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**Regional Workshop on Energy  
Conservation in Industry**

**Cairo, Egypt, 1-5 October 1989**

**REPORT\***

12/5

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\* This document has not been edited.

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## CONTENTS

	<b>Page</b>
<b>I. ORGANIZATION OF THE MEETING.....</b>	<b>3</b>
<b>II. PRESENTATION.....</b>	<b>5</b>
<b>III. SUMMARY OF DISCUSSIONS.....</b>	<b>5</b>
<b>IV. CONCLUSIONS AND RECOMMENDATIONS.....</b>	<b>7</b>
<b>Annex I: Agenda.....</b>	<b>10</b>
<b>Annex II: List of documents.....</b>	<b>12</b>

## I. ORGANIZATION OF THE MEETING

1. The Regional Workshop on Energy Conservation in Industry was held at the Arab League Conference Hall in Cairo, Egypt from 1 to 5 October 1989. A list of participants is issued as a separate document - ID.WG/494/14/Rev. 1(SPEC).
2. The objective of the Workshop was to up-grade the skills and knowledge of the participants on the application of modern technical and technological achievements in the field of energy conservation and to provide sound advice to improve energy utilization through energy conservation in industry.

### Opening of the Meeting

3. Dr. Mr. Selim, Rector, Tabin Institute for Metallurgical Studies, Egypt, underlined the importance of the reduction of the energy consumption and of the improvement of energy efficiency in those industries where the specific energy consumption is high. From this point of view, the building materials industries and the metallurgical ones have in Egypt an utmost importance.
4. Mr. M. A. El-Danaf, Chairman, Public Sector Metallurgical Industries Cooperation, Egypt, emphasized that considerable efforts have been focused to reduce the specific energy consumption in metallurgical industry. In spite, there is a great potential to further improve the energy use mainly by means of technology improvement, higher level monitoring systems and improved product pattern. He expressed his wishes that this subsector of industry which is playing a crucial role in the Egyptian industry energy consumption, will benefit from the outcome of this Workshop.
5. The Deputy Director-General, Department of Industrial Operations, UNIDO delivered an opening speech on behalf of the Director-General of UNIDO summarizing the place of energy and energy-related activities in industrial development of the developing countries and the steps being taken by UNIDO in this field. He outlined the importance of rational use of energy in industry for African countries and the need for international and regional co-operation in this area.
6. Mr. Mohamed Maher Abbaza, Minister of Electricity and Energy, Egypt underlined the importance of the appropriate management of the electricity generation and consumption within such a country where electricity is a key issue in the overall energy management. The gross weight of demand determines firmly the capital requirement of the supply enlargement. That's why the conservation of power has a multiple effect in the overall economy.

7. Mr. Mohamed Abd El-Wahab, Minister of Industry, Egypt stressed that the attention of the specialists in industry and in scientific institutions all over the world is attracting by the estimation of energy consumption in different industrial sectors, and they are more attractive by the potential of opportunities of the conservation of energy and the reduction of its consumption. The rate of energy consumption for the individual in Egypt reaches 0,577 t.o.e. which is 67 % more than the average rate for countries of similar national income level. Moreover, the rate of energy consumption per unit product in industry is 60 % higher than the corresponding international norms. All these factors led our country to adopt an energy conservation policy and to plan the necessary programmes to achieve the countries' goals.

#### **Election of Chairman**

8. The Workshop elected Dr. M. Selim (Egypt) as its Chairman.

#### **Adoption of the Agenda**

9. The Workshop adopted the agenda (see Annex I).

#### **Concluding remarks**

10. In their concluding reports the participants reiterated their support for UNIDO's assistance to the developing countries in the field of energy conservation. A number of participants underlined that for practically the first time, they had the opportunity to discuss and exchange views on their experience and needs in industrial energy conservation with representatives of other African countries.

11. The participants thanked the UNIDO secretariat and the host counterpart for the excellent preparation of this meeting and the hospitality extended to the participants of the Workshop.

#### **Adoption of Conclusions and Recommendations**

12. The conclusions and recommendations of this report were adopted by all the participants of the Workshop.

## II. PRESENTATIONS, VISITS

13. Five reports on the main areas of energy conservation and four case studies on the experience of Egypt in this field as well as on the results of UNIDO's energy conservation projects in industry were presented by UNIDO consultants. Ten country papers were presented by the participants of the Workshop (Annex II).

14. Two in-plant visits to the El-Nasr Glass & Crystal Co. and the Tabbin Institute for Metallurgical Studies were organized during the Workshop. The participants have been acquainted with the results of UNIDO projects on energy conservation and of the capacities of the Industrial Energy Conservation Centre including laboratories and equipment necessary for carrying out energy auditing at the plant level.

## III. SUMMARY OF DISCUSSIONS

15. It was stressed that in developing countries, the industrial sector offers the largest potential for energy conservation. Energy conservation is an efficient way for most developing countries to stretch energy supply, reduce energy costs and save foreign exchange. Therefore, a national energy conservation policy should pursue twin goals, namely:

- a) raising energy efficiency; and
- b) substituting imported fuel resources such as oil, with other fuels which are locally available and cheaper.

