The Hashemite Kingdom of Jordan

Ministry of Energy and Mineral Resources

Annual Report 2003

His Majesty
King Abdullah the Second Ibn Al-Hussein

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Terms and Abbreviations

Kw	Kilowatt
Kwh	Kilowatt hour
Gwh	Gigawatt hour - one million Kilowatt hour
Mw	Migawatt
MWh	Migawatt hour
B/d	Barrel/day - Barrel per day
BOE	Barrel Oil equivalent
BOE/d	Barrel Oil equivalent / day
TOE	Ton Oil Equivalent
MVA	Megavolt Ampere
KV	Kilovolt
Km	Kilometer
Kg	Kilogram
Kgoe	Kilogram oil quivalent
Cf	Cubic feet

Statistics on Energy and Economy in Jordan, 2003

- Kingdom's population (million)	5.476
- Gross domestic product (GDP) at current prices (million JD)	6991
- Per capital annual income (JD)	1277
- Energy Intensity (toe/JD 1000 at 1994 prices)	0.95
- Per capita share of energy consumption (Kgoe)	1054
- Per capital share of electricity consumption(Kwh)	1341
- Electricity generation (Gwh)	7988
- Electric energy consumption (Gwh)	7346
- Percentage of population supplied dwith electricity	99.9%
- Overall domestic energy production (1000 toe)	291
- Oil imports (1000 toe)	5560
- Primary energy consumption (1000 toe)	5774
- Cost of energy consumption (million JD)	764
Cost of energy consumption against:	
- exports %	35.9
- imports %	19.3
- gross domestic production %	10.9
Jordan dinar = 1000 fils = US $ 1.41 in 2003	

Introduction

The Ministry of Energy and Mineral Resources (MEMR) seeks to provide various forms of energy for sustainable and comprehensive development with minimum possible cost and best standards. The Ministry aims to enable all the sectors of the society, with their various categories and locations to enjoy the energy services in order to improve their welfare and living standards. His Majesty King Abdullah II utilized his personal relations to secure Jordan's needs of energy during the events that swept, and still does, the area during 2003.

MEMR, with the other energy entities could attain various achievements in 2003. The most important one was the project of natural gas pipeline from Egypt to Jordan. His Majesty King Abdullah II and President Husni Mubarak of Egypt, inaugurated the pipeline officially on 27/7/2003, Aqaba Thermal Power Station (the first stage) started using the natural gas.

The Jordan Egyptian company, Al Fajr, which was established with a capital of US $ 124 million to transport and provide the natural gas, started the work of implementing the second stage of the project to transport the natural gas to the middle and north of the country, at a cost of US $ 300 million. This project with its two stages is considered part of the Arab Gas Pipeline project, which will connect Egypt, Jordan, Syria and Lebanon.

On another level, with the aim to upgrade welfare services standards of the rural Jordanian areas, to restructure the population distribution and sustain the livelihood of rural area residents, MEMR and the electricity distribution companies continued their serious work to complete electrification of the Jordanian rural areas, and populated areas. During 2003, they were able to electrify 1162 villages, and populated areas which contained 3900 houses, at a cost of JD 9.3 million. About 100% of the population have become electrified which is an achievement Jordan is proud of, when compared with other Arab and foreign countries.

To meet the increasing demand for electricity, work has started on the project of converting gas generation station of Rahab to operate on the combined cycle, by adding two steam turbines with a capacity of 100 MW. Work has also started on adding the fifth gas generation unit in Al Risha area with a capacity of 30 MW. The total capacity of the station will be 150 MW.

In the field of electric interconnection, an agreement was signed to exchange electric energy between Jordan and Egypt. The total electric energy, imported from Egypt through the interconnection line was about 700 Gwh in 2003.

In 2003, MEMR continued its optimal effort to utilize the sources of new and renewable energy through inviting tenders for the project of electricity generation , via wind energy in the south, with a capacity of 50-60 MW. Three international companies were invited to invest in this field.

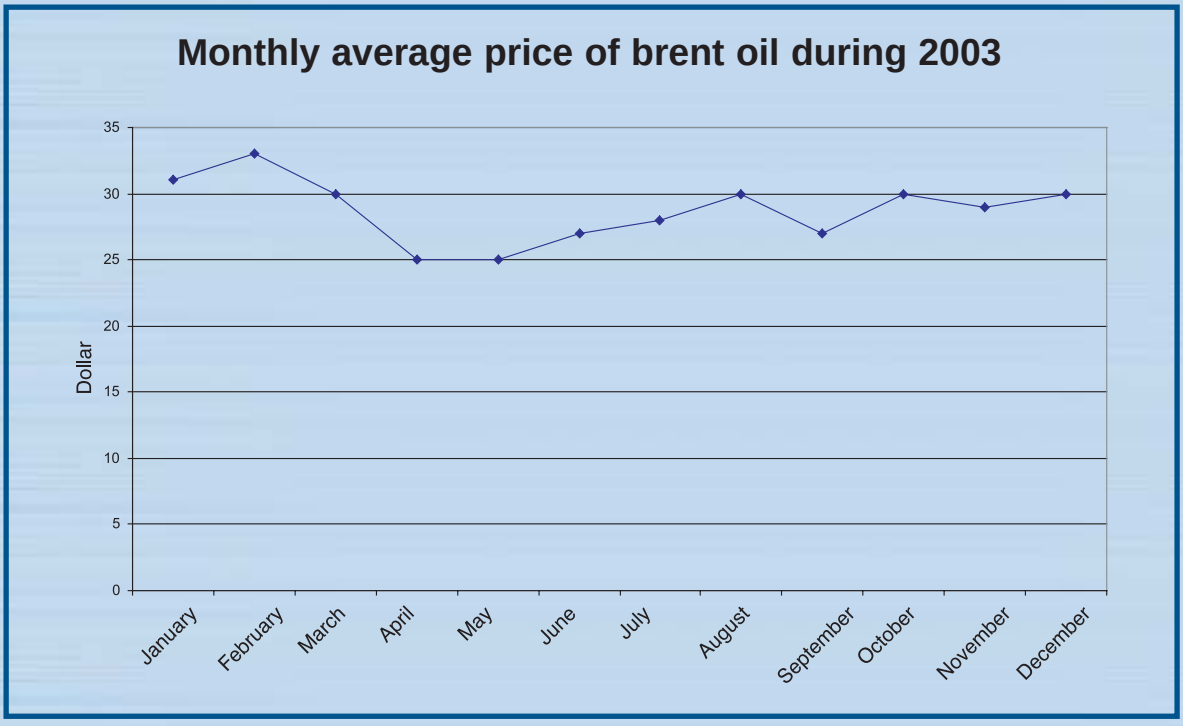
In the field of restructuring the energy sector and privatizing its production entities with the aim to reorganize the roles of the public and private sectors, and reinforce the role of the private sector to take part in the energy sector's projects whose nature necessitates its running on commercial basis, MEMR continued reconstructing the energy sector and creating a legal, competitive and safe environment.

First: Arab and International levels

World oil production in 2003 reached about 79 million barrels/day, with an increase of 4% against 2002 figures. World reserves however amounted to 1105 billion barrel. Crude oil production of Arab countries, reached about 22 million barrels/day, which is 28% of the world's production. Arab countries' reserves of crude oil amounted to 655 billion barrels which represent 59% of the world oil reserves.

Brent Oil prices in 2003 ranged between US $ 33 per barrel in February and US$ 25 in April.

The following diagram shows the monthly average price of Brent Oil during 2003.



The world reserves of natural gas in 2003 were about 172299 billion cubic meters while the production amounted to about 2578 billion cubic meters with an increase of 3% against 2002. The Arab reserves were about 52552 billion cubic meters representing 30% of the world reserves. The Arab production was about 266 billion cubic meters, representing 10% of the world production.

