



UNITED NATIONS
ECONOMIC AND SOCIAL COUNCIL

Distr.
LIMITED
E/ESCWA/NR/88/17
18 September 1988
Original: ENGLISH

ECONOMIC AND SOCIAL COMMISSION FOR WESTERN ASIA

Natural Resources, Science and Technology Division
Energy Programme

PROJECT PROFILE

**DISSEMINATION OF PROGRAMMES ON "DO-IT-YOURSELF" SMALL-SCALE
SOLAR EQUIPMENT IN REMOTE AREAS OF THE ESCWA REGION**



PREFACE

In this field of energy, developing countries throughout the world and the countries of Western Asia face a twofold challenge: achieving a satisfactory overall growth rate; while, at the same time, preparing a new self-sufficient energy era under conditions much more complex than present ones.

In order to meet this challenge, the Economic and Social Commission for Western Asia has been working in the areas of energy planning, research, development, implementation and evaluation with regard to new and renewable sources of energy, including activities aimed at promoting projects related to rural energy.

The United Nations Development Programme (UNDP)-funded regional Seminar on Small-scale Solar and Wind Technologies for Rural and Remote Areas in the ESCWA Region, held in Amman, Jordan, in December 1986, considered the outline of a number of regional projects that would lead to the elaboration of specific projects at a regional level. That Seminar was followed up by an Inter-governmental Meeting of energy experts from ESCWA countries who considered and approved various new and renewable sources of energy (NRSE) projects.

In this context of objectives and programmes, and in the face of the magnitude of the work required, ESCWA efforts are focused on technical co-operation among the region's countries; these efforts complement the manpower and technological capacities of technical co-operation among developing countries (TCDC) in the rest of the world. It is therefore important to seek the technological and financial co-operation of the regional and international community, as well as to exchange the experiences gained in the development of NRSE; this may prove a highly productive exercise to further regional and interregional co-operation.

Such co-operation with the region's countries and scientific institutions and those outside the ESCWA area will doubtlessly be highly useful in general, particularly so in so far as it complements the region's existing indigenous capacity and strengthens the possibilities of achieving a regional renewable energy breakthrough, with increasing technological autonomy.

The central goal of the project profile presented is to obtain support from regional and international financial agencies and from national institutions of industrialized countries in order to bolster the region's rural energy supply, while contributing to the world-wide process of energy/technology transition.

This document describes one of several projects that are to be carried out in the ESCWA region in the years to come. It must be emphasized that this project, which may in some cases be isolated from a regional context, constitutes only part of the regional NRSE projects identified by member countries for execution or implementation by ESCWA through the Energy Programme of the ESCWA Natural Resources, Science and Technology Division.

This project is part of a package of projects on solar and wind energy. These projects are integrated into ESCWA programmes and activities, and form part of a group of projects under regional programming with regional co-operation as the objective.

TITLE: DISSEMINATION OF PROGRAMMES ON "DO-IT-YOURSELF"
SMALL-SCALE SOLAR EQUIPMENT IN REMOTE AREAS OF
THE ESCWA REGION

DURATION: TWO YEARS

Part One

A. Development objectives

The development objectives of the project are the following:

1. To assist selected ESCWA member States in promoting solar energy through the local manufacturing of simple, low-cost solar equipment to meet the basic energy needs of small communities in remote areas in the ESCWA region.
2. To assist Governments of the region in accelerating the social and economic development of remote areas.
3. To assist Governments of the region in increasing self-sufficiency and self-reliance by producing simple solar systems locally.
4. To assist Governments of the region in developing a long-term policy for the diffusion of simple solar systems in rural areas.

B. Immediate objectives

The immediate objectives of the project are as follows:

1. To develop modular designs and production for small-scale low-cost solar equipment such as water stills, cookers, water heaters and crop dryers using local materials and skills in remote areas.
2. To develop local capabilities in the manufacture, installation, operation and repair of solar systems.
3. To install some of the simple solar systems produced locally for demonstration in selected remote areas.
4. To familiarize and train the population in remote areas on the use of solar equipment on a "DO-IT-YOURSELF" basis.

