Palestine Economic Policy Research Institute

Round Table Discussion (4)

Renewable Energy in the Palestinian Territory: Opportunities and Challenges

May 2012

Executive Summary
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Background and Rationale

The energy sector in the Palestinian territory faces a variety of significant challenges. First, it relies on external sources for the supply of electricity (86% of electricity consumed is imported from Israel). Second, the costs of importing energy sources are exorbitant (electricity import bill is estimated at about 400-500 million dollars a year). Finally, many environmental risks arise from the use of traditional sources of energy. These facts represent genuine challenges to the Palestinian decision maker in terms of advancing, crafting and utilizing a strategy for finding reliable, usable energy alternatives. The main goal of this strategy is to ensure the provision of permanent, safe and economical sources of energy that would meet the needs of ever-increasing consumption. To some extent, there is now a consensus among experts that the most favorable way to realize this goal is to increase reliance on renewable energy sources at the expense of the traditional sources.

Many countries worldwide have made impressive strides in the industry of renewable energy. To this end, they set ambitious targets to be achieved in the short run. Despite the efforts exerted and initiatives undertaken by the Palestinian agencies (government, civil and private) to use solar energy to generate power, they remain desultory, limited and not commensurate with the ground challenges. Besides, the Israel enterprises set up beyond Israeli territories to areas within the West Bank have driven Palestinians to accelerate such efforts to keep pace with rapid developments in order to establish an efficient system to take advantage of solar energy in addressing the problems of the power sector. The significant economic, environmental and political impacts of the electricity sector on other sectors and individuals alike led MAS to shed light on this hot issue through raising questions at the dialogue table before experts and stakeholders in order to explore the opportunities and challenges and make recommendations accordingly.

Participants

Contributors

Dr. Omar Kittanah: Chairman of the Palestinian Energy and Natural Resources Authority
Mr. Mohammed Hilow: Founder of the Palestinian Association for Solar Energy
Mr. Ali Hamouda: Assistant Director General for Planning - Jerusalem District Electricity Company

Summary of the Session

Dr. Numan Kanafani, Research Director at MAS and Session Moderator, gave a presentation of the background paper prepared by the Institute. He said that countries worldwide have made significant efforts to reduce the emissions of greenhouse gases along with the associated environmental and health risks. The most prominent of these efforts was the signing of the Kyoto Protocol in 1992. The Protocol involved legal obligations on signatory states that collectively agreed to reduce their greenhouse gas emissions by 5.2% on average for the period 2008-2012. This reduction is relative to their annual emissions in a base year, usually 1990. In order to achieve this goal, the signatories would enhance energy efficiency and develop renewable energy sources that would reduce environmental damage and climate change. The EU has already formulated a clear response in the shape of an integrated energy and climate change policy, a commitment to cut emissions of greenhouse gases by at least 20% by 2020. The EU countries are even planning to raise that percentage to 30%.

The Energy Sector in the Palestinian Territory

In 2009, the power consumption in the Palestinian Territory was 4.413 GW / hour. These power needs are imported from three sources: Israel (86%), Egypt and Jordan (4.5%) and Palestine Electric Company- Gaza (around 10%). The bill of imported electricity ranges from 400 to 500 million dollars annually. Electricity services (including distribution and maintenance) are carried out by Palestinian providers (3 in the West Bank and one in Gaza). It should be noted that there is no purchase agreements between the PNA and Israel and thus the purchase is done through bilateral contracts between the Israeli Electricity Company and Palestinian providers.

The most prominent characteristics of the power sector in the Palestinian Territory are:

- Household and services account for 75% of consumption, while 25 percent is consumed by economic and productivity activities.
- The annual consumption in 2020 is expected to reach 8.400 GW / hour- assuming an annual growth rate of 6%.
- The wastage of electricity is about 26% of imported energy, while the electricity prices are relatively high as a result of importing most of the needs from Israel.
- The average per capita consumption of electricity (after deducting wastage) is around 830 KW / hour per year. This average is low compared with neighboring countries (2093 in Jordan, 1549 in Egypt and 6600 In Israel).

Uses of solar energy in Israel (a case study)

Israel has achieved quantum leaps in alternative energy, particularly solar energy technologies. Israel signed the Kyoto Protocol in 1998 and ratified it in 2004. The Israeli competent authorities have started a large scale campaign to encourage the initiatives undertaken by individuals and companies to generate electricity from solar energy. The government has announced that the goal is to produce 10% of the electricity consumed in Israel from solar energy by 2020. The June 2008 law regulates matters relating to renewable energy and it sets promotional prices and specifications for the purchase of electric power generated from the sun from individuals and small businesses. The prices can reach up to nearly four times the current market price of electricity. In addition, the Israeli government has allocated $ 5 billion shekels to finance a program supporting the production of electricity from solar energy.

