

**Deployment of Photovoltaic Technologies: Co-operation with Developing Countries.
Task IX of the International Energy Agency's Photovoltaic Power Systems Programme**

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ABSTRACT:

This paper describes the aims, objectives and progress to date of the latest Task (Task IX) of the International Energy Agency's Photovoltaic Power Systems Programme. The overall mission of the IEA PVPS Programme is to encourage international collaboration efforts through which photovoltaic energy becomes a significant option in the near future.

The objective of Task IX is to further increase the overall rate of successful deployment of PV systems in developing countries where PV is often the only viable option for remote electrification. Task IX is therefore exploring the possibilities for, and scope of, co-operation with developing countries and international financial institutions.

The following countries are actively participating in the work of the Task: Australia, Canada, Denmark, France, Germany, Italy, Japan, the Netherlands, Switzerland, the United Kingdom and the United States of America. The United Nations Development Programme and the World Bank also participate in Task IX.

Keywords: Developing countries - 1: Rural electrification- 2: Strategy – 3

1. INTRODUCTION

The primary objective of Task IX is to further increase the overall rate of successful deployment of PV systems in developing countries. This will be achieved by:

- Development of Recommended Practice Guides;
- Promoting improved techno-economic performance of PV in developing countries;
- Identification of areas where further technical research is necessary;
- Exchange of information with, and between, target groups;
- Workshops for, and information exchange with, donor agencies.

The Task IX Workplan was agreed by the PVPS Executive Committee in May 1999. The Task has been divided into 3 subtasks:

- (i) Deployment Infrastructure;
- (ii) Support and Co-operation;
- (iii) Technical and Economic Aspects of PV Systems in Developing Countries.

The process of identifying a number of target countries has been initiated and these have been provisionally identified as: Argentina, Brazil, China, Dominican Republic, Ghana, Honduras, Kiribas, Indonesia, India, Morocco, Philippines, South Africa, Vietnam and Zimbabwe

2. DEPLOYMENT INFRASTRUCTURE

This subtask has been developed to identify and overcome the critical barriers to the widespread PV deployment and implementation through developing a series of Recommended Practice Guides (RPGs) to help promote the necessary infrastructure requirements in developing countries. These Guides will be both technical and non-technical in nature, covering issues such as quality and certification, operation and maintenance, training and accreditation, and financing mechanisms.

This work is investigating the various strategies for infrastructure development and deployment to ensure widespread and successful implementation of future PV programmes. Key issues relating to PV deployment strategies and initiatives are being investigated and collated to provide input to the preparation of the Guides.

A series of surveys are currently underway on various aspects of PV deployment programmes. As far as possible, information is being gathered from existing sources and networks (e.g. local in-country expertise, PRESSEA, existing PV suppliers networks, results gathered from the IEA PVPS Task III Developing countries Survey Report¹). If it proves necessary, in-country missions may also be undertaken. The surveys are collecting data on existing schemes and initiatives for each of the identified subject areas. Each survey will be then be reviewed by the Task experts and then used as input to the corresponding Recommended Practice Guide.

A framework for the development of the guidelines has been developed and will involve the following actions:

- (i) Preparation of an experts panel from Task IX and possibly with representation from target groups.
- (ii) Analysis of documents to identify relevant lessons learned.
- (iii) First Draft of the guidelines document.
- (iv) Workshop on the draft guidelines with the experts panel to improve it with their comment.
- (v) Finalising the guidelines document with the comments and improvements of the expert panel.

Guides relating to the following areas will be collated:

- government policy and RE planning
- financing mechanisms
- institutional development
- training programmes
- operation and maintenance of systems
- certification and accreditation
- systems planning
- infrastructure frameworks
- awareness raising.

The Guides will be published over the internet as this is both cost effective and easier than hard-copy publication. It will also facilitate easy and regular updating.