C. Special considerations

This project gives special attention to the needs of developing countries in the ESCWA region and to the improvement of the social and environmental conditions of the inhabitants, especially women living in remote areas, by relieving them of some of their strenuous tasks, improving their quality of life, and safeguarding them from exposure to the hazards involved in using conventional sources of energy.

This project also provides for creating more jobs for people, thus improving the social and economic conditions of the community. In addition, the project will increase the self-sufficiency and self-reliance of the community.

The project also provides for promotion of technical co-operation among developing countries in the field of enhancing the utilization of renewable energy resources.

D. Background and justification

A substantial part of the population in the ESCWA region live in rural and remote areas which are in most cases located far from electrical power connections. In these areas, the women spend hours every day fetching, collecting and hauling twigs, farm waste and fuel-wood to use for cooking and for heating water. In some remote areas, fresh drinking water is scarce and must be transported for long distances, which leads to the risk of possible contamination.

In some other areas, drying crops in the sun may cause losses from incursions by birds and insects. In some other cases, such as drying of herbs in open air, there is a loss of important volatile materials. Using solar dryers will preserve the quantity and quality of crops and thus increase the farmers' economic return.

Solar water stills are required in some areas where potable water is scarce. These stills produce a few liters of fresh drinking water a day.

All these simple small-scale solar systems could be locally manufactured using local skills and materials, which would make a social and economic contribution to the region. Another strong reason for using local skills and materials is that many solar equipment parts for water distribution, cooking, water heating and drying could be manufactured in small workshops in remote areas, thus increasing community self-sufficiency and self-reliance. Intensive training and dissemination programmes are therefore required.

This outline of this project proposal was discussed in the Regional Seminar on Small-Scale Solar and Wind Technologies for Rural and Remote Areas in the ESCWA Region, sponsored by the United Nations Development Programme (UNDP), organized by ESCWA and held in Amman, Jordan, from 29 November to 3 December 1986. The experts participating in the Seminar emphasized the importance of this project.

The representatives of Democratic Yemen, Egypt, Oman, Saudi Arabia, the Syrian Arab Republic and the Yemen Arab Republic expressed the interest of their countries in participating in the project.

Following the Seminar, the Inter-Governmental Technical Meeting on New and Renewable Sources of Energy that was held in Amman, Jordan on 4 December 1986 unanimously approved this project proposal.

E. Outputs

The outputs of the project will include the following:

1. Report assessing the feasibility of manufacturing, using local skills and materials, solar water heaters, solar stills, solar cookers and solar dryers in selected rural areas;

2. Development of a set of alternative designs for the above-mentioned solar systems appropriate to the local conditions of rural areas in the selected ESCWA countries;
3. Establishment of local team in each of the participating countries trained on the job in manufacturing, installation, operation, repair and maintenance of the solar systems;
4. Programme for training of local rural manpower in manufacturing, constructing, installing, operating and maintaining the solar systems in each of the participating countries;
5. Report on the technical performance of the solar systems operating under local conditions (climatic conditions, local materials, etc.);
6. Report on the financial implications of manufacturing the solar system using local manpower and local materials;
7. Report on the social impact and acceptability of introducing solar technologies in rural areas and the role of the community in the promotion of these technologies.

F. Activities

Project activities will include the following:

1. Selection of sites for local manufacturing of solar systems in the participating countries: the criteria should include, inter alia, the availability of semi-skilled manpower and materials and the accessibility of the site for efficient transport of engineers, technicians and equipment;
2. Identification of modular designs for small low-cost solar equipment such as stills, cookers, water heaters and crop dryers, using local materials in remote areas;
3. Identification of the magnitude and specifications of solar equipment, materials, tools and instruments required for the production of the solar system;
4. Identification of the number, qualifications and/or experiences of the local manpower who will participate in manufacturing, installing, testing, operating, repairing and maintaining the equipment;
5. Organizing training of local manpower on manufacturing, testing, installing, operating, repair and maintenance of solar system;
6. Organizing training for technicians in remote areas on the diffusion of solar technologies;
7. Organizing mobile units of technicians for two-week missions on a periodic basis to visit different sites in the participating countries to train the population and furnish them with all necessary information and skills to use solar equipment on a "do-it-yourself" basis;

8. Assessing the economic impact of solar systems and local manufacturing and utilization of these systems on the community;
9. Assessing the social impact of solar systems and their utilization on local manufacturing in the community, particularly women;
10. Assessing the environmental and health impact (population control) of the utilization of solar systems in rural areas;
11. Evaluation of the project.