Later on, the interest in the production of alternative energy and the reduction of emissions has spread to the Palestinian Territory. Since Israel considers the occupied Palestinian territories a part of its sovereignty and because the Palestinian Authority is not a signatory to the Kyoto Protocol, any reduction in the emission of greenhouse gases in the Palestinian Territory is taken as an advantage for Israel. The occupying power carries out its plans through the civil administration which offers promotional rates to buy solar energy from Palestinians (individuals and companies).

Plans for energy development and utilization of renewable (solar) energy in Palestine

The PNA has adopted a national strategy for the energy sector (2011-2013) which aims to increase domestic production of electric power to cover 50% of consumption by 2020. The strategy stipulates that the domestic production of energy should be a combination of both traditional and renewable sources. According to this blueprint, renewable energy will generate 5% of the total target electricity by 2020.

Recently, the Palestinian Cabinet has launched "The Palestinian Solar Initiative" advanced by the Palestinian Energy and Natural Resources Authority. The initiative aims at producing 5 megawatts of solar power during 2012-2014 (2 MW in the central West Bank, 1.5 MW in northern West Bank and 1.5 MW in southern West Bank). The planners believe that this amount of energy can be produced through providing 1,000 homes' roofs with solar cells. The estimated cost is $ 16,000 per house. The initiative suggests that each owner of the target homes pay $ 8,500, while the remaining amount can be funded by other sources. The initiative also proposes that the electricity is purchased from individual producers for 54 agora per kilowatt / hour.

Using the cost-benefit analysis, one can conclude that the household involved in this project can recover its investment ($ 8.500) during almost 8 years. Assuming that the lifespan of the equipment is 20 years, the household will achieve a profit of $ 13.200. MAS estimates funds of such a project at about $ 17 million.

Determinants of expansion in the generation of alternative energy
The attempts and efforts being made locally to expand the uses of solar energy to generate electricity are hampered by a number of constraints:

Political Constraints
The Israeli occupation authorities foil Palestinian attempts to generate electricity using solar energy, especially in the area "C" which constitutes 62% of the Palestinian territory.

Technical and Skill Constraints
Generating electricity using solar cells is a relatively recent technology in Palestine. Though the initiatives in this connection are considerable, the expansion of applications to broader levels needs technical and human capabilities that are not adequately available in the local market.

Financial Constraints
The cost-benefit analysis of "The Palestinian Solar Initiative" demonstrates that the cost of investment in this area is relatively high and thus unaffordable for the majority of Palestinian households. Moreover, the PNA does not have the financial resources to provide a catalyst fund for these projects- which hinders the expansion of such promising projects.

Key Questions for the debate

First: How realistic are the goals set in official documents about the future of alternative energy production in the Palestinian Territory?
Second: Are the incentives contained in " The Palestinian Solar Initiative" adequate? What are the problems that can hinder implementation?
Third: What items of the national strategy for the energy sector (2011-2013) have been achieved? Has the strategy well established a linkage between the development of the energy sector as a whole and the development of alternative energy?

Summary of contributions

Presentation of Mr. Mohamed Hilow
Mr. Hilow started his speech by providing a brief on the importance of renewable energy as a safe, environmentally friendly source of power. He outlined the risks of depending on Israel for the supply of electricity, where the data show that the energy reserves in Israel have declined significantly. As such, the available supplies can hardly compensate for any sudden failure of power due to technical malfunctions. The electricity sector in the Palestinian Territory is inescapably affected by faults occurring in the electricity sector in Israel. The electricity sector in Jordan is not an exception, as it sustains a financial deficit as a result of the policy of the government's support; therefore it might not be a strategic alternative for electricity imported from Israel.

To such a degree, it is necessary to focus on renewable energy as a viable, strategic alternative. According to Mr. Hilow, there are three methods to support renewable energy policy: First, direct support which is usually carried out by rich countries (the financial position of the Palestinian Authority does not cater for this method). Second, the fixed price systems are done through tenders targeting companies wishing to produce electricity from renewable energy. These systems are subject to certain conditions that must be available such as experience and financial situation. Third, the Feed-in Tariff encourages investors in renewable energy through recovering the money invested within an economically reasonable period. This method usually works with guarantees to

investors to the effect that the produced electricity would be purchased for a period of not less than 15 years. One caveat for this method is that the current prices of electricity and the preferential rates granted to investors might become identical over time (studies predict that in 2016 the current and preferential prices for electricity will be the same). The question is "who will finance the difference between the preferential and current prices". Typically, countries (including Israel) finance the system of Feed-in Tariff through a number of mechanisms- the most prominent is getting the consumers of electricity from traditional sources to pay for some of the costs. It is estimated that Israel collects about 12 million shekels a month from Palestinian consumers to finance renewable energy activities in Israel. These funds could have been invested in the energy sector in the Palestinian territory. Mr. Hilow also pointed out that the Palestinian Cabinet recent decision on renewable energy does not address this issue.

