE products or components an unattractive investment opportunity.
- o) *Non-availability of up-to-date and comprehensive NRE data* - The segregated, non-integrated data gathering system on NRE, and the inability of the NRE project developers to assess such data are hampering efforts not only to promote NRE but also to design effective NRE delivery systems.

- p) *Lack of success stories on sustainable NRE applications in the country* - This is a basic reason why market awareness is low and limited is the few success stories known, related to the technical and economic/financial sustainability of NRE projects.
- q) *Unsuccessful NRE delivery mechanisms* - Experiences in previous attempts to implement NRE delivery mechanisms have been beset with problems and have not succeeded in making the venture sustainable and replicable. Such problems have brought about bad impressions and false expectations to other potential markets.
- r) *Lack of technology extension to users and suppliers of NRE technologies* - Training programs on NRE have catered to the upgrading of the technology needs of government personnel (e.g., DOE, NEA) but not the technology and skills upgrading needs of the people who will operate NRE systems, particularly those in the rural areas.
- s) *Ineffective NRE Promotion and Advocacy Programs* - Despite the many activities that have been carried out in the past, there is still lack of users' and government decision-makers' awareness of NRE, particularly in local government units (LGUs).

## **RATIONALE AND OBJECTIVES**

### **RATIONALE**

23. A NRE support project is proposed for the Philippines to address the foregoing barriers that have persisted despite various government and private sector NRE projects in the past, to enhance the national capacity on integrated energy planning and to contribute to and coordinate with ongoing NRE activities. The Project will achieve these goals primarily by building capacity in three major areas: (a) Policy and planning; (b) Market preparation and implementation; and, (c) Indigenous technology development support.

### **Links with Ongoing Initiatives**

24. This project complements the efforts of national, bilateral and multilateral funding agencies by providing capacity building assistance. Initiatives that will directly benefit from the project include the: (a) PDF-B work for the World Bank-GEF APL project; (b) ADB project on Rural Electrification Institutional Strengthening; (c) USAID/NREL project on renewable energy; and, (d) DOE NRE Bill. This UNDP-GEF project shall build capacity for both grid and off-grid market development mechanisms of both electricity and non-electricity NRE applications. The project objectives and corresponding activities support and do not duplicate the aforementioned initiatives. The DOE has the primary responsibility for coordination with these other initiatives.

### **Benefits of the Project**

#### **Global Benefits**

25. Reduction in GHG emissions - The Department of Energy (DOE-GOP) has calculated the impact of the proposed project on the Philippine Energy Plan (PEP) which projects fuel use to 2010 and thence estimated emission reductions of GHG. Incremental NRE consumption is assumed in three locations: the grid, electricity in remote barangay and thermal/mechanical, non-power uses. Incremental NRE consumption will be supplied from mini-hydro, wind, bagasse and municipal

waste sources. Incremental off-grid consumption will be accounted from micro-hydro, wind and solar PV systems. Additional NRE utilization for non-power or thermal/mechanical applications would be accounted from the operation of wind pumps, in water heating, industrial process heating and in the increase in waste-to-energy utilization. All calculations were made to be resource sensitive, meaning that energy supply was constrained to maintain an environmentally sustainable limit.

26. The GHG emission reductions were estimated on the basis of NRE incremental consumptions displacing part of the total baseline energy production. These were estimated based on an assumed mix of fossil fuels replaced by the incremental increase in NRE usage attributed to the CBRED project. It was assumed that baseline generation is from oil-, coal-, and gas-fired power plants. Estimates place total emission reduction by 2010 at about 29,500 Gg CO<sub>2</sub>. Assumptions and spreadsheet calculations for emission reductions can be found on Annex I.
27. The greatest potential benefit of the project globally is in the long-term emission reduction potentials, which are basically indirect. More strategic reductions that the project will bring about is in helping reduce costs, remove barriers and expand markets for renewable energy in the Philippines and globally. Such developments are expected to produce far greater reductions in future GHG emissions.

#### National Benefits

28. The benefit to the country will be in form of hard currency savings on fossil fuel imports. Putting on the ground large-scale grid-connect and thermal NRE projects as well as small-to-medium size on-grid and off-grid units will generate employment opportunities and assist the poverty alleviation thrust of the government. Improved market penetration will also increase economic activities through private sector participation.
29. Access to electricity allows access to communication services in remote locations improving the social, political and educational opportunities. Access to income generating activities is an integral part of this project's promotion of NRE. These are directed toward the alleviation of poverty particularly in the remote villages.
30. The DOE estimates that by 2010, the project would have influenced/stimulated the addition of over 350 MW in grid-connected NRE, over 20 MW of off-grid, remote barangay NRE power and an annual savings of over 3 MMBFOE in conventional fuels in NRE non-power applications.

#### OBJECTIVES

31. In keeping with the GEF mandate, the overall goal of the project is the reduction of the growth rate of GHG emissions by removing the major barriers to and reducing the costs of development of renewable energy to replace fossil fuel use in the Philippines.
32. The project has been conceived therefore to remove major barriers by setting the following main objectives. These objectives are:
  - a) Strengthening of the capacity of the relevant GOP agencies to formulate, enact and implement sound NRE policies;

- b) Enhancement of NRE data banking and provision of information on NRE for targeted audiences to build markets;
- c) Enhancement of coordination among organizations concerned with NRE;
- d) Assisting the market penetration of NRE in remote off-grid communities through the provision of incentives, and innovative financing and delivery mechanisms; and,
- e) Improvement of the quality of, and knowledge and skills on, NRE technologies and systems.

#### PROJECT COMPONENTS AND EXPECTED RESULTS

33. To realize the achievement of the above-stated objectives above, the proposed UNDP-GEF project will involve the implementation of six (6) major project components. These are:

- a) Component No. 1: NRE Policy, Planning and Institutional Capacity Building;
- b) Component No. 2: NRE Market Services Institutionalization;
- c) Component No. 3: NRE Information and Promotion Services;
- d) Component No. 4: NRE Initiatives Delivery and Financing Mechanisms;
- e) Component No. 5: NRE Training Program; and,
- f) Component No. 6: NRE Technology Support.

Each of the project components listed has been designed to undertake specific activities that address specific barriers and gaps that have remained even after many different NRE projects had been implemented in the past. Further, these have been designed to ensure that all objectives stated above are addressed.

#### **34. Component No. 1: NRE Policy, Planning and Institutional Capacity Building**

This component will build on the existing policies of the government regarding NRE development and utilization, the proposed NRE Bill, as well as the GOP's rural electrification program. It aims to remove the policy and energy planning related barriers, as well as the institutional issues regarding the development and implementation of NRE initiatives in the country that have persisted since the 70s despite abundant experience/lessons learned from previous projects. Previous efforts to incorporate lessons learned from previous policy making and energy planning exercises failed to bring about changes in the type of policies and the kind of policy enforcements that would have brought about a conducive climate for NRE. One glaring example is the proposed NRE Bill, which after 10 years still remains a proposed legislation. This project component will involve the provision of technical assistance in eliminating the persistent barriers to facilitating the widespread application of RETs in the country. In particular, the provision of assistance in resolving the "level playing field" issue concerning the pricing and off-take of electricity generated from NRE-based power generation facilities (i.e., NRE Electricity) will be covered. The specific activities under this component are basically considered baseline but some would require incremental GEF support in order to help realize the barrier removal objective.

- a) **Intra-agency NRE Committee Establishment** - *This will involve the creation of a committee, whose members represent the various key stakeholders/players in the area of NRE, that will regularly coordinate and report on NRE policy issues related broadly to policies within the country's energy, industry and financial sectors. This committee will also monitor impacts of policy implementations and coordinate the revision/improvement of*

*policies as necessary in accordance with the NRE goals/objectives of the country. GEF support is not necessary.*

- b) **Technical Assistance on the NRE Bill** - *This will involve the provision of technical advice in the review of, and formulation of relevant recommendations to, the proposed NRE Bill. Consultations with different stakeholders particularly the private sector to capture their true sentiments about what major concerns to facilitate NRE development must be addressed by the bill will be carried out, including the impacts of the Omnibus Electricity Law. GEF support is required for TA on the development of implementing rules and regulations on the NRE Bill.*
- c) **NRE Policy Analyses** - *This will involve the provision of technical advice in the review of existing NRE-related policies and regulations in the Philippines, as well as those from other countries, regarding energy resource development and utilization, with the aim at promoting and supporting NRE. It will also evaluate possible policy support activities and strategies that can be considered for NRE system project developers/investors. Among the specific sub-activities that will be carried out are the following:*
- **NRE Electricity Policy Study** - *This activity will involve the evaluation and formulation of policies and regulations on the production and sales of NRE electricity in the Philippines, along with the policy support activities. This will also come up with recommendations for the NRE Bill. GEF support is not necessary.*
  - **NRE Electricity Pricing Study** - *This activity will involve the conduct of an electricity tariff pricing study for electricity generated using NRE. It will further investigate and evaluate various options for financial incentives to encourage NRE-based power projects, including capacity and energy payment and investment incentives. After evaluating each option, this activity will propose specific recommendations for the levels of each incentive measure. A model for electricity pricing with environmental impact costing will also be developed. This activity will also come up with recommendations for the NRE Bill. GEF support is required for TA on the pricing of NRE electricity considering the open electricity market and the provisions of the Omnibus Electricity Law, and in the development of the electricity pricing model.*
  - **NRE-based Power Generation Market Strategy** - *This activity will involve the evaluation and development of strategies for NRE-based power producers, to assist them compete in an open electricity market. It will include evaluating possible incentives for prospective investors, and appropriate terms and conditions for grid connection. GEF support is part of the TA for the NRE Electricity Pricing Study.*
- d) **NRE Planning Model** – *In support with the government's power development and rural electrification programs, this activity will upgrade existing planning models used by relevant government agencies (e.g., NEA). This activity will upgrade NEA's Rural Electrification Planning model to a more efficient operating platform and to include NRE project analysis as well as improve rural electrification policy. Moreover, in conjunction with the market strategy study, an electricity market simulation model will be developed. The assessment of the Philippine Electricity Market with the aim of assisting NRE-based power producers in competing in an open electricity market will form part of this activity. This activity will seek to balance out the need for a comprehensive census of village-level information with the practical needs of IPP producers who may be interested in pursuing renewable generation. GEF support required for TA on planning model development and training for users of the model*

- e) **Integrated Energy Planning** – *This activity will enhance support to NRE development efforts of the DOE through capacity building in the area of integrated energy planning. A review of the planning methods of DOE will be carried out and recommendations for integrating existing development policies/plans (e.g., technological, social and economic) as well as plans/programs in various sectors related to NRE development and commercialization will be provided. Evaluation and enhancement of existing planning models and forecasting tools will be made to facilitate integrated planning. GEF support required for TA on the fundamentals and application of integrated energy planning.*
- f) **NRE Policy Implementation Monitoring and Evaluation** - *This activity entails the monitoring and evaluation of the impacts of the enforcement of policy; pricing and regulatory measures that are recommended and implemented in order to promote the use of NRE both for power and non-power applications. Lessons learned around issues such as incentive mechanisms, further barriers to market uptake, communication and policy strategies will be identified and appropriate actions recommended. GEF support is not necessary.*

### 35. Component No. 2: NRE Market Services Institutionalization

Most of the prospective project proponents (those who are convinced about the potentials and benefits of NRE) view NRE project development as a complex process, involving many steps and phases where the government institutions need to be consulted for approval. In the process, the project proponent inevitably encounters problems and barriers not only in the context of red tape and bureaucracy, but in terms of too many overlapping policies, rules and regulations. The “permitting issues” is only the initial barrier for the potential NRE investor/developer. There is also the issue of inconsistencies in guidelines/policies of the government agencies involved in the permitting process.

Many of the potential private investors perceive the setting up of NRE projects as a difficult task starting at the very beginning of registration and application process. Because of this, there is a sector-wide clamor for mechanism like the “one-stop shop” concept, where an investor will have to deal with a single agency only in order to obtain all the legal papers and permits required for an NRE project.

This project component will mainly involve the creation of such “one-stop-shop” for NRE market services. This is in response to the NRE project developers’ clamor for an expedited processing of their applications and proposals for permits to carry out NRE projects, and for guidance/advice in developing their projects. The “one-stop-shop”, which will be referred to as the Market Service Center (MSC) will be the focal point in the country for NRE market development and will serve to link private sector players to the government institutions particularly the DOE for the purpose of harmonizing expectations and mutual support. It will be a non-profit organization representing private sector, NGO and GOP interests. This project component will comprise of the following activities:

- a) **Setting up a “One-Stop-Shop”** - *This activity will provide essential funding to set up a Market Service Center (MSC) and for equipping, staffing, operating and managing of the MSC during its incubation period. The center will represent the interests of the GOP, NGO and the private sector and its staff will be drawn from different responsible government agencies and independent experts to work under the stewardship of the DOE. GEF support is*

required to supplement baseline funds for the provision of the logistical and equipment needs of the MSC, including the center's operating cost.

- b) **Preparation of MSC Business Plan** – *The business plan for the MSC will be prepared with a view of ensuring its financial sustainability. Such plan will chart the mandate and goals of the MSC, the roles and responsibilities of its personnel, its NRE market barrier removal activities and projected income statements. Emphasis will be placed on self-sufficiency within project term through fee-for-services, memberships and other mechanisms. Subsequent activities of the GEF-financed project will support the incubation of the MSC by being implemented through it. GEF support is part of the setting up cost for the MSC.*
- c) **Capacity Building for MSC Staff** – This activity will involve the training of the MSC staff during the center's incubation period. *The required training will be in line with the mandated roles of the MSC and would include, among others, Information/Database Management and Documentation; and the Provision of NRE Advisory Services. The latter would include: (1) Conducting of project techno-economic feasibility studies; (2) Preparing agreements and contracts, including power purchase agreements, fuel supply agreements, tender documents, as well as equipment, procurement and construction contracts; and (3) Arranging project financing package, including preparation of business proposals and loan arrangements. Training will also be provided in the dissemination of Information to facilitate investments on NRE and in monitoring and disseminating information about successful NRE projects. GEF support is required for the provision of the training of the MSC staff.*

GEF support to the operation of the MSC will progressively diminish until the end of the project, at which time the MSC would have been already a self-supporting organization active in the promotion of NRE particularly in off-grid locations. The MSC's will prepare a business plan with a view of ensuring its financial sustainability over the longer term. Emphasis will be placed on self-sufficiency within project term through fee-for-services, memberships and other mechanisms.

### **36. Component No. 3: NRE Information and Promotion Services.**

This project component will address the information barriers that hinder the development and implementation of NRE system (electricity and non-electricity) projects in the country. These include technical information that are required in the conceptualization/design of potential NRE projects (e.g., wind speeds and other meteorological data, volume of biomass resources), and market information that are necessary in evaluating the economic/financial viability of NRE projects (e.g., electricity prices, fuel prices, electricity demand). The Philippines is an archipelagic country and because of the diverse geography as well as varying regional economic conditions, NRE information availability, accessibility and affordability are big issues that affect NRE development in these different areas in the country. Moreover, different target groups would require different kinds of information related to NRE.

Information on NRE may be substantially available in some offices in the government, the academe and in the private sector, but on the whole, are: (1) dispersed in various locations (no central catalogue or repository) and, (2) difficult to access. On the other hand, *internet search* has generally been catered to meet individual or institutional needs. Information dissemination on NRE is scant and irregular. There has been no mechanism to share and collaborate on information generation with others. The government energy agencies, specifically DOE-NCED, NEA and NPC, generate voluminous energy data and information, and they have that inherent advantage of easy access to a wide array of information, both local and international. However,

the utility value of information collected and generated is low due to poor information management. Moreover, further processing and analyses of information into useful information packages are not given attention. The weak state of information sharing is reflected in the failed effort in 1998 by the Renewable Energy Network to develop an NRE information repository. The following are the proposed NRE information dissemination and promotion activities under this project component:

- a) **NRE Resource Inventory** - *This will involve the conduct of additional NRE resource surveys in the country to update and supplement/augment existing data that can be utilized by project developers/investors in conceptualizing/designing NRE projects. GEF support is required for the conduct of additional surveys on NRE resources, including verification, processing, evaluation and data banking.*
- b) **National NRE Database Development** - *This will involve the design and development of a database of a national NRE database that will include information on NRE resources, NRE technologies and technology applications in the Philippines and in tropical countries' and linkages with other NRE-related databases in the country. GEF support is required for the TA in the development of the database (including training of database users)*
- c) **Integrated NRE Information Exchange Service** - *This will involve the design and development of a NRE technology information exchange services program to be operated by DOE. It will also involve the development and implementation of an integrated information dissemination program for DOE, including private and government institutions involved in NRE development. GEF support is needed for TA on the design of the suitable mechanics for the information exchange.*
- d) **NRE Website Development** – *This activity will involve the setting up of a website that will be used to supplement NRE promotion activities and will have access to relevant databases in the country and in the ASEAN region. GEF support is not necessary.*
- e) **Consolidation of NRE Database** - *The project will primarily support the consolidation of existing information into database formats into the National NRE Database. Public access to the databases will be ensured by project support and the database linkages provided by the MSC website. The database will incorporate, among others, the following: (1) NRE Policy database (NCED); (2) Rural Energy database (NCED and UP Solar Lab); (3) NRE R&D database (PNOC-ERDC); (4) Private Sector services database (REAP); (5) NRE and climate change database (PCCIC); and, (6) Community based NRE opportunities (SIBAT-STRCC). GEF support is not necessary.*
- f) **NRE Advocacy and Promotion** – *This activity will involve the development and implementation of an outreach and promotion using appropriate communication mechanisms for target markets (e.g., print media, conferences and site visits) to: (1) Potential users such as off-grid communities, LGUs and RECs; (2) Potential proponents such as financiers, technology distributors, NGOs, ANECs; and, (3) Policy decision-makers in legislative positions such as the Congress. GEF support is required to supplement baseline funds for program design.*
- g) **NRE Engineering Service Industry Development** - *This activity will address the need for an enhanced local expertise in the area of NRE technology that will support the NRE development efforts. It will also include capacity building for energy consultants in providing consultancy service on NRE technology. While the MSC will be providing the market-related assistance/service to prospective NRE project developers/investors, this industry will provide the technical services associated with the design, installation and maintenance and troubleshooting of NRE systems. GEF support is required for the TA in the capacity development of NRE consultants, the development of business plans for engineering and*



energy consulting firms that will be involved in the industry, promotional program for the industry, and the provision of inputs regarding policies and regulations governing the operation of the industry.

- h) **Green Energy Rating Program** - *This is intended as a promotional activity to encourage utilization of NRE in relevant industries and by prospective NRE system developers and operators. It will involve the design of an environmental rating scheme that would be based, among others, on the magnitude of realizing the potentials for using NRE. GEF support is required in the provision of TA for the design of the rating scheme, including the implementing guidelines, rules and regulations.*

### 37. **Component No. 4: NRE Initiatives Delivery and Financing Mechanisms**

This project component will come up with financing mechanisms that will support NRE application projects involving the employment of NRE delivery mechanisms. A number of NRE service delivery projects will be financed using the funds that will be allocated for the financing schemes to showcase the applicability, viability and sustainability of both the financing and delivery mechanisms. The results and experiences derived from the supported NRE projects will be documented and disseminated. The success of the project implementations will demonstrate the effective and feasible process of designing, developing, implementing, and particularly financing, of NRE system projects. Successful NRE projects supported by the program would also demonstrate the technical and commercial viability of NRE systems in the country. This in turn is expected to facilitate increased interest and enhanced investments in future NRE system (both electricity and non-electricity) projects in the Philippines.

This project component will address the problems/issues surrounding the delivery of energy services (power and non-power) using NRE systems. Preparatory work has identified a number of financing and market delivery mechanisms by which NRE may be deployed. Market delivery mechanism refers to the means of bringing the technology and/or service to the intended users while financing mechanism refers to the means of providing financial assistance to the project in a manner suited to the requirements and capabilities of the developer and his intended users. Based on the NRE delivery mechanism assessments made during the PDF-B work, those that are promising include: (a) Fee for Service/RESCO Model; (b) Concession Model; (c) Community-based/Village Power Systems; and (4) Lease/Lease-to-Own Model.

Experience from previous NRE power and non-power projects (and even those that got stranded during the planning stages) employing delivery mechanisms that include those mentioned above, shows that there are financial barriers that hinder the facilitation of the proposed delivery mechanisms. These barriers include:

- High cost of project preparation activities for NRE power and non-power applications in off-grid and remote locations;
- Absence of guarantee facility for small-scale NRE projects where proponents are inadequately capitalized and cannot provide sufficient collaterals; and,
- Limited loanable funds earmarked for NRE projects especially in off-grid areas

The following are the specific activities under this project component:

a) **NRE Fund Establishment** - *This activity will entail the design of applicable financing schemes for prospective NRE system project applicants that will be implemented by the relevant government and banking/financing institutions. It will also involve the development and establishment of 3 separate funds that will address the 3 specific financing barriers to the facilitation of delivery mechanisms. This will include:*

- Project Preparation Fund (PPF) – *This is intended to support the cost for NRE project preparation (including arrangement of main project financing). See Annex A for details.*
- Loan Guarantee Fund (LGF) - *The fund will overcome financing barriers in remote off-grid locations where projects lack a track record and require high levels of securitization as well as provide support to an increased number of proponents. See Annex A for details.*
- Micro-Finance Fund (MFF) - *This is intended as a financing mechanism for small power loans with relaxed terms for long-term borrowing for small barangays. See Annex A for details.*

Concise descriptions of the financing schemes are found in Annex A (Incremental Cost). There will be three (3) sources of seed funds for this activity. One is the grant from the Dutch Government under the Environmental Improvement for Economic Sustainability (EIES) project, a joint collaboration of the DOE and the Ministry of Foreign Affairs of Netherlands. Under the EIES, a total of US\$ 6 million Dutch grant will be provided for installing 15,000 SHSs in Regions I, II and CAR. Another source would be part of the budget allocations of DOE for NRE demo projects. The third fund source is the GEF.

In the baseline scenario, the GoP (particularly the DOE) will continue to develop and implement NRE projects (mainly solar energy projects) with an “equipment demonstration” mentality. In the proposed alternative scenario, the GoP will be carrying out an NRE demonstration program that will integrate planned NRE projects (including the EIES) to showcase the design, development, and facilitation of the implementation of sustainable NRE projects. Included in the program will be additional demonstration projects on other NRE applications (e.g., micro-hydro, biomass and wind). The 3 financing schemes that will be created will be used to support the design, implementation and sustainable operation of NRE projects employing any of the 4 identified delivery mechanisms. Whereas the Dutch grant will only cater for solar NRE projects, the GEF will be supporting other NRE systems.

The funds for the PPF and MFF will be loaned to eligible NRE projects as concessional loan. Project proponents who will avail of these loans are expected to pay back an agreed percentage of the amount they borrowed at an agreed time (See Annex A). The LGF money will only be used if the borrower defaulted from paying the loan. Loan repayments and unused funds (e.g., loan guarantee) will later be used as seed money for a NRE Fund that will support replication projects. GEF support is required in the provision of TA in the design of the financing schemes, meetings/discussions with participating financing institutions, as well as contribution to the funds.

b) **Assistance Services to Financing Applicants** - *This will entail the provision of assistance to entities that will be eligible for NRE funds. The assistance also extends to the procurement of required hardware. GEF support is not necessary.*

- c) **NRE Delivery and Financing Mechanisms Demonstration Scheme Promotion** - *This will involve the conduct of a seminar-workshop to promote the demonstration schemes, and the identification of prospective project sites. GEF support is not necessary.*
- d) **Selection Criteria and Selection of NRE Projects Eligible for Financing Support** - *This activity will involve the development of selection criteria for the financing schemes and the selection of eligible NRE projects. The implementation of the selected eligible projects will make up the bulk of the demonstration program under this project component. The number of solar PV projects that will be considered in the demonstration program will correspond to a total capacity equivalent to that of the planned 15,000 SHS installations under the EIES project. The number of incremental NRE projects (e.g., biomass, wind, micro-hydro) that will be showcased in the program will be limited according to each type of financing mechanism:*
- Project Preparation Fund (PPF) – *Total combined capacity of projects that will be demonstrated is 100 MW (See Annex H for details).*
  - Loan Guarantee Fund (LGF) – *Total combined capacity of projects that will be demonstrated is 3 MW (possibly 3 projects of 1 MW capacity each). See Annex H for details.*
  - Micro-Finance Fund (MFF) – *Total combined capacity of projects that will be demonstrated is 500 kW. See Annex H for details.*

GEF support is not necessary for the development of selection criteria and the selection of eligible NRE projects.