G. Inputs

1. Governments' participation

The diffusion of simple small-scale solar systems is first and foremost the responsibility of the Governments concerned. The contribution of the Governments should include, but will not be limited to, the following:

(a) To identify and designate a technically competent official who will act as a focal point for the project. The designated focal point will be in charge of the project in the respective country, will be fully aware of the project's development and ensure the Government's participation in the project;

(b) To make available to the experts and consultants all necessary documents and information relevant to the implementation of the project;

(c) To identify engineers, technicians and national experts who will participate in the project;

(d) To provide the project personnel and other parties jointly involved in the project with the services of national experts, technicians and labourers as may be necessary;

(e) To secure suitable areas of land in selected communities for establishing the manufacturing facilities, storing produced systems, and setting up testing and measuring stations;

(f) To provide the experts and consultants on missions in their respective countries with local transport, offices and adequate secretarial services;

(g) To provide all facilities necessary for reproduction of data sheets and reports;

(h) To follow up and supervise the project after completion.

The total cost of each participating country is expected to be about \$US 10,000.

2. Financing agencies' contribution

Financing agencies are expected to provide funds for the following:

	<u>Work-months</u>	<u>United States dollars</u>
(a) Expert in solar water heating systems	1	5,000
(b) Expert in solar crop drying systems	1	5,000
(c) Expert in solar cookers	1	5,000
(d) Expert in solar stills	1	5,000
(e) Expert in manufacturing of solar systems	6	36,000
(f) Expert in socio-economic assessment	2	10,000
(g) Manufacturing equipment groups including:		
- Cutting saws		2,000
- Bending machine		5,000
- Drill and trimming machine		3,000
- Welding facility		2,000
- Threading machine and fasteners		1,000
- Glass cutting tools and gaskets		500
Subtotal		13,500
(h) Materials and prototypes cost including:		
- Compact type solar water heaters		6,000
- Simple solar stills		7,000
- Solar dryers		6,500
- Solar cookers		3,000
- Improved stoves		4,000
Subtotal		<u>26,500</u>
(i) Training cost including:		
- Technology course for trainees		4,000
- Training of local manpower on manufacturing		7,000
- Training of local manpower and users on operation, maintenance and repair		4,000
Subtotal		15,000
(j) Travel cost		10,000
(k) Reporting		<u>5,000</u>
Total		130,000

I. Preparation of the framework for effective participation of national and international staff in the project

The activities necessary to produce the indicated outputs and achieve the project's immediate objectives will be carried out jointly by the national and international staff assigned to it. The respective roles of the national and international staff will be determined at the beginning of the project and set out in a framework for effective participation of national and international staff in the project. This framework will be attached to the project document as an annex and will be reviewed as necessary. The respective roles of the national and international staff shall be in accordance with the established concept and specific purpose of technical co-operation.

J. Development support communication

ESCWA and other participating agencies and organizations will communicate reports and data and exchange information collected on solar and wind water pumping.

K. Institutional framework

ESCWA, as the executing agency, will be the primary institution concerned with the implementation of the project activities. The project co-ordinator and any project personnel or consultants recruited to implement the project will be based with ESCWA headquarters in Baghdad.

The project will be executed by, under the supervision of and in accordance with the administrative procedures of ESCWA, the executing agency. It is suggested that the project should be hosted by either Democratic Yemen, the Syrian Arab Republic, or the Yemen Arab Republic.

All activities to be carried out within the framework of the project will be reviewed by ESCWA participating countries, principle donor countries, financial institutions, consultants, advisory groups and, where appropriate, suggestions and advice will be forwarded by them directly to ESCWA, as the executing agency for the project.

Participating countries are requested to support the project either through a direct contribution or through the seconding of experts to study specific problems, and to provide equipment and, by special arrangement, to provide access to technical information for the implementation of the project.