Mr. Hilow made a cost-return analysis of the use of solar cells to generate electricity. He found that the cost of producing 5 MW is $16,000 per household and that the production of electricity in each house will be 8905 KW / h per year. At a preferential rate of 1.1 shekels per KW, the annual return of each house will be NIS 9795 (2612 dollars). Thus, the investment recovery period would be 6 years and two months in the case of self-financing, or 8 years and four months if investment was financed by banks with an annual interest rate of 4.5%. Accordingly, 5 MW of power could be produced through the use of solar cells to generate electricity on the roofs of 1000 homes without the need for support from the government or donor countries to cover the total cost of the project, provided that preferential rates for bills are funded from conventional energy (the annual required funding is estimated at about $ 1.5 million).

The project can start immediately and it can be expanded to engage 10,000 homes with a capacity of 50 MW instead of the 5 MW contained in "The Palestinian Solar Initiative" (PSI). The expected outputs of this project include achieving electricity self-sufficiency for about 16 thousand households; stocking about $ 16 million into the domestic economy; saving about $ 14 million a year as electricity imports; reducing emissions of 8,000 tons of carbon; selling the surplus to other countries; and creating 1600 job opportunities.

Presentation of Mr. Ali Hammouda

Mr. Hammouda first talked about the interest of Jerusalem District Electricity Company in diversifying sources of energy in the Palestinian Territory. Hammouda summarized the practical steps taken by the company to promote renewable energy applications. JDEC has set up a center for training and preparing cadres in solar energy technology. JDEC funds studies and Master theses on the uses of renewable energy. Hammouda said that the company is currently working to establish a smart grid: a process of embedding alternative energy (solar energy) into existing networks to improve system performance and reduce wastage. The smart grid is a quick way to get accurate information about the performance of the network and the potential failures and their sources. JDEC has conducted some pilot projects, such as the Jerusalem project, the remote villages project and the installation of fiber optic network that is meant to utilize energy and increase the production capacity of the company. Hammouda recalled the benefits that accrue to the company and citizens through improving the efficiency of the company in providing services and increasing the quality of services and coverage. Hammouda disclosed that JDEC is promptly endeavoring to shift from centralized generation and control of power to decentralization.

With respect to projects proposed for the generation of electricity through renewable energy and the efforts made to incorporate such alternative energy within the main network of electricity produced from conventional energy sources, research and experiments are still underway even in developed countries. Hammouda, however, warned of some caveats for the expected integration. Electrical energy produced from renewable energy sources should meet some technical specifications in order to avoid potential damage to grid in terms of performance, frequency, voltage and resistance. This concern also applies to the safety of consumers and technical crews.

There are also major concerns about the high costs of investment in solar energy technology and sources of funding in light of the current financial situation of the PNA. Further, guarantees should

be made to purchase the produced electricity for a long period of time. It is also important to provide a legal framework to regulate matters relating to the uses of renewable energy, as well as the availability of equipment needed in renewable energy applications.

Presentation of Dr. Omar Kittanah

Dr. Kittanah's presentation consisted of two parts: the first reviewed the theoretical framework, while the second discussed the renewable energy technical aspects in the Palestinian Territory. According to Kittanah, the main drive behind the search for alternative sources of energy is the environmental damage caused by the use of traditional energy sources. Kittanah believes that in Palestine other factors have made such search all the more important: the extraordinary conditions; the increasing demand for electricity; the absence of local sources to generate electricity; and the dependence on Israel for the power needs. Kittanah reviewed the Palestinian experience with solar energy, particularly the solar heaters.

Kittanah then outlined the steps taken by the Palestinian Authority regarding the renewable energy, including the general strategy for the energy sector for the years 2011-2013. The strategy urged competent authorities to focus on renewable energy. A month ago, the Palestinian Cabinet ratified "The Palestinian Solar Initiative" which, in turn, constituted a part of the decision of the Cabinet on the regulation of matters relating to the uses of renewable energy (solar - wind - biogas - biomass) and the Feed-in Tariff. Kittanah summarized the three key factors which must be taken into account when discussing renewable energy in Palestine: the high prices of electricity generated by traditional sources; the areas necessary for the implementation of renewable energy projects; and the regulatory legal framework.

