

**ASIAN DEVELOPMENT BANK**

**TAR:PHI 36561**

**TECHNICAL ASSISTANCE**

(Financed by the Danish Cooperation Fund for Renewable Energy  
and Energy Efficiency in Rural Areas)

**TO THE**

**REPUBLIC OF THE PHILIPPINES**

**FOR THE**

**REHABILITATION OF RENEWABLE ENERGY PROJECTS  
FOR RURAL ELECTRIFICATION AND LIVELIHOOD DEVELOPMENT**

**September 2003**

## **CURRENCY EQUIVALENTS**

(as of 1 August 2003)

Currency Unit	=	peso (P)
P1.00	=	\$0.0182
\$1.00	=	P54.85

## **ABBREVIATIONS**

ADB	–	Asian Development Bank
CBRED	–	Capacity Building for Renewable Energy Development
DMC	–	developing member country
DOE	–	Department of Energy
ICC	–	indigenous cultural communities
MMBFOE	–	million barrels of fuel oil equivalent
NGO	–	nongovernment organization
NRE	–	new and renewable energy
TA	–	technical assistance

## **NOTE**

In this report, "\$" refers to US dollars.

This report was prepared by Y. Zhai (team leader).

## I. INTRODUCTION

1. The Government of the Republic of the Philippines (the Government) requested Asian Development Bank (ADB) for technical assistance (TA) to explore the opportunities for rehabilitating renewable energy projects that were implemented in the past, but which at present are not or are hardly operational. During the Fact-Finding Mission from 23 May to 6 June 2003, meetings and discussions were held with the relevant government organizations, research institutes, and other stakeholders in the new and renewable energy (NRE) program in the Philippines. An understanding was reached with the Department of Energy (DOE) on the objectives, scope, and implementation arrangements of the TA.<sup>1</sup> The TA framework is in Appendix 1.

## II. ISSUES

2. Despite the substantial progress in rural electrification in recent years, about 5,409 or 18% of the country's 41,999 *barangays*<sup>2</sup> were still unelectrified as of February 2003. The Government aims to have all barangays electrified by 2006. However, 1,671 or about 30% of the nonenergized barangays are beyond the vicinity of a grid or in remote areas far from the grid system. Therefore, the Government has recognized the importance of NRE as means of delivering energy to populations in remote areas and islands.

3. The Government's policy is to facilitate the energy sector's transition to a sustainable system with NRE as an increasingly prominent, viable, and competitive fuel option. At the end of 2001, the Philippines had 5,120 solar and 380 wind installations with contribution equivalent to about 0.3 million barrels of fuel equivalent (MMBFOE). From 1999 to 2001, about 1,000 barangays were electrified using NRE technologies including solar, micro-hydro, and hybrid systems. DOE has identified long-term goals to increase NRE-based capacity by 100% by 2012 in the next 10 years. The contribution from solar, wind, and ocean energy is expected to reach 3 MMBFOE in 2012. In support of the general goal, the Government will aim to (i) be the top geothermal energy producer in the world; (ii) be the top wind energy producer in Southeast Asia; (iii) double its hydro capacity by 2012; and (iv) expand the contribution of biomass, solar, micro-hydro, and ocean by 250 megawatts. These goals serve as concrete benchmarks for the Government to advance its vision of a sustainable energy system with NRE taking a prominent role in the process.

4. To implement its NRE policy, the Government through DOE has established the NRE program. This program seeks to accelerate the promotion and commercialization of NRE systems. The NRE program objectives are to (i) reduce poverty, (ii) enhance energy self-sufficiency, (iii) encourage private sector investment and participation, and (iv) reduce emissions by applying cleaner energy systems. To comply with the 100% electrification target in 2006, the Government has established the "gift of light" program. The aim of the program is to provide electrification to all barangays and to provide the necessary rural infrastructure through NRE technologies. In particular, 1,500 barangays are programmed to be electrified using NRE systems.

5. So far, the implementation of NRE projects has been largely supported by the development financing agencies such as the Global Environment Facility, United Nations Development Programme, World Bank, and bilateral agencies such as the Japan International

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<sup>1</sup> The TA first appeared in *ADB Business Opportunities* (Internet edition) on 24 May 2003.

