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REPORT

EXPERT GROUP MEETING ON DISSEMINATING RENEWABLE ENERGY TECHNOLOGIES IN ESCWA MEMBER COUNTRIES BEIRUT, 2-5 OCTOBER 2000

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INTRODUCTION

1. The Energy, Natural Resources and Environment Division of the United Nations Economic and Social Commission for Western Asia (ESCWA), within the framework of its programme of work for the biennium 2000-2001, convened the Expert Group Meeting on Dissemination of Renewable Energy Technologies in the ESCWA Member Countries. The Meeting was organized in cooperation with the International Energy Agency (IEA) Solar Power and Chemical Energy Systems (Solar-PACES) Programme and the German Goethe Institute in Beirut. It was held at United Nations House, Riad El-Solh Square, Beirut, from 2 to 5 October 2000.

2. The objective of the Meeting was to provide a forum for national experts and representatives of regional and international organizations involved in the field of renewable energy to exchange views and experiences relating to the following:

(a) Opportunities and challenges in the development of renewable energy and its possible contribution to the energy supplies in the ESCWA region, with particular emphasis on solar energy;

(b) Existing regional and international initiatives and programmes for promoting renewable energy use;

(c) The potentials and prospects for renewable energy electricity generation in the ESCWA region, with specific emphasis on the potentials for solar thermal and photovoltaic technologies;

(d) Experiences relating to large-scale renewable energy applications;

(e) The relevance of renewable energy dissemination to the region's sustainable development;

(f) Market development strategies, policies, regulations and financing mechanisms relating to renewable energy.

3. On 5 October, within the framework of the Meeting, ESCWA held a seminar on the initiation of the ESCWA Renewable Energy Promotion Mechanism (REPM) to give the national focal points (NFPs) of the member countries, as well as other national and regional experts, the opportunity to (a) overview the status of the REPM development; (b) discuss the renewable energy regional profile, prepared by the secretariat; (c) review and endorse the REPM memorandum of understanding on the establishment and activation of the REPM; and (d) to discuss and endorse the proposed REPM work programme for 2001-2002.

I. ORGANIZATION OF THE MEETING

A. OPENING OF THE MEETING

4. The Meeting was held under the auspices of His Excellency Mr. Soleiman Trabulsi, the Minister of Energy and Water of Lebanon. In addressing the Meeting, the Minister emphasized the need for better utilization of solar energy in both heating and electricity generation, since it was one of the abundant renewable energy resources in the Arab region. He added that because of the recent advances and reduction of costs in renewable energy technologies, such as solar and wind, their utilization could do much to ease the energy burden on the economy of the non-oil producing Arab countries, such as Lebanon for example. At the same time, he stressed the useful effect of those technologies in reducing the detrimental impact of the energy sector on the environment.

5. Mr. Omar Touqan, Chief of the Energy, Natural Resources and Environment Division of ESCWA, welcomed the participants and expressed thanks to the co-organizers of the Meeting. He said that the urgent need to promote renewable energy in the ESCWA region had been the motivating factor in organizing the

expert group meeting and called on all the participants to support the ESCWA initiative in establishing the REPM as a tool for fostering regional cooperation in the field of renewable energy.

6. In addressing the gathering, Dr. Hazem El-Beblawi, the Executive Secretary of ESCWA, expressed his gratitude to the Minister of Energy and Water of Lebanon for his patronage and thanked the co-organizing institutions for their valuable contributions. Referring to the purpose of the Meeting, the Executive Secretary affirmed that it was specifically planned by ESCWA to give support to the member States in their efforts to utilize the abundant renewable energy resources they enjoy. The opportunity for the exchange of experiences provided by the Meeting would strengthen that support and help remove the obstacles that hinder the widespread use of renewable energy resources in the ESCWA region. He also noted that the main objective of the Meeting was to discuss and evaluate the regional renewable energy report prepared by ESCWA within the scope of the REPM development, as well as to ratify and sign the REPM memorandum of understanding. The Executive Secretary added that the discussions and recommendations that resulted from the Meeting would constitute an input for formulating the work programme of the Energy Issues Section of ESCWA for the next biennium. Dr. El-Beblawi also stated that ESCWA had initiated the REPM to foster regional cooperation in the promotion of the use of renewable energy technologies based on mutual cooperation and existing capabilities among the member countries and that he hoped the Meeting would serve as a forum for more in-depth discussions on the issue. Finally, he expressed his thanks and appreciation to all the participants and organizers of the Meeting.

7. In her opening statement, Dr. Monika von Krafft, the Director of the Goethe Institut in Beirut, spoke of the opportunities that Lebanon has—as most of the countries in the region also have—to adopt advanced renewable energy technologies, especially in solar energy, since the region enjoys more than 300 days of sunshine per year. This would greatly contribute to increasing urgently needed generating capacity in Lebanon and other countries in the region. Dr. von Krafft noted that although the Goethe Institut is a German cultural centre, it holds a broad notion of the term "culture" and considers that the use of solar energy is not about fusion, but is about survival. For those reasons, the Institut welcomed the opportunity to cooperate with ESCWA in inviting several well-known German solar energy experts to participate in the Meeting. She added that the Meeting was taking place at a most appropriate time, when there was a global increase in energy consumption, as well as a growing concern about environmental issues. Dr. von Krafft then expressed her thanks to the speakers and to the ESCWA staff for including her ideas and the presentations of the German participants in the Meeting programme.

8. In his address to the participants, Mr. Wilfried Grasse, the Executive Secretary of IEA/SolarPACES, said the SolarPACES group envisions that, during the next two decades, the global concentration of solar thermal power plants will make a significant contribution to the delivery of clean, greenhouse-free and sustainable energy services in the world's sun belt. Mr. Grasse added that, based on the ongoing projects for the interconnection of electric grids around the Mediterranean area, the IEA/SolarPACES group foresees a high potential generation of more than 20 gigawatts (GW) of electric power from concentrating solar power in the Mediterranean region. He reported that there had been an impressive response by international institutions to the request for proposals related to the planned Egyptian 130-megawatt (MW) solar-integrated power plant. He said, moreover, that the IEA/SolarPACES group views the Meeting as a good opportunity to discuss the potential of multinational collaboration for the realization of something close to the SolarPACES vision, by disseminating the experience, knowledge and ideas of the IEA to the solar-rich region of ESCWA. Finally, he wished the meeting success and expressed thanks to ESCWA and to the Goethe Institut for initiating and organizing the Meeting.

B. ADOPTION OF THE AGENDA

9. The proposed provisional agenda was discussed and adopted by the participants of the Meeting (see annex I).

C. ORGANIZATION OF WORK

10. In line with the agenda adopted, the organization of work for the Meeting (as shown in annex II) was based on the following themes:

(a) Renewable energy opportunities and challenges;
(b) World Energy Assessment and energy for sustainable development;
(c) Solar electricity generation: options and opportunities;
(d) Solar architecture.

11. The last day of the Meeting, 5 October, was devoted to the initiation of the ESCWA REPM. The status of the REPM development and a proposed two-year work plan were discussed. In addition, the memorandum of understanding was endorsed and signed by the representatives of the NFPs.

12. Annex III contains the list of documents presented at the Meeting.

D. ATTENDANCE

13. The meeting was attended by 66 participants (see annex IV), representing:

(a) Twelve member countries, namely, Egypt, Iraq, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, Syrian Arab Republic, United Arab Emirates and Yemen;

(b) Nine REPM NFPs, identified by their respective authorities;

(c) Twenty-five national experts from ESCWA member countries, representing the competent authorities involved in issues related to renewable energy development;

(d) Representatives of United Nations regional organizations and international agencies concerned with issues related to renewable energy, in particular ESCWA (16), the Organization of Arab Petroleum Exporting Countries (OAPEC) (1), United Nations Department of Economic and Social Affairs (2), United Nations Environment Programme/Regional Office for West Asia (UNEP/ROWA) (1), IEA/SolarPACES (2) and the Goethe Institut (4);

(e) Four resource persons in their personal capacity.

II. SUMMARY OF PRESENTATIONS AND DISCUSSIONS

14. During the three days of the Expert Group Meeting on Disseminating Renewable Energy Technologies in ESCWA Member Countries, 18 papers were presented and discussed on the four themes adopted in the organization of work. In addition, on Tuesday 3 October 2000, a session was held to discuss the United Nations Department of Economic and Social Affairs proposal for a "Declaration of Arab Energy Perspectives and Proposed Action Plan"; and on Wednesday 4 October, a Round Table Discussion on Technologies Development and Market Opportunities for Renewable Energy Electricity was organized. The seminar on the initiation of the ESCWA REPM was held as well, on 5 October, at which ESCWA and national experts presented seven papers and the relevant memorandum of understanding was ratified and signed.

A. RENEWABLE ENERGY OPPORTUNITIES AND CHALLENGES

15. Four papers were presented under this theme: one by a German expert, one by a representative of Greenpeace International and two by staff members of the ESCWA secretariat. The papers discussed different issues, with emphasis on:

(a) The use of renewable energies as a means for solving energy problems in the region, with particular emphasis on rural energy needs;

(b) The possible contribution of renewable energy to sustainable development and the investment opportunities offered by the Clean Development Mechanism;

(c) The constraints facing the dissemination of renewable energy and the means to overcome them.