- e) **Monitoring and Evaluation of NRE Projects Implemented under the Demo Program** - *This activity will involve the monitoring and evaluation of the operating performance and economics of each demonstration scheme. GEF support is not necessary.*
- f) **Financing Schemes and Delivery Mechanisms Review** - *This activity entails the evaluation of the impacts of the demonstrated financing and delivery mechanisms, and the provision of recommended revisions (if necessary) to the relevant policy and implementation guidelines that affects the proposed financing schemes and delivery mechanisms. GEF support is not necessary.*
- g) **Demonstration Program Results Evaluation and Dissemination** - *This will entail the conduct of an overall performance evaluation of the demonstration program, including the dissemination of program results and recommendations. GEF support is not necessary.*
- h) **Sustainable Follow-up Program Design** - *This activity will involve the design of a sustainable follow-up program for financially supporting NRE utilization (where applicable) in the various sectors of the national economy. GEF support is needed for supplementary TA in the design of sustainable follow-up program.*

### 38. Component 5: NRE Training Program.

Capacity building activities, mainly through training on various aspects of NRE have been carried out in the past and are still being pursued in recognition of the continuing need to strengthen capacities to be responsive to the challenges at hand. Based on the assessments made during the PDF-B exercise, the major stakeholders in the country's NRE sector require capacity upgrading in the various aspects of NRE development and commercialization, particularly in the policy/regulatory, financial, market, technical and operational aspects. There still remains a great deficiency in the number of NRE technical and skilled workers that can be mobilized to ensure

the sustainability of the country's NRE programs. The existing NRE technical and skilled workers are commonly affiliated with the NRE suppliers, the ANECs, ECs, BAPAs and several NGOs that are managing community-based NRE facilities. Profit-oriented and mostly risk-averse banking/financial institutions in the country are also lacking in skills in the evaluation of NRE project proposals, and this is further aggravated by the fact that they are not yet fully supportive of NRE. Many NRE project proponents also lack knowledge in the preparation, packaging and presentation of their proposals.

This project component will involve the implementation of a NRE Training Program that will address the capacity building needs of the various NRE stakeholders, and to improve training programs conducted in the past that were:

- **Project Based** - The various NRE training activities are primarily project-based and tend to be episodic and opportunistic. Training is a long and continuing process and as such, a plan or a program is necessary to take care of this concern and to ensure sustainable and effective capacity enhancement activities for the NRE sector.
- **Inadequate Recognition of Multi-Sector Needs** - Past training programs largely benefited the government officials. The extension of such programs (local and international) to private sectors and NGOs is limited.
- **Donor Dependent with Minimal Local Participation** - Early training activities are totally donor driven; and even the technical inputs, identification of training areas and financial requirements are based on the donor recommendations.
- **Limited Scope of Capacity Building Focus** - Early training programs gave substantial focus on the technical aspect and technological developments of various NRE technologies.
- **Minimal Interfacing with External Expertise** - The earlier engagements of international experts in the national NRE affairs did not result to local empowerment but rather created vacuum. The foreign experts, then, tended to undertake the training tasks with very minimal interfacing with the national and/or local officials.

The proposed NRE Training Program will include both in-country and foreign-implemented activities. The specific activities are based on the capacity enhancement needs identified during the PDF-B exercise and are considered vital to the success of the current thrusts and projects of the energy sector. Subsequent program review, assessment and planning may identify new activities and training areas, which the sector needs.

**Table 3. Proposed In-Country NRE Training**

**NRE Training Module: National**

Activities		Duration	Target Participants	Number of Participants	Year
1.	Study Tour on NRE Policy Initiatives by other countries	10 days	DOE, NEA, NPC, PNOC, NGO Rep, Private Sector Rep	10 – 15 Participants	Year 1
2.	Technician Trainors' Training on NRE Systems	10 days	ECs/BAPAs, ANECs NGOs/Pos	25 - 30 Participants	Year 1

3.	Training on Facilitation and Consensus Building	5 days	DOE, NEA, NPC-SPUG ANECs, NGOs/POs	25 - 30 Participants	Year 2
4.	Training on Rural Electrification Planning Model	10 days	NEA	25 - 30 Participants	Year 2
5.	Training on NRE Pricing	5 days	DOE, ERB	25 - 30 Participants	Year 2
6.	Training on NRE Project Financing	5 days	DOE, Financing Institutions and Intermediaries Private Investors	25 - 30 Participants	Year 2
7.	Training on NRE Power Purchase Contracting and Negotiations	5 days	DOE, NPC	25 - 30 Participants	Year 3

### **NRE Training Module: Sub-National**

<b>Activities</b>		<b>Duration</b>	<b>Target Participants</b>	<b>Number of Participants</b>	<b>Year</b>
1.	Training on Basic Concepts on Rural Energization	5 days	ECs, BAPAs, LGUs, Communities Rural Banks/ Micro-credit Enterprises	3 Training Courses @ 30 Participants/ Course	Year 1 - 3
2.	Training on NRE Project Management	5 days	ECs, BAPAs, LGUs Communities	3 Training Courses @ 30 Participants/ Course	Year 1 - 3
3.	Renewable Energy Technicians' Training	10 days	ECs, BAPAs, Communities, LGUs	3 Training Courses @ 30 Participants/ Course	Year 1 - 3
4.	Training on Renewable Energy Project Appraisal for Rural Financial Intermediaries	5 days	Rural Banks, Micro-credit enterprises	3 Training Courses @ 30 Participants/ Course	Year 2
5.	Rural NRE Entrepreneurial Training	5 days	O-IIaw Project, Proponents, NGOs/POs	3 Training Courses @ 30 Participants/ Course	Year 1 - 3
6.	NRE System Design, operation and Maintenance	5 days	Engineering and Energy Consulting Firms	3 Training Courses @ 30 Participants/ Course	Year 1 - 2

Emphasis is given to the need to conduct regional NRE training for technician's since it has been highlighted in many NRE projects in the past, particularly those which involved the installation and operation of NRE system hardware, that poor maintenance and lack of knowledge to operate and maintain such systems are among the main causes of the failure of such projects. Such

training courses will not only cover the fundamentals of NRE but will focus substantially on the operation, maintenance and troubleshooting of NRE systems.

39. The development and management of the NRE Training Program will have two major components: (1) program institutionalization; and, (2) training activities implementation. The first component will involve the creation and mobilization of a program management structure, defining policies and regulatory framework, developing and implementing procedures and measures of evaluation to sustain a coherent sector-wide NRE Training Program. After the approval and/or acceptance by the DOE, the following steps will be carried out:

<b>Activity</b>	<b>GEF Support</b>
Creation and mobilization of the appropriate program management structure	Not necessary
Validation and benchmarking of capacities (i.e., needs assessment zooming in on the specific training needs)	Not necessary
Development of program management guidelines, standards, forms, procedures and measures of performance	Not necessary
Implementation of the training activities	Supplement baseline funds
Documentation and database development and management	Supplement baseline funds
Monitoring	Not necessary
Evaluation and planning through participatory consultation	Not necessary
Solicitation of technical and financial assistance	Not necessary

The preparatory and post activities required in the implementation of training activities are the following:

<b>Activity</b>	<b>GEF Support</b>
Design of the training course	Supplement baseline funds
Identification of participants and resource persons	Not necessary
Preparation of course materials	Supplement baseline funds
Organization of training courses and study tours	Not necessary
Evaluation of training course, resource persons, and others	Not necessary
Documentation of proceedings	Not necessary
Design of a sustainable continuing education program on NRE development	Not necessary

#### 40. **Component 6: NRE Technology Support.**

Previous NRE projects have been technology-driven and are basically designed with an “equipment demonstration” mentality where the main objective is installation and maintenance of a certain number of expensive NRE systems, most of them on PV technology. Many of these previous projects were not sustainable and did not last because the components failed to perform as per design and because the necessary capabilities of the local technicians to operate and maintain them were not factored in the project design. Sub-standard components, below-par performance and frequent breakdown could erode the users’ confidence on NRE technology. In the past 15 years, many NRE systems failed because of misuse/abuse of the system by the user, poor quality of components used, poor workmanship, and lack of after-sales service infrastructure to sustain its utilization. A common problem of some of the NRE systems in the

country is the premature failure of components after installation. These problems are attributed to the proliferation of cheap products either locally fabricated or imported from developing countries and the lack of quality standards these products. The PDF-B exercise identified that absence of specific guidelines in the design and setting-up of the system is a serious issue and recommends the drafting of a National Standard for NRE to serve the requirements of the NRE industry. Such steps are supportive to the rural electrification program of the GoP, which opted for NRE as the appropriate energy technology to adopt for most remote areas.

NRE stakeholders collectively agree that the lack of standards for NRE systems and components is a barrier to the commercialization of NRE. Suppliers perceive the lack of standards as a hindrance in marketing good quality and reliable products because consumers by themselves cannot adequately understand and compare the specifications of the various products in order to make intelligent decisions for selection and purchase. Very often, price becomes the primary and sometimes the sole consideration, thereby allowing low-priced but lower-quality products to dominate the market. The resulting poor performance on these products gives negative perceptions regarding the NRE technology concerned, which oftentimes becomes difficult to rectify, thereby stunting further promotion of the technology to more users. Fair competition needs to be based on identifiable, clearly defined common references that are recognized by all players in the industry. An industry-wide standard in NRE will serve as the common language in technology development and commercialization.

Corollary to the lack of standards is the lack of testing, verification and quality control measures that makes enforcement of product standards almost impossible. There are also legitimate concerns regarding how efficient NRE system components are used in their applications. It should also be realized that while local manufacturers and suppliers of NRE system equipment are aware of the necessity to improve product quality, they do not have the capacity to produce or bring the level of quality of their products compared to that of imported units. In addition to knowing best practices in the manufacture and use of NRE system equipment, they need both technical and financial assistance in realizing these. The NRE equipment industry would need assistance in improving the quality and efficiency of locally made NRE products (e.g., wind pumps and windmills, small wind turbine/generators, mini/micro-hydro turbines, biomass boilers and furnaces/kilns).

This project component will address the identified technical barriers that hinder the promotion and implementation of projects that utilizes NRE for energy (electricity or non-electricity) purposes. The activities under this component include:

- a) **NRE System Utilization Best Practices** (electricity and non-electricity) - *This activity is designed to evaluate the present operating performance of existing NRE system installations in the country (representative samples). This activity will result in the delivery of useful inputs in the design of new NRE systems or expansion, as well as identify potential improvements in the operation of existing NRE systems in relevant sectors of the national economy. Moreover, this activity will also consolidate current best practices in the utilization of NRE and application of NRE technologies. GEF support is required for the TA in the assessment of NRE system operating performance and practices in the country.*
- b) **NRE System Equipment Standards Setting** – *This will involve the development of appropriate performance (energy and quality) norms for major NRE system equipment such as the BOS of solar PV systems, biomass-based power generation equipment, wind turbine system components, micro-hydro components, etc. Part of this activity is the consolidation of*

*equipment performance and contractual standards based on relevant codes/standards in other countries and information that will be gathered from local NRE industry consultations. Developed standards will be proposed for consideration to the relevant government agencies. Technical support from the project will be provided if necessary, in government deliberations concerning the setting of standards or regulations concerning the specification and performance of NRE system equipment used in the country. GEF support is required for the TA in standards setting and accompanying testing procedures for components of solar, wind, mini/micro-hydro and biomass energy systems. GEF support is required for the TA in the standards setting.*

- c) **Assessment of Capabilities of Local NRE System Equipment Manufacturers** – *This will entail the evaluation of the manufacturing capabilities of the local NRE system (e.g., water turbines, biomass boilers and furnaces) manufacturers in the country. GEF support is required for the TA in the evaluation of manufacturing capabilities.*
- d) **Performance Evaluation of Locally Produced NRE System Equipment** – *This will involve the evaluation of the energy performance of locally produced NRE system equipment. GEF support is required for the TA in the performance evaluation of locally made NRE system components.*
- e) **Potential Improvements and Efficient Designs for Locally Produced NRE System Equipment** – *This activity will build on the results of Activity 5e and will involve the identification of potential improvements and recommendation of new efficient designs for locally made NRE system equipment and components. GEF support is required for the TA in the evaluation of potential improvements and efficient designs for locally made NRE system components.*
- f) **Financial Assistance to Local NRE System Equipment Manufacturers** - *This activity will utilize project funds to support the incremental cost required to make improvements in the design or manufacturing of locally made NRE system equipment and components. The resulting performance of improved designs and/or manufacturing processes will be documented and disseminated. The funding assistance for the incremental cost will be on a concessional loan basis. The loaned amount will have to be repaid at a specific and agreed time. Loan repayments will be utilized for assisting future NRE system equipment manufacturing improvement initiatives. GEF support is required for financing this incremental activity.*
- g) **Sustainable NRE R&D Program** - *This activity will involve the design and development of sustainable NRE R&D program supported by the NRE system owners/operators and equipment manufacturers, including work on NRE system standards. GEF support is needed for supplementary TA in the design of sustainable follow-up program.*

## **RISK AND SUSTAINABILITY**

### **RISKS**

41. There is a range of risks associated with the success of the project. Primary amongst these is a lack of commitment amongst stakeholders. Specific risks for the project includes:
  - a) *Inadequate Support from the GoP in Enacting Existing Policy* – The pending NRE Bill would be supportive of NRE market penetration. It targets GoP support for NRE both in remote and grid connected locations. The recently passed Omnibus Electric Power Industry Reform Bill calls for the deregulation of power generation in the country. It commissions government spending and activities to open the national grid to private generation sources.



While nominally this practice is currently permitted, without a fully open market many barriers to NRE participation exist. An open market will encourage the competitive development of the Philippines' extensive NRE potentials particularly wind and hydro. However, uncertainties exist. The GoP has only recently come under a new administration and it is this administration that recently passed the Omnibus Electricity Reform Bill. Future passage of the NRE bill remains uncertain and depends on unknown priorities of the new administration. The project has addressed this risk by building capacity within the DOE and affiliates to analyze and formulate policy in support of sound NRE practice. Politicians will have access to current and well-formulated information to support decision-making. In the final analysis this project has not been designed to be dependant on any current or forecast changes to existing legislation. Passage of the NRE Bill would be supportive to the objectives of the project. *Status of Risk: Moderate*

- b) *Inadequate Support of DOE* - As the chief executing agency. DOE is central to the success of the proposed project. Its support is critical in the formation of government interagency policy bodies, in the allocation of GoP counterpart funds and in providing access to information. There is a risk, despite good intentions, of bureaucrats' time not being available to carry out tasks related to the project. The DOE and its affiliates are stretched thin as extensive donor coordination and regular government responsibilities vie for their attention. As a participating stakeholder in formulation of the project the DOE have given their support for their roles in the project. This support will be bolstered by annual work plan commitments in which project activities are expected to appear. *Status of Risk: Moderate*
- c) *Lack of Participation of Private Sector* - There is a risk that the private sector will not participate adequately in the project, particularly in the setting of standards, the enhancement of NRE technology and in investment in off-grid communities. Concerning the setting of standards industry associations have been consulted and are actively preparing to participate in the project. Concerning investment in NRE for remote communities there is a risk that the barriers addressed by the project (lack of information, capability in project preparation, access to financing, defined market models) will not be enough to overcome investor reluctance. Other barriers such as the remoteness of the community, the lack of community support or unstable local politics may mean that the services of a MSC are not utilized or that there is a weak up-take on pilot projects. *Status of Risk: High*
- d) *Inadequate or Inappropriate Direction Given to the MSC* – As proposed, the DOE will supervise the MSC, but may after due consultations with the stakeholders, consider putting the MSC under PNOC-ERDC, for purposes of sustainability and self-sufficiency. The MSC can reside in ERDC and partially be staffed with the existing ERDC personnel. The project will ensure that with the creation of the MSC, the essential skills in marketing, financial packaging and community organizing and development will be provided to its staff. The Center will have an unequivocal private sector focus serving the interests of private investors. However, given the historical development and mandate of ERDC, there is a risk that the market orientation will be lost. ERDC is a semi-government technology research organization without a strong background in energy markets. The benefit of the ERDC is that it provides some basis for growth and cost sharing as it is an existing organization, which is publicly funded. It is important that the MSC is directed by a strong Board with private sector representation, and its CEO have a strong background in marketing and project development. *Status of Risk: Moderate*

## SUSTAINABILITY

42. This project is directed toward sustainability by supporting NRE delivery mechanisms and the private sector. It is working to improve the quality of NRE equipment used and produced in the Philippines. It supports marketing efforts and promotion widely in the Philippines in remote village and in industrial settings. It is showcasing financing and delivery mechanisms to overcome market barriers to the sustainable growth of sales of NRE equipment. These activities are directed toward building a sustainable market base for NRE product and service growth in the Philippines.
43. An important component of the project is the formation of the MSC in order to address market barriers particularly in remote locations. The MSC is not envisaged as a government agency, dependent on public funds. Rather the MSC will be formulated as a quasi-private organization representing private sector, NGO and GOP interests, and serve as a "one-stop-shop" for NRE market services, and the country's focal point for NRE market development. The goal of the MSC is to be largely self-supporting by the end of project support through implementation of a fee-for-service approach. During project implementation, the possibility of continued partial public support may also be explored during the development of the MSC's business plans.

The MSC will have a Board Of Directors to be chaired by a representative of the DOE and co-chaired by a representative of the private sector. It will be made an integral component of the "One Stop Energy Investment Center" (OSEIC) that the DOE will be creating to assist and facilitate private sector investments in the energy sector. The DOE will supervise the MSC and provide policy oversight and guidance. It is proposed to maintain the MSC's quasi-governmental nature to ensure its sustainability and self-sufficiency. The DOE may, after due consultations with stakeholders consider making the MSC a part of PNOC-ERDC where it could receive long term support and yet maintain close links with the private sector.

44. This project is proposing the use of funds to pilot financing and delivery mechanisms. These funds will be used judiciously to ensure proponent buy-in to and participation in the applications being assisted. The financial assistance will be provided on a concessional loan basis and will have to be repaid at an agreed period of time. Repayments will be revolved, i.e., utilized to finance other NRE projects in the future. GEF financial support will also for increasing the capacity of NRE stakeholders and project proponents/developers to become self-sufficient and to enhance the replicability of NRE projects.
45. The Project will facilitate the formulation and enforcement of policies and regulations regarding the use of NRE in the country. It will facilitate the review and improvement of electricity pricing policies, particularly concerning NRE-generated electricity to ensure the commercial viability of future NRE-based power projects. The proposed GEF-supported project is fully consistent with national policies and has been endorsed by the GoP. To sustain the momentum that will be generated by the initial project activities, the project will set up a financing mechanism for NRE system projects by providing financial assistance for the replication of the technologies that will be showcased by the demonstration schemes. It will also train the financial/banking institutions in financing NRE system projects to ensure continuity in the financing of future projects, as well as promote investment opportunities for potential investors in the Philippines. Furthermore, follow-up programs will be included in each project component with the primary intention of

sustaining the impacts of the project. These efforts will ensure the financial sustainability and viability of the NRE system projects even after the completion of the GEF assistance.

46. The government policies and regulations that will be put in place and implemented through this project will influence growing interest not only in the unelectrified rural communities, but also in other NRE-related industries (e.g., wood, and agriculture) in developing and implementing NRE-based power generation and CHP. These and all other related efforts will ensure the institutional sustainability of this project.

## **STAKEHOLDERS PARTICIPATION AND IMPLEMENTATION ARRANGEMENTS**

47. In the recent PDF B exercise, a large number of stakeholders were consulted in the formulation of this proposal through participation in workshops and consultations. These stakeholders include government agencies, utilities, research institutions, and project developers working in the area of NRE, RESCOs, and some NGOs. The Department of Energy (DOE) is the central concerned government agency.

- a) The DOE was created to provide a central coordinating machinery and Cabinet-level advocacy for the implementation of energy policies and programs. R.A. 7636 placed in the hands of the DOE the supervision of major government agencies implementing energy programs, and outlined the government's vision of the energy sector to be free-market oriented and private sector dominated. Under the present structure, the DOE supervises three key government agencies for energy program implementation. These are: (1) National Power Corporation - the agency in charged with power generation and transmission; (2) National Electrification Administration - the agency in charged with rural electrification and supervision of electric cooperatives; and, (3) Philippine National Oil Company - the agency involved in energy exploration, development and energy research activities. The DOE is responsible for the preparation of the Philippine Energy Plan that embodies the totality of government objectives, policies, strategies, and programs for the sector. The macroeconomic parameters for the forecasts are derived from the NEDA and the Department of Finance. The Plan is submitted to regional and multi-sectoral consultations and thereafter to the Cabinet and Congress.
- b) The Energy Regulatory Board (ERB), a quasi-judicial body responsible for determining the rates and other cost adjustments of the NPC, private and public electric utilities and electric cooperatives is an independent body directly attached to the Office of the President. There are other non-energy government agencies that influence energy policies or have direct supervision over the operations of energy agencies and the industry in general. These agencies where the DOE maintain linkages include the National Economic and Development Authority, the Department of Finance, and the DENR through the Environment Management Bureau.
- c) The Non-Conventional Energy Division (NCED) under the Energy Utilization and Management Bureau (EUMB) of the DOE is the focal point of all activities pertaining to NRE development and support activities. The NCED is charged with implementing the Department's program and services pertaining to development, promotion, commercialization and use of NRE systems. It coordinates and implements projects, programs, and activities geared for the overall development of renewable energy sector in the Philippines. The NCED oversees the administration and management of the Area-Based

Energy Plan (ABEP) through the Affiliated Non-Conventional Energy Centers (ANECs) based in the country's leading agricultural colleges and Universities, of which there are 20 Centers at present. The NCED is also directly involved in the Barangay Electrification Program, specifically under the O-IIaw Program that is implemented together with the NEA, NPC and PNOC. A Rapid Rural Appraisal of prospective barangays was conducted by NCED that determined the energy needs and other socio-economic indicators like employment, income level, and household expenditures. The NCED is expected to play an oversight role of the project and to ensure coordination and information sharing between this project and the other renewable energy initiatives under way in the country.

- d) The "Renewable Energy Network" (REN) is an assembly of leaders, experts and major players in NRE and related fields with membership coming from the public and private sectors, non-government and people's organizations, financial and research community sectors. It is the only existing initiative to establish a sector-wide linkage/coordination body in the area of NRE. The setting up of the REN in 1998 is in response to the private sector's concern regarding the lack of coordination mechanism in the NRE sector.
- e) Government Financing Institutions such as the DBP has been trained in renewable energy lending and has given out several NRE project loans from both its in-house and Official Development Assistance funds. The Land Bank of the Philippines (LBP) on the other hand is interested to go into renewable energy lending but needs to be trained on the basics of NRE project evaluation and finance. It also has access to in-house and ODA funds. Together with rural banks, which would also need appropriate training and orientation, these institutions shall be tapped as sources of financing for actual projects for the different financing and market delivery mechanisms.
- f) Other stakeholders include other government agencies, NGOs, beneficiaries and private commercial sector firms. The main roles and mandates of these stakeholders are not necessarily directly related to energy, but also refer to energy in some of their broad development objectives. For example, the Department of Agrarian Reform (DAR) is the lead organization of the Solar Power Technology Support (SPOTS) Project to Agrarian Reform Communities (ARCs) that is aimed to uplift the living conditions of people in the Agrarian Reform Communities by providing solar home systems for selected agrarian beneficiary communities. In this case, the DOE is designated as one of the implementing institutions, specifically, as provider of technical services. The DOST is likewise involved in NRE through its various attached agencies and councils like the Philippine Council for Industry and Energy Research and Development (PCIERD) whose role directly relate to research, development, demonstration and pilot scale implementation of some NRE projects.
- g) NGOs and other private sector organizations such as SIBAT, ICEE, and REAP are also directly involved through projects and activities relating to NRE. These organizations are involved in NRE through specific projects that these organizations undertake pursuant to their development goals.

#### IMPLEMENTATION ARRANGEMENT

- 48. The project will establish an Advisory Board, to be chaired by a DOE Undersecretary. This will provide policy and technical advice to the project and will consist of representatives from the

Renewable Energy Network (REN), DOE, ICEE, NEDA, DENR GEF Focal Point, IACCC and UNDP. The Board will meet regularly during the project implementation.

