

SCOPE OF WORK
FOR
THE MASTER PLAN STUDY
ON
PHOTOVOLTAIC RURAL ELECTRIFICATION
IN
THE REPUBLIC OF BOTSWANA

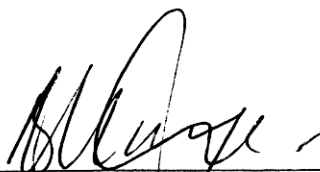
AGREED UPON BETWEEN

**ENERGY AFFAIRS DIVISION,
MINISTRY OF MINERALS, ENERGY AND WATER
AFFAIRS IN THE REPUBLIC OF BOTSWANA**

AND

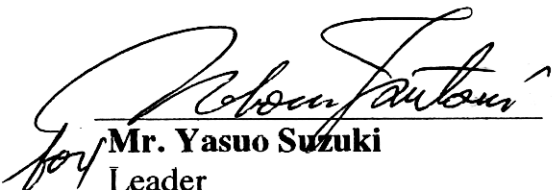
JAPAN INTERNATIONAL COOPERATION AGENCY

Gaborone



Mr. B. Marole
Permanent Secretary
Ministry of Minerals, Energy
and Water Affairs

Date: 18/2/2000



Mr. Yasuo Suzuki
Leader
The Preparatory Study Team
JICA

Date: 18th February 2000

I. INTRODUCTION

In response to the request of the Government of the Republic of Botswana (hereinafter referred to as "Botswana"), the Government of Japan decided to conduct the Study on Photovoltaic Rural Electrification Plan in the Republic of Botswana (hereinafter referred to as "the Study") in accordance with the relevant laws and regulations in force in Japan. Accordingly, Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan, will undertake the Study in close cooperation with the authorities concerned in Botswana. The present document sets forth the scope of work with regard to the Study.

II. OBJECTIVE OF THE STUDY

The objective of the study is to formulate a Master Plan on Photovoltaic (hereinafter referred to as "PV") Rural Electrification in reference to the eighth (8th) National Development Plan (1997-2002:NDP8) and the Botswana Energy Master Plan (1996). The Master Plan on PV Rural Electrification will focus on geographical PV deployment strategy, PV technology improvement, effective institutional structure and sustainable management system for further dissemination of PV systems in order to accelerate rural electrification.

III. THE STUDY AREA

The Study covers the whole country of the Republic of Botswana. During the Study, the Dissemination Project for PV rural electrification will be implemented in selected villages.

IV. SCOPE OF THE STUDY

Phase 1: Preliminary Investigation Stage

In order to optimize strategy and institutional framework for PV deployment, the following investigations are carried out.

1. Collection and review of the relevant data and information
2. Review of the current rural electrification policy including the incentive programs
3. Review of the roles of concerned institutions in rural electrification
4. Assessment of the past and on-going PV electrification programs including socio-economic survey
5. Assessment of socio-economic situation and energy demand / supply in rural communities
6. Identification of suitable strategy and measures for promotion of PV rural electrification in terms of policy and finance
7. Identification of suitable institutional and management framework to undertake PV rural electrification
8. Identification of the target villages for the Dissemination Project

Phase 2: Dissemination Project Stage

In order to establish the way of PV dissemination, process of PV rural electrification is standardized through actual installation of solar home systems and other PV appliances in the target villages. Technology transfer and capacity building are also carried out as the basis for PV dissemination. At the same time the strategy and institutional framework identified in Phase 1 are demonstrated and evaluated.

1. Establishment of the institutional and management framework to undertake long-term maintenance of PV systems which will be installed in the Dissemination



- households and public institutions
4. Determination of specifications of PV systems and other equipment
 5. Installation and monitoring of PV systems and other equipment
 6. Inspection of management framework and institutional capacity
 7. Technology transfer and capacity building such as workshops, seminars, and training
 8. Evaluation of the Dissemination Project including the following points of view;
 - a) Technical knowledge and maintenance skill on PV systems of users and suppliers
 - b) Management framework and institutional capacity in terms of sustainability and effectiveness
 - c) Incentive programs including the electricity tariff
 - d) Financial evaluation
 - e) socio-economic effect
 - f) environmental impact

Phase3: Master Plan Formulation Stage

Based on the outcome and experiences of Phase 1 and 2, The PV Rural Electrification Master Plan is formulated. The Plan provides the framework within which rural PV electrification can be implemented and include the followings:

- (1) targets and priorities of PV rural electrification
- (2) implementation schedule
- (3) cost implications and financial procurement (for whole target areas and for particular target areas with highest priority)
- (4) economic and financial evaluation (for whole target areas and for particular target areas with highest priority)
- (5) policy recommendations to support the Plan including the following points of view;
 - a) regulations, incentive programs and financial resources for PV rural electrification
 - b) institutional framework and management system
 - c) education and training programs for technical staffs about PV systems
 - d) improvement of public awareness about PV systems
 - e) promotion of PV-related industries, including manufacturing, distributions, installations and maintenance services industries
 - f) development of battery recycling system

V. WORK SCHEDULE

The Study will be carried out in accordance with the tentative work schedule shown in the appendix I.

