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1. Introduction

Jordan is Located in the heart of the Middle East. It is a middle-income county shaped by its geography, history, geopolitics and scarcity of natural resources. Jordan is located about 80 km to the East of the Mediterranean Sea with a predominantly Mediterranean climate; hot and dry summers and wet and cool winters. Jordan is also characterized by a unique topographic nature, where the western part represents the world lowest valley that lies north south between two mountain ranges.

The demographic characteristics of the Jordanian population show that the Jordanian development processes are facing challenges in providing the basic needs, given that it is a developing country. One of the main demographic determinants is migration. Migration movements from, to and through Jordan have been continuously playing a key role in shaping its demographic strata, economic and political structures. In both 1948 and 1967 Jordan received a great influx of Palestinian refugees resultant from the wars with Israel that lead to the creation of Israel in historic Palestine.

In 1991 and 2003, Jordan received about a million refugees from Kuwait and Iraq during the two Gulf wars; In 2011-2014, millions of Syrian refugees escaped from the turmoil of wars in their homeland to Jordan and other neighboring countries. In March 2014, the Government of Jordan drafted the National Resilience Plan (NRP) in cooperation with the United Nations Country Team (UNCT), other donors and NGOs in order to address the accumulating fiscal burdens as a result of the Syrian crisis that had its heavy toll on the Kingdom.

This plan includes a request to extend $4.295 billion to Jordan to support the implementation of priority projects in education, health, energy, municipalities, water, housing and security sectors.

Jordan has the following three distinct ecological systems:

(i) The Jordan Valley which forms a narrow strip, located below the mean sea level, has warm winters and hot summers and completely reliant on irrigation;
(ii) The western highlands where rainfall is relatively high and climate is typical of Mediterranean areas; and
(iii) The arid and semiarid inland to the east (estimated to cover over 80% of the total area), known as the “Badia”, where the annual rainfall is below 50 mm[1].

Jordan is among the poorest countries in the world on the basis of per capita water availability, with only 147 cubic meters per person per year in 2010. Renewable water resources are less than 130 cubic meters per person per year. The current total use is exceeding the renewable supply. The difference (the water used that is not renewable) comes from nonrenewable and fossil groundwater extraction and the reuse of reclaimed water. If supply remains constant, per capita domestic consumption is projected to fall to 90 cubic meters per person/year by 2025.

Moreover, Jordan is a country with limited indigenous energy resources; leaving Jordan heavily depending on its imports of energy to meet growing demand; this is expected to double to a forecasted 15.08Mtoe (million tons of oil equivalent) by 2020 from 7.58 Mtoe in 2007.

[1] TNC Report, 2014

2. Jordan and Climate Change

Jordan's anthropogenic (human-induced) emissions by sources and removals by sinks of all uncontrolled greenhouse gases (GHGs) have been estimated for the base year 2006 as per the Montreal Protocol, using the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories. The GHG emissions and removals from the following sectors were estimated: energy, industrial processes, agriculture, land use, land-use change and forestry (LULUCF), waste and solvents. The direct GHGs whose emissions have been estimated in this national inventory are carbon dioxide (CO2), methane (CH_4), nitrous oxide (N_2O), sulphur hexafluoride (SF_6), Perfluorocarbons (PFCs) and Hydrofluorocarbons (HFCs). Emissions of the following indirect GHGs have also been estimated and reported in this inventory: oxides of nitrogen (NO_x), carbon monoxide (CO), non-methane volatile organic compounds (NMVOC); and Sulphur dioxide (SO_2).

In the year 2006, Jordan contributed about 28,717gigagrams (Gg) or 28.72 million tons (MT) of CO_2 equivalent (CO_2 eq.) of GHGs to the atmosphere. Table (2.1)) summarizes Jordan's direct and indirect GHGs emissions with proper notations as required by decision 17/CP.8.

Sectoral breakdown of GHGs total emissions are shown in Table 1 below.

Table 1: Sectoral breakdown of Total GHG emissions in 2006

Sector	Emissions Gg In CO_2 Equiv.	Percentage
Energy	20,938	72.9%;
Industrial processes	2,550	8.9%;
Agriculture	1,318	4.6%;
Waste	3,045	10.6%
LULUCF	866	3.0 %

In the energy sector, the contribution of the subsectors to national GHG inventory is shown in Table 2.

Table 2: Breakdown of GHG emissions from various sub-sectors

Sub-sector	Emissions	Percentage
Energy industries	7,916 Gg CO_2 eq	27.6%
Transport	4,706 Gg CO_2 eq	16.4%
Other sectors (Commercial, residential and agricultural)	2,883 Gg CO_2 eq.	10%
Manufacturing industries	2,675 Gg CO_2 eq	9.3%
Others	2,715 Gg CO_2 eq	9.5%

A breakdown of Jordan's total emissions on a GHG basis is as follows:

- Carbon dioxide (about 24,003Gg CO_2), 83.58%;
- Methane about (3,087 Gg CO_2 eq.), 10.75 %; and
- Nitrous oxide (about 1,627Gg CO_2 eq.), 5.67 %.[2]

3. Objectives and scope

The aim of this report is to provide an overview of current evolving policies and regulations on energy sector in Jordan with a particular focus on the integration of renewable energy and energy efficiency applications.

4. General Overview of the Energy Sector

[2] TNC Report, 2014

Jordan has limited energy resources and depends heavily on imported crude oil for its energy use. The national goals of the energy sector in Jordan depict performing adequate energy provision for intensive development with the least possible cost and best outcomes.

Recent developments, such as extreme volatility in oil prices, security of energy supply and demand, amidn fears of diminishing future energy supplies continue to remain at the top of our political agenda.

The GoJ is seeking to address challenges in the energy sector through a combination of medium to long-term solutions. Additionally, the GoJ is seeking to improve its energy security and lower its exposure to external shocks in terms of supply. It is working on implementing measures in line with over-arching goals to improve the fiscal and macro-economic status, leading to sound and sustainable growth for Jordan.

Crude oil and oil products imports have decreased from 7130 thousand tons of oil equivalent (toe) in 2012 to 5705 thousand toe in 2016 registering a decrease of around 20%. Figure 1 below shows the quantity of crude oil and oil products imports during 2012-2016.

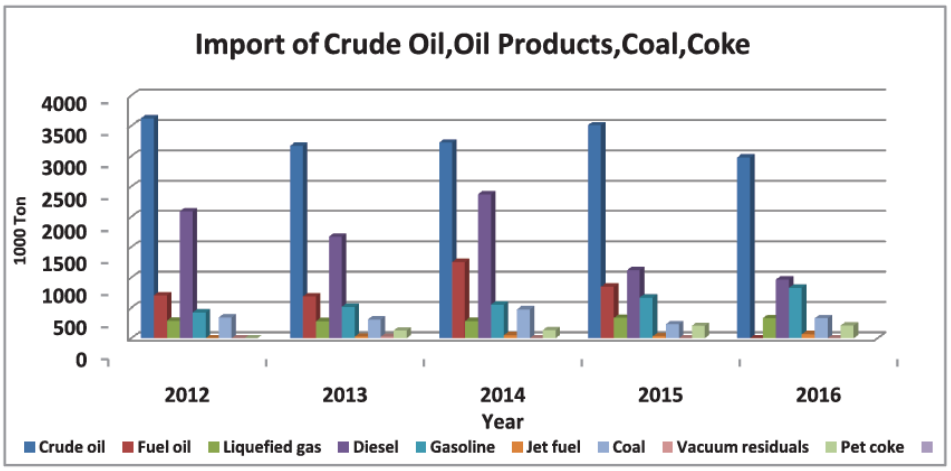


Figure 1: Quantity of crude oil and oil products imports during 2012-2016. (*Source:MEMR Annual Report 2016*)

Table 3 below shows the total primary energy consumption during 2012-2016 (in thousand toe).

Table 3: Total primary energy consumption during 2012-2016 (in thousand toe), (*source:MEMR Annual Report 2016*)

Year	Type of primary energy						Total
	Crude Oil and Oil Products	Coal	Pet Coke	Natural Gas	Renewable Energy	Imported Electricity	
2012	6992	226	-	659	140	188	8205
2013	6689	204	116	907	145	96	8157
2014	7479	332	88	301	152	109	8461
2015	6331	161	165	1944	160	183	8944
2016	5327	220	182	3389	412	84	9614

As for the final energy consumption and distribution, all economic sectors have consumed 5383 thousand toe in 2012 and 6416 thousand toe in 2016, registering a decrease of around 19%. Table 4 shows the sectorial distribution of Final Energy Consumption during 2012-2016 (thousand toe).

Table 4: Sectorial distribution of the final energy consumption during 2012-2016 (thousand toe), (*source:MEMR Annual Report 2016*)

Year	Sector				Total
	Transport	Industry	Household	*Others	
2012	2521	921	1198	743	5383
2013	2734	924	1109	617	5384
2014	2558	1079	1152	718	5507
2015	2811	991	1272	754	5828
2016	3184	1064	1342	826	6416

*Includes commercial and agricultural sectors along with street lights.

5. Energy Policy and Legal Framework

5.1. General overview and main challenges

Jordan is heavily dependent on foreign energy sources with over 96% of its needs being met by imports of oil products, natural gas and electricity; this brings about an annual cost of imports of over 4 Billion JoD. The second gulf war created a shock in the energy sector in Jordan and revealed the oil supply vulnerability of the country. This has increased the need for more serious efforts to

diversify energy supplies and develop domestic energy resources to reduce dependency on foreign energy resources and attain supply security.

The energy sector in Jordan is facing the following main challenges:

- Almost no indigenous energy resources,
- High dependency on imported energy (97% imports in 2015),
- Volatile oil prices (The energy cost amounted in 2014 to 4.48 billion dinars which represented 17.6% of GDP at current prices and has decreased to 2.5 billion JD in 2015 representing almost 10% of GDP),
- Continued increase in demand (High growth of primary energy demand of 5.5% and electricity generated capacity of 5.3% per annum),
- High energy intensity of 207oil kg equivalent/1000US$ in 2015.

5.2. Key Actions and Strategies

Securing energy supply and diversifying energy sources is one of the main goals of the GoJ's Executive Development Program (EDP) for 2016-18. Through its reviewed Energy Strategy (2015-2025), Jordan is adamantly seeking to diversify its energy supply and considering the development of short-term projects. Additionally, the GoJ is working on the security and reliability of its supply chain to avoid future situations of energy shortage. Several on-going initiatives in that respect are highlighted as follows:

a. Discussions with neighboring countries to secure reliable supplies;
b. On-going discussions with the Egyptian authorities to secure the supply of contracted quantities of natural gas from Egypt;
c. The Iraq-Jordan liquefied natural gas (LNG) terminal in Aqaba which was inaugurated on 30 July 2015 to import LNG through three main tracks i) importing LNG from international markets through tendering or bilateral agreements, ii) constructing LNG jetty and connecting with the main Arab Gas Pipeline iii) leasing FSRU through requests for proposals (RfPs) from FSRU providers.
d. Electricity production capacities (IPP1: 370MW; IPP2: 373MW; IPP3: 573MW; and IPP4: 240MW for peaking units) developed and financed by the private sector;
e. Increase the country's strategic oil and oil products storage capacity to secure a 60-days strategic storage for petroleum products and development of infrastructure projects:
    - Oil terminal rehabilitation project
    - LPG jetty
    - Aqaba oil terminal (100 thousand tons storage)
    - Aqaba LPG terminal (6 thousand tons storage)
    - Amman Strategic Reserve Terminal (250-300 thousand tons of light oil products and 10 thousand tons of LPG)

f. Liberalization of the downstream oil sector: the GoJ granted licenses to three initial oil marketing companies (OMCs) for trading and importing white products.
g. Exploitation of national energy resources: there are medium- to long-term prospects for oil shale and additional extraction of natural gas from Risha field;
h. Renewable energy programs: 200 MW will be contracted (signed Power Purchase Agreement 'PPA' and Implementation Agreement 'IA') in 2013 following a direct proposals process that was carried out in 2011 and 2012.

Considering the existing technical potential for solar and wind energy in the country, the Energy Strategy calls for 10 per cent of the Kingdom's energy mix to come from renewable energy sources by 2020. To achieve this, GoJ is following an evolving multi-faceted action plan with partners from public and private sectors to significantly increase electricity generation from renewable sources, substitute conventional fuels for renewable energy across sectors and increase energy efficiency to reduce overall demand for energy without compromising economic growth.

5.3. Renewable Energy Policy

The Jordanian government's policies focused on planning, supervision and regulation of the sector, and enhancing its capacity and volume of investment. Jordan has already signed Agreements covering more than 1000 MW of renewable energy projects (both wind and solar), out of which around 135 MW have been connected to the grid and under commercial operation; another 900 MW are currently under construction & financial closure to be connected to the grid in 2016 – 2018.

The 2007-2015 strategy aims at promoting the development of renewable energy and energy efficiency. The strategy has adopted an ambitious renewable energy target to capitalize on local resources and has targeted a contribution rate of 10% by 2020 of the country's energy needs.

As a consequence, the target installed RE capacity by 2020 at 1850 MW from which 1200 MW came from wind, 600 MW from solar PV and 50 MW from waste. The 2007-2020 strategy has aimed to reach a share of 30% of households equipped with solar water heaters by 2020. The government has underlined its commitment to reach the ambitious targets set in the Energy Strategy and has issued the Renewable Energy and Energy Efficiency Law on the 17th April 2012. With this law, for the first time in Jordan, unsolicited or direct proposal submission is allowed, where investors have the opportunity to identify and develop renewable grid-connected electricity production projects such as wind parks, solar systems or others on their own and propose these to the Ministry of Energy and Mineral Resources. As a result of this process, 580 MW renewable energy projects were planned up to 2015 as follows: 200 MW direct proposals, 70 MW PV solar projects and 70 MW wind projects that will be constructed on EPC basis. This lead to the consideration of these RE projects within the baseline scenario of Jordan's Third National Communication report on Climate Change:

- Wind power project in Tafila with a capacity of (117 MW).
- Wind power project in Fujeij with a capacity of (90MW).
- Wind power project Maan with a capacity of (70 MW) (Gulf Grant).

- PV solar project in Quweirah with a capacity of (70 MW) (Gulf Grant).
- PV solar project with a capacity of (10 MW) in Mafraq.
- Direct proposal solar PV projects to generate solar electricity (200 MW)
- PV solar project with a capacity of (5 MW) (Spanish Grant).
- Wind energy projects from direct proposals to generate electricity (100 MW).

The Renewable Energy and Energy Efficiency Law (REEEL) was approved and released in mid-2012 (Law No. 13 for year 2012). The main objectives of the REEL include:

a) Increasing the contribution of RE to the total energy mix in Jordan;
b) Promoting and exploiting RE for environmental protection and sustainable development purposes; and
c) Enhancing energy efficiency in all sectors of the economy. According to Article 10 of REEEL, rules and regulations were issued to guide the implementation of REEEL by the Ministry of Energy and Mineral Resources and the Electricity Regulatory Commission, which was later substituted by the Energy and Minerals Regulatory Commission in 2014 [27-28].

According REEEL's approved directives and regulations, Jordan will follow a five-track approach to develop and connect the RE system to transmission or distribution electric grids in the country (see Annex B). These are:

- Direct proposals (DP)
- Competitive bidding system (CBS)
- EPC turn-key (through grants)
- Small scale re scheme (net metering)
- Power energy wheeling

Jordan has laid down the necessary foundations and preparedness that will assist it in achieving policy targets and attract commercial investments in this field, in addition to the following regulatory and policy frameworks and commercial tools for renewable energy.

a. The Renewable Energy and Energy Efficiency Law (Law No. 13): this law, the first in the region, allows investors to identify and develop grid-connected electricity production projects through unsolicited or direct proposal submission.

b. Jordan Renewable Energy and Energy Efficiency Fund (JREEEF): The law sets up the JREEEF that is financed by national and international institutions. The fund has a legal nature and is financially and administratively independent. Both national and foreign private companies are allowed to apply for this fund when setting up renewable energy generation projects.

The Fund provides renewable energy subsidies to privately operate and own facilities, interest rate subsidies on commercial loans, a Public Equity Fund to support the deployment of private investment in the sector, a renewable energy guarantee facility to

ease credit access for energy efficiency and renewable energy project developers, researchers, technical cooperation grants and feasibility studies.

The Board of Directors (BoD) of the Fund oversees the activities of the Fund, under the chairmanship of the Minister of Energy and Mineral Resources, and memberships of secretary-generals of the Ministries of Environment; Planning and International Cooperation and Finance plus three other representatives from the private sector.

c. Reference Pricelist Record: this is used to calculate the electricity purchase prices from renewable energy sources. According to the Record, the ceiling tariff for the sale of electric energy generated by renewable energy facilities is set at: 0.12, 0.19, 0.17, 0.13 and 0.08 USD/kWh for wind, solar thermal, PV, biomass and biogas-based electricity, respectively. These prices will be applicable to winning bidders of direct proposals for RE projects; should they install a fully Jordanian-originated facility, then the tariff can be increased by 15%.

d. Net-metering for small RE systems (roof tops) with fixed purchase prices for excess power: this allows consumers to install, use and connect to the grid RE systems (solar, wind, bio-energy, geothermal, small hydro) if their expected generation does not exceed their average monthly consumption of the previous year (estimated by the distribution company in case of new users).

The net value of electricity consumption (or generation) is calculated monthly. In case of net consumption, the user pays the value of electricity to the distributor; and in case of net generation, the distributor can carry over the surplus to the next month as long as the balance is cleared by the end of the year according to the tariffs set by law (0.17, 0.13 and 0.12 USD/kWh for solar, hybrid and other forms of renewable energy, respectively). If RE systems are of Jordanian origin, then the tariff can be increased by 15%; however this increase will be withdrawn once the total grid-connected installed RE capacity reaches 500 MW. The directive also states that the maximum total RE capacity in a geographical location cannot exceed 5 MW and (per distributor) the capacity of connected RE systems may not exceed 1% of the maximum recorded load on the low voltage network and 1.5% on the medium voltage network.

e. Tax Incentive regime: a bylaw was issued on tax exemptions for RE and EE systems and equipment. Article 11 states that “All systems and equipment of renewable energy sources and energy efficiency and its production inputs whether manufactured locally and/ or imported, will be exempted from all customs duties and sales tax.”

The bylaw on exempting renewable energy and systems and energy saving equipment from custom fees and sales tax (Bylaw No. 13 for 2015), was issued by virtue of Article (11/B) of REEEL. In this bylaw, it is clearly outlined that all RE and EE systems, equipment and devices, imported and locally manufactured (inclusive inputs for local production) are exempted from all custom fees and duties as well as sales tax). Hence, the bylaw established a special committee at MEMR to insect applications related to tax exemptions. Finally, the bylaw “Jordan Renewable Energy and Energy Efficiency

Fund" No. 49 for 2015, was issued; it enabled MEMR to initiate supportive activities to RE and EE projects.

5.4. Energy efficiency policy

The energy efficiency of the overall economy of Jordan can be assessed through the evolution of its primary and final energy intensities. The primary energy intensity has decreased from 0.942 toe/1000 JD in 2005 to 0.728 toe/1000 JD in 2011, i.e. a reduction of around -4.2%. The final energy intensity has decreased with a higher rate of - 4.9% in the same period. However, since 2011, both intensities have slightly increased with annual rates of 1.8% and 2.3%, respectively. This reflects some kind of degradation of the energy performance of the economy. During the overall period of 2005-2015, the primary and final energy intensities have decreased by annual rates of -1.8% and -2.1% respectively.

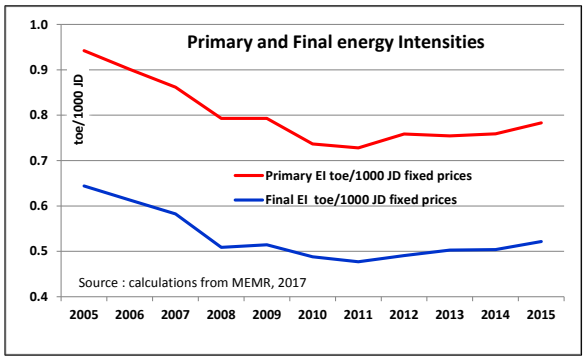


Figure 2: Primary and final energy intensities

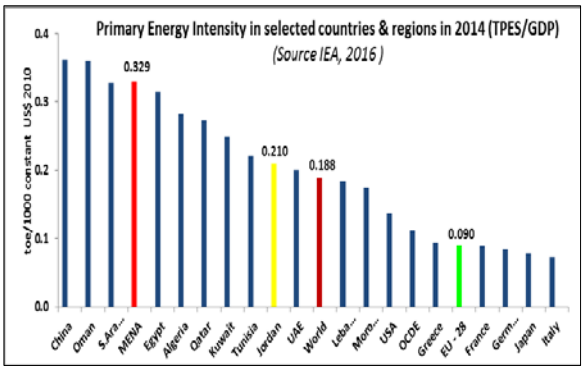


Figure 3: Primary energy intensity of selected countries

Compared to other countries, the primary energy intensity of Jordan can be considered high. It is around 0.21 toe/1000 US$ for 2010, i.e. 1.2 times the world intensity and 4 times the average EU intensity.

The situation is worse when we consider the electricity demand which has increased much higher than the GDP. The electricity intensity has moved from 1168 kWh/1000 JD in 2004 to 1416 kWh/1000 JD in 2015, partly due to the switch from fuel to electricity in space and water heating.

The situation is quite different for the electricity generation which has shown an important improvement of the performance, mainly due to the introduction of gas fired power plants with higher efficiency. The specific consumption of the electricity generation has in fact dropped from 251 toe/GWh in 2004 to 211 toe/GWh in 2014, showing an improvement of around 2.5% per year.

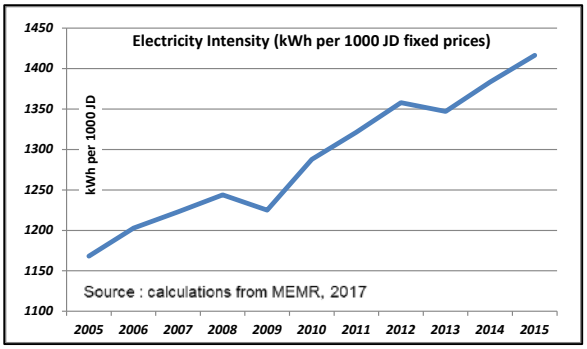


Figure 4: Electricity intensity

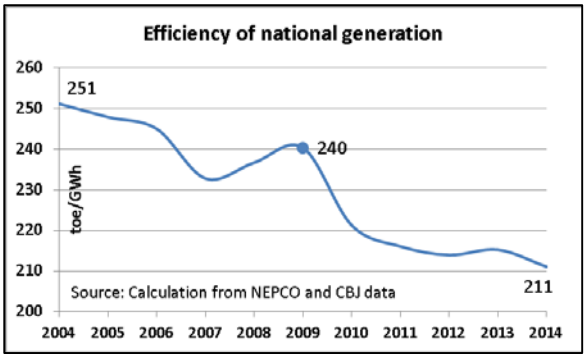


Figure 5: Specific consumption of electricity generation

The GoJ has issued the energy efficiency strategy in 2004 that specifies prudent use of energy as a national priority and most important element of the sustainable development policy. This strategy states three principal goals: energy saving, renewable energy promotion and creation of new forms of energy that favors cost reduction on the level of national economy, over and above environmental protection.

The Energy Strategy 2007-2020 is targeting a 20% improvement in energy efficiency by 2020. In its turn, MEMR has developed the first National Energy Efficiency Action Plan, 2013. This plan included the following recommendations:

- Promotion of solar water heaters (SWH) in different sectors,
- Upgrading and updating the Solar Energy Code,
- Building the capacities of engineers and technicians in the fields of solar and wind technologies.

In 2011, following the adoption of the Arab EE Guideline by the Arab Ministerial Council for Electricity (AMCE) in 2010, Jordan embarked on setting its 2020 target as part of developing its first NEEAP for 2012 - 2014. The baseline represented 5 years (2006-2010) in terms of average electricity consumption prior to the adoption of the Arab EE Guideline 2010. Therefore, the 2020 target remained the same, at 20% of the (2006-2010) baseline consumption, i.e. 11291 GWh resulting in 2258 GWh of cumulative electricity savings by 2020.

According to the Renewable Energy & Energy Efficiency Law, Article (18), the MEMR issued the energy efficiency Bylaw No. (73) for 2012 on “Regulating Procedures and Means of Conserving Energy and Improving its Efficiency”. The main objectives of this bylaw are:

a. Setting the general policy of energy conservation, improving its efficiency, submitting it to the Cabinet for endorsement and enacting the plans and programs deemed necessary for implementation.

b. Encouraging investments in areas of energy conservation and improving efficiency.
c. Monitoring energy audit procedures, implementation of systems and activities related to conservation of energy and improving efficiency of its use.
d. Submitting to the Cabinet dates of summer and winter daylight saving times.
e. Taking the necessary measures for implementing emergency plans that reduce energy consumption.
f. Spreading national awareness on conservation of energy and improving its utilization efficiency.
g. Disseminate information and raise awareness on energy-consuming projects.
h. Establish a database related to conservation of energy and improvement of its efficiency.

According to this bylaw, it is compulsory to use SWH systems void of permits to connect to services unless a SWH system has been installed, as of 1/4/2013, as follows:

- Building(s) with an area of 250 M^2 or more
- Apartment(s) with an area of 150 M^2 or more
- Office(s) with an area of 100 M^2 or more in commercial buildings

6. Renewable Energy Potential and Applications

Undoubtedly, Jordan has great resources for renewable energy, particularly solar and wind energy. Jordan is located within the sunbelt where the intensity of direct solar radiation is 5-7 kWh/m² and wind speed in specific areas ranges between 7-9 m/s; the data is promising and supports generation of electricity in Jordan.

Based on the above-mentioned figures, the overall comprehensive strategy for the energy sector aims to diversify energy sources, reduce reliance on energy importation and contribute with 10% to the overall energy mix, by 2020.

The most prominent achievements in 2016 were:

6.1. Solar Energy

I. Twelve direct photovoltaic projects offers and commercial operations to generate electricity with a total capacity of 200 MW.
II. Commercial operation of the Philadelphia Solar Power Company IPP PV direct project proposals (Round I) has been achieved in 22/10/2015 with a capacity of 10 MW in Mafraq.
III. Complete PV Solar Power plant that generates electricity with a capacity of 5 MW in Azraq. The project is financed by a Spanish-Jordanian Debt Swap agreement with the Spanish Government on an EPC contract basis that started operation in April 2015.

IV. Thirty-four photovoltaic tenders were submitted in Round II, as direct proposals to develop 4 PV projects with a total capacity of 200 MW (50 MW each) in the developmental zones of Mafraq and Safawi/Azraq. The Ministry signed 4 MOUs achieving financial closures and expecting operations in 2017-2018. The agreed-upon rates declined to unprecedented low levels (ranging 43-55 fils/kWh).

V. Signing a contract and implementing a photovoltaic project on 20/12/2015 with a capacity of 103 MW in Qweirah/Aqaba with the awarded consortium TSK/ Enviromena, under an engineering, procurement and construction contract (EPC), funded by the UAE/ Abu Dhabi Fund for Development and expected that operated in 2017.

VI. Under the German Government Grants, the German Development Bank (KfW) financed a solar plant that produces electricity for the Za'tri camp and refugees host communities at a value of 15 million euros. The solar project tender has been awarded to Belectric Gulf Ltd on 1/3/2016 under an engineering, procurement and construction contract (EPC) with a capacity of 8-10 MW in Za'tri camp. The contract was signed on 8/9/2016. The company implemented the project through 2017.

VII. Masdar, a clean energy developer based in Abu Dhabi, UAE, signed a power purchasing agreement on 22/10/2016 to build a solar power plant with a capacity of 200 MW in Muwaqqar. The project is currently achieving financial closure and due for completion by 2018.

6.2. Wind Energy

I. The private sector represented by the Jordan Wind Project Company JWPC has started the commercial operation of Tafila wind farm, the first large-scale renewable energy IPP on 16/9/2015 with 117 MW of capacity on an EPC contract basis.

II. The first phase of this wind project generated electricity that fed into the grid with a capacity of 66 MW on an EPC contract basis in Ma'an on 22/9/2016. The project is funded by the Kuwait Fund for Arab Economic Development and the work has progressed in its second expansion phase to 14 MW of 44 capacity expected by mid-2017.

III. Wind projects direct proposals Round I, with a total capacity of 330 MW in southern Jordan. Purchase power agreements were signed with all five companies. All projects are currently achieving financial closures and expecting to operate in 2017- 2018.

IV. The Korean KEPCO direct offer in Al-Fjej / Shoubak, with a capacity of 90 MW. The purchase power agreement was signed on 13/12/2015 with expected operations by end of 2018.

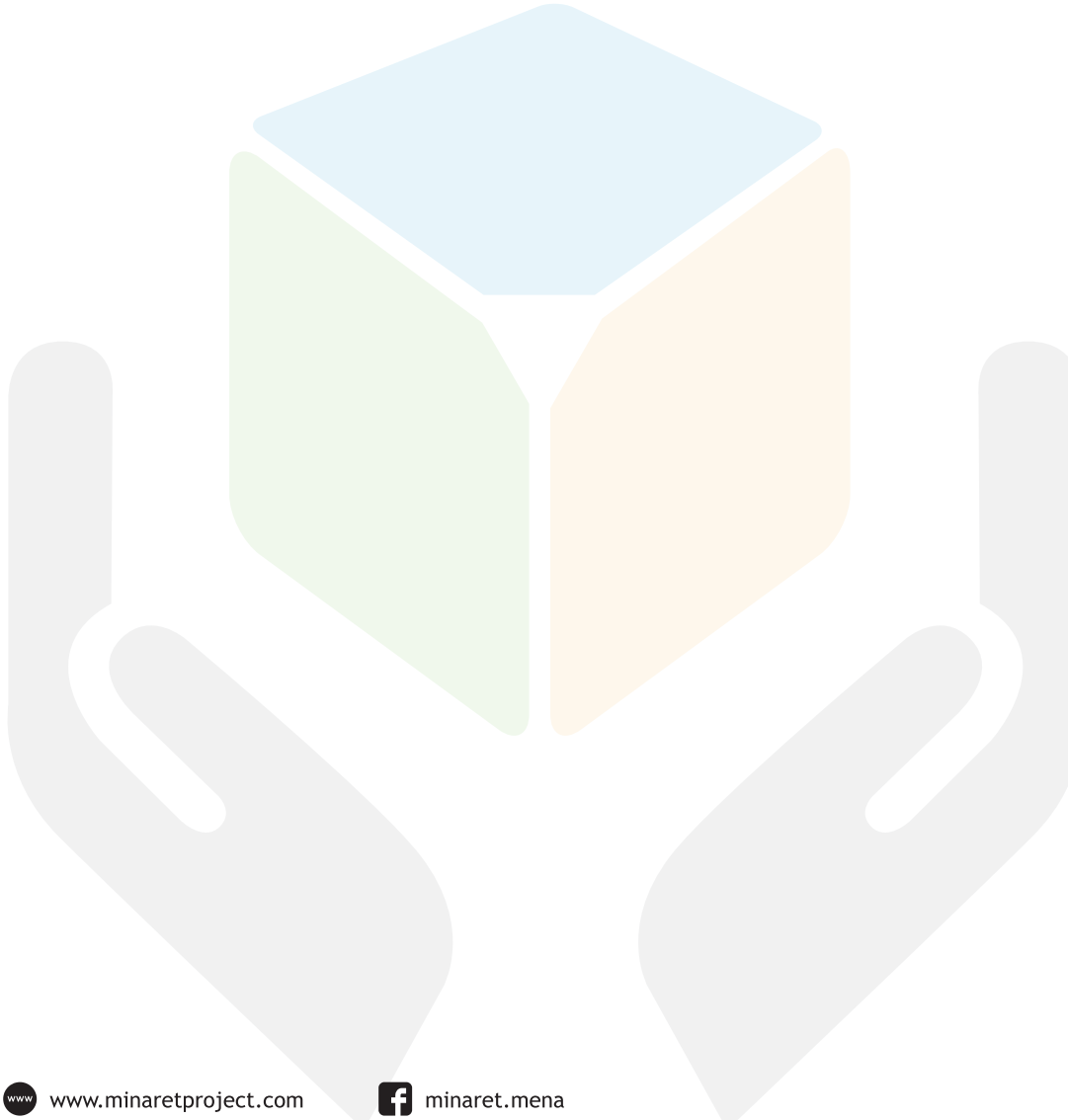
6.3. Round III- Direct Proposals

I. The Ministry of Energy and Mineral Resources MEMR announced an expression of interest on 13/12/2016 from qualified developers with in-depth experience in IPP/BOO schemes interested in investing in renewable energy projects for power generation on build, own and operate (BOO) basis. MEMR aimed to develop 200 MW of four solar PV projects with a project size of 50 MW each, and 100 MW of two wind projects with a project size of 50 MW each. All requests for submission of expression of interest were submitted by 15/12/2017.

II. Small-Scale Renewable Energy Schemes. The number of small-scale renewable energy schemes installations and connections to the grid for residentials, universities, commercial and industrial enterprises, government institutions, schools, mosques, churches, telecommunication companies, banks, CBOs, hospitals, farms, etc. reached a total of 80 MW and a total of 17 MW of solar systems using instructions on installations and regulations related to photo voltaic PV systems as per power purchase agreements of electricity generated from renewable energy (net metering and wheeling systems) respectively.

References

1. Annual Report 2016, Ministry of Energy and Mineral Resources www.memr.gov.jo
2. First National Energy Efficiency Action Plan
3. Second National Energy Efficiency Action Plan
4. Third National Communication Report (TNC)
5. Updated Energy Strategy, 2015
6. Jordan Vision 2025



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