16. The first paper analysed the long-term environmental and political consequences of energy demand growth and the fluctuation of oil markets, and suggested that sustainable development could only be achieved if energy conservation and energy efficiency policies were adopted and if the share of renewable energy in the energy supply is increased. In this context, the paper placed emphasis on the promising near-term potential of large-scale electricity generation using solar thermal and wind technologies, with generation costs reaching in the range of 5 to 7 US cents/KWh within the coming five to seven years. The paper presented the policies and measures taken by the European Union (EU) countries in achieving such objectives and recommended that renewable energy development in the Middle East take place in collaboration with the EU under the framework of the Europe-Mediterranean Partnership.

17. The two ESCWA papers dealt with the acute energy shortage in the rural areas of the ESCWA region and the possible role of renewable energy technologies in solving that problem. The first paper covered the rural energy issue within the context of rural development in the region and its impacts on education and health conditions, with particular emphasis on its relevance to the development status of rural women. The paper also defined the requirements for achieving rural sustainable development and the prospects for renewable energy use in rural areas, together with its positive impact on environment and the quality of life in rural areas. The barriers facing the dissemination of renewable energy applications in the region were also addressed and, in conclusion, the paper proposed a programme targeting the removal of those barriers, especially with regard to rural energy needs. The proposed programme included five main activities, to be completed within a four-year period and implemented on a regional level, and Yemen was proposed as a case study. The activities included were: (a) a renewable energy assessment study; (b) development of an awareness campaign on renewable energy for sustainable development; (c) renewable energy capacity-building activities; (d) renewable energy market development and promotion; and (e) demonstration of renewable energy systems in rural areas in Yemen.

18. The second ESCWA paper discussed a framework for accelerating the transfer of renewable energy technologies to the region. It pointed out the need for creating an adequate regulatory framework and encouraging the involvement of local private industrial enterprises. Additionally, despite the role that may be played by the private sector, it was recommended that Governments strengthen their own efforts and provide direct subsidies, as well as indirect incentives, to foster the dissemination of renewable energy applications.

19. The Greenpeace paper presented the objectives of the Clean Development Mechanism (CDM) of the Kyoto protocol, identifying it as an effective tool for allowing industrialized and developing countries to circumvent the environmental mistakes made in the past and implement renewable energy applications that could enable sustainable development. The paper specified some of the issues related to technologies and projects suitable under the CDM and the crucial role that non-industrialized countries occupy in defining the integrity of global climate politics. Special emphasis was placed on the fear that funds made available through the CDM for promoting the use of clean technologies may be deviated to implement projects to upgrade existing plants using older technologies. The paper identified a list of technologies that were eligible for use under the CDM, such as those related to wind power, solar power, small hydro, biomass and geothermal technologies, and also addressed the issues of demand-side management and energy efficiency.

20. The Meeting's discussions and recommendations regarding the CDM theme focused on the following concerns:

(a) The role of renewable energy technologies in meeting the energy demand in rural areas, and its positive impact on achieving economic and social development in the region, as well as improving the environment;

(b) The need to utilize available financing mechanisms such as the Global Environmental Facility (GEF) and the CDM for promoting renewable energy technologies;

(c) The current importance of fostering market development versus technological development to accelerate the dissemination of renewable energy technologies, particularly in rural areas;

(d) The need to introduce new policies, measures and incentives into national energy strategies on the use of renewable energy technologies;

(e) The need to strengthen regional cooperation to further develop renewable energy systems and applications.

21. The Meeting acknowledged the ESCWA proposed programme and requested the Commission to take action towards its implementation.

B. World Energy Assessment and Energy for Sustainable Development

1. *The World Energy Assessment report*

22. In 1998, the United Nations Development Programme (UNDP), the United Nations Department of Economic and Social Affairs (DESA) and the World Energy Council (WEC) initiated the World Energy Assessment (WEA) report. This report analyses the social, economic, environmental and security issues linked to energy supply and use and assesses the options for sustainability in each area. The report will be introduced as an input to the CSD-9 process (United Nations Commission on Sustainable Development) and the Rio+10 meeting in 2002.

23. In order to incorporate the ESCWA regional energy perspective and challenges into the WEA report, DESA and ESCWA coordinated in organizing a regional consultative meeting in November 1999, at which the draft WEA report was presented to the representatives of the member countries and recommendations for inclusion of the regional ESCWA perspectives in the report were developed and communicated to the project team. In the continuing cooperation between ESCWA and DESA on the subject, two sessions of the Meeting were devoted to presenting and discussing the WEA report.

24. The paper on "World Energy Assessment: energy and the challenge of sustainability, overview" was presented in four parts. Part 1 of the paper gave an introduction to energy and its relationship to economic development. It considered the linkages between the present energy system and major global challenges, including poverty alleviation, health, environmental protection, energy security and the improvement of women's lives. Although energy is critical to economic growth and human development, affordable commercial energy is beyond the reach of one-third of humanity, and many countries and individuals are vulnerable to disruptions in energy supply. Furthermore, energy production and use have negative environmental impacts at the local, regional and global levels that threaten human health and the long-term ecological balance.

25. Part 2 of the WEA report examined the energy resources and technological options available to meet the challenges identified in part 1. It concluded that physical resources were plentiful enough to supply the world's energy needs through the twenty-first century and beyond, but that their use may be constrained by environmental and other concerns. Options to address those concerns—through greater energy efficiency, renewable energy and next-generation technologies, were then analysed. The analysis indicated that the technical and economic potential of energy efficiency measures were under-realized and that a larger contribution of renewables to world energy consumption is already economically viable. Over the longer term, a variety of new renewable and advanced energy technologies may be able to provide substantial amounts of energy safely, at affordable costs and with near-zero emissions.

26. Part 3 synthesized and integrated the material presented in the earlier sections by considering whether sustainable futures—which simultaneously address the issues raised in part 1 using the options identified in part 2—were possible. As a way of answering that question, three scenarios were offered to examine how the future might unfold, using different policy approaches and technical developments. The analysis showed that a reference scenario based on current trends did not meet several criteria of sustainability. Two other scenarios, particularly one that was ecologically driven, were able to incorporate more characteristics of sustainable development. The challenge of bringing affordable energy to rural areas of developing countries was also examined, including approaches to widening access to liquid and gaseous fuels for cooking and heating and to electricity for meeting basic needs and stimulating income-generating activities.

27. Part 4 analysed policy issues and options that could shift current unsustainable practices in the direction of sustainable development (as called for by every major United Nations conference held in the 1990s), using energy as an instrument to attain that goal. Creating energy systems that support sustainable development will require policies that take advantage of the market to promote higher energy efficiency, increased use of renewables and the development and diffusion of cleaner, next-generation energy. Given proper signals, the market could deliver much of what is needed. However, because market forces alone were unlikely to meet the energy needs of poor people or to adequately protect the environment, sustainable development would demand appropriate frameworks (including consistent policy measures and transparent regulatory regimes) to address those issues.

28. In light of the discussions on the WEA report reviewed at the Meeting, a draft Declaration of Arab Energy Perspectives and a Proposed Action Plan were presented for discussion and consideration. The participants studied the proposed Declaration and recommended that it would need to be further discussed in other regional meetings and communicated to their Governments for consideration.

29. The main perspectives and views contained in the draft Declaration were the following:

(a) *Income for sustainable development.* Energy security should not only be concerned with ensuring the flow of energy fuels to consumers; it should also ensure security of the income needed by supplier countries to undertake their sustainable economic development programmes;

(b) *Introducing new technologies.* Introducing new environmentally friendly energy technologies would involve high upfront costs that developing countries would be unable to shoulder. There was need for such costs to be borne by donor agencies and other developmental funds;

(c) *Technology transfer.* For developing countries to do their share in the global environmental effort, they will need technical assistance to leapfrog into new efficient technologies;

(d) *Enhancing accessibility of energy.* The fact that about 25 per cent of the population of the Arab region do not have access to electricity emphasizes the need for accessible rural electrification. This will require that policy makers give more attention to the development and deployment of renewable energy resources;

(e) *Energy efficiency.* Energy efficiency is a critical and vital issue in the Arab countries. Launching an international training initiative for capacity-building would be particularly important in introducing new and innovative energy-efficient technologies, with codes and standards for commercial/residential buildings and energy-consuming equipment/appliances.

2. *Energy for sustainable development: options and strategies*

30. DESA presented a discussion paper focusing on the challenges confronting energy for sustainable development and on the various issues that need to be addressed in order to arrive at future sustainable energy for all. The paper covered several options in addressing these issues. Among them were several specific actions that would be needed at the national, regional and international levels. Discussed also were options for improving coordination of the United Nations system-wide efforts aimed at assisting developing countries in their efforts to develop the energy sector in a sustainable manner. The key issues presented in the paper were: accessibility of energy, energy efficiency, renewable energy, advanced fossil fuel technologies, nuclear energy technologies, rural energy and energy for transport utilization.

31. In conclusion, the discussion paper emphasized the fact that energy for sustainable development continues to face many challenges that call for dialogue and action at the national, regional and international levels. In order to minimize the risk of energy consumption patterns becoming unsustainable, a risk that was likely if current patterns continue, there was need for a global shift to sustainable energy paths. The challenge of sustainability called for an inclusive and integrated approach involving all relevant stakeholders —Governments, industry, finance, business and commerce in the public and private sectors, civil society and the international community. Options and strategies would need to take into account the diversity of country

situations. There was need to strengthen existing mechanisms and the role of multilateral organizations in regional and international cooperation, as well as to explore new and innovative approaches for the mobilization of financial resources to support energy for sustainable development in developing countries. Urgent attention would be required to focus assistance on building the requisite capacity in developing countries to promote energy for sustainable development.