Second: Domestic Level

The domestic production of oil and gas remains modest. In 2003 it amounted to 214 thousand toe, representing 3.7% of our total needs of energy. This meant that Jordan depends substantially on imports to meet its needs of energy. Total imports of crude oil and oil products in 2003 were 5.176 million toe The volume of natural gas imported from Egypt amounted to 7.9 billion CF. The electric energy imported from Egypt was 972 GWh. The cost of energy imported from various sources was JD 764 million, with an increase of 25% against the previous year.

The whole demand of primary energy in 2003 was 5.8 million toe while demand of final energy, which is the energy available to the final consumer was 4 million toe with an increase of 7.4 % against 2002. The volume of demand of oil products on the level of primary energy was 5.03 million toe, and on the level of final energy, was 3.3 million toe. with an increase of 7.6% against the previous year.

Electricity generated in 2003 was 7988 GWh with a decrease of 1.7% against last year. This was due to an increase in electricity imported from Egypt. The volume of consumed electricity was 7345 GWh, with an increase of 6.4 % against 2002. The peak load amounted to 1428 GW with an increase of 1.3% against previous year.

The institutional situation of the energy sector in 2003

The energy entities in Jordan were historically isolated from each other without any framework that gathers them. Energy matters were distributed among several entities and many committees, which hindered a clear policy for the energy sector. This led to the inability of achieving the optimal efficiency in managing this sector. Due to the importance of the role played by this sector in the economic and social fields, and the direct connection between this sector and the political and economic aspects, the government paid attention to reconstruct this sector to upgrade and activate it. In light of the new institutional amendments, the current institutional framework of the energy sector is comprised as follows:

1- Ministry of Energy and Mineral Resources (MEMR)

The Ministry adopts the comprehensive planning for this sector in regard to organization, setting and following up the implementation of general policies to achieve the assigned missions, mainly providing the necessary forms of energy for the purpose of comprehensive development with minimum cost and best standards, in addition to attract world capital for investment in the Kingdom in various fields of energy such as power generation, oil products and exploiting the domestic energy resources.

2- Electricity Sector Entities

These are the entities that deal with organization, generation, transmission and distribution of electricity inside the Kingdom. These are as follows:

2-1 Electricity Sector Regulatory Commission

It is an autonomous entity, set up in 2001. Its most important task is to set electricity tariff, consumer's subscription fee, issue licenses to electricity generation, transmission and distribution companies, control their compliance with the license terms, solve disputes amicably between the electricity companies and consumers, and between the companies themselves in a way that safeguards the public interest, in addition to providing advice on any affair regarding the electricity sector.

2-2 National Electric Power Company (NEPCO)

It is a public shareholding company owned by the government. It is assigned to install and operate the electricity transmission networks from the generation centers to the distribution networks and load centers. The Company also

manages and operates the Control Center purchases electric energy from the generation companies and sells electricity to the distribution companies.

2-3 The Central Electricity Generation Company (CEGCO)

It is a public shareholding company assigned to electric power generation and wholesale to NEPCO. CEGCO was established in 1999 where the government owns 75% of its shares, while the rest is owned by NEPCO.

2-4 Electricity Distribution Companies

There are three companies as follows:

2-4-1 Jordan Electric Power Company (JEPCO)

It is a public shareholding company, in charge of electricity distribution in the governorates of the Capital, Zarqa, Madaba and Balqa' (excluding the middle Jordan Valley areas), under a 50 years concession that expires in 2012.

2-4-2 Irbid District Electricity Company (IDECO)

It is a public shareholding company in charge of electricity distribution in the governorates of Irbid, Mafraq, Jerash and Ajloun (excluding the northern Jordan Valley areas and the eastern areas) under a 50 years concession that expires in 2011.

2-4-3 Electricity Distribution Company (IDECO)

It is a public shareholding company in charge of electricity distribution in the areas located outside the concessions of JEPCO and EDCO, mainly the southern and eastern areas and the Jordan Valley.

2-5 Rural Electrification Project

Work started in this project in 1992 when the cabinet sanctioned adding one fils on every kilowatt of electricity consumed. This was raised to be two fils in 1997. The sums raised from these two fils are allocated for the Rural Electrification Project that is under direct management by the Ministry.

3- Petroleum, Gas and Mineral ores Entities

These are the entities in charge of petroleum and mineral ores exploration within the Kingdom, in addition to crude oil refinement. They are as follows:

3-1 Natural Resources Authority (NRA)

It carries out exploration of natural resources and geological, geophysical and geochemical surveys, in addition to issuing quarries and exploration licenses, beside supervising their operations.

3- 2 National Petroleum Company (NPCO)

It is a public shareholding company owned by the government. It carries out the works of oil and gas search, exploration and production within its concession areas of 7000 square Kilometers in the north eastern part of the country, close to the Iraqi borders. Al-Risha gas field, of about 1500 square kilometers, lies in this area. The renewable concession agreement commenced in 1996 for fifty years.

3-3 Jordan Petroleum Refinery Company (JPRCo)

It is a public shareholding company. The Government holds 6% of its shares. This company is in charge of refining crude oil, production of oil products and distributing them throughout the country according to a concession due to expire in 2008.

4- National Energy Research Centre (NERC)

It is a scientific center affiliated to the Higher Council for Science and Technology. It was established in 1998 to undertake scientific research and development activities, transfer of new and renewable energy technologies, energy conservation and shale oil. These activities were dispersed among several entities including MEMR, the Royal Scientific Society and the Natural Resources Authority. Minister of Energy and Mineral Resources is the Chairman of the Center's board of directors.

5- Jordan Atomic Energy Commission

It is an independent government entity, established in 2001 to deal with transfer and development of the nuclear energy technology for peaceful purposes and protection from radiation.

6- The Bio Gas Company

It is a joint sharing company owned by CEGCO and Greater Amman Municipality. It was established to utilize methane gas extracted from the organic wastes in generation of electric energy.

Sources of Energy in Jordan

MEMR continued to exploit the available domestic sources of energy and searching for new sources which can be exploited to lessen dependence on imported energy, in order to ease the heavy burdens carried by the State's treasury.

The following is a review of the latest efforts in this context during 2003.

1- Oil and Gas

The National Petroleum Company focused in 2003, on developing Al- Risha field and increasing its gas output. During the second half of 2003, a pipeline was constructed, 51 km long and 16 inch diameter, to deliver gas from south Risha . This construction of this pipeline aims to link all the producing wells to deliver gas to the consumption center. This led to raising the capacity of supply to the generation units at Al-Risha to achieve their utmost consumption which amounts to 35 million cubic feet per day. The increased output led to encourage CEGCO to plan for expansion and add a fifth gas turbine. The volume of produced gas in 2003 was about (10.2) billion CF and 1.4 thousand ton crude oil extracted from Hamzeh field.

Table No (1) shows the domestic production of oil and natural gas and their contribution to the overall energy consumption in the Kingdom during the period 1999 - 2003.

Table No. (1)
Crude Oil and Natural Gas Produced in Jordan 1999 - 2003

Year	Crude Oil (1000 ton)	Natural gas (billion cf)	Contribution to the overall Energy consumption %
1999	1.8	10.8	4.6
2000	1.8	10.2	4.2
2001	1.6	9.8	3.7
2002	1.5	9.0	3.6
2003	1.4	10.2	3.7

2- Oil Shale

MEMR continued its efforts to exploit the oil shale. It addressed many international agencies, through the Ministry of Planning, to fund a comprehensive economic feasibility study to exploit the Jordanian oil shale in electric energy generation and oil production. This study must include identifying the volume conforming with the Kingdom's needs of electricity generation capacities and the oil needs, specially after the termination of oil supplies from Iraq.

The National Energy Research Center carries out several activities in the field of exploiting the oil shale. The Center designed and manufactured a burner for oil shale. This burner works on the principle of dissolved layer with a capacity of 10 kg/hour to start making studies and research in cooperation with Tafileh Applied University College. The Center also started experimenting on oil shale distillation with a capacity of barrel/day, supported by the Higher Council for Science and Technology. The Center also continued media marketing through a seminar on exploiting the oil shale which was attended by all the concerned parties.

3- New and Renewable Energy

Out of the government's interest in exploiting all the available sources of energy in the country, MEMR started preparing a project for national comprehensive strategy plan and for the renewable energies in the country by preparing the necessary terms of reference and raising them to the Ministry of Planning, to address the donors in order to go ahead with this project.

The Nordic Trust Fund is expected to provide a grant for the implementation of this project in 2004 through UNDP, The Japanese Fund for Developing Policies and Human Resources approved providing a grant amounting to one million US dollars, under the World Bank umbrella to support the project of developing the sources of renewable energy in the country within the context of weather changes. MEMR will be in charge of this grant which will be used to study evaluating the sources of renewable energy and removing the handicaps that face exploiting these sources.

It is intended also to make a preliminary economic feasibility study of electric energy generation using wind on commercial bases, in addition to studying energy consumption at a number of heavy and light factories and a number of shops and houses. It is intended also to make the economic and technical evaluation of the data of Natural Resources Authority on the chances of exploiting the hot underground water for different purposes, such as electricity generation.

In general the most important activities carried out by MEMR during 2003 in the field of new and renewable energy are as follows:

Solar energy

MEMR and the entities concerned with lighting the remote villages followed by using the solar cells within the programme of the Jordan Badia development. After lighting Rawdat Albendan village in Rweished district in 2002, Alfaida village, in the same district was lighted in 2003. In cooperation with the Rural Electrification Project, and the National Center for Energy Research and through (RSW) of Canada, and funded by (CIDA), the Ministry carried out a feasibility study to light a number of remote villages, by solar energy or wind energy, depending on the location of each of them. The villages of Zebdet Abour, Fqoue and Wester Risha were lighted as well.

The National Center for Energy Research carried out several activities in this field, such as:

- implement the project of gauging solar radiation in the Kingdom by installing and operating seven gauging stations.
- start carrying out research in the field of water desalination by using solar cells.
- implement the project of lighting the tourist resort of Finan by solar energy on behalf of the Royal Society for Nature Conservation.
- make maintenance for water pumping stations from the desert wells working on solar energy on behalf of the Water Authority.

Wind Energy

CEGCO continued production of electric energy by using wind turbines at Hofa and Al-Ibrahimiah stations. The electric energy produced during 2003 was about 3064 MWh.

MEMR seeks to expand Hofa and Al-Ibrahimiah stations. At the end of 2003, an agreement was signed between the Jordanian government and (USTDA) and Delenova Company of America. According to this agreement, Delenova is to conduct the economic feasibility study to expand the two stations. It will provide US $ 180 thousand as a part of the whole cost estimated at US$ 360 thousand while USTDA will provide the rest of the cost.

To finalize the project of private electricity generation from wind energy whose tender was issued in 2001, inviting specialized international firms, which include establishing a project for electricity generation in three selected areas in the country, which are Hofa, Al Fajij and Wadi Araba, on (BOO) bases, with a capacity of 75 - 90 MW, the proposals were received from two interested companies in late 2002. The German company, Lahmeyer, was assigned as a consultant to evaluate the proposals and negotiate with the winning company. The Spanish Company, EHN, won the first rank in the technical and financial evaluation of the

proposals. MEMR and the consultant are currently negotiating with the company to build two stations on (BOO) bases to generate electricity by wind in Al-Fjij and Wadi Araba areas with a capacity of 25-30 MW each.

On the other hand, the National Center for Energy Research is carrying out several activities in this context. In addition to developing the data base and information regarding the wind energy and developing the electricity generator which generates the (DC Current) at the electric turbines, the Center developed a new type of (Turn-Table) which is used now in the new generation of smaller developed electric turbines. An electric turbine with a capacity of 500 watt was installed to charge batteries in the scientific garden of the Jubilee School in Amman. Three turbines were installed on behalf of the Badia development project at three sites in the Eastern Desert of Jordan.

Bio Energy

The Jordan Bio Gas Company continues operation, management and maintenance of the bio gas project in Ruseifah area, east of Amman. Due to the importance of this project in limiting emission of methane gas into the atmosphere and utilizing it in electricity generation, the project's work plan includes carrying out five similar projects at different sites in the country. MEMR is preparing a national plan for bio energy. An international consultant laid the necessary terms of reference for this purpose. The National Center for Energy Research was commissioned to prepare this plan in 2004.

Table No (2) shows the achievements of Jordan Bio Gas company during 2002-2003.

Table No (2)
Achievements of Jordan Bio Gas Company
During 2000 - 2003

Year	Volume of processed solid waste (Ton)	Volume of processed liquid waste (Ton)	Volume of produced bio gas (m3)	Volume of curbed emission of methane gas (m3)	Generated energy MWh
2000	--	--	1606162	839679	2506
2001	1395	4033	2692413	1416271	4933
2002	2178	6719	3182204	1668365	5376
2003	3403	8617	3566809	1860202	6000
Total	6976	19369	11047588	5784517	18815

Local Energy Demand

The year 2003 witnessed the termination of the Kingdom's needs of crude oil from Iraq, as a result of the war. This prompted the government to search for alternative sources. It was agreed with the Saudi party to provide part of the Kingdom's needs of crude oil and oil products in 2003. Moreover, the Jordan Petroleum Refinery Company issued several tenders to fulfill these needs.

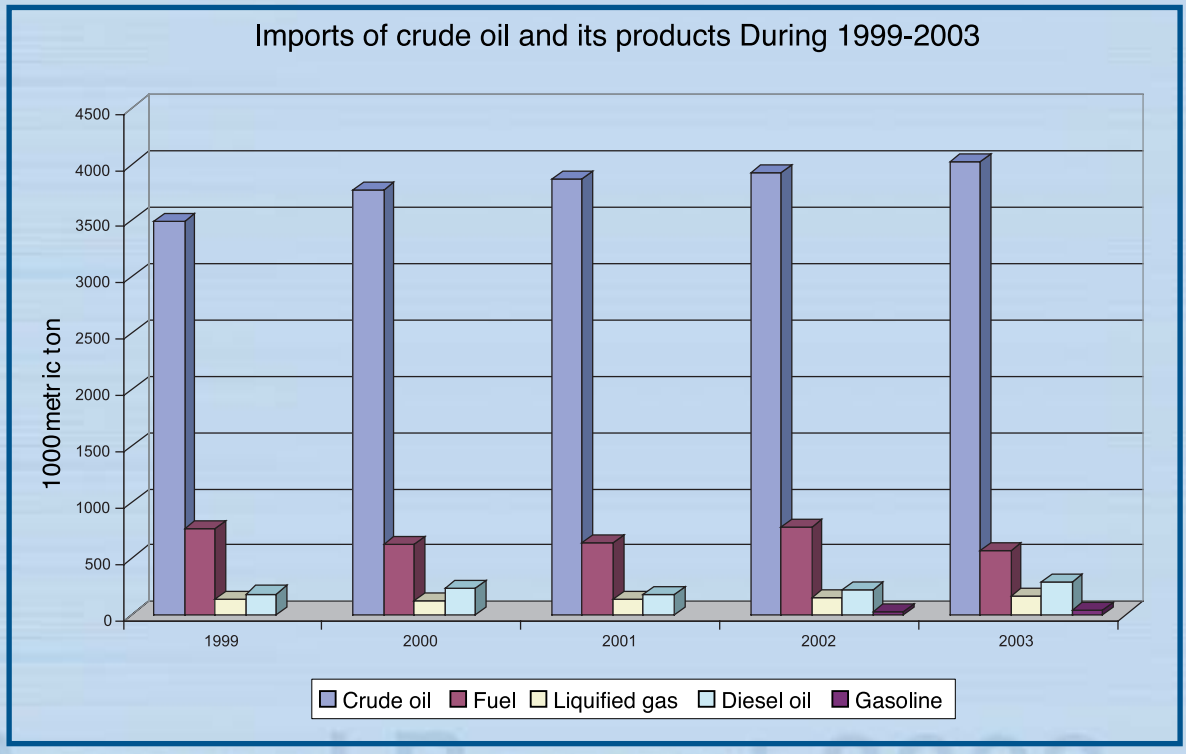
1- Impors of Crude Oil and Oil products

Imports of crude oil and oil products in 2003 amounted to about JD 764 million, which represented about 10.9% of the gross domestic product, 19.3% of the value of imports and 35.9% of the value of exports for the same year.

Table No. (3) shows the volume of imported crude oil and other oil products during the period 1999 - 2003.

Table No. (3)
Imports of crude oil and oil products (1999 - 2003)
(thousand metric ton)

Year	Crude oil	Fuel oil	Liquid gas	Diesel	Gasoline
1999	3501	773	138	191	--
2000	3778	626	133	239	--
2001	3875	647	138	182	--
2002	3926	785	155	230	25
2003	4023	570	171	292	40



2- Primary and final energy Consumption

Table No. (4)
Primary and final energy Consumption (1999 - 2003)
(thousand toe)

Year	Crude oil and oil products	Natural gas	Renewable Energy	Imported Electricity	Exported Electricity	Total
1999	4471	216	68	--		4755
2000	4815	213	75	11		5114
2001	4803	206	76	65		5150
2002	4954	188	79	78		5299
2003	5030.7	432	77	234	0.6	5774

Table No. (5) shows the consumption of final energy for all the Economical sectors.

Table No. 5
The percentage of sectorial consumption of Final energy
(thousand toe)

Year	Sector				Total
	Transport	Industrial	Domestic	Others*	
1999	1279	788	810	553	3430
2000	1370	852	881	585	3688
2001	1411	826	849	606	3692
2002	1435	846	868	662	3811
2003	1495	878	945	722	4040

***** *This include the commercial and agricultural sectors and street lighting.*

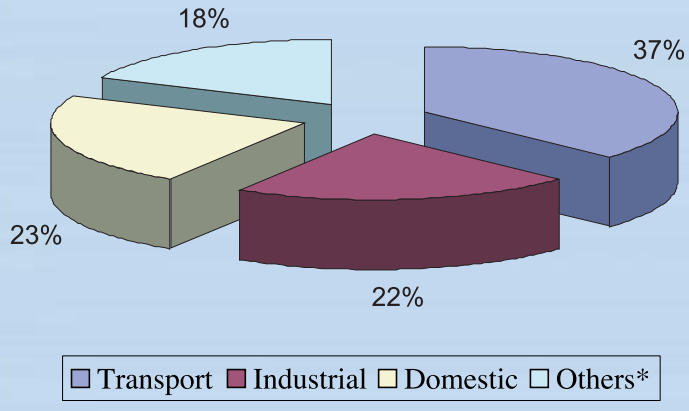
Table No. (6) shows the percentage of sectorial final energy consumption.

Table No. 6
The Percentage of Sectorial Final Energy Consumption During 1999-2003

Year	Sector				Total
	Transport	Industrial	Domestic	Others*	
1999	37 %	23 %	23 %	16 %	100 %
2000	37 %	23 %	24 %	16 %	100 %
2001	38 %	22 %	24 %	17 %	100 %
2002	38 %	22 %	23 %	17 %	100 %
2003	37 %	22 %	23 %	18 %	100 %

• *This include the commercial and agricultural sectors and street lighting.*

Percentage of sectorial distribution of final energy consumption during 2003



3- Oil Products Consumption and Prices

The year 2003 witnessed a slight decrease in oil products consumption against 2002. The volume of consumption amounted to 5014 thousand metric tons. This decrease represents about 0.2%.

It is noticeable that there is an increase in consumption including all the oil products excluding the fuel oil which witnessed a decrease of 7.4%. This is due to the start of supplying Aqaba Thermal Power Station (ATPS) with natural gas. As for the other oil products, the increase in consumption rates was as follows:

Liquefied gas 2%, Gasoline 2%, Avtur 21%, Kerosine 23%, Diesel 1.6 %, Asphalt 16%

The following tables show the development of production and consumption of the oil products during the period 1999 - 2003.

Table No. (7)
Development of the production of the Jordan Petroleum Refinery Company Of oil products during 1999 - 2003
(in thousand metric tons)

Oil Products / Year	LPG	Gaso-line	Avtur	Kero-scine	Diesel	Fuel Oil	Asphalt	Total
1999	130	549	217	179	951	1102	137	3265
2000	145	581	246	258	893	1341	114	3578
2001	138	641	214	181	999	1286	135	3594
2002	136	631	208	208	1091	1188	176	3638
2003	128	596	266	192	1150	1165	198	3695

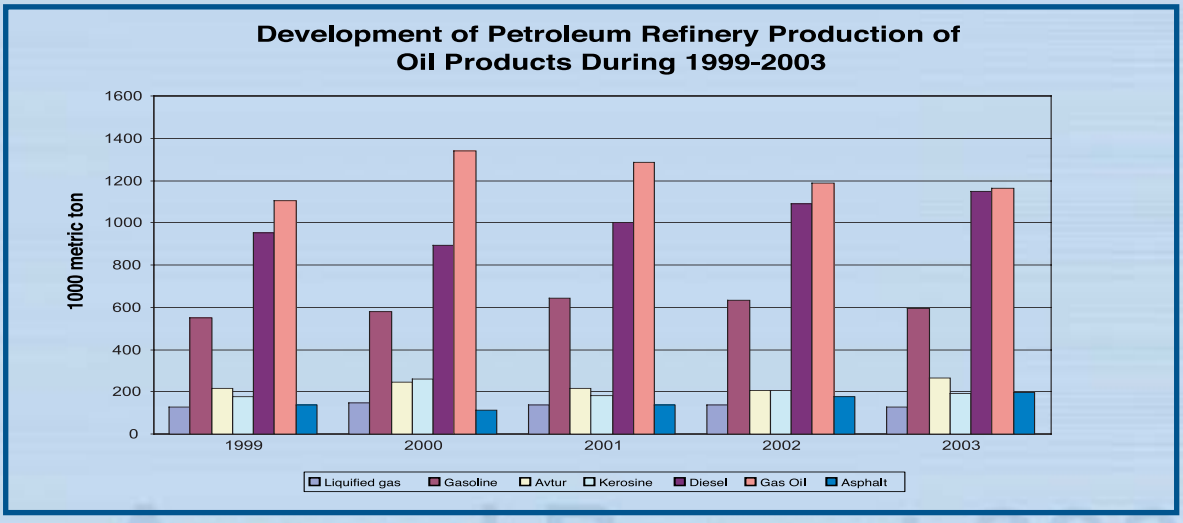
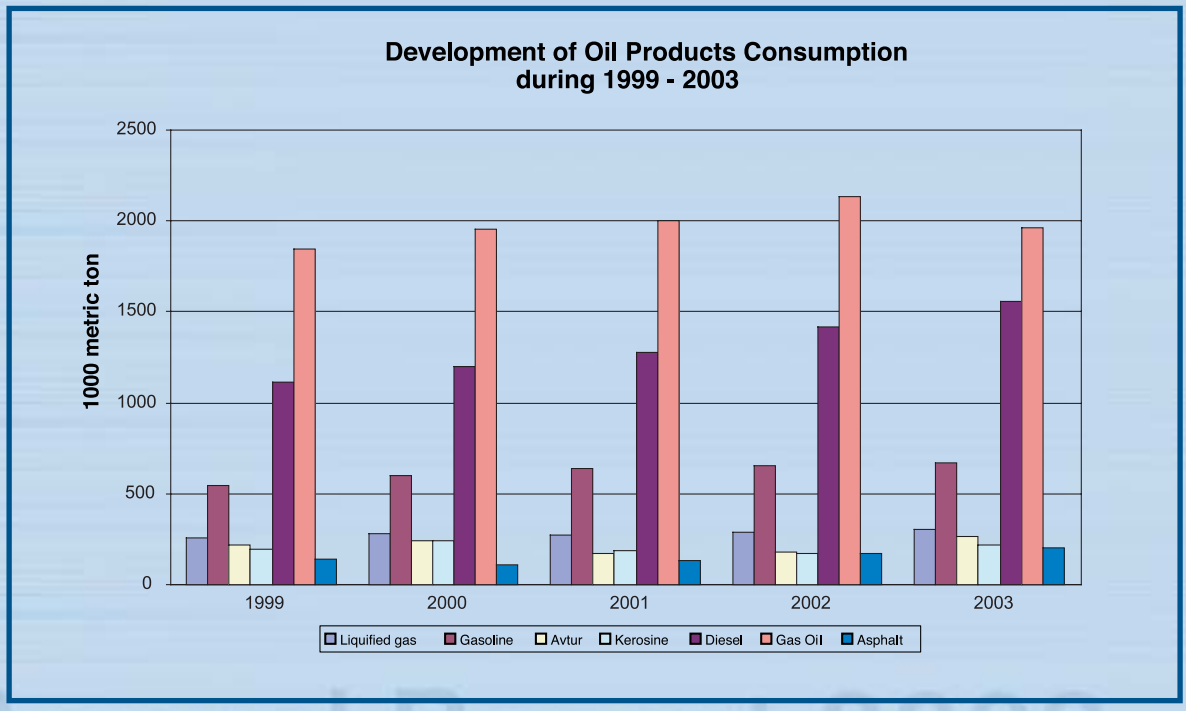


Table No. 8
Development of oil products consumption
In 1999 - 2003 (thousand metric ton)

Year	LPG	Gaso-line	Avtur	Kero-scine	Diesel	Fuel Oil	Asphalt	Total
1999	258	545	219	194	1114	1848	137	4315
2000	283	596	243	242	1202	1957	112	4635
2001	276	640	175	185	1274	2001	135	4686
2002	292	655	178	174	1417	2133	175	5024
2003	298	668	215	214	1439	1976	204	5014



The prices of oil products went through many adjustments in 2003, as shown in table No (9).

Table No (9)
The Development of Oil Product Prices
During 1999 - 2003

Product	Unit price	1999	2000	2001	2002	2003
LPG	Fils/12.5 Kgm gas Cylinder	2080	2080	2400	2500	3000
Gasoline (Regular)	Fils/Litre	241	241	275	275	300
Gasoline (Super)	Fils/Litre	321	321	370	370	400
Gasoline (unleaded)	Fils/Litre	371	371	425	425	450
Avtur						
Royal Jordanian	Fils/Litre	97	125	150	135	150
Foreign companies	File/Litre	120	190	190	143	180
Kerosene	Fils/Litre	91	91	110	120	130
Diesel	Fils/Litre	106	106	110	120	130
Foreign companies	Fils/Litre	135	170	200	200	200
Fuel Oil:						
Industries	JD/Ton	72.5	72.5	72.5	77	82
Electricity	JD/Ton	60.4	60.4	60.4	70	77
Local ships	JD/Ton	75.5	75.5	75.5	75.5	85
Foreign ships	JD/Ton	80	115	115	115	115
Asphalt:						
Liquid	JD/Ton	64.5	64.5	64.5	64.5	64.5
In barrels	JD/Ton	85	85	85	85	85
White Spirits	Fils/Litre	154	154	154	154	154

Generation and consumption of Electricity

The total electricity generating in 2003 was about 7988 GWh representing a decrease of 1.7% against 2002. This is due to the increase in imports from the Egyptian network whereby about 972 GWh were imported in 2003.

The electricity consumption was about 7346 GWh representing a growth of about 6.5% against 2002.

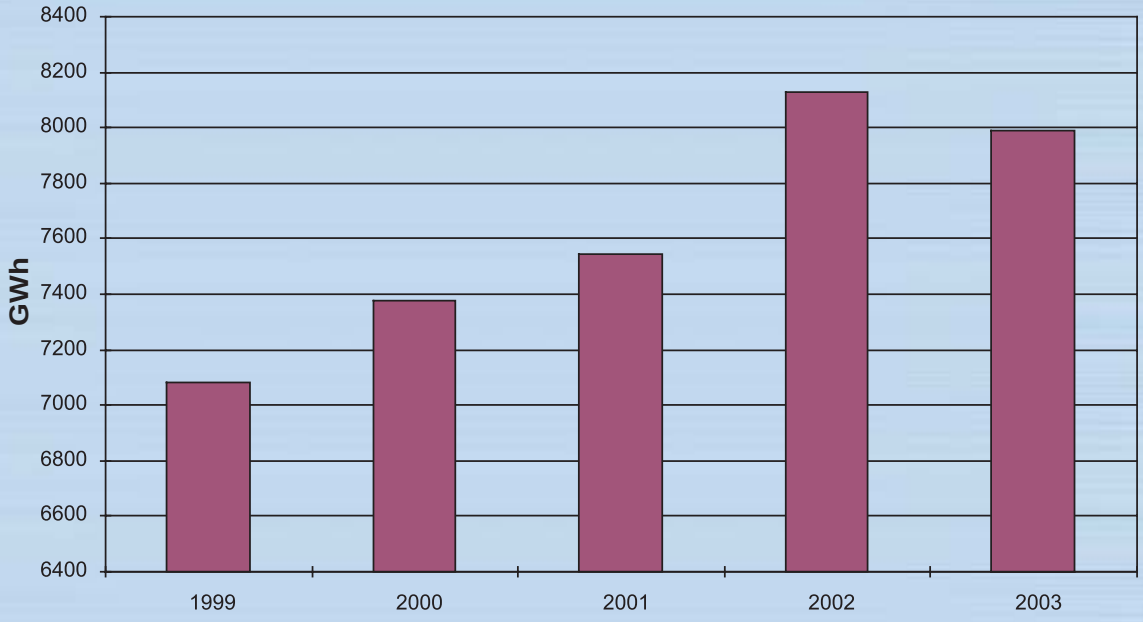
The peak load in 2003 was about 1428 MW representing a growth of about 1.3% against 2002.

The following tables show the production of consumption of electricity and the breakdown of sectorial consumption.

Table No (10)
The Development of Electricity Generation And the Peak Load during 1999 - 2003

Year	Peak Load MW	Growth Rate(%)	Electricity Generation (GWh)	Growth Rate (%)
1999	1137	7.3	7081	5.0
2000	1238	8.9	7375	4.2
2001	1255	1.4	7544	2.3
2002	1410	12	8127	7.7
2003	1428	1.3	7988	(1.7)

The Development of Electricity Generation during 1999 - 2003



The Development of Peak Load of Electricity during 1999 - 2003

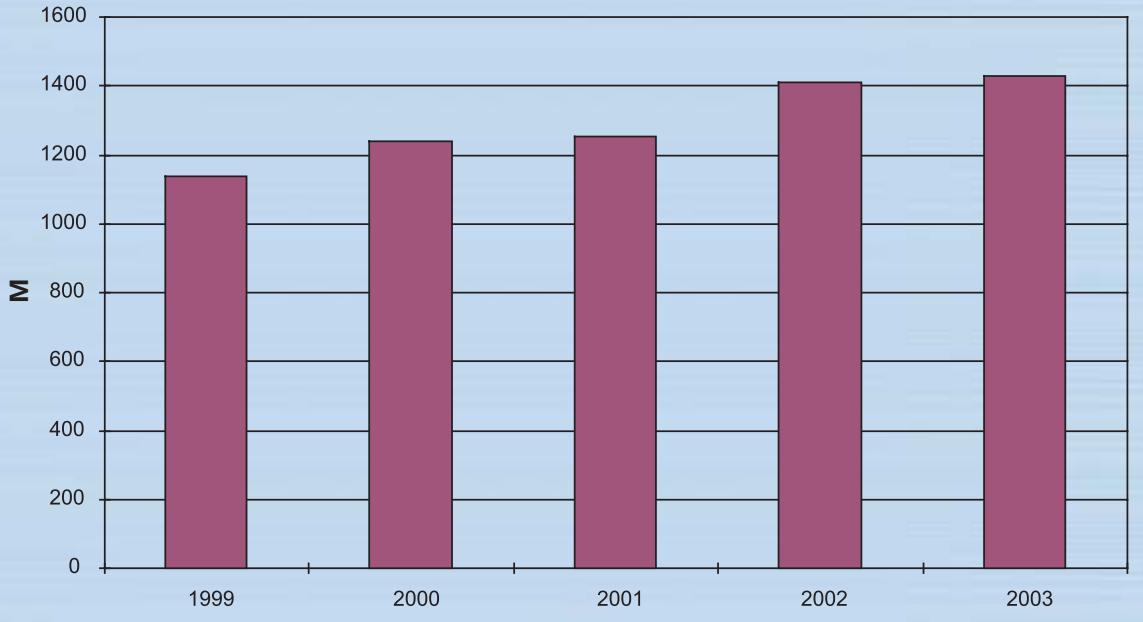
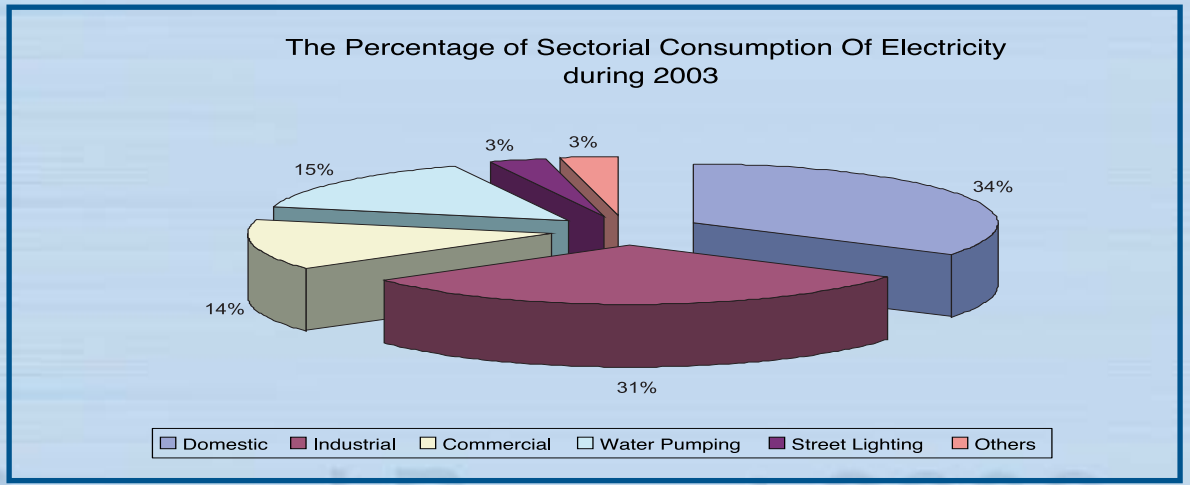


Table No. (11)
Breakdown of Sectorial Electricity Consumption And growth rate 1999 - 2003 Gwh

Year	Sector						Total	Growth Rate %
	Domestic	Industrial	Commercial	Water Pumping	Street Lighting	Others		
1999	1834	1915	721	972	158	205	5805	3.0
2000	1981	1974	805	990	173	210	6133	5.6
2001	2110	2024	880	982	177	219	6392	4.2
2002	2266	2193	971	1044	190	236	6900	7.9
2003	2471	2310	1047	1104	201	213	7346	6.5

Table No (12)
Electricity Consumption Percentage by Sector During 1999 - 2003

Year	Sector						
	Domestic	Industrial	Commercial	Water Pumping	Street Lighting	Others	Total
1999	31.6	33.0	12.5	16.7	2.7	3.5	100%
2000	32.3	32.2	13.1	16.2	2.8	3.4	100%
2001	33.0	31.6	13.8	15.5	2.7	3.4	100%
2002	33.0	32.0	14.0	15.0	3.0	3.0	100%
2003	34.0	31.0	14.0	15.0	3.0	3.0	100%



The following table shows the prices of electricity

Table No (13)
Electricity Tariff in the Kingdom

First: Bulk Tariff	Unit	Value
A. Distribution Companies		
1. Peak load	UnitJD/KW/Month	2.4
2. Day supply	Fils/KWH	31.4
3. Night supply	Fils/KWH	21.4
B. Large Customers		
1. Peak load	JD.Kw/Month	2.4
2. Day supply	Fils/Kwh	48
3. Night supply	Fils/Kwh	33.5
Second: Retail Tariff		
A. Ordinary Consumers	Fils/Kwh	
First block	From 1-160 Kwh/Month	31
Second block	From 161-300 Kwh/Month	55
Third block	From 301-500 Kwh/Month	64
Fourth block	More than 500 Kwh/Month	80
B. Broadcasting station & TV		
Station: Flat Rate Tariff	Fils/Kwh	60
C. Commercial Consumers	Fils/Kwh	62
D. Small Industrial	Fils/Kwh	38
Consumers:		
E: Medium Industrial consumers:		
1. Peak load	JD/Kw/Month	3.05
2. Day supply	Fils/Kwh	35
3. Night supply	Fils/Kwh	25
F. Agriculture	Fils/Kwh	26
G. Water Pumping	Fils/Kwh	38
H. Hotels	Fils/Kwh	60
I. Street Lighting	Fils/KWh	25
Monthly Minimum charge:		
A. Ordinary Consumers		JD 1.00
B. Other Consumers		JD 1.25

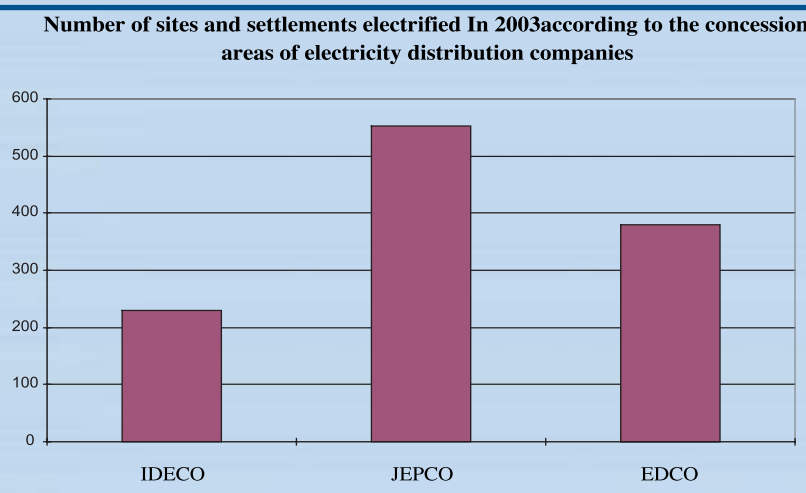
Rural Electrification Project

The government continued providing electricity to the rural settlements through the Rural Electrification Project by the electricity distribution companies, in accordance with their respective concession areas. In the year 2003, (3901) houses dwelled by about 21845 persons were electrified, at a total cost of around JD 9.3 million.

Table No (14) shows the number of houses and beneficiaries and the total cost according to the respective concession areas of the electricity distribution companies in 2003.

Table No (14)
Number of houses electrified in 2003 According to the concession areas of the Electricity distribution companies

Company	No of Sites	No. of Houses	No. of beneficiaries	Total cost million JDs
IDECO	230	964	5398	2650228
JEPCO	553	1822	10203	3530234
EDCO	379	1115	6244	3072339
Total	1162	3901	21845	9252801



Conservation of Energy Consumption

MEMR continued to carry out its programmes regarding the conservation of energy consumption in the consuming sectors. These programmes include:

1- Programme for energy consumption conservation in the industrial sector.

Due to the importance of this sector as the largest in consumers, and in order to help MEMR and the National Center for Energy Research in implementing the programme started out in the last year with a group of industrial plants, three new studies were conducted on three industrial plants: United Company of Steel, Jordan Ceramics Company and Jordan Phosphate Mines Company. Detailed reports were made, including specified recommendations to lower the energy bill. The following table shows the annual saving ratio in energy consumption and the period needed to recover the needed investment to achieve this saving.

Company	Saving ratio %	Recovery Period (year)
Steel	55	4.16
Ceramic	9	1.67
Phosphate	22	4.8

This programme includes as well the conduction of more studies on energy conservation in other industrial plants, such as National Poultry Company, South Company for Filter Manufacturing, and Ghadeer Company for Mineral Water.

2- Adjustment of fuel consumption ratios for vehicles used by about 26 ministries and government departments. This work is done by MEMR and representatives of Ministry of Public Works and Housing, Accounting Commission and the concerned departments.

The National Center for Energy Research carries out several activities in this field which include:

- implement the programme of improving the efficient use of energy in cities, by employing (GIS) in laying the maps regarding the general lighting network and

employing the best modern technological means of upgrading the efficiency of these systems in city of Irbid.

- implement a detailed study of energy conservation at Radisson Sas Hotel in Amman and Aqaba, Nayrouz Plastic Plant and Rum Engineering Industries.
- Conduct a study on the chances of energy saving at the pumping plants in the country.
- Equip a mobile energy laboratory (a bus) with equipment that enable the team of energy consumption conservation to conduct studies at various sites.
- Work in cooperation with MEMR on issuing legislations (regulations, laws or instructions) in regard to energy efficiency. The draft of these legislations were discussed at a workshop held for this purpose. Most of the involved parties took part in this workshop.

The Center also contributed to awareness raising and technical capabilities in the field of energy consumption conservation and increasing their efficient utilization by issuing periodic pamphlets and technical booklets and holding specialized courses for different sectors.

3- Awareness programmes

MEMR and the National Center for Energy Research disseminate information and launch campaigns for awareness through all the media means. These call for the optimal and most efficient utilization of energy by lessening the lost energy and employing the most efficient and saving techniques, either through lighting or thermal insulation or others.

Energy and the Environment

MEMR renders great attention to the environment issue. It cooperates with the Ministry of the Environment to ensure continued compliance with environmental conditions, and upgrade their level in all energy activities. The most significant achievements in 2003 are as follows:

- participation in the technical committees for the project of organic pollutants. This project includes identifying the ratios of dioxide emissions from different sources, particularly the electric power stations.
- continued participation in studying the evaluation of the effects on the environment as a result of utilizing petroleum coal at Jordan Cement Factories Co.
- participation in the works of the technical committee to study the environmental and economic dimension of electric power stations for the purpose of privatization of electricity sector.
- Continued participation in the meetings of the technical committee concerned with designing solutions to control the pollution caused by different means of transport.

Mining

Natural Resources Authority (NRA) seeks through research, investigation and exploration of mineral resources, to increase the mining sector's contribution to the gross national product. This is done through focusing on exploration of mineral resources related directly to domestic mineral manufactures which have substantial economic revenues.

NRA sets policies and recommendations to control exports of some mineral ores and industrial rocks. This aims to protect them of random exploitation, and maximize their added value locally to raise the revenues of mining and the national income.

In cooperation with the Corporation of Investment Promotion, NRA works on attracting the international investments in exploration of mineral resources, oil and gas. This is done through promotional campaigns that provide parties interested in investments with all the technical information regarding the mineral ores.

These campaigns deal with the possibilities of exploiting, the volume of available mineral ores and the supply and demand aspects for the ores, locally, regionally or internationally.

The most significant projects carried out by the NRA on exploration of mineral ores can be summarized as follows:

- exploration of zircon and heavy minerals project

  This project is located in the South of Jordan. It aims to continue the exploration works to increase the volume of reserves of this ore. Three further sites were identified in the south of Jordan following the encouraging results of the sample which was analyzed in Egypt. Nineteen wells were drilled with a total depth of 330 meters.

- diatomite pentonipe exploration project

  This project is located in Qae Al Azraq and Qae Al Umari areas. It aims to follow up the exploration works in the areas which were not covered in earlier exploration works. This is done due to the encouraging results shown by explorations.

  Eight wells were drilled amounting to a total of 275 meters. Fifty three samples were taken from the wells. The analysis results showed the presence of slime minerals such as Kaolin and Semktite and non-slime minerals such as Quartz, Feldspar, Calcite and lime.

  The analysis results also showed that the average silica in the wells ranged from

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32.9% and 47.8%, and the aluminum oxide between 16.1% and 18.5% in the layers of diatomite and about 10.4% in the clay layers, iron oxide between 2.1% and 3% in the clay layers, and between 6.8% and 8.6 % in the diatomite layers.

- Oil shale exploration project

This project lies in Etarah Um Al Ghadran which aims to identify the horizontal, vertical and quality expansions of the oil shale for conducting future studies by the interested companies. Seven wells were drilled with a total depth of 903 meters. Forty eight samples were taken for analysis. The results showed that Calcite is the main component.

- Kaolin exploration project

This project is in the area of Batn El Ghoul. It aims to continue exploration works for Kaolin in the south east region of the country. Twenty one wells were drilled with a total depth of 405 meters.

104 samples were collected from the wells. The results of analysis showed that the main component is Quartz and a limited presence of Kaolin. The results also showed that aluminum ratio ranged between 8.4% and 30.8%, and iron is between 0.5% and 7.6%.

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Strategic Planning for the Energy Sector

The expected continued rising growth of energy consumption at an annual rate of 3% in general, and a growth of 6% of electricity consumption, prompted large annual investments in the energy industry, possible reaching the sum of JD 150 million, as well as a high incurred cost of energy imports. These as a whole constitute a great and worrisome burden for the state budget. For this reason, the energy sector based its strategic planning on this fact. MEMR carried out a number of projects to lessen this financial burden on the treasury. The projects are:

1- Crude oil pipeline from Iraq to Jordan:

This project is considered one of the vital ones that Jordan intended to carry out in order to discard the traditional way of transporting crude oil by tankers, which had negative effects on the environment and the roads. But due to the developments on the Iraqi scene and because of cessation of Iraqi crude oil supply to Jordan, the Cabinet decided to freeze this project for the time being, until the situation in Iraq becomes clearer, in terms of security and economic stability.

2- Developing mechanisms to receive, store and transport crude oil, and oil products through Aqaba port:

Due to the cessation of crude oil supply from Iraq, there was a change in the sources and mechanisms of importing crude oil and oil products as Aqaba port became the only delivery point. In light of the great volume of delivering crude oil and its products through the oil terminal, which also received chemicals and vegetable oils, the terminal assigned for the delivery of crude oil and its products, became unable to handle the amount of oil received, with the same flexibility that suits the general needs of the Kingdom. This situation prompted taking several procedures to increase the efficiency of the installations that deal with receiving, handling and delivering crude oil and oil products. The following are some of these procedures:

- expanding the existing terminal assigned to receive crude oil and oil products in order to be able to accommodate two tankers at one time in succession to avoid jamming in the movement of ships and tankers and to be able to receive the imported quantities of crude oil and oil products as scheduled. The estimated cost of the project is about US $ 12 million.

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- increasing the storing capacities of crude oil and oil products in Aqaba, to maintain a convenient strategic stock, in addition to ensuring the needed flexibility needed to accommodate and unload the tankers as quick as possible, which entails lowering the cost of chartering the tankers and ensuring the arrival of these items to the refinery as scheduled. This also leads to manage without assigning tankers used to stockpile crude oil in Aqaba.

  The project includes the building of storage capacities for liquid gas estimated at 7000 metric ton, and storage capacities to crude oil at 75 thousand metric ton. The estimated cost of the project is about US$ 19 million.

- installing an oil pipeline from the oil terminal through the refinery installations in south Aqaba, to reach a proposed site in Wadi Al-Yutum area, where a station will be built to receive the crude oil.

  This project aims to raise the capacity of loading the needed quantities of crude oil and getting rid of the negatives of the tankers' usage of the back road leading to the industrial zone which has its effects on human beings and the environment.

  This project results as well in decreasing the transport cost and increasing the storage capacities of crude oil. The project comprises establishing a pipe of 24 inches in diameter and with length of 25-30 km, building additional storage capacities of 50 thousand tons at the new station, and building a station for unloading and loading tankers with a capacity of 20 thousand tons per day. The estimated cost of the project is about US$ 16 millions.

- modifying four of the seven tanks at ATPS used to store heavy oil, so as to be capable to store crude oil. This project aims to raise the strategic stock of crude oil in Aqaba, by 140 thousand ton after converting ATPS to operate on natural gas. The estimated cost of the project is about US$ 3 million.

3- Natural Gas Transportation Project from Egypt to Jordan

This project includes Jordan's purchase of the Egyptian Natural Gas for thirty years. The Egyptian side carries out the first part of the project which includes installing and operating an overland gas pipeline from Arish to Taba with a diameter of 36 inches and a length of 245 km, in addition to a submarine pipeline of 15 km through the Gulf of Aqaba. This part also includes construction of overland facilities on the beach of the Gulf of Aqaba near ATPS.

These facilities include the receiving station, gauging station, the control system and gas delivery to ATPS Al Sharq Gas Company of Egypt carried out this stage which was officially inaugurated on 27 July 2003 under the patronage of His Majesty King Abdullah

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II and His Excellency President Mohammad Husni Mubarak of Egypt. Gas delivery to ATPS started on 4 August 2003.

The second part of the project includes installing a gas pipeline from the point of gas delivery in Aqaba to Rehab Station site, to the north of the Kingdom, with a diameter of 36 inches, 393 km long, and a transportation capacity of 10 billion cubic meter per year.

An Egyptian consortium was selected as the best bidder, in an international bidding exercise, to carry out this part of the project. The consortium consists of four firms: the Egyptian Natural Gas Holding Company, Petrojet, Anbi and Gasco.

Negotiations with the consortium resulted in agreements to implement the project and the contract was initially signed in December 2003.

According to these agreements, the Egyptian consortium established the project's company under the title "Jordanian -Egyptian Fajr for natural gas transportation and delivery. They registered it with the general controller of companies in Jordan. The Company will fund, install, operate and own the pipeline throughout the project's period of 30 years with an estimated cost of US$ 300 million.

The Egyptian consortium also prepared the designs needed for the project, determined the final path of the pipeline and handed them to MEMR. The official signing on the project's agreement is expected in the beginning of 2004. After that, carrying out the project will start after reaching the stage of financial closing.

The pipeline is expected to be completed and commercially operated, and to start transporting and delivering gas to the electric power stations in 2006.

4- Projects of Electricity Generation in Jordan

a- project of Kherbet Al-Samra power station

In light of Tractabel Company's decision to stop work on the project on 20 November 2002, the Cabinet decided on 26 November 2002 to commission CEGCO to carry out the project using the combined cycle with a capacity of 300 MW. CEGCO assigned a consultant to do the consultancy works needed for the project. These works include preparing the tender documents, and doing the engi-

neering and supervisory works of the project. The tender documents were issued on 7 July 2003. Offers were received from several companies on 4 December 2003. The tender is expected to be awarded in June 2004.

Commercial operation of the first gas turbine will be in July 2005, while the second gas turbine will be operational in September of the same year. The commercial operation of the station as a combined cycle is expected in June 2006.

b- Project of first private electricity generation

This project comes to meet the demand on electricity during the summer of 2008. It includes constructing an electric power station using the technology of combined cycle that combust natural gas as the main fuel, and diesel as a secondary fuel with a capacity estimated at about 300 MW.

The American Consultant, K&M, was contracted on 31 March,2002 to do the consultancy works needed for the project.

The consultant conducted several studies concerning the project with the aim of preparing the draft of the tender documents of the project. These documents are expected to be issued by the end of 2004. The commercial operation of the project as a simple cycle will be in the end of the second half of 2007, and as a combined cycle at the end of the first half of 2008.

5- Privatization of Electricity Generation and Distribution Project

In spite of the surrounding regional developments (war on Iraq) and their effect on willing investors in the region, the Consultant N. M. Rothshild continued the implementation of the second stage of consultancy services contract after completing the first stage and obtaining the government's approval. The second stage includes preparing the draft of the tender documents and pre-qualification of the investors, in addition to the draft of the agreements needed and necessary for the selling process and negotiations in preparations for selecting the winning firm.

The Consultant completed the stage of preparing the documents and agreements needed for selling the companies. These documents were raised to the Cabinet for approval in preparation for starting the sale programme and issuing the necessary tender by the beginning of 2004. It is expected to complete the privatization programme towards the end of the same year. This project aims to privatize the activities of electricity generation and distribution by means of privatizing 60% of CEGCO, 100% of EDCO and 55.4% of IDECO.

6- Electric Interconnection Projects

The strategic merits of electric interconnection are great, particularly among Arab countries. Interconnection constitutes an additional generation capacity for the interconnected networks. It also leads to decrease the capital investments needed for meeting the demand for electric energy. These capital cutbacks can be used for other economic aspects. Due to the importance of this fact, Jordan implemented a number of electric interconnection projects at the regional level, as follows:

- Jordan-Egypt Electric Interconnection Project

The cost of the Jordanian side of this project amounted to US$ 75 million. The line was officially inaugurated on 16 March 1999.

Electricity exchange between the two countries started , whereby the electric energy imported from Egypt through this line in 2003 amounted to about 972 GWh. The contract on electric energy purchase between the two sides was renewed on 29 December 2003. It was agreed that the Jordanian party would import maximum electric capacities of 300 MW per year through the year 2004, in addition to electric capacities accompanying the aforementioned, of about 700 GWh parceled out through the months of this year.

- Jordanian Syrian Interconnection Project

The investment costs of the project were US $ 25 million for the Jordanian party.

The line was officially inaugurated on 14 March 2001.

Electric energy exchange between the two countries, is continuing on an in kind basis until agreement is reached regarding the tariff of electric energy exchange between the two countries.

- Jordanian Iraqi Electric Interconnection Project

A memorandum of understanding was signed between the Jordanian and Iraqi parties on 30 November 2003. This memorandum comprises the cooperation guidelines in the field of electricity sector. The most significant points are:

- establishing a coordination office for the Iraqi electric sector on NEPCO premises.
- working on implementing the electric interconnection between Jordan and Iraq with a voltage of 132 KV and/or 400 KV and conducting the studies needed for this purpose.

- The Jordanian electric sector companies are to participate in the works of maintenance needed for the various components of the Iraqi electric system.

These projects are considered part of the six countries electric interconnection project which includes Jordan, Egypt, Syria, Iraq, Lebanon and Turkey. The application of Libya was approved to join the six countries interconnection project, thus becoming seven interconnected countries. The approval was taken on 2nd November 2003 in the meeting of the ministers concerned with electricity and energy in the six interconnected countries, where Egypt and Libya were interconnected and the electric transmission line of 220 KV was put in effective operation as of May 1998.

Upon the full achievement of this project, the electric networks of these countries become connected to the European network and through Turkey in the north, and through the Moroccan network and Spain in the West.

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