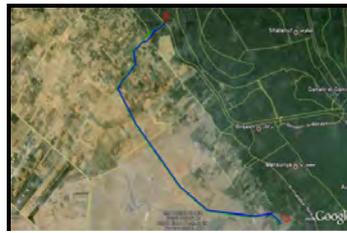
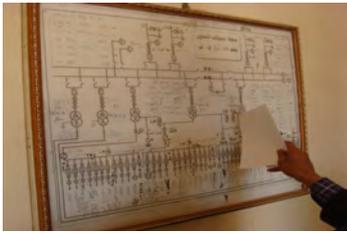




- 220/132/66 K.v SUB
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- 220/33 K.v SUB
- 220/11 K.v SUB
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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)

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Draft Report

Giza North Power C.C. 3*750 MW Interconnections Project

**220 kV Giza North/Ashmoun
500 kV Giza North/Cairo
500 kV Giza North/Samalout**

June 2011

Executive Summary

1. Introduction

Background

The Egyptian Electricity Transmission Company (EETC) is one of sixteen affiliated Companies under the Egyptian Electricity Holding Company (EEHC). The main role of the EEHC is the management, operation and maintenance of electric power transmission grids on extra high voltage and high voltage all over the country, and the optimal economic usage of those grids. EEHC's goal is to meet the growth in electricity demand while optimizing the use of all resources and maximizing profit.

The European Investment Bank (EIB) has agreed to fund the construction of OHTL interconnection lines for transforming electricity in Egypt in cooperation with the EETC, who is undertaking efforts to expand its services to meet EEHC's objectives and meet the growing demand for electricity.

The EETC is committed to producing an Environmental and Social Impact Assessment of Giza North Combined Cycled Interconnections as required by the Egyptian Environmental Affairs Agency (EEAA), World Bank (WB) and the EIB.

EcoConServ has been asked to prepare the environmental and socioeconomic study to investigate the potential environmental and social impacts of the Giza North interconnection lines. The effects of the planned activities are detailed in this Environmental and Social Impact Assessment (ESIA), and monitoring and mitigating any negative environmental aspects.

The Environmental and Social Impact Assessment Objectives

According to the Terms of Reference, this consultancy task has one main output; the ESIA, which has the following objectives:

- Assess the potential environmental and social impacts of the project in areas of implementation
- Compare the impacts in relation to relevant national and international requirements and guidelines
- Develop an environmental and social management framework for mitigation of the potentially negative impacts and for monitoring compliance with relevant environmental laws
- Assess the capacity of the implementing agencies to implement the developed environmental and social management framework
- Develop a capacity building program to cover any identified gaps in the capacity of implementing agencies regarding environmental and social measures
- Hold public consultation events to be publicly announced and well attended by relevant stakeholders, targeted, and affected community of the project site.
- Develop a Resettlement Policy Framework (RPF) to address cases where involuntary resettlement may occur.

The Environmental and Social Impact Assessment Methodology

The ESIA focused on identifying the strategic environmental and social issues. The ESIA included collecting background data from previous reports and studies about the environmental and socio-economic characteristics of the project area. The literature review included both reports provided by the client as well as web-based resources, which helped in assessing:

- The environmental and socio-economic characteristics of the project areas
- Project background and proposed interventions
- The legal, institutional and organizational framework and background of the electricity sector and the historical background
- The Egyptian legislations and the WB safeguard policies related to resettlement issues as well as the EIB guidelines
- Environmental and social standards and guidelines for related environmental and social issues

In addition to the literature review, structured site visits were undertaken to collect primary data in order to get stakeholders perceptions about some issues, especially social issues, such as:

- The current environmental situation on the site and the surrounding the project area as well as the natural condition of the project area
- The current energy sources and their impacts on the families' livelihoods
- Existing service providers, their strengths and weaknesses
- The short and long term impacts predicted from the project
- Ideas for maximizing the positive benefits especially on people's livelihoods and the economic development of the project
- The social power dynamics and the different interests of different stakeholders
- Consult with project-affected groups and local non-governmental organizations about potential resettlement issues, and take their views into account