49. The DOE will be the executing agency for the proposed Project. The UNDP Country Office in Manila will undertake the GEF oversight. The day-to-day operational management of the will be the responsibility of the PMO based within the NCED of DOE. A Local Project Appraisal Committee (LPAC) will be established to provide overall guidance and approval of key program activities including fund commitments and co-financing arrangements. The LPAC will consist of UNDP, the Director of the EUMB of DOE, senior representatives from the NEDA, IACCC, DOST, ICEE, DENR, the power utilities, NRE R&D institutions and the NRE industry associations.
50. Successful project execution will require close cooperation of the abovementioned stakeholders. As executing agency, DOE will ensure the delivery of the project outputs and the judicious use of the project resources. The PMO will be responsible to the DOE and provide the mechanism and technical inputs necessary to integrate the results of the various activities. It will also ensure the satisfactory performance of the project members and contractors that will be directly involved in the project implementation. A Project Manager along with core senior technical staff will make up the PMO. The PMO will be supported with local and international experts as and when needed to undertake project activities. DOE and other agencies will provide support staff, services and facilities. The EUMB Director will act as the overall Project Director.
51. The PMO will be responsible for the overall operational management and financial management and reporting of the UNDP-GEF funds in accordance with financial rules and regulations for nationally executed projects. Some of the PMO's tasks include, but not limited to, the following:
  - Preparation of work plans, budget, and TORs of consultants, trainers, and subcontractors;
  - Monitoring and evaluation of progress of project activities;
  - Arranging of regular review meetings and ensure effective coordination of project activities;
  - Preparation and dissemination of project reports and other information materials;
  - Maintenance of books and records required for financial record-keeping and internal control;
  - Submission of timely and accurate financial reports and progress reports to UNDP
52. Considering the typical gestation period for obtaining GEF funding commitment, actual project development, evaluation and approval, it is anticipated that project will kick-off by January 2002. It will operate for a period of 5 years concluding on 31 December 2006. Annex D shows the tentative schedule of project activities. A detailed project implementation plan will be formulated after the GEF's approval of this Project Brief.

#### **INCREMENTAL COSTS, PROJECT FINANCING AND SCHEDULE**

53. The total estimated project cost is US\$ 23,364,048. In addition to the US\$ 5,143,048 requested from the GEF, the GOP-DOE will provide additional funds amounting to US\$ 2,835,000 (US\$ 2,650,000 in cash and US\$ 185,000 in kind). The PNOC will contribute US\$ 900,000 (US\$0.50 M in cash, US\$0.40 M in kind). Other contributions will come from REAP (US\$ 0.24 M in kind); by the Dutch Ministry of Foreign Affairs (US\$ 6.00 M, as part of the EISI Project); ADB (US\$ 0.1 M in cash), FINESSE (US\$ 0.08 M in cash); UP Solar Lab (US\$ 0.15 M in kind); NGO interests (US\$ 0.072 M in kind), and RESCOs and RECs (US\$ 7.844 M in cash).

54. The costs for all of the incremental activities that will be carried out in each of the project component amounts to US\$ 5,143,048. This is the amount to be provided by the GEF. Table 4 summarizes the project cost details. The incremental cost analysis is presented in Annex A. Details of the indicative project costs are in Table A1.
55. The total requirement for the financing schemes in the demonstration program component of the CBRED Project (i.e., Component 4) is an estimate based on assumptions for each scheme. The project design team has chosen not to firmly identify specific NRE projects that will be showcased under this project component. Rather, the selection of demo projects will be during the implementation of the CBRED, based on a set of criteria that will be developed for such purpose. For “showcase” solar system projects, the main source of funds will be the US\$ 6.0 million grant portion of the DOE’s EISI project. This represents the baseline activities for the demonstration program. The incremental activities involve the financing and implementation of “showcase” NRE delivery projects on biomass, hydro, and wind energy applications. The contribution from the GEF (for the cost of incremental activities) for each financing scheme was estimated separately based on certain assumptions and representative sample NRE projects that could be eligible for funding assistance. Assumptions and calculations are shown on Annex I. Funds requested from GEF are US\$ 0.321 M, US\$ 1.606 M and US\$ 0.535 M for the Project Preparation Fund (PPF), the Loan Guarantee Fund (LGF) and the Micro Finance Fund (MFF), respectively.

**Table 4: Project Budget (US Dollars)**

<b>Project Component</b>		<b>Baseline Cost</b>	<b>Incremental Cost</b>	<b>Total Cost</b>
<b>No.</b>	<b>Name</b>			
1	NRE Policy, Planning and Institutional Capacity Building	545,000	257,505	802,505
2	NRE Market Services Institutionalization	1,205,000	448,993	1,653,993
3	NRE Information and Promotion Services	520,000	616,595	1,136,595
4	NRE Initiatives Delivery and Financing Mechanisms	15,196,000	2,676,195	17,872,195
5	NRE Training Program	355,000	478,140	833,140
6	NRE Technology Support	400,000	665,620	1,065,620
<b>TOTAL</b>		<b>18,221,000</b>	<b>5,143,048</b>	<b>23,364,048</b>

56. Annex D: Project Schedule and Detailed Activities provides a Gantt chart for the project’s schedule. The project will be completed over a period of 5 years.

## **MONITORING, EVALUATION AND DISSEMINATION**

57. The project will be monitored and evaluated following UNDP-GEF rules and procedures. The Executing Agency will be required to prepare quarterly and annual work plans and to report to UNDP on progress in achieving targets. The Quarterly Progress Reports (QPRs) would provide a brief summary of the status of input procurement and output delivery, explain variances from the work plan, and present work-plans for each successive quarter for review and endorsement. These quarterly reports will include financial statements and the work plan for the subsequent quarter. Annual Progress Reports (APR’s) would provide a more in-depth summary of work-in-progress, measuring performance against both implementation and impact indicators. APR’s

would inform decision-making by the Project Advisory Board, which would evaluate whether any adjustment in approach is required. A terminal report would be completed prior to the completion of the project detailing achievements and lessons learned.

58. The PMO, led by DOE will undertake continuous, self-monitoring. The Project Framework Design (Annex B) states all the success indicators or objectively verifiable indicators for each activity that will be carried out under this project. These indicators, which will be reviewed for their practicability and completeness prior to project implementation, are the parameters that have to be monitored by the DOE under this project. The annual growth in installed NRE systems in the country provides a clear indication of the realization of the project's purpose. As such, this is one parameter that has to be monitored and evaluated during the course of project implementation. The extent by which the GEF developmental goal is achieved can be evaluated from the monitored results. The forecast trend in energy supply and electricity generation patterns can be evaluated based on the monitored and reported results of the project. By the time of project completion, at least the NRE projects in the demonstration program (Component 4) will be in operation. Other indicators might involve the number of additional households, businesses, or other institutions with access to renewable power following the project's completion. The target values for these indicators will be agreed upon during project document finalization.
59. Quarterly work-plans will be prepared based on the overall project objectives and performance indicators. These will be used to measure performance. It is through these reports and meetings that the project approach and activities will be formally refined.
60. The project will be subjected to two mandatory independent evaluations. The first evaluation will be conducted during the third quarter of year 3. A second and final evaluation will be scheduled upon project termination and UNDP, may, at its discretion, schedule additional independent evaluations if deemed necessary.

## **LIST OF ANNEXES**

### **REQUIRED:**

- A. INCREMENTAL COSTS**
- B. LOG FRAME MATRIX**
- C. STAP ROSTER TECHNICAL REVIEW**
- C1 RESPONSE TO STAP ROSTER TECHNICAL REVIEW**
- J. GEF Focal Point Endorsement Letter**

### **OPTIONAL:**

- D. CBRED PROJECT: SCHEDULE OF ACTIVITIES**
- E. COMPLETED, ONGOING AND PLANNED NRE PROJECTS**
- F. PERSISTENT BARRIERS TO NRE DEVELOPMENT IN THE PHILIPPINES**
- G. SAMPLE PROJECTS FOR DEMONSTRATION PROGRAM**
- H. Financing and RE Delivery Mechanisms: Calculation of GEF Contributions**
- I. GHG EMISSIONS CALCULATION ASSUMPTIONS AND SPREADSHEETS**



## **ANNEX A**

### **INCREMENTAL COST**

#### **BROAD DEVELOPMENT GOALS**

1. In line with the new and renewable energy (NRE) objectives of the Government of the Philippines (GOP), and its energy targets in the next 10 years, the Capacity Building for Renewable Energy Development (CBRED) Project was conceived with the primary aim of improving capacity in the country in planning, designing, developing, and implementing NRE system projects, both for electricity and non-electricity purposes, to meet national development and social needs and environmental preservation commitments. This project seeks GEF's support to ensure that the GHG emissions from the fossil fuel-based activities in the country is reduced by 2.9% by year 2010 through the utilization of NRE resources.

#### **BASELINE ACTIVITIES**

2. The baseline conditions for this project consist of what the GoP would do without GEF support. Under this baseline, several barriers/problems and issues that have persisted since the early 80s and have hampered the widespread implementation of NRE system applications in the Philippines, for non-electricity uses and mainly for electricity generation purposes in remote rural areas. Without this project, the country would not be able to effectively make the most of the potentials its abundant NRE resources.
3. The GOP recognizes the advantages of utilizing NRE to meet its energy needs for sustainable development and at same time, is aware of the environmental benefits that would result from the use of such climate-friendly energy forms. Some of the ongoing and soon to be implemented activities of the DOE/NCED, DENR, research institutions like the UP Solar Lab, and international lending institutions like the ADB are complementing the activities of the proposed CBRED Project and will be integrated. These are regarded as baseline activities. Overall, the baseline expenditures are estimated at US\$ 18,221,000.

#### **GLOBAL ENVIRONMENT OBJECTIVES**

4. The global environmental objective of the CBRED Project is the reduction of the growth rate of GHG emissions from fossil fuel-based activities through the removal of the persistent barriers to the development and widespread applications of NRE systems. The proposed project's main strategy is to enhance the capacity of the relevant stakeholders in the NRE area in the Philippines in removing persistent policy, institutional, financial, market, information, and technical barriers to RE development. As this capacity building will be carried out in a sustainable manner, the country would be able to address effectively the barrier removal tasks and mitigate the recurrence of such barriers in the future. The Project has been designed to be consistent with GEF Operational Program #6 on "Promoting the Adoption of Renewable Energy by Removing Barriers and Reducing Implementation Costs".

#### **GEF ALTERNATIVE**

5. There have been studies and technology-focused demonstration projects that were carried out in the country since the early 80s and lessons learned from these have pointed out the need to address the establishment and stimulation of an NRE market as an effective way of enhancing the development and widespread application of NRE systems. The private sector has expressed interest in advancing the development of NRE projects. Because barriers exist, the large potential of NREs may not be realized. Currently important policies on NRE such as the sale of NRE-based electricity to the grid are non-existent, let alone policies/regulations that will encourage people to make use of NRE. Without the removal of these barriers through the Project, the widespread application for example, of off-grid NRE-based power generation in rural areas and industrial use of NRE-based systems, are unlikely to take place. The GEF support for the proposed initiative will be instrumental in assisting the Philippines to fully tap the potential of its NRE resource. Total project expenditure (including the PDF-B grant) is US\$ 23,774,048. Of this the GEF is requested to provide US\$ 5,143,048 as the incremental cost required to remove barriers to NRE development in the country.
6. The proposed CBRED Project is comprised of six (6) components that will address in an integrated manner the persistent barriers to NRE development in the Philippines. Component No. 1 will address the remaining policy/regulatory and institutional barriers to NRE development. Component No. 2 will involve the establishment of a “one-stop-shop”, referred to as the Market Service Center (MSC), which will be mandated to provide market development services to both off-grid and grid-connected NRE projects proponents/developers. Component No. 3 is made up of activities that will address the information and advocacy problems/issues of NRE development and applications. Component No. 4 is a demonstration program that will involve the showcasing of appropriate financing schemes to facilitate development and implementation of NRE delivery projects. It will demonstrate the “business angle” of NRE projects showing how such projects are designed, financed, implemented and sustainably operated and maintained. Component No. 5 involves the implementation of NRE training programs focusing on policy, market, business and technical aspects of NRE development and utilization. The last component (No. 6) will address the persistent technical barriers in the design and operation of NRE systems and system components, including the development of standards for such components/equipment that are sold and/or locally manufactured in the country.
7. **COMPONENT NO. 1: NRE POLICY, PLANNING AND INSTITUTIONAL CAPACITY BUILDING.** This project component will involved activities intended to enhance the capacity of the relevant stakeholders (e.g., government policy makers) in coming up with appropriate, proactive and integrated plans and policies that will facilitate the a conducive climate for NRE development and commercialization in the country. This project component will involve the implementation of incremental activities (gap filling) that will enhance the capability of government and corporate decision makers in coming up with policies and plans that will promote NREs, (development and utilization). These additional NRE policy and planning capacity enhancement activities of the CBRED project will cost US\$ 257,505 to implement. This budget is in addition to the cost involved in the implementation of the usual activities that are carried out in the area of NRE planning and policy making in the country, which is characterized by, among others, policy development that is not proactive, and different agencies involved in NRE development, promotion and commercialization lack inter-agency coordination resulting to dispersed program direction and waste of meager country resources. For the CBRED project, the budget for these usual planning and policy-making activities in the country is regarded as the baseline cost for this project component. This amounts to US\$ 545,000 and the total cost of this project component is US\$ 802,505.

8. **COMPONENT NO. 2: NRE MARKET SERVICES INSTITUTIONALIZATION.** This project component will involve the creation of a “one-stop-shop” called Market Service Center (MSC) to provide market development services to both off-grid and on-grid project developers. The work of the MSC during and after the GEF support is expected to result to more NRE investments and projects on the ground resulting to reduction in use of fossil fuels. The MSC is an incremental activity that will require incremental funding (from GEF). The estimated incremental cost is US\$ 448,993. The usual market development services for NRE particularly for remote off-grid communities are dispersed in different government agencies, donor institutions, NGOs and financing agencies. The estimated aggregated 5-year cost for such non-integrated activities represents the cost that will be committed to the CBRED as the baseline cost for this project component and this amounts to US\$ 1,205,000. This project component will cost US\$ 1,653,993 to implement.
9. **COMPONENT NO.3: NRE INFORMATION AND PROMOTION SERVICES.** The present NRE information and promotion activities in the country are non-coordinated and information and data pertaining to NRE lie in many different agencies in unorganized formats that are not readily useful. The CBRED project will build on these ongoing activities. The budget for these activities in the next 5 years is considered baseline cost and this project component will involve additional activities that will enhance such baseline activities. The present information and promotion activities cost US\$ 616,595 to implement in the next 5 years, and this represents the baseline cost for this project component. The additional activities, which require US\$ 520,000 to implement under the CBRED project will, among others promote increase awareness and interest among investors and developers in both private and public sectors to undertake NRE projects on the ground in place of what could have been fossil fuel-based investments. The project component cost is US\$ 1,136,595.
10. **COMPONENT NO. 4: NRE INITIATIVES DELIVERY MECHANISMS DEMONSTRATION.** The lack of financial assistance to NRE project developers has hampered the widespread development and commercialization of NRE energy systems in the country. Under this project component, three (3) financing mechanisms for NRE projects will be demonstrated as effective means of overcoming financial barriers to facilitation of NRE delivery mechanisms. There will be three (3) sources of seed funds. One is the US\$ 6 million grant from the Dutch Government under the Environmental Improvement for Economic Sustainability (EIES) project, a joint collaboration of the DOE and the Ministry of Foreign Affairs of Netherlands. Another source would be part of the budget allocations of DOE for NRE demo projects. The third fund source is the GEF. Whereas the Dutch grant will only cater for solar RE projects, the GEF will be supporting other NRE systems.

In the baseline scenario, the GoP (particularly the DOE) will continue to develop and implement NRE projects (mainly solar energy projects) with an “equipment demonstration” mentality. In the proposed alternative scenario, the GoP will be carrying out an NRE demonstration program that will integrate planned NRE projects (including the EIES) to showcase the design, development, and facilitation of the implementation of sustainable NRE projects. Included in the program will be additional demonstration projects on other NRE applications (e.g., micro-hydro, biomass and wind). The 3 financing schemes that will be created will be used to support the design, implementation and sustainable operation of NRE projects employing any of the 4 identified delivery mechanisms.

11. **Project Preparation Fund:** This proposed fund is to allow preparation (including arrangement of financing and PPAs) for a number of “delivery mechanism” NRE projects slated for development. Eligible projects will be selected on the basis of their use of financing and their proven commitment. Preliminary identification has been made of a number of possible projects awaiting development in the preparatory phase. The fund could be utilized for project preparatory activities like analysis and evaluation of wind data, wind turbine generator micro-siting, hydrologic investigation and analysis, detailed topographic surveys, geological and geo-technical investigation and hydraulic study. Depending on the market readiness, appropriate NRE projects will be eligible for financial assistance. Samples of identified possible projects are described in Annex G, and Annex H shows the estimation of the GEF contribution.

The PPF will provide conditional loan of up to 50% of the project preparation cost. The loan repayment mechanism which is proposed as a starting point of negotiations with the relevant banking/financial institution would stipulate that 30% of the loan would be repaid to the DOE if the preparatory activities came up with a finding that the project is non-viable, or the preparatory activities resulted in a viable project but the project could not be implemented within an agreed period because of financing difficulties, which could not be overcome with the assistance of the CBRED project. If the preparatory activities resulted in a viable project, 80% of the loan would be repaid. The PPF will be held and administered by an existing financial institution like the DBP. The MSC will facilitate the set-up of the PPF and ensure training for its proper administration. Part of the EIES grant money will form part of the PPF. The contribution from the GEF to the PPF is intended for supporting the non-solar energy projects (i.e., incremental projects) is US\$ 321,300. This incremental money from the GEF will be directly applied to project preparation of NRE projects with a combined capacity of 100 MW.

12. **Loan Guarantee Fund:** Loan guarantee can spur lending to NRE project proponents by spreading risks among the guarantor(s), the lender and the borrower-proponent. The underlying premise is that ultimately the loan guarantee will not be needed because the lender will be convinced that the risks and transaction costs are reasonable and manageable. The Philippines has at least 3 existing loan guarantee mechanisms, namely: (a) Guarantee Fund for Small and Medium Scale Enterprises (GFSME); (b) Small Business Guarantee Fund Corporation (SBGFC); and, (c) Local Government Unit Guarantee Fund (LGUGF). The first 2 focus specifically on small to medium manufacturing activities and are not available for NRE projects. The LGUGF, while applicable for NRE has restricted access only to LGUs. A guarantee mechanism focused solely on NRE and mainly accessible to private sector and community interest, is recommended. The fund will overcome financial barriers in remote off-grid locations where projects lack a track record and require high levels of securitization.

The proposed fund is meant to provide guarantee to the loan that banking/financing institutions will provide to NRE project proponents. The GEF contribution to this fund will be used for partial guarantee of off-grid NRE projects (non-solar energy) with a combined capacity of 3 MW. The DOE will also contribute to the fund and will be a co-guarantor of the loans. Access to a partial guarantee can be the deciding factor in the financial viability of a project because it can reduce the risk to a level where the lender becomes comfortable and is willing to accept the loan terms. The fund will be held in trust by the DOE but implemented and administered by the DBP. A Project Steering Committee will evaluate, screen and approve proposals for LGF. The DBP processes approved guarantee applications with terms and conditions set by the PSC. The seed money contribution to the LGF from the GEF is US\$ 1,606,500. This amount will be used to guarantee for example the principal payments for an agreed period of time of the loans provided

to the non-solar energy projects (incremental) that will be carried out under the demonstration program. The DOE will contribute US\$ 850,000 to the LGF. (See Annex G for the sample LGF-supported project and Annex H for the estimation of the GEF contribution)

13. **Micro Finance Fund:** This is intended as a financing mechanism for loans to small-scale power projects in remote barangays with relaxed terms for long-term borrowing. Micro finance entities (e.g., rural banks) that lend money to micro-enterprises (e.g., rural cooperatives) with the ultimate goal of poverty alleviation can be tapped to lend for NRE projects, inasmuch as energy generation and livelihood projects are complementary.

The MSC, in cooperation with the rural banking network in the country will evaluate project proposals, based on a set of eligibility criteria. The MFF will be managed and administered by the rural banks. The seed money contribution from the GEF is US\$ 535,500. This will be earmarked for community-based energy and/or village power projects that will utilize NREs other than solar energy, the total combined capacity of which is 500 kW. (See Annex G for the sample MFF-supported project and Annex H for the estimation of the GEF contribution)

14. The GEF money for the PPF and MFF will be provided as concessional loans to eligible NRE projects. Therefore, project proponents who will avail of these loans are expected to pay back an agreed percentage of the amount they borrowed at an agreed time. The LGF money will only be used if the borrower defaulted from paying the loan. Loan repayments and unused funds will later be used as seed money for a NRE Fund that will support replication projects. GEF support is required in the provision of TA in the design of the financing schemes, as well as contribution to the funds.
15. The baseline cost for the demonstration program will include part of the budget allocation for NRE project demonstrations of DOE (including the US\$ 6 million grant money in the EIES), DOE contributions to the financing schemes, and contributions from the RESCOs, RECs and community-based NGOs that will be eligible for funding assistance under the program. This comes up to US\$ 15,196,000. The GEF portion, which will be for financing of incremental activities and provision of the seed money for the 3 financing schemes, amounts to US\$ 2,676,195. Bulk of this (93.6%) is seed money to the 3 financing schemes. Annex I shows how the size of GEF seed money for the financing schemes was arrived at. Annex G shows the sample projects that are eligible for funding assistance.
16. **COMPONENT NO. 5: NRE TRAINING PROGRAM.** Although training programs on NRE development and applications are also available and planned in the country, particularly by the DOE-NCED, these are very limited if the goal is to improve the capacity of the relevant stakeholders in the field of NRE. If these and other related activities (supported by the government and/or the private sector) will be included in the CBRED project, the budget allotment for such activities in the next 5 years would make up the baseline cost for this component. This amounts to US\$ 355,000. The CBRED project will improve on the planned NRE training programs in the country and will be expanded to cover the equally important institutional, financial and business aspects of NRE development and commercialization. The additional activities, which will never be implemented without GEF support, will require an incremental cost of US\$ 478,120. The total cost of this project component is US\$ 833,140.

17. COMPONENT NO. 6: NRE TECHNOLOGY SUPPORT. Presently and as projected in the next 5 years, a higher efficiency of operation of NRE systems in the country will remain much to be desired. Although there is a recognized need to establish a system of ensuring that only good quality NRE products are allowed in the market place, there is no such quality check in place at the industry level for any NRE product. Local NRE system manufacturers, developers, distributors and suppliers will still carry out activities to somehow improve their products and services, but these have to be supplemented with NRE technology extension/support programs. Under this project component of the CBRED, technical and financial support will be provided to the NRE system industry to improve product and system quality and efficiency. The total estimated cost for such incremental improvements and technical support is US\$ 665,620. The budget allocation by the GoP for product quality and equipment manufacturing technology enhancement for the next 5 years will be considered the component's baseline cost. This is estimated at US\$ 400,000. The improvements in local NRE system manufacture that will be supported under this component are based on findings from the PDF-B work. The total cost of this project component is US\$ 1,065,620. The incremental activities, which will cost US\$ 665,620 to implement is expected to induce local manufacturers of NRE products particularly micro/mini hydro components, biomass boilers and PV BOS to improve their manufacturing process and design. Product quality improvement could also open regional markets for local manufacturers of NRE system equipment/components.

