

Energy conservation indicators in Southern Mediterranean countries



Country report for Egypt

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Preface

The design, the implementation and the monitoring of national energy policies require relevant indicators reflecting the energy use performances at macro and sector level. Moreover, for developing countries the implementation of information systems on energy and greenhouse gas emissions indicators will be a key condition for the development of new mitigation financing mechanisms (NAMAs, sectoral mechanism, etc.) currently under negotiations for the new international climate governance regime. In fact these mechanisms will need Measures, Reporting and Verification systems (MRV) to prove the integrity of these actions. Also, for the Arab League States Energy Efficiency Directive, such indicators are crucial for the monitoring and the assessment of the National Energy Efficiency Action Plans (NEEAPs).

For these reasons and based on European experiences (ODYSSEE), PLAN BLEU, in cooperation with RCREEE and with the support of MED-ENEC, has launched the current Energy Efficiency Indicators Project in ten MENA countries, namely: Morocco, Algeria, Egypt, Lebanon, Syria, Jordan, Libya, Palestine, Tunisia and Yemen as a tenth member state of RCREEE. This project is aiming at i) strengthening the capacities of these countries in monitoring their energy policies by using the energy efficiency indicators approach ii) building and interpreting a range of basic common indicators for the region.

The project was carried out according to a two years process based on specific methodology including:

- A Participative approach associating national public and private experts
 - 4 workshops and working sessions held in Tunisia, Egypt, France and Morocco.
 - Selection, by the participants, of the common indicators to be developed in the project, based on the data availability and the relevancy for the country
 - Technical assistance throughout the project provided by the regional coordination
- Capacity building through “ learning by doing” and experience exchanges
 - Data collection by the national experts with the support of RCREEE focal points, strengthening the cooperation between public and private experts
 - Common development of a simplified calculation tool for data collection and indicators’ calculation used by the experts
 - Development of capacity for analysis and interpretation of energy indicators by national experts
 - Country reports developed by the national teams
- Dissemination of the results and the learned lessons
 - Organization of final seminar for the decision-makers in June 2012
 - Publication and wide dissemination of the results recorded in flyers, national and regional reports.

The project was coordinated by:

- Plan Bleu: Ferdinand Costes, El Habib El Andaloussi
- RCREEE: Amel Bida
- MED-ENEC: Florentine Visser
- ALCOR: Rafik Missaoui, Hassen Ben Hassine, Adel Mourta

Framework of the mission

The purpose of this report is to provide “a national study on indicators of energy efficiency in Egypt”. The study will provide input to a regional study “The development of a set of indicators of energy conservation in the Southern and Eastern Mediterranean Countries (SEMCs)”. The mission was to prepare with lead and national experts from the region the phase of data collection and their analysis and treatment. The data was collected from various concerned national bodies eventually developing energy and environmental indicators. The data were of two types socio-economic and energy data. The data was collected over a duration of ten years with year 2009 as the most recent year. The collected data and estimated data were validated with official agencies in the country, mainly CAPMAS (Central Agency for Public Mobilization and Statistics), Electricity sector, Petroleum sector and some end user sectors. The collected data were entered to the analysis tool provided by the project manager (PLAN Bleu and ALCOR).

The data was collected through:

- Annual reports and studies from different entities representing the supply and demand of energy in Egypt.
- Reports from Central Agency for Public Mobilization and Statistics (CAPMAS).

The collaboration with CAPMAS represented by Ms. Doria Abbas was quite useful and is highly appreciated.

Also the input information from the following entities is highly valued:

- The industrial Development Authority
- The Egyptian Electric Utility and Consumer Protection Regulatory Agency
- The New and Renewable Energy Authority

List of abbreviations

DSM	Demand Side Management
EEHC	Egyptian Electricity Holding Company
GDP	Gross Domestic Product
GWh	Giga Watt hour
ktoe	Kilo Ton of Oil Equivalent
MW	Mega Watt
NG	Natural gas
MOED	Ministry of Economic Development