Part Two

SCHEDULE OF MONITORING, EVALUATION AND REPORTS

A. Tripartite Monitoring Reviews

The project will be subject to periodic reviews by ESCWA in accordance with ESCWA policies and procedures for monitoring projects and programmes.

B. Evaluation

The project will be subject to evaluation in accordance with the policies and procedures established for this purpose by the financing agencies. The organization, terms of reference, and timing of the evaluation will be decided by consultation between the Governments, the financing agencies and ESCWA as an executing agency.

C. Progress and final reports

The project co-ordinator, in consultation with the experts, consultants and focal points of the project, will submit periodic reports during the implementation of the project and will submit a final report.

Table 2. Project budget

PROJECT PERSONNEL	WORK- MONTHS	TOTAL US \$	1988		1988	
			WORK- MONTHS	TOTAL US \$	WORK- MONTHS	TOTAL US \$
1. Expert on solar heating systems	1	5,000	1	5,000		
2. Expert on solar crop drying	1	5,000	1	5,000		
3. Expert on solar cooker system	1	5,000	1	5,000		
4. Expert on solar stills	1	5,000		5,000		
5. Expert on manufacturing of solar systems	6	30,000	6	30,000		
6. Expert on socio-economic assessment	2	10,000			2	10,000
SUBTOTAL	12	60,000	10	50,000	2	10,000
7. Equipment, materials for prototype manufacturing cost		40,000		30,000		10,000
8. Training cost		15,000		12,000		3,000
9. Travel cost		10,000		8,000		2,000
10. Reporting cost		5,000		3,000		2,000
SUBTOTAL		70,000		53,000		17,000
TOTAL		130,000		103,000		27,000

Annex

REGIONAL RENEWABLE ENERGY PROJECTS

Regional NRSE priority projects	Participating countries	Suggested host country for the project in priority scale	Estimated budget in thousands of US dollars
1. Establishment of Solar and Wind Energy Measuring Network	Bahrain, Democratic Yemen, Egypt, Iraq, Jordan, Lebanon Oman, Qatar, Saudi Arabia, Syria, Yemen	(1) Egypt, (2) Jordan, (3) Syria	895
2. Solar and Wind Energy Water Pumping in Remote Areas	Democratic Yemen, Egypt, Oman, Saudi Arabia, Syria, UAE, Yemen	(1) Syria, (2) Yemen, (3) Democratic Yemen	920
3. Solar and Wind Energy for Water Desalination of Brackish Sea Water in Remote Areas	Bahrain, Democratic Yemen, Egypt, Oman, Saudi Arabia, UAE	(1) Saudi Arabia, (2) Oman, (3) UAE	920
4. Demonstration of Wind and Solar Ice Making in a Fishing Community	Democratic Yemen, Egypt, Oman, Saudi Arabia, Yemen	(1) Democratic Yemen, (2) Oman, (3) Saudi Arabia	485
5. Training Programme on Biogas, Solar and Wind Technologies	All ESCWA countries	(1) Jordan, (2) Egypt, (3) Syria	175
6. Solar Energy Based Herders Settlement	Egypt, Democratic Yemen, Iraq, Jordan, Oman, Qatar, Saudi Arabia, Syria, Yemen	(1) Oman, (2) Syria, (3) Iraq	1,630
7. Solar Agro-industrial Demonstration Farm	Egypt, Democratic Yemen, Iraq, Jordan, Oman, Syria, Yemen	(1) Iraq, (2) Syria, (3) Jordan	365



Annex (Cont'd)

Regional NRSE priority projects	Participating countries	Suggested host country for the project in priority scale	Estimated budget in thousands of US dollars
8. Dissemination Programme for "Do-It-Your-Self" Small-scale Solar Equipment in Remote Areas.	Egypt, Jordan, Syria, Iraq, Yemen	(1) Iraq, (2) Jordan (3) Yemen	130
9. Solar Pond Technology for Electricity Generation in Remote Areas of the ESCWA Region	Bahrain, Egypt, Iraq, Jordan	(1) Qatar, (2) Jordan, (3) Egypt	1,240
10. Development of Demonstration of Mini-hydro Plants	Yemen, Syria, Iraq, Egypt	(1) Syria, (2) Iraq, (3) Egypt	6,176

