

**IMPLEMENTATION COMPLETION MEMORANDUM (ICM)**  
*Revised Template version May 2007*

**A. BASIC TRUST FUND INFORMATION**

TF Name: GEF MSP- Yemen Rural Electrification and Renewable Energy Development Project

TF Number: TF054713

Task Team Leader Name/TF Managing Unit: Somin Mukherji/MNSSD

TF Amount US\$ 999,232

Recipient of TF funds: Government of Yemen, Ministry of Electricity and Energy

Type of TF: GEF/Free Standing

Single/Multi Donor: Multi Donor

Donor(s) Name(s): Multi-donor Trust Fund

TF Program Source Code: NA

Purpose of TF: GEF MSP/Advisory Activities - Recipient

TF Approval/IBTF Clearance Date: 2/21/2005

TF Activation Date: 02/21/2005

TF Closing Date(s): June 30, 2008

**Date of ICM Submission to TFO:**

Cost and Financing Table:

<b>Cofinancier</b>	<b>Original</b>	<b>Actual</b>
GEF	999,232	995,416
IBRD/IDA	-	-
Recipient	201,868	250,432
Other	799,775	783,609
<b>Total</b>	<b>2,000,875</b>	<b>2,029,457</b>

**Rating Summary**

<b>Category</b>	<b>Rating</b>
Overall TF Outcome	Satisfactory
Overall Risk to Development Outcome	Moderate
Bank Performance	Satisfactory
Recipient Performance	Satisfactory

## **B. TRUST FUND DEVELOPMENT OBJECTIVES AND DESIGN**

### 1. Original (and Revised) Trust Fund Development Objectives

The overall grant objectives are to: (i) create a comprehensive Rural Electrification Strategy and an enabling environment for exploiting renewable energy; and (ii) implement appropriate institutional set-up and regulatory framework for rural electrification and renewable energy development in a sustained manner.

### 2. Original (and Revised) Trust Fund Activities/Components

The Project comprises implementation of seven activities that have been carried out through several consultancy assignments. These are:

- (i) Preparation of a National Rural Electrification Strategy;
- (ii) Preparation of a Renewable Energy Strategy and Action Plan;
- (iii) Development and Implementation of the Institutional Framework;
- (iv) Assessment of Wind Resources and Business Demonstration;
- (v) Assessment of Photovoltaic Market and Project Pipeline Development;
- (vi) Preparation of a Wind Atlas; and
- (vii) Implementation of Awareness and Training Activities.

In addition, there is a separate training and capacity building activity targeted at incorporating international best practices in the Yemeni rural electrification and renewable energy development program.

### 3. Outcome Indicators

In order to measure the success of the activities under the Project, the following indicators were used: (a) wind mapping based on satellite data and ground level monitoring stations - **complete**; (b) market study on SHS potential - **complete**; (c) the number of consumers with SHS – 80 SHS (GOY financed) installed and procurement of additional 600 SHS (GOY financed) is in progress; (d) the completion of wind pilot projects – this is **no longer being pursued** and the GOY is now seeking financing for commercial scale Wind Farm at Al-Mocha (60 MW) to serve as a demonstration project; (e) training and capacity building activities - **complete**; and (f) tons of GHG emissions reduction - this was the only measurable outcome. Since financing a small wind project (item (d) above) was replaced by financing of a separate 60 MW demonstration wind farm was conceived, this indicator was **dropped**.

### 4. Other Significant Changes in Trust Fund Design

The Project was to be co-financed by the GEF, GTZ, CIDA Inc. and the GOY. In particular, CIDA Inc. was expected to finance the preparation of a wind atlas and implementation of business demonstration projects. Subsequently, CIDA Inc. indicated its inability to participate in the Project as a co-financier leaving a financing gap of about US\$550,000. In October 2007, financing from USTDA/NRECA/USAID of about US\$580,000 was made available; this helped retaining the elements of project design.

No other major changes were made to the design of the Trust Fund (TF).

## **C. OUTCOME**

### **1. Relevance of TF Objectives, Design and Implementation**

The goal of the National Rural Electrification Strategy is to contribute to economic growth and social development of the rural sector in Yemen. In its Second Five-Year Development Plan, the Government of Yemen (GOY) targeted an ambitious, annual average growth rate of 9 percent through 2025, with growth in the agricultural sector of over 7 percent. Improved rural infrastructure, including modern and reliable energy, will clearly be an important factor in achieving the greater growth needed to reduce poverty in Yemen over the long term. Consequently, in both its Second and Third Development Plans, one of the GOY's objectives for the power sector is to increase the proportion of the rural population with access to electricity from its estimated current low level of 20 percent.

The development of the National Rural Electrification Strategy for Yemen is a first step towards the development of a sustainable rural electrification program. The adoption and enforcement of appropriate policies and laws, the existence of political support, the creation of competent rural electrification institutions and provision of adequate financing are some of the critical program elements that have been addressed in the Strategy.