I. Country General background

1. Economy and population

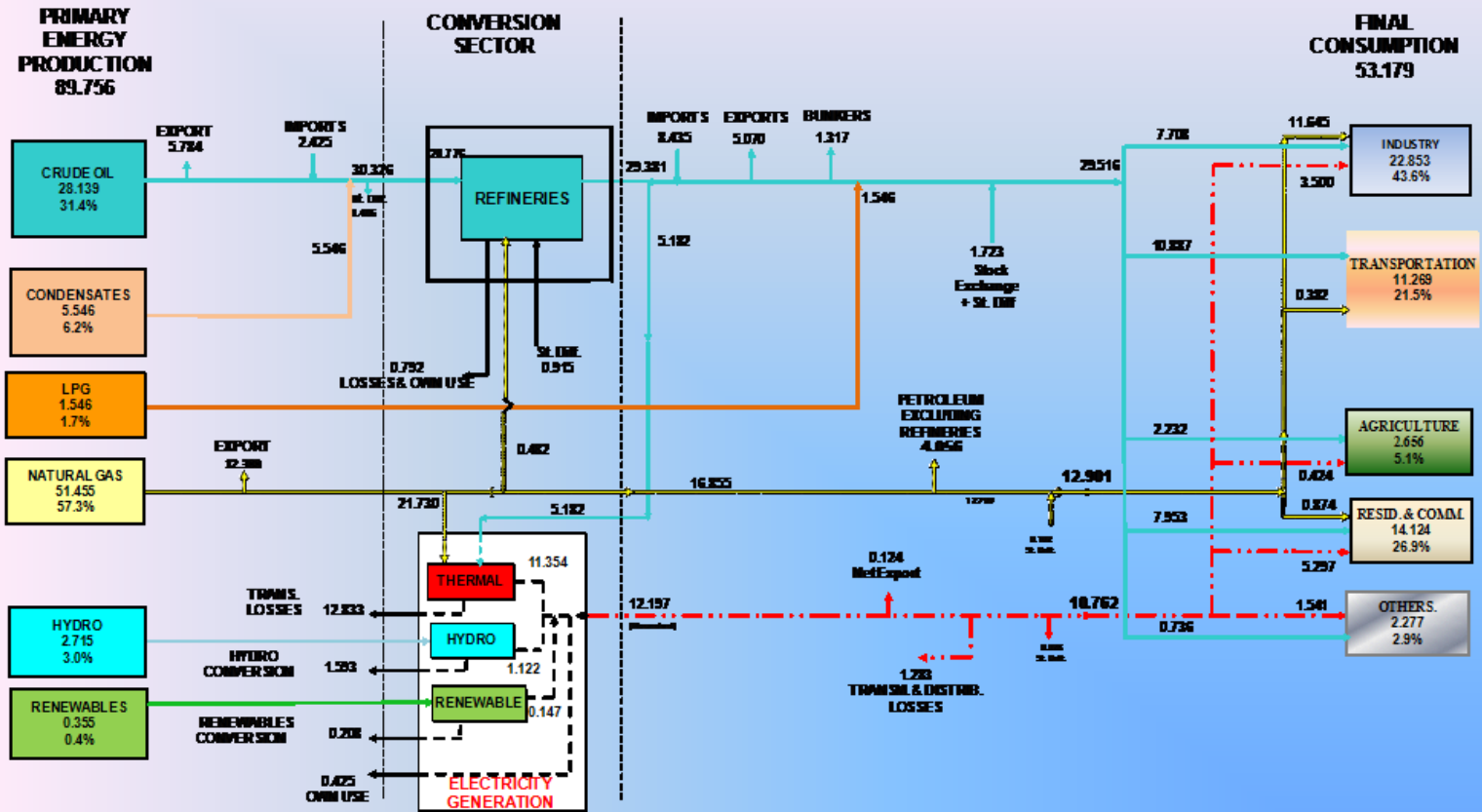
Located at the northeast corner of the African continent, Egypt is bisected by the highly fertile Nile valley, where most economic activity takes place. Egypt's economy was highly centralized during the 1960s and the early 1970s. Since then the economy was opened up considerably. Egypt since from 2004 to 2008 aggressively pursued economic reforms to attract foreign investment and facilitate GDP growth. The global financial crisis in 2008 slowed the reform efforts. The budget deficit climbed to over 8% of GDP and Egypt's GDP growth slowed to 4.6% in 2009, predominately due to reduced growth in export-oriented sectors, including manufacturing and tourism, and Suez Canal revenues. In 2010, the government spent more on infrastructure and public projects, and exports drove GDP growth to more than 5%, but GDP growth in 2011 is unlikely to bounce back to pre-global financial recession levels, when it stood at 7%. Despite the relatively high levels of economic growth over the past few years, living conditions for the average Egyptian remain unchanged notably. In year 2003 the population of Egypt was nearly 69.5 million and it reached 79 million in 2009. Accompanying this increase in the population, the Egyptian GDP at current prices increased from 390,600 million EGP in 2003 to 990,200 million EGP in 2009 with an average annual increase rate of 14%.

2. Energy demand and energy supply

The Egyptian energy chain consists of three main phases the primary energy exploration and development phase, the conversion phase, and the secondary energy transmission and distribution phase. The primary energy exploration and development phase is concerned with the production of the primary energy from its natural resources. These primary energies are put into usable forms (secondary energy) during the conversion phase either by refining of the crude oil, processing the NG, or by electricity generation. This secondary energy is then transmitted from the conversion phase facilities to the main distribution points or to the exporting ports by means of transmission networks, pipelines in case of fuel products or NG and electrical transmission network in case of electricity. The first part of the energy chain represents Egypt's primary energy phase with percentage share of the fossil based fuels reaching 96% or about 3,573 trillion BTU in year 2009. Egypt acquires almost all its fossil fuel based primary energy from its national resources. Both hydro and wind energies are primarily used to produce electricity, they account for about 4% and less than 1 % respectively of the total primary energy, but which is equivalent to 12.4% and about 1% of the overall electricity generated in the country.

The 2010 -2011 energy balance of Egypt is shown in the following diagram.

ENERGY BALANCE IN EGYPT 2010/2011



HYDROPOWER IS CALCULATED AS 1 KW. THERMAL GENERATION REQUIRES 2.631 GRAM OF OIL EQUIVALENT (THERMAL EFFICIENCY 41.9%)

UNITS: MILLION TOE

3. Major issues of the energy sector (energy dependency, security of supply, etc.)

The Egyptian energy sector depends on diverse resources for the primary energy supply. These resources vary from fossil fuels (oil and natural gas) and renewable sources (hydro, wind, solar and biomass). However the dominant sources are the fossil fuels. The most useable sources of the *renewable* energies are the hydro energy and wind energy which combined represent about 4% of the primary energy production. Solar energy possesses a wide range of potential uses. A plan for using nuclear energy to produce electricity has already been implemented, and it is expected that Egypt will realize around 4000 MW power generation station by the early 2020s. Other sources, such as biomass, possess good potential for development; however, notwithstanding some pilot and demonstration projects and some limited commercialization, this potential is left untapped. Finally, other sources such as hydrogen, tidal and geothermal have been developed for research purposes.

4. Energy efficiency and Renewable energy strategy

In the early 1980s, the Ministry of Energy and Electricity, in cooperation with the United Nations Development Program, began formulating the first “Egyptian Renewable Energy Strategy.” The 1982 strategy called for RE to provide 5 % of annual primary energy consumption by 2000. This goal was modified in 1987, with the target year pushed to 2005. In the early 1990s, the target share was reduced from 5 % to 3% by 2005, and in the late 1990s, the target was again revised, to 3 % of annual electricity consumption by 2010. The most recent RE strategy, approved by the supreme energy council in February 2008, sets a target for renewable energies to supply 20 % of electricity generation by 2020, with 12 % coming from wind energy and 8 % from hydropower generation. In addition, the government has established a program to install a further 600 MW of solar energy by 2017, which might go up to 2500 MW.

The recent energy supply uncertainties, combined with increasing energy costs, have led the country to look into Energy Efficiency (EE) alternatives. However, despite this general interest in EE by the GOE and the statement of an ambitious target to reduce energy consumption by over 8% in 2022 as compared to the projection under business-as-usual scenario, it appears that there has been little progress in developing an adapted policy framework and institutional structure to support the achievement of the stated target.

Over the past decades, the GOE has committed itself to addressing the growing problem of air pollution occurring in the country, which signaled the beginning of energy efficiency initiatives in Egypt. Various initiatives have been undertaken since the late 1980s regarding energy efficiency improvement, mainly.