C. SOLAR ELECTRICITY GENERATION: OPTIONS AND OPPORTUNITIES

32. The theme of solar electricity was covered by seven presentations that dealt with the different issues relevant to the current status in the development of solar thermal and photovoltaic technologies, together with their application potentials in the ESCWA region. The papers were:

(a) Two IEA/SolarPACES presentations on the development status of concentrating solar power (CSP) and its potential market opportunities;

(b) Three ESCWA papers on the potentials and prospects of both solar thermal and photovoltaic electricity generation systems in the ESCWA member countries;

(c) Two member country papers on current experiences in solar thermal generation (in Egypt) and photovoltaic generation (in Bahrain).

1. *Concentrating solar thermal power*

33. As a result of the research and development (R and D) activities sponsored by countries within the IEA/SolarPACES group, solar thermal electricity generation using CSP systems is currently mature and approaching the phase of large-scale commercial application. The recent development of CSP technologies helped reduce its cost and improve its system performance. It is a well-proven demonstrated technology, with over 100 years of accumulated operating experience. Nine solar thermal power plants of the parabolic trough type, totalling 354 MW capacity, are currently feeding over 9 billion KWh of solar-based electricity into the California grid in the United States. In addition, plans for large-scale field projects using different CSP systems have been developed in more than ten countries worldwide, including Egypt and Morocco.

34. Concentrating solar technologies are appropriate for a wide range of electricity generation systems, including both dispatchable and distributed power systems. In a dispatchable system, central-station power plants can meet the peak-load to near-base-load needs of a utility, while a distributed modular plant can serve for both remote and grid-connected application. However, the commercial success of CSP has faced some barriers to commercialization, which need to be overcome. These barriers include: (a) utility deregulation and low energy prices; (b) perceived risks associated with high-capital projects; (c) uncertainty about cost, performance and reliability; and (d) the reluctance of investors.

35. The continued technological improvements in CSP systems, along with the cost reductions achieved by the system scale-up to larger mass-production levels, have made CSP systems the lowest cost renewable energy in the world. They promise cost competitiveness with fossil-fuel plants in the near future, particularly the integrated solar combined cycle systems (ISCCS) that use a mix of solar and fossil fuel resources. While the current solar power generation costs using CSP systems (solar only) are in the range of 12 to 20 US cents/KWh, the SolarPACES community expects that with continued development success and early implementation opportunities, dispatchable system costs can drop to 8 to 10 US cents/KWh within five years and 4 to 6 US cents/KWh by 2010-2015. Meanwhile, distributed system costs are expected to drop to 12 to 15 US cents/KWh within about five years and to 5 to 7 US cents/KWh by 2010, in the event that solutions for its reliability problems are found.

36. It is the vision of the IEA/SolarPACES community that, by 2010, concentrating solar (thermal) power plants will make a significant contribution to the delivery of clean, sustainable energy services in the world's sun belt. A detailed assessment of electricity generation in the Mediterranean region showed a "realistic" potential by 2020-2025 of 23 GW, compared to an estimated worldwide market of 120-140 GW. In addition, SolarPACES not only continues to cooperate intensively on research and technology development;

it also continues to initiate activities to support project development, to tackle non-technical barriers and to build awareness of the importance of CSP applications in resolving current problems of energy and the environment.

37. There is an ever-increasing interest in solar thermal technologies, which can be perceived by the eagerness of world key players to participate in new electricity generation projects using this technology; and where the GEF would cover the excess cost in comparison to conventional fossil fuel power plants. The sponsors of energy investments in the developing world have recently been convinced of the environmental promises and economic perspectives of CSP technologies and, therefore, have approved grants for first solar thermal projects that total US$ 200 million. Based on this background, the SolarPaces papers gave an overview of the development status of the present generation of CSP plants; it presented the current project developments, including solar thermal opportunities for independent power producers (IPP), and analysed their economic and financial feasibility.

2. *Potential and prospects of solar electricity generation in the ESCWA member countries*

38. The development status of the current solar photovoltaic technologies, as well as their application prospects and potentials in the ESCWA member countries, were explained thoroughly in two ESCWA papers presented at the Meeting. The first paper described the components of photovoltaic systems, the current state-of-the-art of their different technologies and their performance records, providing examples of typical photovoltaic applications for different sectors. The paper also addressed the status of the photovoltaic world market, presenting figures on market growth since the mid-1990s and a world consumption forecast until the year 2010, as well as a projected forecast on modules efficiency evolution. It was concluded that photovoltaic solar technologies have been rapidly developed and that further advances, in terms of higher efficiencies and lower costs, are expected. In addition, the last three years have shown a dramatic increase in the market size for photovoltaic systems, particularly for solar roof systems. However, the sustainability of that market would require that the industry develop more reliable components (particularly for inverters and batteries), undertake more intensive training and capacity-building programmes, and secure financing mechanisms for photovoltaic projects.

39. The current situation for photovoltaic applications in the ESCWA member countries was presented, together with their future prospects and potential. The paper identified four priority areas for photovoltaic application in ESCWA member countries, namely, rural electrification, water pumping, telecommunications and photovoltaic cathodic protection. The estimated total potential for the year 2010 would vary between 25-35 MW for different applications, which could be totally or partially utilized based on the extent of supporting policies and actions to be taken by the member countries.

40. The first ESCWA paper dealt with the prospects and potential of solar thermal electricity generation (STEG) using CSP, the rationale for the region's need to diversify its energy resources and the main characteristics of the STEG systems that favour it as a future generation option in the region. The paper presented the criteria for evaluating the cascaded potentials of STEG in the region, taking into account the available and/or anticipated theoretical, technical, economic and practical (or realistic) potential. The criteria elaborated on the availability of: appropriate solar resources and climatic conditions; adequate surface area for plant installation; the infrastructure elements required, particularly the water and natural gas electricity networks; and the sufficiency of local expertise and capabilities. The criteria for evaluating the practical potentials also included the electricity demand structure and the technology costs, as well as the social and economic development status of each member country.

41. Based on the above criteria, the study concluded that in the ESCWA region there is an area of more than 1.3 thousand square kilometres available that fills the requirements for STEG, representing a potential of about 70,000 GW in electric power plant production, which is highly beyond any expected practical use. The total practical application potential in the region could reach 670 MW in 2010 and 3420 MW in 2015. Between 2010-2015, the largest practical and realistic potentials, by country, exist in Egypt (240-1240 MW), Saudi Arabia (200-900 MW) and Iraq (60-700 MW).

42. To be able to utilize the predicted potential, the paper called on the ESCWA secretariat and the member countries to coordinate their efforts for the further identification and consideration of large-scale STEG project opportunities. In this respect, they should continue the awareness process and information flows to member countries through the ESCWA REPM and enhance relations with concerned regional and international agencies. The paper also emphasized that the adaptation and promotion of STEG systems in the countries of the region could have several positive impacts, contributing to the sustainable diversification of energy resources, as well as to social and economic development in general. In addition, it was also noted that the countries in the region have expertise and capabilities in several relevant areas that could be utilized through the promotion of STEG applications.

3. *Selected country experiences in the field of solar electricity*

43. The country paper on Egypt elaborated on the strong commitment of the Government of Egypt to the development of renewable energy within the framework of strategic plans for its overall energy sector, with particular emphasis on renewable energy electricity production both for large-scale dispatchable systems using wind farms and solar thermal CSP technologies and small-scale applications using photovoltaic systems. The programme is targeted to cover 3 per cent of Egypt's electricity demand through renewable energy by the year 2010.

44. Encouraged by the high solar availability, the ongoing interconnection of Egypt's power grid to the Mediterranean networks, the huge availability of natural gas and the growing interest by international financing institutions in developing renewable energy, the Egyptian power sector has formulated a plan to implement a series of large-scale grid-connected STEG plants in an overlapping time-frame based on the ISCCS concept. The plan, targeted to reach a 750-MW capacity by the year 2010, was approved by the Egyptian Cabinet of Ministers. The Cabinet also agreed on the establishment of the first ISCCS pilot plant of about 100-150 MW capacity, using a mix of solar and natural gas resources and built under a build-own-operate-transfer (BOOT) contract.

45. The paper presented the implementation status of the first ISCCS project. The project, being established with the financial support of GEF to cover its incremental cost (US$ 50 million), has a total generating capacity of 126.7 MW, including 31.2 MW of solar capacity and a 95.5-MW combined cycle system. The solar contribution to the annual electric energy to be produced by the plant will be 81.5 GWh/year, or 9.2 per cent of the total energy generated. Such generated electricity is equivalent to about 37.0 MW of photovoltaic systems and 9.3 MW of conventional power plants.

46. Several private developers have expressed interest in the project, the total cost of which is estimated at US$ 118.5 million. The levelised electricity generation cost is estimated at 3.08 US cents/KWh, compared to 2.44 US cents/KWh for the reference plant.