<sup>2</sup> Barangay is the smallest local government unit equivalent to a village, normally consisting of 100 to 500 families.

Cooperation Agency and United States Agency for International Development. These agencies have financed various NRE initiatives including solar, wind, and mini-hydro projects. To streamline and better coordinate these initiatives, DOE is presently implementing an umbrella program of Capacity Building for Renewable Energy Development (CBRED) in close cooperation with key stakeholders. All present and future NRE projects in the Philippines will be coordinated and carried out under the CBRED program. The present TA has been designed in consultation with various stakeholders and is consistent with the CBRED program and its affiliated projects.

6. Many NRE projects were carried out in the Philippines since 1970 in both public and private sectors with total investment estimated at \$100 million. The project were mostly driven by the funding agencies and technology-based. However, about 20–25% of these projects were less than successful. An ADB-financed rural electrification project<sup>3</sup> in early 1980s, which included construction of mini-hydro schemes, was rated partly successful by the project performance audit report. Reasons for failure can be divided into the following categories: (i) institutional problems, including improper management schemes; (ii) lack of stakeholder mobilization and beneficiary participation; (iii) technical problems, including lack of skill and spare parts for operation and maintenance as well as technology obsolescence; and (iv) financial problems, including high initial and maintenance cost, and high tariffs for consumers.

7. An increasing number of NRE projects have been successfully implemented in the recent years. An important factor for this success is the close collaboration of the beneficiary communities, nongovernment organizations (NGOs), and private sector for the resource assessment, project design, construction, management, operation, and maintenance of the established NRE systems and related livelihood activities. As NRE technology has matured over the last decade, the key factors that could affect the success of the NRE projects mostly involve institutional and social issues. To ensure productive use and sustainable operation of the installed NRE systems, it is important to develop a renewable energy-based community livelihood opportunities, such as installation of rice mills to increase the value from rice production, mini-ice plants for cold storage of fish products, and provision of skills and training, identification of potential markets, and marketing of products from such livelihood projects.

8. Some of the remote rural areas earmarked for NRE projects are likely to be predominantly indigenous peoples' communities or indigenous cultural communities (ICC) whose concerns need to be carefully addressed to enhance NRE projects' compliance with ADB's Policy on Indigenous Peoples.

9. Therefore, rehabilitation of selected NRE projects by changing these institutional set up and increasing participation of the beneficiary communities, NGOs, and private sector with livelihood development would secure the invested capital and contribute to achieving the Government's NRE policy. Lessons learned in the design, implementation, and follow-up of the rehabilitated pilot projects can be applied to projects in the Philippines and the rest of developing Asia. This will increase the chances of successful NRE projects and will contribute to rural electrification and livelihood development.

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<sup>3</sup> ADB. 1981. *Loan to the National Electrification Administration for Rural Electrification Project*. Manila.

### III. THE TECHNICAL ASSISTANCE

#### A. Purpose and Output

10. The overall goal of the TA is to reduce poverty through the provision and efficient use of sustainable NRE supply, in support of livelihood systems for poor local communities in off-grid areas of the Philippines, within the framework of public-private-civil society partnerships. Specifically, the purpose of the TA is to ensure the sustainability of NRE projects through pilot testing rehabilitation of unsuccessful NRE projects combined with income generating livelihood development.

11. The TA will result in the following outputs: (i) background study on the issues regarding successes and failures in project design and implementation of NRE projects in the Philippines, (ii) rehabilitation of 2–3 selected NRE projects, and (iii) documentation and dissemination within the Philippines and to other developing member countries with similar issues, of the methodology and lessons learned.

#### B. Methodology and Key Activities

12. The generic approach of the study will be a participatory one, in which the stakeholders, e.g., electric cooperatives, NGOs, local government units, and beneficiaries (small and medium size enterprises and residents) will have a crucial role. Feedback from these groups is particularly important to identify reasons for the failure of previous NRE projects. During the whole process, impacts on poverty alleviation and gender issues will be considered.