- From late 1980s to late 1990s, the USAID assisted the Egyptian government in promoting energy conservation and reducing polluting emissions, mainly through two specific initiatives, the Cairo Air Improvement Project and the Egyptian Environmental Policy Program (EEPP) & the Energy conservation & Environment project (EEPP) The primary focus of the project was to promote the application of 10 proven technologies in Egypt’s industrial sector. Over the 10-year implementation period, a total of 200 energy audits were carried out for various industrial processes and entities, 30 demonstration projects were implemented, and 120 training sessions were conducted for 1200 trainees.
- From 1999 to 2010, the UNDP, through a GEF grant, has been promoting the energy service industry as a way of establishing a sustainable EE market in the Egyptian industrial and commercial sectors. The Energy Efficiency Improvement and Greenhouse Gas Reduction Project (EEIGGR) consists of three different components: (i) loss reduction on the national grid and demand-side management, (ii) market support for EE businesses and energy

codes and standards, and (iii) promotion of cogeneration. During the past 10 years, the project supported: (i) energy audits in industrial, government, and commercial buildings; (ii) implementation of pilot projects; (iii) the creation of Energy Service Companies (ESCOs); and (iv) the development of building codes and standards for appliances.

- The Egypt National Cleaner Production Center (ENCPC) was established as a service provider to industry supported by the Ministry of Trade and Industry in close cooperation with the United Nations Industrial Development Organization (UNIDO). ENCPC has been providing training to energy managers, conducting energy audits and supporting the implementation of energy efficiency measures in industrial facilities.
- The Industrial Modernization Centre (IMC) of Egypt set up the Energy Efficiency and Environment Protection Program by the end of 2007 to improve the efficient use of energy and encourage the use of renewable energy as a source of energy in industrial establishments through technical and financial support to the industrial establishments. IMC works under the auspices of the Ministry of Industry and Trade and operates with funds provided by the European Union, GOE and the private sector.
- The Egypt Electricity Holding Company (EEHC) launched a major program of promoting the use of CFLs to replace incandescent lamps. The program is implemented by EEHC's subsidiaries, the local distribution companies. The distribution companies provide CFLs to low income households at half of the market price. The price difference is absorbed by the distribution companies.

II. Data collection process

1. Main sources of data

Major reference documentations.

Data were mainly from annual reports and issued surveys and the national database which is at Central Agency for Public Mobilization and Statistics (CAPMAS). Also, the database of the Energy International Administration (EIA) was very much helpful.

Major initiations holding data and information

Institution name	Address	Tel and fax	Email and Website
Ministry of Petroleum and its affiliated agencies	1 A, Ahmed El Zomor St., 8th District, Nasr City, Cairo	+202-26706401 +202-26706402	contact@petroleum.gov.eg www.petroleum.gov.eg
Ministry of Electricity and Energy and its affiliated agencies and projects	Ramsis St. Abbassia, Cairo	+202-22616321	info@moe.gov.eg www.moe.gov.eg
Central Agency for Public Mobilization and Statistics (CAPMAS)	Salah Salam St., Nasr city, Cairo	+202-24032169	pres_capmas@capmas.gov.eg www.capmas.gov.eg
Ministry of Finance	Ministry of Finance Towers, Nasr city, Extension of Ramsis St., Abbassiya, Cairo	+202-23428886 +202-23428010 +202-23428032	finance@mof.gov.eg www.mof.gov.eg
Ministry of Housing and its affiliated agencies	1 Ismail Abaza St. Off Kasr El Ainy St., Cairo	+202-27921364 +202-27957105	
Ministry of Tourism and its affiliated agencies	Misr travel Tower, Abbassiya, Cairo	+202-22487601 +202-22487602	www.tourism.gov.eg
Ministry of Economic Development	P.O: 11765, Nasr City	+202-24014732 +202-24014532	mop.egypt@gmail.com www.mop.gov.eg

2. Data availability

Sector***	Energy data			Socio-economic data			Environmental data		
	Total* number of data	Available data**		Total number of data	Available data		Total number of data	Available data	
		Number	%		Number	%		Number	%
Macro	56	56	100	42	42	100	7	7	100
Transformation sector	91	89	98				7	7	100
Transport sector	49	7	14	105	40	38	21	7	33
Tertiary sector	28	21	75	35	21	60	7	7	100
Residential sector	21	21	100	49	35	71	7	7	100
Industry sector	56	21	38	91	49	54	7	7	100
Agriculture & fishing	14	14	100	56	35	63	7	7	100
Total	315	229	73	378	222	59	63	49	78

*: Total number of data expected by the sheet "Energy & socioeconomic data"

** : Total number of data (collected or estimated) filled in the sheet "Energy & socioeconomic data". One value for one year is considered as a data.

*** Data predicted using statistical models are not included in the count of available data, but rather considered unavailable. The decision is made to identify data gaps to be tackled by future studies.

The above table reflects the need of a unified database in Egypt and the main weak point lies in the economy part of the data. This is because all the data available were on the macro level; however, the details may be unavailable. Also, this is the case for energy data. The data may be available but due to the different classifications of the end user types, it could not be used.

3. Major difficulties met during the data collection

The major difficulties met during the data collection were:

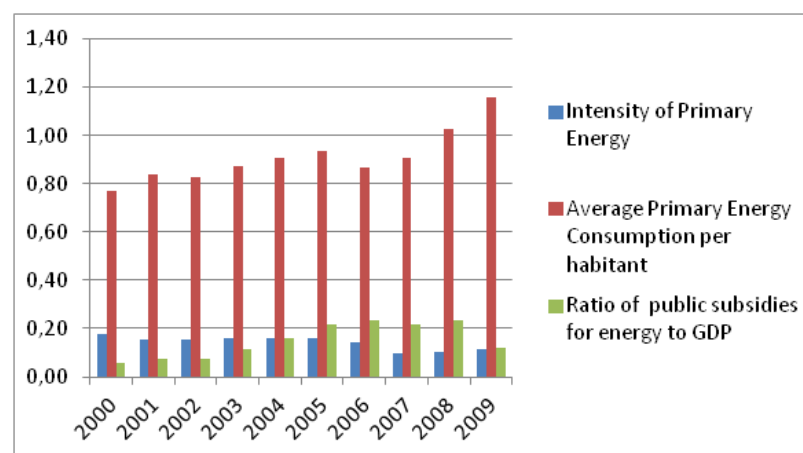
- The unavailability of the data required on the micro level.
- The different classifications of the data at the different authorities.(for example the tertiary sector does not stand alone regarding the energy use as it might be classified as commercial or industrial)
- The classification used at the concerned authority is different than the one required for the data collection.