To this end, a set of specific measures should be applied on the national level such as economic and financial measures which are e.g. soft loans and credits, subsidies, taxes, pricing policy, tariffs and special payment conditions as well as organizational measures which mean the establishment of appropriate institutions, training programmes, loans and regulations, information systems and raising public awareness. The third group should consist of technical measures such as plant surveys, energy housekeeping analysis, waste energy re-use, co-generation, etc.

16. Most of the participants identified energy auditing and energy management as a crucial component of energy conservation in industry. The experience gained from various countries proved the usefulness of an appropriate diagnostic audits which significantly strengthen the capability of its users in surveying the industrial enterprises with the aim to identify the potential and also to recommend measures for energy conservation, production intensification and quality improvement. According to the results obtained in different industrial plants from a number of countries, energy consumption of nearly any audited plant can be reduced by five to ten per cent with very simple management improvements which require very low investment.

17. The participants agreed that a computerized energy management system at the plant level has a wide effect on the overall management of technological processes. This could not only improve energy efficiency, but also positively effect the overall economy of production. However, it was stressed that the proper instrumentation and especially monitoring systems should be determined, otherwise these sophisticated arrangements would have restricted potential for its application.

18. Several participants pointed out the danger of mismanagement in developing countries which are net oil exporters. The experience which some countries have gained, shows that due to the underestimated importance of energy savings in those countries energy consumption increased dramatically. As this situation became apparent, specific measures were introduced to dampen this growth. However, in spite of these efforts, in the near future local resources could be exhausted, and now, it takes a lot of efforts and funds to strengthen energy conservation policy and practice at the national as well as at the enterprise level.

19. The participants stressed that most of their difficulties with the implementation of energy conservation in industry had been caused by the absence of specific financial measures and special funds which should also be used as a tool for promoting lower energy consumption. Therefore, most of the countries need strong financial support from the Governments as well as from other international/donor funds.

20. The participants drew attention to the fact that practically all represented countries carrying out energy conservation in industry had the following common difficulties:

- absence of well-defined and publicized government policy toward energy conservation and management;
- lack of awareness in energy conservation and management;

- technical problems, specifically lack of instrumentation;
- financial and economic constraints;
- lack of know-how, data and information exchange;
- lack of trained manpower in industrial energy conservation and management.

It was stressed that all those problems could be solved more effectively through joint activities, exchange of experience and information among the countries in the region. To this end, the participants suggested that UNIDO could play an important role in promoting regional co-operation among developing countries.

21. The participants strongly recommended that UNIDO should initiate a regional project as a first step to co-operation in the field of energy conservation. This project should be aimed at setting up pilot energy conservation systems at the plant level in several participating African countries, building up manpower resources and establishing a regional energy conservation information network. This network could be based and connected with the existing UNIDO/INECA system.

22. Some of the participants pointed out that several countries gained already useful experience in the field of energy conservation in industry and had special institutions working in this area such as the El Tabin Institute for Metallurgical Studies (Egypt), the Agence de Maitrise de l'Energie (Tunisia) and the Agence Nationale pour la Promotion et la Rationalisation de l'Utilisation de l'Energie (Algeria). The experience of those institutions could be used for the establishment of pilot energy conservation systems on their basis.

#### IV. CONCLUSIONS AND RECOMMENDATIONS

##### Conclusions

23. The participants of the Workshop considered the following criteria would be of high importance to sound energy practices and use:

- a) Creation of an appropriate institutional infrastructure which would be responsible for the design and management of the national energy conservation programme, rendering of advisory and



consultancy services to industrial enterprises in both the public and the private sector and training of personnel needed for the implementation of such a programme;

b) Provision of additional financial resources by governments to industry to act as a tool for promoting lower energy consumption, including establishment of a legal framework for the energy conservation system, thus enabling more oversight and regulation of energy use and consumption;

c) Promotion of research and development based in areas of energy auditing and management, taking into account the pattern of energy consumption and use by the various industrial sub-sectors. Such research and development should be carried out, in closer co-operation between concerned R&D institutions and industry;

d) Establishment of national data banks and information systems which will be responsible for providing information on the state-of-the-art technologies developed in the field of energy conservation for industry.

24. Considering the far-reaching damage of forestry and wood resources in African countries caused by the high consumption of firewood and charcoal in African households and industries, and the threat that such a practice has on the ecological balance on the continent, the participants urged the governments concerned to undertake necessary measures to avoid further depletion of those natural resources and considered that the introduction of efficient energy conservation systems would constitute a vital step in this direction.

25. In order to intensify regional co-operation, results and experience gained through UNDP/UNIDO projects, particularly those in African countries, should be fully utilized in the development of future energy conservation systems within the region.

