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**Economic and Social Commission for Western Asia (ESCWA)****REPORT****NATIONAL TRAINING WORKSHOP ON THE ROLE OF PUBLIC-PRIVATE  
PARTNERSHIPS IN THE IMPLEMENTATION OF RENEWABLE ENERGY  
PROJECTS IN RURAL AREAS  
AMMAN, 3-4 JUNE 2014****Summary**

The Economic and Social Commission for Western Asia (ESCWA) organized a national training workshop on the role of public-private partnerships (PPPs) in the implementation of renewable energy projects in rural areas, in Amman, on 3 and 4 June 2014. The workshop is one of the activities undertaken within the United Nations Development Account project on Enhancing energy security and improving access to energy services through development of public-private renewable energy partnerships, led by the Economic and Social Commission for Asia and the Pacific (ESCAP) and jointly implemented by all the United Nations regional commissions.

Seven Jordanian cases of successful PPPs in renewable energy projects were reviewed, with a view to drawing lessons and making recommendations and proposals for future projects. Cases where photovoltaic (PV) cells were used for the production of electricity in Jordanian rural areas were examined during the first day, five of which being projects where the PV system was grid-connected. On the second day, participants went on a field trip to the Dead Sea Panorama Complex, where a PV system with a capacity of 100 kilowatts-peak (kWp) is installed.

The workshop was attended by 24 experts from Jordan and Palestine, who represented the Jordanian Ministry of Energy and Mineral Resources, the National Energy Research Centre in the Royal Scientific Society, and a number of non-governmental organizations, enterprises, universities and research centres in both countries.

## CONTENTS

	<i>Paragraphs</i>	<i>Page</i>
Introduction .....	1-5	3
<b>I. TOPICS OF DISCUSSION</b> .....	6-23	3
A. Economic feasibility and financing .....	6	3
B. Case studies: Jordan .....	7-20	4
C. Private-public partnerships .....	21-22	6
D. Concluding observations .....	23	6
<b>II. ORGANIZATION OF WORK</b> .....	24-29	6
A. Date and venue .....	24	6
B. Opening .....	25-26	6
C. Participants .....	27	7
D. Objectives .....	28	7
E. Assessment .....	29	7
<i>Annex.</i> List of participants .....		8

## **Introduction**

1. The Economic and Social Commission for Western Asia (ESCWA) has been a partner in the United Nations Development Account project on Enhancing energy security and improving access to energy services through development of public-private renewable energy partnerships since 2011. This project is led by the Economic and Social Commission for Asia and the Pacific (ESCAP) and is also jointly implemented by the remaining three regional commissions, namely the Economic Commission for Europe (ECE), the Economic Commission for Africa (ECA) and the Economic Commission for Latin America and the Caribbean (ECLAC).
2. This project aims to improve the access of the poor to energy services in rural areas and to promote renewable energy applications through public-private partnerships (PPPs). In this context, a Jordanian national team was established to collect data on a number of renewable energy case studies implemented through PPPs in rural and marginalized areas of Jordan.
3. The project team was led by the National Energy Research Centre of the Jordanian Royal Scientific Society and was composed of a number of experts from the public and private sectors, representing the Centre as well as enterprises, non-governmental organizations, universities and other research centres. The national team collected data and information on seven cases of PPPs in renewable energy projects implemented in rural and marginalized areas of Jordan. It assessed these cases, identifying the challenges that they face and proposing solutions thereto.
4. With a view to presenting the findings of the Jordanian national team, ESCWA organized a national training workshop on the role of PPPs in the implementation of renewable energy projects in rural areas, in cooperation with the Royal Scientific Society, at its headquarters in Amman, on 3 and 4 June 2014.
5. Seven cases where photovoltaic (PV) cells used to generate electricity were discussed, five of which involving grid-connected PV systems. The current statuses of these cases were assessed; challenges and lessons learned were discussed; and solutions were proposed. On the second day of the workshop, participants went on a field trip to the Dead Sea Panorama Complex, where a PV system with a capacity of 100 kilowatts-peak (kWp) is installed.