III. Indicator's calculation

1. Macro level indicators

Abbreviation	Indicators	Unit	2003	2004	2005	2006	2007	2008	2009
EDR	Energy dependence Ratio	%	-13%	-7%	-16%	-33%	-28%	-20%	-5%
IPE	Intensity of Primary Energy	toe/1000 LC	0.17	0.16	0.15	0.16	0.16	0.16	0.14
IFE	Intensity of Final Energy	toe/1000 LC	0.11	0.09	0.09	0.09	0.09	0.08	0.07
RFEPE	Ratio of final energy consumption to primary energy	%	61%	59%	60%	58%	57%	47%	52%
REB	Ratio of National Energy Bill to GDP	%	11%	12%	12%	16%	21%	26%	28%
RPSE	Ratio of public subsidies for energy to GDP	%	6%	7%	7%	11%	16%	22%	24%
AEF	Average emission factor	teCO ₂ /toe	2.84	2.85	2.79	2.72	2.70	2.73	3.02
ICO ₂	Intensity of CO ₂	teCO ₂ / 1000 LC	0.496	0.448	0.432	0.434	0.437	0.437	0.425
AECH	Average Primary Energy Consumption per habitant	ktoe/1000 hab	0.769	0.836	0.830	0.875	0.909	0.938	0.865
AELCH	Average Electricity Consumption per habitant	MWh/hab	1.152	1.159	1.264	1.310	1.367	1.443	1.503

- REB indicates that the economy is moving towards more energy intensive uses.
- RPSE indicates that the energy prices are not moving towards liberalizing fast enough
- ICO₂ indicates that there are major steps taken to reduce the GHG emissions
- AECH and AELCH indicate that all the economical activities are growing

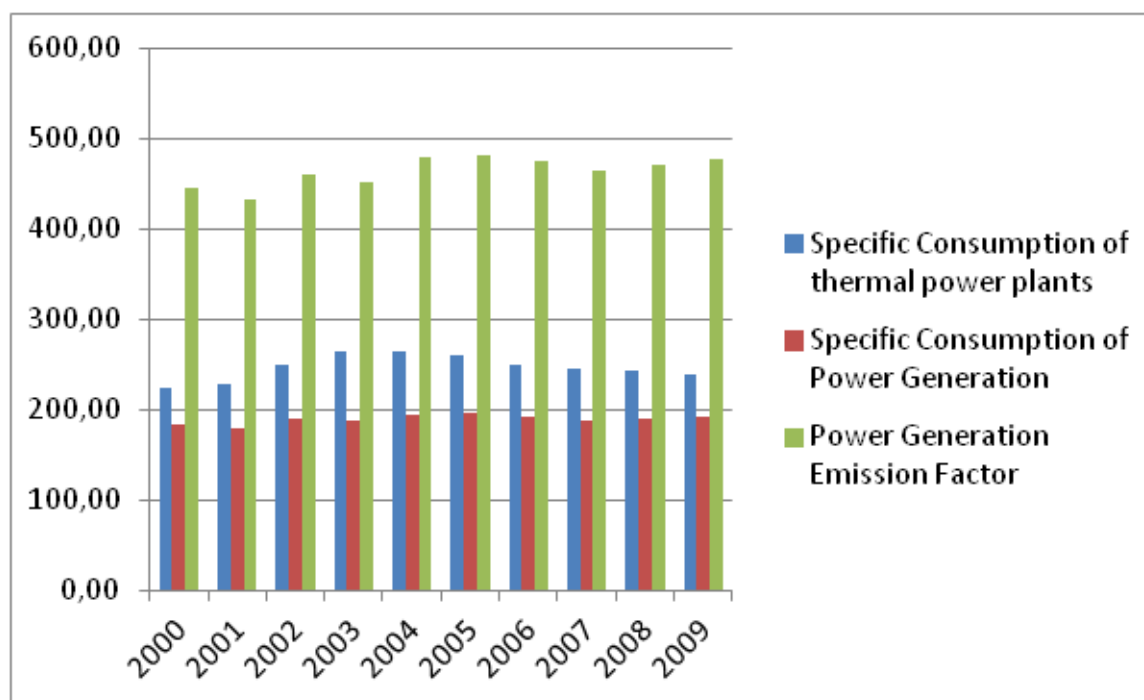


2. Energy transformation sector indicators

Electricity generation in Egypt is dominated by fossil fuels, which represented about 85.5% of total electricity generation in 2008. This is mainly NG, which accounted for 66.4% of the total electricity generation in 2008. Heavy fuel oil (HFO) is the dominant oil product used in electrical energy generations. It represents nearly 99% of the oil used in electricity generation. Also, Egypt has a well-developed oil refining industry, with nine operational refineries. The government has spent \$4 billion on upgrading and expanding these refineries. All of them are state-owned except for one, Middle East Oil Refinery (MIDOR). As for the natural gas, processing is usually carried out onsite, or at the point of landing for off-shore facilities. Sometimes, further processing is carried out at points along the grid or near shore (in case of off-shore production) at central processing facilities, in order to extract valuable lighter hydrocarbons, such as ethane, ethylene, propane, butane, butylenes, isobutene and their mixes.