The Recommended Practice Guides will provide a comprehensive series of documents that will be disseminated via appropriate networks. The dissemination of the Recommended Practice Guides is crucially important to ensure that they are implemented and utilised by the organisations at which they have been targeted.

A key goal of this dissemination exercise is to ensure that the guides are implemented on a practical level in real implementation programmes. In order to achieve this goal, relevant agencies will be encouraged to adopt the Recommended Practice Guides as an integral part of their rural electrification programmes. A part of this process will involve a series of workshops and seminars, targeted

at relevant institutions in specified countries, as well as manufacturers, utilities, training organisations etc.

3. SUPPORT AND CO-OPERATION

This second subtask aims to stimulate awareness and interest amongst multilateral and bilateral agencies, NGOs, development banks, on the technical and economic potential, opportunities and recommended practice of PV systems. This will enable decision-makers to obtain the expertise and knowledge that is required to prepare PV programmes and appropriate PV system deployment.

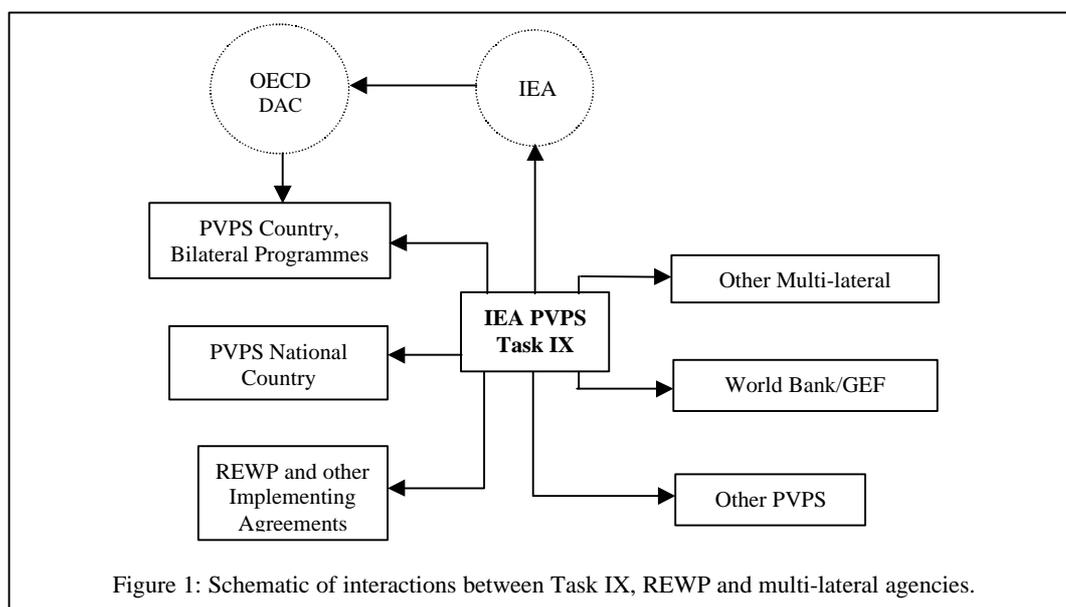
The objective of the Subtask is to stimulate awareness and interest amongst the target sectors on the technical and economic potential, social implications, opportunities and best practice of PV systems and to establish a dialogue with multilateral and bilateral agencies and development banks. The objectives will be met through two main areas of activity:

- (i) Support to Multilateral and Bilateral Donors and Development Banks
- (ii) Co-operation with IEA's Renewable Energy Working Party (REWP) and IEA / OECD

The programme of work for each Activity will take the form of:

- Educational seminars and workshops for donor agency, bank and client country staff;
- Information and dissemination services including publications;
- Review of publications.
- Co-operation with the IEA / REWP, IEA / non-member country committee and OECD Secretariats.

The dynamics of the interactions are shown in Figure 1.



