Environment 2003

Growth of the Environment Market of Egypt
Profitable Compliance,…
…the Carrot not the Stick

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A. Financial Environment Market in Egypt

Egypt suffers from a number of serious environmental problems. In the last years the enormous pollution evolved into one of the priority issues of the Egyptian government. In the current five-year plan (2003-2008) environmental projects receive its share of the budget. On environmental equipment alone the Egyptian government anticipates to spend more than $1.2 billion. This is besides similar amounts spend on programs, capacity building and technical assistance.
In addition to that the private sector annually spends since 1999 a comparable sum due to the increased efforts to comply with the environmental legislation. Another motivation is the opportunity for diverse BOOT environmental projects, mainly in the field of solid waste management, renewable energy, and air pollution.
For this reason export opportunities related to Egypt's environment are substantial and cut across the entire spectrum of environmental activities and needs.

As a result of the effort spend by the Egyptian government to reduce environmental pollution, other financial sources have been made available to Egypt to help protect and remediate the environment. The international community welcomed the Egyptian environmental law, the creation of an environmental ministry and the obligation for government and businesses to adjust to a new environmental standard. A series of funds are now offered by multilateral and bilateral donors such as the World Bank (IBRD), UNDP, the European Union, and its member states (mainly Denmark, Spain, France, UK and Italy), USAID, GTZ, DANIDA, CIDA, Canada, Japan, the African Development Bank and Arab funds etc. They are provided for assisting both the Egyptian government in capacity building and local businesses in acquiring the right technology and consulting. This support applies to mainstream production technologies as well as to end-of-pipe waste management technologies and equipment.
Together with the financial support from the Egyptian government this foreign aid is especially aiming at strengthening the private sector through Public-Private-Partnership as this is understood as indispensable for the realization of the new environmental standards.

The World Bank is providing Egypt with 40 mill. US$ on a soft loan basis for the environmental pollution abatement project, USAID is providing 56 mill. US$ for the Cairo Air Improvement Project and another 45 mill. US$ for an environment policy reform. The U. K. is providing 11 mill. US$ for supporting the Environmental Assessment and Management Programs, the German Bank of Reconstruction (KFW) is providing 25 mill. Euro for the Zaafarani windfarm project, Japan is re-activating its yen credit with a 15 years grace period, the EIB is availing a loan in the tune of 300 mill. Euro for the industry, and others such as CIDA, DANIDA or Spain and Italy are also availing grants/loans for environment. This is in addition to other contributions from many other countries to Egypt in support of its environmental programs.

Donors also provide a mixture of grants and soft loans such as the European Union Industrial Modernization Program with a 250 mill. Euro supported by an EIB 150 mill. Euro soft loan, the 150 mill. Euro from the German KFW for the private sector in addition to the same amount for the public sector, JBIC 300 mill. US$, the World Bank 10 mill. US$, etc. as well as the USAID 300 mill. US$ CIP Program that could be utilized for procurement of machinery and equipment.

Furthermore the Government of Egypt has passed the necessary legislations to ensure the active participation of the private sector in infrastructure projects on a BOT basis.
Moreover, the requirement for touristic projects to fulfill their infrastructure needs in particular in the new tourism development areas along the Red Sea coast and the Gulf of Aqaba are expected to create substantial demand for environmental services and products. The development will especially proceed in the areas of renewable energy utilization, solid waste management, water supply, and wastewater management**.**

The opportunities to enter the environmental market in Egypt are broad, covering every area of expertise from technology supply to consulting and project management. The main emphasis during the present five-year plan will be in the field of air pollution abatement, water quality, hazardous substances, solid waste and environmental management as well as nature conservation.

B. Environmental Problems

Environmental problems in Egypt are extensive and there is a broad need for measures in nearly every field of environmental pollution. Following there are some examples to name but a few main problems.

Air Pollution

Air pollution in the large cities is clearly one of the major problems in Egypt, especially in the industrial areas. The levels of common pollutants, such as sulfur dioxide, suspended particulate matter, and carbon monoxide in the air are substantially higher than the WHO guidelines allow. In the industrial areas of greater Cairo, the suspended particulate matter is 5 to 10 times higher than international standards; sulfur dioxide is 2 to 20 times higher; and nitrogen oxide is about two times higher.