Abbreviation	Indicators	Unit	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
SREC	Share of installed RE electricity capacity	%	0,4%	0,4%	0,4%	0,8%	0,8%	0,9%	1,0%	1,4%	1,8%	2,0%
URIC	Usage rate of the installed power generation capacity	%	58,4%	57,1%	57,6%	60,0%	62,4%	60,5%	60,0%	63,3%	63,6%	64,2%
AETS	Apparent Efficiency of Energy Transformation Sector	%	79%	77%	78%	82%	78%	78%	75%	72%	0%	0%
PGEFF	Power generation efficiency of thermal plants	%	38%	38%	34%	32%	33%	33%	34%	35%	35%	36%
SCFFP	Specific Consumption of thermal power plants	toe/GWh	223,46	229,13	250,03	264,85	264,54	260,34	250,79	246,00	244,31	239,94
PGF	Power generation efficiency	%	0,38	0,38	0,34	0,32	0,33	0,33	0,34	0,35	0,35	0,36
SCPG	Specific Consumption of Power Generation	toe/GWh	183,04	179,19	191,19	189,07	194,71	195,95	193,11	188,30	189,98	192,60
TDEE	Transmission and Distribution Electricity system Efficiency	%	0,86	0,90	0,87	0,89	0,88	0,89	0,89	0,89	0,89	0,89
PGEF	Power Generation Emission Factor	teCO ₂ /GWh	445,57	432,17	460,68	452,75	480,73	480,90	475,62	464,33	470,19	476,84
ESEF	Electricity Sector Emission Factor	teCO ₂ /GWh	537,26	518,20	548,25	534,30	567,70	561,22	555,50	541,85	547,11	551,51

- ESEF and PGEF indicate that the electricity generation technology did not change much
- TDEE shows that the electrical system efficiency did not change over the past ten years
- SCPG, PGE and SCFFP show that the electricity generation technology did not change.
- URIC shows that the electricity capacity is not used optimally and there is a room for DSM programs application
- SREC indicates that the renewable energy integration is moving forward but with slow steps



3. Industry sector indicators

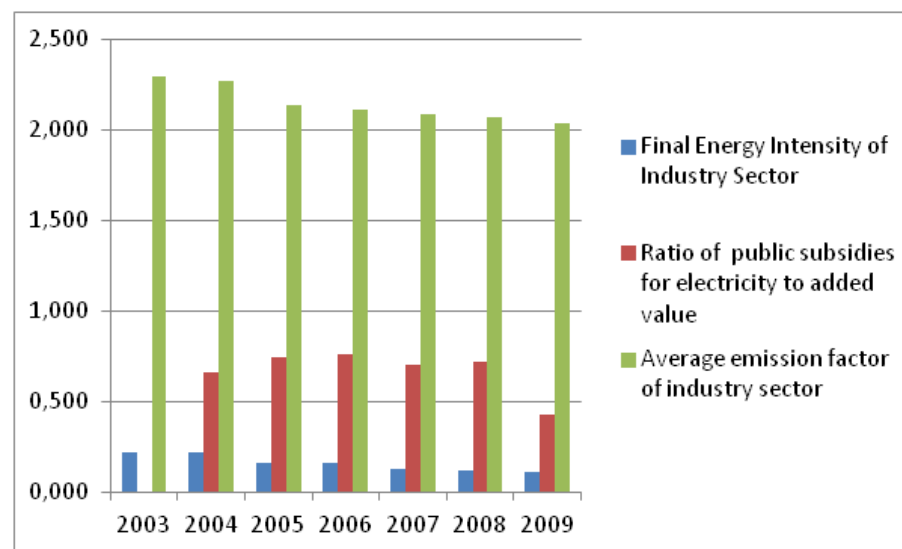
Among various sectors, the Egyptian industry is consuming almost half of the final end-use energy consumption (around 40%), 35% of total electricity consumption and is responsible for almost 30% of the national GHG emissions in 2005. Yet the Egyptian industry is not very efficient in utilizing the available energy resources. In other words, Egypt has increased wasted consumed energy (fuel + Electricity) compared to countries which are geographically and economically close to Egypt. In Egypt, there are about 42000 licensed industrial establishments distributed all over the country. The majority of the industrial establishments are located within Greater Cairo Region representing about 40% of the total number of establishments. The other three major industrial locations are located in 10th of Ramadan city within Sharkia Governorate, Alexandria and Sohag respectively.

In terms of energy consumption, the significant industrial sectors are the building materials sector (including cement and ceramics), chemical fertilizers, aluminum and steel are the highest energy consumers. Other significant consumers include glass, pulp & paper and food & beverages. As for industrial establishments which are considered “energy intensive”, these have been determined to be 32 companies in the fields of cement, steel, aluminum and fertilizers. These companies consume almost 70% of the entire energy consumption within the industrial sector

Abbreviation	Indicators	Unit	2003	2004	2005	2006	2007	2008	2009
BSEC	<i>Specific energy consumption for the Cement</i>	toe/t	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	<i>Specific energy consumption for the Phosphate</i>		0.000	0.000	0.000	0.000	0.000	0.000	0.000
	<i>Specific energy consumption for the Phosphoric acid</i>		NA	NA	NA	NA	NA	NA	NA
	<i>Specific energy consumption for the T. Super Phosphate</i>		NA	NA	NA	NA	NA	NA	NA
	<i>Specific energy consumption for the Steel</i>		0.000	0.000	0.000	0.000	0.000	0.000	0.000
	<i>Specific energy consumption for the Paper</i>		0.000	0.000	0.000	0.000	0.000	0.000	0.000
	<i>Specific energy consumption for the Sugar</i>		0.000	0.000	0.000	0.000	0.000	0.000	0.000
FEIS	Final Energy Intensity of Industry Sector	toe/1000 LC	0.226	0.229	0.228	0.217	0.216	0.162	0.158
IEBR	Ratio of Industry sector Energy Bill to Added Value	%	0%	0%	0%	0%	0%	0%	0%
IESR	Ratio of public subsidies to added value	%	0%	0%	0%	0%	0%	0%	0%
ESRGB *	Ratio of public subsidies for energy to Government Budget	%	0.4282141	0.6649752	0.7434762	0.7618507	0.69997132	0.71804636	0.4282141
IELSR	Ratio of public subsidies for electricity to added value	%	0%	0%	0%	0%	0%	0%	0%
IICO ₂	Intensity of CO ₂	teCO ₂ / 1000 LC	0.478	0.511	0.528	0.498	0.489	0.347	0.335
IAEF	Average emission factor of industry sector	teCO ₂ /toe	2.120	2.229	2.313	2.292	2.267	2.140	2.115

*Correct values have been recalculated and have replaced the false ones

- Due to the need of a consistent database, where all the collective data are there (amount of production and energy use) most of the indicators could not be calculated.
- In some cases, the data is found in CAPMAS in the monetary values only.
- In other data sources either the amount of production or the amount of energy is found.
- The data which were made available from CAPMAS were in monetary values for the amount of production and the energy consumption. Attached the tables from CAPMAS for the paper and sugar industries.
- FEIS indicates that the Egyptian industry is moving towards less energy intensive industries
- IICO₂ and IAEF indicate that serious measures have been taken to reduce the GHG emission