13. The TA will (i) analyze successful and unsuccessful projects resulting in recommendations for correcting failures, (ii) implement the recommendations in demonstration projects, and (iii) help the project recover investments. The TA will contribute to poverty reduction by rural development and improvement in local livelihood, and will provide hands-on experience that can be used for Asian developing countries facing similar issues. Accordingly, the TA will be implemented in three steps: (i) identification of issues relating to the successes and failures in design and implementation of NRE projects in the Philippines, (ii) selection and rehabilitation of 2–3 projects including livelihood activities, and (iii) documentation and dissemination of methodology used and lessons learned.

14. For step (i), the following key activities will be undertaken:

- (i) inventory and review of existing NRE projects in the Philippines on the basis of existing documentation and studies, with particular attention on ICC areas or projects with ICC beneficiaries;
- (ii) field visits and consultation and workshops with electric cooperatives, NGOs and end-users, including ICC representatives for selected projects;
- (iii) classification of the projects into successful, partly successful, and unsuccessful; and
- (iv) identification of general factors that contributed to the success and failures of NRE projects (wind, solar and photovoltaic, biomass, and micro and mini-hydro).

15. For step (ii), the following key activities will be undertaken:

- (i) definition of criteria for selecting NRE projects to be rehabilitated; the criteria will include least-cost analysis, poverty reduction and livelihood development, public-

- private partnerships, and operational sustainability (geothermal and large hydroelectric projects will be excluded);
- (ii) selection of 2–3 typical failed NRE projects in accordance with the defined criteria;
- (iii) data collection for the selected NRE projects (including the capital costs of the investment, operation and maintenance costs, number of consumers, system losses, costs of alternative sources of energy, and a demand for electricity function);
- (iv) detailed analysis of the selected projects to identify specific barriers for successful operation;
- (v) formulation of recommendations and plans to rehabilitate the selected NRE projects, including livelihood developments in association with various stakeholders; and
- (vi) rehabilitation of selected NRE projects with livelihood development in association with relevant stakeholders, including ICC representatives (the cost of spare parts will be borne by the Government and stakeholders).

16. For step (iii), the following key activities will be undertaken:

- (i) documentation of the methodology used and the lessons learned,
- (ii) preparation of manuals and guidelines for sustainable development of NRE projects,
- (iii) dissemination of the TA results in the Philippines through national workshops, and
- (iv) assessment of further financing requirements if the recommendations of the TA are implemented nationally.

### **C. Cost and Financing**

17. The total cost of the TA is estimated at \$650,000, including \$350,000 in foreign exchange and \$300,000 equivalent in local currency. The Government has requested ADB to finance \$450,000 equivalent, covering the entire foreign exchange costs, and \$100,000 equivalent of the local currency cost. The TA will be financed on a grant basis by Danish Cooperation Fund for Renewable Energy and Energy Efficiency in Rural Areas funded by the Government of Denmark. The Government of the Philippines will provide \$200,000 equivalent for office accommodation, transport, spare parts, and counterpart staff. Detailed cost estimates and financing arrangements are presented in Appendix 2.

### **D. Implementation Arrangements**

18. DOE will be the Executing Agency for the TA and will work in close collaboration with other relevant government agencies and NGOs. DOE will be responsible for implementing the TA and will appoint a suitably qualified professional as project coordinator.

19. A team of consultants (18 person-months of domestic and 10 person-months of international consultancy) will be recruited to undertake the TA. The team will have expertise in rural renewable energy and the aspects of institutional setup, financing, and sociocultural issues. Two international consultants, i.e., one NRE expert (6 person-months) and one project economist (4 person-months), will be recruited. The international consultants will be assisted by three domestic consultants, including (i) an NRE expert (6 persons-month); (ii) a project economist (6 person-months), and (iii) a poverty reduction and social development specialist (6

person-months). The consultants will be engaged by ADB through a firm using the quality- and cost-based selection method in accordance with ADB's *Guidelines on the Use of Consultants* and other arrangements satisfactory to ADB for engaging domestic consultants. The simplified technical proposal format will be used. Equipment for use by the consultants will be procured in accordance with ADB's *Guidelines for Procurement*. The outline terms of reference for the consultants are in Appendix 3.

