# Implementation of Renewable Energy Technologies – Opportunities and Barriers

**Summary of Country Studies** 

Jyoti Prasad Painuly Jørgen Villy Fenhann

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## Contents

Preface	Page iv
Executive Summary.	v
1. Introduction	1
2. Objectives	3
3. Methodology	4
3.1. The Framework	4
3.2. Methodological Variation across the Case Studies	7
4. Findings from the Case Studies	9
4.1. Egypt Case Study	9
4.1.1. Energy Policy in Egypt	9
4.1.2. Renewable Energy Strategies	9
4.1.3. Status of RETs in Egypt	10
4.1.4 Selection of RETs for Study of Barriers	10
4.1.5 Barriers to RETs Implementation in Egypt	11
4.1.6. Direct and Indirect Impacts	17
4.1.7. Conclusions of the Egypt Study	17
4.1.8. Proposal for Follow-up RETs Projects in Egypt	18
4.2. Ghana Case Study	20
4.2.1. Renewable Energy in Ghana	20
4.2.2. Energy Policies in Ghana	21
4.2.3. RETs selected for Barrier analysis	21
4.2.4. Barriers to RETs Implementation in Ghana	22
4.2.5. Opportunities for Promotion of RETs and General Recommendations	24
4.2.6. Proposal for Follow-Up RETs Projects in Ghana	26
4.3. Zimbabwe Case Study	28 28
4.3.2. Renewable Energy Potential in Zimbabwe	20
4.3.2. Renewable Energy Fotential in Zimbabwe	29
4.3.4. Proposal for Follow-up PETs Projects in Zimbabwa	3/
5 Lessons Learned from the Case Studies	36

#### Preface

The project was initiated in 1999 jointly by UNEP and RISØ National Laboratory, and sponsored by DANIDA. The UNEP Centre, RISØ co-ordinated the project. The project was launched to identify barriers to the implementation of renewable energy technologies (RETs) and explore measures to overcome the identified barriers. It included three country case studies; Egypt, Ghana and Zimbabwe. The studies were carried out by national institutions in these countries. The New and Renewable Energy Authority (NREA) at the Ministry of Electricity and Energy in Egypt, the Kumasi Institute of Technology and Environment (KITE) in Ghana, and the Southern Centre For Energy and Environment (SCEE) in Zimbabwe were responsible for the country case studies.

In addition to the direct results of the national studies, the project also provided input to the preparatory process of the Commission for Sustainable Development (CSD) for its ninth session in 2001. The national studies were presented at the African High-Level Regional Meeting on Energy and Sustainable Development, held in Nairobi in January, 2001. The inputs from the meeting were provided to CSD9 through a ministerial declaration of African countries on strategies for action and ways of strengthening regional co-operation in the areas of energy and sustainable development.

The case studies have analysed the barriers to the implementation of potential RETs in the three countries and also identified measures to remove the barriers. The case studies have been published and are available at the Centre, as well as at it's web site (http://www.uccee.org/). This summary of the case studies brings forth the valuable lessons learnt in the three countries, and is expected to be useful in identifying barriers and removal measures to RETs in other countries also. This, it is hoped, will help successful implementation of these technologies.

## Implementation of Renewable Energy Technologies (RETs) Project – Opportunities & Barriers; Egypt, Ghana and Zimbabwe country studies

#### **Executive Summary**

The project was launched to identify barriers to the implementation of renewable energy technologies (RETs) and explore measures to overcome the identified barriers. National institutions in Egypt, Ghana and Zimbabwe carried out the country studies based on the basic methodological framework provided by the UNEP Centre. The objectives of the project included strengthening institutional capacity for analysis and implementation of RET projects in the participating countries and bring out experiences on RETs barriers and removal measures for dissemination so that others can benefit from the knowledge so gained. An important highlight of the studies was involvement of stakeholders in the process of identification of barriers and measures to remove them.