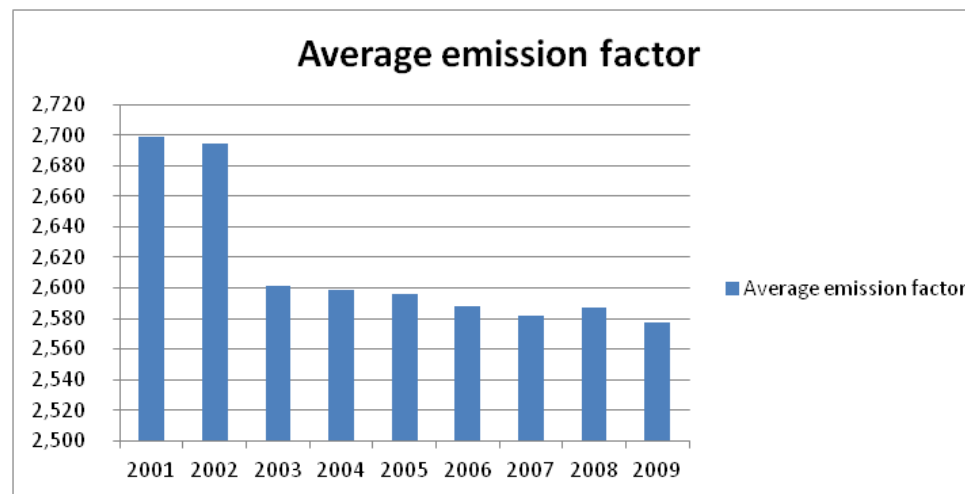
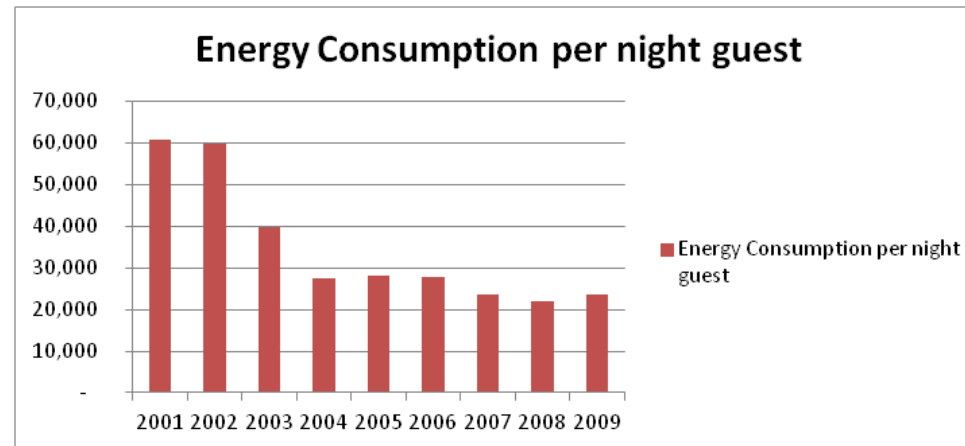
4. Tertiary sector indicators

The energy consumption of the tertiary sector was assumed to be that of the hotels and the hospitals. The Education, health, social, cultural, entertainment & personal services account for about 4% of the Egyptian GDP in the FY 2008/2009.

Abbreviation	Indicators	Unit	2003	2004	2005	2006	2007	2008
FEITS	Final Energy Intensity of Tertiary Sector	toe/1000 LC	0,170	0,175	0,177	0,173	0,086	0,088
TDRSHR	Diffusion Rate of Solar Water Heaters in tertiary sector	m ² /1000 hab	NA	NA	NA	NA	NA	NA
TEBR	Ratio of energy bill to added value in tertiary sector	%	NA	NA	NA	NA	NA	NA
TELSR	Ratio of public subsidies for electricity to added value	%	NA	NA	NA	NA	NA	NA
TESRGB	Ratio of public subsidies for energy to Government Budget	%	NA	NA	NA	NA	NA	NA
HECNG	Energy Consumption per night guest	kgoe/Nigh Guest	39,830	27,497	27,980	27,893	23,487	22,041

- FEITS was tremendously reduced which shows that energy efficiency measures were taken yet they were end-user initiatives rather than government actions. There is still more room for further improvement when resorting to full fledge natural gas usage as well as resorting to renewable energies especially solar in water heating.
- Diffusion of Solar Water Heaters in tertiary sector is limited and is unaccounted in a robust statistical form.

- It is estimated that TEBR ranges between 15% to 20% which was hard to get because it depends on the actual financial balances which are not available for every one.
- The subsidies are through the reduced fuel prices to electricity generation.
- HECNG and TICO₂ were tremendously reduced indicating that serious measures were taken in the field of energy conservation and environment protection