**Table A-1: Incremental Costs and Benefits**

Component	Costs	Baseline	Alternative	Increment
<b>1.0. NRE Policy, Planning and Institutional Capacity Building</b>				
Total Baseline Funds	\$545,000	<b>Business as Usual</b> Some work continues addressing policy issues on a reactive basis as energy supply issues arise in Government. Policy development is not proactive. Departmental priorities lack a clear direction.	<b>Proposed Situation</b> Create an Interagency Committee of appropriate government agencies and outside stakeholders as required. Sub-committees would be formulated depending on the issues to be addressed. Issues would be forecast and planned in yearly work plans. Resources are provided to carry out studies, to hold stakeholder consultations and to interact with foreign governments around similar issues. Committees are responsible for formulating policy statements.	<b>Additional Features</b> Government agencies are induced to take a coordinated planned approach to the development NRE resources in the Philippines.
Funds Requested from GEF	\$257,505	<b>Domestic Benefits:</b> NRE makes some gains.	<b>Domestic Benefits:</b> A cadre of expertise is developed around planning and policy development for NRE. Targets may be increased for non-fossil fuel indigenous energy sources leading to foreign exchange savings.	<b>Domestic Benefits:</b> NRE is given more government profile and support and integrated with other fuel sources. More international funds from bilateral and multilateral donors as well as focused ODAs for NRE lending are funneled locally.
		<b>Global Benefits</b> GHG are reduced marginally	<b>Global Benefits</b> The Philippines develops a strong national profile with a rationalized approach to NRE development.	<b>Global Benefits</b> Reduced GHG emissions.
Total Funds Required	\$802,505	\$545,000	\$802,505	\$257,505
<b>2.0. NRE Market Services Institutionalization</b>				

Component	Costs	Baseline	Alternative	Increment
Total Baseline Funds	\$1,205,000	<b>Business as Usual</b> Market development services for NRE particularly in remote communities are dispersed in government, donor, NGO and financial agencies throughout the country. Potential proponents face a bewildering array of development requirements. Links between income generation and locally produced energy are not clear.	<b>Proposed Situation</b> Establish a "one-stop-shop" Market Service Center (MSC) to provide market development services largely for remote Barangay's but with information concerning large scale NRE as well.	<b>Additional Features</b> An MSC addresses entrenched information and coordination barriers for NRE. The Center provides a mechanism for testing and applying novel financing mechanism to further enhance uptake of NRE.
Funds Requested from GEF	\$448,993	<b>Domestic Benefits:</b> Low cost programs	<b>Domestic Benefits:</b> Energization of remote villages emphasizing benefits such as income generation. Goals for widespread electrification are met as well as livelihood improvements.	<b>Domestic Benefits:</b> Establishing an MSC leverages a coordinated approach to financing and market-related information by potential NRE investors in the private and government sectors to facilitate their investments in NRE projects, which have been factored in into the projected national NRE generation.
		<b>Global Benefits</b> None	<b>Global Benefits</b> Market expansion of NRE technology for off-grid applications.	<b>Global Benefits</b> Reduced GHG emissions: potential for replication elsewhere.
Total Funds Required	\$1,653,993	\$1,205,000	\$1,653,993	\$448,993
<b>3.0. NRE Information &amp; Promotion Services</b>				



Component	Costs	Baseline	Alternative	Increment
Total Baseline Funds	\$520,000	<b>Business as Usual</b> Information and data pertaining to NRE lies with an array of different agencies in unorganized formats. Access to the data is uncertain. Awareness of information is low.	<b>Proposed Situation</b> Create a website promoting NRE development; identifying investment opportunities, providing access to information and data as well as resource listings and case histories.	<b>Additional Features</b> Agencies are induced to collectively develop and maintain relevant databases. A website provides low-cost flexibility by allowing information to reside with and be maintained by a host agency.
Funds Requested from GEF	\$616,595	<b>Domestic Benefits:</b> Agencies collect and store information independently in a variety of formats mostly hardcopy.	<b>Domestic Benefits:</b> Information and data from a variety of agencies is available electronically in standardized formats. Access to information is widespread. Agencies take a coordinated approach to information formatting and collection.	<b>Domestic Benefits:</b> The development of a project website as well as data bases of information immediately usable by potential NRE investors in both private and government sectors will facilitate their decision making process expected to redound to NRE project implementations. At present, various market-related information are available but are not organized and processed as tools for investment decision.
		<b>Global Benefits</b> None	<b>Global Benefits</b> Access to investment and development information.	<b>Global Benefits</b> Reduced GHG emissions.
Total Funds Required	\$1,136,595	\$520,000	\$1,136,595	\$616,595
<b>4.0. NRE Initiatives Delivery Mechanisms Demonstration</b>				

Component	Costs	Baseline	Alternative	Increment
Total Baseline Funds	\$15,196,000	<b>Business as Usual</b> Project opportunities are identified with very limited uptake. Markets are confused by an array of requirements for project preparation and funding. Few models of successful operations.	<b>Proposed Situation</b> Pilot demonstration projects are identified for on and off grid as well as electricity and thermal/mechanical applications. Funding is provided for soft costs to prepare projects, guarantee consumer loans and provide a limited financing mechanism. Sources of private and public equity are encouraged and identified. Pilots are initiated and monitored for lessons learned.	<b>Additional Features</b> Funds are applied to test mechanisms to overcome market barriers. Depending on proposed pilot demonstrations these might include project preparation funds, loan guarantees or a village power loan mechanism. The MSC implements and monitors these market inducement mechanisms.
Funds Requested from GEF	\$2,676,195	<b>Domestic Benefits:</b> None	<b>Domestic Benefits:</b> Support funds and private capital are combined to efficiently develop NRE pilot projects.	<b>Domestic Benefits:</b> Financing and market delivery barriers shall be addressed through actual project implementation. A revolving fund that will service similar project initiatives facing similar barriers is set. Potential funds leveraged by the revolving fund shall be about 4 times. Successes provide a model for structuring energy subsidies to be non-intrusive on the market.
		<b>Global Benefits</b> None	<b>Global Benefits</b> Reduced GHG emissions. Lessons learned for replication.	<b>Global Benefits</b> Potential for replication elsewhere.
Total Funds Required	\$17,872,195	\$15,196,000	\$17,872,195	\$2,676,195

## 5.0. NRE Training Program

Component	Costs	Baseline	Alternative	Increment
Total Baseline Funds	\$355,000	<b>Business as Usual</b> Stakeholders lack coordinated information. NRE manufacturing and services is weakened by a lack of skilled workforce.	<b>Proposed Situation</b> Establish a training regime for a range of stakeholder agencies: Government agencies, national and local; training institutes; NGOs; manufacturers and service providers.	<b>Additional Features</b> Training the trainers provides sustainability for learning.
Funds Requested from GEF	\$478,140	<b>Domestic Benefits:</b> None	<b>Domestic Benefits:</b> A trained cadre of professionals at many levels of society.	<b>Domestic Benefits:</b> Institutions incorporate NRE education and course modules expected to yield more support for wider use of NRE at the community level. For policy makers, a better appreciation of NRE benefits and potentials expected to yield patronage of needed legislations and government policies that will push NREs at a national level
		<b>Global Benefits</b> None	<b>Global Benefits</b> Improved competencies can be transferred internationally.	<b>Global Benefits</b> Potential for training replication.
Total Funds Required	\$833,140	\$355,000	\$833,140	\$478,140
<b>6. NRE Technology Support</b>				
Total Baseline Funds	\$400,000	<b>Business as Usual</b> Domestic manufacturing continues to be of uneven quality and unable to compete with international technology. Technology inputs tend to be unsophisticated balance of systems.	<b>Proposed Situation</b> Encourage an industry-wide adoption of standards for a range of NRE technologies. Support industry in efforts to improve technologies and levels of sophistication.	<b>Additional Features</b> Funds induce industry to cooperate in becoming self-regulating and to standardize product quality. Research and demonstration funds lead to substantial improvement in manufacturing quality.

<b>Component</b>	<b>Costs</b>	<b>Baseline</b>	<b>Alternative</b>	<b>Increment</b>
Funds Requested from GEF	\$665,620	<b>Domestic Benefits:</b> Limited investment.	<b>Domestic Benefits:</b> Improved quality of technologies leads to increasing markets and greater productivity for the sector.	<b>Domestic Benefits:</b> Increase financial competitiveness of NREs with alternatives. Prevention of NRE image destruction resulting from lack of standards. Improved local market for indigenous equipment and possible penetration of regional markets.
		<b>Global Benefits</b> None	<b>Global Benefits</b> Higher quality and more efficient products suitable for export.	<b>Global Benefits</b> Lessons replicated in other countries.
Total Funds Required	\$1,065,620	\$400,000	\$1,065,620	\$665,620
<b>Total Costs</b>	<b>\$23,364,048</b>	<b>\$18,221,000</b>	<b>\$23,364,048</b>	<b>\$5,143,048</b>

**Table A-2: Indicative Budget for Major Project Components**

COMPONENT	Staff & Contract Costs	Training Costs	Project Implementation Cost	Travel Costs	TOTAL Costs	Transaction Barriers to Implementation	Incremental Costs	Replication/ Dissemination
1. Component No. 1								
Total Baseline Funds	\$400,000	\$100,000	\$40,000	\$5,000	\$545,000	- Lack of interagency coordination - Lack of coordinated study of NRE options - Lack of information for decision-makers	POSITIVE	Information program and policy inputs to decision-makers, legis lators, key GOP planning agencies
Funds Requested from GEF	\$109,180	\$51,500	\$40,525	\$56,300	\$257,505			
Estimated Funds Required	\$509,180	\$151,500	\$80,525	\$61,300	\$802,505			
2. Component No. 2								
Total Baseline Funds	\$485,000	\$600,000	\$70,000	\$50,000	\$1,205,000	- Lack of "one stop shop" for project preparation services	POSITIVE	Information program to potential proponents and users in rural barangay's and with investors.
Funds Requested from GEF	\$243,398	\$20,000	\$158,495	\$27,100	\$448,993			
Estimated Funds Required	\$728,398	\$620,000	\$228,495	\$77,100	\$1,653,993			
3. Component No. 3								
Total Baseline Funds	\$305,000	\$100,000	\$100,000	\$15,000	\$520,000	- Limited, unprocessed and dispersed data & information - Limited awareness	POSITIVE	Ongoing maintenance and upkeep of databases - online website promotes and provides access
Funds Requested from GEF	\$554,670	\$5,150	\$29,675	\$27,100	\$616,595			
Estimated Funds Required	\$859,670	\$105,150	\$129,675	\$42,100	\$1,136,595			
4. Component No. 4								
Total Baseline Funds	\$435,000	\$0	\$14,756,000	\$5,000	\$15,196,000	- Difficulty in accessing traditional financing windows - Limited expertise in project preparation	POSITIVE	Financing schemes to support NRE and delivery mechanis ms for NRE projects.
Funds Requested from GEF	\$138,020	\$0	\$2,503,775	\$34,400	\$2,676,195			
Estimated Funds Required	\$573,020	\$0	\$17,259,775	\$39,400	\$17,872,195			

5. Component No. 5								
Total Baseline Funds	\$175,000	\$150,000	\$20,000	\$10,000	\$355,000	- Lack of experience of proponents in marketing and after sales service	POSITIVE	NRE Training and continuing education
Funds Requested from GEF	\$144,715	\$267,800	\$28,325	\$37,300	\$478,140			
Estimated Funds Required	\$319,715	\$417,800	\$48,325	\$47,300	\$833,140			
6. Component No. 6								
Total Baseline Funds	\$325,000	\$0	\$70,000	\$5,000	\$400,000	- Lack of quality control for local equipment	POSITIVE	Participatory program with local industry ensures buy-in.
Funds Requested from GEF	\$201,370	\$0	\$432,250	\$32,000	\$665,620			
Estimated Funds Required	\$526,370	\$0	\$502,250	\$37,000	\$1,065,620			

### SUMMARY

Total Baseline Funds	\$2,125,000	\$950,000	\$15,056,000	\$90,000	\$18,221,000
Funds Requested from GEF*	\$1,391,353	\$344,450	\$3,193,045	\$214,200	\$5,143,048
Estimated Funds Required	\$3,516,353	\$1,294,450	\$18,249,045	\$304,200	\$23,364,048

### SUMMARY OF BUDGET

COMPONENT	Baseline	Incremental	Total	% Share
Component No. 1	\$545,000	\$257,505	\$802,505	3.4%
Component No. 2	\$1,205,000	\$448,993	\$1,653,993	9.5%
Component No. 3	\$520,000	\$616,595	\$1,136, 595	4.9%
Component No. 4	\$15,196,000	\$2,676,195	\$17,872,195	76.5%
Component No. 5	\$355,000	\$478,140	\$833,140	3.6%
Component No. 6	\$400,000	\$665,620	\$1,065,620	4.6%
Total	\$18,221,000	\$5,143,048	\$23,364,048	100.0%

FUND CONTRIBUTORS	AMOUNT		TOTAL	% Share	PROJECT COST SHARING		
	Cash	In-kind			Contributor	%Share	Amount
GOP – DOE	\$2,650,000	\$185,000	\$2,835,000	12.1%	1. Government of the Philippines	16.6%	\$3,885,000
GOP - PNOC/ERDC	\$500,000	\$400,000	\$900,000	3.9%	2. Other International	26.5%	\$6,180,000
MO	\$0	\$30,000	\$30,000	0.1%	3. Private and NGO Sector	34.9%	\$8,156,000
UP - Solar Lab	\$0	\$150,000	\$150,000	0.6%	4. Global Environmental Facility	22.0%	\$5,143,048

ADB	\$100,000	\$0	\$100,000	0.4%	TOTAL	100.0%	\$23,364,048
FINESSE	\$80,000	\$0	\$80,000	0.3%			
Dutch Government (Min. of Foreign Affairs)	\$6,000,000		\$6,000,000	25.7%			
REAP	\$0	\$240,000	\$240,000	1.0%			
RESCO	\$7,450,000	\$0	\$7,450,000	31.9%			
COMMUNITY NGO		\$42,000	\$42,000	0.2%			
REC	\$394,000	\$0	\$394,000	1.7%			
Global Environment Facility	\$5,143,048	\$0	\$5,143,048	22.0%			
TOTAL	\$22,317,048	\$1,047,000	\$23,364,048	100.0%			





**Table A-3: CBRED Project Budget Contributors**

Activities		Co-Funding										GEF	Grand Total	
		GOP-DOE	PNOC-EDRC	MO	UP - Solar Lab	ADB FINESSE	DUTCH	REAP	RESCO	NGOs	REC			Total
	Component No. 1													
	1 Policy/Planning Capacity					80,000						80,000	109,855	189,855
1.1	NRE Intra-Agency Establish	70,000										70,000	0	70,000
1.2	TA on NRE Bill	70,000										70,000	28,325	98,325
1.3	NRE Policy Analyses	70,000				50,000						120,000	63,525	183,525
1.4	NRE Planning Model	65,000										65,000	33,050	98,050
1.5	Integrated Energy Planning	45,000				50,000						95,000	22,750	117,750
1.6	Policy Implementation Monitoring & Evaluation	45,000										45,000	0	45,000
	SUB-TOTAL	365,000	0	0	0	180,000	0	0	0	0	0	545,000	257,505	802,505
	Component No. 2													
	2 NRE Market Enhancement											0	245,695	245,695
2.1	Set-up “One-Stop-Shop” (MSC)	50,000	800,000					200,000				1,050,000	183,298	1,233,298
2.2	Preparation of MSC Business Plan	55,000	100,000									155,000	0	155,000
2.3	Capacity Building for MSC Staff											0	20,000	20,000
	SUB-TOTAL	105,000	900,000	0	0	0	0	200,000	0	0	0	1,205,000	448,993	1,653,993
	Component No. 3													
	3 NRE Information & Promotion											0	148,445	148,445
3.1	NRE Resource Inventory	20,000										20,000	100,000	120,000
3.2	Nat’l NRE Database Devt.	150,000										150,000	155,150	305,150
3.3	Integrated NRE Information Exchange Service	40,000										40,000	10,000	50,000
3.4	NRE Website Devt.	40,000										40,000	0	40,000
3.5	Consol’n NRE Database Devt.	150,000		30,000						15,000		195,000	0	195,000
3.6	NRE Advocacy & Promotion	40,000								15,000		55,000	100,000	155,000
3.7	NRE Engg. Service Industry Devt	10,000										10,000	51,500	61,500
3.8	Green Energy Rating Program	10,000										10,000	51,500	61,500
	SUB-TOTAL	460,000	0	30,000	0	0	0	0	0	30,000	0	520,000	616,595	1,136,595

Activities		Co-Funding										GEF	Grand Total	
		GOP-DOE	PNOC-EDRC	MO	UP - Solar Lab	ADB FINESSE	DUTCH	REAP	RESCO	NGOs	REC			Total
	Component No. 4													
4	NRE Initiatives Delivery & Financing Mechanisms											0	207,745	207,745
4.1	NRE Fund Establishment	150,000					6,000,000		7,450,000	12,000	394,000	14,006,000	2,463,300	16,469,300
	-Project preparation fund	250,000										250,000		250,000
	-Loan Guarantee Fund	250,000										250,000		250,000
	-Micro-Finance Fund	350,000										350,000		350,000
4.2	Assistance Services to Financing Applicants	37,500										37,500	0	37,500
4.3	RE Delivery & Financing Mechanisms Demonstration Scheme Promotion	40,000										40,000	0	40,000
4.4	Selection Criteria & Selection of Eligible NRE	75,000										75,000	0	75,000
4.5	Monitoring & Evaluation of Each Demonstration Site	75,000										75,000	0	75,000
4.6	Financing & Delivery Mechanisms Review	37,500										37,500	0	37,500
4.7	Demonstration Program	37,500										37,500	0	37,500
4.8	Sustainable Follow-up Program Design	37,500										37,500	5,150	42,650
	SUB-TOTAL	1,340,000	0	0	0	0	6,000,000	0	7,450,000	12,000	394,000	15,196,000	2,676,195	17,872,195
	Component No. 5													
5	NRE Training Program											0	115,065	115,065
5.1	Design & Preparation of Training Mat'ls											0	66,950	66,950
5.2	Organization of Training Programs and Study Tours											0	0	0
5.3	Conduct of Training Courses & Study Tours	355,000										355,000	244,625	599,625
5.4	Docu & Dbase Devt& Mgt											0	51,500	51,500
5.5	Training Program Review											0	0	0
5.6	Training Program Results Evaluation and Dissemination											0	0	0
5.7	Sustainable Follow-up Program Design											0	0	0
	SUB-TOTAL	355,000	0	0	0	0	0	0	0	0	0	355,000	478,140	833,140

Activities		Co-Funding										GEF	Grand Total	
		GOP-DOE	PNOC-EDRC	MO	UP - Solar Lab	ADB FINESSE	DUTCH	REAP	RESCO	NGOs	REC			Total
	Component No. 6													
6	NRE Technology Support										0	290,520	290,520	
6.1	NRE System Utilization Best Practices										0	30,900	30,900	
6.2	RE Equipment Standards Setting	110,000			150,000			30,000			290,000	82,400	372,400	
6.3	Assessment of Capabilities of Local NRE System Equipment Manufacturers							10,000			10,000	12,875	22,875	
6.4	Performance Evaluation of Local Produced										0	12,875	12,875	
6.5	Potential Improvement & efficient Designs										0	25,750	25,750	
6.6	Financial Assistance to Local NRE System Equipment Manufacturers	100,000									100,000	200,000	300,000	
6.7	Sustainable NRE R & D Program										0	10,300	10,300	
	SUB-TOTAL	210,000	0	0	150,000	0	0	40,000	0	0	0	400,000	665,620	1,065,620
	GRAND TOTAL	2,835,000	900,000	30,000	150,000	180,000	6,000,000	240,000	7,450,000	42,000	394,000	18,221,000	5,143,048	23,364,048

## ANNEX B

### LOG FRAME MATRIX: PROJECT FRAMEWORK DESIGN

Project Strategy	Objectively Verifiable Indicators	Means of Verifying Success	Assumptions
<b>A. Development Goal</b>			
1. The annual growth rate of GHG emissions from activities using fossil fuels is reduced through the removal of the major barriers to the development and widespread implementation of renewable energy applications to replace part of the current fossil fuel use in the Philippines.	1.1.1. The annual growth rate of GHG emissions from fossil fuel-based activities in the country is reduced by 2.9%, by the year 2010.	1.2.1. Documentation of annual data on fossil fuel and NRE utilization for power generation and industrial process heating from DOE.	1.3.1. Monitoring activities under the project on renewable energy utilization are fully supported.
		1.2.2. Documentation of estimates of annual GHG emissions reduction from the replacement of fossil fuel by renewable energy in power generation and industrial process heating.	1.3.2. Reports of estimates of GHG emissions reduction from various sources are consistent.
<b>B. Project Purpose</b>			
2.1 The overall capacity (technical, policy, planning, institutional, financial) in the country, both in government and the private sector, to develop, design and make use of the energy potentials of NRE resources is significantly improved.	2.1.1. The Project induces an increase in NRE of about 8% by the year 2010.  The Project will also lead to increasing numbers of households, businesses, and institutions in remote, rural areas with access to renewably-generated electricity.	2.2.1. Documentation of the annual inventory of NRE system installed capacity from DOE.	2.3.1. Compliance of NRE users to the reporting requirements of the proposed Project to DOE.
		2.2.1a. Documentation of the number of industries that installed new NRE-based power generation facilities.	
		2.2.2. Annual energy balance report from the DOE.	
<b>C. Project Outcomes</b>			
<b>1. NRE Policy/Planning Capacity Building</b>			
1.1 NRE Intra-Agency Establishment	* Interagency Committee meets regularly starting early 2002	Monitoring meeting schedules and attendance profiles	GOP buy-in to Interagency concept.

1.2 TA on NRE Bill	* 2 workshops conducted in 2002. * Outcomes of the workshops are used for NRE policy formulation by 3 <sup>rd</sup> quarter 2002.	Attendance profiles Workshop proceedings and recommendations for the NRE Bill	GOP will involve relevant stakeholders in NRE policy
1.3 NRE Policy Analyses	Consultation meetings with relevant stakeholders and legislative members conducted during 2002-2003.	Minutes of consultation meetings	NRE remains a priority for the GoP.
NRE Electricity Policy Study	Findings of policy reviews and recommendations regarding NRE electricity policies completed by 1 <sup>st</sup> quarter 2003.	Study report	DOE and legislators support the study and will seriously consider the recommendations for the NRE Bill and other NRE-related issues.
NRE Electricity Pricing Study	Findings of pricing policy reviews and recommendations regarding NRE electricity pricing completed by mid-2003.	Study report	DOE and legislators support the study and will seriously consider the recommendations for the NRE Bill and other NRE-related issues.
NRE-based Power Generation Market Strategy	Findings of review of market development strategies for NRE-based power producers completed by 3 <sup>rd</sup> quarter 2003.	Study report	DOE and legislators support the study and will seriously consider the recommendations for the NRE Bill and other NRE-related issues.
1.4 NRE Planning Model	* More reliable NRE Planning model is used by NEA/RECs by mid-2003. * More systematic NRE planning starting 2004.	NRE Planning Model used by NEA and RECs	NEA and DOE support the development and utilization of a more reliable NRE planning model.
	Existing planning tools are updated and used to program NRE in Barangays by second half of 2003	Annual report of NEA	REC finds NRE technologies attractive.
1.5 Integrated Energy Planning	Findings of energy planning methods and recommendations regarding capacity building on integrated energy planning completed by mid-2003.	Evaluation report	

1.6 Policy Implementation, Monitoring & Evaluation	Enhanced energy planning models and forecasting tools completed by end 2002 and ready for use by DOE by mid-2003. * Evaluation of the policy implementation and impacts starting 2004 and every year thereafter.	Energy Planning Model installed in DOE  Documentation of policy impact analysis and recommendations for policy revisions/modifications.	NRE policy impact analysis is a regular activity of the DOE.
	Relevant recommendations on policy improvements are made and implemented by end of each year starting Year 3	Documentation of policy reviews and recommendations	NRE Bill includes provision of policy reviews on NRE issues.
<b>2. NRE Market Enhancement</b>			
2.1 Set-up “One-Stop-Shop” (MSC)	MSC structure in place and operational by second half of 2002	Operational organizational structure	A Board of Directors and a CEO is selected to aggressively promote quality NRE market services.
	MSC is functioning as a fee-for-service agency by 2006	Annual Reports of the MSC	
2.2 Preparation of MSC Business Plan	MSC business plan is approved by Oct 2002.	Documentation of business plan	Project starts mid-2002
2.3 Capacity Building for MSC Staff	MSC staff are knowledgeable in the various aspects of NRE market services are providing such services by Jan 2003.	Documentation of staff training and staff time sheets	Staff NRE market service activities are monitored and recorded in time sheets
<b>3. NRE Information and Promotion Services</b>			
3.1 NRE Resource Inventory	Additional and updated NRE resource inventory data available to the public by mid-2003	Documentation on the resource inventory	Survey to cover areas not included in previous surveys.
3.2 National NRE Database Development	Components of a publicly accessible NRE database is resident in at least 6 agencies and is linked by a website by 2004, and used by NRE project developers and researchers.	Number of requests for data	Information can be readily assembled into database formats and keepers will allow public access.