In Greater Cairo and Alexandria, large industrial sources of air pollution include the metallurgical (ore and scrap-based steel plants, ferro-alloys, copper, lead and aluminum smelters), chemicals (including refineries), and the cement industries. Air pollution from these industries comes from both process and combustion sources. 60% of the cement industry consists of wet-process plants, which tend to produce more pollution than the dry

process and consume twice as much energy. Refineries are also the major source of SO2, NO2 and volatile organic compounds.

Another major source of air pollution is the mobile emission resulting from traffic. In Greater Cairo are more than a million vehicles on the streets. Vehicle emissions of fine particulate matter and other pollutants are therefore significant.

Water & Waste Water Pollution

With a population growth of about 2,4% (approx. 1,7 mill. inhabitants per year) the two main urgent public utility problems of Egypt are potable water and sewerage. Although over 90% of urban population have potable water supply, only 50% have adequate connections to sewage services. The result is major problems for the water table that is augmented by leaching from landfills and seepage from industrial activities.
The pollution from industrial sources constitutes a major environmental pressure. Few industries have pretreatment systems that function well.

The Nile, which is the main source of water in Egypt, is being polluted by discharges of untreated or partially treated domestic wastewater, industrial effluents, and agricultural drainage water. The Nile and its Rosetta and Damietta branches receive about 6,000 mill. cubic meters of drainage water per year, 1,700 mill. cubic meters of municipal wastewater, and 312 mill. cubic meters of industrial wastewater.
The Mediterranean coastal water receives annually 765 mill. cubic meters of sewage and about 545 mill. cubic meters of industrial wastewater.

Municipal sludge generated by wastewater treatment plants in greater Cairo and Alexandria is estimated at 1,700 tons per day and is expected to reach 4,800 tons per day after the completion of the treatment plants that are under construction, by the end of 2000.

INDUSTRIAL WASTEWATER DISCHARGES OF MAJOR PUBLIC SECTOR INDUSTRIES IN Egypt

Industry Sector	**No. of Facilities**	**Wastewater Discharge** (Millions of m3/year)
Chemicals	35	42
Fertilizers	6	46
Metals	15	93
Oil and soap	35	59
Pulp and Paper	11	41
Sugar	13	136
Textiles	72	81
Others	134	42
Total	**321**	**540**

Waste

Studies indicate that the municipal solid waste generated in urban areas is amounting to 24,000 tons per day, and in rural areas to about 11,000 tons per day (adding up to 35,000 tons nationwide). In general, about half or more of the waste consists of organic materials (see Figures 1 and 2). Collection rates in urban areas vary between 40% and 70%. There is a shortage of disposal facilities for municipal solid waste.
Waste generated by hospitals amounts to about 209 tons per day, 20% of which is considered hazardous, however, no pre-sorting system exists in almost all hospitals. Estimates for annual industrial solid waste generation ranges from between 200,000 to one million tons per day, not including non-hazardous wastes from cement, steel, mining and other industries. Hazardous wastes generated by Egyptian industries are estimated to be at least 50,000 tons annually.

ESTIMATED AVERAGE COMPOSITION OF MUNICIPAL WASTE IN EGYPT

Organic material	60%
Other material	29%
Paper	13%
Metals	3%
Glass	2.5%
Plastic	1.5%

ESTIMATED COMPOSITION OF MUNICIPAL SOLID WASTE

Households	66%
Markets	15%
Shops	14%
Streets	4%
Hospitals	1%

NB: This analysis is based on a survey in Alexandria, which is almost the same in all urban areas.

C. Market Profile

To breakdown the diversified cross-cutting environment market, we will follow the end-of-the-pipe classification, as it also serves to prioritize and categorize the various sectors as well as to identify the potential subsidiary companies and the required know-how partner(s).

The following estimates, obtained mainly from the Trade and Technological Information Promotion System "TIPS" were verified by a host of surveys conducted by the World Bank, USAID, and other donor funded programs and by our own surveys and interviews with experts and government officials.

♦ Environmental Market Size Estimates by Sector

Market Segment US$ Millions	1992	1997	2001 Estimate	2003 Forecast
□ Water & Wastewater Treatment	350	685	600 – 800	700 – 800
□ Waste Recycling (Services/Equipment)	5	9	8 – 10	350 – 370
□ Industrial Waste Treatment	9	135	100 – 150	200 – 250
□ Air Pollution Control	N/A	141	100 – 150	250 – 270
□ Water Purification Systems	40	67	60 - 80	160 – 180
□ Municipal Solid Waste	N/A	N/A	N/A	900-1,000
□ Renewable Energy (Excluding Wind Farms)	12	28	30	80 – 100
□ Mobile Source Air Pollution	0	11	20	30
□ Air & Water Monitoring & Testing	6	18	20	220 –2 30
□ Environmental Consulting	15	40	50	60
Total Estimate of the Environmental Market excluding Mainstream Technologies & Equipment	**430**	**1,104**	**990 - 1,310**	**2,950 – 3,290**