## **I. TOPICS OF DISCUSSION**

### **A. ECONOMIC FEASIBILITY AND FINANCING**

6. Mr. Walid al-Deghaili, ESCWA consultant, presented the economic feasibility of renewable energy projects, discussing their costs and financing modalities. He addressed the various renewable energy options, their related requirements and factors influencing their economic feasibility and costs. He presented four components that should be taken into consideration in the calculation of these costs: (a) the amount paid at the start of the project (capital expenditure); (b) the amount spent during its implementation (maintenance, operational and other expenditures), highlighting the importance of calculating the actual cost; (c) the deduction factor (bank interest); and (d) the project duration. He highlighted that these components should be assessed to compare alternatives and choose the most economically feasible. The speaker noted that in order to ensure that cost expectations were realistic, a sensitivity analysis should be carried out to determine the effect of each assumption or estimation on the final outcome. He emphasized the importance of introducing environmental factors, including polluting emissions and their impact on climate change, into the calculation of economic feasibility. Furthermore, he addressed the electrification of Al-Qaawa village in Yemen, which was undertaken by ESCWA and funded in cooperation with the OPEC Fund for International Development (OFID), and underlined the importance of raising the awareness of stakeholders through training and the need for local competent bodies to follow up on the project. The speaker finally presented the various funding mechanisms for renewable energy projects that could be used in the Arab region.

## B. CASE STUDIES: JORDAN

7. Seven case studies were addressed under this agenda item.

### *Case study 1: Rawdat el-Bendan*

8. Mr. Firas Alawneh, Royal Scientific Society, Jordan, presented a case study on the use of solar cells for the electrification of homes and the provision of electricity for lighting, ventilation and various electrical appliances in the village of Rawdat el-Bendan. This project was funded by the Ministry of Energy and Mineral Resources and provided electrical power free of charge for the village residents. The funds originated from the Rural Electricity Fund of the Ministry's Department of Rural Electrification.

9. The speaker detailed the technical aspects of the project, namely the use of deep cycle batteries for lighting after sunset. These systems have been designed to provide electricity for households for two days in a row even when the weather is cloudy. Their service life is 25 years excluding the lifetime of the batteries, which ranges between five and eight years. The systems require maintenance and the batteries are replaced at the end of their service life, both processes being funded through the Fils el-Reef project, in collaboration with the Jordan Badia Research Program and the National Energy Research Centre. These renewable energy systems are secure and eco-friendly, as they do not produce environmentally hazardous gas emissions. They have been successful in providing the required electrical energy to the villagers for some 12 years, although there have been challenges and obstacles, such as access to water in the village.

### *Case study 2: Feynan Ecolodge Hotel*

10. Mr. Nabil Tarazi, Founder and Director of EcoHotels and board member of The International Ecotourism Society (TIES) in Jordan, presented a success story in the field of ecotourism, the Feynan Ecolodge Hotel. He highlighted the contribution of the National Energy Research Centre of the Jordanian Royal Society for the Conservation of Nature, which has designed and implemented a system of PV cells to feed lighting units and fans. The hotel was equipped with solar cells with a 4.5 kWp capacity, a system financed by the United States Agency for International Development (USAID).

11. The speaker pointed that the system was able to transform direct current into alternating current, and was provided with standby batteries with the capacity of producing electricity during three cloudy days with no additional back-up, and could function as a hybrid PV/diesel system. He highlighted that the hotel was located in a remote area, far from the national grid, which made the use of solar cells a good option, particularly considering the low incurred cost. Finally, he underlined the challenges remaining and suggested a range of solutions thereto.

### *Case study 3: Dead Sea Panorama Complex*

12. Mr. Alaa Mjahid, Royal Society for the Conservation of Nature, presented the project of the Dead Sea Panorama Complex, which was established in collaboration between the Government of Japan and the Jordanian ministries of Planning and International Cooperation, and of Tourism and Antiquities. The project aimed to support the country's efforts in reducing greenhouse gaz emissions and mitigating climate change by promoting renewable energy applications, within the framework of an environmental grants programme for developing countries. The studies undertaken for the project had showed that solar cell technology was the most productive renewable energy application for electricity generation; it was also the longest-lasting and the most robust. The speaker finally evoked the challenges faced by the project and proposed solutions to tackle these challenges.