20. The consultants will submit short monthly progress reports summarizing TA activities, issues, and constraints for the duration of the TA. In addition, four major reports will be submitted: an inception report within 1 month from TA commencement, an interim report of TA progress within 8 months, a draft final report within 16 months, and a final report toward the end of the TA. After receiving the inception report, ADB will undertake an inception mission to discuss and agree with DOE and the consultants on the milestones of TA implementation. A TA review mission will be fielded after receipt of the interim report to monitor the progress of TA implementation and make necessary adjustments. A tripartite meeting will be held among DOE, the consultants, and ADB to discuss the draft final report. The final report will be prepared by the consultants within 15 days after the tripartite meeting has taken place.

21. The TA will be implemented during an 18-month period, and is expected to commence in December 2003 and be completed by June 2005.

#### **IV. THE PRESIDENT'S DECISION**

22. The President, acting under the authority delegated by the Board, has approved ADB administering technical assistance not exceeding the equivalent of \$450,000 to the Government of the Philippines to be financed on a grant basis by the Government of Denmark's Danish Cooperation Fund for Renewable Energy and Energy Efficiency in Rural Areas for the Rehabilitation of Renewable Energy Projects for Rural Electrification and Livelihood Development, and hereby reports this action to the Board.

## TECHNICAL ASSISTANCE FRAMEWORK

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<p><b>Goal</b></p> <p>To reduce poverty through the provision and efficient use of sustainable renewable energy supply in support of promoting livelihood systems for poor local communities</p>	<p>Level of poverty reduced, 100% of rural villages electrified by 2006, and the new and renewable (NRE) energy capacity doubled by 2013</p>	<p>United Nations Development Programme human development report</p> <p>Government statistics</p> <p>Technical assistance (TA) progress report</p> <p>TA review missions</p> <p>TA completion report</p>	<p>Government commitment in promoting NRE</p>
<p><b>Purpose</b></p> <p>To ensure the sustainability of NRE projects through pilot testing rehabilitation and livelihood development</p>	<p>Increase in access to electricity using NRE</p> <p>Increased income in the project areas</p>	<p>The annual activity report of the Department of Energy (DOE)</p> <p>TA progress report</p> <p>TA review missions</p> <p>TA completion report</p>	<p>Unsuccessful projects might have reduced motivation of community</p>
<p><b>Outputs</b></p> <p>Background study on the issues regarding failures of NRE projects</p> <p>Typical projects selected for rehabilitation and livelihood development</p> <p>Documentation and dissemination of the TA results nationally and to other developing member countries</p>	<p>2–3 NRE projects rehabilitated for normal operations</p> <p>Study report and guidelines prepared for sustainable development of NRE</p>	<p>TA progress report</p> <p>TA review missions</p> <p>TA completion report</p>	<p>Availability of government counterpart support</p> <p>Participation of electric cooperatives, local government units, nongovernment organizations (NGOs), and local residents</p>
<p><b>Key Activities</b></p> <p>Inventory and review of existing NRE projects</p> <p>Definition of criteria for selection of NRE projects to be rehabilitated</p> <p>Detailed analysis of the selected projects to identify specific barriers for successful operation</p> <p>Implementation of the</p>	<p>Asian Development Bank (ADB) and DOE to ensure fielding of consultants as per the terms of reference (TOR) by December 2003</p> <p>The final report reviewed and accepted by the Government and ADB in accordance with the TOR</p>	<p>Consultants' reports</p> <p>TA review missions</p> <p>TA completion report</p>	<p>Selection of qualified consultants in accordance with ADB's <i>Guidelines on the Use of Consultants</i></p>

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
rehabilitation plans Preparation of manuals and guidelines			
<b>Inputs</b>  28 person-months: 18 domestic, and 10 international.  TA grant of \$450,000 and government contribution of \$200,000 in kind	ADB and DOE to ensure fielding and provision of consultants as per the TOR by December 2003  Submission of the final report by the consultant in June 2005	Consultants' reports  TA review missions  TA completion report	Selection of qualified consultants in accordance with ADB's <i>Guidelines on the Use of Consultants</i>