Source: EnviroEgypt 2003

The future outlook is based on the forecasts of the results of the above surveys, corrected by the various national plans for each sector as well as the impact of the various legislations in force. No figures were mentioned as this table serves as a guideline for prioritization rather than mere market assessment. The boom in 2002/3 is due to the launch of 15 years BOT tenders for Solid Waste Management in several Governorates (80% of the population) for collection, transfer and sorting/recycling/composting and final disposal of urban (municipal), industrial and hospital waste as well as street, parks and beach cleaning. This is

augmented by increasing industrial compliance and the introduction of the new vehicle inspection systems.

♦ Most Attractive Features of Environmental Business Segments in Egypt

Market Segment	Fast Growing	Opportunities for Foreign Business	Opportunities for Egyptian Private Sector	Near Term Market	Long Term Market
Water & Wastewater Treatment	Medium	Best	Medium	Best	Best
Waste Recycling Services & Equipment	Best	Best	Medium	Best	Best
Industrial Waste Treatment	Best	Best	Low	Medium	Best
Air Pollution Control	Best	Best	Low	Best	Best
Water Purification Systems	Medium	Best	Medium	Best	Best
Municipal Solid Waste	Best	Best	Low	Best	Medium
Renewable Energy	Best	Best	Medium	Medium	Best
Mobile Source Air Pollution	Best	Medium	Low	Best	Medium
Air & Water Monitoring & Testing	Best	Best	Low	Best	Medium
Environmental Consulting	Best	Best	Best	Best	Best
Mainstream Technologies & Equipment	Best	Best	Low	Best	Medium

Source: EnviroEgypt 2003

Many projects concerned with Egypt's environmental development have already started and proved successful, so that they are being extended now. Some of the greatest projects are planned now for the next years. Following there are just a few examples of the great business opportunities in Egypt.

Waste

To date, 7 governorates have been already tendered, 9 others are in the process and the remaining ones will all be tendered during this year. No American companies participated in any of these tenders leaving the Market to European (French, German and Spanish), Arab (Saudi and Lebanese) and Canadian companies as well as the Egyptian ones. A precondition for participation is forming a local company, alone or with a local partner. Changes in the investment law grants solid waste management as well as BOOT projects in infrastructure 5 years tax holiday as well as customs exemptions. The main selection variable is the experience of similar operations (comprehensive solid waste management) in large cities.
A special focus lies on the control and management of hazardous waste with respect to both the elimination as well as the safe disposal of it.

Table 2.2
Average selling price for Recycled Materials

Local Commercial Name	Composition	Recycling Output	Price	Unit
Baraka	PVC	Wire tubes - Sewage pipes - Plastic for detergent bottles	1300-1500	LE per Ton
Siwa - Teeba - Delta - Sabeel	PET	New bottles and plastic bags	1200-1400	LE per Ton
Bags - Plastic covers - White bottles - Tubes and pipes	LDPE	Garbage bags - New bottles - Plastic pipes	1300	LE per Ton
Thick bags & old containers	HDPE	Plastic pipes for electricity and water hoses	1000	LE per Ton
Batteries , pipes and ropes	PP	Hoses and pipes	1300	LE per Ton
Local Commercial Name	**Composition**	**Recycling Output**	**Price**	**Unit**
Plastic sandals and shoes	PVC	Sewage pipes - Electric tubes - Shoes	1000	LE per Ton
Transparent bottles	PS	Window frames - Plastic containers	750	LE per Ton
Biological Waste	Fermented Food, agro-waste- animal manure	Compost	25	LE Per m^3
Paper	Shredded Paper Molded in Bales	New Paper	25	LE per Ton
Cardboard	Wetted, molded, then sun dried Cardboard	Shoe Boxes – Cardboard Boxes	180	LE per Ton
Glass	Washed, molded – crushed, molded with cement for wall covering	New bottles – Building entrance covers		Depending on size
Metals	All metals in any form	Door knobs – Hinges & Hangers – Doors & Windows		According to end use
Textiles	Washed and minced in bales	Furniture filling – recycled cotton	2000	LE per Ton