13. During the second day of the workshop, participants visited the Complex, taking a closer look at its activities and objectives, and at the 100 kWp PV system that generates electricity for it.

*Case study 4: Al-Ghoiba secondary school*

14. Mr. Mohammad Omar, KIA, Jordan, presented an initiative of The Princess Alia Foundation on renewable energy for sustainable education. The project, in which solar power is used to generate electricity in two secondary schools in Jordan, is implemented through a partnership between the Ministry of Education in Jordan and KIA Motors Corporation in the Middle East and North Africa, through its subsidiary company based in Amman, National Arab Motors, which provided the needed funding. He underlined that achieving environmental balance in the country and raising awareness about eco-friendly practices were among the main objectives of the National Arab Motors Company.

15. The speaker explained that the aim of that specific project was to enable two public schools with limited resources to meet their electric power needs through the use of solar PV cells and to raise public awareness about the benefits of renewable energy applications.

*Case study 5: Integrated management of energy and water resources*

16. Ms. Lara Hawari, Royal Scientific Society, Jordan, presented a project on the Integrated management of energy and water resources: a grid-connected PV system, implemented by Mercy Corps as part of its endeavours for the promotion of PV systems and their applications in rural areas, in order to improve the living conditions of low-income families. These applications included community-based initiatives for water management in Jordan, where PV systems were used to provide the needed electricity for water management projects.

17. The speaker highlighted the benefits of the project, including enabling citizens to access modern energy services; own PV systems; reduce monthly electricity bills; shift from fossil fuel to clean energy; and create eco-friendly environments using the resources available in the region. The project was an example of eco-friendly renewable energy activities and PPP was critical to achieving its objectives. Such international projects would promote public awareness of the importance of clean solar energy systems. A projected additional activity is the installation of PV systems on a number of government buildings.

*Case study 6: Tafila*

18. Mr. Alaa Marri, Royal Scientific Society, presented a project on the supply and installation of 1000 intelligent solar tracking systems on the roofs of residential units in the town of Tafila, Jordan. The project also involved the construction of an operation centre for the systems' network in Tafila Technical University, as well as the training of students and teachers on the related technical aspects. The speaker underlined that the role of the Royal Scientific Society had been to oversee the installation of the systems on the roofs, which was implemented by Petra Solar Company. An assessment of the socioeconomic impact of the project on the residents of Tafila was also conducted through questionnaires, which highlighted the new opportunities provided by the project in terms of use of smart networks and clean, safe renewable energy.

*Case study 7: Ghor Fifa*

19. Ms. Loulousa Safarini, EDAMA Association, presented the association's activities for the development of rural areas in Jordan through innovative solutions in the water and energy fields, which aim to achieve energy independence and a positive impact on the environment. Fifa village in Kerak, one of the poorest areas in Jordan, was chosen to become the first eco-village in the country. It was declared a reserve by the Royal Society for the Conservation of Nature, owing to the high environmental value of its biological diversity. In addition, the village is endowed with the ideal climate for solar energy as solar radiation is available throughout the year.

20. Solar systems with a capacity of 65 kWp were installed atop a health centre; a mosque; a number of schools, teachers' residential units and kindergartens; the Royal Society for the Conservation of Nature

building; and two houses. Three PV lighting poles in an area mostly inhabited by the Bedouin were also installed. The main objectives of this project were to enable the village to meet its electricity needs through efficient clean energy applications and raise public awareness about renewable energy applications.