Renewable energy development in Yemen faces a number of barriers and challenges that need to be overcome. Current approaches to renewable energy initiatives have had limited success due to institutional, policy and financial barriers and, in particular, lack of private sector engagement. Absence of any comprehensive strategy addressing the above barriers has led to a few supply driven interventions in the past with limited sustainability. Without GEF involvement and articulation of an appropriate strategy, only limited and scattered activities related to renewable energy market development would be undertaken in the future. Also, it is likely that without GEF support, the IDA support for the rural electrification program would tend to focus more on the conventional energy based rural electrification approaches, leaving renewable energy development to bilateral agencies and government support in an unsustainable manner.

Therefore, in order to develop a market for renewable energy technologies and evolve sustainable models for energy service delivery, GEF support for overcoming barriers to renewable energy development was essential. The Project was responsive to the GEF OP#6, as it directly contributed to wider use of renewable energy technologies, especially for off-grid electrification in rural areas, and in diversifying supply options by creating an enabling environment for grid-connected renewables.

### **2. Achievement of TF Development Objective**

The TF development objectives have been substantially met. Implementation of grant activities has largely been satisfactory. While all studies have been completed, implementation of the necessary institutional framework is in progress. The Government has already adopted the Rural Electrification Strategy developed under the Project. The adoption of the Renewable Energy Strategy is expected to be accomplished very soon. Implementation of the Institutional Framework has made significant progress. Provisions in the electricity law include the creation of a new Rural Electrification Authority and

Rural Electric Service Providers (RESP). In addition, the law also encourages renewable energy based power generation. The law has recently been approved by the Cabinet and is awaiting ratification by the parliament.

Based on a request from the Government of Yemen (GOY), a proposed Rural Energy Access Project has now been included in the CAS for 2006-10 and is currently scheduled for Board presentation in FY09. The proposed Project will inter alia: improve electricity access in rural areas through expansion of grid systems and development of renewable energy. Preparation of the proposed Project will be closely aligned to the development of appropriate rural and renewable energy development strategies, which have been financed under the Project.

The GOY has also requested Bank assistance for the implementation of a 60 MW wind farm at Al-Mocha directly as a result of the activities implemented under this grant. This project is slated for Board presentation in early FY10.

Both the above projects have significant co-financing prospects, some of which are already committed.

### 3. Efficiency

The Trust Fund activities have been efficiently implemented and the cost of implementation was in line with the estimated expenditures. Project implementation involved extensive stakeholders' consultation processes which are crucial for ensuring appropriate ownership of new policy directives. Such an approach was never adopted in the past. Also, time required for data collection was underestimated. In view of the above, the Closing date of the project was extended from February 28, 2007 to June 30, 2008.

### 4. Development Impacts, including those that are Unintended/Unrelated to TF Objectives

The Project has been able to catalyze significant donor interest in rural electrification and renewable energy development. In addition, the BMZ/GTZ, GOY and the USTDA/NRECA/USAID contributed towards the project financing and increased the overall level of co-financing significantly. The Project laid the foundation for a strong investment program in rural electrification with preliminary cost estimates for Phase-I for about US\$124 million and wind energy development through a 60 MW Pilot Wind Park Project in the range of US\$125 million. There is also a possibility of developing a geothermal energy project of about 100 MW at Al-Lisi in Dhamar Governorate with support of developers from Iceland, Reykjavik Energy Invest (REI) at an estimated cost of US\$200 million. Thus, the Project (of less than US\$1.0 million) could ultimately result in investment potential of more than US\$400 million.

### 5. Overall TF Outcome

The overall rating for the TF is **Satisfactory**

## **D. RISK TO DEVELOPMENT OUTCOME**

### **1. Follow-On Results and/or Investment Activities**

*Activity/Investment:*

\_\_\_\_\_ Recipient/Other Investment; \_\_\_\_\_ Grant Project/Program; **X** Bank Project;  
\_\_\_\_\_ IFC Financial Project/Activity

This activity directly led to the preparation of the Rural Energy Access Project and the Al-Mocha Wind Farm (60 MW) Project in Yemen.

### **2. Replicability**

As this is the first comprehensive rural electrification and renewable energy project focusing on policy, regulatory and institutional issues in Yemen, the Project will serve as a basis for implementation of GOY investment projects related to rural electrification in the future.

The project activities have contributed to the preparation of a comprehensive National Rural Electrification Strategy and a Renewable Energy Development Strategy. These activities are highly replicable in developing countries where modern energy can improve livelihoods and contribute to increased income in rural areas by making it possible to increase production and productivity and create jobs, particularly in agriculture and related commercial or agro-processing activities.

### **3. Overall Risk to Development Outcome**

There is moderate risk that project outcomes will be sustained in the long run as external factors could change and influence the interest of development partners and financing institutions in energy efficiency. This risk is therefore rated “**Moderate**”.