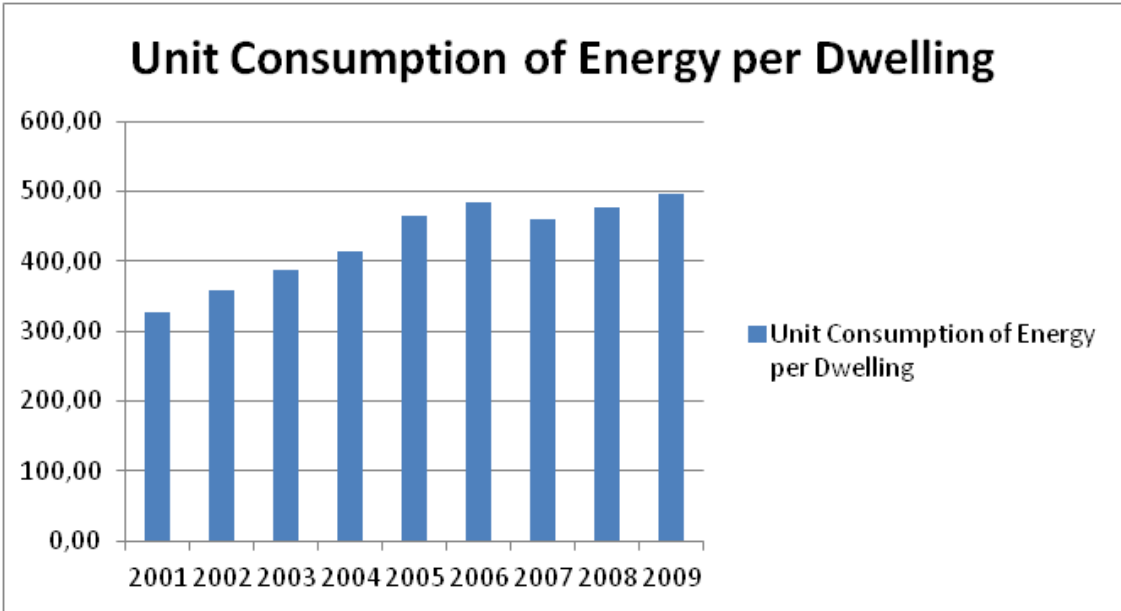
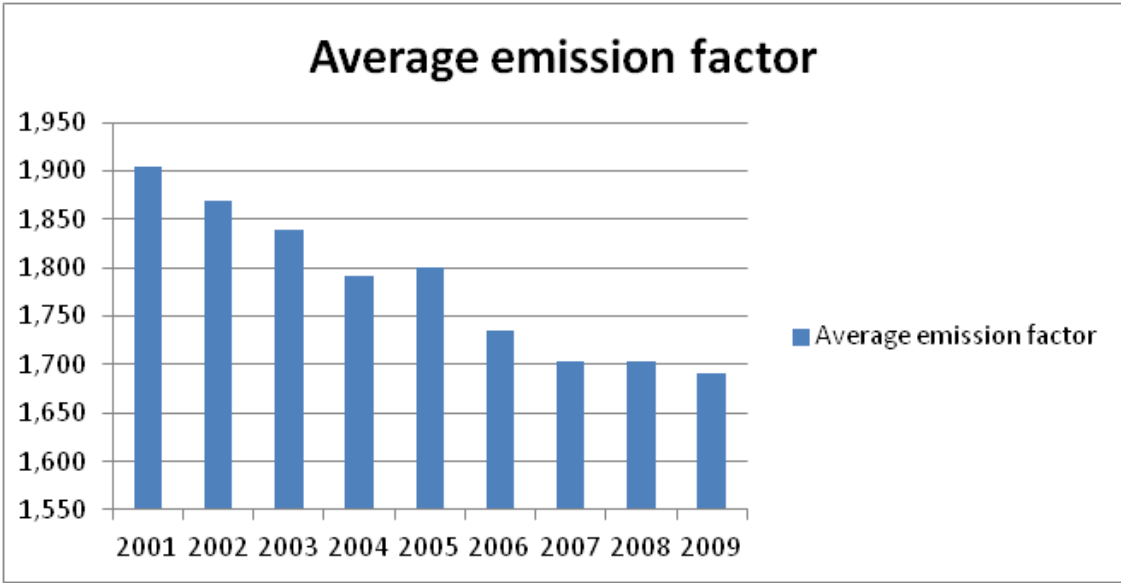


5. Residential sector indicators

The residential sector comes in the second place after the industrial sector in the consumption of energy as it reached about 26% of the total final energy consumption in the FY 2007/2008 with an annual rate of increase of about 8.25% in the electricity consumption and 4.15% in the oil products and natural gas consumption.

Abbreviation	Indicators	Unit	2003	2004	2005	2006	2007	2008	2009
UCED	Unit Consumption of Energy per Dwelling	kgoe/Dw	387.57	414.56	464.24	483.60	459.95	476.57	496.08
SCEM ²	Specific Consumption of Energy per area unit	kgoe/m ²	6	7	8	8	8	8	8
UEICD	Unit Consumption of Electricity per Dwelling	kWh/Dw	1605.04	1794.45	1988.52	2197.03	2148.01	2212.49	2330.33
SCEIM ²	Specific Consumption of Electricity per m ²	kWh/m ²	26.751	29.908	33.142	36.617	35.800	36.875	38.839
RIPE	Intensity of Residential Sector	toe/ 1000 LC	0.045	0.040	0.037	0.033	0.031	0.030	0.028
RELSR	Ratio of public subsidies for energy to private consumption	%	0%	0%	0%	0%	0%	0%	0%
RESRGB	Ratio of public subsidies for energy to Government Budget	%	0%	0%	0%	0%	0%	0%	0%
RAEF	Average emission factor	teCO ₂ /toe	1.839	1.792	1.801	1.735	1.703	1.703	1.690
RICO ₂	Intensity of CO ₂	teCO ₂ / 1000 LC	0.082	0.072	0.067	0.058	0.052	0.051	0.048
RDRSHR	Diffusion Rate of Solar Water Heaters in Residential sector	m ² /1000 hab	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ERACR	Equipment Rate of Air conditioning in Residential sector	Unit/Dw	0	0	0	0	0	0	0
ERFR	Equipment Rate of refrigerator in Residential sector	Unit/Dw	0.0386827	0.03974249	0.044494	0.06459	0.060862	0.059246	0.059414

- UCED, SCEM², UEICD and SCEIM² indicate an increase of life style and energy consuming equipment
- RIPE indicates that the expenditure on energy is representing smaller ratio to the total expenditure.
- Assessment of the subsidies is not a clear issue here.
- RAEF and RICO₂ indicate reduced GHG emissions from the residential sector.
- The use of solar water heaters is negligible in the residential sector.
- The informal statistics estimate that the number of AC units is around 7 millions of different sizes and that the number of dwellings is around 20 millions, yet the exact number of AC units per dwelling cannot be determined as it can go up to 10 units per dwelling in some cases.



6. Transport sector indicators

The transport sector represents one of the important sectors of the economy that contribute to the economic and social development. The steady increase in the transportation of passengers and goods as well as the dependence of various sectors on the transport sector as one of the essential inputs to achieve rates of growth over the past years resulted in increasing its share in the total final energy consumption approximately 31% and more than about 40% of the total consumption of petroleum products in 2007/2008. This has in turn led to increase the rate of emission of pollutants from this sector to reach about 45 million tons of carbon dioxide during the same year and by 26% of the total emissions across all sectors. Also, the increased dependency on diesel fuel in the main passenger cars and railway locomotives has led to increase the volume of import of diesel from abroad, which peaked in 2000/2001. The Egyptian government has given great importance for the transportation sector through providing the necessary investments to continuous development. The volume of these investments was about 65.8 billion pounds during the previous five-year plan (2002/2003 - 2006/2007) accounted for about 12.8% of total investments implemented at the level of the national economy.