3.3 Integrated NRE Info Exchange Service	<ul style="list-style-type: none"> <li>* Mechanics for the information exchange set-up by end 2002</li> <li>* Request for information by other organizations (local and abroad) are served by 2003.</li> </ul>	<p>Documentation on the information service</p> <p>Documentation of information service requests and receipt</p>	Links with NRE-related agencies, NGOs and private sector in the country and abroad are established.
3.4 NRE Website Development	NRE website developed by second half of 2002 and fully operational by 2003.	Number of "hits" in the website	Project proponents are web conversant and the website is advertised widely.
3.5 Consolidation of NRE Databases	NRE databases and other related databases are included in the National NRE Database by 2004.	Updated National NRE Database	Agencies where NRE-related data reside will cooperate in the sharing of their data/information.
3.6 NRE Advocacy & Promotion	<ul style="list-style-type: none"> <li>* A continuous program of awareness-raising and promotion of NRE is in place by end 2002, and carried out every year thereafter.</li> <li>* Funds are continuously allocated by the DOE in the program</li> </ul>	Documentation on the program DOE's annual budget allocation for the program	The program will continuously be evaluated and improved based on findings and recommendations of the evaluation.
	Potential proponents are informed of NRE benefits starting 2003	Number of NRE promotion events. Attendance at the events. Breadth and relevance of NRE promotion material.	Media and promotional campaigns are properly designed and targeted.
3.7 NRE Engineering Service Industry Development	<ul style="list-style-type: none"> <li>* At least 10 engineering and energy consulting firms are registered as providers of NRE services by end 2003</li> <li>* Institutional and regulatory requirements for the industry are defined by mid-2003.</li> </ul>	<ul style="list-style-type: none"> <li>* Company profiles of the NRE service providers</li> <li>* Documentation on institutional and regulatory requirements of the NRE industry</li> </ul>	NRE industry is regarded as a special industry, which will be governed by specific laws and provided special incentives.
3.8 Green Energy Rating Program	<ul style="list-style-type: none"> <li>* Guidelines for the rating program prepared by end 2002.</li> <li>* Rating program starts in mid-2003 and ratings given by end 2003</li> </ul>	<p>Documentation on the guidelines</p> <p>Documentation on the ratings</p>	Private sector views the program as an incentive to improve marketability and relevant government agencies support the program
<b>4. NRE Initiatives Delivery &amp; Financing Mechanisms</b>			

4.1 NRE Fund Establishment -Project Preparation Fund -Loan Guarantee Fund -NRE Micro Finance Fund	Funds established by 4 <sup>th</sup> quarter 2003 and implementing guidelines and fund management arrangements approved by 1 <sup>st</sup> quarter 2004.	Documentation on the approved mechanics and guidelines for each fund.	* Banks are familiar with all aspects of NRE project financing and implementation. * Arrangements with partner banks (for fund management) are completed. * Seed money contributions from EIES, GEF and DOE are confirmed.
4.2 Assistance Services to Finance Applicants	At least 25 applicants for each fund served/processed by the MSC each year starting 2004	Number of applications processed.	Preference given to projects that have already undergone pre-feasibility analysis.
4.3 RE Delivery & Financing Mechanism Demo Promo	At least 50 applicants for each fund are received after the workshop.	Number of applications received.	Private sector is interested in availing of the loans provided under the financing schemes.
4.4 Selection Criteria & Selection of NRE Eligible Projects	Eligibility criteria for each fund are set and approved by end 2003.	* Documentation on the selection criteria * List of eligible projects	Preference given to projects that have already undergone pre-feasibility analysis.
4.5 Monitoring & Evaluation of each Demo Sites	At least 50 sites are monitored and evaluated each year starting 2005.	* Documentation on the monitoring and evaluation activities	The projects to be monitored are those in their 2 <sup>nd</sup> year of operation.
4.6 Financing & Delivery Mechanisms Review	Evaluation of the effectiveness and viability of the financing schemes and the delivery mechanisms completed by mid-2005	Documentation on the review.	
4.7 Demo program Results Evaluation	* Evaluation of the demonstration program accomplishments completed by 3 <sup>rd</sup> quarter 2006 * Replication of NRE projects on both on and off-grid as well as electricity and thermal/mechanical applications with estimated	Documentation of the evaluation report. Number of NRE projects accessing financing.	Non-technical barriers are primary to the replication of NRE projects. Pilot mechanisms do not interfere with replication through the market place.



	aggregate capacity of 400MW starting 2003		
4.8 Sustainable Follow up Program Design	Follow-up program based on the evaluations and the creation of an NRE fund using loan repayments from the demo program completed by mid-2005.	Documentation of the program design	
<b>5. NRE Training Program</b>			
5.1 Design & Preparation of Training Materials	Training materials completed/updated 2 months before each training course.	Training materials	Capacity building needs of relevant stakeholders are already identified.
5.2 Organization of Training Programs & Study Tours	Organization and coordination completed at least 1 month before each study tour or training course.	Documentations of arrangements made.	
<b>5.3 Conduct of Training Courses &amp; Study Tours</b>			
Study Tour: NRE Policy	10 government and corporate policy and decision makers completed the study tour by end 2002.	Number of study tour participants and documentation on the results of the study tour.	NRE remains a priority for the GoP and for relevant private sector groups and industries.
TC: NRE Trainors	25 NRE technology trainors accredited by DOE by end 2002	List of accredited NRE technology trainors and training course report.	The market demand for NRE will attract relevant target groups. Training the trainers will be successful in leaving NRE pedagogy in institutions.
TC: Institutional Capacity Building	25 government and private sector personnel trained by end 2003.	Training course report	NRE is a priority for the GoP and relevant institutions (government and private) accepts the need for a coordinated effort towards NRE development.
TC: Rural Electricity Planning	25 NEA staff trained and applying the techniques/skills learned by end 2003	Training course report and documented “one-on-one” post-interviews of course participants.	NEA supports NRE-based power generation as part of its rural electrification program. The market demand for NRE will attract relevant target groups.

TC: Energy Pricing and NRE Electricity Pricing	25 DOE and ERB personnel trained and applying concepts learned by end 2003.	Training course report and documented “one-on-one” post-interviews of course participants.	NRE is a priority of the GoP and policies geared towards establishing “level playing field” are at least being worked out.
TC: NRE Project Financing	25 DOE and banking/financing sector personnel trained and providing support to CBRED by end 2003.	Training course report and number of trainees providing support to Component No. 4 implementation.	The market demand for NRE will attract relevant target groups.
TC: PPA Contracts and Negotiations	25 DOE/NPC personnel and prospective IPPs trained and applying concepts learned by 2004.	Training course report and documented “one-on-one” post-interviews of course participants.	The market demand for NRE will attract relevant target groups. Electricity market allows NRE-based power producers.
TC: Basic Concepts of Rural Electrification	One training course conducted each year starting 2002 for LGUs, BAPAs, ECs and rural banks till 2004	Training course reports.	The market demand for NRE will attract relevant target groups.
TC: NRE Project Management	One training course conducted each year starting 2002 for LGUs, BAPAs, ECs till 2004	Training course reports	The market demand for NRE will attract relevant target groups.
TC: NRE Technicians Training	At least 20 technicians recognized by DOE in Luzon, Visayas, Mindanao each year starting 2002 till 2004.	List of recognized NRE technicians and Training course reports	Recognized NRE technicians are employed by NRE system operators.
TC: NRE Project Appraisal for Rural Financial Intermediaries	One training course conducted each year starting 2002 for rural banks and micro-finance enterprises till 2004.	Training course reports	The market demand for NRE will attract relevant target groups. Concerns about risks associated with NRE projects is already reduced
TC: Rural NRE Entrepreneurial	One training course conducted each year starting 2002 for “O-Ilaw” proponents, NGOs/Pos till 2004.	Training course reports	The market demand for NRE will attract relevant target groups. Concerns about risks associated with NRE projects is already reduced

TC: NRE System Design, Operation and Maintenance	At least 20 engineering and energy consultants as well as NRE system equipment manufacturers recognized by DOE to provide NRE services each year during 2002-2004.	List of recognized NRE consultants and NRE system equipment manufacturers and Training course reports	NRE Industry is supported by the government
5.4 Documentation & Database Development & Management	Database of training materials and evaluation report prepared by end 2003 and regularly updated each year.	Database installed at the DOE	
5.5 Training Program Review	First evaluation of training program results completed by 1 <sup>st</sup> quarter 2003 and evaluation carried out each year thereafter.	Documentation of review reports	
5.6 Training Program Results Dissemination	Training program evaluation report prepared and disseminated by mid-2003 and every year thereafter.	Training program evaluation reports	The market demand for NRE will attract relevant target groups.
5.7 Sustainable Follow up Training Program Design	Sustainable follow-up program based on the evaluations completed by mid-2004.	Documentation of follow-up program	GoP and private sector supports continuing education in the area of NRE.
<b>6. NRE Technical Support</b>			
6.1 NRE System Utilization Best Practices	* Compendium of best practices completed and disseminated by mid-2003. * Best practices information included in NRE Database and Website by end 2004 and accessed by project developers and NRE users.	Documentation of best practices No. of access to database and no. of hits in website.	The market demand for NRE will attract relevant target groups to utilize the best practices.
6.2 RE Equipment Standard setting	National NRE system equipment standards established in 2004	Documented national standards	The industry is ready to set standards and become self regulating
6.3 Assessment of Capabilities of Local NRE Manufacturers	Assessment of capabilities (technical, financial and human	Assessment reports	Local NRE equipment manufacturers will cooperate and

	resource) of leading local manufacturers completed by mid-2003.		willing to divulge information about their operations
6.4 Performance Evaluation of Locally produced NRE Equipment	Performance evaluation of selected locally made NRE equipment completed by end 2004.	Performance evaluation report.	Local NRE equipment manufacturers will cooperate and willing to divulge information about their operations.
6.5 Potential Improvement & Efficient Designs for Local NRE equipment manufacturing	Identified/verified improvements recommended to local manufacturers and arrangements for TA in employing improvements completed by mid-2005.	Documentation of identified improvements and recommended actions.	Industry market volume and profit margins justify significant improvements in equipment quality.
6.6 Financial Assistance to Local NRE System Equipment Manufacturers	* Financing scheme for funding assistance to local NRE equipment manufacturers (including eligibility criteria and funding guidelines) approved by mid-2005 * Selected manufacturers avail of loans and implement improvements in their design and/or production process.	Documentation of financing scheme (including eligibility criteria and scheme mechanics). List of equipment manufacturers benefited by the financial assistance.	* Industry market volume and profit margins justify significant improvements in equipment quality. * Loan terms are acceptable to local equipment manufacturers.
6.7 Sustainable NRE Research & Development	NRE R&D program supported by NRE equipment manufacturers completed by mid-2006.	Documentation of the program	Local equipment manufacturers expresses interest and financial support.

## **ANNEX C**

### **STAP ROSTER TECHNICAL REVIEW (AND RESPONSE)**

UNDP/GEF Project: Philippines Capacity Building to Remove Barriers to Renewable Energy Development

Review by Gautam S. Dutt  
27 Sep. 2001

This reviewer strongly supports the project as described in the brief. A formal review according to GEF guidelines, and minor observations follow.

#### **KEY ISSUES**

##### **Scientific and technical soundness of the project**

The project is scientifically and technically sound. The barriers to renewable energy have been correctly identified, including extensive consultations with stakeholders. These barriers are similar to those in other developing countries. The approach taken to remove these barriers is excellent. The approach to reduce the cost of renewable energy technologies is based on reducing indirect costs (e.g. administrative barriers) as well as direct costs (by increasing the scale of implementation).

The potential market for renewable energy is presented and compared with current utilisation in Table 2. The assumptions used to estimate the potential are not given. However, these estimates appear reasonable and the project brief elsewhere (e.g. Annex E) demonstrates extensive analysis of completed, ongoing and planned renewable energy projects. In fact, according to project design the potential of the different renewable technologies is not specified, leaving the actual projects to be an outcome of decisions taken in the course of project implementation. A number of examples of sample projects are given in Annex G. This approach is better than deciding at the outset how many of what technologies are to be implemented over the five year period.

Training is an essential component of the project. This would ensure not only better awareness of the potential for renewable energy, and where these technologies are most applicable, but also how to install and maintain the equipment. This reviewer would suggest that these practical components of training be stressed in the project brief.

The financing mechanisms proposed are excellent, and demonstrate a great deal of awareness of that the barriers are, and how they are best surmounted. The financial incentives should be directed to reducing the barriers (such as infrastructure development tending to reduce direct and indirect costs). On the other hand, subsidies that only last the duration of the project do not help to reduce the barriers in a sustainable manner. This distinction has been very carefully taken into consideration in the project design.

Important barriers include perceived risks of unknown renewable technologies, and appropriate demonstration projects can help to surmount these barriers. The project brief has given adequate emphasis on the importance of demonstration projects as a part of the barrier removal process.

The Project Brief outlines some aspects of project monitoring. Monitoring to evaluate the success of any project is very important, for two reasons: to make sure that the planned tasks are actually being carried out, and also to make sure that the planned tasks are those best suited to achieve the results desired. While the detailed design of an adequate monitoring strategy is beyond the scope of the Project Brief, it should be included in the Project Document, considering both aspects mentioned.

### **Identification of global environmental benefits**

The principal global environmental benefits of this project are in terms of reduced emissions of CO<sub>2</sub> (a greenhouse gas) to the extent that renewable energy replaces burning of fossil fuels for producing heat or electricity. This is indeed the case for this project, and the reductions are quantified in Section 26 and Annex I (Section 26 incorrectly mentions Annex H).

**How does the project fit within the context of the goals of the GEF.** The project fits very well within the context of GEF goals, specifically through its Operational Programme 6.

**Regional context.** Not relevant for this project.

**Replicability of the project.** Many early GEF projects were prototypes, so that their successful implementation would lead to similar progress in other countries. At this point in time, many projects—including this one—are indeed replications of projects successfully implemented elsewhere. The objective is thus to make sure that the experience acquired in other countries from projects with similar goals are being applied to this project. This appears to be the case, since the project builds not only on successful and failed experience within the Philippines but also on similar experiences elsewhere. The successful implementation of this project will, in turn, lead to larger scale projects both in the Philippines and other countries.

**Sustainability of the project.** Technical sustainability requires that the infrastructure for maintenance, repair and replacement be created along with equipment installation. Economic sustainability is also important. As I have mentioned above, persistent subsidies do not remove barriers. The project brief recognises this and the tasks include addressing issues that need to be resolved over the course of the project to ensure economic sustainability. This reviewer has one concern in this regard. Renewable energy for rural electrification is often less expensive than conventional technologies and grid extension. Here, barrier removal is all that is necessary for project sustainability. However, many renewable electricity generation alternatives are not cost competitive with large-scale grid connected conventional generation alternatives, and may not be so by 2006, at project end. Attention should therefore be focused on those grid connected options (e.g. islands where the demand is not high enough for the scale of conventional

technologies to be as economically attractive) and specific renewable technologies which are competitive at a larger scale (e.g. wind). These options might be economically sustainable before project end, without any subsidies.

## **SECONDARY ISSUES**

**Linkages to other focal areas.** The promotion of renewable energy does not have a significant impact on other focal areas. One exception is the use of biomass. Technologies that convert biomass to energy might depend on the use of biomass harvested in a non-sustainable manner, leading to land degradation and loss of biodiversity. Attention should thus be given during project implementation that such negative impact is minimised or avoided altogether (e.g. through the use of agricultural and forest product residues as an energy feedstock, and not primary biomass).

**Linkages to other programmes and action plans at the regional and subregional levels.** A great deal of attention has been paid in this project brief to learn from previous programmes to promote renewable energy in the Philippines (a country with many years of experience and many institutions dedicated to it). These, and other planned projects, are summarised in Annex E. The project also integrates and complements a Dutch project on rural electrification using solar energy. Indeed, the GEF contribution sought for the project is a small part of overall project costs. Thus the project is *extremely well linked* to other programs.

**Other beneficial or damaging environmental effects.** To the extent that renewable energy will offset fossil fuels, there will be reduced air pollution emissions that would occur through the combustion of those fuels. In general the generally higher environmental impact of conventional energy sources will be reduced through this project.

**Degree of involvement of stakeholders in the project.** There is a great deal of involvement of stakeholders in this project. During the PDF, these stakeholders were extensively consulted, and they will be consulted formally throughout the project. Some of the project components were indeed the outcome of suggestions from stakeholders, e.g. the creation of a one-stop shop for renewable energy project delivery.

**Capacity building aspects.** Training at all levels is a significant part of the proposed project. Thus capacity building has been a central part of project objectives.

**Innovativeness.** Again, in the earlier years of GEF, when there were few successful projects, one sought innovative solutions to pressing problems. However, at this point in time, there is a large body of GEF experience, which can be drawn on, and the need for further innovations is less. However, the emphasis given on standards and product testing, given in this project and missing in many others, is well deserved. Many renewable technologies are based on small-scale equipment, much of which can be manufactured at a small scale, with inadequate capacity to control quality. This project recognises the problem and attempts to deal with it.

Minor suggestions.

Sec. 5 states that an NRE bill was presented in 1999. Elsewhere we are told that an NRE bill is pending for 10 years. Please clarify. Were there several NRE bills?

In various parts the abbreviation RE is used. Presumably this means renewable energy. I suggest that NRE be used throughout, to leave out any confusion about whether RE is different from NRE.

Section 7. Give absolute values of total energy consumption.

Sec. 8. Care should be taken to separate baseline projection (i.e. without project) from project-specific future demand for NRE.

Sec. 9 should cite Table 2 in the text. Table 2 should give some idea of where the “potential” numbers come from, or at least a reference.

Sec. 10 suggests a “goal of total electrification of all barangays by 2004”. (In Sec. 13, it states “by 2006”) Several points. Is this baseline? Even so, is not 2004 too soon? The number of barangays still not electrified should be stated here, or combine Sec. 10 and 13. Assuming barangays are villages, what is the average population of one?

Sec. 13 states that 4152 barangays are “suited for NRE electrification due to their distance from the grid”. In fact, NRE includes larger scale grid connected systems as well. Clarify.

Sec. 17 list item: “Limited uptake of NRE project opportunities – mainly grid connected NRE systems only”. Does this mean that most existing NRE projects are grid connected? This does not seem to be the case, unless we mean that these grid-connected systems are virtually all “mini-hydro” (see Table 2).

In fact it is not clear in various places what has been done or emphasised in the past. For instance, Sec. 22 (a) states: “government sticks to its approach of focusing on large-scale NRE projects”

Sec. 20. Figure. Problem here: how can the baseline and alternative scenarios differ in the first analysis year (2001)?

Sec. 25 states: ... “increase in animal waste consumption”. What?

Sec. 30 states a goal of over 350 MW in grid-connected NRE and 20 MW of off-grid power. The first number is very ambitious, but possibly can be attained. The 20 MW figure appears to be very high. I estimate 1 MW or 2 MW. (4000 villages with say 50 households each with 60W solar panel would only be 1200 kWp). Please verify.



Sec. 33. Please match title of (c) on list with heading in Sec. 36.

Sec. 36 first para. Add technology information (costs, performance, suppliers, etc.) to list.

Specify how REN could contribute to MSC.

## ANNEX C 1

### RESPONSE TO STAP ROSTER TECHNICAL REVIEW

UNDP/GEF PROJECT: CAPACITY BUILDING TO REMOVE BARRIERS  
TO RENEWABLE ENERGY DEVELOPMENT (CBRED)

#### KEY ISSUES

Scientific and technical soundness of the project

**Para. 2, 2<sup>nd</sup> sentence:** *The assumptions used to estimate the potential are not given.*

Response: The information on NRE potentials as shown in Table 2 are based on recent NRE resource assessments like for wind as determined in the Wind Energy Mapping Project conducted by NREL (National Renewable Energy Laboratory) in 1998. The potentials for solar, mini-, and micro-hydro, and biomass were based on resource mapping activities that were implemented under the Philippine Renewable Energy Project (1998). References for the estimate of NRE potentials have now been mentioned in the project brief in section 9.

**Para. 3, 3<sup>rd</sup> sentence:** *This reviewer would suggest that these practical components of training be stressed in the project brief.*

Response: As stated in Table 3 of the project brief, there will be 3 NRE Technician's Training Courses that will be conducted under Component 5 of the CBRED Project. In these training courses, technicians will be trained on the installation and maintenance of NRE system equipment. The specific details of these activities have now been added in the project brief in section 38.

**Para. 6, 3<sup>rd</sup> sentence:** *While the detailed design of an adequate monitoring strategy is beyond the scope of the Project Brief, it should be included in the Project Document, considering both aspects mentioned.*

Response: The Project Document will definitely include details of the general project monitoring and evaluation work that will be undertaken during project implementation. We would like to point out that specific monitoring and evaluation (M&E) activities have been proposed for specific components specially those wherein changes in the area of NRE development (e.g., policy, financing, training) are being proposed. For example, an activity (NRE Policy Implementation Monitoring and Evaluation) is proposed in Component 1, which would entail the monitoring and evaluation of the impacts of the enforcement of policy, pricing and regulatory measures that are recommended and implemented. Lessons learned around issues such as incentive mechanisms, further barriers to market uptake, communication and policy strategies will be identified and appropriate actions recommended. A similar type of activity (Monitoring and Evaluation of NRE Projects Implemented under the Demo Program) in Component 4, which would involve the monitoring and evaluation of the operating performance and economics of each demonstration scheme. An activity that would involve monitoring the impacts of the training courses that will be conducted under the

NRE Training Program (Component 5). These are in addition to the general M&E activities of the CBRED.

### **Identification of global environmental benefits**

This is indeed the case for this project, and the reductions are quantified in Section 26 and Annex I (Section 26 incorrectly mentions Annex H).

Response: Reference to Annex I will be made.

### **Sustainability of the project**

This reviewer has one concern in this regard. Renewable energy for rural electrification is often less expensive than conventional technologies and grid extension. Here, barrier removal is all that is necessary for project sustainability. However, many renewable electricity generation alternatives are not cost competitive with large-scale grid connected conventional generation alternatives, and may not be so by 2006, at project end. Attention should therefore be focused on those grid connected options (e.g. islands where the demand is not high enough for the scale of conventional technologies to be as economically attractive) and specific renewable technologies which are competitive at a larger scale (e.g. wind). These options might be economically sustainable before project end, without any subsidies.

Response: As the reviewer rightly put it, the project was designed without specifying the NRE technologies to be considered in the demonstration program, leaving the actual projects to be an outcome of decisions taken in the course of project implementation. The viability and sustainability of NRE systems for providing energy services is what the CBRED would be facilitating.

The CBRED will contribute to the facilitation of future NRE-based power generation projects by directly and indirectly removing barriers that have persistently hampered the market development of NRE in the country. Barriers/issues that have persisted since the early days of NRE development affects both off-grid and on-grid systems, although the major barriers are in the former. The demonstration program (Component 4) of CBRED would include, depending on their technical and economic merits, both off-grid and on-grid NRE systems. Annex G of the project brief provide examples of off-grid (e.g., San Carlos City Wind & Hydro Hybrid, Lukidnon Micro Hydro) and on-grid (ZANECO Micro-Hydro and ROMELCO Micro-Hydro) projects that can be eligible to avail of the financing schemes that will be demonstrated in Component 4. Take note that what will be demonstrated under the program is the “business angle” of NRE projects, and how such projects are designed, developed, financed and sustainably operated and maintained. However, it is expected that bulk of the projects (particularly those to be assisted under the Micro-Finance Fund) will be off-grid NRE systems.

### **Minor suggestions .**

Sec. 5 states that an NRE bill was presented in 1999. Elsewhere we are told that an NRE bill is pending for 10 years. Please clarify. Were there several NRE bills?

Response: The NRE Bill was first drafted and presented to Congress in 1989. Since then, it has undergone several discussions and revisions. The latest version is tabled for deliberations in the next session of Congress this year (Eleventh Session of Congress). Necessary corrections have been made on the project brief.

In various parts the abbreviation RE is used. Presumably this means renewable energy. I suggest that NRE be used throughout, to leave out any confusion about whether RE is different from NRE.

Response: We will be consistent in the use of NRE in the project brief.

Section 7. Give absolute values of total energy consumption.

Response: The total energy consumption is 256.31 MMBFOE as reflected in section 7 of the project brief.

Sec. 8. Care should be taken to separate baseline projection (i.e. without project) from project-specific future demand for NRE.

Response: NOTE: This response is in conjunction with comments on Sec 20 (below). The projections of NRE consumption are based on available historical data (up to 1998) and information on NRE installations in the late 90s. The forecasts were made starting year 1999, but the table just show the forecasts starting from year 2001. The Area Chart in Sec 20 of the project brief has been changed to a combination line and column chart to avoid confusion. There are actually no substantial differences between the alternative and baseline in years 2001 and 2002. The chart is based on the data in the tables in Annex I, where one can note that for year 2001 there are no “NRE project induced increments”, i.e., no additional NRE consumption. In year 2002, the estimated additional consumption (coming from off-grid NRE systems) is 0.00018 MMBFOE.

Sec. 9 should cite Table 2 in the text. Table 2 should give some idea of where the “potential” numbers come from, or at least a reference.

Response: Reference to table 2 will be added in the text. As stated previously, the information on NRE potentials as shown in Table 2 are based on 1998 NRE resource assessments like the Wind Energy Mapping Project (by NREL), and those carried out under the USAID-sponsored Philippine Renewable Energy Project. References for the NRE potentials estimate will be mentioned in the project brief.

Sec. 10 suggests a “goal of total electrification of all barangays by 2004”. (In Sec. 13, it states “by 2006”) Several points. Is this baseline? Even so, is not 2004 too soon? The number of barangays still not electrified should be stated here, or combine Sec. 10 and 13. Assuming barangays are villages, what is the average population of one?

Response: NOTE: This response is in conjunction with comments on Sec 13 (below). It should be 2004 as per the latest Philippine Energy Plan (2001-2010). Yes this is baseline. There are actually several NRE projects in the pipeline; many of them are in the final stages of implementation. Barangay is the smallest unit of government in the Philippines. Depending on the location and economic status, a barangay can be comprised of several

villages. Based on present classification, if one village is electrified (i.e., at least 10 households in the village), the entire barangay is considered electrified. Rural barangays could comprise a number of households varying from a few tens to several hundreds.