Kittanah argued that the Palestinian Initiative aims at producing 130 megawatts of electricity through renewable energy sources (half of which from the solar energy) by the year 2020. This energy will represent about 25% of local needs at the time. Kittanah re-emphasized the importance of the areas required in the implementation of solar energy projects since the area needed in each house is about 50 square meters. Besides, many Palestinian homes are not fit for the implementation of such projects. He concluded his presentation by stressing the need to raise the public's awareness about the importance of renewable energy and encourage the local and foreign private sectors to invest in this industry.

Summary of the Discussion

Dr. Riad Hodali (an expert in renewable energy and Director of the Palestinian Association for Solar Energy) made a number of notes on the PNA policy towards renewable energy, the decision of the Palestinian Council of Ministers and "The Palestinian Solar Initiative". Hodali questioned the feasibility of copying the experience of other countries in the production of electricity from conventional sources and then turning to renewable energy, noting that the year 2016 will witness a worldwide major shift toward renewable energy. He also spotted some scientific and technical errors in the decision of the Council of Ministers on renewable energy. Hodali demanded rescinding of the decision and instead drafting a law based on accuracy and professionalism.

Dr. Yousef Dawoud, a lecturer at Birzeit University, reviewed the obstacles hindering the implementation of individual projects to generate electricity from solar cells. He listed some technical problems relating to the lack of electricity meters that measure electricity produced from solar-powered homes. Dawoud believes that renewable energy to generate electricity is especially needed in the Palestinian Territory given the high costs of electricity imported from Israel.

Dr. Iskandar Najjar, Dean of the Faculty of Economics at Al-Quds University, talked about the importance of encouraging the private sector to engage in renewable energy projects. Najjar recommended asking donors (particularly the Islamic Development Bank) to finance renewable energy projects in Palestine. He cast doubts on the obstacles associated with the Paris Economic Agreement: whether the agreement impedes the implementation of these projects in the Palestinian Territory, particularly in area 'C'.

Muayad Hamad, Director of Yafa for Renewable Energy, spoke of the existence of initiatives by the Palestinian private sector to set up projects for the production of electricity from renewable energy sources, including individual and small and medium enterprises without the need for external funding. He emphasized that the use of solar cells to generate electricity should be accessible to the rich and the poor alike. Integrity and transparency in the implementation of renewable energy projects should be integral elements of the industry, Hamad reiterated.

Key Recommendations

- ✧ It is important to expedite the process of drafting legislations regulating renewable energy in Palestine. However, this process should not be at the expense of the quality of legislation and its adequacy in the development of the renewable energy sector. In this connection, Palestine can benefit from the experiences of other countries, both legally and practically.
- ✧ The Energy Authority, in coordination with electricity distribution companies, should make sure all technical requirements are in place to expand the use of renewable energy. These requirements include rehabilitation of technical personnel, the provision of electricity meters, and conducting the required studies.
- ✧ The Palestinian Authority should commit itself to the goals set out in the general strategy of energy, diversify the existing sources of power and address the impediments to achieving these goals, especially the constraints related to the PNA performance.
- ✧ Energizing the role of energy research centers and maximizing their funding, and thus enabling them to carry out the needed research.

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Name	Organiozation
Mohammed Al Hilou	Palestine Society for Solar Energy
Riyad Hodali	Palestine Society for Solar Energy
Abdullah Azzam	PCBS
Jihad Qabha	Palestinian Standards Institution
Wijdan Al Sharif	Exalt
Haytham Rabay'a	PARC
Haneen Jabareen	Palestine TV
Abdullah Milhem	Media Company
Ala' Hantash	Environmental Information Center
Ismail Al Amsi	Ministry of Foreign Affairs
Yousef Daoud	Birzeit University
Tarek Ma'ay'a	Exalt
Jamal Abu Ghosh	Energy Authority
Hassan Abu Libdeh	
Fathi Srouji	Birzeit University
Bashar Jum'a	Negotiation Affairs Committee
Mu'ayyad Hamad	AYAVA
Samar Al Nather	Birzeit University
Ali Hammoudeh	JDECO
Muhammed Husseini	Portland Trust
Hani Dajani	Portland trust
Waleed Zahran	ENEX Company
Abdallah Abu Kishek	United Global Energy Services Company
Thafer Milhem	Palestinian Electricity Regulatory Council
Mansour Mansour	PalSolar Company
Omar Kittaneh	Palestine Power Authority
Khaled Al kutob	IFC
Youssef Habash	IFC
Mohammed Karake'	AREEJ Institution
Adnan Abul Hummos	PEDICO
Ziad Fadel	Ministry of National Economy
Ruba Dahdal	National Spatial Plan
Obeida Salah	National Spatial Plan
Nael Saadeh	ROYAL Group
Bashar Al Shawwa	Popular Campaign against High Prices
Majd Al Madani	Popular Campaign against High Prices