AIR

Starting from the second half of September 1997, the Ministry of Petroleum, in cooperation with the Egyptian Environmental Affairs Agency (EEAA), the Transportation Authority, and the Greater Cairo Bus Company, started a plan to switch 4,000 public buses from gasoline to natural gas operation, at a cost of 22 mill. US$ provided from USAID. Many public and private buses are presently using natural gas, and so are private cars and taxicabs.
Moreover, the Ministry of Petroleum has eliminated the use of lead as an additive in gasoline and is introducing unleaded 90- and 95-octane gasoline. This will open the door for the real implementation of the decree to enforce catalytic converters issued early 1999 and applied to all imported cars. Moreover, by July 1, 2003, mandatory inspection and tuning of all vehicles will commence starting with greater Cairo opening the door for inspection and tuning operators and equipment suppliers.
However, converter toxicity due to sulfur has not been solved yet.

Also in the private sector the Egyptian Ministry of Environmental Affairs is encouraging the conversion of the combustion processes of fabrics to

natural gas. In addition to that Egypt is cooperating to reach the gradually reduction of ozone depleting substances in industries.

The Egyptian Electricity Authority (EEA) of the Ministry of Electricity is studying ways to reduce the pollution from power stations, so retrofit opportunities could exist here to hybridize the existing power plants. Many of these power plants are already using natural gas as a fuel to reduce pollution. EEA has determined not to build any more electrical power plants itself. Future plants will be built on a BOOT (build-own-operate-transfer) basis. In such cases, environment-related equipment would probably be included as a part of the overall package submitted by the bidding consortium. There are three BOOT tenders awarded with over 3000 MW more in the pipeline for the next 5 years, one of which is a solar-thermal (80 MW) and a number of wind farms.

With the improvement of an advanced monitoring network Egypt extending its ability to take immediate measures against the most concentrated air pollution.

Technology and Equipment

Competition in the Egyptian market for environmental equipment and technologies is sensitive to both price and quality. While price is a decisive buying factor in Egypt, branded products which generally carry a higher price tag, are also recognized for their quality and therefore find market acceptance. However, “the financial package” is the most decisive factor.

End-users of environmental protection equipment and technology are government-owned plants, as well as large private industries. There are about 22,000 registered industrial establishments in Egypt. Of these, 1,000 industries are responsible for about 80% of industrial pollution.

RENEWABLE ENERGY

An example for Egypt’s effort to step up the use of renewable energy is the broad project for winning wind energy. A national strategy for wind energy was put in place as early as 1988 with the plan to have 6000 MW wind farms by the year 2017. The production aim is 21 billion kWh saving 4.68 Mio. tons of oil equivalent.
The Ministry of Electricity & Energy of Egypt has embarked on this mammoth wind energy program to utilize the promising areas, especially the West Shore of the Gulf of Suez where wind speed reaches 10 meters per second being one of the best locations worldwide. Other promising areas include East Oinat where the wind speed reaches 7 meters per second, and the North coast reaching 6.5 meters per second.

A complete assessment of wind speed in Egypt was conducted producing a wind atlas for the whole of Egypt with emphasis on remote communities not connected to the national grid such as the New Valley and East of Oinat. This was through a 4 years project funded by Danida through a Danish Corona 9 Mio. grant.

The following table shows the components of the wind energy plan

- **Wind Energy Plan of Egypt**

	Installed Capacity "MW"				Annual Power Generated "Billion "kWh"		
5 year-plan Period	**Red Sea**	**East Owinat**	**Total Added during period**	**Cumulative Added by end of period**	**End of Period**	**Total Added during period**	**Cumulative annual**
1997-2002	400	0	400	400	1.4	3.50	3.50
2002-2007	1000	0	1000	1400	4.9	15.75	19.25
2007-2012	2000	0	2000	3400	11.9	42.00	61.25
2012-2017	3000	600	2600	6000	21.0	82.25	143.50

The plan started with a pilot project funded by USAID in Ras Ghareb (4 x 100 kW). This project used three mast propeller of 21 meters diameter (38.7 rpm). With a cylindrical 22 meters pylon.
In the same year, a UNDP/KFW project was launched for a single turbine unit (55 kW and diesel generator of 32 kW and a battery set of 105 kWh) for an ice factory in Abou El-Gesoun. This project used three mast propeller of 26 meters diameter and Wincon 55 turbines on a hexagonal 22 meters pylon. This initiated a pilot wind farm in Hurghada in 1992 funded by UNDP/UNIDO (4 turbine 110 kW each). The difference was that the local content reached 50%. This project used three mast propeller of 26 meters diameter (38.7 rpm) and Wincon W110 XT turbines on a cylindrical 22 meters pylon.
The first real "Pilot Farm" started in 1995 funded by Danida and KFW, again in Hurghada at three stages:

Stage 1:
Included 10 units of 100 kW WTG turbines (Ventis 20/100 kW) with an adjustable dual mast propeller of 20 meters diameter on a cylindrical 30 meters pylon

Stage 2:
Included 22 units of 100 kW WTG turbines (Wincon W 110 X) with an Fixed triple mast propeller of 21 meters diameter on a cylindrical 22 meters pylon

Stage 3:
Included 6 units of 300 kW WTG turbines (Nordtank NTK 300/31) with an Fixed triple mast propeller of 31 meters diameter on cylindrical and hexagonal 30 meters pylons

This project reached a total of 16.5 mill. kWh. The whole project had an average of 50% local content.

It took then four more years to start the real wind farms. The best site was selected (Zafaraana on the Red Sea) and the following two projects were initiated:

1. Danida funded a 60 Mega Watt Wind Farm (600 kW turbines). The project is producing an average of 200 mio. kWh annually which is connected to the national grid (OHTL included in the project 220 kV and substation of 220/22 kV). The grants total component was 253 mill. Danish Corona.

2. KFW funded a 60 Mega Watt Wind Farm (600 kW turbines). The project is in three stages, each of 20 MW producing an average of 70 mill. kWh annually per stage. It is connected to the national grid (OHTL included in the project 220 kV and substation of 220/22 kV). The grants total component was 50 mill. DM for phase one, and 40 mill. DM for each of phase two and three.

The Zafaarana area is planned to have over 6000 MW wind farms. Only 20% have been concluded. Negotiations with Danida, KFW, and Japan are under way for the remaining 80%. It is expected to utilize larger turbines in the following phases. A feasibility study is underway which is commissioned by JBIC (Japan Bank for International Cooperation) which will offer yen loans (mixed grant and soft loans with 0.75% interest over 40 years after a 10 years grace period), whereas Danida and KFW offered a clear cut grant and loan components.

D. Market access

The market for environmental equipment is expected to increase parallel to the improvement of the economy. Consumer demand is durable and future trends look very positive. For suppliers and businesses there are some conditions they should be aware of.

Customs tariffs on environmental equipment range between 5-40%. There is also a 10% sales tax.
Egyptian law requires that for public tenders, foreign companies must retain Egyptian commercial agents. Foreign firms are not required to have an agent when dealing with the private sector or for sales financed by donors. However, most foreign companies have found it beneficial to engage a local agent to handle the problems associated with communications, bureaucratic procedures, local business practices, and marketing. Based on the geographical location or product basis, a firm can appoint multiple agents in Egypt to further enhance its success.

Although agent commissions vary with services provided and the amount of individual contracts, agents generally charge a commission ranging from 2-4% for initiative, 2-4% for opening credits, and 1-2% for clearing goods through customs.

Parastatal companies purchase commodities through calls for international tenders. These are announced in the daily Egyptian press. Foreign firms must use an Egyptian agent to purchase tender documents from the issuing public sector entity.

In many cases, a foreign firm may not be able to provide the wide variety of products required in large tenders. With the formation of a consortium, however, it can offer a bid. The Italians, Germans and Japanese have successfully used this technique in Egypt. Egyptian buyers prefer a single bid for an entire tender rather than having to piece together bids for each component.

Public sector companies may request credit in their procurement tenders. While suppliers offering credit will certainly have a better chance of winning bids, sales without credit are sometimes made since other factors such as price, quality, and a delivery schedule may be of greater importance.

Public sector companies generally also require a performance bond equal to 10% of the contract, releasable upon completion of the contract. To avoid delays in obtaining release of the performance bond, the contract must be

formally amended if the buyer requests any change in delivery terms or specifications.

Foreign firms should be aware that while the purchasing company may simply accept the lowest bid meeting specifications, it may also attempt to bargain (Dutch auction) with one or more of the low bidders to negotiate better terms. Therefore, foreign firms should be prepared to empower their agents to do so. On major contracts, it is advisable to have an American representative conduct such bargaining.

There are no language requirements in Egypt. Although Arabic is official, English is acceptable. The country uses the metric system of measurement, but bids will not be rejected if another system is offered unless the tender specifically requires metric measurements.