Large-scale grid-connected power generation can indeed also be NRE-based, and can be competitive with non-NRE-based systems. These kinds of projects stand the chance to be implemented because they are attractive investors who understood the economic benefits of such projects and have the resources, or adequate access to resources to finance such projects. However, in line with the macro-economical goal of the Philippine Energy Plan (i.e., economic growth with social equity and poverty alleviation), NRE development is also focussed on off-grid power generation as pointed out in Sections 4, 12 and 13 of the project brief. The objective of extensive utilization of NRE resources includes off-grid electrification projects, which are packaged with economic programs in coordination with relevant government agencies and sectors. There is currently a lack of private sector involvement in small to medium scale NRE projects. This is because of conflicting policies promoting competition and privatisation and those directed toward universal service and economic development. Consequently, fully competitive private sector driven electric supply markets shy away from remote rural areas where costs to serve are high and demand and ability to pay are low. The CBRED Project will contribute to the facilitation of the enabling environment for the development and widespread commercial application of NRE systems.

Sec. 13 states that 4152 barangays are “suited for NRE electrification due to their distance from the grid”. In fact, NRE includes larger scale grid connected systems as well. Clarify.

Response: See response for Sec 10 (above).

Sec. 17 list item: “Limited uptake of NRE project opportunities – mainly grid connected NRE systems only”. Does this mean that most existing NRE projects are grid connected? This does not seem to be the case, unless we mean that these grid-connected systems are virtually all “mini-hydro” (see Table 2). In fact it is not clear in various places what has been done or emphasised in the past. For instance, Sec. 22 (a) states: “government sticks to its approach of focusing on large-scale NRE projects”

Response: What is meant here is that many of the “favored” (*vis-à-vis* off-grid) NRE projects are those that are grid-connected. “Favored” in the sense that these projects are provided fiscal “incentives” like those provided in the Mini-Hydro Law. But investors are finding difficulties availing of these so-called incentives.

As in the past, when fully competitive private sector driven electric supply markets shy away from off-grid electrification projects in remote rural areas where costs to serve are high and demand and ability to pay are low, present initiatives are focussed on large-scale grid-connected NRE projects. In fact many of the NRE-based power generation projects in the DOE pipeline (see Annex C.1) are grid-connected.

While Sec 4 of the project brief mentions that off-grid NRE systems will be promoted, the first persistent barrier to NRE development described in Annex F explains the current situation regarding the types of NRE projects being implemented.

Sec. 20. Figure. Problem here: how can the baseline and alternative scenarios differ in the first analysis year (2001)?

Response: They are not. Please see response for Sec 8 (above).

*Sec. 25 states: ... “increase in animal waste consumption”. What?*

Response: This is a typo. What is meant here is increased waste-to-energy utilization.

Sec. 30 states a goal of over 350 MW in grid-connected NRE and 20 MW of off-grid power. The first number is very ambitious, but possibly can be attained. The 20 MW figure appears to be very high. I estimate 1 MW or 2 MW. (4000 villages with say 50 households each with 60W solar panel would only be 1200 kWp). Please verify.

Response: The figures quoted are based on the latest Philippine Energy Plan (2001-2010). These could also be gleaned from the data presented in Annex I. It should be noted that the CBRED project does not specifically target the achievement of the stated goal in Sec 30 of the project brief. Rather, the CBRED will contribute to the facilitation of various NRE projects that would result in the achievement of the target electrification goal.

Sec. 33. Please match title of (c) on list with heading in Sec. 36.

Response: The title will be corrected accordingly in the project brief.

Sec. 36, first para. Add technology information (costs, performance, suppliers, etc.) to list.

Response: We will include this among the information that will be covered in the database.

Specify how REN could contribute to MSC.

Response: Because of the involvement of various stakeholders in the area of NRE in the REN, it would be able to provide guidance/advice to the MSC in matters relating to meeting the needs of the NRE industry. Since the MSC will be the focal point for NRE market development in the country, it would need guidance/advice for it to serve as the effective link between the private sector-led NRE industry and the government for purposes of harmonizing expectations and mutual support.


## **ANNEX J**


### **GEF FOCAL POINT LETTER OF ENDORSEMENT**

## ANNEX D

### CBRED Project: Schedule of Activities

No.	Activities	2002				2003				2004				2005				2006			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>1</b>	<b>Policy/Planning Capacity Building</b>																				
1.1	NRE Intra-Agency Establishment																				
1.2	TA on NRE Bill																				
1.3	NRE Policy Analyses																				
1.4	NRE Planning Model																				
1.5	Integrated Energy Planning																				
1.6	Policy Implementation Monitoring & Evaluation																				
<b>2</b>	<b>NRE Market Service Institutionalization</b>																				
2.1	Set-up "One-Stop-Shop" (MSC)																				
2.2	Prep'n of MSC Business Plan																				
2.3	Can Building for MSC Staff																				
	Operation of MSC																				
<b>3</b>	<b>NRE Information and Promotion</b>																				
3.1	NRE Resource Inventory																				
3.2	National NRE Database Development																				
3.3	Integrated NRE Info Exchange Service																				
3.4	NRE Website Development																				
3.5	Consolidation of NRE Database Devt.																				
3.6	NRE Advocacy & Promotion																				
3.7	NRE Engineering Service Industry Devt.																				
3.8	Green Energy Rating Program																				
<b>4</b>	<b>NRE Initiatives Delivery &amp; Finance Mechanism</b>																				
4.1	NRE Fund Establishment																				
4.2	Assistance Services to Finance Applicants																				
4.3	RE Delivery & Financing Mechanism Demo Promo																				
4.4	Selection Criteria & Selection of NRE Eligible Prois																				
4.5	Monitoring & Evaluation of each Demo Sites																				
4.6	Financing & Delivery Mechanisms Review																				
4.7	Demo program Results Evaluation & Evaluation																				
4.8	Sustainable Follow up Program Design																				
<b>5</b>	<b>NRE Training Program</b>																				
5.1	Design & Preparation of Training Materials																				
5.2	Organization of Training Programs & Study Tours																				
5.3	Conduct of Training Courses & Study Tours																				
5.4	Documentation & Dhase Devt. & Management																				
5.5	Training Program Review																				
5.6	Training Program Results Evaluation & Dissemination																				
5.7	Sustainable Follow up Training Program Design																				
<b>6</b>	<b>NRE Technology Support</b>																				
6.1	NRE System Utilization Best Practices																				
6.2	NRE Equipment Standard Setting																				
6.3	Assessment of Capabilities of Local NRE Mfrs																				
6.4	Performance Eval. of Locally produced NRE Equipment																				
6.5	Potential Improvement & Efficient Designs																				
6.6	Financial Assistance to Local NRE Equip Mfrs																				
6.7	Sustainable NRE Research & Development																				

 = Project activity implementation

 = Follow-up/continuing activity



## Annex E

### COMPLETED, ONGOING AND PLANNED NRE PROJECTS

Completed Projects	Description	Accomplishments	Lessons Learned/Gaps
1. Philippine Renewable Energy Project	This is a USAID-funded project that provided technical assistance to support the analysis, development, implementation and evaluation of the USAID/Manila Mission's Climate Change Mitigation Program giving emphasis on Renewable Energy Activities.	<ul style="list-style-type: none"> <li>• Several NRE-related laws such as the EO 462 and ER 1-95 and their corresponding guidelines were amended but such amendment became irrelevant due to the recent passage of EPIRA.</li> <li>• Resource maps for solar, micro-hydro, biomass and wind resource data for selected island grids were prepared. Such maps are useful guides for macro-planning and initial site identification.</li> <li>• Technical trainings on the use of GIS and Homer/VIPOR software tools for off-grid electrification projects were conducted.</li> <li>• Several potential projects were initiated under TCAPP tasks.</li> <li>• Several appropriate delivery mechanisms for electrification projects were identified and analyzed.</li> <li>• The draft NRE Bill was reviewed.</li> </ul>	<ul style="list-style-type: none"> <li>• There is a need for funding support for conduct of detailed site-specific resource assessment to develop actual specific NRE projects (both off-grid and on-grid).</li> <li>• There is a need to establish an institution that will manage the various resources and technical information, which have been put together from the project and disseminate the same to potential users like investors, funders, decision makers and technology users.</li> <li>• Conduct of pilot projects employing the identified delivery mechanisms for NRE projects are needed to test their applicability under actual field conditions.</li> <li>• An NRE policy-making body involving relevant government agencies and selected private sector stakeholders needs to be established and tasked among others to develop the national NRE policy and program.</li> <li>• A comprehensive manpower training on the actual use of the software tools in planning, technology prioritization and implementation of electrification projects is necessary to optimize the</li> </ul>

Completed Projects	Description	Accomplishments	Lessons Learned/Gaps
			use of the tools and local fund and manpower resources, transfer the expertise to relevant groups in the energy sector and promote their widespread use as part of regular planning activity
2. Villa Escudero Micro-hydro Project	The project aimed to rehabilitate the existing 75 kW microhydro power plant and increase its capacity with the addition of 2 state-of-the-art micro-hydro units to increase the total capacity to 172.8 kW. Management decision was hinged not only to increase its in-house power generating capacity but likewise to offer new attraction to tourists.	<ul style="list-style-type: none"> <li>Two (2) micro-hydro units with a combined capacity of 97.8 kW were installed.</li> <li>Project had yielded favorable results in terms of energy supply reliability and savings far bigger than what was projected.</li> </ul>	<ul style="list-style-type: none"> <li>Apart from the loan provided, the facilitation work provided by PEI to make the project happen until completion made the difference from a traditional financing institution.</li> <li>There is a need for a One-Stop Shop to assist RE project developers in complying various approvals and documentation requirements of different government agencies and financing institutions without which private developers tend to be discouraged.</li> </ul>
Pagudpud 10-kW Pilot Wind Turbine Power Project	NAPOCOR and the Philippine Council for Industry and Energy Research and Development (PCIERD) of the Department of Science and Technology (DOST) undertook the pilot project to demonstrate its	<ul style="list-style-type: none"> <li>Twenty three (23) households in a fishing village in Ayoyo, Pagudpud, Ilocos Norte with a daily load demand of 16 kWh benefited from the project.</li> </ul>	<ul style="list-style-type: none"> <li>A scheme for sustainability should always be an integral part of a project framework; without it, the project is doomed to fail.</li> <li>There are various market delivery mechanisms to rural energization one of which is the RESCO approach. A government-initiated energization project that pumps in subsidies is more effectively implemented towards sustainability if undertaken</li> </ul>

Completed Projects	Description	Accomplishments	Lessons Learned/Gaps
	technical feasibility as a stand-alone electrification project.		through a private sector, say a RESCO. This scheme needs to be tried and demonstrated.
Gregorio del Pilar solar Home System Project	This is a technical cooperation project between the National Electrification Administration (NEA) and the German Agency for Technical Cooperation (GTZ). The objective was to provide electric power to the remote mountain town of Gregorio del Pilar in Ilocos Sur.	<ul style="list-style-type: none"> <li>• One hundred sixteen (116) standalone PV-SHS were installed. A community-based organization assumed the implementation of the project.</li> <li>• Proper training of end-users on the use and maintenance of the system was given by the equipment supplier. This helped ensure the continuing operation of the systems.</li> <li>• The community-based organization, which took the responsibility of continuing the operation of the project, accepted as collaterals the panels. This eased the burden of interested users in availing of the system even if commercial interest rate is used.</li> </ul>	<ul style="list-style-type: none"> <li>• Involvement of the community in the development phase of the project increases the level of acceptance of the project and its ownership by the community as a whole and the individual commitment of the participants in particular.</li> <li>• Proper training at the technician level and information dissemination among target users is vital for acceptance and sustainability of the project.</li> <li>• The community-based approach is a market delivery mechanism that works only when the community is well informed and is committed to make the project work.</li> <li>• Donor-driven projects can be configured towards sustainability as against the common approach of “dole-outs” or “highly subsidized” scheme.</li> </ul>
Solar Electrification in Remote Areas	This is bilateral project with the Belgian Government. It aims to improve the living conditions of the inhabitants of the island of Pangan-an in Cebu through solar	<ul style="list-style-type: none"> <li>• A 25kWp centralized PV power station has been installed and is presently supplying electricity to some 140 households. The number of household connections reached 180 but others were unable to sustain their monthly payments and were cut off.</li> </ul>	<ul style="list-style-type: none"> <li>• Another donor-driven and highly subsidized project, sustainability was not given adequate attention during the planning process.</li> <li>• DOE needs to ensure that all donor-driven projects are structured to support private sector effort and must at all time be geared to sustainability.</li> </ul>

Completed Projects	Description	Accomplishments	Lessons Learned/Gaps
	electricity supply.		<ul style="list-style-type: none"> <li>An electrification project that does not bring about additional income to the households by way of supporting income-generating activities does not give an added value and are often short-lived.</li> </ul>
Philippine-German Photovoltaic Water Pumping Project for Visayas and Mindanao	This is a bilateral technical assistance project with the German government through the GTZ. The objective is to provide solar photovoltaic water pumping systems to selected areas in Cebu, Mindoro and Leyte.	<ul style="list-style-type: none"> <li>Thirteen (13) solar PV pumping systems were installed for nursery and potable water supply. The four years of operation of the solar pumping systems led to improvements in the community in terms of migration and small-scale businesses. There was a significant improvement in the quality of life as well as health and sanitation in the community.</li> </ul>	<ul style="list-style-type: none"> <li>Clearly a demonstration project and a complete dole out for the beneficiaries, the aspect of sustainability was not made part of the implementation strategy. As a result when project funds dwindled, there was no money to buy replacement components were not made</li> </ul>
Davao del Sur Rural Electrification Project	A project with the Australian government and a local project implementor, the Business Center Davao (BCD) aimed to demonstrate the economic feasibility of PV-SHS for remote area electrification. Australian grant was PHP 7.9 MM, Philippine government counterpart PHP 9 MM and BCD PHP 3MM.	<ul style="list-style-type: none"> <li>Five hundred (76) units of SHS and 35 kW were provided to households and barangay facilities of the United Farmers and Fishermen Association of the Philippines in Malita, Davao del Sur.</li> </ul>	<ul style="list-style-type: none"> <li>Government is faced with problem of collecting dues and amortization from the implementor, the BCD due to poor collection of BCD from the beneficiaries.</li> <li>The extremely long delay in project implementation (2-3 years) was faced with grid extension by the time the equipment were ready for delivery. This demonstrates the bureaucracy the project had to face. New sites and recipients needed to be immediately identified within limited time. This points to the lack of market data, which could have been useful in the identification of new site.</li> </ul>

Completed Projects	Description	Accomplishments	Lessons Learned/Gaps
			<ul style="list-style-type: none"> <li>The project was taken advantage of by politicians who at the end did not pay for the systems they got.</li> </ul>
PROSOLAR Project of the DOE	<p>This is a technical assistance grant from the German government the first phase of which was implemented as “Isang Libong Pabahay: Pailaw Mula sa Araw”. The second phase was called the Solar Lantern Project. It is an incentive-based initiative aimed to install 1000 PV- SHS through the private sector specifically by giving rebates after they meet certain installed capacities.</p>	<ul style="list-style-type: none"> <li>Five companies were accredited namely: MATEC, Solar Electric, RULEC Corporation, Kyocera and C.C. Unson. Of the 5, only C.C. Unson availed of the incentive after it had installed 25 SHS with 75 Wp each in Isla Verde and Tingloy, Batangas.</li> <li>For Phase 2, the Solar Lantern for Rural Village Electrification Project, RULEC Corporation was contracted for PHP 601,000 to do feasibility studies on the environmental improvement for economic sustainability of SHS for rural electrification and the potential of solar lanterns for rural village electrification. The study pointed out that rechargeable solar lanterns are expensive and not appropriate for the target application.</li> </ul>	<ul style="list-style-type: none"> <li>The first phase of the project demonstrated the need to establish a service network with properly trained technicians tasked to provide timely maintenance services. Local residents may be trained and tapped for this purpose.</li> <li>There is a need for DOE to provide private companies invited to participate with site-specific market information. This task requires time and money which private companies are not prepared to take on specially if the market is relatively small. This is the main reason for the project’s very limited accomplishment compared to the target</li> </ul>
BELSOLAR Project	<p>This is a technical and financial assistance project from the Government of the Netherlands. Project site is Dupax, Nueva Viscaya, a very remote upland community in northern Luzon. The</p>	<ul style="list-style-type: none"> <li>Ninety-five (95) SHS were installed 91 of which are reported to be still functional. The rest have either been damaged or transferred to another site.</li> </ul>	<ul style="list-style-type: none"> <li>Target market must be adequately educated on the basic features of the RE technology including proper operation and maintenance. Information campaign must be a continuing activity since users tend to forget after sometime.</li> <li>The market delivery mechanism employed is through the local</li> </ul>

Completed Projects	Description	Accomplishments	Lessons Learned/Gaps
	aim is to install PV-SHS for home lighting and streetlights. The Development Bank of the Philippines through its Window III provided PHP 1.5 MM loan to the local cooperative for on-lending to the coop members for the lease purchase of the SHS systems.		<p>employed is through the local multipurpose cooperative. In this case, however, the lack of oversight has caused the cooperative to be remiss in remitting its collections to the bank even after the household users had dutifully paid their amortizations to the coop. A short refresher on management could have helped improve the operation of the coop.</p> <ul style="list-style-type: none"> <li>Being a very remote area, there was difficulty in bringing-in replacement components. Stocking a few often-replaced components could have been a practical approach to ensure timely repair and maintenance services.</li> </ul>
Burias Island NRE Project	This was one of the first solar PV projects in the country funded by the German government through GTZ. A financial and technical assistance package, the objective was to demonstrate a PV-based rural electrification scheme. Project site was Burias Island in Masbate. GTZ provided grant of 10% of the project cost. The balance was provided as loan by the	<ul style="list-style-type: none"> <li>One hundred (100) units of 50Wp PV-SHS were sold to households on a “lease-to –own” scheme.</li> </ul>	<ul style="list-style-type: none"> <li>Users of PV-SHS have the natural tendency to abuse their systems more commonly by deeply discharging their batteries or by-passing the battery control unit once it starts to malfunction. This shows the need for continuing education and information campaign on the proper use and maintenance of the systems.</li> <li>There is need to establish a service center in the locality with capability to do trouble shooting and immediate replacement of components. Once the systems are not in use, the owners will start not to pay.</li> </ul>

Completed Projects	Description	Accomplishments	Lessons Learned/Gaps
	DBP through its Window III program to the San Pascual Masbate Solar Power Corporation (SAPMASOPCO), the first solar PV cooperative. SAPMASOPCO. It re-loaned the PV systems to individual household users on a 3-year leasing scheme with monthly amortizations.		

On-Going Projects	Description	Accomplishments	Lessons Learned/Gaps
MSP: Palawan Alternative Rural Energy & Livelihood Support Project	This is a joint project of the UNDP, the GEF, Shell Philippines Exploration, and the Provincial Government of Palawan (PGP), which aims to enhance the capability of PGP to develop and implement NRE programs.	<ul style="list-style-type: none"> <li>Expected outputs include design on the risk sharing mechanism to support a RESCO, planning of an awareness campaign on renewable energy, and establishment of a renewable energy development center. At present, livelihood programs are being initiated.</li> </ul>	<ul style="list-style-type: none"> <li>Formal/Written commitment of LGU should be secured prior to implementation to avoid delays in implementation.</li> </ul>
Grant for Preparation of Rural Electrification Project (PHRD 1)	The World Bank, under the Policy and Human Resource Development Fund, funds this project. The project's scope of work is to implement Market Assessment on Rural	<ul style="list-style-type: none"> <li>Market assessment has been completed. It provided a better picture of the characteristics and profile of the unenergized barangays in the country in relation to socio-economic</li> </ul>	<ul style="list-style-type: none"> <li>The outputs are general representation but do not provide specific information for other barangays (except in those covered in the randomly sampled barangays). The latter information which are important</li> </ul>

On-Going Projects	Description	Accomplishments	Lessons Learned/Gaps
	<p>Electrification, Energy Resource Assessment and Technology Screening, Investment Mgt Contract (IMC) framework – Involving Private Sector in Rural Electrification, Pre-Investment Studies, and Project Integration for WB-financed off-grid Rural Electrification Project Using NRE.</p>	<p>conditions, energy demand consumption patterns for power/lighting using various fuels, among others. Useful for macro planning and decision- making.</p> <ul style="list-style-type: none"> <li>• Resource Assessment is ongoing. It aims to determine the characteristics of NRE resources in the country including the clustering/ dispersal of HHs.</li> <li>• Investment Management Contract Study shall look into the issues and mechanisms on how a private investor can bring in private risk capital to turnaround financially distressed ECs and in the process gain management control.</li> </ul>	<p>in private sector decision-making process needs to be gathered by actual study and survey of the target barangays.</p> <ul style="list-style-type: none"> <li>• Similar information needs to be gathered for other unelectrified barangays that are being considered for electrification through private sector investments.</li> <li>• Marginal ECs that need more help for re-engineering are not covered by the project.</li> </ul>
Rural Power Project (PHRD II)	<p>The project is one of the initiatives of the WB with funding from Japanese PHRD. It aims to accelerate rural electrification &amp; improve the operational efficiency &amp; financial performance of the rural power sector.</p>	<ul style="list-style-type: none"> <li>• Conduct of feasibility studies for 4-5 pre-identified provincial market packages for off-grid electrification</li> </ul>	<ul style="list-style-type: none"> <li>• There is a need to undertake detailed FS for the same market packages in order to establish the financial viability of undertaking project implementation by the private sector. Determination of specific RE power generation capacity, e.g. hydro, requires data gathering at the resource site. Similar detailed feasibility studies need to be made for other unelectrified barangays, which are candidates for private sector investments. Site-specific resource</li> </ul>



On-Going Projects	Description	Accomplishments	Lessons Learned/Gaps
			and market data also need to be gathered for each market package as basis for determining the viability of the off-grid electrification project.
Rural Electrification Institutional Strengthening	The REIIS of the ADB shall develop & strengthen institutional capability of the energy sector in implementing overall Rural Electrification (RE) Program to create sustainable development, and alleviation of poverty. Interventions include: training programs for planning and evaluation of RE projects, and functional instructions for RE technology operation and maintenance.	<ul style="list-style-type: none"> <li>• Manpower training in rural electrification – the trainings, workshops/seminars are aimed at providing key players and implementers with the basic skills and knowledge in planning, implementation and management of the off-grid, rural electrification RE projects.</li> <li>• Functional Instructions on Rural Electrification aims to identify the roles, responsibilities and functions of the different players in the rural electrification sector.</li> <li>• Procedural guidelines and instructions on the integration of livelihood and development projects into rural electrification program</li> </ul>	<ul style="list-style-type: none"> <li>• The project only targeted the skills deficiencies of the key players (DOE, NEA, NPC, PNOC, ECs) in the rural electrification sector and excluded potential players.</li> <li>• This is merely to study and suggest guidelines in the implementation of rural electrification program but will not attempt to implement its recommendations. There is a need to actually operationalize the proposed guidelines.</li> <li>• Projects that will use the recommended guidelines need to be tried in order to assess its applicability and effectiveness.</li> </ul>
Technical Assistance on Rural Electrification	An ADB-funded project, which aims to increase the operational efficiency of ECs, to accelerate electrification activities of selected ECs within their franchise areas and to link electrification projects with livelihood and sustainable development	<ul style="list-style-type: none"> <li>• The project was terminated due to its potential duplication of activities with WB-funded projects.</li> </ul>	<ul style="list-style-type: none"> <li>• An NRE policy-making body is necessary in providing oversight of all activities and initiatives on NRE and rural electrification to prevent duplication of activities and ensure complementation.</li> </ul>

On-Going Projects	Description	Accomplishments	Lessons Learned/Gaps
	activities in rural areas.		
Technical Assistance to the Development Bank of the Philippines for Capacity Building to increase RE lending (FINESSE)	A capacity building project aimed to enhance the capability of the DBP core group to increase the bank's lending for RE projects. Funded by the Dutch Government through the UNDP, main intervention is the conduct of technical seminars on different RETs for the core group.	<ul style="list-style-type: none"> <li>• Conduct of technical seminars on various RE technologies (RET) for DBP-Finesse core group</li> <li>• Development of lending guidelines for actual project financing for each RET</li> <li>• Development of lending guidelines for use of Project Preparation Fund; i.e. loan for doing detailed feasibility studies</li> <li>• Study tours for DBP senior management for RE orientation and appreciation</li> <li>• Strengthening of DBP's linkages with key RE players, e.g. DOE, NEA, LGUs and private sector</li> </ul>	<ul style="list-style-type: none"> <li>• Study tour is an effective way of making senior management understand, appreciate and support the Bank's NRE lending program</li> <li>• Need for site-specific resource and market data as basis for developing project proposals for bank financing and evaluation of financial viability</li> <li>• Need to inform and educate target RE users, loan proposal evaluators and approving authorities on the features and inherent characteristics of RE technologies vis-à-vis their conventional alternatives</li> <li>• Insufficient loan ceiling currently available from FINESSE for doing project preparation activities e.g. detailed FS</li> <li>• Early installations of solar PV systems which are no longer operational due to poor maintenance have created poor public image and acceptance of the technology</li> <li>• Some project proponents are not credit worthy and need loan guarantee to be able to access financing from funding institutions like the DBP</li> <li>• Need to enhance bank's appreciation of energy management and efficiency and capability to evaluate related loan proposals</li> <li>• Existing power and energy</li> </ul>