47. The country paper on Bahrain explained that, in spite of the fact that conventional electricity costs were very cheap (2.9 US cents/KWh) compared to photovoltaic electricity (50-70 US cents/KWh), the State of Bahrain was supporting the use of solar energy for photovoltaic electricity generation and favouring renewable energy education programmes. In this regard, the paper presented a brief assessment of the renewable energy resources in Bahrain and highlighted some projects using solar-produced electricity. These were: water desalination (250 gallons per day), using reverse osmosis technology; street lighting; mobile solar/wind-powered electricity generation (2 KW); solar electricity for security guard rooms and wind-generated electricity for beacons.

48. The constraints of using renewable energy technologies in Bahrain were also discussed, in particular the potential conflict between promoting renewables and the role of conventional energy resources in the economies of the Gulf Cooperation Council countries. The paper recommended that Bahrain direct its efforts towards photovoltaic applications in rural areas and foster renewable energy financing partnerships linked to the country's environmental goals. It called on the Ministry of Electricity and Water in Bahrain to establish a small unit for renewable energy technologies and train some technicians.

D. SOLAR ARCHITECTURE

49. Four papers were presented under this theme by experts invited by the Goethe Institut of Beirut—from Germany, the American University of Beirut and the Middle East Centre for Transfer of Appropriate Technology. The main issues addressed in the papers were:

(a) The possible use of solar radiation as the prime source of energy for buildings;

(b) The proven low cost of solar applications for rural areas;

(c) The methodology to explore the feasibility of solar energy within the context of sustainable development in Lebanon.

50. Two of the papers demonstrated the concept of solar architecture. The first one provided general guidelines for incorporating solar concepts into the construction of buildings in Lebanon to maximize benefits from solar radiation. The presentation also demonstrated a comparison of energy consumption patterns between a regular Lebanese household and another equipped with solar collectors. The second paper gave a description of the SolarBau programme, sponsored by the German Government, which funds investigations, simulations and thorough monitoring of buildings that feature elements of passive cooling. The paper also included the initial evaluation of a number of large-scale commercial buildings situated across Germany that were under the SolarBau programme. The technical requirements for admittance of a building to the programme included an anticipated total primary energy use below 100 KWh/m^2, combined with excellent visual and thermal comfort conditions, which can be achieved by a design featuring increased thermal insulation, intensive use of daylight and a strategy for passive cooling.

51. The third paper presented an overview of some proven solar energy applications that could easily be disseminated in rural areas of the ESCWA region. Such applications included solar crop drying, solar ovens for food cooking and solar energy for disinfecting drinking water. The three applications were shown to have low cost and low maintenance in common.

52. Finally, a methodology to explore the feasibility of solar energy in the context of sustainable development was presented and discussed. This methodology was based on seven issues that must be considered while evaluating the solar energy potential in a given country. Once investigation of the issues was completed, a national policy encompassing local factors and constraints would need to be designed and adopted by decision makers to ensure large-scale diffusion of solar energy in the energy market. The Analytic Hierarchy Process Technique was proposed as a tool to help develop such national policies.

53. The promotion of solar energy is a national issue requiring the participation of many stakeholders and decision makers. The penetration of solar energy is constrained by many factors, including technical and financial limitations, decision criteria and policy instruments. Addressing such issues would require the availability of the appropriate environment and tools, which would have to be made available by Governments and concerned institutions.

54. The Meeting's discussions on this theme focused on the following concerns:

(a) Directing efforts towards renewable energy resource assessment, using appropriate techniques and on a regular basis;

(b) Evaluating solar energy systems and projects versus their total benefits, including the economic and environmental advantages;

(c) Introducing appropriate legislation to support solar energy utilization;

(d) Raising awareness of issues related to environmental quality and energy value;

(e) Launching intensive solar energy promotional campaigns and training programmes.

E. THE ESCWA RENEWABLE ENERGY PROMOTION MECHANISM

55. In 1997, ESCWA had developed a regional programme for the promotion of renewable energy applications. The programme recognized the need for an appropriate coordination and promotional mechanism to coordinate the available renewable energy expertise and resources for the mutual benefit of the member countries. It was in light of this need that the creation of a Renewable Energy Promotion Mechanism in the ESCWA region was recommended and a preliminary project proposal was prepared.

56. The core objective of the mechanism was to foster subregional and regional cooperation among the ESCWA member countries to utilize their mutual capabilities to accelerate the diffusion of renewable energy technologies in field applications.

57. Actions were taken by ESCWA to reach consensus among the member countries on the establishment of the REPM; and an initiation seminar was planned within the framework of the Expert Group Meeting on Disseminating Renewable Energy Technologies in ESCWA Member Countries. The REPM initiation seminar, held on 5 October 2000, served as a platform for ESCWA and the identified national focal points (NFPs) to discuss and review the REPM development status, as well as endorse the memorandum of understanding prepared by the Coordination Unit for activation of the REPM. In addition, the draft regional renewable energy profile and the draft two-year work plan proposed by the Coordination Unit were presented and reviewed by the NFPs during the seminar.

58. The Executive Secretary of ESCWA addressed the participants of the seminar, emphasizing the need for fostering regional cooperation on renewable energy and energy efficiency. He also assured the NFPs that ESCWA was devoting its efforts towards the realization and activation of the mechanism and called on them to effectively join in those activities.

59. The Coordination Unit presented a paper on the REPM development status, the regional renewable energy profile and the recommended draft of the first two-year work plan for the mechanism. The paper elaborated on the intensive consultations undertaken by the Coordination Unit with the member countries on the REPM objectives and process of realization. Consensus was reached; eleven member countries agreed to join the mechanism. In addition, the Coordination Unit presented a framework for developing renewable energy country profiles, using a model profile on Egypt. Several country profiles had been prepared prior the seminar, while others were received during the Meeting. The Coordination Unit also prepared and presented a draft profile on regional renewable energy.

60. The memorandum of understanding for the activation of the REPM and its start of operations was agreed upon and endorsed during the seminar. However, only nine NFPs signed the memorandum, while the others awaited approval from their national authorities. The NFPs also discussed and endorsed the two-year work programme proposed by the Coordination Unit. It includes:

(a) Finalizing the renewable energy profiles;
(b) Ensuring the full representation of member countries;
(c) Identifying the national entities concerned;
(d) Developing a regional renewable energy inventory and database;
(e) Promoting actions for implementation of the proposed ESCWA project;
(f) Initiating a new set of activity proposals.

61. The recommendations adopted by the Meeting are given in chapter III of this report.

III. CONCLUSIONS AND RECOMMENDATIONS

62. On 4 October, after three days of intensive presentations and discussions on disseminating renewable energy technologies in ESCWA member countries, the final session of the Meeting was held. The next day, on 5 October, presentations and discussions were exclusively devoted to the ESCWA REPM. Two sets of draft recommendations were formulated—the first, on the Meeting in general; and the second, on the activation of the REPM and its two-year work programme.

63. Meanwhile, based on papers presented by the United Nations Department of Economic and Social Affairs on World Energy Assessment and the options and strategies for action on key issues of energy and sustainable development, the Department proposed a Declaration of Arab Energy Perspectives and Action Plan. The Meeting took note of the Declaration and recommended that it be further discussed at the Arab Thought Forum meeting on Energy Policies in Arab States in the 21st Century to be held in Amman on 23 and 24 October 2000. The two sets of recommendations are outlined below.

A. RECOMMENDATIONS ON DISSEMINATING RENEWABLE ENERGY TECHNOLOGIES IN ESCWA MEMBER COUNTRIES

64. The Meeting's participants acknowledged the ESCWA secretariat's efforts in organizing expert group meetings and in the preparation of studies that target promoting renewable energy technologies and disseminating their applications in the region.

65. They strongly urged the national and regional authorities to take the necessary measures to evaluate the available energy resources in the member States, to formulate programmes for developing and disseminating their use, and to build up national and regional capabilities in this respect in order to maximize the contribution of renewable energy resources to the economic and social development of the region.

66. The Meeting, therefore, recommended the following:

(a) The concerned authorities in member countries should formulate appropriate national programmes for renewable energy resources assessment. These programmes are essential to facilitate the identification and evaluation of renewable energy opportunities in each country and to assure that the selection of appropriate technologies is made. The Meeting emphasized that such programmes should be based on updated and accurate measurement methodologies and advanced analytical tools;

(b) Governments in the region should establish capable specialized organizations entitled to undertake renewable energy planning, policy development and coordination of national actions and programmes related to renewable energy concerns. This would cover all the necessary activities, from R and D to the implementation phase of field applications;

(c) The development and implementation of medium- and long-term national strategies for promoting the use of renewable energy within the context of national energy programmes. Emphasis should be placed on national capacity-building and on taking advantage of opportunities to ensure the increase of a tangible share of renewable energy in the country's energy budget within a targeted time limit;

(d) Having recognized the need to raise awareness on the status of and opportunities for renewable energy technologies in the member countries, the participants called on Governments and other concerned authorities, as well as on regional organizations, to develop and implement educational and media programmes to raise the awareness of all partners in the renewable energy promotion process, from decision makers to end users. These would include:

(i) Educational programmes at all levels (primary, elementary, secondary and university);

(ii) Programmes to raise public awareness in the various media (television, radio and the press);

(iii) Training programmes covering all relevant renewable energy fields, including technology development, systems design and the operation and maintenance of related technologies;

