

Chapter 10

Energy





Energy

Introduction

The Egyptian energy sector relies mainly on primary fossil fuel resources with ratio about (95%) in addition to water energy resources. Despite restrictions imposed by limited traditional energy exhaustible resources, we have found that the energy consumption rate rises by almost 7.5%; that's why it's a time to propose strategic alternatives such as new and renewable resources, as well as using new technologies to improve energy efficiency (EE).

Improving energy efficiency in industry, electricity, construction and oil still one of the significant challenges at the local level, as enormous mutual benefits arise from applying EE policies in production and consumption sectors, such as reducing energy demand and costs, improving air quality, and controlling greenhouse gases. Thus, availability of EE technologies in such domains will undoubtedly support efforts to achieve sustainable production and consumption patterns.

Energy Project Status Quo

1– Oil and Gas Projects:

During, 2006-2007⁽¹⁾, MSEA issued environmental approval for 261 projects in oil and gas company concessions all over Egypt, onshore and offshore. Environmental clearances included 40 seismic survey projects to determine the potential of oil reservoir; 173 exploration well drilling projects to examine earth layers, specifications and determine the type of each to see which contain oil or gas; 27 development wells to extract oil/gas and facilitate production; 8 pipeline projects to link production facilities for gas/oil treatment; 10 projects to extend natural gas distribution networks in Cairo, Giza, Faiyum, Beni Soueif, Minya, Assiut, South Sinai, Port Said and Nubaria; and 3 chemical projects.



Table (10.1) Total environmental clearances for oil/gas projects in 2006-2007

Administration	Seismic survey	Drilling exploration well	Developing well	Pipelines	Chemicals
Egyptian General Petroleum Corporation (EGPC)	31	108	12	7	-
Egyptian Natural Gas Holding Company (EGAS)	8	61	15	11	-
Ganoub El-Wadi Petroleum Holding Company (GANOPE)	1	4	-	-	-
Egyptian Petrochemicals Holding Company (ECHEM)	-	-	-	-	3
Total	40	173	27	18	3

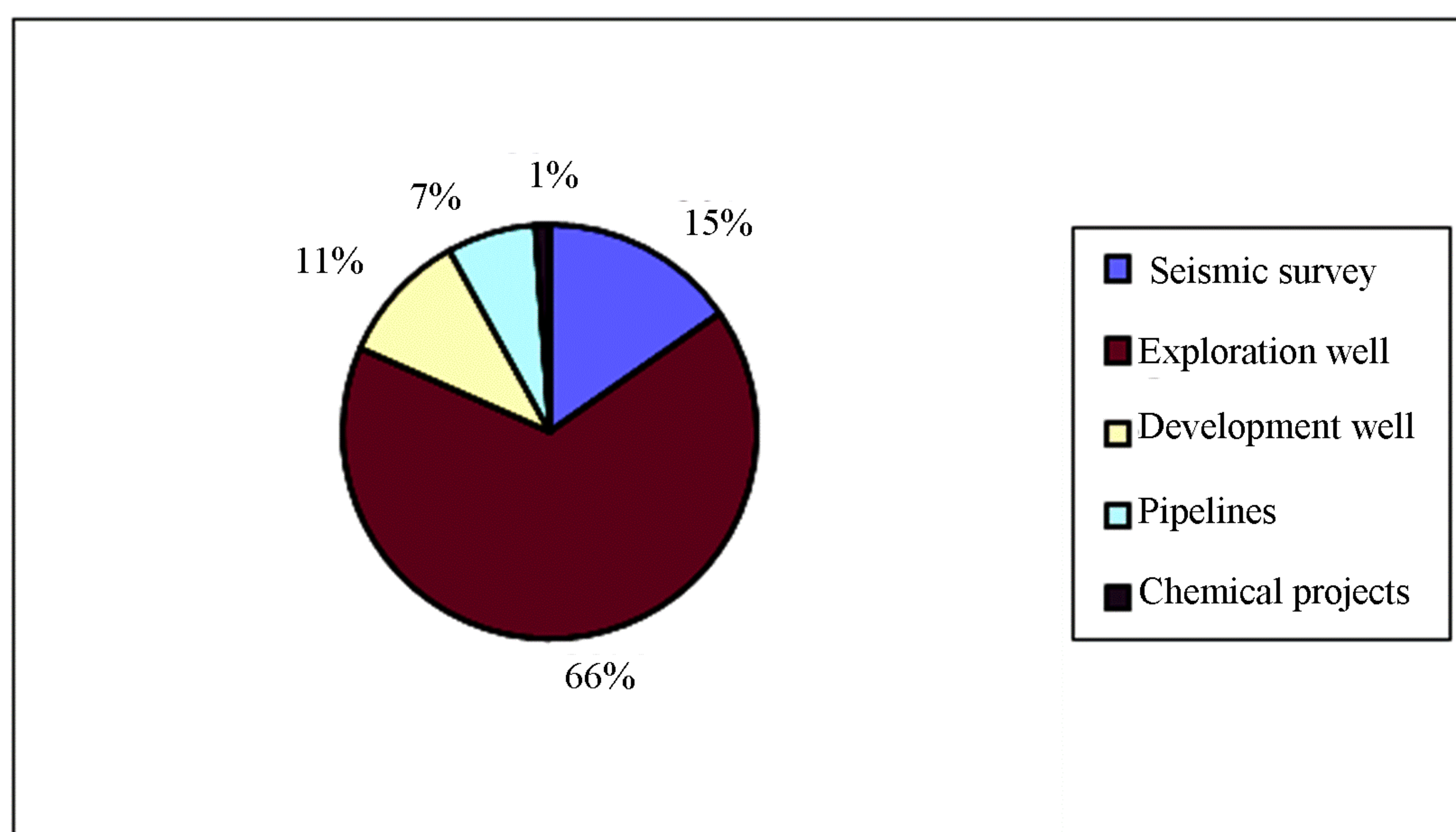


Fig. (10.1) Percentage of oil/gas projects environmentally cleared in 2006-2007



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2– New and Renewable Energy Resources

The Higher Council of Energy on 10/4/2007 adopted the Renewable Energy Strategy in Egypt which targets the increase of energy generated from renewable resources to 20% of the total generated energy in 2020, 12% comes from the wind and 8% from water resources⁽²⁾.

Currently, the New and Renewable Energy Authority (NREA) completed the data required for the environmental clearance of two additional wind power stations in Zaafarana on an area of 42km², the first is 80 MW in collaboration with Germany, and the second is 120 MW in collaboration with the Danish Government.

Noteworthy, a study monitoring bird migration in Gebel Zeit (a 70-km long and 10-km wide 656-km² plot of land on the Red Sea west coast, which was allocated to the New and Renewable Energy Authority, on the most significant bird migration routes among Africa, Europe and the Middle East) recommended the exclusion of 464 km² (67%) of the total area and prevention of any wind turbines there due to migrating birds that densely perch in autumn and spring. Environmental approval was given to use the remaining area (67 km²) [following the exclusion of the rest of the area allocated for other purposes (125 km²)] which accommodates about 420 MW, taking into account the wind turbine height not to exceed 100 m, i.e. output of not more than 1000 KW. Furthermore, the use of tubular metal towers, not lattice metal towers, is a must with a corridor not less than 1km wide, parallel to bird migration direction, between each wind farm.

Under MSEA program to enforce environmental regulations for protecting and maintaining the environment, it participated in reviewing the new Nuclear and Radioactive Draft Law regulating the benefit from peaceful uses of nuclear power and providing the nuclear safety precaution.

3– Industrial Projects

MSEA issued environmental clearance for the following projects:

- A. 1 urea production line at the end of 2007. It is noted that in 2006, no environmental clearance was issued, while in 2005, clearance was issued for 2 urea production lines, and 1 in 2004 besides 1 liquid ammonia production line. The total consumption of these projects is estimated to be about 2.6bn m³/year.



B. For petrochemical projects, an environmental clearance was issued in 2007 for a methanol production line, at a consumption capacity of 1.2bn m³/year, and in 2006, for a linear alkyl benzene production line for producing detergents, at a consumption capacity of 0.08bn m³/year. Both projects have been introduced for the first time in Egypt. Table (10.2) shows natural gas daily consumption rates for some energy-intensive petrochemical industries.

Table (10.2) Daily natural gas consumption for some energy-intensive petrochemical industries

Sr.	Company	Product	Location	Environmental Clearance Date	Investment costs (in \$ m)	Daily natural gas consumption (million m ³)	Daily natural gas consumption (ton of oil equivalent)
1	Egyptian Basic Industries	Liquefied ammonia	Sokhna	29/8/2004	-	1.2	1.333
2	Egyptian Fertilizers	Urea	Sokhna	1/9/2004	-	2.4	2.666
3	Helwan Fertilizers	Urea	Tebbin	15/12/2005	-	1.2	1.333
4	Mopco Fertilizers	Urea	Damietta Port	21/12/2005	-	1.2	1.333
5	Alexandria Fertilizers	Urea	Abu Qir	23/12/2007	-	1.2	1.333
6	ECHEM	Linear Alkyl Benzene	Max, Alexandria	20/12/2006	450	0.225	25.0
7	EMethanex	Methanol	Damietta Port	4/11/2007	900	3.3	3.666
Total						10.725	11.914

Source: EIA received by EEAA to receive environmental approval



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- C. For iron industries, there are 4 existing companies consuming 1.32bn m³/year of natural gas, as shown in Table (10.3), whether for manufacturing or for generating electricity.

Sr.	Company	Classification	Production capacity cleared	Location	Needs	
					Manufacturing gas (million m ³ /day)	Electricity generation gas (million m ³ /day)
1	Al-Ezz Steel Rebars (Ezz Steel)	Existing	3.3m tons of DRI 1.7m tons of pellet	Economic Zone, North West Gulf of Suez	1320	330
2	Taybah Steel	Existing	0.45m tons of pellet 0.45m tons of steel re-bars	Economic Zone, Gamasa, Daqahlia	20	100
3	Egyptian for Sponge Iron and Steel	Existing	1.8m tons of DRI 1.3m tons of pellet 0.45m tons of steel re-bars	Industrial Zone, Sadat City, Waste Land	720	200
4	Suez Steel	Existing	1.95m tons of DRI 2.06m tons of pellet 0.81m tons of steel re-bars	Industrial Zone, Ataqa, Suez	720	200

Table (10.3) Production capacities and gas necessary for manufacturing and generating electricity for existing iron factories

Table (4.10) indicates that the total annual potential natural gas consumption by new fertilizers, iron and petrochemicals factories is estimated at about 5.20bn m³/year, which is equivalent to about 10% of Egypt's total natural gas production currently (about 52bn m³/year in 2007), which is a huge amount. This entails the necessity of reviewing energy use planning policies in Egypt and incorporating the environmental dimension in order to meet sustainable development goals.



Table (10.4) Natural gas consumption rates in iron, cement and petrochemicals factories

Sr.	Product	Annual Consumption of natural gas (billion m³/year)
1	Urea and ammonia	2.6
2	Methanol	1.2
3	Alkyl benzene	0.08
4	Iron and cement	1.32
Total		5.20

Efforts to minimize negative impact:

Law 4/1994 and its Executive Regulations require, for issuing environmental clearance to energy-intensive consumption industries, that each company undertakes the provision of saving electric power needed on its own and expense by establishing a power plant to cover its consumption. Moreover, they should apply European EE standards via the most recent energy-saving technologies, avoid buying used, low-cost and efficiency production lines and machines, and apply and train technical staff on energy audits. Abiding by such requirements leads to better EE and reduced natural gas consumption in such new facilities.

Future Provision:

MSEA suggests establishment of an energy efficiency agency to audit energy consumption in all sectors of industry, electricity, oil, transport and housing to reduce electricity and natural gas consumption through setting of binding legislation aiming to increase the efficiency of using electrical and thermal energy.

MSEA supports selling of natural gas used in all energy-intensive industries at the international free price and supports also the deliberation of issuing any new approval for this type of energy-intensive industries until assuring of the capability of the local current natural gas production to meet all needs of any new energy intensive factories.



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Further more, it is possible to reduce the current CO₂ emissions resulting from operating of electricity power plants by about 20% through publicizing application of compound cycle in all electricity power plants by natural gas rather than the current oil fuel which represents 83% of the total consumed fuel.

Biofuel production plants are committed to using any type of edible oil as a raw material. In case of production of biodiesel fuel, which is considered as a cleaner source of energy and highly safer than crude oil in transportation and storage, it is mandatory to use algae and jatropha oil plus any other kind of plants cultivated in desert lands and irrigated with treated waste water. In case of producing ethanol in the local market it's a mandatory to use agricultural waste and to issue a binding decree to allocate half the produced amount of ethanol to the local market, as well as binding all oil refineries to add both the ethanol and biodiesel on gasoline and diesel fuels used locally in order to reduce air polluted by vehicles exhaust.



Pic. (10.1) Wind farm

To encourage investors to establish wind farms, it is suggested to allow the private sector to provide electricity generated from their wind farms to the national electricity grid, and to give all such electric power producers the right to sell their products in the local market or receive a return revenue equal to its value if the produced electricity fed into the national grid owned by the State.



References:

- (1) Report by the General Department for Energy Projects, EEAA, 2007**
- (2) Higher Energy Council Resolutions, 2007**
- (3) Bird Migration Monitoring in Gebel Zeit Study, Authority for New and Renewable Energy Development and Use, 2007**