2. Legislative and Regulatory Considerations

Laws and Regulations in Egypt

- Environmental Law 4/1994
- Law 38/1967 of Public Cleanliness
- law 93/63 of Discharge to the Public
- Law 63/1974 Electricity Installation
- Law 67/2006 Electricity Law for protecting the consumers

World Bank Safeguards and Policies

- OP 4.01 for Environmental Assessment
- OP 4.12 for Involuntary Resettlement
- OP 17.50 for Public Consultation and Disclosure Plan

EIB Guidelines

- Environmental Statement,1996

- Environmental Statement 2004
- EIA Directive 85/337/EEC, amended by Directives 97/11/EC and 2003/35/EC for EIA requirement
- EIB Sourcebook on EU Environmental Law
- EIB Social Guidance Notes

Potential EEAA, Egyptian Environmental Laws and Regulation, WB policies and guidelines as well as EIB policies regarding Environmental and Social aspects for Giza North Power Plant interconnections project are summarized as follows:

No	Safe guard	Policy Triggered			Justification
		Egypt	WB	EIB	
1	EIA	Yes	Yes	Yes	<ul style="list-style-type: none"> • This policy applies to all project requiring a Category B of Egyptian Laws and Regulations 4/1994, WB Policy (OP 4.0) and Table D of EIB project categorization to be applied. • EIA Policy summaries in Environmental Statement 2004 governed by Directive 85/337/EEC, amended by Directives 97/11/EC and 2003/35/EC according to the EIB Guideline. • All Environmental and Social aspects included in this interconnections project are adequately examined
2	Involuntary Resettlement	Yes	Yes	Yes	<ul style="list-style-type: none"> • Involuntary Resettlement is adequately analyzed and presented on separate report named RPF. • This policy applies to the all project triggering OP 4.12 (WB) as well as EIB Statement 2004 toward EIA. • There is one 220 kV OHTL interconnection from the Giza North Power Plant to the Proposed Ashmoun SS and there are two 500 kV OHTL interconnections that will connect the Giza North Power Plant to the Existing Cairo 500 SS and to the existing transmission line Samalout 500 / Cairo 500.
3	Public Consultation	No	Yes	Yes	<ul style="list-style-type: none"> • Although it is not required under the EEAA Environmental Law, a Public Consultation Process has been held in accordance with WB Guideline for Preparation of a Public Consultation and Disclosure Plan (January 1996). • This policy apply to all project triggering OP 17.50 for the WB and concerning the Public Concern under the EIB statement.
4	Disclosure	Yes	Yes	Yes	<ul style="list-style-type: none"> • The disclosure mechanism will take place through the related websites.

3. Project Description

The objectives of the project are:

- Evacuate the power generated by the Giza North power plant;
- Meet the increase in load and improve the voltage profile of the substations in Cairo and the West Delta zone;
- Relieve the load of neighbouring 220 kV Ashmoun substation; and
- Relieve the load of Samalout 500/Cairo 500 from Cairo 500 substation and interconnect it with the Giza North Power Plant.

Project components are presented as follows:

1. Connecting the proposed Ashmoun substation to Giza North Power Plant via a 220 kV double circuit OHTL (about 15 km length).
2. Connecting the existing Cairo 500 substation to Giza North Power Plant via a 500 kV single circuit OHTL with length about 30 km.
3. Release 500 kV OHTL Samalout 500 / Cairo 500 from Cairo 500 substation side and extending it with a length of 1x 30 km to Giza North Power Plant to become Giza North/Samalout.

The estimated total cost of the project is about EGP 116 Millions (with estimation of EGP 1.4 Million to construct 1 km of 500 kV OHTL and 1.2 Million to construct 1 km of 220 kV OHTL). It is intended that this will be met by the European Investment Bank (EIB) and the Government of Arab Republic of Egypt.

The total duration of the project estimated to be 15 months including all the preparations, studies, surveys, tenders, procurements and construction period.