## **E. PERFORMANCE**

### **1. Bank**

Bank performance on this project is rated **satisfactory** as the proposed activities were carried out successfully and efficiently. A significant amount of co-financing was arranged by the Task Team, including US\$579,616 from USTDA/NRECA/USAID for funding the institutional framework for implementing the rural electrification investment program and US\$200,177 from GTZ for funding the solar market assessment. As a result of carrying out the studies, a significant amount of capital investments are expected to follow.

### **2. Recipient (for Recipient-executed TFs only)**

Recipient performance is rated **satisfactory** as it did successfully complete all activities and also increased its level of co-financing.

## **F. LESSONS LEARNED / RECOMMENDATIONS**

### **1. *Donor Coordination***

The Project has been able to catalyze significant donor interest in rural electrification and renewable energy development program of Yemen. The adoption of a National Rural Electrification Strategy, the articulation of a Renewable Energy Strategy and Action Plan,

the setting up of necessary legal and institutional arrangements will ensure that the development of Rural Electrification and Renewable Energy development will indeed be on a sound and sustainable basis.

## ***2. Stakeholder Consultations during Project Preparation and Implementation***

Lack of information on the different renewable energy options and their costs is an awareness barrier in Yemen. There is also limited information available on the market for renewable energy in Yemen. A consultative process with various stakeholders over the duration of the Project helped create awareness and build capacity on renewable energy technologies. It also helped with market assessments of these technologies. The stakeholder process also facilitated the creation of a comprehensive strategy that was quickly adopted by the GOY. Over the project duration period, eleven workshops were organized with participation of more than 460 stakeholders.

## ***3. Integration of Off-Grid Renewable Energy Development Strategy into the National Rural Electrification Strategy***

One of the important tasks in developing a national rural electrification strategy for Yemen was to identify the rural areas of Yemen that will not be viable candidates for grid connection over the medium term. For areas that are clearly beyond the reach of grid connected service, off-grid service through photovoltaic and other renewable energy technologies are to be considered. Zones that should not be electrified through connection to the grid in the next ten years or so, are indicated in the final map sets that are presented in the Rural Electrification Strategy Report. This data was then used in the Renewable Energy Action Plan also to be adopted by the GOY in addition to the National Rural Electrification Strategy.

## ***4. Testing multiple business models utilizing existing institutional networks for the delivery of Solar Home Systems:***

A positive lesson learned is the development and pilot testing of several delivery models for solar-based systems by utilizing existing institutional networks. Well functioning networks that are established and known to the population are able to disseminate more effectively and efficiently with lower overhead costs.

One solar pilot has been successfully completed based on a “fee-for-service” approach at Al- Matharish in Hodeidah Governorate covering 80 households each with a solar home system (SHS) of 40 Wp. The systems were procured by the Rural Electrification Sector (RES) department of the PEC and installed by a contractor under a separate implementation contract. Participating customers pay a US\$25 down payment and a fee of US\$1.5/month. The technical assistance for this activity was provided by GTZ that helped train two local technicians and set-up up of a Solar Users Association (SUA). A board has been elected and is functioning well. The main objectives of the Board are fee collection, financial management and ensuring proper operation and maintenance.

Additional GTZ supported pilots testing SHS business models include:

(i) In the districts of Abs and Mustaba - Hajjah Governorate, the RES will install 600 systems at a cost of about US\$ 250,000 using a micro finance approach, integrating

international best practices in SHS financing, particularly from the highly successful Bangladesh experience. Under this business model, a Micro Finance Institution (MFI) will provide access to credit and technical support to customers interested in purchasing a SHS;

(ii) In Bilhaf, a corporate partnership model is followed whereby YLNG will electrify 600 households providing the required capital cost of about US\$ 250,000. Customers will pay a monthly fee towards operation and maintenance (GTZ will provide technical assistance and training); and

(iii) The GTZ will finance the distribution of 500 solar lanterns through the Postal Service at a capital cost about US\$ 50,000 with the possibility of the program expanding utilizing the postal banking channels.

## **G. ICM PROCESSING AND COMMENTS**

### 1. Preparation

TTL at Approval: Somin Mukherji, MNSSD

TTL at Closing: Somin Mukherji, MNSSD

Comment of TTL at Closing: The outcomes of this TF were fully satisfactory. It helped generate overall awareness on rural electrification and renewable energy development. Now that the Recipient is committed toward implementing the reform measures, significant investments are expected.

Prepared by (if other than TTL): Jason Steele, Chandra Govindarajalu, Somin Mukherji

Date Submitted to Approving Manager: December 12, 2008

### 2. Approval

Manager: Jonathan D. Walters

Date Approved by Manager:

Manager's Comment:

### 3. TFO Evaluation of ICM Quality

TFO Reviewer:

TFO Rating on the Quality of ICM (*Satisfactory or Unsatisfactory*):

Comment and Justification for Rating Given by TFO: