Hashemite Kingdom of Jordan

Ministry of Energy and Mineral Resources

Annual Report
2014

His Majesty King Abdullah II Bin Al Hussein

H.R.H Crown Prince Hussein Bin Abdullah II

Contents

Vision

The achievement of secure and sustainable energy supply.

Mission

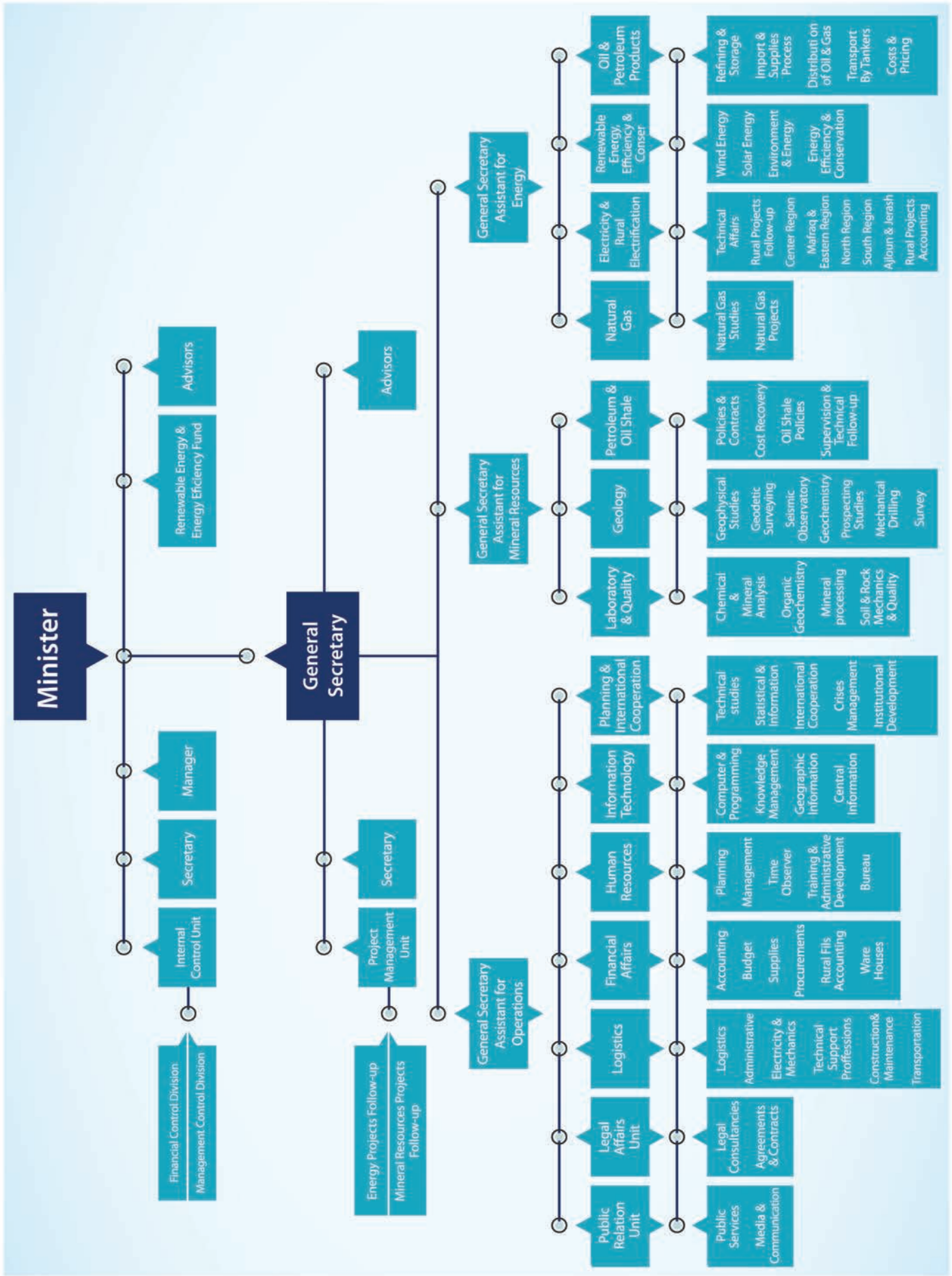
The provision of energy required for sustainable development with least costs and better qualities through enhancing and implementing proper policies, legislations and plans.

Core Values

- Teamwork Spirit.
- Knowledge Dissemination.
- Transparency and Objectivity
- Affiliation and Discipline
- Excellence
- Justice and Equity
- Innovation and Creativity
- Social Responsibility

Strategic Objectives

- Achieve a secure energy supply.
- Diversification of sources and types of energy.
- The development and utilization of conventional and renewable domestic energy sources, Oil Shale and Uranium.
- Transfer, localize and develop the technology of nuclear energy and improve its uses and sustainability.
- Increase energy efficiency in all sectors.
- Maximize the value added to utilize mineral ores.


Minister
Advisors
Renewable Energy & Energy Efficiency Fund
Manager
Secretary
Internal Control Unit
Financial Control Division
Management Control Division
General Secretary
Advisors
Secretary
Project Management Unit
Energy Projects Follow-up
Mineral Resources Projects Follow-up
General Secretary Assistant for Operations
General Secretary Assistant for Mineral Resources
General Secretary Assistant for Energy
Public Relation Unit
Legal Affairs Unit
Logistics
Financial Affairs
Human Resources
Information Technology
Planning & International Cooperation
Public Services
Media & Communication
Legal Consultancies
Agreements & Contracts
Logistics
Administrative
Electricity & Mechanics
Technical Support Proffessions
Construction& Maintenance
Transportation
Accounting
Budget
Supplies
Procurements
Rural Fils Accounting
Ware Houses
Planning
Management
Time Observer
Training & Administrative Development
Bureau
Computer & Programming
Knowledge Management
Geographic Information
Central Information
Technical studies
Statistical & Information
International Cooperation
Crises Management
Institutional Development
Laboratory & Quality
Chemical & Mineral Analysis
Organic Geochemistry
Mineral processing
Soil & Rock Mechanics & Quality
Geology
Geophysical Studies
Geodetic Surveying
Seismic Observatory
Geochemistry
Prospecting Studies
Mechanical Drilling
Survey
Petroleum & Oil Shale
Policies & Contracts
Cost Recovery
Oil Shale Policies
Supervision & Technical Follow-up
Natural Gas
Natural Gas Studies
Natural Gas Projects
Electricity & Rural Electrification
Technical Affairs
Rural Projects Follow-up
Center Region
Mafraq & Eastern Region
North Region
South Region
Ajloun & Jerash
Rural Projects Accounting
Renewable Energy, Efficiency & Conser
Wind Energy
Solar Energy
Environment & Energy
Energy Efficiency & Conservation
Oil & Petroleum Products
Refining & Storage
Import & Supplies Process
Distributi on of Oil & Gas
Transport By Tankers
Costs & Pricing

Terms and Abbreviations

Unit	Definition
b/day	Barrel/day
boe	Barrel oil equivalent
boe/day	Barrel oil equivalent /day
CF	Cubic Feet
GDP	Gross Domestic Product
GWh	Gigawatt–hour =10^9 Watt-hour
JD	Jordan Dinar (10^3 Fils)
kg	Kilograms
kgoe	Kilogram oil equivalent
km	Kilometer
kt	Thousand tons
kV	Kilovolt
kW	Kilowatt (10^3 Watt)
kWh	Kilowatt–hour
MVA	Mega Volt Ampere
MW	Megawatt
MWh	Megawatt–hour (10^6 Watt-hour)
toe	Ton oil equivalent

Significant Statistics of Economy in Jordan 2014

Item	Unit	Amount
Population	Million	6.650
Gross Domestic Product (GDP) at current prices	Million JD	25437
GDP per capita	JD	3825

* Source: Department of Statistics

Significant Statistics of Energy in Jordan 2014

Item	Unit	Amount
Energy Intensity	kgoe/US$1000 Fixed Price	207
Per capita energy consumption	kgoe	1272
Per capita electricity consumption	kWh	2318
Electricity generation	GWh	18207
Electricity consumption	GWh	15418
Population access to electricity	% of population	99.9
Domestic energy production (crude oil and natural gas)	1000 toe	97.5
Energy imports	1000 toe	8449
Primary energy consumption	1000 toe	8461
Cost of consumed energy	billion JD	4.48
The Cost of Consumed Energy		
Exports	%	86.8
Imports	%	27.7
Gross Domestic Product	%	17.6

Introduction

The Ministry of Energy and Mineral Resources aims to provide all forms of energy required for sustainable development through the enhancement and implementation of proper policies, legislations and programs; diversify sources and forms of imported energy; and to boost local and renewable sources of energy and efficiency in various sectors.
In this context, the Ministry of Energy and Mineral Resources and other sector's institutions were able to accomplish many achievements during 2014.

Crude Oil and Oil Products

A continuous approach towards securing the Kingdom's need of crude oil and oil products was duly achieved. All the storage capacities projects for crude oil, oil products and liquefied petroleum gas established in Aqaba are under implementation and it is anticipated to complete the projects in 2015. It is also anticipated to follow-up a project to build strategic storage capacities of oil products and liquefied petroleum gas in the middle of the Kingdom which is duly expected by the end of 2016. Moreover, the follow-up for developing an oil port which aims to increase handling capacities of crude oil and oil products project is expected to start the experimental operation of the project in March 2015.
As for exploitation of domestic energy sources of oil and gas, the Ministry of Energy and Mineral Resources attracted many international companies to explore for oil in Jordan. The Kingdom was divided into eleven exploratory areas. Number of international oil companies signed a production sharing agreements and memoranda of understanding for oil exploration and oil drilling and study the possibilities of oil in these areas.

Oil Shale

The Government has given several local and international companies the concession to invest in areas of oil shale by surface, In-situ retorting and direct burning in addition to signing memoranda of understanding with many other companies.

Natural Gas

An active and ongoing follow-up was made with the Egyptian authorities to ensure the permanence of supply of natural gas quantities to power electricity generating stations in the Kingdom following frequent interruptions in supply. In pursuit of new sources to natural gas needs after signing a contract of Floating Storage and Regasification Unit FSRU project with Golar LNG ltd. and signing an EPC contract to implement Liquefied Natural Gas LNG Port Project between The Aqaba Development Corporation ADC and BAM-MAG joint venture partnership. The project commenced on 21.1.2014 and it is expected to end in the first third of 2015. A memorandum of understanding and head of terms of an agreement to sale and purchase LNG were signed between the Ministry of Energy and Mineral Resources and Shell International Trading Middle East Ltd. on 18.5.2014. Gas Transportation Agreement and a Tie-In Agreement were signed with Jordanian Egyptian Fajr for Natural Gas Transmission and Supply Company on 6.3.2014. The National Electric Power Company NEPCO was assigned by Cabinet decision to manage, operate and maintain the LNG Port.

Electricity

The first stage of the Third Independent Power Plant IPP3 with a capacity of 240 MW was operated on 5.8.2014, the second stage with a capacity of 210 MW and the third stage with a capacity of 120 was operated on 23.10.2014 while the Fourth Independent Power Plant IPP4 achieved the commercial operation on 11.7.2014 with a capacity of 240 MW. As-Samra Electric Power Generating Company was assigned to transfer the seventh gas turbine to a combined cycle by adding a gas turbine with 70 MW of a capacity to improve the efficiency of the seventh gas unit and decrease fuel consumption.

Renewable Energy

A consortium of investors is expected to follow up twelve solar PV projects to generate electricity with 200 MW of capacity in total mostly in Ma'an and expected to be operated by end of 2015. Another tender of PV projects totaling 65–75 MW in Quweirah/Aqaba is expected to be operated by end of 2015.
Part of the second phase of direct offers, forty-five MOUs were signed with international companies to compete for the development of around 200 MW of solar energy projects (50 MW for each project) in northern, central and eastern of Kingdom. All direct offers shall be received on 20.01.2015.
Project construction works have already been commenced to generate electricity out of wind energy with 117 MW of capacity in Tafeelah which it is expected to run in the second half of the year 2015.
A tender of wind energy project has also been awarded to the Spanish company Elecnor with a capacity of 66 MW in Ma'an on 24.7.2014 and is expected to be operated in the first quarter of the year 2015.
With respect to small-scale renewable energy systems, a door was largely opened to consumers in all domestic, industrial, commercial sectors as well as government institutions, houses of worship , etc…to secure their needs of electricity using renewable energy and sell the excess power (if any) back to the grid.

Energy Efficiency and Energy Conservation

A tender project has been awarded to promote energy efficient solar heaters in many other different sectors. Additionally, the United States Agency for International Development USAID has funded the Energy Sector Capacity Building ESCB program to implement and promote energy efficiency for the period 2013-2014.

Geology and Mining

More recently, there has been extensive core drilling at four oil shale deposits in four regions which covered an area of 2700 km^2 in Ma'an to add new areas and increase the reserves of oil shale in the Kingdom.
Plenty of projects of mineral explorations were implemented and conducted to prospect, evaluate, determine the specifications, quantities, different industrial use and needs of local and external markets of various ores such as dolomite, phosphate and pure limestone, etc.
Currently, Jordan Seismological Observatory is in full swing to detect, monitor and record earthquakes. In 2014, JSO has recorded around 483 earthquakes activities, 10 of which were detected in Dead Sea sinkholes, 268 earthquakes were mostly detected in the eastern Mediterranean in addition to 205 remote earthquakes.
The annual report shall also cover many accomplishments and achievements that have been made to many other energy sectors such as nuclear energy, mining, and rural electrification, etc.

Development of Oil and Natural Gas Sectors

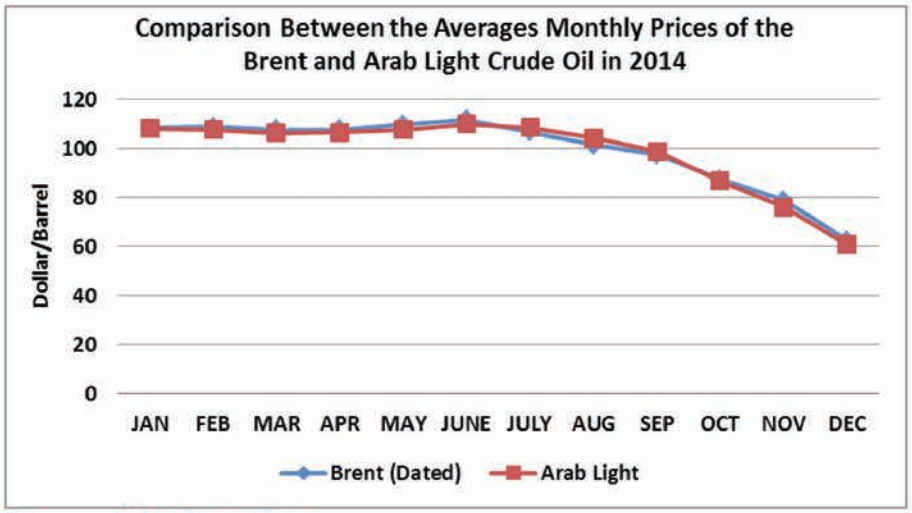
First Arab and International Levels

The average daily world production of crude oil in the year 2014 has reached around 89 million barrels showing a growth of 2.3% comparing to 2013. However, the world's proven reserves in 2014 scored around 1700 billion barrels.

With regard to the Arab counterpart daily production of crude oil for the same year has amounted to around 29 million barrels, a proportion of 33% of the global production.

The Arab's proven reserves of crude oil for 2014 has amounted to 714 billion barrels that represents 42% of global reserves.

Brent oil prices have fluctuated and reached the highest rates at 111.6 dollars/ barrel in June. It hit the lowest rate at around 62.5 dollars/barrel in December. The following chart shows comparison of monthly average prices on Brent crude oil and Arab light imported by Jordan in 2014.



* Source: Platte Bulletin

The world production of natural gas in 2014 amounted to approximately 3461 billion cubic meters with a growth estimated to 1.6% comparing with 2013 while the world's reserves stood at 187 trillion cubic meters.

On the Arab level, the Arab states' produced nearly 592 billion cubic meters of natural gas representing 17% of the world production. Yet, the Arab states' reserves of natural gas have reached nearly 55 trillion cubic meters representing 29% of the global reserves.

Second-The Local Level

The local production of energy (crude oil, natural gas and renewable energy) was around 265.8 thousand toe in 2014 representing 3% of Jordan's total energy needs. Due to the lack of energy sources, Jordan heavily depends on imports to fulfill its domestic energy needs. The imported quantities of crude oil and oil products in 2014 were amounted to approximately 7716 thousand toe, while total quantities of natural gas imported from Egypt reached 221 million cubic meters. The total cost of crude oil and oil products, natural gas and coal imported by Jordan has reached to JD 4406 million in 2014 with a 9% of an increase comparing with 2013.

The total demand for primary energy was estimated to 8461 thousand toe in 2014 with a rise of 3.7% while the total demand for final energy i.e., energy available to the consumer, has reached 5594 thousand toe with a rise of 3.5% comparing with 2013 demand levels. On the other hand, the demand for oil products was amounted to 3695 thousand toe.

Institutions of the Energy Sector in 2014

Given the importance of the overriding role played by energy in the socioeconomic aspects and the direct relationship to the political and economic issues; the Government has paid the sector a great attention to enhance the efficiency and effectiveness. In the light of the new institutional amendments, the current institutional framework of the energy sector comprises of the following structure:

1. The Ministry of Energy and Mineral Resources MEMR

The Ministry has adopted a comprehensive planning process for the sector in terms of regulation, policies and follow-up implementation to achieve the tasks entrusted. The most important of which is to provide the required energy by all forms needed for the purposes of comprehensive development at the lowest possible cost and better quality; beside attracting the required capital needed to invest in energy sector such as generating electricity, producing oil products, and utilizing domestic energy resources particularly the renewable ones. Not to mention supplying villages, populations and Jordanian rural communities with electricity through rural electrification. However, the Ministry spares no effort to support studies to improve energy efficiency in various sectors and ensure loan guarantee for renewable energy and energy efficiency projects through Jordan Renewable Energy and Energy Efficiency Fund JREEEF.

2. Energy and Minerals Regulatory Commission EMRC

Energy and Minerals Regulatory Commission is an autonomous corporate and the legal successor of the Electricity Regulatory Commission, the Nuclear and Radiation Regulatory Commission and the regulatory functions of the National Resources Authority with financial and administrative autonomy pursuing to the restructuring of Institutions and Government Departments law, no. 17/2014.

3. Electricity Institutions

Institutions responsible for generating, transmitting and distributing electricity all over the Kingdom as:

3.1 National Electric Power Company NEPCO

A public shareholding company owned by the government responsible for the construction, operation and maintenance of the transmission system in the Kingdom along with the electric transmission system which connects the system with other neighboring countries' systems. It also secures power supply through expansion of generating units either by the private sector and/or the public sector.

3.2 Central Electricity Generating Company CEGCO

A public shareholding company founded in 1999 generates electricity and sells electricity in wholesale to the National Electric Power Company. The generating capacity of the company has amounted to 1392 MW at the end of 2014.

3.3 Samra Electric Power Company SEPCO

A private shareholding company founded in 2004 and whose shares are fully owned by the government. The company is responsible to generate electricity and sell it to NEPCO. The generating capacity of the company reached around 1059 MW at the end of 2014.

3.4 AES-Jordan. PSC

Also known as Amman East Power Project, a private company owned by the American AES company and the Japanese MITSUI company founded in 2009. It generates and sells electricity to NEPCO. AES-Jordan. PSC owned the first private project to generate electricity in East Amman power plant/Al-Manakher which was inaugurated under the patronage of His Majesty King Abdulla II on 26th, Oct.2009. The generating capacity of the company reached around 373 MW at the end of 2014.

3.5 Qatraneh Electric Power Company

A private company owned by the Korean KEPCO company and the Saudi XENEL company founded in 2010. The company generates and sells electricity to NEPCO. The generating capacity of the company reached around 373 MW at the end of 2014.

3.6 Electricity Distribution Companies

Includes three companies, each has a concession area to distribute electricity as follows:

3.6.1 Jordan Electric Power Company JEPCO

A 20-year licensed public shareholding company which was given license in 29.5.2014. JEPCO is responsible for distributing electricity in Zarqa, Ma'daba and Balqa governorates excluding Central Jordan Valley.

3.6.2 Irbid District Electricity Company LTD IDECO

A public shareholding company responsible for distributing electricity in Irbid, Mafraq, Jerash and Ajloun governorates excluding Northern Jordan Valley and Eastern areas. The company has been granted a 25-year license in 2008.

3.6.3 Electricity Distribution Company EDCO

A public shareholding company responsible for distributing electricity outside the concession areas of JEPCO and IDECO; namely the Southern, Eastern and Jordan Valley areas. The company had been granted a 25-year license in 2008.

4. Petroleum, Gas, and Mineral Ores Institutions

Institutions carry out operations of prospecting oil, gas and mineral ores inside the Kingdom along with refining and selling crude oil and oil products. The institutions include:

4.1 National Petroleum Company NPCO

A public company owned by the government. NPCO prospects oil and gas in the concession area to the northeast of the Kingdom along with the Iraqi borders covering an area of 7000 square kilometers including Risha gas field within an area around 1500 square kilometers. The duration of the concession period lasts for 50 years from the date of entry into force in 1996.

4.2 Jordan Petroleum Refinery Company JPRCO

A public shareholding company responsible for refining producing and distributing crude oil and oil products inside the Kingdome by service agreements signed with MEMR and have been extended several times.

4.3 Jordanian Egyptian Fajr for Natural Gas Transmission & Supply Co. Ltd

A limited liability company, pursuant to the Jordanian Companies Law and License Agreement signed on 25.1.2004 by both Jordan government represented by the Ministry of Energy and Mineral Resources and Jordanian Egyptian Fajr. It builds, operates and owns the gas pipeline from Aqaba to the north of Kingdom. Moreover, it collects the Egyptian natural gas in Aqaba through the pipeline, transfers and sells it to the power plants and major industries.

4.4 Gas Stations

Stations owned by legal or natural persons concerns with selling fuel. The number of the stations operated in the region reached 482 stations at the end of 2014.

4.5 LPG Agencies

Agencies owned by legal or natural persons concerns with distributing gas cylinders. The number of working agencies reached 1024 stations at the end of 2014.

4.6 LPG Warehouses

Warehouses owned by legal or natural persons distribute and transfer LPG cylinders from filling stations to warehouses and provide licensed distribution agencies. The number of warehouses has reached 100 warehouses at the end of 2014.

4.7 Central LPG Distribution Companies

Privately-held companies concerns with distributing LPG by tanks. The number of the companies reached 6 companies in 2014.

4.8 Oil Products Marketing Companies

Three privately-held companies concerns with distributing oil products (gasoline, diesel, kerosene and jet fuel).

5. Jordan Atomic Energy Commission

Jordan Atomic Energy Commission was established at the beginning of the year 2008. The work of the Atomic Energy Commission focuses on introducing the peaceful uses of nuclear energy and radiation to the Kingdom and developing its sustainable use to generate electricity, desalinate water and various applications of agriculture, medicine and industry purposes.

6. Jordan Bio-Gas Company Ltd.

A joint-stock company owned by the CEGCO and Greater Amman Municipality GAM founded in 1998. The Company aims at converting organic waste into methane gas to generate electricity. The generating capacity reaches 3.5 MW.

Energy Sources in Jordan

Jordan local energy sources of oil and natural gas are very limited despite the exerted efforts spent by the government to develop, search, or prospect for other domestic resources through foreign companies associated with the government. Those companies have offered all required facilities and information provided by seismic studies and surveys.

Jordan has a huge amount of oil shale which exceeds 70 billion tons containing more than 7 billion tons of oil. Oil shale may be burned directly to generate electricity. Furthermore, ICP technology and surface retorting may be used to produce gas and shale oil.

In connection with the contribution of renewable energy resources to the total energy mix, it does not exceed 2%. The Ministry of Energy and Mineral Resources has adopted an ambitious program to increase the contribution of renewables the total energy mix to reach 7% by 2015 and 10% by 2020.

All details related to domestic energy resources will be subsequently discussed while pointing out to the comprehensive strategy of the energy sector.

Table 1 shows the domestic production of crude oil and natural gas and their contribution to the overall energy consumed during 2010-2014 in the Kingdom.

Table (1)
Production of Crude Oil and Natural Gas in Jordan during 2010-2014

Year	Crude Oil (kt)	NaturalGas (BCF)	Contribution of Domestic Production of Oil and Natural Gas to the Overall Energy Consumption (%)
2010	1.2	6.5	2.8
2011	1.0	6.4	3.0
2012	1.0	5.8	2.4
2013	1.0	5.3	2.1
2014	0.8	4.6	3.0

Domestic Demand for Energy and Electricity

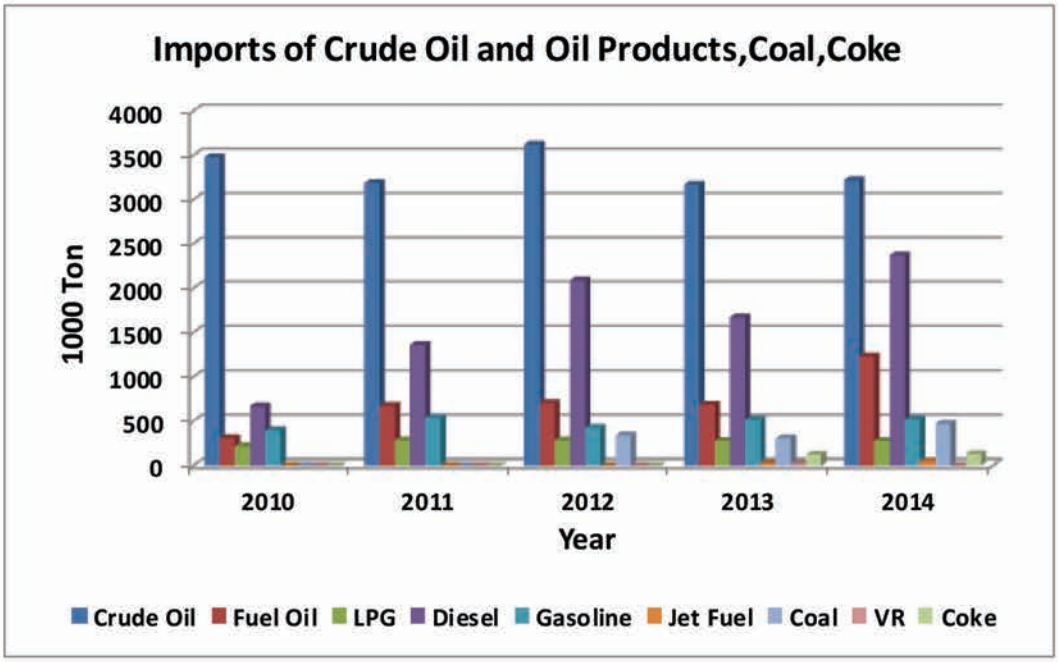
1. Crude Oil and Oil Products

The cost of crude oil and oil products imports in 2014 was estimated to JD 4297 million registering an increase of 11% comparing with 2013.

Table 2 shows the quantity of crude oil and oil products imports during 2010-2014.

Table (2)
Imports of Crude Oil and Oil Products during 2010-2014 (thousand ton)

Year	Crude oil	Fuel oil	Liquefied gas	Diesel	Gasoline	Jet fuel	Coal	Vacuum residuals	Pet coke	Total
2010	3485	307	219	670	400	1		-	-	5082
2011	3189	674	288	1361	540	1		-	-	6137
2012	3623	703	288	2089	426	1		-	-	7130
2013	3170	685	280	1670	515	27	306	23	123	6799
2014	3221	1255	282	2373	552	51	474	0	130	8338



2. Natural Gas

The overall quantities of natural gas imports from Arab Republic of Egypt in 2014 through the Arab gas pipeline was around 221 million cubic meters with a drop amounted to 75% comparing to that registered in 2013.

3. Primary and Final Energy Consumption

The overall demand for primary energy in 2014 was nearly 8461 thousand toe with 3.7% of increase comparing with 2013.

Table 3 demonstrates the domestic demand for primary energy during 2010-2014.

Table (3)
Primary Energy Consumption during 2010-2014
(thousand toe)

Year	Type of primary energy						Total
	Crude Oil and Oil Products	Coal	Pet Coke	Natural Gas	Renewable Energy	Imported Electricity	
2010	4774	-	-	2289	124	168	7355
2011	6141	-	-	873	130	313	7457
2012	6992	226	-	659	140	188	8205
2013	6689	204	116	907	145	96	8157
2014	7479	332	88	301	152	109	8461

As for final energy consumption and distribution to all economic sectors are shown in table 4.

Table (4)
Sectorial Distribution of Final Energy Consumption during 2010-2014 (thousand toe)

Year	Sector				Total
	Transport	Industry	Household	Others*	
2010	1991	1014	1019	849	4873
2011	2012	961	1136	779	4888
2012	2521	921	1198	743	5383
2013	2734	924	1109	617	5384
2014	2558	1079	1152	718	5507

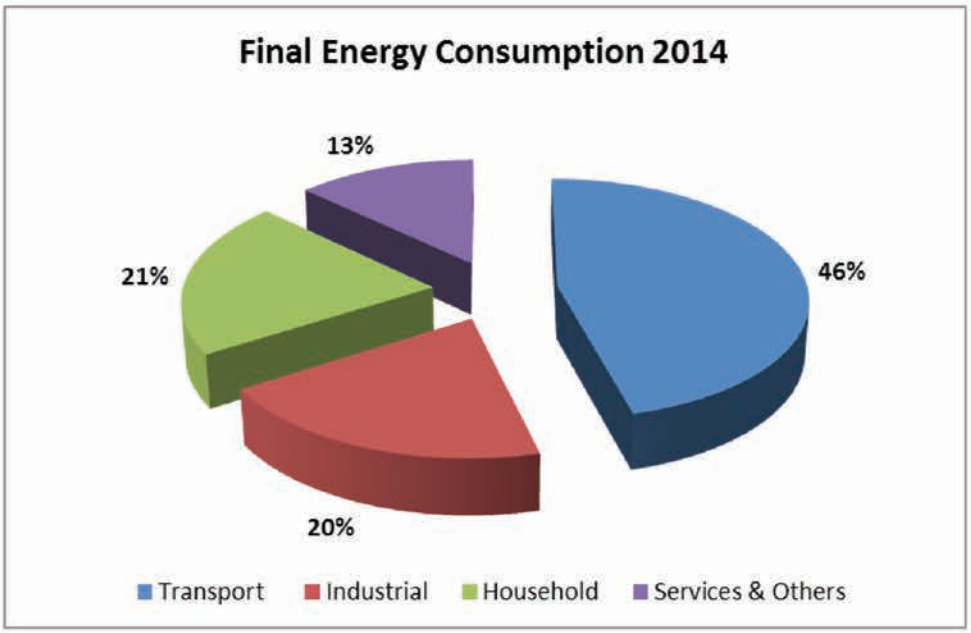
* Includes commercial and agricultural sectors along with street lights.

Table 5 shows the percentages of the sectorial distribution of final energy.

Table (5)
Percentages of Sectorial Distribution of Final Energy Consumption during 2010-2014

Year	Sector				Total %
	Transport	Industry	Household	Others *	
2010	41	21	21	17	100
2011	41	20	23	16	100
2012	47	17	22	14	100
2013	51	17	21	11	100
2014	46	20	21	13	100

*Includes commercial and agricultural sectors along with street lights.



4. Oil Products Consumption and Prices

In general, the year 2014 had witnessed a marked increase of around 13% in the consumption of oil products due to the increase demands of oil products for the dramatic drop in natural gas quantities imported from Egypt. The growth of consumption amounted to 21.5% and 16.5% for fuel oil and diesel respectively. The consumption of oil products has amounted to around 7420 thousand tons comparing with 6544 thousand tons in 2013.

Table 6 shows development in the production of oil products during 2010-2014. Meanwhile, table 7 shows development in the consumption of oil products for the same period.

Table (6)
Development of Jordan Petroleum Refinery's Production of Oil Products during 2010-2014
(thousand ton)

Oil Products / Year	Liquefied Gas	Gasoline	Jet Fuel (Avtur)	Kerosene	Diesel	Fuel Oil	Asphalt	Total
2010	85	703	343	85	903	1080	150	3349
2011	84	681	329	58	1030	868	107	3157
2012	102	716	357	96	1109	999	97	3476
2013	78	663	325	34	980	900	101	3082
2014	91	634	318	63	930	812	160	3008

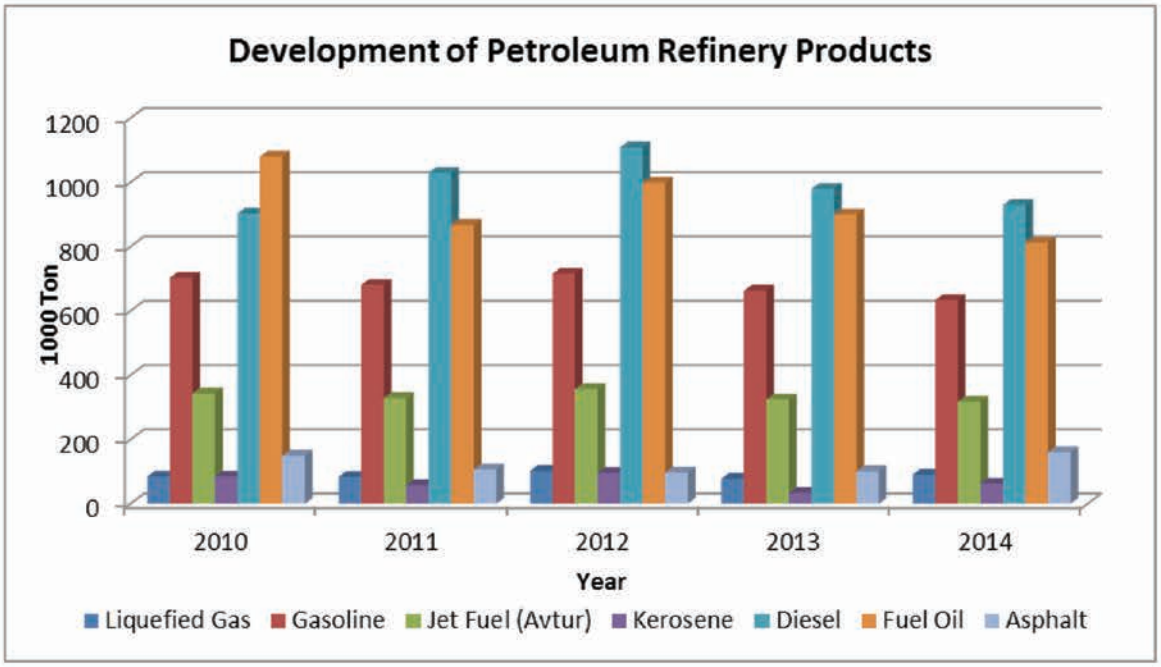
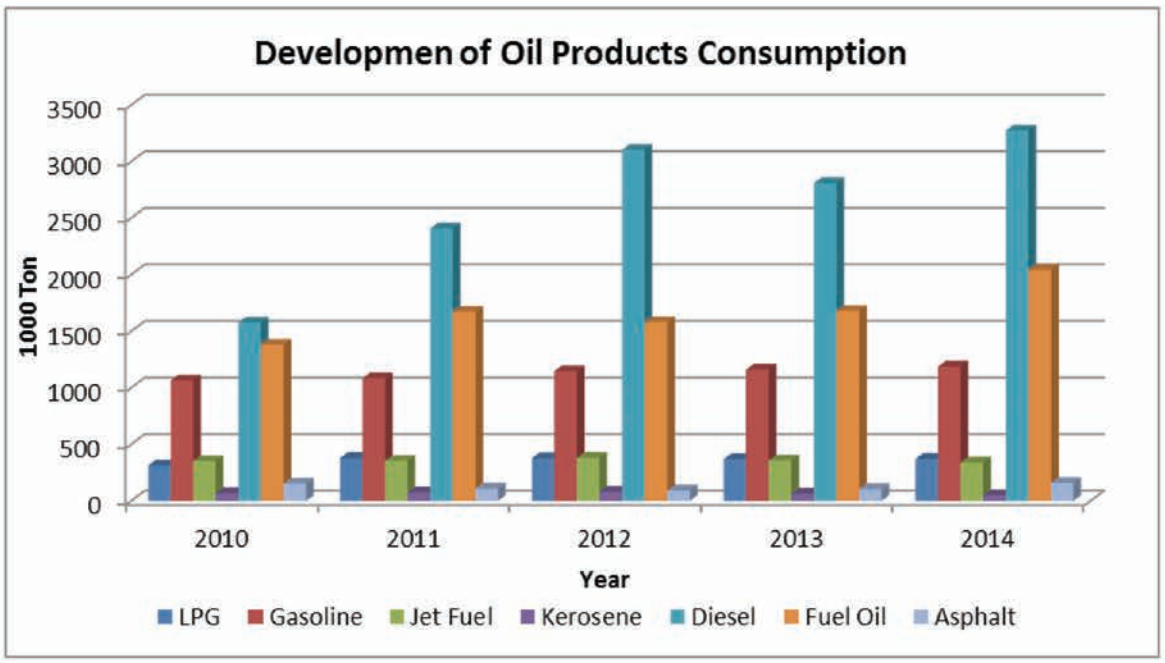


Table (7)
Development of Oil Products Consumption during 2010-2014
(thousand ton)

Oil Products / Year	Liquefied Gas	Gasoline	Jet Fuel (Avtur)	Kerosene	Diesel	Fuel Oil	Asphalt	Total
2010	312	1065	351	69	1577	1381	152	4907
2011	378	1083	354	75	2407	1670	109	6076
2012	377	1147	380	81	3103	1578	92	6758
2013	369	1161	357	63	2810	1679	104	6544
2014	371	1187	339	49	3274	2041	159	7420
Growth Rate %	1	2.2	(5)	22	16.5	21.5	53	13

* Where brackets around numbers signifies a negative amount.



As for oil products prices in 2014, a policy towards liberating oil products prices was reinstated starting from 14.11.2012 according to global pricing policy after a stop in early 2011. A monthly pricing formula was applied on most oil products while keeping same prices of gas cylinders i.e., 10 JD/12.5 kg gas cylinder.
The following table demonstrates the prices of oil products announced locally in 2014.

Table (8)
Local Prices of Oil Products 2014

Item	Unit	Jan.	Feb.	Mar.	Apr.	May	June	Jul	Aug.	Sept.	Oct.	Nov.	Dec.
Gasoline (90)	Fils/Litre	830.00	820.00	835.00	835.00	840.00	845.00	855.00	850.00	800.00	790.00	735.00	690.00
Gasoline (95)	Fils/Litre	1010.00	1000.00	1015.00	1015.00	1025.00	1030.00	1040.00	1035.00	970.00	960.00	895.00	835.00
Kerosene	Fils/Litre	685.00	670.00	680.00	670.00	675.00	670.00	675.00	660.00	650.00	630.00	575.00	545.00
Diesel	Fils/Litre	685.00	670.00	680.00	670.00	675.00	670.00	675.00	660.00	650.00	630.00	575.00	545.00
Diesel/Ship	Fils/Litre	685.00	670.00	680.00	670.00	675.00	670.00	675.00	660.00	650.00	655.00	655.00	640.00
Liquefied Gas 12.5kg	JD/Cylinder	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Liquefied Gas 50kg	JD/Cylinder	59.04	52.36	50.71	46.55	44.93	44.69	45.20	45.96	44.42	43.24	42.58	40.00
Liquefied Gas/Central Distribution/ Bulk	JD/ton	1139.88	1006.29	973.24	890.02	857.61	852.83	863.00	878.26	847.30	823.84	810.65	800.00
Liquefied Gas/Tank Bulk	JD/ton	1180.88	1047.29	1014.24	931.03	989.61	893.83	904.00	919.27	888.30	864.84	851.65	735.68
Fuel Oil/Industry	JD/ton	476.98	475.24	476.91	468.56	462.68	467.49	477.57	470.00	462.49	448.19	395.56	362.74
Fuel Oil/Ships	JD/ton	476.98	475.24	479.70	489.32	483.54	477.22	477.57	473.39	468.45	470.83	469.87	440.93
Avtur/Local	Fils/Litre	628.00	608.00	611.00	599.00	601.00	601.00	606.00	597.00	586.00	564.00	517.00	491.00
Avtur/Foreign	Fils/Litre	633.00	613.00	616.00	604.00	606.00	606.00	611.00	602.00	591.00	569.00	522.00	496.00
Avtur/Charter	Fils/Litre	648.00	628.00	631.00	619.00	621.00	621.00	626.00	617.00	606.00	584.00	537.00	511.00
Asphalt	JD/ton	510.95	509.10	510.87	502.02	495.79	500.89	511.57	502.60	495.59	480.42	424.64	389.85

5. Electricity

The demand for electricity had increased in 2014. The highest rate recorded by industry and water pumping has reached 10% followed by 9% for street lightening. The overall amount of electricity imports through interconnection network with Egypt and Syria reached 435 GWh registering an increase of 14% comparing to year 2013. The Ministry of Energy and Mineral Resources and the National Electricity Power Company made several actions to meet the growing demand. The details of mentioned procedures will be described later on while viewing the overall strategy for the energy sector.

- **Electricity Generation and Consumption**

The volume of electricity generated in 2014 reached 18704 GWh registering a growth of 8.4% of that in 2013 while the electricity consumed for the same period reached 15418 GWh recording a growth of 5.8% approximately comparing with that in 2013.

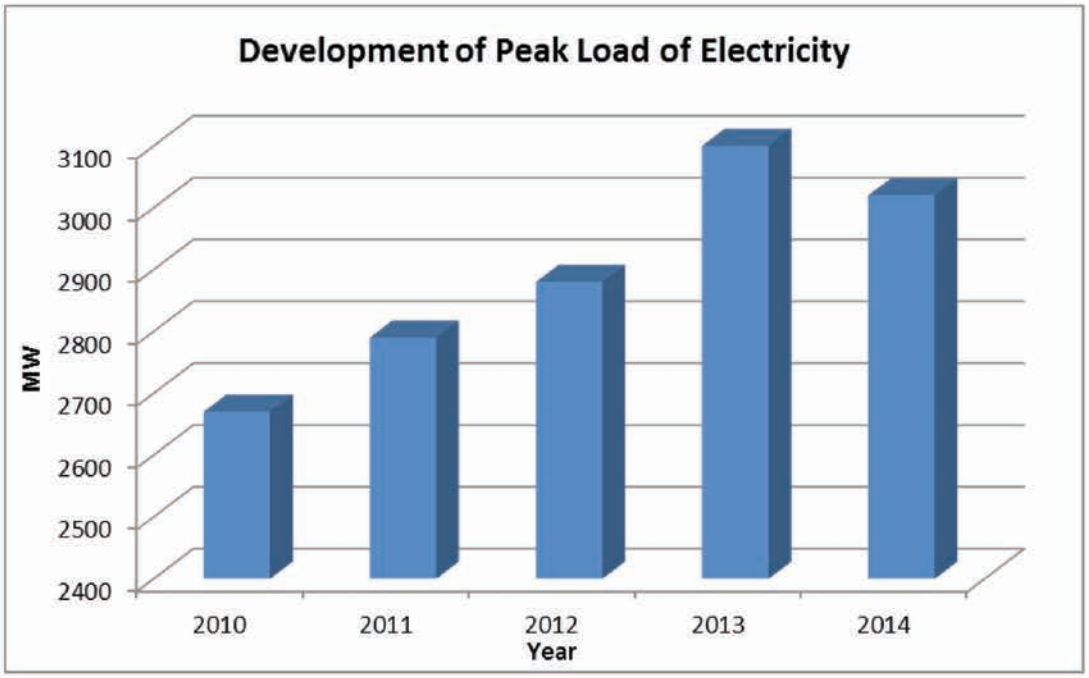
However, the Peak load of the electricity system has recorded 3020 MW in 2014 pointing a reduction of 2.5 % compared to that in 2013.

The following tables 9, 10 and 11 demonstrate the development of production and consumption of electricity as well as the distribution of the consumption and the rate across sectors.

Table (9)
Growth of Electricity Production and Peak Load during 2010-2014

Year	Peak Load MW	Growth Rate %	Electricity Generated GWh	Growth Rate %
2010	2670	15	14777	3.5
2011	2790	4.5	14647	(0.9)
2012	2880	3.2	16595	13.3
2013	3100	7.6	17261	4.0
2014	3020	(2.5)	18704	8.4

* Where brackets around numbers signifies a negative amount.


Development of Peak Load of Electricity
MW
3100
3000
2900
2800
2700
2600
2500
2400
2010
2011
2012
2013
2014
Year

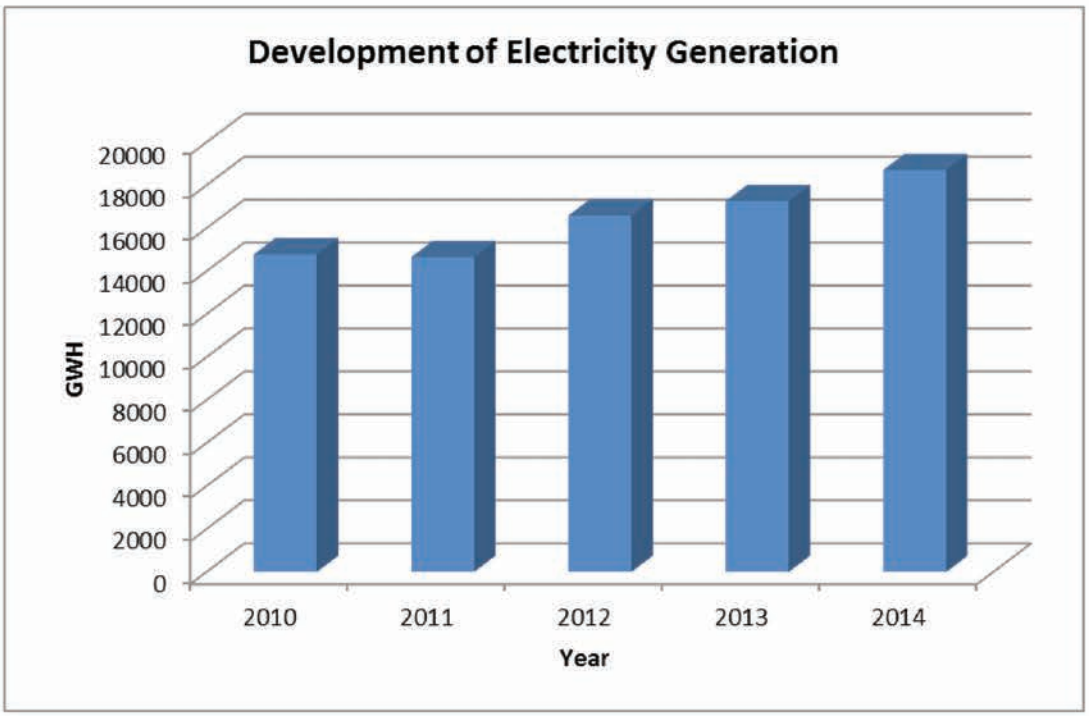

Development of Electricity Generation
GWH
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
2010
2011
2012
2013
2014
Year

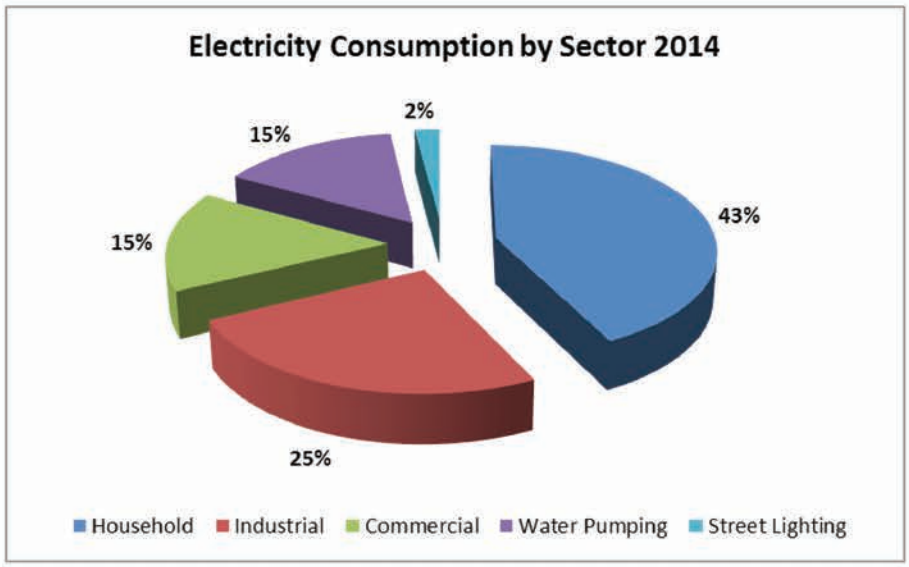
Table (10)
Sectorial Distribution of Electricity Consumption and Growth Rate during 2010-2014 (GWh)

Sector / Year	Household	Industry	Commercial	Water Pumping	Street Lights	Others	Total	Growth Rate %
2010	5220	3258	2184	1867	315	-	12844	7.4
2011	5441	3478	2260	1938	324	94	13535	5.4
2012	6126	3461	2427	1955	305	0	14274	5.5
2013	6265	3517	2415	2076	291	0	14564	2.0
2014	6580	3877	2358	2287	316	0	15418	5.9

Table (11)
Percentages of Sectorial Consumption of Electricity during 2010-2014

Sector / Year	Household	Industry	Commercial	Water Pumping	Street Lights	Total %
2010	41	25	17	15	2	100
2011	41	26	17	14	2	100
2012	43	24	17	14	2	100
2013	43	24	17	14	2	100
2014	43	25	15	15	2	100

Percentages of Sectorial Consumption of Electricity during 2010-2014



- **Electricity Tariff**

Electricity tariffs sold by NEPCO to the distribution Companies and major subscribers in 31.12.2014 are demonstrated in the following table:

Table (12)
Electricity Tariffs Applicable in the Kingdom Issued on January 1st, 2014

Electricity Tariff sold by NEPCO to the Electricity Distribution Companies:	Unit	Tariff Value
A. JEPCO 1- Peak Load 2- Day-time Supply 3- Night-time Supply	 JD/kW/Month Fils/kWh Fils/kWh	 2.98 76.26 66.21
A. EDCO 1- Peak Load 2- Day-time Supply 3- Night-time Supply	 JD/kW/Month Fils/kWh Fils/kWh	 2.98 68.90 58.85
A. IDECO 1- Peak Load 2- Day-time Supply 3- Night-time Supply	 JD/kW/Month Fils/kWh Fils/kWh	 2.98 62.71 52.66

Table 13 below shows the electricity tariffs sold by the distribution companies to consumers in 31.12.2014.

Table (13)
Electricity Tariffs sold by the Distribution Companies to Consumers

Consumer	Unit	Value
A. Household Users		
First Block: 1-160 kWh per month	Fils/kWh	33
Second Block:161-300 kWh per month	Fils/kWh	72
Third Block: 301-500 kWh per month	Fils/kWh	86
Fourth Block: 501-600 kWh per month	Fils/kWh	114
Fifth Block: 601 -750 kWh per month	Fils/kWh	152
Sixth Block: 751-1000 kWh per month	Fils/kWh	181
Seventh Block: More than 1000 kWh per month	Fils/kWh	259
B. Ordinary Users		
First Block:1-160 kWh per month	Fils/kWh	40
Second block:161-300 kWh per month	Fils/kWh	87
Third Block: 301-500 kWh per month	Fils/kWh	104
Fourth Block: 501-600 kWh per month	Fils/kWh	138
Fifth block: 601-750 kWh per month	Fils/kWh	163
Sixth Block: 751-1000 kWh per month	Fils/kWh	185
Seventh Block: More than 1000 kWh per month	Fils/kWh	259
C. Radio and TV Broadcasting Stations-Flat Rate Tariff	Fils/kWh	161
D. Commercial Users		
First Block:1-2000 kWh per month	Fils/kWh	120
Second Block: More than 2000 kWh per month	Fils/kWh	168
E. Banks		
First Block: 1-2000 kWh per month	Fils/kWh	278
Second Block: More than 2000 kWh per month	Fils/kWh	278

F. Telecommunication		
First Block: 1-2000 kWh per month	Fils/kWh	250
Second Block: More than 2000 kWh per month	Fils/kWh	292
G. Small Industries – Flat Rate Tariff		
First Block: 1-10.000 kWh per month	Fils/kWh	66
Second Block: More than 10.000 kWh per month	Fils/kWh	75
H. Medium Industries		
Peak Load	JD/kW/Month	3.79
Day-time Supply	Fils/kWh	83
Night-time Supply	Fils/kWh	70
I. Agriculture- Flat Rate Tariff	Fils/kWh	60
J. Agriculture- Three Part Tariff		
Peak Load	JD/kW/Month	3.79
Day-time Supply	Fils/kWh	59
Night-time Supply	Fils/kWh	49
K. Water Pumping.	Fils/kWh	87
L. Hotels- Flat Rate Tariff	Fils/kWh	168
Peak Load	JD/kW/Month	3.79
Day-time Supply	Fils/kWh	153
Night-time Supply	Fils/kWh	135
M.Street lighting- Flat Rate Tariff	Fils/kWh	106
N. Armed Forces- Flat Rate Tariff	Fils/kWh	136
O. Ports Corporation- Flat Rate Tariff	Fils/kWh	148

P. Large Industry		
First: Mining Extractive Industries		
Peak Load	JD/kW/Month	2.98
Day-time Supply	Fils/kWh	254
Night-time Supply	Fils/kWh	190
Second: Other Industries		
Peak Load	JD/kW/Month	2.98
Day-time Supply	Fils/kWh	124
Night-time Supply	Fils/kWh	101
Q. Mixed (Commercial/Agriculture)- Flat Rate Tariff	Fils/kWh	100

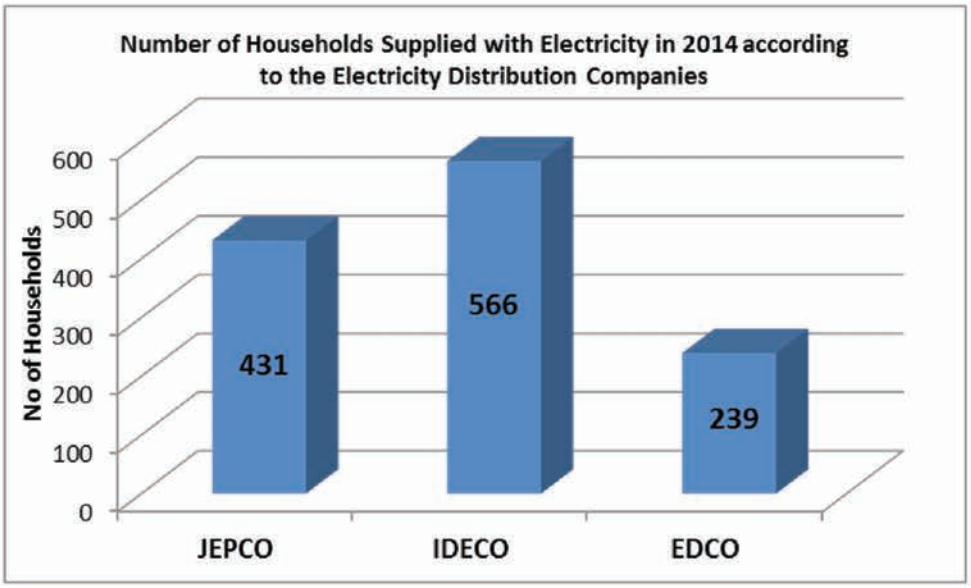
Rural Electrification

The Ministry of Energy and Mineral Resources has continued electrification to remote villages, rural communities and poor families in 2014. The total recorded requests for electrification was 4539 at an estimated cost amounted to JD 24.1 million. Requests were handled as described in table 14, which also shows the cost for each category based on the total cost estimates required by all applications amounting to JD 24.1 million.

The following figures illustrate the number of houses electrified in 2014 recording 1236 houses distributed by areas under concession of the electricity distribution companies.

Table (14)
Classification of processed sites in 2014 and cost of each category of estimated total cost

Implemented Sites		Sites under construction		Remained Sites		Cancelled Sites		Rejected Sites		Approved Sites	
No.	Cost million JD	No.	Cost million JD	No.	Cost million JD	No.	Cost million JD	No.	Cost million JD	No.	Cost million JD
1074	3.397	676	3.28	320	1.661	86	0.54	809	9.42	1592	5.783
Cost%	14	14		7		2		39		24	



Most Significant Accomplishments of Energy and Mineral Resources Sector in 2014

The Ministry of Energy and Mineral Resources and other energy institutions have continued working in action plan for 2014 emerged from the Executive Development Program along with the overall energy strategy.
Outlined below are the accomplishments of the Ministry:

Crude Oil and Oil Products

To continue:

- Building storage capacities of crude oil and oil products estimated to around100 thousand tons in Aqaba, expected in February 2016.
- Building storage capacities of liquefied petroleum gas estimated to around 6 thousand tons in Aqaba, expected by February 2016.
- Building 250-300 thousand tons strategic capacities of oil products and 8000 tons of LPG in the middle of the kingdom, expected by the end of 2016.
- Developing oil port to increase the handling capacity of crude oil and oil products to around 14 thousand tons/day instead of 8 thousand tons/day.
- LPG port which is expected by 1.3.2015.
- Building Iraq-Jordan pipeline to import crude oil from Iraq to the port of Aqaba. A framework agreement was signed and deemed effective in 22.4.2013.
- Establishing, licensing and operating the logistic company, expected to be completed by end of 2015.
- Progress of Jordan Petroleum Refinery Company fourth expansion project.
- Study investor's requests to construct new refineries.
- Monitoring transparent crude oil and oil products prices data using Platts' daily assessment to determine oil prices in Jordan market beside preparing monthly pricing schedules for oil products based on prices and costs in Platt Bulletin plus the shipping costs and follow-up Jordan Petroleum Refinery Company financial statements and marketing companies' activities.
- Grant eight licences to cement factory companies to import 185 thousand tons of pet coke, 27 twenty-seven operating licences to new gas stations, 75 seventy-five permits to start LPG agencies, 104 one hundred and four licences to operate LPG small cylinders storage areas and 175 one hundred and seventy five permits to operate central LPG facility.

Domestic Energy Resources – Natural Gas & Oil

The Ministry of Energy and Mineral Resources attracted many global companies to prospect oil in Jordan. The Kingdom has been divided into 11 eleven prospecting areas and several production sharing agreements, memorandums of understanding of oil prospection; and study the possibilities of oil in these areas have been awarded to a number of global oil companies.
Prospecting areas in 2014

- **Dead Sea-Wadi Araba**

Pursue the production sharing agreement with both the Korea Global Energy Corporation and the Canadian Enegi Oil Plc. in order to ratify the agreement and obtain the Parliament approval. The Agreement is under procedures since 10.5.2014.
The Korea Global Energy Corporation was requested to provide certified official documents with respect to its partnership with the Enegi Oil Plc. founded in the United Kingdom and operates in both Canada and Ireland to complete all relevant legal proceedings whereas the company has provided the documents in 26.9.2014.
The Cabinet has approved the production sharing agreement later known as Joint Venture of Korea Global Energy Corporation and Enegi Oil Plc. However, Jordan parliamentary Energy and Mineral Resources committee has declined the agreement and sent to a parliamentary session to be voted on for final determination.

- **East Safawi**

A Royal Decree has been issued approving the production sharing agreement with the National Petroleum Company under a special law No. 14 of 2014 and published in the Official Gazette under No. 5278 on 01.04.2014. The agreement entered into force on 01.04.2014 for the company has fulfilled the contractual obligations relevant with performance bond guarantee and training in 24.11.2014.

- **West Safawi**

An international Bid Round has been awarded to international oil companies to explore in Western Safawi. Despite the extension of the tender period, no company applied. Recently, West Safawi is opened for investment for global oil companies.

- **As-Sirhan excluding WS-4 Area**

The Ministry has launched an international Bid Round for exploration and drilling for oil and gas on 20.8.2014 for a period of two months. Another one month was given to extend tender and allow companies to apply, yet no company applied for the tender. The ministry has decided to re-tender again in 2015.

- **Al-Azraq excluding Hamza Oil Field**

The Ministry has launched an international Bid Round for exploration and drilling for oil in Al-Azraq on 20.8.2014 for a period of two months. Another one month was given to extend tender and allow companies to apply. The Canadian Abenteuer Resources Corp. has submitted for the tender. The Ministry decided to extend the period once again until 02.02.2015 in an opportunity to give other companies a chance to apply for a tender to ensure competition among companies.

- **Area around WS-4 - 400 km^2**

Four hundred square kilometers were deducted from As-Sirhan area within an area around WS-4 well. Area is devoid of oil in commercial quantities and be in an independent bid as the case in Hamzah Oil Field. The Ministry has launched an international Bid Round for discovery and development for oil and gas on 20.8.2014 for a period of two months. Another one month was given to extend tender and allow companies to apply. The Canadian Abenteuer Resources Corp. has submitted for the tender. The Ministry

decided to extend the period once again until 02.02.2015 in an opportunity to give other companies a chance to apply for a tender to ensure competition among companies.

- **Al-Jafr & Central Jordan Blocks**

The Cabinet has approved a production sharing agreement with the Canadian Ammonite Energy International Inc. on 28.2.2013. The approval was sent later on to the Legislation and Opinion Bureau to complete legal and legislative procedures and be issued by a special law on 28.2.2013. The agreement was approved by both the Bureau and the Cabinet and sent to the Parliament to be adopted and be issued by a Special Law.

- **North Highlands Block**

A memorandum of understanding was signed with the French Thyssen Petroleum Ltd. All technical information was available about the area and the company has submitted its final study and evaluation of oil prospection possibilities and was unwilling to proceed in production sharing agreement. The region is currently opened for investment.

- **Southern Jordan**

The Ministry has proceeded the terms of reference and the marketing packages to submit an international Bid Round offer for the global petroleum companies willing to invest in the Southern Jordan on 18.4.2013 and closed on 20.6.2013. Global companies showed no interest of prospecting in the region due to lack of information. Therefore, 2 million JD was allocated to make further studies and the region is currently opened investment and will be marketed through direct communication with the interested companies.
The Ministry of Energy and Mineral Resources is preparing terms of reference to launch a bid to carry out seismic acquisition and studies in order to raise the information quality.

Oil Shale

The Government has granted Concession Agreements and Memoranda of Understanding for several domestic and global companies to invest in oil shale using direct burning, surface retorting and In-situ for the Deep oil shale to produce oil and to generate electricity.

Concession Agreements

1- Jordan Oil Shale Company JOSCO

JOSCO is a wholly owned subsidiary of Royal Dutch Shell plc. Registered in the Hashemite Kingdom of Jordan in 2009 to search for and evaluate the commercial potential of the deeper layers of Jordanian oil shale using an enhanced production technology In-Situ Conversion Process ICP. JOSCO was granted a large concession agreement of around US$ 20 billion to explore for oil shale in Jordan.
The company has completed the first phase of its project plan by relinquishing part of the concession and has retained an area of 15000 square kilometers of prospection for more studies before taking a final decision in the area where the project will be implemented.

2- Jordan Oil Shale Energy Company JOSE

JOSE is a wholly owned of the Estonian Malay Jordanian Enefit using surface retorting technology in prospecting for oil shale with expected investment of approximately US$ 6 billion registered in the Hashemite Kingdom of Jordan in 2010. JOSE implements the annual program for 4-year pre-development stage.

3- Karak International Oil Company KIO

KIO is a company with expected investment of approximately US$ 1.9 billion registered in the Hashemite Kingdom of Jordan in 2011 and works in surface retorting technology in prospecting for oil shale. A memorandum of understanding was signed with KIO and was granted an additional concession area in An-Na'diyah to achieve the required reserve for the expansion to raise production capacity to reach 50000b/d. KIO implements the annual program for pre-development stage.

4- Saudi Arabian Corp for Oil Shale SACOS

SACOS is a wholly owned company by Saudi investor works in surface retorting technology in prospecting for oil shale with expected investment of approximately US$ 1.8 billion registered in the Hashemite Kingdom of Jordan in April 2014. SACOS implements the required work in the concession agreement in preparation to get a pre-development stage licence.

Memoranda of Understanding

1. Global Oil Shale Holdings GOSH

GOSH is a Canadian oil shale exploration and development company focused on exploitation oil shale in Attarat and Isfeer al-Mahattah using Brazillian modified technology with an investment of approximately US$ 3.5 billion.

2. Aqaba Petroleum for Oil Shale Co. APCO

APCO is a wholly owned company by Jordanian armed forces and Marvol Management to retort oil shale in An-Na'diyah using Russian technology.

3. Whitehorn Resources, Inc.

A Canadian company with an investment of approximately US$ 1.35 billion for exploitation oil shale in Wadi Abu Hamam area using the capsule technique to produce 50,000 /day.

4. National Oil & Electricity from Oil Shale Company JOSECO

A national company with an investment of approximately US$2.2 billion to exploit oil shale in As-Sultani area using Russian technology.

5. Fushun Mining Group

A Chinese company signed MOU in March 2014 to retort oil shale in An-Na'adiyah area using special Chinese technology.

6. Al Qamar for Energy & Infrastructure Ltd.

An Indian company which is part of the Indian CJ Group signed MOU in November 2014 to retort oil shale in Attarat area using Russian technology.

Interested Companies in Oil Shale Investment

A group of international companies showed high interest in oil shale investment and submitted requests to the Ministry of Energy and Mineral Resources. All documents applied to be studies to determine the financial and technical efficiency for the applied companies below:

1- **The Canadian Questerre Energy Corp.**
2- **The Canadian-Jordanian Orcana Resources Ltd.**
3- **SJ Oil and Volvox-Montenegro Joint Venture.**

Oil Shale Direct Burning Projects

1. The Estonian /Malay/ Jordanian Attarat Power Company

Project agreements were signed for direct burring in Attarat area with the Estonian /Malaysian/ Jordanian company with a capacity of 470 MW under the patronage of the prime Minister in October 2014 on basis of selling electricity tariff to the government at a value of 95 fills/kW. The Ministry of Energy and Mineral Resources and the National Electricity Power Company anticipates the final closure at the end of the current year noting that the expected financial investments of the projects is estimated toUS$1.9 billion.

2. El-Lajjun Company for Investment in Oil Shale and Mineral Resources

A Jordanian company which signed MOU in Attart and El-Lajjun area using Russian technology. The company has submitted a feasible study to produce 30 000 barrel/day in various stages.

The Renewable Energy

Undoubtedly, Jordan has great potential sources of renewable energy, particularly solar and wind energy. Jordan is located within the Sunbelt where the intensity of direct solar radiation is 5-7 kWh/m^2 and wind speed in specific areas ranges between 7-9 m/s; the data is promising to generate electricity in Jordan. Based on the previously mentioned figures, the overall comprehensive strategy for energy sector aims at diversification of energy sources and reduction of reliance on energy imports and contributes with 7%of an overall energy mix by 2015 and 10% by 2020.

Below are the most prominent achievements in 2014

1. Solar Energy

- Pursue 12 photovoltaic projects to generate electricity with a capacity of 200 MW mostly in Ma'an. The investing companies worked towards financial closure and asked for extension up to six months i.e., ends of May 2015. The projects are expected to become operational by the end of 2015 should a successful financial closure is reached.

- Pursue a photovoltaic project to generate electricity with a capacity of 65-75 MW in Qweirah/Aqaba funded by UAE/ Abu Dhabi Fund for Development under an Engineering, Procurement and Construction contract EPC. Nine offers were received from qualified companies. However, in light of Abu Dhabi Fund recommendation on 30.9.2014 in order to allow more companies to participate, increase competition and get better prices, the project was retendered on 5.11.2014 and letters of Intent LOIs were received on 18.12.2014.

- Commencement of the construction of the IPP PV project with a capacity of 10 MW in Mafraq through Philadelphia local company. The project is developed as Build, Own, and Operate contract BOO and it is expected to be operated by the first quarter of the year 2015. Based on this, a power Purchase Agreement PPA was signed between Irbid District Electricity Company IDECO in June 2014.

- Implementing PV Solar Power plant to generate electricity with a capacity of 2 MW in Azraq as an EPC contract. The project is financed by a Spanish-Jordan Debt Swap agreement with the Spanish Government. Another PV project is also under development in Azraq. The project is financed by a Spanish Soft loan with a capacity of 3 MW. Both to be operated in the first quarter of 2015.

- Under the Direct proposal submission Scheme for PV projects, the Ministry has signed 45 MOUs with global companies to compete on developing around 200 MW of PV solar projects, 50 MW each to be distributed in north, middle and east of the Kingdom. Direct offers shall be received in 20.1.21015.

2. Wind Energy

- Commence a construction of IPP Project with a capacity of 117 MW in Tafeelah under EPC contract through JWPC. Agreements were signed and financial closure was reached by end of 2013. It is expected to operate the project in the second half of 2015.

- A tender project has been awarded to the Spanish company Elecnor with a capacity of 66 MW under EPC contract in Ma'an on 24.7.2014. The project is funded by the Kuwait Fund for Arab Economic Development .The fund estimated at approximately US$ 112 wholly owned by the government and is expected to be operated in the first quarter of 2016. Recently, the company has begun the geological and topographical surveys to the project site. A project introductory meeting was held to discuss all the relevant requirements and update the schedule in 7.9.2014

- Receive four project offers within the first stage of direct offers in 30.9.2014 in a total capacity of 230 MW currently under evaluation to prepare for negotiations on the project agreements in accordance with the provisions of the Renewable Energy Law and Amendments with the accepted owners.

- Receive KEPCO direct offer in al-Fjej/ Shoubak with a capacity of 89 MW in accordance with the provisions of the Renewable Energy and Energy Efficiency Law which is currently under evaluation.

3. Small-Scale Renewable Energy System

- Open the door for consumers in all domestic, industrial, commercial sector, government institutions, houses of worship and many others to secure the electricity needs using renewable energy and sell the excess (if any) to the electrical grid by installing a grid-connected small-scale renewable energy system to the network in accordance with the instructions issued by the Energy and Minerals Regulatory Commission.

- Installing a grid-connected photovoltaic power system with capacity of 24 MW in total in many different sectors (households, universities, commercial and industrial enterprises, government bodies, schools, mosques, churches, telecommunication companies, banks, civil associations, hospitals, farms, etc.). These systems along with the two Azraq projects 5 MW save the National Electricity Power Company about JD 3.5 million per year. Those who have installed such small-scale systems would be able to get approximately 3-year Return of Investment ratio.

Energy Efficiency and Energy Conservation

The Ministry's goal achievements are summed up with regard to energy efficiency aspect 2014 into the following:

- A tender was submitted to purchase equipment for Public Service Office to raise public awareness. The project aims at drawing public attention to promote a more rational use of energy by using daily use energy-efficient appliances. The appliances will be displayed in public and show users how to measure the amount of energy being saved on a screen linked directly to the appliance. The appliances include light bulbs, solar cells, wind turbine, central heating system, and solar heaters, etc. The tender was announced on 16.6.2014 and currently the offer is being evaluated to start implementation.

- Implement and design a national program of energy efficiency in street and in-house lighting by Price Waterhouse Coopers PWC and in co-operation with the Agence Française de Développement AFD as one of the approaches to improve energy efficiency which aims at reducing energy consumption by 2020 to 20% below the 2007 levels as enlisted in the overall energy strategy 2007-2020. The project had been implemented in three regions representing high, medium, and low energy consumption areas. The results showed that saving rate has varied significantly among the three regions; however, the average in electricity consumption savings rated 10%.

- Contribute to develop a proposal for tender specifications of GPS in the Ministry of Transport which is designed to observe the track and movement of government vehicles during or after office hours and participation in technical committees to set out technical specifications.

- Participation in technical committees to study the supply of the Prime Ministry building with PV system in a step towards decreasing the cost of energy and electricity in government buildings. It is obvious that the Prime Ministry buildings need an installation of PV system with a capacity of 740 kW to cover the entire need of electricity and an installation of solar heaters to provide a capacity of 10500 liters approximately of hot waters on daily basis which would be required to fully cover hot water be needed for the building.

- A tender project to promote and buy solar water heaters for various sectors. The promoting and marketing will be part of an integrated plan which includes MEMR's special logo design, TV Spots, Radio Spots, SMS, and the design and spread of electronic advertising. The tender has been deferred to 2015.

- Follow-up USAID Energy Sector Capacity Building ESCB project in co-operation with USAID for 2013-2014 which aims at raising workers capacities with respect to energy projects and capacity- building programs in renewable energy and energy conservation.

- Complete the implementation of awareness-raising plan to conserve energy for all sectors.
- Follow-up TV and Radio spots of energy conservation through Jordanian TV and Radio Stations.
- Follow-up the implementation of the adopted parliamentary legislative initiative to save and conserve energy consumption.

The Energy and Environment

- The Ministry has started measurements towards licensing advanced factories to produce bio-diesel out of consumed vegetable and animal oil and to produce industrial fuel out of waste for electricity generating purposes.

- In its membership in the commission of the environmental impact assessment of projects in general, MEMR has participated in various projects submitted to the Ministry of Environment.

- The Ministry has a membership of the Integrated Management Advisory Committee of Poly Chlorinated Biphenyls PCB compounds and a membership in the National Committee on Climate Change NCCC.

- The Ministry has also prepared reports on several studies submitted by local and foreign companies to produce industrial, bio fuel and electricity out of waste.

- The Ministry has issued special legislations regulating the industrial diesel activities out of wastes. The legislation was published in the Official Gazette no. 5281 on 16.4.2014.

- The Ministry works with the national teamwork on drafting the Jordan third national communication project on climate change issued in December.2014. One of the most important inclusive outcomes were to report a national list to identify and contract greenhouse gases inventory emissions for various developmental sectors, assess potential mitigations to reduce GHG emissions and come up with national guidelines to support GHG mitigation projects and reduce the expected costs emphasizing the significant role of renewable energy and energy efficiency projects, producing energy out of waste and tie all projects with the capacity of each sector to adapt the impact of climate change.

- The Ministry co-partnered the Greater Amman Municipality listing the technical specifications of generating electricity tender out of waste using global latest technologies processing municipal solid wastes disposed at Al-Sha'aer waste transfer station or Al-Ghabawi Landfill into industrial gas, or fuel, or electricity .

The Jordan Renewable Energy and Energy Efficiency Fund JREEEF

In purist of MEMR to activate the Jordan Renewable Energy and Energy Efficiency Fund JREEEF which was established by the Renewable Energy & Energy Efficiency Law, Law No. 13 of 2012 under the Ministry of Energy and Mineral Resources MEMR to provide the funding necessary for the exploitation of renewable energy sources and the rationalization of energy consumption including small renewable energy facilities and facilitate scaling-up of renewable energy and energy efficiency in various sectors in accordance with the National Energy Strategy and National Energy Efficiency Action Plans to meet the energy needs of Jordan.

To accomplish this mission, JREEEF presided by HE the Minister of Energy and Mineral Resources will prepare a strategic plan which include financial resources, technical assistance to energy users and renewable energy and energy efficiency project developers to facilitate the spread of RE and EE technologies, reduce associated risks, expand market potential, and leverage existing resources.

In collaboration with the associations of the local community, Jordan River Foundation JRF and JREEEF started implementing a solar water heaters project by affordable installments-Revolving Loan. The project included installing 2500 heaters in first phase and will reach 5500 heaters for the next two years. More inclusive initiatives and programs to launch solar heaters, PV solar system program for households, schools, and health centers in 2015 will take place in Jordan Valley and the surrounding area of Wadi Araba.

JREEEF bylaw was developed in 2014 through extensive consultation with stakeholders and is designed to build the credibility of JREEEF. The Bylaw ensures effective and transparent management of the Fund. It has been approved by the Cabinet and is now with the Legislative Commission.

Electricity

Key achievements determined in 2014:

- Commence a commercial operation of the Third Independent Power Producer Project IPP3 for burning heavy fuel oil as base fuel and natural gas as an alternative fuel, implemented in three stages and consisted of 38 diesel engines with a capacity of 15 MW each using diesel engine technology; the first stage with a capacity of 240 MW on 5.8.2014, the second and the third stages with a capacity of 210 MW and 120 MW on 23.10.2014 consecutively. The Project agreements were signed with Korea Electric

Power Corporation KEPCO and Japanese Mitsubishi joint venture in 2012.

- Commence a commercial operation of the Fourth Independent Power Producer Project IPP4 using diesel engine technology for burning heavy fuel oil as base fuel and natural gas as an alternative fuel with a capacity of 240 MW on 11.7.2014. The Project agreements were signed with the American AES and the Japanese Mitsue joint venture at end of 2012 and consisted of 16 diesel engines with a capacity of 15 MW each.

- At the meeting held on 29.6.2014, the Cabinet has adopted a decision No. 4784 to assign Samra Electric Power Company to convert the seventh gas turbine to a combined cycle by adding a gas turbine with a capacity of 70 MW which aims to improve the seventh unit efficiency and reducing costs and fuel consumed. The project is planned to be operated at end of 2017.

- The Cabinet has decided on 22.5.2014 to adopt the settlement and reconciliation between the Government and Jordan Electric Power Company JEPCO regarding the franchise period. The agreement was signed on 29.5.2014 and has handled all issues, allegations and existing and pending claims between both parties. The Energy and Minerals Regulatory Commission EMRC has reached an agreement with JEPCO on all the terms of the 20-year retail distribution and supply licence including tariff methodology and performance criteria. The most significant gains achieved by government for the first time were charging an amount of JD 65 million for issuing licence and determine 16% of the profit margin before tax, which contributed to the achievement of a financial surplus in favor of the tariff and the treasury for the period of the licence validity. The company approves government's ownership to assets of subscribers and Reef fils, and accepted to give the government permission to use five pairs of blisters of fiber-optic cable without paying any charges and fees, to be used by the government, official institutions and municipalities. The agreement also stipulated to emphasize the right of the government to purchase the project at the end of the license pursuant to article 31 of the concessions.

- Participation with Japan International Cooperation Agency team JICA to study the comprehensive plan for the electricity sector in Jordan for 2015-2034 and provide the team with the required document.

- The electricity tariff was amended on 1.1.2014.
- The final outcomes of the comprehensive study for Pan-Arab Interconnection Grid and exploitation of natural gas that has been financed by the Arab Fund for Economic and Social Development AFESD in cooperation with the Arab league has stressed the feasibility to implement seven new electric projects among Arab countries including Jordan-Saudi electrical intersection to be operated in 2020. Currently, there is coordination between both sides in this regard.

Natural Gas

Key achievements determined in 2014:

- An ongoing follow-up with the Egyptian side to ensure the continuity of natural gas supplies for power plants in the Kingdom due to successive interruption of natural gas from Egypt.

- In order to diversify the natural gas resources to secure an additional source to meet the Kingdom needs, and to meet the growth demands of natural gas for power plants, a project was implemented to import LNG by ships through the port of Aqaba in accordance with the Cabinet decision No. 189 on 26.5.2012.

In this context, the following procedures were concluded:

- The Floating Storage and Regasification Unit FSRU Lease was signed with Golar LNG Ltd. on 31.7.2013 selected through an international competitive tender process. The FSRU receives LNG, regasify and transfer to the Arab gas pipeline to the power plants. The storage capacity of the vessel 160 thousand cubic meters of LNG equivalents to 3.3 billion cubic feet of natural. The vessel supply reaches 750 million cubic feet gas per day which meets the power plants needs of natural gas.

- The Aqaba Development Corporation ADC has been assigned to construct an LNG jetty project pursuant to the Cabinet decision No. 189 on 26.5.2012. ADC has signed an EPC contract with the BAM-MAG consortium on 23.12.2013. The project commenced on 21.1.2014 and started to set the construction management to Dar Al-Handasah and Arcade's partnership at the end of May 2014. A tripartite agreement for the provision of Marine Services was signed on 24.7.2014 with the Ministry of Energy and Mineral Resources and Aqaba Port marine Services Co.

- Gas Transportation Agreement and a Tie-In Agreement were signed with Jordanian Egyptian Fajr for Natural Gas Transmission and Supply Company on 6.3.2014.

- Signing a Memorandum of Understanding and Head of Terms HOT for LNG Sale and Purchase Agreement between the Ministry of Energy and Mineral Resources and Shell International Trading Middle East Ltd. on 18.5.2014. The Cabinet has approved finalizing the draft of agreement in accordance with the Cabinet decision no. 7203 on 21.12.2014.

- The National Electric Power Company NEPCO has been assigned to manage, operate and maintain the LNG port in accordance with the Cabinet decision No. 5169 on 13.8.2014. NEPCO has appointed SPT Marine Transfer Services LTD. to manage, operate and maintain the LNG port testing services and Intertek Testing Services for inspecting and testing services, selected through competitive tenders.

Bio Energy

Jordan Biogas Company Ltd. continues to work on processing the organic waste in Rusaifa Landfill. The amount of the generated electricity in 2014 has reached around 5.2 GWh. As far as biogas is concerned, the mitigated volume amounted to 4.5 million cubic meters.

Peaceful Uses of Nuclear Energy

Jordan's interest of nuclear energy stemmed from the press need to face challenges represented by the scarcity of domestic energy sources, increase of energy demand, and the rise in the fossil fuel global prices. In other words, to provide domestic long- lasting sources of energy, the National Strategy of Energy for 2007 strengthened the development of domestic energy sources and diversification of resources by introducing nuclear energy as one of the alternatives to generate electricity. Accordingly, Jordan Atomic Energy Commission was created in 2008 to achieve two major goals:

- Transfer, develop and sustain the peaceful uses of nuclear energy and radiation technology to the Kingdom.
- Leverage investment projects to boost national economy in radiation technology and nuclear energy and utilize it to generate electricity, desalinate sea water as well as other nuclear practices.

Accordingly, the commission has developed a strategy for nuclear energy represented by the Jordanian nuclear program includes exploitation and investment of nuclear natural resources especially Uranium, establishing and operating Jordan nuclear power plant, building qualified domestic human resources, and supporting activities and nuclear sciences and applications of the nuclear program. As a result, Jordan Atomic Energy Commission has continued during the year 2014 the intense activities to achieve objectives designated.
Major achievements of the Jordan Atomic Energy Commission:

First- Jordan Nuclear Power Plant

In the scope of the Jordan nuclear plant project, the Nuclear Power Plant Commission has followed-up several tasks included the selection of a the Russian technology ROSATOM to build and operate the first Jordanian nuclear plant with two nuclear reactors with a capacity of 1000 MW each. The offer includes third generation of Russian reactors which upholds the highest standards of nuclear safety and security. Generally, Russian reactors were originally licensed, built and operated while using this technology. The Russian has agreed on participation in the nuclear plant establishment costs with 49.9% estimated to USD10 billion with slight ownership majority to Jordan 50.1% to be one of Jordan conditions to select nuclear technology for long-term economic and strategic accounts that Jordan seems so assiduous in achievement.
A project development agreement was signed on 9.9.2014 between the Jordanian government and the Russian government with regard to necessary procedures to develop the scope of work to establish Jordan nuclear plant.
The commission has also followed-up in 2014 necessary procedures to sign an intergovernmental framework agreement at beginning of 2015 between Jordan and Russia with regard purchasing electricity, provide necessary cooling for the plant and many other issues related to operation over 60 years.
To complete the studies, the commission has selected the Korean KEPCO in 2014 to implement the tender and carry on a detailed study for the nuclear plant site in Quseir Amra region east. The detailed study will continue for two years where it tackles the environmental, geological, seismic and demographic aspects, the technical needs, the Jordanian grid reliability and the needed infrastructure.
With such significant achievement, the commission will be making great strides in the work required to sign an EPC contract with the Russian company to start implementation.
To guarantee the fulfillment of the workflow within the specified period and to prepare for future implementation, the commission has arranged 10 groups from both sides, Jordanian and Russian, to follow and provide the requirements and needs for the nuclear plant in various areas such as nuclear safety and security, necessary legislations to develop human resources, prepare nuclear and radiological emergency plan, site studies, nuclear fuel, radioactive waste and other similar matters.
In this context, the commission continues to work with the International Atomic Energy Agency on the implementation of a technical project and supportive annual work plan from various aspects as a contribution to assist Jordan to proceed the vital project and achieve transparency.

Second- Build Jordan HR Core Competencies

The commission has continued in 2014 the implementation of appropriate plans for capacity and human resources building required giving success to the Jordanian nuclear program by strengthening cooperation and coordination with the International Atomic Energy Agency and the Arab Atomic Energy Agency in support of several national and regional projects in the nuclear and radiological applications,

qualify and train technical staff of the commission, Jordan facilities and benefit from agreements and MOUs in nuclear cooperation for peaceful uses between Jordan government and friendly countries especially Russia, China, France, South Korea, and Japan through grants, special training, scholarships, masters and doctoral programs in the disciplines of nuclear sciences and technology.

The commission has followed-up through Nuclear Research Commission the implementation of Jordan Reactor for Training and Research JRTR in Rehab - Jordan University of Science and Technology with 5 MW of capacity for training purposes of nuclear engineering students, conduct scientific research, the production of radioactive isotopes used in various medical and industrial sectors.

After the issuance of the construction licence from the Energy and Minerals Regulatory Commission EMRC which included the environmental and radiological impact of reactor, site characteristics and the analysis of the seismic hazard analysis, the cumulative construction work on the project continues. The achievement has estimated to 75% of the construction work at the end of 2014 and the number of Jordanians working in the project has exceeded 650 engineers and technicians working with the Korean team in various works of construction, support and quality control.

The commission has applied for operation licence at the end of 2014 to be able to review all the documents and work required for the issuance of operating license expected to be issued in 2015, the date on which it is expected to do the experimental operation of the reactor and to start specialized engineering system up to the completion of construction in 2015 and operation in 2016.

On the other hand, the commission keep on efforts with the Korean team for training and qualification the engineers and technicians of the technical staff of the research reactor. The Korean team has provided long-term training grants for post graduate studies in nuclear energy and grants in nuclear training for employees in the nuclear research reactor.

To support cadres and human capacity in the region and to shed light on significance of the features and benefits of establishing nuclear energy in Jordan and spread community awareness of Jordan nuclear program to help local communities develop the infrastructure and raise standard of living for the areas surrounding the nuclear plant, and due to selecting the nuclear plant site in Quseir Amra region, the commission has allocated 15 scholarships for undergraduate study in nuclear engineering to youth in the central desert at Jordan University of Science and Technology at beginning of 2014.

Third - Uranium Mineralisation

The achievements of the Nuclear Fuel Cycle Royal Commission has implicated the continue of the Jordanian Uranium Mining Company JUMCO the organized and systematic exploratory work in the midst of Jordan through a specialized team under the supervision of seven international experts and specialists to perform the following operations:

1- Surficial Mineralisation

Mainly concentrated in a thin, ~4.5 m thick layer by drilling 1967 trenches and collecting 19685 samples to be analyzed in the laboratories accredited to the global quality standard ISO 17025.

2- Deep Mineralisation

The mining is mainly concentrated in a 30 m deep based on previous results by Areva Company. The results were used to estimate the source size of uranium post re-examination on scientific and statistical basis different from what was previously analyzed.

The team has reached interim results on estimating uranium resources in 40% of land area of the overall surface area under mining in central Jordan. Uranium resources estimates of yellowcake U3O8 in the explored region have reached 36 thousand tons. This figure is expected to increase upon completing the rest of the exploration works.

Based on this, the commission has issued technical reports signed by experts and specialists from Jordan. The reports were reported and classified and based on exploratory results according to a global JORC Code-2012 Edition. The reports confirm uranium presence in the midst of the Jordan in commercial quantities that will be adopted by competent firms interested investing in the Kingdom's uranium.
Moreover, the commission in cooperation with the Arab Potash Company is currently handling laboratory and experimental works to extract uranium ore to determine the optimum technical and economic ways to extract natural uranium ore to enable Jordan's competent teamwork properly understand labour vocabulary and to facilitate future cooperation with global firms in commercial extraction operations.

Fourth- Nuclear Sciences and Applications

The Nuclear Science Applications Commission has carried on the development of scientific laboratories and various nuclear applications aimed at the development and transfer of peaceful uses of nuclear energy and radiation technology to Jordan through human resources and skills development to support the Jordanian nuclear program, enhance the infrastructure for nuclear science and technology in education and scientific research, and service production sectors in Jordan by operating research and information laboratories for post graduate students and researches from universities and concerned Jordan scientific centers, and provide radiation inspection services for various environmental, food and consuming samples.
In addition, it provides uranium analysis services to determine the concentration of uranium to invest in mining and extracting project in Central Jordan, and operate Gamma Irradiator Center to the growing demand of medical raw materials suppliers for sterilization need in Jordan beside participation in radiation protection and environmental control between the commission and the international laboratories to develop local capacities, a preventive plan to control radiation and monitor personal and spatial exposure to radiation in the commission.

Geology and Mining

The mining sector is one of the vital sectors that play an active role in driving growth and development in the national economy. Despite the instability in contribution all over different periods, geology still possess a great value and represents one of the most important pillars of the national economy.
The mining sector is mainly based on the exploitation of local raw materials and comprises of the two main mining industries:

- Mining Extractive Industries
  Phosphates, potash, carbonate and quarrying products, etc.
- Mining Transformative Industries

A. Chemical Industries
  Fertilizer, chemical acids, quick and hydrated lime.
B. Construction Industries
  Cement, white cement, ceramics and building materials.

In terms of the contribution of the Jordanian Mining Sector in GDP, the total Jordanian mining sector revenues has estimated to around JD 1930 million in 2013. It represents 8% of GDP and the revenues has been distributed among mining extractive industries by 67.7% and transformative industries by 32.3% of the mining sector. The exports of mining sector; both extractive and transformative reached JD 1428 million representing 29.7% of the total national exports [No data is available for 2014].

Major projects carried out by the Ministry of Energy and Mineral Resources MEMR in 2014

❖ **Oil Shale Exploration Project**

Based on the significance of oil shale as one of the alternative energy sources, four drilling projects have been carried out in four areas covering 2700 km^2 in Ma'an to allocate new areas, increase reserves and determine the horizontal and vertical extension of the ore, determine quantities, conduct necessary tests and the average of oil contents in preparation to launch investment whether to extract oil or generate electricity. One-hundred and fifty-one exploration wells have been drilled and 3048 samples were collected for necessary analysis in the following areas:

- **Isfir Al Mahatta** located 20 km to the south east of Ma'an in the southwestern part of Al-Jaffr and the southern part of Isfir Al Mahatta sheet areas. Thirty-five 35 wells have been drilled by a local company in an area that covers 356 km^2 under the supervision of MEMR technical staff. The lithology of wells was described and 250 samples were collected for analysis.

- **Al-Jaffr & Jibal Al Adhriyat** located 76 km to the northeast of Ma'an. It is part of Al-Jaffr & Jibal Al Adhriyat sheet areas. Sixty-four wells have been drilled by a local company in an area that covers1209 km^2 under the supervision of MEMR technical staff. The lithology of wells was described and 670 samples were collected for analysis.

- **Al-Jaffr** located 30 km to the northeast of Ma'an. It is part of Al Jafr Geological Map. Twenty wells have been drilled by a local company in an area that covers 355 km^2 under the supervision of MEMR technical staff. The lithology of wells was described and 150 samples were collected for analysis. The results of the samples to be completed in the Ministry laboratories to prepare for the technical report of the project.

- **Adh Dhirwa** located 180 km northeast Ma'an. It is part of Qasr Tuba sheet area. Fifty wells were drilled in an area that covers 780 km^2. The lithology of the well was described and 1978 samples were collected and sent to the Ministry laboratories for analysis to prepare for the technical report for the project.

❖ **Metal Ores Exploration Project**

The project aims to explore and evaluate various metal ores in Jordan and to determine their specifications, quantities, various industrial uses, and the needs and requirements of local and foreign markets.

The most important raw materials studied

- **Dolomite Ores**

  Dolomite can be used in different industries that include glass industry, cracks treatment, fertilizers, polyester sheets, roads maintenance mixtures, insulating materials foams for doors and walls, tile molds and smelting industries. Meanwhile, Dolomite can be used as a basic material in the production of chemicals involved in industries such as magnesium carbonate, magnesium hydroxide and magnesium sulfate. The study area is located in Al Farsh/Ras Negev, around 15 km east of Amman-Aqaba road. Forty-five wells were drilled by a local company under the supervision of MEMR technical staff. The lithology of wells was described and 120 samples were collected and sent to the Ministry laboratories for necessary analysis to prepare the technical report for the project.

- **Phosphate Ores**
  Based on the principle of increasing the discovered areas, strengthening phosphate ore presence and increasing the general reserve, an exploration plan was carried out in the areas surrounding Jordan Phosphate Mines Company. One-hundred and sixty-three wells were drilled in Ash Shidiyya/Ma'an and 1364 samples were collected and sent to the Ministry laboratories for analysis to prepare a detailed technical report and assessment for the area.

- **Pure Limestone Ores**
  The project was carried out in two areas within Al Hisa sheet area. Thirty-five wells were drilled in the first area and 110 samples were collected by a local drilling company under the supervision of MEMR technical staff. The samples were sent to the Ministry laboratories for analysis to prepare a technical report. In the second area, eight wells up to 30 m deep with a total of 167.5 m were drilled by the rigs of the Ministry of Energy for the purpose of evaluating sites of pure limestone ores.

- **Clay Study**
  The project to study clay has continued in Wadi Al Mizrab/Hiswa. Forty samples were collected and tested by water separation. The results indicated that the percentage of aluminum oxide has increased from 23% to 31%. Furthermore, thirty samples were collected and examined by magnetic separation in the Ministry laboratories. The results showed that the percentage of an iron oxide has decreased from 6% to 1%.

- **Silica Sand**
  The project to study silica sand has continued in Ras Negev. Twenty-five samples were collected and examined by magnetic and hydro cyclone separation and flotation in the Ministry laboratories. The results showed that the percentage of silica dioxide has increased from 98% to 99%.

- **Feldspar Ore**
  The project has continued in Ar Rashidiya. Fifteen samples were collected and examined by flotation, 25 samples were examined by magnetic separation and 20 samples were examined by gravity separation in the Ministry laboratories. The results showed an increase in the percentage of iron oxides to 0.13%, aluminum oxides 16%, and the sodium and potassium oxides to 12.7% . A secondary silica product by 99.5% was obtained. All tests took place in the Ministry laboratories.

- **Taba Sediments**
  Eight exploratory wells were drilled in Taba sediments by the rigs of Ministry. Forty samples were collected from the wells and sent for analysis to the Ministry laboratories to determine the type of sediments. A technical report will be prepared as soon as the results are obtained.

- **Engineering Properties of Concrete Mixtures**
  The technical staff of the project has studied the effect of adding improved chemicals to granite debris from Aqaba region and the degree of coherence between these materials and to find out the suitability for use in accordance with international standards by preparing 60 concrete mixtures of different granite materials to carry out the proper laboratory tests to determine the engineering properties. Moreover, 12 standard concrete mixtures were prepared using reduced and light weight cement. Sixty samples were sent to MEMR laboratories to do the required engineering tests.

- **Dykes and Xenoliths**
  The technical staff of the project has studied 65 dykes and xenoliths in the extended area 50 km between Aqaba and Rahma. The study has identified the width, extension, direction and lithological description of the dykes. Fifty-one samples were collected for chemical analysis and thin sections Microscope Slide. Seventeen slides representing 17 dykes were prepared for petrographic studies. All the samples were projected by satellite.

❖ Geophysical Studies

- **Electric Survey**
  The survey aims at determination of the sandstone layers that contain a near-surface copper ore in Wadi Araba to detect the depth of its upper surface. Ten lines were measured using multipolar electrical survey with a total length of 3 km. Meanwhile, 3 lines were measured using frequency domain electromagnetic survey with a total length of 2 km.

- **Magnetic Survey**
  The survey was carried out in Khan Az Zabib to determine the hydrothermal anomaly, depth and shape, as well as to determine the nature of the magnetic influential and draw a contour map for the anomalies. The aeromagnetic measurements of the Kingdom have indicated the presence of anomalies in the magnetic values. The magnetic anomalies were delineated in Madaba/Ma'in using geoelectrical measurements method (agitational induction) in Abu Al-Assal Bridge. The preliminary results of the measurements have indicated the presence of high values of metals and ability to recharging, therefore the presence of iron oxides metal ores and/or manganese close to the surface.

- **Gravitational Survey**
  The gravity survey aims to cover the entire kingdom area. Throughout the project 88% of the Kingdom's area was covered in the past years. The gravity survey is important for prospecting mineral ores, identifying water basins, geological structures and the study of the earth's crust for the purposes of seismic risk assessment.

  Gravity survey was carried out in the eastern and north-eastern parts of the Kingdom Azraq/Safawi where 86 gravity measurements covering an area of 20 km^2 were detected. Meanwhile, topographic corrections and geodesic measurements were prepared. The preliminary results were processed using specific software to produce Bouguer gravity anomaly maps, free aerial anomalies, quantitative and qualitative interpretation, as well as measuring the depth to the basement rocks, the thickness of sedimentary cover and building a three-dimensional geologic model of the basement rocks surface.

❖ National Geological Mapping

The project aims at producing geological maps at different scales (1:50,000) and (1:100,000) for entire Jordan. Three geological maps at scale 1:100,000 and one geological map at scale 1:50,000 are under survey. Two geological bulletins for Al Awja and Wadi Abu Al Hamam are in preparation. The following table shows the current status of geological maps and reports.

No.	Maps/ Bulletins	Scale	Current Situation
1.	Al Inab Map	1:100,000	In press
2.	Ras Negev Map	1:50,000	Editorial Stage
3.	Mishah Hudruj	1:100,000	Field work in progress
4.	Wadi Hudruj & Wadi Ed Dhbei'ani Map	1:100,000	Field work in progress
5.	Wadi El-Fkok Map	1:100,000	Field work in progress
6.	Ain Jedi & As-Safi Map	1:100,000	Start Survey
7.	Correlation Project between Jordan and Saudi Arabia Report	-	In press
8.	Al Awja Bulletin	-	Editorial Stage
9.	Wadi Abu Al-Hamam Bulletin	-	In preparation

❖ **Geological Correlation**

The geological report of the correlation project between Jordan and Saudi Geological Survey is printed in Special Issue.

❖ **Petrographic Studies**

Studies concerned with providing petrographic service to identify the age and mineral contents required for the Ministry projects and public and private sectors (for price). In 2014, 18 rock samples and 26 thin sections microscopic slides were studied and photomicrographed and the required technical reports were prepared.

❖ **Geological Museum**

The Geological Museum demonstrates the important achievements of the Ministry of Energy and Mineral Resources and the nature of the work carried out in the field of mineral resources through exhibition to interested people from all sectors. The museum was visited by 1356 people in 2014. The technical staff of the museum has participated in the exhibition of the Second International Oil Shale Conference held in the Dead Sea during 14-15.4.2014, where most noteworthy activities and achievements of the former Natural Resources Authority were demonstrated. Different rocks, mineral samples and posters were all exhibited.

❖ **General Geochemical Survey**

The geochemical survey project work was carried out along the borderline between Jordan and Saudi Arabia in cooperation with Saudi Geological Survey. The survey extended from Durra in the west to Mudawwara in the east and located within the map sheets of Jabal Mubarak, Ain Al Hashem, Jabal Umm Saham and Jabal Dubaydib. Two-hundred and ninety-nine samples were collected; 128 of which samples were of heavy metals, 114 samples from valleys sediments and 57 rock samples were packaged and stored in Ar Rashidiya Field Station to be sent to the Saudi Geological Survey laboratories as soon as sampls are fully collected.

❖ **Jordan Seismology Observatory**

The Jordan seismology observatory is working 24 hours daily monitoring and recording earthquakes. The observatory stations have recorded 483 earthquakes distributed as follows: 10 earthquakes occurred in the Jordan Valley/Dead Sea (the major located in Tiberias area with 3.6 seismic intensity), 268 regional earthquakes, mostly occurred in the eastern Mediterranean region, and 205 earthquakes abroad. Four new sites for seismic stations were proposed by the observatory staff in the areas of Titin/Aqaba, Rahma /Wadi Araba, Al-Balqa Applied University Farm and Al Bayt University. An official approval is needed and in progress. The work is in progress with the German institutions through the DESERVE project for allocating 15 seismic stations in the panorama/Dead Sea for one year in the form of a certain seismic variety to study the effect of disturbances on the seismic signals and this study ends in early 2015. Jordan Seismology Observatory has also participated in the integrated exercise field inspections in 2014 and was organized by the Comprehensive Nuclear-Test-Ban Treaty Organization in collaboration with the Ministry of Energy and Mineral Resources during the period from 07.11.2014 to 12.09.2014, this exercise brought together 250 experts from 43 countries.

The MEMR Laboratories have also analyzed all kinds of natural raw materials to determine the mineral types and contents of major oxides and minor trace elements using X-Ray spectroscopy, X-ray diffraction, plasma and atomic absorption. The laboratories analyzed 1748 samples in 2014 with a total estimated cost of JD 75 thousand. It has also tested and analyzed 1593 samples of oil shale in 2014 for private sector companies to determine the proportion of oil and the calorific value with a total estimated cost of JD140 thousand.

The Ministry laboratories have examined the soil and rocks for the public and private sectors in terms of granular gradation, moisture content, density of virtual specific weight, corrosion, impact, crushing and hardness using Mohs scale of mineral hardness, fracture resistance, speed of sound waves and bending modulus scale. The laboratories analyzed 1014 samples in 2014. The estimated revenue of the Ministry laboratories in 2014, internal or external, has amounted to around six hundred thousand Jordanian Dinars.

The Ministry has also provided cadastral services for the gas pipeline project, the gravity survey project in Safawi/Azraq, wind power project and the private oil storage project for the Ministry's favor by monitoring 85 survey points. Boundaries were detected in mining rights area of phosphate concession in Wadi Al Abyad, Wadi Hasa and Ash Shidiya to be allocated for Central Electricity Generating Company CEGCO in Risha gas field and the seismic observatory site to be allocated in Aqaba in coordination with the Commission.

❖ **Cooperation with international institutions**

The Ministry of Energy and Mineral Resources works in collaboration with international institutions concerned with geology matters such as cooperation with the German Geophysical Research Centre GFZ through conducting geophysical studies of the sinkholes in Ghor Haditha. It also cooperates with the Comprehensive Nuclear-Test-Ban Treaty Organization CTBTO by organizing integrated field exercise IFE14 and Ministry's staff participation in activities. Moreover, the Ministry has widened cooperation with some institutions like cooperating with the Geotectonic Institution at University of Paris to continue the implementation of the paleoseismicity and active faults project along the Dead Sea Transform DST for the purposes of seismic risk assessment in the regions. In addition to cooperation with the Arab Industrial Development and Mining Organization by organizing the second applied workshop in the field of using geophysical techniques in mineral exploration investigations.

Financial Statements 2014

Item	Allocations JD	Expenses JD	Disbursed Rate %
Current Expenses	5017000	4429200	88
Capital Expenses	139035000	132201642	95
Total	144052000	136630842	95

Financial Statements of Major Capital Projects in the Ministry in 2014

Project	Allocations JD	Expenses JD	Disbursed Rate %
Encourage establishment of natural gas networks in the Kingdom	1000000	764881	77
Evaluation of direct proposals of Renewable Energy Projects / EU grant	750000	605683	81
Design and construction of an LNG Jetty/ Aqaba	38100000	37906148	100
Oil products storage facilities	44850000	42422151	95
Utilize wind energy to generate electricity -Al-Fjej	2860000	2860000	100
Supporting projects of Jordan Atomic Energy Commission	8425000	8425000	100
The administrative project	350000	268256	76
Total	96335000	93252119	97