(e) In selecting the energy supply options for any project, renewable energy has to be included within the options considered when evaluating project feasibility. The selection of the most suitable renewable energy technology/application should match local circumstances (location, alternative energy available, cost, usage, size and the existing national capabilities);

(f) The ESCWA secretariat and the concerned authorities in member countries should make a concerted effort to give priority to studies and project development on renewable energy electricity generation. This should include both small-scale applications in rural and remote areas and large-scale renewable energy generation for connection to electricity grids. Identifying the most suitable technology available in each case is essential (photovoltaic systems, wind turbines/farms and solar thermal generating systems);

(g) The promotion of programmes for bilateral, regional and international cooperation through:

(i) Cooperation among ESCWA countries to benefit from the acquired experience in a particular country and transfer it to another through the ESCWA REPM;

(ii) Cooperating with international organizations that support the promotion of renewable energy technologies as environmentally friendly and benefiting from the resources and financing programmes of those organizations to cover the differential between the initial cost of renewable energy technologies and conventional energy technologies. Such organizations include GEF, UNDP, UNEP and the World Bank;

(iii) Cooperating with organizations specialized in the field of renewable energy, such as the International Energy Association (IEA), in order to transfer renewable energy technology and increase awareness and knowledge of the field;

(iv) Cooperating with organizations that support the development of social health programmes for women, recognizing the impact of renewable energy on furthering the objectives of those programmes;

(h) The participation of regional and international organizations in helping to finance and implement renewable energy projects in rural areas in the ESCWA region. Such projects have been prepared by the ESCWA secretariat, either in all or some of their phases, with priority given to capacity-building and training, as well as to the preparation of survey studies on the use of renewable energy technologies in ESCWA member countries;

(i) Member countries should be strongly encouraged to give priority to energy efficiency, as well as to the development of renewable energy use, and integrate this approach in their national energy policies and programmes.

B. Conclusions and recommendations on the Renewable Energy Promotion Mechanism

67. At the final session, on 5 October, the representatives of the NFPs of the ESCWA REPM, as well as the regional experts, expressed their acknowledgement of the efforts undertaken by ESCWA in the REPM development, in the formulation of the regional renewable energy profile and in working to arrive at consensus among the member countries on the REPM memorandum of understanding. The conclusions and recommendations arrived at during this session included the following:

(a) Nine member countries endorsed and signed the memorandum of understanding, declaring the REPM operative as of 5 October 2000;

(b) In approving the proposed ESCWA two-year work programme of the REPM, the following recommendations were made:

(i) The REPM Coordination Unit should continue to coordinate with the NFPs to ensure that all country profiles are submitted to the Coordination Unit to enable it to update and finalize the regional renewable energy profile;

(ii) The Coordination Unit should continue consulting with the remaining ESCWA member countries to join the REPM or to establish possible links with it;

(iii) The NFPs should direct efforts towards identifying the concerned and interested national entities in their respective countries, assess their capabilities or needs and develop an updated inventory of the national renewable energy expertise, institutions and business entities in their country;

(iv) In coordination with the NFPs and on the basis of recommendation (b)i above, the Coordination Unit of the ESCWA Energy, Natural Resources and Environment Division should develop a regional inventory of the existing national energy expertise, institutions and business entities in the ESCWA region. The Division should also take action to create an ESCWA regional renewable energy database based on that inventory;

(v) The Coordination Unit, in coordination with the NFPs, must specifically promote actions for the implementation of the proposed project on the dissemination of renewable energy services to the rural areas in ESCWA member countries. Those actions may be devoted to all or any of the five proposed activities, namely, a renewable energy assessment study; development of an awareness campaign on renewable energy for sustainable development; renewable energy capacity-building activities; market development and promotion; and demonstration of renewable energy systems in rural areas.

68. The NFPs should continue assessing needs in their respective countries and propose the support required to the Coordination Unit. Upon identification of the cooperating and/or contracting parties involved, the Coordination Unit will be charged with coordinating efforts to facilitate providing the support requested.

69. The Coordination Unit, in its capacity as a United Nations body, was urged to direct its efforts—on the basis of the needs identified by the NFPs—towards raising funds for any of the specified activities, as well as pooling technical expertise to support the implementation of programmes. The Meeting recommended that ESCWA, in coordination with the NFPs, organize regular meetings to discuss prevailing renewable energy issues. Such meetings would be useful for updating progress reports on national renewable energy issues and activities and/or exchanging information on available R and D, training and educational programmes.

70. An Internet web site should be established for the dissemination of information on REPM activities, including news on the achievements of the national institutions concerned with the promotion and support of renewable energy applications in the ESCWA member countries.

71. The draft recommendations were sent to all participants on 23 October 2000. Both sets of recommendations were endorsed by the participants, with Iraq and Yemen adding a request that more emphasis be given to the activation of the REPM, particularly in the areas of training and information exchange. In addition, Kuwait requested that more effort be directed towards supporting R and D activities.

IV. EVALUATION OF THE MEETING

72. The Meeting was evaluated based on the substantive content of this report, with particular emphasis on the attendance level, the number and quality of the papers presented and the views of the participants as collected through a questionnaire covering the main evaluation issues (see annex IV). In this context, an evaluation of the Meeting was summarized as follows:

(a) The Meeting was attended by 50 participants and 16 ESCWA experts, representing 12 member countries, 5 regional and United Nations organizations and 9 NFPs of the REPM, in addition to 25 independent experts;

(b) Twenty-five papers were presented at the Meeting: six by ESCWA, two by the Department of Economic and Social Affairs, two by IEA/SolarPACES, six by the Goethe Institut and nine by national experts and resource persons;

(c) Twenty-three participants filled out the evaluation questionnaire. The analysis of their inputs revealed that:

(i) Altogether on the average, the topics discussed at the Meeting were found to be 90 per cent relevant to the participants' work;

(ii) The participants considered that the objectives of the Meeting had been achieved by an average of 86 per cent;

(iii) The participants acknowledged that they would use an average of 72 per cent of the information provided by the Meeting;

(iv) The preparations and arrangements made for the Meeting were regarded as having met an average 81 per cent of their expectations;

(v) The participants estimated that most of the papers presented at the Meeting, at an average of 81 per cent, had met the desired standard.

Annex I

LIST OF PARTICIPANTS

A. ESCWA MEMBER COUNTRIES

Egypt

Mr. Mahmoud Sami Zannoun
Executive Chairman
New and Renewable Energy Authority
Ministry of Electricity and Energy
Cairo
Tel.: 202-271-3176
Fax: 202-271-7173
E-mail: nre@disc.gov.eg.

Iraq

Mr. Abdul Sattar Kadhim Mohammed
National Committee for Technology Transfer
P.O. Box 8265
Baghdad
Tel.: 964-1-8864837
Fax: 964-1-5372460
E-mail: nctt@uruklink.net

Jordan

Mr. Mohammad Ahmad Amr
Vice President
National Energy Research Center
P.O. Box 1945 Al-Jubaiha
Amman 11941
Tel.: 962-6-5346701
Fax: 962-6-5344806
E-mail: amr@rss.gov.jo

Kuwait

Ms. Nadia Salem Al-Jandal
Deputy Assistant to the Minister for Developing Projects
Ministry of Planning
Kuwait
Tel.: 965-2415781
Fax: 965-2330093

Lebanon

Mr. Georges Mouawad
Director General
Electricité du Liban
P.O. Box 131
Beirut
Tel.: 961-1-444-313, 443828, 443968
Fax: 961-1-445978
E-mail: pdg@edl.gov.lb

Oman

Dr. Hilal Ali Zaher Al-Hinai
Academic Assistant for Innovation and Industrial Links
Sultan Qaboos University
P.O. Box 50 Al-Khod
Muscat 123
Tel.: 968-515095
Fax: 968-513254
E-mail: hilal@squ.edu.om

Palestine

Dr. Omar Kittaneh
Director General
Palestinian Energy Authority
Alersal Street, Alersal Building
P.O. Box Albirah 3591
Ramallah
Tel.: 970-2-298 6190
Fax: 970-2-298 6191

Qatar

Mr. Fahad M. Al-Naimi
Head of Planning
Corporate Planning and Business Development Department
Qatar General Electricity and Water Corporation
P.O. Box 41
Doha
Tel.: 974-4845475
Fax: 974-4845491
E-mail: alnaimif@hotmail.com

Saudi Arabia

Dr. Naif M. Al-Abbadi
Assistant Research Professor
Supervisor, Renewable Energy Department
King Abdulaziz City for Science and Technology
P.O. Box 6086
Riyadh 11442
Tel.: 966-1-481-3487
Fax: 966-1-481-3880
E-mail: nabbadi@kacst.edu.sa

Syrian Arab Republic

Mr. Sufian Al-Alao
Deputy Minister
Ministry of Electricity
P.O. Box 4900
Damascus
Tel.: 963-11-2133974
Fax: 963-11-2227736
E-mail: moe@net.sy

United Arab Emirates

Mr. Ali Abdullah Al-Owais
Deputy Minister
Ministry of Electricity and Water
P.O. Box: 99979
Dubai, United Arab Emirates
Tel.: 04-262 2000
Direct tel.: 04-262 5858
Fax: 04-262 2555

Yemen

Mr. Ahmed Hasan Alaini
Deputy Minister for Electricity Sector
Ministry of Electricity and Water
P.O. Box: 11422
Sana'a
Tel.: 967-264153/264128
Fax: 967-263115/264119

B. Regional and United Nations organizations

Organization of Arab Petroleum Exporting Countries

Dr. Jamil M. Tahir
Director of Economics Department
P.O. Box 20501
Safat, Kuwait 13066
Tel.: 965-481-5692
Fax: 965-481-5747
E-mail: jamiltahir@hotmail.com

United Nations/Department of Economic and Social Affairs

Mr. Yehia Abu Alam
Technical Adviser
Department for Economic and Social Affairs
United Nations
New York, 10017, USA
Tel.: 212-963-8599
Fax: 212-963-4340
E-mail: abu-alam@un.org

Dr. Hisham Al-Khatib
World Energy Council
P.O. Box 925387
Amman
Tel.: 962-6-562 1532
Fax: 962-6-569 8556
E-mail: khatib@nets.com.jo

United Nations Environment Programme/Regional Office for West Asia (UNEP/ROWA)

Mr. Abdul-Elah Al-Wadaee
ODS Regional Network Coordinator
P.O. Box 10880
Manama
Tel.: (973) 826600
Fax: (973) 82511011
E-mail: awunrowa@batelco.com.bh

Mr. Mohammed Benouahi
Team Leader
Infrastructure Development Group
Middle East and North Africa Region
The World Bank Office in Beirut
United Nations House
P.O. Box 11-8577
Beirut
Tel.: 961-1-987 800
Fax: 961-1-986-800
E-mail: mbenouahi@worldbank.org

C. RESOURCE PERSONS

Dr. Waheeb Essa Alnaser
Dean
College of Science
University of Bahrain
P.O. Box 32038
Manama
Tel.: (973) 782300/449999/728811
Mobile: 968001
Fax: 973-682582/827766
E-mail: waheeb@sci.vob.bh or
alnaserw@batelco.com.bh

Dr. Asser Aly Zaky
Professor and Consultant
Arab Academy for Science and Technology
Tel.: 203-5820710
Fax: 203-5624027
E-mail: asserzaki@dataxprs.com.eg.

Mr. Ahmad Hassan
Deputy Director of Renewable Energy Planning
State Planning Commission
Damascus
Tel.: 963-11-5122014/9
Fax: 963-11-5121415

Dr. Ali Hamed Al-Ghafri
Assistant Director-General
Directorate General of Electricity
Ministry of Electricity and Water
P.O. Box 105
Muscat
Postal Code 112
Tel.: 699265
Fax: 605-367

D. EXPERTS

Dr. Adnan A. Al-Hamoud
Deputy Director General
Kuwait Institute for Scientific Research
P.O. Box 24885
Safat, Kuwait 13109
Tel.: 4836604
Fax: 4836608
E-mail: ahomoud@safat.kisr.edu.kw

Mr. Abdullah Mohamed Al-Mutawa
Director of Nuclear Safety and Energy
Ministry of Electricity and Water
Dubai, United Arab Emirates
P.O. Box 99979
Tel.: (009714) 262 2000
Fax: (009714) 262 2555

Mr. Riad B. Chedid
Associate Professor
Faculty of Engineering
American University of Beirut
P.O. Box 11-0236
Beirut
Tel.: 340460, ext. 3541
Mobile: 961-3-647330
Fax: 961-1-744462
E-mail: rchedid@aub.edu.lb

Mr. Farid B. Chaaban
Professor
American University of Beirut
P.O. Box 11-0236
Beirut
Tel.: 961-3-706474
Fax: 961-1-744462
E-mail: fbchaban@aub.edu.lb

Mr. Fadi Charif Musharrafie
Faculty of Architecture
American University of Beirut
P.O. Box 11-0236
Beirut
Tel.: 961-3-678502
E-mail: bine@cyberia.net.lb

Mr. Chafic Salim Abisaid
Consultant
Algiers Street
Baydoun Building
Zarif, Lebanon
Tel.: 961-3-366551
Fax: 961-1-735162
E-mail: cabisaid@intracom.net.lb

Mr. Boghos Ghougassian
Manager
MECTAT
P.O. Box 113-5474
Beirut
Tel.: 341-323, 1-742043
Fax: 346-465
E-mail: boghos@mectat.com.lb
Web site: www.mectat.com.lb

Mr. Emad Abdul Kareem Qatafah
Energy and Water Controlling Sector
Ministry of Planning
Kuwait
Tel.: 965-241-3797
Fax: 965-242-5785

Mr. Abed El-Hadi Zein
Head of Solar Energy Group at SSRC
Higher Institute for Applied Science and Technology
P.O. Box 31983
Damascus
Tel.: 963-11-5124639
Fax: 963-11-223-7710
E-mail: abedzein@excite.com

Mr. Karl Mallon
Director of Energy Solutions
International Climate Campaigner
Greenpeace International
Keizergracht 176, 1016 DL1
Amsterdam
Tel.: 31-621-276-860
Fax: 31-20-523-6200
E-mail: Karl.Mallon@ams.greenpeace.org

Dr. Mohamed Salah El-Sobki
Professor of Electric Engineering
Cairo University
3 Mosdak Street, Dokki, 12211,
Giza, Egypt
Tel./Fax: (202) 485-7923/4
Mobile: 2012-329-1037
E-mail : Sobki54@hotmail.com

Dr. Othman Abd Alnatheer
National Coordinator for Sustainable Energy in the Arab States
Energy Research Institute
King Abdulaziz City for Science and Technology
P.O. Box 6086
Riyadh 11442
Tel.: 966-1-4813326
Fax: 966-1-481-3880
E-mail: onatheer@kacst.edu.sa

Mr. Khalid Khalil Al Mohanadi
Director
Electricity and Water Conservation
Ministry of Electricity and Water
P.O. Box 2
Manama
Tel.: 726804
Mobile: 9684890
Fax: 728481
E-mail : kalid96@batelco.com.bh

Mr. Mohammed Khalil Sheki
Generation Directorate
Technical Department Chief
Public Establishment of Electricity for Generation and Transmission
Ministry of Electricity
P.O. Box 3386
Damascus
Tel.: 963-11-2119934/5/6
Fax: 963-11- 222-9062

Mr. Nabil Meddeb
Directeur (Etudes et Planification)
National Renewable Energy Agency
Energy Conservation Agency of Tunisia
3, Rue 8000 – Montplaisir
P.O. Box 213
Tunis
Tel.: 216-1-787 700
Fax: 216-1-784 624
E-mail : ame@email.ati.tn

Dr. Samer L.A. ElHaw
Professor of Mechanical Power Engineering
Consulting Engineer
Cairo University
Faculty of Engineering
Cairo
Tel.: 3602694 or 3485363
Tel./Fax: (B) 5699123
Mobile: (012) 343 3018

Mr. Abdul Jabbar Khalifa
Energy and Environment Research Center
National Committee for Technology Transfer
P.O. Box 13026
Jadiriya, Baghdad
Tel.: 964-1-776 5276
Fax: 964-1-537 2460
E-mail: nett@uraklink.net

Mr. Hassan Ajam
Iraqi Architect
P.O. Box 11-6570
Beirut
Tel.: 750154

E. PARTICIPANTS FROM LEBANON

Ms. Rola Nasereddine
National Focal Point for Energy
Ministry of Environment
P.O. Box 70-10991
Antelias, Lebanon
Tel.: 961-4-522222
Mobile: 961-3-762431
Fax: 961-4-525080
E-mail: r.nasreddine@moe.gov.lb

Dr. Wehbeh N. Samih
Expert in Energy and Oil
Ministry of Environment
P.O. Box 10-7090
Beirut
Tel.: 961-4-522.222
Mobile: 961-3-434.346
Fax: 961-5-557.259
E-mail: s.wehbe@moe.gov.lb

Mr. Antoine Rabbat
Acting General Manager
Ministry of Energy and Water
Electricité du Liban
P.O. Box 131, Beirut
Tel./Fax: 961-1-565060
Mobile: 961-3-708775

Mr. Roudi E. Baroudi
Energy and Privatization Consultant
Arabian Services Group
P.O. Box 40-198
Beirut
Tel.: 961-5-951536/7
Fax: 961-5-951650
E-mail: midland@inco.com.lb

Mr. Mohamad Fouad Ramdan
President
Electricity of Lebanon
P.O. Box 131
Beirut
Tel.: 961-1-444700
Fax: 961-1-585952

Ms. Zeina K. El-Hajj
Greenpeace Campaigners in Lebanon
Ghazal Bldg., Ain El-Tineh
Beirut
Tel.: 961-1-785665
Fax: 961-1-785607
E-mail: gp.med@cyberia.net.lb

Mr. Bassam A. Jaber
Institutional Expert
Ministry of Energy and Water
Beirut
Tel.: 961-1-565110
Fax: 961-1-565666
E-mail: bajaber@litcom.com.lb

Mr. Hassane A. Jaber
Vice Président
Association Libanaise pour la Maîtrise de l'Energie et pour l'Environnement
Beirut
Tel.: 961-1-644901
Fax: 961-1-385043
E-mail: hjaber@litcom.com.lb

Mr. Ricardo A. Khoury
Project Engineer/Environmental Consultant
Arab Resources Development s.a.r.l
Sin el-Fil, Beirut
Tel.: 961-1-512121/2/3371973
Fax: 961-1-512123
E-mail: rkhoury@ardsite.com

Mr. Samer A. Najm
Electrical Engineer
Midland Management Corporation
Hazmieh, Gardenia Center
Beirut
Tel.: 961-3-837732
E-mail: sanajm@inco.com.lb

Mr. Raji Maasri
Director
Arab Resources Development s.a.r.l
Aley, Hay El Gharbi, Lebanon
Tel.: 961-3-615528, 961-1-512121
Fax: 961-1-512123
E-mail: rmaasri@ardsite.com

Mr. Shady M. Sfeir
Greenpeace International
Achrafieh, Fassouh
Beirut
Tel.: 961-3-850453
E-mail: s-sfeir@bigfoot.com

Mr. Geoges Zammar
Electricité du Liban
P.O. Box 131
Beirut
Tel.: 961-1-443935
Fax: 961-1-583084

Mr. Afif M. Soubra
Civil Engineering Consultant
Arifi Bldg., Amine Beyhum Street
Zokak Al Balat
Beirut
Tel.: 961-1-376367
Fax: 961-1-378788
E-mail: zas@ciberia.net.lb

Mr. Rabah M. Marini
Public Accounts Director
Ministry of Finance
Riad Solh Square
Tel.: 961-1-980955
Fax: 961-1980475
E-mail: adql@aub.edu.lb

Mr. Michel Karkour
Manager, LATTICE- Lebanese Associated Team
Sin el Fil, Beirut
Tel.: 961-1-492810
E-mail: lattice@tmi.com.lb

Mr. Zokhrof Sleiman
Managing Director
Al-Bonian Group
Tel.: 961-1 385708/755/759
Mobile: 961-3-718484
Fax: 961-1-385714
E-mail: albonian@cyberia.net.lb

Ms. Nella Younan
Directeur des Affaires Administratives
Electricité du Liban
P.O. Box 131
Beirut
Tel.: 961-1-585817
Mobile: 961-3-766246
Fax: 961-1-583084

Mr. Roger Saliba
Director, METAPLAST
Amal Ayoub Bldg., Achrafieh
P.O. Box 7484
Beirut
Tel.: 961-1-201868/201869
Fax: 961-9-937042

Mr. Gilbert Zabbal
Managing Partner
Sky Energies, s.a.r.l.
P.O. Box 116-2323
Ashrafieh, Lebanon
Tel.: 961-1-201868/9
Fax: 961-1-215568
E-mail: sky@cyberia.net.lb

Mr. Hassan Hashem
Director General of Investment
Ministry of Energy and Water
Beirut
Tel.: 961-1-565001/2
Fax: 961-1-565555
E-mail: ministry@hydro-électric.gov.lb

Mr. Muhieddin Majzoub
Director of Production
Electricité du Liban
P.O. Box 131
Beirut
Tel.: 961-1-448544
Fax: 961-1-583084

Mr. Sami H. Karaki
Associate Professor
American University of Beirut
P.O. Box 11-0236
Beirut
Tel.: 350000, Ext. 3549
E-mail: skaraki@aub.edu.lb

F. GOETHE INSTITUT EXPERTS

Dr. Monika von Krafft
Director
Geothe Institut
P.O. Box 113-5159
Beirut
Tel.: 961-1-740524
Fax: 961-1-743524
E-mail: goethe-v@cyberia.net.lb

Dr. Michael Geyer
Division Director
Plataforma Solar de Almeria
Apartado 39
E-04200 Tabernas (Almeria)
Spain
Tel.: +34-950-387915
Fax: +34-950-365313
E-mail: michael.geyer@psa.es

Dr. Wilfried Grasse
Executive Secretary
SolarPACES
Kleimannsruh 7
D-38518 Gifhorn-Winkel
Germany
Tel.: +49-5371-15742
Fax: +49-5371-15755
E-mail: solarpaces@dlr.de

Mr. Christoph Reinhart
Fraunhofer Institut Solar Energiesysteme
Oltmannsstrasse 5
D-78100 Freiburg
Germany
Tel.: +49-0-761/45 88-129
Fax: +49-0-761/45 88-132
E-mail: reinhart@ise.fhg.de

Mr. Gerhard Finking
Ministerialrat
SPD-Bundestagsfraktion
Platz der Republic 1
11011 Berlin
Germany
Tel.: + 030-227-57791
Fax: +030-226-56264
E-mail: Finking@spdfrak.de

G. ESCWA SECRETARIAT

United Nations House
Riad El-Solh Square
P.O. Box 11-8575
Tel. (961-1) 981301
Fax: (961-1) 981510

Dr. Hazem El-Beblawi
Executive Secretary

Mr. Omar Touqan, Chief
Energy, Natural Resources and Environment Division
E-mail: touqan.escwa@un.org

Ms. Anhar Hegazi, Chief
Energy Issues Section
Energy, Natural Resources and Environment Division
E-mail: ahegazi@escwa.org.lb

Mr. Omar Bizri, Chief
Technology Section
Sectoral Issues and Policies Division
E-mail: bizri.escwa@un.org

Dr. Ibrahim Mohamed El-Mohr
Regional Advisor on Energy
E-mail: ielmohr@escwa.org.lb

Mr. Mohamad Kordab
Energy Issues Section
Energy, Natural Resources and Environment Division
E-mail: mkordab@escwa.org.lb

Mr. Hedayat Allah Gari
Energy Issues Section
Energy, Natural Resources and Environment Division
E-mail: hgari@escwa.org.lb
hgari@hotmail.com

Mr. Luis Ruiz
Energy Issues Section
Energy, Natural Resources and Environment Division
E-mail: lruiz@escwa.org.lb
Ruiz.escwa@un.org

Annex II

AGENDA

1. Opening session.

2. Adoption of the agenda and organization of work.

3. Renewable energy opportunities and challenges.

4. World Energy Assessment and energy for sustainable development:

   (a) World Energy Assessment overview;
   (b) Energy and sustainable development, key issues;
   (c) Proposal for a regional declaration on World Energy Assessment.

5. Solar electricity generation: options and opportunities:

   (a) Concentrating solar power;
   (b) Photovoltaic solar electricity;
   (c) Solar electricity: technologies development and market opportunities.

6. Solar architecture.

7. Country presentations on renewable energy activities and plans.

8. The ESCWA Renewable Energy Promotion Mechanism (REPM).

9. Conclusions and recommendations on:

   (a) Renewable energy opportunities and challenges;
   (b) The ESCWA Renewable Energy Promotion Mechanism.

Annex III

ORGANIZATION OF WORK*

Monday, 2 October 2000

08:30 - 9:30 a.m.	Registration.
09:30 - 10:30 a.m.	Opening session *Item No. 2 of the Provisional Agenda.* The Director, Goethe Institut, Dr. Monika von Krafft The Executive Secretary of IEA/SolarPACES, Mr. Wilfried Grasse The Executive Secretary of ESCWA, Dr. Hazem El-Beblawi His Excellency the Minister of Energy and Water, Mr. Soleiman Trabulsi
10:30 - 11:00 a.m.	Coffee break.
11:00 - 11:15 a.m.	Adoption of the agenda and organization of work *Item No. 2 of the Provisional Agenda.*
11:15 a.m. - 1:15 p.m.	**Theme I: Renewable Energy Opportunities and Challenges** *Item No. 3 of the Adopted Agenda.* *Chairman:* Mr. Omar Touqan *Co-chairman:* Dr. Monika von Krafft
11:15 - 11:45 a.m.	"Solar technology is a contribution for solving energy problems in the Middle East countries" *Dr. Gerhard Finking* M.P., Berlin.
11:45 a.m. - 12:15 p.m.	"Dissemination of renewable energy services to the rural areas in ESCWA member countries" *Ms. Anhar Hegazi,* ESCWA.
12:15 - 12:45 p.m.	"Renewable energy and the Clean Development Mechanism: threats, opportunities and options in the lead-up to COP6" *Dr. Karl Mallon*, Greenpeace International.
12:45 - 1:15 p.m.	"Solar energy technology transfer in the ESCWA member countries" *Mr. Omar Bizri,* ESCWA.
1:15 - 2:15 p.m.	Lunch break.
2:15 - 4:15 p.m.	**Theme II: World Energy Assessment and Energy for Sustainable Development** *Item No. 4 of the Adopted Agenda.* *Chairman*: Dr. Hisham Al-Khatib *Co-chairman*: Dr. Othman Al-Natheer
2:15 - 3:15 p.m.	"World Energy Assessment: energy and the challenge of sustainability, overview" Dr. Hisham El-Khatib, UN-DESA.
3:15 - 4:15 p.m.	"Energy and sustainable development: options and strategies for action on key issues" *Mr. Yehia Abu-Alam,* UN-DESA.

* The organization of work is presented as adopted by the Meeting.