On-Going Projects	Description	Accomplishments	Lessons Learned/Gaps
			<p>infrastructures are geared toward conventional energy systems which are heavily subsidized and puts RETs in an uneven footing</p> <ul style="list-style-type: none"> <li>• Need to incorporate environmental costs in the pricing scheme to make RETs competitive with conventional alternatives</li> <li>• Some government projects give substantial subsidies to end-users and result to price distortion and pose competition to private sector initiatives</li> </ul>
Off-Grid Electrification of Alaminos, Aklan	<p>Alaminos, Aklan has been unelectrified until after Shell Philippines Exploration and Community Power Corporation of the USA decided to put up a 10.2 kW solar PV-LPG hybrid electrification project following a RESCO approach. The first in the country, the RESCO sells electricity services to about 90 households in the barangay. A biomass livelihood component is underway.</p>	<ul style="list-style-type: none"> <li>• Provision of electricity mainly for lighting to some 90 HH a biomass livelihood component is underway</li> </ul>	<ul style="list-style-type: none"> <li>• Project financial viability is essential component of sustainability</li> <li>• PV and LPG singly or in hybrid are technically proven to be viable sources of power for rural electrification; however related investment costs and their life-cycle cost need to be seriously looked at as a basis for determining their viability and sustainability</li> <li>• Highly subsidized demonstration projects create good public image but are difficult to sustain and replicate; hence bring about false expectation to other potential markets</li> <li>• RESCO is a potential delivery mechanism to provide electricity services to unelectrified barangays; however, since RESCOS operate for profit, the life cycle cost of the energy</li> </ul>

On-Going Projects	Description	Accomplishments	Lessons Learned/Gaps
			source is a major consideration
Energization of Rural Palawan through Renewable Energy	Jointly funded by the DOE and the DBP, 400 solar PV home systems shall be installed in two (2) unelectrified barangays in Palawan namely Sabang and Bahile. The provincial government of Palawan (PGP) is the project proponent while the local electric cooperative, PALECO, is the implementor. DOE funding which comes as grant is intended to bring down systems cost and make the systems affordable to the market.	<ul style="list-style-type: none"> <li>• Loan proposal has been approved by DBP</li> <li>• Actual implementation shall happen upon PGP's compliance to DBP's collateral requirements</li> </ul>	<ul style="list-style-type: none"> <li>• Commitment of the highest official in the LGU is very important in facilitating submission of documents and approvals in compliance to bank requirements</li> <li>• Highest LGU official must be involved beginning the early stage of project development in order to identify him with the project by making him part of the planning process</li> <li>• For stand-alone PV systems, smart financing schemes are needed to bring down systems cost to affordable level</li> <li>• Provision for maintenance (e.g. replacement of components like battery) must be built into the monthly payments of users to ensure continuous operation of system</li> <li>• Consultation/ awareness campaign at the level of end-users help create understanding and acceptance of the technology</li> <li>• For decision makers, knowledge of RETs facilitates the most practical decision on technology choice</li> <li>• Primary market and resource data are needed to identify the most appropriate RET and financing mechanism</li> <li>• There is a need to train local technicians on the maintenance aspect</li> </ul>

On-Going Projects	Description	Accomplishments	Lessons Learned/Gaps
			of RETs as basic input to sustainability of the project
Municipal Solar Infrastructure Project	This is a 5-year AusAID-funded project which was implemented by DILG in 1997. The project aims to support the delivery of health and other essential services to very remote areas in the Visayas and Mindanao through the provision of solar powered facilities and appropriate training in the targeted municipalities and communities for sustained development.	<ul style="list-style-type: none"> <li>About 910 packaged PV systems for community applications were installed in 49 municipalities in identified Social Reform Agenda Provinces in Visayas and Mindanao.</li> </ul>	<ul style="list-style-type: none"> <li>The project showed that the use of packaged NRE systems, if supported by intensive community-based trainings, is effective in the fast-track implementation of NRE projects. There is a need for a service center, which can provide advice and disseminate information and product profiles of packaged NRE systems by existing local and international NRE suppliers.</li> <li>There is a need to expand the same initiative to other deserving poor rural communities but must require integration of cost recovery schemes either in full or in-part through repayment by beneficiaries according to their capacity to pay as well as other possible local counterpart contributions.</li> <li>The project also emphasized the importance of post-installation activities such as user trainings on maintenance and repair and the availability of spare parts to ensure sustainability.</li> </ul>
Pangan-an Island Solar Electrification Project	The project demonstrates the technical feasibility of centralized PV electrification. This is a pilot project of such scheme.	<ul style="list-style-type: none"> <li>Sponsored a 22.5 kWp centralized PV system that benefits 280 households.</li> </ul>	<ul style="list-style-type: none"> <li>This is a donor driven project where the Belgian government has identified the system to be used, in this case the centralized PV system and where it will be installed.</li> </ul>

On-Going Projects	Description	Accomplishments	Lessons Learned/Gaps
			<ul style="list-style-type: none"> <li>There is need to set guidelines on how similar future donor-driven projects must be developed and implemented in support of the national RE development program.</li> </ul>
Environmental Improvement for Economic Sustainability	This is a Dutch-funded project which aims to install 15,000 solar home systems in Regions I, II and CAR (could be extended to Regions IV and V) and will be undertaken by PNOC.	<ul style="list-style-type: none"> <li>The implementation of the project has just started. The provision of SHSs will be tied up with the demonstration program of the CBRED Project.</li> </ul>	<ul style="list-style-type: none"> <li>Results of the preparatory activities has indicated the need for further capacity building for the national government in designing more appropriate NRE technologies vis-à-vis local needs of the target beneficiaries.</li> <li>Another donor-driven project, there is need to set guidelines on how similar efforts must be developed and implemented in support of the national RE development program</li> </ul>
Rural Electrification Project	This refers to the current off-grid NRE electrification projects being initiated by the national government agencies in support of the overall “O Ilaw” Program w/c aims to attain 100% barangay-level electrification by 2006.	<ul style="list-style-type: none"> <li>DOE, NEA, NPC-SPUG and PNOC have collectively energized a total of 2541 barangays within 21/2 years using both NRE and conventional energy sources, Total accomplishment however is behind by about a thousand barangays for the same period.</li> </ul>	<ul style="list-style-type: none"> <li>There is a need to identify a more systematic set of strategies that will accelerate electrification activities on a least-cost approach and maximize the use of available resources (financial and manpower) for off-grid NRE electrification.</li> <li>Financial incentives and technical support must be developed and implemented to attract more private investors and other potential project players in implementing off-grid NRE electrification.</li> <li>There is al need to enhance government capacity to develop specific policy guidelines in</li> </ul>

<b>On-Going Projects</b>	<b>Description</b>	<b>Accomplishments</b>	<b>Lessons Learned/Gaps</b>
			classifying the remaining unelectrified barangays either for off-grid NRE or grid-extension projects.
UNDP-JMFA funded NRE Wind-Solar Hybrid project	DOE , in cooperation with its Affiliated Non-Conventional Energy Centers, initiated a renewable energy project that will Install a 5 kW solar/wind hybrid system for 50 households in Sition Sicud, Candawaga, Rizal, Palawan.	<ul style="list-style-type: none"> <li>The project has recently commenced and the necessary project management group is currently being formed.</li> </ul>	<ul style="list-style-type: none"> <li>Commitment of LGU should be secured prior to implementation to avoid delays in implementation</li> <li>Project seeks to determine the commercial feasibility of such hybrid system.</li> </ul>

<b>Planned/Pipeline Projects</b>	<b>Description</b>	<b>Accomplishments</b>	<b>Lessons Learned/Gaps</b>
Solar Power Technology Support Project	The project's focus is on agricultural productivity and agri-business by providing different solar energy systems to 74 agrarian reform communities (ARC).		<ul style="list-style-type: none"> <li>The project is focused on the use of PV systems for various applications in DAR's ARCs.</li> <li>Close coordination with DOE is required especially if the ARCs are already energized through the grid.</li> <li>End-users' training is a key component for the sustainability of the project.</li> </ul>
Photovoltaic Rural Electrification Service Project	To be financed by the French Protocol, it involves the installation of solar PV systems for various applications and initiation of livelihood projects for unelectrified barangays in Visayas and Mindanao.		<ul style="list-style-type: none"> <li>There is a need to provide financial assistance to project proponents for project preparatory activities such as conduct of pre FS and detailed FS.</li> </ul>
Municipal Integrated Social Development Project	Proposed for funding by the OECF through the DILG, it aims to provide about 4600		

Planned/Pipeline Projects	Description	Accomplishments	Lessons Learned/Gaps
	PV systems to power schools, health clinics, barangay halls and other rural infrastructures all over the country.		
Municipal Solar Infrastructure Project II	Proposed for funding by the Spanish Government through DILG, the basic objective is the delivery of health and other essential services to remote areas in Regions 5, 4 and CAR through provision of solar-powered facilities coupled with appropriate training		



## Annex E.2

### Philippines: NRE Projects on the Pipeline

Proponent	Description	Capacity	Location
Asia Power International, Ltd.	Tidal Current Exploration and Development	30 – 600 MW	3 sites in Central and Southern Philippines
Hebro Tech Industries, Inc.	Wave-Propelled Pilot Power Plant	1 MW	2 sites in Southern Luzon
First Philippine Energy Corp.	Wind Power Plant	80 MW	Several sites in Central and Southern Philippines
First Philippine Wind	Wind Energy Farm	80 MW	Burgos and Pagudpod, Ilocos Norte
PNOC Energy Development Corporation	Wind Power Plant	40 MW	Burgos, Ilocos Norte
SB-RESCO	Wind Power Plant	40 MW	3 sites in Negros Occidental
Northwind Power Development Corporation	Wind Power Plant	60 MW	Ilocos Norte (2 sites)
BreezElectric – Philippine Hybrid Energy Systems, Inc	Wind Power Plant	2.25 MW	Catanduanes
	Wind Power Plant	3 MW	Marinduque
	Wind Power Plant	13.5 MW	Mindoro Oriental (2 sites)
	Wind Power Plant	0.3 MW	Mindoro Occidental
	Wind Power Plant	3 MW	Masbate
	Wind Power Plant	1 MW	Romblon
	Wind Power Plant	1.5 MW	Tablas Island
	Wind Power Plant	5.1 MW	Palawan (3 sites)
	Wind Power Plant	1 MW	Siquijor Island
	Wind Power Plant	3.0 MW	Tablas Island
	Wind Power Plant	0.5 MW	Aurora
	Wind Power Plant	0.5 MW	Polilio Island
Windpark (Phils), Inc.	Wind Power Plant	TBD	Mindanao (5 sites)

*NOTE: Except for the projects of First Philippine Wind Corp., PNOC-Energy Development Corp., SB-RESCO, and some of the projects of BreezElectric, the others are still in their early stages of project development.*

## **Annex F**

### **PERSISTENT BARRIERS TO NRE DEVELOPMENT IN THE PHILIPPINES**

Since the 70s, the government has carried out efforts to develop and commercialize NRE technologies, as part of the strategy to utilize indigenous energy resources to support sustainable development. However, in a manner where the development efforts on NRE are limited to “on and off” promotion and the implementation of technology-, and donor-driven pilot projects rather than the identification of markets and applications, the commercialization stage suffers and lags behind. At the same time, there are various barriers that hindered the government in furthering its cause regarding NRE as learned from previous and even ongoing NRE projects. The following are specific barriers that were cited from various reviews/evaluations of the present state of affairs in the area of NRE development in the Philippines.

#### **1. Non-comprehensive development plan on NRE**

Despite the not-so-favorable experience in previous NRE initiatives, the government sticks to its approach of focusing on large-scale NRE projects in its energy development efforts. The projected NRE system growth in the latest PEP (2000-2009) focuses mainly on the development of such projects, which are supply additions to the main grid. Nothing much is mentioned about small-scale applications that are considered more effective in remote and more depressed areas. In this regard it could be concluded that traditional policy, planning and implementation processes have not successfully tapped NRE for developmental objectives. This barrier is attributed to inadequate information on NRE, lack of an integrated development framework on NRE, and unclear role of stakeholders and their minimal participation in planning process

#### **2. NRE projects are not directed towards sustainability and real market approach**

The government’s NRE efforts show heavy reliance on technology-driven projects implemented by or for government agencies with little stimulation of private sector activity. Since these installations use equipment specified or made available by a donor rather than reflecting the site and use requirements of the purchasers or recipients, most of these projects were not sustainable. Most projects/programs of the DOE on NRE are considered unsustainable because they are highly subsidized and would bring about market distortion.

#### **3. Lack of coordination and non-integrated programs on NRE**

Relevant institutions in the energy sector and economic development have been pursuing their respective plans and programs on NRE in an uncoordinated manner as a result of the absence of an NRE development framework. Roles are not delineated properly

for various agencies involved in NRE as well as those wanting to get involved. The existing energy planning framework does not facilitate participation from NGOs, civic and people's organizations, not realizing the fact that with their wide base and far-reaching networks, these entities can contribute significantly in the information dissemination process.

#### **4. Lack of clear policies and appropriate legislation on NRE applications**

Specific regulatory and policy barriers to NRE in the country take the form of the absence of appropriate policies, and the existence of conflicting, vague or non-responsive policies. Presently, there are conflicts or inconsistency between policies promoting competition and privatization, and those directed toward universal service and economic development, as fully competitive markets do not allow for subsidies and are unlikely to serve remote rural areas. There is also lack of policies to attract/sustain private sector investments, particularly for off-grid power systems

#### **5. Lack of appropriate incentives for NREs**

The private sector strongly feels that highly subsidized government projects (grant-in-aid or soft loan packages from foreign donor countries), run counter-productive to the commercial renewable energy sector. Current incentives from the Board of Investments (BOI) have not been accessed by a lot of renewable energy projects. This is because of the lack of clear guidelines and descriptions on the constitution of its products and equipment. There is also an unclear jurisdiction and coordination mechanism between the DOE and Bureau of Customs in the classification of products. Likewise, the applicability of "incentives" is confined only to "power plant applications". BOI incentives are based on power producer model and do not apply to renewable projects. For example, solar projects that cater to household applications are not eligible to avail of the incentives since they don't fall under the category of power producers.

Since NREs projects require higher front-end capital cost and local companies are not able to come up with a sufficient investment base, the much needed foreign investment is impeded by the 60:40 local:foreign ownership ratio requirement on medium to large scale NRE projects. Moreover, existing tax duty exemptions do not offer much advantage to the commercialization of NREs.

The goal of promoting NRE projects through fiscal incentives is mired in slow procedures and project certification.

#### **6. Uneven playing field in the area of NRE**

NRE finds itself competing in an uneven playing field where there is no mechanism allowing for the inclusion of externalities in energy pricing. The present energy pricing policies do not consider environmental effects, allowing the continued use of conventional energy sources despite huge environmental costs. Moreover, there is the issue of distortion in the price structure due to donations and subsidies, which unintentionally pose competition to the private sector

Conventional energy projects are provided fuel guarantees by government and are routinely allowed to pass through fuel price increases to the purchaser. However, NRE projects do not receive such consideration as to guarantees. For example mini/micro-hydro project developers are provided special privilege tax (2% of gross receipts), but this neither replaces existing taxes nor protects them from additional tax burdens imposed by LGUs. Their facilities are subjected to the same rules as larger hydro facilities even if they are run-of-the river types (without dams) and have less environmental impacts. Moreover, the use of RE resources for power generation is subject to a substantial production sharing tax. Such tax is at a level commensurate with those applied for coal and fuel oil, thus creating an incentive for increasing the use of more highly polluting sources of energy.

#### **7. Utility regulations are not favorable to renewable energy development.**

The existing criteria for NRE to be granted fiscal incentives are “lumps on the throat” for prospective developers, so to speak. These range from the 5-year track record of a project sponsor to a 95% NRE “content” for hybrid projects; from a required 60% thermal efficiency rating to the provision of spinning reserves at all times. These requirements are clearly bias in favor of conventional systems. With the passage of the Omnibus Power Bill, another hurdle to overcome is the requirement for an existing 10-year contract with NPC as a precondition to buy non-NPC power. Another NPC restriction limiting the maximum wind electric capacity of 15 MWe to be installed in any given year (starting 1998) lessens potential developers' interest to pursue similar projects.

#### **8. Difficulty in establishing a power contract**

This has been the current case highlighted by frustrations of developers to negotiate contracts with NPC, both for small- and large-scale projects. With the advent of the passage of the Omnibus Power Bill however, prospective developers may be relieved of this problem. However, selling to a utility, other than NPC, would require knowledge in negotiating PPAs by the NRE developers. Among the important issues to consider here is the absence of standard contract procedures concerning the supply and pricing of NRE resources to generate electricity (e.g., supply of biomass like bagasse), as well as standard power purchase agreements that can be used by NRE power generators in negotiating the sale of their electricity to a utility.

#### **9. Difficulty in accessing traditional financing windows**

This barrier is specifically due to the limitations in project size, markets and balance sheets of project proponents. Many project proponents are aware of the available financing schemes for NRE projects and they are also aware that they are not able to avail of most of these NRE-unfriendly financing packages. The government does not provide guarantees for NRE projects. NRE projects are usually too small individually for consideration by the government.

Since NRE projects are perceived to be high risk, local-based developers have difficulty accessing support for feasibility studies and project financing from banks and regular financial institutions. On the financing packages available, schemes for NRE are prejudiced by

a repayment period limit of 3 to 5 years, in contrast to conventional fuel systems' package where repayment periods can be extended. Although DBP, through its FINESSE project gives up to 12 years for mini-hydro loans and up to 7 years for solar PV, still the traditional bank collateral requirement is the most difficult to comply with and is a major barrier for obtaining loan approval. A Loan Guarantee Fund will definitely be a welcome development.

#### **10. Lack of support from Government Banks**

Aside from the typical barrier of lack of familiarity on NRE projects by commercial banks and financial institutions, and their lack of interest to support NRE projects, which are typically small-scale, a big barrier is encountered with government banks like the Development Bank of the Philippines (DBP). Under the FINESSE project, it is suppose to relax its lending procedures and terms for projects like NRE. However, this is not the case and consequently, there are few takers of the financing facility that it offers for NRE project developers. This is a clear case of conflict of NRE objectives and the banking (development and commercial) policies of the government. Although the terms and conditions of the lending guidelines have been somehow softened in support of the CBRED, the real problems why there are few projects funded though there are some money available for lending include among others the lack of proposals really ready for implementation (meaning they are not supported with adequate preparatory studies like market assessment and the like), the problem with compliance to collateral and requirement for PPA, etc.

Local and international development companies do not show much interest in providing seed money or investment capital to projects lower than 10 MWe, due to lead times and the small size of the deal and no financial institution or bank will undertake financing at small project levels.

#### **11. Lack of capacity in project packaging and presentation among NRE project proponents**

While there is a modest level of knowledge in doing technical and economic studies, there is inadequate capacity in packaging projects and in presenting bankable projects. Worthwhile NRE projects often fail to get financing assistance because of poor project packaging and presentation. Many projects are yet to be advanced to a stage where they can be presented to financing institutions or other entities that can provide financial assistance.

#### **12. Inadequate knowledge of NRE market conditions**

Unavailable and segregated information on NRE market conditions and status results in the lack of reliable technical information to showcase NRE systems. Aggravated further by reports of failures in project implementation, the general public perceives NRE projects as weak and to the extent, a dubious undertaking. NRE systems are not yet fully understood by policy makers and the public as well.

### **13. Lack of private sector involvement in small to medium scale NRE projects**

Because of conflicting policies promoting competition and privatization, and those directed toward universal service and economic development, fully competitive private sector driven electric supply markets shy away from remote rural areas where costs to serve are high, and demand and ability to pay are low. In this regard, the government's rural electrification efforts have not fully and successfully taken advantage of NGOs and private developers to derive new and innovative approaches to NRE development that supports countryside economic development. For one thing, there are no incentives yet in place to encourage the establishment of private sector-led RESCOs, such as being able to charge unregulated rates and to operate in the franchise area of RECs. With the recent approval of the Energy Bill or EPIRA (Electric Power Industry Reform Act) the ECs are mandated to open up to private power generators.

### **14. Inadequacies in the area of NRE technology development**

- Lack of competence - Local technicians and end-users are still largely unfamiliar with the application of NRE technologies.
- Lack of product standards, quality control measures, testing and verification - The quality of materials and other components of NRE technologies are not adequately monitored, allowing the entry of sub-standard equipment. This works to the detriment of the indiscriminating client. The proliferation of sub-standard products in the market aggravates the image of the technologies, and lowers market acceptability.
- Reliance on imports - The market for NRE is underdeveloped, thus making the local production of NRE products or components an unattractive investment opportunity. Almost all components of NRE systems are still being imported. Local manufacturing capability is negligible as well.

### **15. Non-availability of up-to-date and comprehensive NRE data**

Although NRE data are believed to be with DOE, in reality these are not comprehensive enough, and that there are also other institutions that house these data. The segregated, non-integrated data gathering system on NRE, and the inability of the NRE project developers to assess such data are hampering efforts not only to promote NRE but also to design effective NRE delivery systems. Data on the characterization and potentials of, and demand for, all the NRE resources in the country are not regularly updated and disseminated. Cost-effective systems for obtaining and accessing such data are presently not in place.

### **16. Lack of success stories on sustainable NRE applications in the country**

A basic reason why market awareness is low and limited is the few success stories known, related to the technical and economic/financial sustainability of NRE projects. Documentation of viable and sustainable project models that showcase the technologies' sustainability remains insufficient.

#### **17. Lack of technology extension to users and suppliers of NRE technologies**

Many of the training programs on NRE that have been carried out under previous NRE projects have catered to the upgrading of the technology needs of government personnel (e.g., DOE, NEA) but not the technology and skills upgrading needs of the people who will operate NRE systems, particularly those in the rural areas. There is not enough focus on strengthening NRE technology training and education in applications of NRE for off-grid communities. There is also a clear lack of management competence for entrepreneurs who venture on NRE systems.

#### **18. Ineffective NRE Promotion and Advocacy Programs**

Despite the many activities that have been carried out in the past, there is still lack of users' and government decision-makers' awareness of NRE, particularly in LGUs. There is also the problem of inadequate information on NRE resources and applicable NRE technologies, which project developers, financiers and users can utilize in planning, designing and developing NRE initiatives.

Because of the rather low awareness and knowledge about NRE systems among the target users especially in rural areas, sustainability of NRE projects (government or private sector) is not realized. This is brought about by minimal participation and contribution from stakeholders in planning process, lack of local competence in project development and design, and lack of capacity and organizational maturity of communities and organizations to mobilize local skills and preserve the viability of an NRE system through sustained cooperation.



## **ANNEX G**

### **SAMPLE PROJECTS FOR DEMONSTRATION PROGRAM**

The following 4 project profiles describe typical projects that can be assisted by appropriate financing and delivery mechanisms. These projects are all at a pre-investment stage of development but for a range of reasons have not proceeded. Component 4 of the proposed GEF-supported project will provide project development and implementation assistance through loan securitization, assistance with project preparation, the provision of soft loans and the identification of attractive financing and funding packages to allow projects such as these to proceed. These projects are examples of typical renewable energy applications, both grid-connected and remote community, that might be expected to apply for funds but none are at the stage where firm commitments can be developed. They are presented here as typical examples of applicants to the financing schemes but not necessarily the confirmed recipients of assistance under this program.

#### **1. Financing Mechanism: Project Preparation Fund**

Title of Project: Wind and Hydro Hybrid Project in San Carlos City, Negros Occidental

##### **The Proponent**

Smith Bell RESCO, one of the two (2) existing RESCOs in the Philippines is the proponent. It was established about two years ago and is aggressively looking for different RE project opportunities.

##### **The Project**

Smith Bell RESCO is interested to tap both wind and hydro resource potentials in the province of Negros Occidental which from a satellite wind mapping project conducted by the National Renewable Energy Laboratory of the US, is one area identified to have a good wind regime. Taking off from the NREL study, Smith Bell RESCO spent its own money in putting up three (3) wind monitoring stations in Negros Occidental and nearby area in January 2000. As of March 2001, fifteen (15) months of wind data have been collected and initially analyzed and data gathering is continuing. To date, Smith Bell has spent about \$30,000 for the purchase and installation of the wind monitoring equipment and related operating expenses for data collection, which is about 50% of the feasibility study cost.

Hydro resource is also bountiful in the province of Negros Occidental. Hydrologic maps and the townspeople attest to this potential. Considering however, the country's two (2) distinct seasons, dry and wet, hydro potential must be determined based on present actual hydrologic data gathered on-site to establish the average hydro power potential of a particular river or stream year round.

Wind and hydro resources like any other RE resources are not available at the same intensity year round. Hybrids with other RE resources or even with conventional diesel power generating system are options to increase the system's level of power supply availability.