### **Recommendations**

26. In view of the high energy consumption and the imbalance of payment for most of the participating countries, it was considered most appropriate that energy conservation be approached in an integrated manner. Towards this end, the participants strongly recommended that the regional project be initiated and funded through multilateral sources with the following objectives:

- a) building up necessary manpower resources in the area of energy conservation;
- b) design and implementation of pilot energy conservation systems at the plant level in one or two energy intensive industrial sub-sectors in the participating African countries;
- c) setting up of the African regional industrial energy conservation information network.

27. This will enable governments and industry to deal efficiently with the following issues:

a) at the policy level:

- strengthening of the institutional infrastructure through the establishment of national energy conservation management units in the participating countries;
- creation and operation of national energy conservation data bases and information services;

b) at the enterprise level:

- operation of tailor-made energy conservation system including energy auditing and management of energy use.

28. Such a regional project should be designed to utilize existing expertise and institutions in African countries which already have gained experience in this area, such as the Tabbin Institute for Metallurgical Studies (Egypt), the Agence de Maitrise de l'Energie (Tunisia) and the Agence Nationale pour la Promotion et la Rationalisation de l'Utilisation de l'Energie (Algeria), all of which have accumulated experience in this field during the past few years.

29. UNIDO was requested to take the necessary steps for initiating the creation of such a project and to ensure adequate financial support for its implementation, both from participating African countries and multilateral sources, such as UNDP, the Industrial Development Fund (IDF) and other funding sources.

30. In order to improve the mode of operation of the recommended network, it is suggested that proper linkage be established between it and the UNIDO-INECA system and/or other related international networks.

**Annex I**

**AGENDA**

**1 October 1989, Sunday**

8:00 - 9:30

Registration of participants

9:30 - 10:30

Opening of the Workshop

Representatives of the Government of Egypt,  
Deputy Director-General, DIO, UNIDO

11:00 - 11:45

Industrial Energy Conservation in Developing  
Countries

*Mr. Lengyel*, UNIDO Consultant

11:45 - 12:30

Industrial Energy Management

*Mr. Engelthaler*, UNIDO Consultant

14:00 - 14:45

Energy Auditing - Important Prerequisites for the  
Success of Energy Conservation

*Mr. Morvaj*, UNIDO Consultant

14:45 - 15:30

Energy Conservation in Industry (Case study -  
Sweden)

*Mr. Lundstroem*, UNIDO Consultant

15:30 - 16:15

Waste Heat Recovery as a Part of Energy  
Conservation in Industry

*Mr. Bergring*, UNIDO Consultant

16:45 - 17:30

Round Table Discussion

**2 October 1989, Monday**

9:00 - 9:45

Towards Energy Conservation Policy for the  
Egyptian Industry

*Mr. Mazhar*, UNIDO National Consultant

9:45 - 10:30

The Role of the Tabbin Institute for Metallurgical  
Studies as Trading Centre for Energy  
Conservation Industry

*Mr. Selim*, UNIDO National Consultant



## Annex II

### LIST OF DOCUMENTS

Energy Policy and Energy Management in Algerian Industry	ID/WG.494/1(SPEC.)
The National Energy Conservation Programme	ID/WG.494/2(SPEC.)
Waste Heat Recovery as a Part of Energy Conservation in Industry	ID/WG.494/3(SPEC.)
Energy Auditing - Important Prerequisite for the Success of Energy Conservation	ID/WG.494/4(SPEC.)
Industrial Energy Management	ID/WG.494/5(SPEC.)
Energy Conservation in Industry (Case Study) Revamping the Pusher-Type Reheating Furnace of the Steel Rolling Mill	ID/WG.494/6(SPEC.)
Energy Conservation in Cameroon	ID/WG.494/7(SPEC.)
The Role of the Tabbin Institute for Metallurgical Studies (TIMS) as a Leading Centre for Energy Conservation in Industry (Case Study)	ID/WG.494/8(SPEC.)
Industrial Energy Conservation in Developing Countries	ID/WG.494/9(SPEC.)
Energy Conservation in Industry (Case Study - Sweden)	ID/WG.494/10(SPEC.)
Towards an Energy Conservation Policy for Egyptian Industry	ID/WG.494/11(SPEC.)
Report of Tunisia	ID/WG.494/12(SPEC.)
Energy Situation in Ethiopia	ID/WG.494/13(SPEC.)
List of Participants	ID/WG.494/14/Rev. 1(SPEC.)
Results of the UNIDO Project on Energy Conservation Measures in the El Nasr Glass & Crystal Company	ID/WG.494/15(SPEC.)
Report from Morocco	ID/WG.494/16(SPEC.)
Energy in the Moroccan Sugar Sector	ID/WG.494/17(SPEC.)
Rapport du Senegal	ID/WG.494/18(SPEC.)
Report of Tanzania	ID/WG.494/19(SPEC.)
Status of Industrial Energy Conservation and Management in Zambia	ID/WG.494/20(SPEC.)