VI. REPORTS

JICA shall prepare and submit the following reports in English to the Government of Botswana:

- | | |
|-----------------------|---|
| 1) Inception report | Twenty (20) copies |
| 2) Progress report | Twenty (20) copies |
| 3) Interim report | Thirty (30) copies |
| 4) Draft final report | Thirty (30) copies (main reports and summaries) |

Energy Affairs Division, Ministry of Minerals, Energy and Water Affairs (hereinafter referred to as "MMEWA-EAD") shall provide its comments on the draft final report within one (1) month after the submission of that report.

5) Presentation

The presentation of draft final report shall be made to MMEWA-EAD.

6) Final report Forty (40) copies (main reports and summaries)

The Team will submit these reports within two (2) months after receiving the comments of the Government of Botswana on the draft final report.

During the field study in Botswana, monthly meetings are held, and monthly reports are prepared and submitted to the meetings.

VII. DIVISION OF TECHNICAL UNDERTAKING

The division of technical undertakings by MMEWA-EAD and JICA of the Study is detailed in the appendix II.

VIII. UNDERTAKING OF THE GOVERNMENT OF BOTSWANA

1. To facilitate smooth conduct of the Study, the Government of Botswana shall take necessary measures;

- (1) to secure the safety of the study team,
- (2) to permit the member of the study team to enter, leave and sojourn in Botswana for the duration of their assignment therein, and exempt them from foreign registration requirements and consular fees,
- (3) to exempt the members of the study team from taxes, duties, fees and other charges on equipment, machinery and other materials brought into, and out of, Botswana for the conduct of the Study,
- (4) to exempt the members of the study team from income taxes and charges of any kind imposed on, or in connection with, any emoluments or allowances paid to them for their services for the implementation of the Study,
- (5) to provide necessary facilities to the study team for remittance as well as utilization of the funds introduced into Botswana from Japan in connection with the implementation of the Study,
- (6) to secure permission for entry into private properties or restricted areas for the implementation of the Study,
- (7) to secure permission for the study team to take all data and documents including maps and photographs related to the Study out of Botswana to Japan,
- (8) to provide medical service as needed. Its expenses will be chargeable on members of the study team.

2. The Government of Botswana shall bear claims, if any arises, against members of the study team resulting from, occurring in the course of, or otherwise connected with, the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the members of the study team.

3. MMEWA-EAD shall act as counterpart agency to the study team and also as coordination body in relation with the other governmental and non-governmental organizations concerned for the smooth implementation of the Study.

4. MMEWA-EAD shall, at its own expense, provide the study team with the following, in cooperation with other organizations concerned;

- (1) available data and information related to the Study,
- (2) counterpart personnel,
- (3) suitable office space with necessary equipment in Gaborone,
- (4) credentials or identification cards,
- (5) necessary vehicles with drivers, fuel and maintenance services for carrying out the field survey,
- (6) communication facilities during the execution of the Study, such as telephone, telex,



transceiver, etc., if necessary.

IX. UNDERTAKING OF JICA

For the implementation of the study, JICA shall take the following measures;