### C. PRIVATE-PUBLIC PARTNERSHIPS

21. Mr. Walid al-Deghili made a presentation on PPPs for the implementation of rural renewable energy projects. He reviewed the current state of the energy sector in Jordan and the effect of energy applications on climate. He underlined the need for funding, in particular through PPPs, to implement renewable energy projects, presenting the characteristics and benefits of such partnerships, which include ensuring complementarity between the public and private sectors and overcoming government budget restrictions. PPPs indeed allow the use of the State's legislative framework and political support while benefiting from the resources, flexibility and knowledge available in the private sector; they also contribute to job creation and poverty alleviation as they involve attracting financial capital and investments and seizing the opportunities provided by the green economy sector. In the framework of PPPs, the public and private sectors share both risks and benefits, on the basis of cooperation, transparency and good governance.

22. The speaker also touched on good governance indicators and on the importance of improving the investment climate and making the needed reforms. He mentioned a number of obstacles to PPPs and suggested means to overcome them. He then presented PPP models established for the implementation of renewable energy projects in rural areas in Jordan. He stressed the importance of the grants and financial facilities provided by partners such as Pro-poor PPP (5Ps), in addition to development funds, Islamic banks and rural development entities, which all contribute to enhance commitment to social responsibility in rural and marginalized areas. He also mentioned in the experience of other Arab countries in the field. He underlined that each situation required a specific model, but that previous models could be used and improved where needed, stressing the importance of legislative and political stability, solid institutional frameworks, government support, capacity-building activities and the involvement of civil society groups in the follow-up, monitoring and accountability processes. He concluded by stressing the importance of the technical, environmental, economic and social aspects of such projects.

### D. CONCLUDING OBSERVATIONS

23. At the conclusion of the workshop, emphasis was placed on the following key points to ensure the success of PPPs for the implementation of renewable energy projects: (a) reaching a political decision on shifting to renewable energy; (b) drawing lessons from past mistakes and success stories; (c) building the capacity of decision-makers; (d) ensuring the transfer and adaptation of technology to national settings.

## III. ORGANIZATION OF WORK

### A. DATE AND VENUE

24. The national training workshop on the role of public-private partnerships in the implementation of renewable energy projects in rural areas was held at the headquarters of the Royal Scientific Society in Amman, on 3 and 4 June 2014.

### B. OPENING

25. The opening statement was delivered by Mr. Walid Shahin, Director of the National Energy Research Centre of the Royal Scientific Society, Jordan. The speaker focused on the importance of strengthening cooperation to establish PPPs in the field of energy, notably in developing countries. He underlined the significant role of the private sector in Jordan, where most renewable energy projects were still at an early stage. He added that the first wind farm for electric power generation in Jordan would be established in Tafila.

26. Mr. Habib al-Andalousi, Chief of the Energy Section, ESCWA, then delivered a speech in which he laid out the reasons for organizing this workshop as part of a Development Account project, implemented in collaboration with other United Nations regional commissions, on Enhancing energy security and improving access to energy services through development of public-private renewable energy partnerships. He mentioned the Jordanian project team whose members collected data on major cases of PPPs in renewable energy in rural areas of the country, and thanked the Royal Scientific Society for leading the team.

#### C. PARTICIPANTS

27. The training workshop was attended by 24 experts from Jordan and Palestine, representing the Jordanian Ministry of Energy and Mineral Resources, the National Energy Research Centre of the Royal Scientific Society (Jordan), as well as a number of non-governmental organizations, enterprises, universities and research centres in Jordan and Palestine.

#### D. OBJECTIVES

28. The workshop sought to review a number of experiences in implementing renewable energy projects in rural areas of Jordan through PPPs, with a view to drawing lessons and proposing solutions for obstacles that impede the implementation process.

#### E. ASSESSMENT

29. A questionnaire was distributed at the end of the workshop for its assessment. Results indicated the following: (a) some 91 per cent of the participants believed that the objectives of the workshop were achieved to a good/great extent; (b) 90 per cent of the participants considered that the administrative arrangements were good/very good; 100 per cent considered that the presentations were clear/very clear; (c) 90 per cent of the participants considered the workshop as a good/very good opportunity to exchange information; 78 per cent described it as useful in making work connections; 80 per cent believed that it was good/very good in providing benefits for the future; and (d) 89 per cent of the participants requested follow-up activities. The below table presents the detailed content of the participants' answers to the assessment questionnaire.