Four workshops are planned over the next four years with staff of the multi-lateral agencies. The following agencies have been identified as potential host institutions:

- World Bank Group, Washington.
- United Nations Development Programme (UNDP), New York.
- Asian Development Bank (ADB), Manila.
- Interamerican Development Bank (IDB), in-country-office in a Latin American State.
- African Development Bank (AFDB), Abidjan.
- European Commission (EC), Brussels.

The proposed approach is to structure the workshops in such a way that invited speakers with relevant practical experience can bring their views to the workshop and assist the Task IX team in enlarging the know-how and experience in PV technology deployment.

As a part of these co-operative activities, the ASTAE Unit of the World Bank has asked the PVPS Programme and Task IX in particular to review a series of QA manuals and associated training programmes. The ASTAE Unit has funded the development of QA documentation on:

- Quality Management in Photovoltaics: Manufacturers Quality Control Training Manual;
- Manual for design and modification of solar home system components;
- Training Manual for Quality Improvement of Photovoltaic Testing Laboratories in Developing Countries;
- PV Installation and Maintenance Practitioner Certification Infrastructure: Development Procedures.

Task IX undertook a peer review of the documents and the associated training programmes. The consensus within Task IX was that there was certainly a need for a quality standard of some kind for World Bank and other programmes and that these manuals went a long way towards addressing this.

Following further discussions with the ASTAE Unit, Task IX is to undertake a further review of the manuals prepared by ISP (PV Installation and Maintenance Practitioner Certification Infrastructure: Development Procedures) and FSEC (Training Manual for Quality Improvement of Photovoltaic Testing Laboratories in Developing Countries). These reviews will be undertaken with a view to further developing the manuals by Task IX.

Another organisation with which Task IX is collaborating is the Renewable Energy Working Party (REWP) of the IEA. The REWP oversees the various Implementing Agreements on bioenergy, geothermal energy, hydrogen, hydropower, wind turbines, solar heating and cooling, solar thermodynamic power (SolarPACES) as well as PV. The REWP also advises the IEA Committee on Energy Research and Technology

(CERT) and other IEA bodies on strategy. A Support Unit has recently been established at IEA Headquarters in Paris.

The REWP is paying particular attention to market deployment in developing countries, and therefore has a special interest in PVPS Task IX, as the first IEA task with this objective.

4. TECHNICAL AND ECONOMIC ASPECTS OF PV SYSTEMS IN DEVELOPING COUNTRIES

This subtask aims to investigate the techno-economic aspects and potential of PV systems, and the roles of utilities in developing countries. The work will identify areas of specific concern to developing country applications requiring further research and feed this into other parts of the IEA PV programme.

A Working Group led by Australia with input from Germany, Japan and the USA has been established to finalise the Workplan for the third subtask.

5. CO-OPERATION WITH DEVELOPING COUNTRIES

It is particularly important that Task IX co-operates with experts and institutions within developing countries in order to ensure that the needs of developing countries are properly addressed. In order to develop this co-operation the following activities have been proposed:

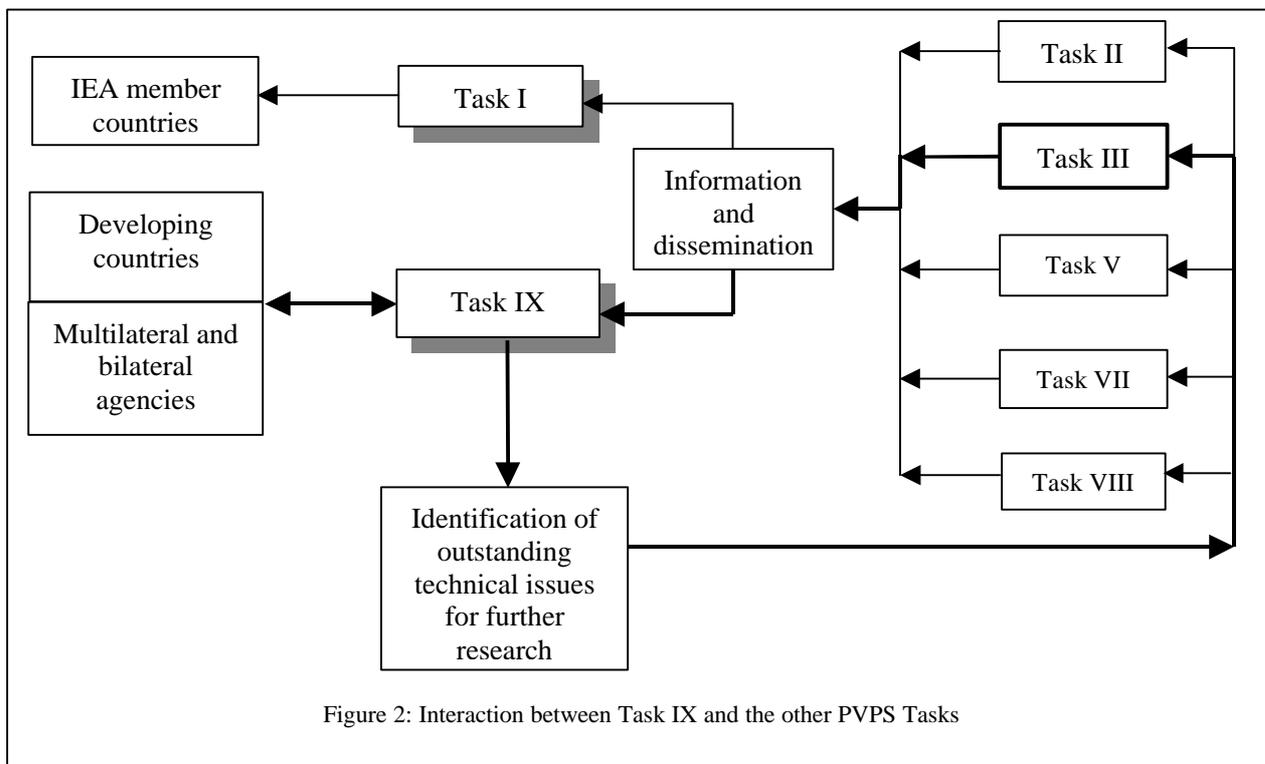
- Hold Task meetings in target countries in association with other related events
- Hold workshops in target countries in association with Task meetings
- Target country experts participate in special sessions of Experts meetings
- DC experts to undertake work - assist with surveys etc

6. CO-OPERATION WITH OTHER IEA PVPS TASKS

Part of the role of Task IX can be viewed as 'cross-cutting' the other PVPS Tasks. This 'cross-cutting' element is essentially in two areas:

- (i) identifying technical areas of research that need to be addressed from a developing country perspective;
- (ii) disseminating the results from the other Tasks to multi-lateral and bilateral agencies, NGOs, banks and to experts in developing countries.

The interaction of Task IX with the other Tasks is shown schematically in Figure 2. The relationship between Task III and Task IX is of particular importance. Task III is addressing relatively advanced technical issues, whereas Task IX will address information exchange and co-operation with international organisations in developed and developing countries, dealing with non-technical barriers in order to avoid duplication. Some of the Activities in Task IX will be undertaken in close co-operation with Task III, in particular the preparation of the



certification and accreditation. A number of publications may be published jointly with Task III.

7. CONCLUSIONS

This paper has highlighted the work to date and outlined the overall objectives of the newest IEA PVPS Task. Through the increased co-operation between the pool of expertise within the PVPS Programme and the various donor agencies, it is hoped that the impact of PV implementation programmes in developing countries can be maximised.

The IEA, by addressing the issues of co-operation with non-member countries (essentially the poorer nations of the world), is supporting establishment of the necessary dialogue.

It is hoped that the successful outcome of Task IX will deliver benefits to both the PV industry and the people of the developing world at one and the same time.

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