Tuesday, 3 October 2000

08:30 - 11:00 a.m.	**Theme III: Solar Electricity Generation: Options and Opportunities. Concentrating Solar Power** *Item No. 5(a) of the Adopted Agenda.* *Chairman*: Mr. Sufian Al-Alao *Co-chairman*: Dr. Riad Chedid
08:30 - 09:00 a.m.	"Concentrating solar power: the IEA-SolarPACES vision, strategy and activities towards its large-scale commercial application" *Mr. Wilfried Grasse*, IEA/SolarPACES.
09:00 - 09:40 a.m.	"System aspects of the present generation of CSP plants under realization: solar electricity technologies and systems, their development status and market potential" *Dr. Michael Geyer*, Plataforma Solar de Almeria.
09:40 - 10:20 a.m.	"The first integrated solar/combined cycle electric generation project in Egypt" *Mr. Sami Zannoun,* New and Renewable Energy Authority.
10:20 - 11:00 a.m.	"Potentials and prospects for solar thermal electricity generation in the ESCWA member countries" *Ms. Anhar Hegazi,* ESCWA.
11:00 - 11:30 a.m.	Coffee break.
11:30 a.m. - 1:00 p.m.	**Country Presentations on Renewable Energy Activities and Plans** *Item No. 7 of the Adopted Agenda.* *Chairman*: Mr. Ahmad Hassan Al-Ainy *Co-chairman*: Mr. Hedayat-Allah Gari
11:30 a.m. - 12:15 p.m.	"Renewable energy research and development activities in Saudi Arabia" *Dr. Naif Al-Abbadi*, Energy Research Institute, King Abdul Aziz City for Science and Technology.
12:15 - 1:00 p.m.	"The status of solar electricity in Bahrain" *Dr. Waheeb E. Al-Naser*, College of Science, University of Bahrain.
1:00 - 2:00 p.m.	Lunch break.
2:00 - 4:00 p.m.	**Theme II (*continued*)** *Item No. 4(c) of the Adopted Agenda.* *Chairman*: Mr. Yehia Abu-Alam *Co-chairman*: Dr. Omar Kettana
2:00 - 2:30 p.m.	Presentation of draft "Declaration of Arab energy perspectives and proposed action plan" *Mr. Yehia Abu-Alam*, UN-DESA.
2:30 - 4:00 p.m.	Discussion of the draft "Declaration of Arab energy perspectives and proposed action plan", led by: *Dr. Hisham El-Khatib*, UN-DESA.

Wednesday, 4 October 2000

09:00 - 11:00 a.m.	**Theme III (*continued*): Solar Electricity Generation: Options and Opportunities. Photovoltaic Solar Electricity*** *Item No. 5(b) of the Adopted Agenda.* *Chairman*: Dr. Hilal Bin Ali Al-Hinai *Co-chairman*: Mr. Ali Ben Abdallah Al-Owais
09:00 - 10:00 a.m.	"Photovoltaic technologies and applications: actual status and prospects" *Mr. Mohamad Kordab*, ESCWA.
10:00 - 11:00 a.m.	"Potentials and prospects for photovoltaic applications in the ESCWA member countries" *Mr. Mohamad Kordab*, ESCWA.
11:00 - 11:30 a.m.	Coffee break.
11:30 a.m. - 1:30 p.m.	**Theme IV: Solar Architecture** *Item No. 6 of the Adopted Agenda.* *Chairman*: Mr. Waheeb E. Al-Naser *Co-chairman*: Mr. Mohamad Kordab
11:30 a.m. - Noon	"Energy efficient commercial buildings in Germany" *Mr. Christoph Reinhart,* Fraunhofer Institut Solare Energiesysteme.
Noon - 12:30 p.m.	"Solar architecture: environmentally friendly architectural planning that contributes to low-energy buildings" *Dr. Fadi Moucharrafie,* Faculty of Architecture, American University of Beirut.
12:30 - 1:00 p.m.	"Solar energy in the context of sustainable development" *Dr. Riad Chedid,* Faculty of Engineering, American University of Beirut.
1:00 - 1:30 p.m.	"Low-cost solar energy applications in rural settings" *Mr. Boghos Ghougassian,* Middle East Centre for Transfer of Appropriate Technology.
1:30 - 2:30 p.m.	Lunch break.
2:30 - 3:30 p.m.	**Theme III (*continued*): Round Table on Technologies Development and Market Opportunities for Renewable Energy Electricity** *Item No. 5(c) of the Adopted Agenda.* *Panelists*: Mr. Mahmoud Sami Zannoun, Dr. Wilfried Grasse, Ms. Anhar Hegazi, Dr. Naif Al-Abbadi, Dr. Mohamad Amro.
3:30 - 4:30 p.m.	**Conclusions and recommendations** *Item No. 9(b) of the Adopted Agenda.*
8 p.m.	Saxofourte concert organized by the Goethe Institut, held at Assembly Hall, American University of Beirut.

* The papers submitted in this session were prepared and presented in Arabic.

Thursday, 5 October 2000

The ESCWA Renewable Energy Promotion Mechanism (REPM)
Item No. 8 of the Adopted Agenda.

Chairman: Mr. Omar Touqan
Co-chairman: Representative of Iraq

08:30 - 09:30 a.m.	Welcoming speech by Mr. Omar Touqan, Chief, Energy, Natural Resources and Environment Division, ESCWA.
08:45 - 09:30 a.m.	"The ESCWA Renewable Energy Promotion Mechanism: background, procedures for realization, status and recommended actions", *Ms. Anhar Hegazi*, ESCWA.
09:30 - 09:45 a.m.	Welcoming address, Dr. Hazem El-Beblawi, Executive Secretary of ESCWA.
09:45 - 10:15 a.m.	Endorsement of the REPM Memorandum of Understanding by the representatives of the REPM national focal points.
10:15 - 11:00 a.m.	Coffee break.
11:00 - 11:30 a.m.	Presentation of "The Renewable Energy Regional Profile", *Ms. Anhar Hegazi*, ESCWA.
11:30 a.m. - 1:00 p.m.	Presentations of Country Profiles by the representatives of the national focal points of the ESCWA member countries.
1:00 - 2:00 p.m.	Lunch break.
2:00 - 3:30 p.m.	Round table on proposals for the REPM two-year work programme.
3:30 - 4:00 p.m.	Conclusions and recommendations *Item No. 9-b of the Adopted Agenda.*
4:00 - 4:30 p.m.	Closing session.

Annex IV

LIST OF DOCUMENTS

Symbol	Title
E/ESCWA/ENR/2000/WG.2/L.1	Provisional Agenda
E/ESCWA/ENR/2000/WG.2/L.2	Proposed Organization of Work
E/ESCWA/ENR/2000/WG.2/3	"The first integrated solar/combined cycle electric generation project in Egypt"
E/ESCWA/ENR/2000/WG.2/4	"Concentrating solar power: the IEA/SolarPACES vision, strategy and activities towards its large-scale commercial application"
E/ESCWA/ENR/2000/WG.2/5	"System aspects of the present generation of CSP plants under realization: solar electricity technologies and systems, their development status and market potential"
E/ESCWA/ENR/2000/WG.2/6	"Report of the ad hoc open-ended intergovernmental group of experts on energy and sustainable development", New York, 6-10 March 2000
E/ESCWA/ENR/2000/WG.2/7	"Low-cost solar energy applications in rural settings"
E/ESCWA/ENR/2000/WG.2/8	"Solar energy in the context of sustainable development"
E/ESCWA/ENR/2000/WG.2/9	"Solar architecture: environmentally friendly architectural planning that contributes to low energy buildings"
E/ESCWA/ENR/2000/WG.2/10	"World energy assessment: energy and the challenge of sustainability, overview"
E/ESCWA/ENR/2000/WG.2/11	"Energy efficient commercial buildings in Germany"
E/ESCWA/ENR/2000/WG.2/12	"Dissemination of renewable energy services to the rural areas in ESCWA member countries"
E/ESCWA/ENR/2000/WG.2/13	"Renewable energy applications in Palestine"
E/ESCWA/ENR/2000/WG.2/14	النظم الكهروضوئية وتطبيقاتها–الوضع الراهن والتوقعات المستقبلية
E/ESCWA/ENR/2000/WG.2/15	"Renewable energy and the Clean Development Mechanism: threats, opportunities and options in the lead-up to COP6"
E/ESCWA/ENR/2000/WG.2/16	"Energy and sustainable development: options and strategies for action on key issues"
E/ESCWA/ENR/2000/WG.2/17	"The status of solar electricity in Bahrain"
E/ESCWA/ENR/2000/WG.2/18	"Solar energy technology transfer in the ESCWA member countries"
E/ESCWA/ENR/2000/WG.2/19	"The ESCWA Renewable Energy Promotion Mechanism: background, procedures for realization, status and recommended actions"
E/ESCWA/ENR/2000/WG.2/20	Draft report on "The renewable energy regional profile"
E/ESCWA/ENR/2000/WG.2/21	"Renewable energy research and development activities in Saudi Arabia"
E/ESCWA/ENR/2000/WG.2/22	الوضع الراهن والتوقعات المستقبلية للتطبيقات الكهروضوئية في دول الإسكوا
E/ESCWA/ENR/2000/WG.2/23	"Renewable energy profile for the United Arab Emirates"
E/ESCWA/ENR/2000/WG.2/24	"Renewable energy profile for Iraq"

Annex V

MEETING EVALUATION FORM

Kindly give your evaluation in percentage.

No.	Questions	Average
1	Were the topics of the meeting relevant to your work?	90.0
2	Did the meeting meet its objectives?	86.0
3	To what extent do you expect to utilize the information acquired from the meeting?	72.0
4	Were the preparations and arrangements for the meeting up to your expectations?	81.0
5	Was the level of the papers presented in the meeting up to standard?	81.0

The average overall evaluation score = 82 per cent, assuming equal weight for each criteria item.