	Not achieved:	Achieved to some extent:	Achieved to a good extent:	Achieved to a great extent:
Objectives of the workshop	0%	9%	54.5%	36.5%
<b>Arrangements and presentations</b>				
Organizational arrangements before and during the workshop	Poor: 0%	Average: 10%	Good: 40%	Very good: 50%
Clarity of presentations	Poor: 0%	Average: 0%	Good: 50%	Very good: 50%
<b>Usefulness of the workshop</b>				
Information-sharing among participants	Poor: 0%	Average: 10%	Good: 50%	Very good: 40%
Making useful work connections	Poor: 11%	Average: 11%	Good: 67%	Very good: 11%
Future benefits	Poor: 0%	Average: 20%	Good: 40%	Very good: 40%
Request for follow-up activities	Yes: 89%		No: 11%	

Annex\*

**LIST OF PARTICIPANTS**

Jordan

Mr. Rami Ahmad Ahmad al-Hassis  
Institutions Development Specialist  
Jordanian Institutions-JEDCO

Mr. Mahmoud Thalgi al-Katarneh  
Ministry of Planning and International Cooperation

Mr. Mohammad Ibrahim Abdallah Shahbaz  
Consultant  
National Center for Research and Innovation  
Jabiha

Mr. Ziad Abel Rahman al-Saadeh

Mr. Ahmad Abdullatif Abu Saa  
Section Head  
Ministry of Energy and Mineral Resources

Mr. Mahmoud Youssef Abdul Hadi  
Maintenance and Logistical Support Officer  
The Royal Society for the Conservation of Nature

Mr. Wael Ababneh  
Director of Rural Electrification Directorate  
Ministry of Energy and Mineral Resources

Ms. Louloua Safarini  
Edama

Mr. Rami Hammad  
Jordanian Society for Economic Projects  
Development

Mr. Mohammad Omar  
KIA Jordan

Mr. Alaa Mjehed  
The Royal Society for the Conservation of Nature  
The Panorama Dead Sea Complex

Mr. Nabil Tarazi  
Director  
Al-Feynan Ecolodge

Mr. Beshr el-Nabulis  
Al-Finan Eco lodge

Mr Layth Zaatar  
Nour for Solar Systems

Mr. Ziad Saaydeh  
Rural Electrification Director  
Ministry of Energy and Mineral Resources

Mr. Walid Shahin  
Director  
National Energy Research Centre (NERC)  
Royal Scientific Society

Mr. Firas Alawneh  
Head of Photovoltaic Division  
NERC  
Royal Scientific Society

Mr. Alaa Marri  
NERC  
Royal Scientific Society

Ms. Lara Walid Hawari  
NERC  
Royal Scientific Society

Palestine

Ms. Tahani Abu Daqqa  
Director of the Palestinian Society for Solar and  
Sustainable Energy  
Former Minister of Youth, Sports and Culture

Mr. Afif Hasan Akl  
Dean of the Faculty of Engineering  
Bir Zeit University

Mr. Nader Mohammad Ibrahim Nemr Bitar  
Member in the Energy Committee of Palestinian  
Chambers

Palestinian Chambers of Commerce, Industry, and  
Agriculture

Mr. Fadi Bkirat  
Chief Eexecutive Officer  
Racktech for Power Engineering and Contracting

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\* Issued as submitted.

Palestine (continued)

Mr. Mahmoud Sliman Khalil Said  
Director General  
Big Deal Company

Mr. Muhammad Abu Ali  
Project Manager  
Big Deal Company

Lebanon

Mr. Walid al-Deghaili  
ESCWA Consultant

Economic and Social Commission for Western  
Asia (ESCWA)

Mr. Habib el-Andalousi  
Chief of the Energy Section  
Sustainable Development and Productivity  
Division

Ms. Lara Geadah  
Research Assistant  
Energy Section  
Sustainable Development and Productivity  
Division

Mr. Nizar al-Halasa  
Innovation Consultant  
ESCWA Technology Centre