4. Description of Baseline Environmental and Socio Economic Conditions

General Description of Giza North Power Plant, Ashmoun Substation and Cairo 500 Substation

Giza North Power Plant

The Giza North Power Plant is intended to be operational by the year 2012/2013. The power plant site is located on the eastern bank of the El-Rayyah (Canal) El-Beheiry, a main branch of the Rosetta Branch of the River Nile, approximately 40 km northwest of Cairo City, and km 20 southeast of El-Khatatba along the immediate northeast side of the Mansheyet El-Qanater/Itay El-Baroud Road, which runs parallel to the El-Rayyah El-Beheiry. The site is within the administrative boundary of the Giza governorate, the Markaz of Imbaba and Menshat El-Qanater. The site, also, is situated about 5-6 km from El-Kata agricultural complex, an area being developed for agricultural use. The area surrounding the site is locally known as the El-Kata area. Giza North power plant covers around 70 Feddans and is delimited by:

- Latitudes 30 14 35 & 30 15 09 N; and
- Longitudes 30 56 39 & 30 56 59 E

The site is situated in the heart of the cultivated lands. It forms the flat area which is a part of the Nile Delta plain. Many small villages (Ezzab /Kafr) are littered around the area. The site is located a small distance to the north of the existing poultry farm at km 22 El-Khatatba and 5 km north west of Ezbet Sayyed Ibrahim, the nearest residential community to the site. The project site is owned by the Cairo Electricity Production Company (CEPC), an affiliate company to the Egyptian Electricity Holding Company (EEHC), and consists of flat land measuring approximately 337m x 876m with a total allocated area of 275,000 m².

Ashmoun Substation

Ashmoun proposed substation is located inside the old electric power station of Ashmoun, surrounded by walls at all sides with a small internal road. A new and active electric power structure was observed in the site, as well as an abandoned old inactive power structure and equipment which were in a portion of the area of the site where the new substation is proposed to be located. An old and abundant storage tank was observed which served as cooling system for the old station was also observed. (See photo log for Ashmoun site below). Project area for the proposed Ashmoun substation covers about 2 Feddans and is delimited by:

- Latitudes 30 17 56 & 31 0 18 N; and
- Longitudes 30 17 59 & 31 0 19 E

Ashmoun Markaz and city belongs to and lies in the northern part of the Menoufia Governorate. Ashmoun is located on the eastern side of Rasheed sub-branch, and on a distance of about 25 Km from Cairo. The Nile sub-branch of Damietta separates Ashmoun from Qalyoubia Governorate, and the sub-branch of Rasheed separates Ashmoun from both Giza and Behaira Governorates. The main borders of Ashmoun are as follows:

- Monshaat Al Qanater city from the south,
- Both Menouf and El Bagour Markazes from the north,
- Qalyoubia Governorate to the east, and
- Both Giza and Behaira Governorates from the western side.

Cairo 500 Substation

Cairo 500 Substation was observed during the site visit. The substation was established in 1964. It is located about 2.25 km away on the northern-east side of Abu Rawas Industrial compound, about 2.0 km away from the regional road of Abu Rawas-Berkash and 5.5 km away from the Cairo-Alexandria Desert Road. The substation area is around 350 m * 800 m with the coordinates of Latitude 30° 6'1.04"N and Longitude 31° 3'41.81"E.

According to discussions with Eng. Ramadan Ragab, the manager of Cairo 500 Substation: "in order to accommodate the new interconnection to Cairo 500 substation, a new cell will be needed (50 m x 200 m). Land for this purpose needs to be purchased from the community since there is no choice with State-owned land."

The Over Head Transmission Lines

Giza North - Ashmoun

The proposed Ashmoun Substation will be connected to Giza North Power Plant via a 220 kV double circuit OHTL of about 15 km distance. The total number of towers to be constructed for the proposed Ashmoun interconnection to the Giza North Power Plant is

50 towers. The expected area of affected land required for establishing the towers¹ will be 7200 m².

Giza North – Cairo 500 and Giza North – Samalout

The existing Cairo 500 substation will be connected to the Giza North Power Plant via a 500 kV single circuit OHTL of about 30 km distance, where 79 towers are estimated to be established along the pathway. In addition, the existing 500 kV transmission line of Samalout 500/Giza North will be released from Cairo 500 substation side and will be extended with a length of about 30 km to Giza North 500 to become Giza North/Samalout 500. A total of 81 towers are estimated to be installed. The routes of both lines will be laid in parallel.