A preliminary identification of relevant RETs for their countries was done by the country teams in the initial stage of the project. After that, national workshops involving various stakeholders were held between July and September 1999 to discuss the RETs and barriers to their implementation. Based on the discussions, a few important RETs were identified for more detailed study. PV systems for rural electrification, solar water heating systems and large-scale biogas system were identified and analysed for barriers in the Egypt country study. Economic, information and policy barriers were identified as major barriers for these technologies. Solar water pumps, biogas and small hydro were the focus of study in Ghana. In this case also, economic, information and policy barriers were found to be the important barriers for the selected technologies. In the case of Zimbabwe, focus was on identification of primary and secondary barriers to RETs dissemination. The primary barriers included lack of capacity to develop proposals, lack of information for policymaking and framework for information dissemination. The study concluded that the secondary barriers as seen and experienced by the stakeholders are due to primary barriers. Therefore, it is important to address primary barriers. Measures to remove the identified barriers were suggested by the stakeholders in all the three countries.

Final national workshops were held in June in Egypt and Ghana, and in August 2000 in Zimbabwe to discuss the study findings. The workshops were attended by a spectrum of stakeholders and generated a lot of interest and discussions on the findings of the studies in all the three countries. The feedback from the stakeholders has been included in the reports finalised during 2001. The lessons learnt from the studies included in this summary report point to the key concerns of the stakeholders on the RETs and their suggestions to promote these technologies.

### 1. Introduction

Economic development is closely linked with the energy development. Most of the world's commercial energy supplies are provided by fossil fuels, with the associated emissions causing local, regional and global environmental problems. Projections over the horizon to 2050 indicate that world energy demand may increase dramatically, with most of this increase taking place in developing countries. It is feared that not only these levels of energy production and use from current energy sources are difficult to achieve but also un-sustainable. Therefore, energy-use efficiency needs to be increased to moderate the growth of energy while contribution from clean energy sources needs to be increased to reduce adverse environmental impacts of energy usage.

Renewable energy is considered one of the potential measures to meet the challenges of ever increasing energy use and related environmental concerns. Renewable energy offers a promising alternative to traditional energy sources in developing countries, who may face several constraints in meeting their energy requirements in future. Most of the investment is still directed towards conventional energy technologies, even where commercially available energy efficient and renewable technologies are technically feasible and economically attractive. Several developing countries have tried to promote renewable energy but despite their efforts renewable energy contribution to the total energy use has not increased significantly. The fact that renewable energy accounts for only a modest proportion in meeting the world's (commercial) energy demand means that there is a missing link in their potential and their implementation - the barriers in their implementation. These barriers (either financial or non-financial) need to be identified and addressed in order to design innovative policy approaches for the international and domestic financing or RETs.

In Africa also, current pattern of energy use is environmentally damaging and unsustainable, and the existing environmental problems are closely linked to energy systems. Africa has substantial renewable energy sources that could be harnessed to meet energy needs of various sectors. Currently, a lack of consumer access to these sources means that Africa is faced with the paradox of experiencing a shortage of energy despite an abundance of energy sources.

Renewable energy can play an important role in helping to meet basic energy needs in peri-urban zones and in rural areas, through the use of modern technologies. These can help to provide alternative sources of energy for some specific needs, for example, hot water production using solar heaters, and small-scale agro-processing industries. However, before this can be done, several issues may have to be addressed. These may include financing schemes, technical appraisal and testing, technology transfer and job creation and product manufacturing etc.

The project was instituted with a view to use case studies of renewable energy implementation projects to analyse the reasons for success or failure of specific projects or technologies. In particular, the project's aim was to identify possibilities for "removing" the main barriers and thus promoting increased implementation of Renewable Energy Technologies (RETs). African region was the focus area of the project and three countries were selected for the case studies. These included Egypt, Ghana and Zimbabwe. The country selection criteria included existence of the RETs programmes in the countries, their interest and capacity in conducting the study, and possibilities to build on existing collaborative activities and experiences between the countries and the implementing/funding institutions. The case study countries were expected to provide sufficient understanding of the barriers to RETs and possible measures to overcome them. The experiences from the case studies can throw valuable lessons to promote the RETs in Africa. This report is an attempt in that direction. It seeks to generalise the experiences from the case studies for dissemination and promotion of RETs.

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