**COST ESTIMATES AND FINANCING PLAN**  
(\$'000)

Item	Foreign Exchange	Local Currency	Total Cost
<b>A. Asian Development Bank Financing<sup>a</sup></b>			
1. Consultants			
a. Remuneration and Per Diem			
i. International Consultants	236	0	236
ii. Domestic Consultants	0	54	54
b. International and Local Travel	13	4	17
c. Reports and Communications	5	4	9
2. Equipment <sup>b</sup>	50	10	60
3. Workshops, Conferences	0	15	15
4. Contingencies	46	13	59
<b>Subtotal (A)</b>	<b>350</b>	<b>100</b>	<b>450</b>
<b>B. Government Financing<sup>c</sup></b>			
1. Office Accommodation	0	40	40
2. Counterpart Staff	0	80	80
3. Spare parts	0	50	50
4. Contingencies	0	30	30
<b>Subtotal (B)</b>	<b>0</b>	<b>200</b>	<b>200</b>
<b>Total</b>	<b>350</b>	<b>300</b>	<b>650</b>

<sup>a</sup> Financed by the Danish Cooperation Fund for Renewable Energy and Energy Efficiency in Rural Areas.

<sup>b</sup> Equipment necessary for the rehabilitation of selected new and renewable energy projects.

<sup>c</sup> Including contribution from stakeholders.

Source: Asian Development Bank estimates.

## OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

### A. International Consultants

#### 1. New and Renewable Energy Expert (6 person-months)

##### 1. **Qualifications.** The expert must have

- (i) demonstrated expertise in the field of new renewable energy (NRE);
- (ii) ample experience with institutional capacity building, particularly with issues on financing of NRE projects; and
- (iii) demonstrated expertise in project management and project management tools.

##### 2. **Responsibilities.** The expert will do the following.

- (i) Manage and coordinate overall technical assistance (TA) implementation by preparing and completing TA reports as required (inception, midterm, and final). Develop a structure including work plans, timelines, and detailed cost estimates. Brief stakeholders on the TA and implementation.
- (ii) Review reports regarding successful experience (including Asian Development Bank-financed rural electrification projects) and failures in project design and implementation of NRE projects in general, and the Philippines in specific. Identify and interview main stakeholders. Visit selected stakeholders in the field. Conduct a national workshop on NRE.
- (iii) Draft a set of criteria for selection of projects to be rehabilitated in consultation with the main stakeholders, including indigenous cultural communities (ICCs). Rank and select 2–3 typical projects (preferably one photovoltaic, one biomass, and one micro-hydro). Guide the team in (a) analyzing in depth the selected projects with respect to implementation obstructions; (b) drafting alternatives to the barriers for successful operation, conducting participatory consultations; (c) implementing the chosen option (e.g., conducting workshops, buying additional equipment, hiring technical staff, providing training, establishing/strengthening institutes/organizations); and (d) monitoring the implementation and adjusting if needed.
- (iv) Document the process followed and lessons learned in guidelines, disseminate the results and findings at a high-level meeting that includes representatives of potential partners and representatives of other developing member countries (DMCs).

#### 2. Project Economist (4 person-months)

##### 3. **Qualifications.** The economist must have

- (i) demonstrated experience in the economic analysis of NRE projects, and
- (ii) ample experience on issues affecting NRE projects (poverty reduction, livelihood development, and community organization).

4. **Responsibilities.** The economist will do the following.

- (i) Review and validate the data collected, including the capital costs of the investment, operation and maintenance costs, number of consumers, system losses, costs of alternative sources of energy, and demand for electricity.
- (ii) Contribute to the selection of projects to be rehabilitated with emphasis on the economic aspects, poverty reduction impacts and sustainability, and with particular attention to ICC areas or projects with ICC beneficiaries.
- (iii) Prepare alternatives to the financial, economic, social, and institutional barriers for successful operation of NRE projects.
- (iv) Undertake least-cost analyses and calculate the economic internal rates of return for the selected NRE projects to be rehabilitated (the economic benefits of the selected projects should be valued in terms of resource cost savings and willingness to pay).
- (v) Prepare the documentation of the methodology followed and lessons learned, and contribute to the dissemination of the results and findings by organizing a high-level meeting that includes representatives of potential partners and of other DMCs.
- (vi) Assess further financing requirements if the recommendations of the TA are implemented nationally.

**B. Domestic Consultants**

1. **New and Renewable Energy Expert** (6 person-months)

5. **Qualifications.** The expert must have

- (i) ample experience with NRE and the development of NRE projects, and
- (ii) experience with financing of NRE projects and with institutional capacity building.

6. **Responsibilities.** The expert will do the following.

- (i) Be deputy team leader and the TA manager's focal point in the Philippines, facilitate workshops and meetings, liaise between the project team and national government, local government, NGOs, etc.
- (ii) Help review reports regarding failures in project design and implementation of NRE projects in the Philippines, participate in the identification and interviews of main stakeholders, visit selected stakeholders (including ICC representatives) in the field, and organize and participate in a national workshop on NRE.
- (iii) Select, in close cooperation with the team, projects to be rehabilitated (after consultation with main stakeholders) in consideration of demand analysis, least-cost analysis, poverty reduction impact, public-private partnerships, and sustainability.
- (iv) Analyze the projects selected with respect to obstructions to their implementation, draft options for their successful operation with inputs from the other specialists, organize and conduct participatory consultations, implement (together with the team) the chosen option (e.g., conduct workshops, buy additional equipment, hire technical staff, provide training, and establish/strengthen institutes/organizations).

- (v) Contribute to documenting the process followed and lessons learned. Disseminate the results and findings at a high-level meeting that includes representatives of potential partners and of other DMCs.

**2. Project Economist (6 person-months)**

**7. Qualifications.** The economist must have

- (i) ability to undertake economic and financial analysis of NRE projects, and
- (ii) experience in poverty reduction, livelihood development, and institutional strengthening.

**8. Responsibilities.** The economist will do the following.

- (i) Help review reports regarding failures in project design and implementation of NRE projects in the Philippines, participate in the identification and interviews of main stakeholders (including the ICC representatives), visit selected stakeholders in the field, and organize and participate in a national workshop on NRE.
- (ii) Contribute to the (a) selection of projects to be rehabilitated, in consultation with main stakeholders, with emphasis on the economic aspects, poverty reduction impacts, and sustainability; (b) in depth analysis of the selected projects with respect to obstructions to implementation (cost effectiveness of NRE technologies especially in the context of high costs associated with electricity generation and cost savings in terms of environmental benefits); (c) draft alternatives to the financial and economic barriers to successful operation, participate in participatory consultations, and implement the chosen option (e.g., conduct workshops, hire technical staff, provide training, establish/strengthen institutes/organizations).
- (iii) Help prepare least-cost analyses and calculate the economic internal rate of return of the NRE projects selected to be rehabilitated (the economic benefits of the selected projects should be valued in terms of resource cost savings and willingness to pay).
- (iv) Contribute to the documentation of the methodology followed and lessons learned, and contribute to the dissemination of the results and findings by organizing a high-level meeting that includes representatives of potential partners and of other DMCs.

**3. Poverty Reduction and Social Development Specialist (6 person-months)**

**9. Qualifications.** The specialist must have

- (i) experience in poverty reduction initiatives through livelihood development in the rural communities;
- (ii) experience in community development and institutional capacity building, and familiarity with issues affecting indigenous people; and
- (iii) adequate experience and with knowledge of NRE and the development of NRE projects.

10. **Responsibilities.** The specialist will do the following.

- (i) Identify issues affecting indigenous people in accordance with ADB policy in the existing NRE projects.
- (ii) Contribute to the selection of projects to be rehabilitated in consultation with the main stakeholders, analyze in depth the projects selected with respect to obstructions to implementation, draft options for their successful operation, conduct participatory consultations, implement the chosen option (e.g., conduct workshops, buy additional equipment, hire technical staff, provide training, establish/ strengthen institutes/organizations.
- (iii) Identify and assess the participatory development issues, including NGO, community and private sector involvement.
- (iv) Carry out a socioeconomic assessment and examine how electrification through NRE sources could improve the livelihoods in the area, particularly by enhancing productivity and increasing the product's market value.
- (v) Develop appropriate systems to poverty reduction impact of the projects.
- (vi) Contribute to the documentation of the methodology followed and lessons learned, and contribute to the dissemination of the results and findings by organizing a high-level meeting that includes representatives of potential partners and of other DMCs.