The route of the interconnections start at Giza North 500 kV Substation and ends at Cairo 500 Substation. The routes pass by El Katta and Nekla villages which currently affiliate to Giza Governorate and El Marioutia from the southern side near Cairo 500 Substation. It is estimated that 50% of the route passes through agriculture land (mostly of reclaimed land), and the rest will pass through empty land. As a part of the agriculture land, the route also will cross two main canals (El Naseri and El Behairy canals), with width 100 m and 75 m respectively, and a railway (about 50 m distance between the two canals) (See photolog of the crossing points). The results indicated are not final as the survey consultant is still defining the route. The expected area of affected land required for establishing the towers will be 6400 m² (31600 m² for Giza North/Cairo 500 and 32400 m² for Giza North/Samalout 500).

Regarding the steel tower, the EETC already has its own towers design. The towers are lattice steel self supporting double circuit towers should be used. The tower design to carry 3 phase conductors, one earth wires and one Composite Ground Wire with Optical Fiber (OPWG). Towers shall be self supported steel lattice tower designed to carry the line conductors with the necessary insulators. Tower foundations shall be insulated footing in case of dessert land. Raft and deep foundation may be used in case of agriculture land. Tower foundations shall be of reinforced concrete pad & chimney. Each tower type shall have its own foundation design. The tower design for 220 kV and 500 kV are presented in Annex III (for 220 kV) and Annex IV (for 500 kV).

Applicable Standards are as follows:

<u>SN</u>	<u>Standards</u>	<u>Title</u>
1	IEC	International Electro technical Commission
2	ANSI	American National Standards Institute
3	IEEE	Institute of Electrical-and Electronics Engineers
4	NEMA	National Electrical Manufactures Association
5	ASTM	American Society for Testing and Materials
6	DIN	Deutshes Institute Fuer Normung (German Standards)

¹ The expected affected land area is calculated based on an assumption that the land required for each tower footing is expected to be 12x12 meters (for 220 kV) and 20x20 meters (for 500 kV). Details on affected lands and compensations are provided in Annex VIII.

Climate Condition

The transmission lines of Giza North/Ashmoun, Giza North/Cairo 500 and Giza North/Samalout 500 cross a region of arid climate of the Northeast Africa, characterized by a warm winter and hot summer, low rainfall and high evaporation intensity. The relative humidity is moderate and active wind of intermediate speed is recorded, rainfall is in the range of 25 to 45 mm/year (for Giza North/Ashmoun) and between 25 to 100 mm/year (for Giza North/Samalout 500 and Giza North/Cairo 500).

The annual minimum and maximum air temperature in this region vary from about 13⁰C to about 28⁰C, however the temperature frequently rise to about 35⁰C during summer season.

Soil

Only one type of soil characterizes the region through the pathway of the pipeline which is the *Calcaric fluvisols*, relatively young soils (clay to loam) developed on recently deposited colluvial, fluvial, lacustrine, or marine sediments in the Nile Valley.

Geomorphology and Geology

Two main geomorphologic units can be identified in the area as follows:

- A. The Old Fluvial Plain (Unit 5), Giza North power plant, Cairo 500 Substation and the interconnection of Giza North power plant to Cairo 500 substation
- B. Young Alluvial Plain (Unit 4), Ashmoun Substation and Giza North/Ashmoun Interconnection

The surface exposures of the area belongs almost totally to the Quaternary and to the Late Tertiary and are essentially developed into clastic facies. Eocene and Upper Cretaceous carbonate rocks are locally exposed and are principally associated with fold-faulted structures.

Structure geology

The selected area for the project implementation is characterized by almost featureless plain with the exception of the small folded and faulted Abu Roach complex which offers a few prominent topographical or geologic features. Regarding the seismicity, recently no earthquakes even of low intensity were recorded throughout the pathway of the power lines.

Groundwater Hydrology (Hydrogeology)

The pathway of the power lines run through Nile Delta Aquifer and partially the Moghra Aquifer. Groundwater flow is being observed by RIGW since 1950, consequently a large amount of data is available, it was observed that the piezometric level decrease gradually from more than 40 m+msl to 15 m+msl in the north as shown in Figure 4-14. The average piezometric gradient is about 11 cm/km. Groundwater flow direction is by definition

perpendicular to the piezometric contour lines and therefore the flow direction is from south to north.