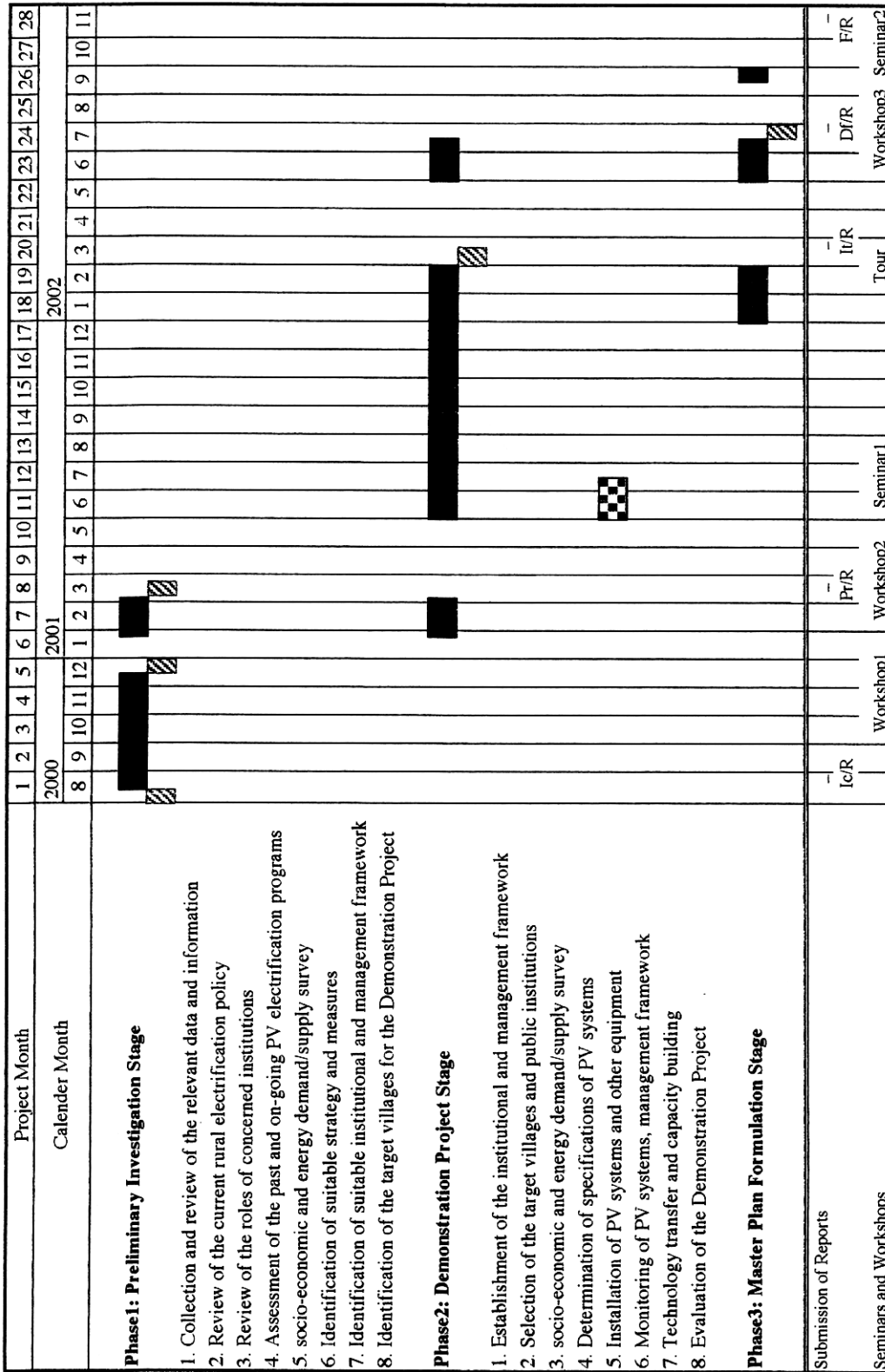
1. to dispatch, at its own expense, study teams to Botswana, and
2. to pursue technology transfer to the Botswanan counterpart personnel in the course of the Study.

X. OTHERS

JICA and Botswana shall consult with each other in respect of any matter that may arise from or in connection with the Study.

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Tentative Work Schedule



JICA work in Botswana
 JICA work in Japan
 Iu/R: Progress Report
 Iu/R: Inception Report
 Iu/R: Interim Report
 Iu/R: Draft Final Report
 F/R: Final Report

Outline of Division of Technical Undertaking

	MMEWA-EAD	JICA
1. Preliminary Investigation	<ul style="list-style-type: none"> (1) Establishment of Working Group and Steering Committee (2) Collection and provision of all relevant data and information (3) Arrangement of meeting with relevant authorities and rural communities (4) Assistance to implement the surveys in rural areas (5) Assistance to select the candidate villages for Demonstration Project (6) Assistance to identify the suitable institutional and management framework (7) Identification of the target villages for the Demonstration Project (8) Establishment of the identified institutional and management framework for PV rural Electrification 	<ul style="list-style-type: none"> (1) Collection and review of the relevant data and information (2) Review of the current rural electrification policy (3) Review of the roles of concerned institutions (4) Assessment of the past and on-going PV electrification programs (5) socio-economic and energy demand/supply survey in rural communities (6) Identification of suitable strategy and measures to promote PV rural electrification (7) Identification of suitable institutional and management framework (8) Identification of the target villages for the Demonstration Project
2. Dissemination Project	<ul style="list-style-type: none"> (1) Operation of Steering Committee (2) Collection and provision of all relevant data and information (3) Arrangement of meeting with relevant authorities and rural communities (4) Establishment of the institutional and management framework (Management Unit etc.) for Demonstration Project (5) Selection of the target households and institutions (6) Assistance to conduct socio-economic and energy demand/supply survey (7) Assistance to determine the PV system design and to install PV systems (8) Monitoring of PV systems, management framework and institutional capacity 	<ul style="list-style-type: none"> (1) Establishment of the institutional and management framework (Management Unit etc.) for Demonstration Project (2) Selection of the target households and institutions (3) socio-economic and energy demand/supply survey in the target households and institutions (4) Determination of specifications of PV systems and other equipment (5) Installation of PV systems and other equipment (6) Monitoring of PV systems, management framework and institutional capacity (7) Technology transfer and capacity building (8) Evaluation of the Demonstration Project
3. Master Plan Formulation	<ul style="list-style-type: none"> (1) Operation of Steering Committee (2) Arrangement of meeting with relevant authorities and rural communities (3) Operation of PV management system 	<ul style="list-style-type: none"> (1) Preparation of technical, institutional and policy recommendations on PV dissemination (2) Preparation of potential area suitable for PV electrification (3) Preparation of Rural Electrification Implementation Plan