At present, Smith Bell RESCO is looking for funding to pursue the feasibility study for both the wind and hydro sites and their possible hybrid. It has invested its own money for related preparatory activities but needs supplemental fund to complete the needed feasibility study.

This project will be assisted under the Project Preparation Fund mechanism to support the removal of financial barriers to the implementation of this environment-friendly NRE initiative. Without such fund support, the wind-hydro hybrid initiative, which has a lower life cycle cost will not happen, and the baseline scenario shall use diesel fuel. The barrier that will be removed is the financing of pre-project activities, which would normally cost about 2-3% of the project investment cost. Hence, following the intended design of the PPF, the incremental cost is equal to 50% of the estimated pre-project work (i.e., feasibility study).

Total Baseline Cost	US\$ 30,000
<b>Total Incremental Cost</b>	<b>US\$ 30,000</b>
Total Feasibility Study Cost	US\$ 60,000
Estimated Total Project Cost	US\$ 3,000,000

## **2. Title of Project: 12 MW Mini-Hydro Plant in Zamboanga del Norte**

### **The Proponent**

Smith Bell RESCO, one of two (2) local RESCOs in the Philippines is the proponent. It was established about two (2) years ago and is aggressively looking for different RE project opportunities.

### **The Project**

Smith Bell RESCO has been negotiating with funding institutions and potential business partners in order to put together the needed investments for a 12-MW mini-hydro power plant to be put up in Dipolog, Zamboanga del Norte in Mindanao. The local development bank has expressed interest in providing loan for part of the project cost while two foreign investors have expressed interest to make equity investments. Smith Bell has forged a Memorandum of Agreement with the local electric cooperative, ZANECO (Zamboanga Electric Cooperative) where the latter has expressed interest to buy the full generating capacity of the hydro plant. Before these negotiations can be finalized, a feasibility study is required as the basis for specific agreements. At the moment, Smith Bell is looking for financial assistance to partly fund the total cost of doing the feasibility study (US\$ 510,000). The remaining fifty percent it is willing to shoulder from its own fund.

This project will be assisted under the Project Preparation Fund mechanism to support the removal of financial barriers to the implementation of this environment-friendly NRE initiative. The barrier that will be removed is the financing of pre-project activities, which would normally cost about 2-3% of the project investment cost. Without the PPF support, the mini hydro project, which has a lower life cycle cost than the baseline option of using diesel, will not happen. Hence, following the intended design of the PPF, the incremental cost is equal to 50% of the estimated pre-project work.

Project Preparation Cost	US\$ 510,000
Total Baseline Cost	US\$ 205,000
<b>Total Incremental Cost</b>	<b>US\$ 205,000</b>

## **2. Financing Mechanism: Loan Guarantee Fund**

### **Title of Project: 900 kW Mini hydro Power Plant in Sibuyan Island, Province of Romblon**

#### **Rationale**

Financing institutions require security to at most one hundred percent for all loans they give out. This requirement poses a major problem for compliance by many potential borrowers because, often, they do not have enough properties or assets to fully cover their proposed loan. Because of such dilemma, many projects which have been proven viable in feasibility studies are not pursued and are left to remain as paper studies until they become obsolete and rendered of little use. While financing institutions have money for lending to renewable energy projects, they are constrained to hold on to their portfolios because of the inability of interested borrowers to provide the level of guarantee they require. A proposed loan guarantee mechanism would provide a source of guarantee on a revolving basis for proponents of NRE projects.

#### **The Proponent**

The proponent is the ROMBLON Electric Cooperative (ROMELCO), one of the good performing electric cooperatives in the country. ROMELCO is faced with the problem of providing security for the loan it intends to apply at the DBP since all its assets are mortgaged with/assigned to the National Electrification Administration per the agency's administrative policy on cooperatives.

#### **The Project**

The Cantingas River in Sibuyan Island, province of Romblon has an estimated minimum potential power generating capacity of 900 kW. This water resource shall be tapped to provide supplemental power for continuous 24-hour supply to currently electrified barangays and at the same time electrify an additional eleven (11) unelectrified barangays in the island.

As a result of the demonstration project, three (3) ice plants shall be put up in the island to support the major industry in the province, which is fishing. At present, local fish catch in commercial quantities are brought directly from coastal waters to the neighboring province and sold immediately to traders with access to refrigeration systems. With an option to refrigerate and keep their catch fresh in their own island, there is an opportunity for added value to their catch.

This project is to be applied for loan for its implementation. However, banks that have expressed interest in providing loans require a loan guarantee equivalent to at least 50% of the loan amount. This requirement is a major financial barrier to the implementation of this environmentally benign project, which would result in both national and global environmental benefits, mainly through reduction of CO<sub>2</sub> emissions. Hence, the incremental cost required for this project is US\$0.485 M, which represents the amount of loan guarantee required by the lender. The loan guarantee will only be utilized if the project fails to perform as designed.

This project will be assisted under the Loan Guarantee Fund mechanism to support the removal of financial barriers to the implementation of this environment-friendly NRE initiative. The barrier that will be removed is the financing of the loan guarantee requirement of financing institutions, which would normally cost at least 50% of the loan amount. Without the LGF assistance, the mini hydro option that is the lower life cycle cost alternative compared to the baseline diesel power plant

alternative will not be realized. Following the intended design of the LGF, the incremental cost is equal to 50% of the estimated loanable amount from financing institutions.

#### Demonstration Project Cost and Loan Guarantee Required

Total Project Cost	\$1.3 M
ROMELCO's Equity (25%)	\$0.33 M
ROMELCO's Loan from DBP (75%)	\$0.97 M
Loan Guarantee Required (50% of DBP loan)	\$0.485
 Total Baseline Cost	 US\$ 1.300 M
<b>Total Incremental Cost</b>	<b>US\$ 0.485 M</b>

### 3. Financing Mechanism: NRE Micro Finance Fund

**Title of Project: Micro-Hydro Project, Lukidnon, Dupax del Sur, Nueva Vizcaya**

#### Rationale

As of early 2001, there are still about 8,000 unelectrified barangays in the country with about half suited for off-grid RE electrification. These areas are endowed with RE resources like solar, hydro and wind that can be tapped to produce electricity. The national government has explicitly stated in the Philippine Energy Plan that bulk of the needed investment to pursue wide-scale electrification is expected to come from the private sector, which has access to financing facilities. While the government is committed to lay down the groundwork and pursue activities and strategies to encourage active private sector participation particularly in the energization of off-grid areas, the low consumer density coupled with low power demand and difficult physical access to such areas make them unviable investments particularly for this sector whose investment decisions are profit-motivated.

Clearly, local organizations need to be tapped to pursue such projects. Many unelectrified remote villages have existing people's organization whether in formal or informal set-up. Examples are farmers' cooperatives and multi-purpose cooperatives. Some multipurpose cooperatives have existing credit lines but many are limited to being recipients of grant projects. The same is true for farmers' cooperatives and other forms of peoples' organization. Generally these local organizations do not have the credit track record normally required by financing institutions. They do not have assets to offer as security for their loan. They operate mainly for community service and profit is secondary. These community-based organizations need to be provided access to a customized "financing package" that best suits their capabilities and limitations. In pursuing RE projects that could be completely new to them, they may need not only financial assistance but technical as well. There is need to support a mechanism by which unelectrified remote areas or villages endowed with RE resources is packaged as business opportunities for other local community organizations.

#### The Proponent

The Lukidnon Farmers' Cooperative (LFC) is the project proponent. LFC has been the recipient of several European Union-funded projects in agricultural productivity and has sufficient experience in

managing such kinds of project. However, it has not been involved in any RE energy generation project and would need technical training in this regard.

## **The Project**

Barangay Lukidnon is an agricultural area with several creeks and river that can be tapped to produce hydropower. Specifically, the Taygiw Creek with an estimated potential generating capacity of 30 kW shall be tapped. A micro grid shall be put up to provide lighting to the 78 households in the barangay which at present use wick or pressurized lamps for lighting and dry cell batteries for transistor radios. If the full potential of the hydropower will be tapped, there will be more than sufficient power to provide the electricity requirements of all the households round the clock as well as to possible livelihood projects like wood planning. Average household energy expense for lighting and radio ranges from \$5 to \$10 per month.

## **Need for Untraditional Financing Package – NRE Micro Finance Fund**

Lukidnon Farmers Cooperative has expressed interest in pursuing the development of the hydro project. The equity it can provide is in kind, specifically, labor, locally available materials for construction, land for the power plant and office space. The balance of the project's fund requirement will be sourced out preferably from a village-oriented financing portfolio with very soft interest rate, no hard collateral requirement and long-term loan.

Weekly service fees shall be collected by the farmers' association from the participating households and deposited in the rural bank, the possible micro finance conduit. Collections are credited to the association's loan payments after an agreed grace period for both interest and principal. Otherwise, collections are maintained in the account of the association and made to gain interest. Monthly withdrawals of agreed amounts can be made for operating and maintenance costs.

Financing with relaxed terms and conditions to suit community-based projects is indeed a barrier to the implementation of this environment friendly energy project. Without such financing, the baseline option is the use of small diesel generators or kerosene lamps, which are both GHG emitting. Hence, the incremental cost required for this project will cover the amount to remove such financing barrier, which is part of the needed investment. This is about US\$ 39,800, which represents 75% of the loan amount from the MFF. The loan amount will be repaid by the cooperative at prevailing development bank prime lending rate, fixed for a loan term of about 7 years.

## **Project Cost**

Total Project Cost	US\$ 53,000
Proponent's Equity	US\$ 13,200
<i>(in the form of labor, locally available materials and land for the power plant)</i>	
Loan from NRE Micro Finance Fund	US\$ 39,800
 Total Baseline Cost	 US\$ 13,200
<b>Total Incremental Cost</b>	<b>US\$ 39,800</b>

## ANNEX H

### FINANCING AND RE DELIVERY MECHANISMS: CALCULATION OF GEF CONTRIBUTION

GEF contributions to piloting financing and market delivery mechanisms (Component 4) are calculated based on assumptions about the extent of market activity these funds are intended to assist and which they can provide incentive for. There are three funds being piloted in Component No. 4:

1. Project Preparation Fund
2. Loan Guarantee Fund
3. NRE Micro Finance Fund

The GEF contribution has been calculated in each case on the basis of projected capacities of the expected NRE projects, as the DOE estimates will result from the CBRED project. The assumptions and calculation of GEF contributions to the funds are summarized below.

#### 1. Project Preparation Fund

A Project Preparation fund will provide a conditional loan of up to 50% of preparation costs and will have to be repaid if the project does not go ahead within 3 years. Subsidies will likely be a component of all projects at this stage in project development but projects will be chosen to receive pilot funds on the basis of the application of smart subsidies and market replicability as determined by the existence of similar market clusters. DOE has on-going preparatory activities identifying and characterizing potential market clusters. The Project Preparation Fund will be held and administered by an existing financial institution like the DBP. The MSC will facilitate the set up of the PPF and ensure training for its proper administration. The total funds requested from GEF are \$321,300, which is estimated to be directly applied to project preparation of about 15% of a total estimated capacity of 100 MW, which the GEF-supported project will leverage (100 MW over 5 years). Besides leveraging private sector capital, the fund will also encourage supplementary project preparation funding from other sources such as the GOP.

Calculation of the GEF contribution was made on the following basis. The total cumulative capacity of new NRE projects added as a result of the CBRED project is 100 MW, as estimated by DOE. Assume 25% of this capacity uses the Fund. This represents a representative portion of the added capacity needed to induce meaningful replication. Average installed cost of larger scale, usually grid-connected, NRE technology is \$1.4 M / MW. On the average, project preparation costs is 3% of the total project cost; of this the PPF would contribute 50% of the cost on a conditional grant basis. Fund management fee is estimated at 2% of the fund size.

Total PPF requirement based on the assumptions below is therefore:

$$100 \text{ MW} * \$1.4 \text{ M/MW} * 0.15 * 0.03 * 0.50 * 1.02 = \$321,300$$

**Assumptions :**

Total capacity of projects, MW	100
% Availing of PPF	15
Average Investment Cost, US\$/kW	1400

Project Preparation Cost (PPC), % of Inv. Cost	3
Available funding, % of PPC	50
Project Preparation Fund required, US\$	315,000
Fund management fee, US\$	6300
Total PPF, US\$	321,300

## 2. Loan Guarantee Fund

The Loan Guarantee Fund will overcome financing barriers in remote off-grid and small island grid locations where projects lack a track record and require high levels of securitization as well as provide support to an increased number of proponents. This project proposes to establish a Loan Guarantee Fund for about 3 NRE projects in off-grid and small island grid locations. The pilot phase is intended to be a model for existing loan guarantee mechanisms. This delivery/financing mechanism will be held in trust by the DOE but implemented and administered by the DBP. A Project Steering Committee (PSC) will evaluate, screen and approve proposals. The DBP processes approved guarantee applications with terms and conditions set by the PSC. The total fund requested is \$1.6065 M, which is estimated to serve as demonstration of guarantee funds operation over the project life for about 3 MW of off NRE applications in different locations where projects ready for financing are found.

Calculation of the GEF contribution was made on the following basis. Over the life of the project 5 NRE applications will serve to demonstrate the application of the loan guarantee mechanism. Average capacity of the target systems will be about 600 kW. Estimated installed cost of systems is \$1400 / kW. Average self-financing capability of these projects is estimated as 25%. The management fee for administering the fund is 2%.

The GEF contribution request based on the assumptions below is:

$$5 * 600 \text{ kW} * \$1400/\text{kW} * (1 - 0.25) * 0.5 * 1.02 = \$1.6065 \text{ M}$$

### Assumptions:

Total capacity of projects to be financed, MW	3
Average Investment Cost, USD/kW	1,400
% Loan available from local funding institutions	75
Total Loan, US\$	3,150,000
% Loan guarantee required by funding institutions	50
Total loan guarantee, US\$	1,575,000
Fund management fee (2% of Total Loan Guarantee)	31500
Total LGF, US\$	1,606,500

## 3. Micro Finance Fund

This is intended as a financing mechanism for small power loans in remote barangays with relaxed terms for long-term borrowing. The World Bank Energy Sector Management Assistance Program (ESMAP) currently has a similar fund called Village Power Fund in place in the Philippines with similar objectives in the amount of \$100,000. The NRE Micro Finance Fund will supplement the amount for lending. The MSC extension work will mean that more villages will want to access the money. The project office in cooperation with the rural banking network will evaluate proposals to the NRE Micro Finance Fund. The Fund will be managed and

administered by the Philippine rural bank network. The total funds requested is \$0.5355 M, which is estimated to serve as demonstration of village power loan funds over the project life of about 500 kW of small village NRE applications.

Calculation of the GEF contribution using the assumptions below is as follows:

$$0.5 \text{ MW} * 1000 \text{ kW/MW} * \text{US\$ } 1400/\text{kW} * 0.75 * 1.02 = \text{US\$ } 535,500$$

**Assumptions:**

Total capacity of projects to be financed, MW	0.5
Average Investment Cost, USD/kW	1,400
% Loan	75
Total loan, US\$	525,000
Fund management fee, US\$	10,500
Total MMF, US\$	535,500

$$\text{Total Funds} = \text{US\$ } 321,300 + 1,606,500 + 535,500 = \text{US\$ } 2,463,300$$



# ANNEX I

## GHG EMISSIONS CALCULATION SPREADSHEETS AND ASSUMPTIONS

ON-GRID NRE CALCULATIONS and GHG REDUCTIONS												
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	TOTAL
<b>BASELINE SCENARIO (WITHOUT PROJECT)</b>												
Mini-hydro	-	0.38167	0.42333	0.45667	0.47500	0.54333	0.58167	0.62333	0.81333	0.81333	0.81333	5.92500
Wind	0.00178	0.00178	0.35802	0.36158	0.36247	0.71960	0.72050	0.72139	1.07852	1.07852	1.07852	6.48268
Ocean	-	-	-	-	-	-	0.26718	0.26718	0.26718	0.26718	0.26718	1.33590
Bagasse Cogen	0.07125	0.07125	0.07125	0.07125	0.11578	0.11578	0.11578	0.11578	0.11578	0.11578	0.11578	1.09544
Municipal Waste	-	-	-	0.22265	0.44530	0.44530	0.44530	0.44530	0.44530	0.48983	0.53436	3.47334
<b>Total MMBFOE</b>	<b>0.07303</b>	<b>0.45470</b>	<b>0.85260</b>	<b>1.11215</b>	<b>1.39855</b>	<b>1.82402</b>	<b>2.13042</b>	<b>2.17298</b>	<b>2.72011</b>	<b>2.76464</b>	<b>2.80917</b>	<b>18.31236</b>
<b>Equivalent kWh</b>	<b>4.42557E+07</b>	<b>2.75546E+08</b>	<b>5.16677E+08</b>	<b>6.73962E+08</b>	<b>8.47523E+08</b>	<b>1.10535E+09</b>	<b>1.29103E+09</b>	<b>1.31682E+09</b>	<b>1.64839E+09</b>	<b>1.67537E+09</b>	<b>1.70236E+09</b>	<b>1.10973E+10</b>
<b>NRE PROJECT INDUCED INCREMENTS IN MMBFOE</b>												
Mini-hydro	-	-	-	0.00357	0.00326	0.05350	0.05284	0.13492	0.13583	0.21840	0.21840	0.82074
Wind	-	-	-	-	0.31171	0.22265	0.48983	0.73029	0.64123	0.81935	0.99747	4.21254
Ocean	-	-	-	-	-	-	-	-	-	-	-	-
Bagasse Cogen	-	-	-	-	-	-	0.04453	0.04453	0.08906	0.08906	0.13359	0.40077
Municipal Waste	-	-	-	-	-	-	-	-	-	0.04453	0.08906	0.13359
<b>Total MMBFOE</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>0.00357</b>	<b>0.31497</b>	<b>0.27615</b>	<b>0.58720</b>	<b>0.90974</b>	<b>0.86612</b>	<b>1.17134</b>	<b>1.43852</b>	<b>5.56764</b>
<b>Equivalent kWh</b>	<b>0.00000E+00</b>	<b>0.00000E+00</b>	<b>0.00000E+00</b>	<b>2.16579E+06</b>	<b>1.90874E+08</b>	<b>1.67349E+08</b>	<b>3.55844E+08</b>	<b>5.51303E+08</b>	<b>5.24870E+08</b>	<b>7.09835E+08</b>	<b>8.71746E+08</b>	<b>3.37399E+09</b>
<b>MEASURABLE IMPACTS</b>												
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	TOTAL
<b>NRE Share Increase = Decrease in Share of Fossil Fuels</b>												
In MMBFOE	-	-	-	0.00357	0.31497	0.27615	0.58720	0.90974	0.86612	1.17134	1.43852	5.56764
In KTOE	-	-	-	0.51607	45.48215	39.87661	84.79190	131.36658	125.06813	169.14218	207.72297	803.96660
Equiv. Electricity ( GWh)	-	-	-	2.14435	188.98402	165.69229	352.32093	545.84452	519.67368	702.80682	863.11482	3,340.58142
Equivalent Emission Reductions	-	-	-	-	-	-	-	-	-	-	-	-
6.9 Gg/GWh (Oil as displaced)	-	-	-	14.79600	1,303.98971	1,143.27680	2,431.01441	3,766.32716	3,585.74837	4,849.36709	5,955.49229	23,050.01183
0.66 Gg/GWh (PEP level 2000)	-	-	-	1.41527	124.72945	109.35691	232.53181	360.25738	342.98463	463.85250	569.65578	2,204.78374

<b>OFF-GRID NRE CALCULATIONS and GHG REDUCTIONS</b>												
	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>TO TAL</b>
<b>BASELINE SCENARIO (WITHOUT PROJECT)</b>												
Micro-hydro	0.01420	0.01540	0.01659	0.01779	0.01929	0.02078	0.02228	0.02377	0.02527	0.02676	0.02826	0.23039
Wind	0.00028	0.00028	0.00028	0.00028	0.00028	0.00028	0.00028	0.00028	0.00028	0.00028	0.00028	0.00308
Solar	0.01199	0.01777	0.02408	0.03097	0.03849	0.04427	0.04952	0.05430	0.05866	0.06264	0.06627	0.45897
<b>TOTAL MMBFOE</b>	<b>0.02647</b>	<b>0.03345</b>	<b>0.04096</b>	<b>0.04904</b>	<b>0.05806</b>	<b>0.06533</b>	<b>0.07208</b>	<b>0.07835</b>	<b>0.08421</b>	<b>0.08968</b>	<b>0.09481</b>	<b>0.69244</b>
<b>Equivalent kWh</b>	1.6040E+07	2.0271E+07	2.4820E+07	2.9718E+07	3.5182E+07	3.9589E+07	4.3678E+07	4.7483E+07	5.1030E+07	5.4347E+07	5.7455E+07	4.1962E+08
<b>No. of Electrified Barangays</b>	366	97	104	112	122	101	93	87	81	76	71	1,310
<b>NRE PROJECT INDUCED INCREMENTS IN MMBFOE</b>												
Micro-hydro	-	-	-	0.00120	0.00419	0.00807	0.01256	0.01764	0.02362	0.03110	0.03977	0.13814
Wind	-	-	0.00018	0.00053	0.00116	0.00561	0.01229	0.02120	0.03233	0.04569	0.06127	0.18026
Solar	-	-	-	0.00001	0.00035	0.00266	0.00527	0.00823	0.01153	0.01517	0.01916	0.06238
<b>TOTAL MMBFOE</b>	-	-	<b>0.00018</b>	<b>0.00174</b>	<b>0.00569</b>	<b>0.01634</b>	<b>0.03012</b>	<b>0.04707</b>	<b>0.06748</b>	<b>0.09195</b>	<b>0.12020</b>	<b>0.38078</b>
<b>Equivalent kWh</b>	0.0000E+00	0.0000E+00	1.0794E+05	1.0547E+06	3.4505E+06	9.9045E+06	1.8252E+07	2.8523E+07	4.0893E+07	5.5725E+07	7.2842E+07	2.3075E+08
<b>No. of Electrified Barangays</b>	-	-	2	22	27	74	95	117	141	169	195	842
<b>MEASURABLE IMPACTS</b>												
		<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>TOTAL</b>
NRE Share Increase = Decrease in Share of Fossil Fuels												
In MMBFOE		-	0.00018	0.00174	0.00569	0.01634	0.03012	0.04707	0.06748	0.09195	0.12020	0.38078
In KTOE		-	0.02572	0.25131	0.82220	2.36007	4.34913	6.79658	9.74417	13.27825	17.35707	54.98451
Equiv. Electricity ( GWh)		-	0.10687	1.04424	3.41634	9.80640	18.07117	28.24065	40.48825	55.17277	72.12081	228.46748
Equivalent Emission Reductions												
3.6 Gg/GWh (Diesel as displaced)		-	0.38474	3.75925	12.29881	35.30303	65.05621	101.66634	145.75769	198.62196	259.63490	822.48293
0.66 Gg/GWh (PEP level 2000)		-	0.07054	0.68920	2.25478	6.47222	11.92697	18.63883	26.72224	36.41403	47.59973	150.78854

## GHG EMISSIONS REDUCTION SUMMARY

	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>TOTAL</b>
<b>BASELINE GHG EMISSIONS (Gg CO2) (from PEP)</b>	<b>75,903</b>	<b>76,253</b>	<b>81,265</b>	<b>88,588</b>	<b>95,535</b>	<b>105,224</b>	<b>113,595</b>	<b>122,344</b>	<b>126,479</b>	<b>135,536</b>	<b>1,020,722</b>
<b>REDUCTIONS</b>											
ON-GRID (oil as displacement)	-	-	14.80	1,303.99	1,143.28	2,431.01	3,766.33	3,585.75	4,849.37	5,955.49	23,050.01
OFF-GRID (diesel as displacement)	-	0.38	3.76	12.30	35.30	65.06	101.67	145.76	198.62	259.63	822.48
NON POWER											
Solar & Wind (diesel as displacement)	-	-	5.86	12.65	21.49	31.35	43.79	59.07	78.85	102.09	355.16
Biomass (LPG as displacement)	149.20	230.73	313.51	398.65	485.17	573.17	662.55	753.33	845.49	939.05	5,350.85
<b>TOTAL</b>	<b>149.20</b>	<b>231.11</b>	<b>337.93</b>	<b>1,727.59</b>	<b>1,685.24</b>	<b>3,100.59</b>	<b>4,574.34</b>	<b>4,543.90</b>	<b>5,972.33</b>	<b>7,256.26</b>	<b>29,578.50</b>
<b>PERCENT REDUCTION</b>	<b>0.20%</b>	<b>0.30%</b>	<b>0.42%</b>	<b>1.95%</b>	<b>1.76%</b>	<b>2.95%</b>	<b>4.03%</b>	<b>3.71%</b>	<b>4.72%</b>	<b>5.35%</b>	<b>2.90%(ave)</b>