Abbreviation	Indicators	Unit	2003	2004	2005	2006	2007	2008	2009
TrFEI	Final Energy Intensity	toe/1000 LC	0.026	0.027	0.017	0.017	0.012	0.012	0.012
STEHE	Share of household expenditure for transport	%	17%	17%	17%	18%	18%	18%	18%
EUCC	Average Energy Unit Consumption of Cars	kgeo/car/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUCC G	Average Energy Unit Consumption of gasoline Cars	kgeo/car/year	NA	NA	NA	NA	NA	NA	NA
EUCC D	Average Energy Unit Consumption of diesel Cars	kgeo/car/year	NA	NA	NA	NA	NA	NA	NA
AEFTS	Average emission factor of transport sector	teCO ₂ /toe	2.890	2.890	2.879	2.880	2.880	2.881	2.882
MR	Motorization rate	persons / Vehicle	44.42	43.29	41.29	38.81	36.46	35.00	33.54
ICO ₂	Intensity of CO ₂	teCO ₂ /1000 LC	0.07551049	0.07840662	0.05036282	0.04945817	0.03403172	0.03552139	0.03551162
SCRW	Specific consumption for Rail ways	kgoe/ p.km	NA	NA	NA	NA	NA	NA	NA
SCAT	Specific consumption for air transport	kgoe/ p.km	NA	NA	NA	NA	NA	NA	NA
SCMT	Specific consumption for maritime transport	kgoe/ t.km	NA	NA	NA	NA	NA	NA	NA
SEAT	Specific emission factor for air transport	kgeCO ₂ /p.km	NA	NA	NA	NA	NA	NA	NA
SEMT	Specific emission factor for maritime transport	kgeCO ₂ /t.km	NA	NA	NA	NA	NA	NA	NA

- TrFEI shows that improvement in the transport sector as moving towards the use of natural gas.
- STEHE shows that the household expenditures on transport is almost the same.
- AEFTS and ICO₂ shows that reduced emissions were achieved however it does not show more use of natural gas.
- MR shows that the Egyptian community is moving towards increased usage of private cars
- The rest of the indicators could not be calculated due to the unavailability of the specific data.

7. Agriculture and fishing sector indicator

During the second half of the twentieth century the High Dam was created which was one of the most important transformations in the history of Egyptian agriculture as the waters of the Nile can be controlled although Egypt was prone to floods and other times of drought. Farmland has increased, as well as the production of most crop view of the progress of scientific and technological methods of cultivation or use of strains producing abundant crops. Most of the agricultural laws were stated in this period. The agriculture sector is considered to be the lowest sector consuming energy since its consumption was about 2% of the total final energy consumption in the FY 2007/2008.

Abbreviation	Indicators	Unit	2003	2004	2005	2006	2007	2008	2009
FEIA	Final Energy Intensity of agriculture	toe/ 1000 LC	0,0060	0,0072	0,0357	0,0358	0,0255	0,0269	0,0267
FEIF	Final Energy Intensity of fishing	toe/ 1000 LC	0,0060	0,0061	0,0303	0,0305	0,0217	0,0228	0,0227
SCF	Specific consumption for fishing	toe/ tone	0,0641	0,0688	0,3387	0,3228	0,3223	0,3375	0,3332
SDCA	Share of Dry cultivated area	%	0%	0%	0%	0%	0%	0%	0%
SICA	Share of Irrigated cultivated area	%	0%	0%	0%	0%	0%	0%	0%
SEWMP	Share of equipped wells with Moto pumps	%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
SEWEIP	Share of equipped wells with electro pumps	%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

- The vast majority of irrigation pumps operational in Egypt are electro-pumps; the study team has founded this proposition on their previous experience within the field.
- The increase in energy intensity of fishing could possibly reflect several trends. First growth in fish processing industry. Second it could be due to increasing fishing activity.
- The increase in energy intensity of agriculture reflects the growth in food-processing industry, as well as increasing automation of agricultural activities.

IV. Conclusion

Similar to the difficulties during the data collection process, we emphasize the following:

- The unavailability of the data required on the micro level.
- The different classifications of the data at the different authorities.(for example the tertiary sector does not stand alone regarding the energy use as it might be classified as commercial or industrial)
- The classification used at the concerned authority is different than the one required for the data collection.

As demonstrated by the indicators discussed earlier in the report some sectors have shown an improvement on their energy efficiency performance- that effort remains modest, to say the least. Yet a crucial sector as far as energy consumption (industrial) is considered suffers a significant gap in data availability. The study team used statistical reasoning techniques to narrow those gaps though the scope of the problems remains well beyond the reach of mathematics.

Consequently, the report illustrates the need for an effort in addressing the shortcomings of national, sector and unit energy saving efforts and plans, as well as the obstacles limiting performance improvement. Some of the problems may be related improper mapping of some sectors, industrial one in particular. Others, however, may be related to a cluster of factors that need further analysis, such as government bodies organization, confounded ill-targeted plans or lack thereof.

V. References and relevant websites

Institution name	Address	Tel and fax	Email and Website
Ministry of Petroleum and its affiliated agencies	1 A, Ahmed El Zomor St., 8th District, Nasr City, Cairo	+202-26706401 +202-26706402	contact@petroleum.gov.eg www.petroleum.gov.eg
Ministry of Electricity and Energy and its affiliated agencies and projects	Ramsis St. Abbassia, Cairo	+202-22616321	info@moe.gov.eg www.moe.gov.eg
Central Agency for Public Mobilization and Statistics (CAPMAS)	Salah Salam St., Nasr city, Cairo	+202-24032169	pres_capmas@capmas.gov.eg www.capmas.gov.eg
Ministry of Finance	Ministry of Finance Towers, Nasr city, Extension of Ramsis St., Abbassiya, Cairo	+202-23428886 +202-23428010 +202-23428032	finance@mof.gov.eg www.mof.gov.eg
Ministry of Housing and its affiliated agencies	1 Ismail Abaza St. Off Kasr El Ainy St., Cairo	+202-27921364 +202-27957105	
Ministry of Tourism and its affiliated agencies	Misr travel Tower, Abbassiya, Cairo	+202-22487601 +202-22487602	www.tourism.gov.eg
Ministry of Economic Development	P.O: 11765, Nasr City	+202-24014732 +202-24014532	mop.egypt@gmail.com www.mop.gov.eg