Hydraulic Parameters of the groundwater aquifer as follows:

- Vertical permeability of the top layer varies from 35 to 75 m/day
- Aquifer Hydraulic conductivity varies from 50 to 70 m/day.
- Transmissivity varies from 5000 to 25000 m²/day, and,
- Aquifer Storativity varies from 0.0005 to 0.01.

Recharge sources are:

- ◆ Seepage from the river and main canals
- ◆ Deep percolation from irrigation of cultivated lands
- ◆ Seepage from drinking water supply networks
- ◆ Infiltration/seepage from the sewage trenches.

Discharge occurs as:

- ◆ Groundwater return flow to the Nile.
- ◆ Interception by sewage system.
- ◆ Groundwater extraction.

Hydrochemistry:

Many authors, institutes and researchers have studied the groundwater quality of greater Cairo water for the purpose of different projects and/or studies. The main points they make are:

1. Groundwater type is bicarbonates, indicating that the source of recharge is surface water.
2. Sodium Chloride and Sodium Sulfate are also present in the deep aquifer which may indicate fossil water and/or recharge from domestic sources.
3. TDS generally range between 1000 and 2000 ppm.

Flora and Fauna

From Giza North to Ashmoun Substation

According to the recorded species; no endemic or threatened species were documented during this study. The investigated habitats are also not unique, but very common and widespread in neighboring areas which provide alternative habitats for the sympatric faunal species to move to these habitats and continue their life cycle.

From Giza North Power Plant to Cairo 500 Substation

According to the planned route of the transmission line, types of habitats, number and dimensions of towers as well as the recorded and reviewed species, there will be a very low impact on faunal species and their habitats as majority of the planned route will be occur in

insensitive areas which are represented by artificial-terrestrial habitats including plantations, rural gardens, cultivated agricultural lands, urban areas, asphalt roads and railways as well as desert habitats. All these habitats including water bodies and other structures that will be crossed by the planned route of the transmission line have been studied and there is no sensitive habitats for the planned transmission line or its towers.

No records of endangered, endemic or rare species and few common faunal species have been recorded from the habitats which planned to be crossed by the planned transmission line; also all recorded floral species are common species. The planned transmission line route will have a low impact on faunal species (including migratory birds) and their habitats as well as on floral species.

Bird Migration

The Giza North-Cairo 500 and the parallel line of Giza North-Samalout as well as Giza North-Ashmoun planned transmission lines, are located in areas which have no clear significant role on bird migration. Also they are not located in a main migratory bird route specially for large birds, which are most likely to be exposed to the danger of collision and electrocution; small birds are rarely at risk of electrocution as they generally fail to complete a circuit either by touching a grounded wire or any other structure.

Air Quality and Noise Measurements

Air quality and noise measurements will be conducted at one point along the transmission line of North Giza/Ashmoun to represent the agriculture environment along the route. In addition, two points will be selected along the transmission line of Giza North/Cairo 500 and Giza North/Samalout 500 (both lines will be laid in paralel; therefore the baseline environment will be similar). The two points will be selected along the route of Giza North to Cairo 500 substation due to the different environment of the site, one point will represent the environment around cultivated lands, and the other point will represent the environment around uncultivated lands along the route.

Socio Economic Baseline

Ashmoun City and The area along the transmission line of Giza North/ Ashmoun

The total population of Ashmoun Markaz is 705925 (information Center of Ashmoun 2010), females represent 48% of the total population. The population of Ashmoun city is 90768. Those who are residing in the rural areas inside Ashmoun are estimated to be 615157, and in urban areas there are 90768 persons. The population size varies among the different districts and local units of Ashmoun.

Ashmoun local units cover an area of about 71390 Egyptian Acres (299838 km²). The inhabited areas cover 4074 Egyptian Acres (17111 km²), whereas agricultural lands cover about 63277 Egyptian Acres (265763 km²). The state owned lands inside Ashmoun are only the construction and building lands; there are no state owned agricultural lands.

The residents of Ashmoun have good access to basic infrastructure such as electricity, potable water and sanitation. There are also well constructed and paved roads inside Ashmoun. There are about 48 electricity transformers distributed among the different villages and satellites of Ashmoun Markaz.

There are around 45 water plants distributed inside Ashmoun Markaz. The total number of residents who have access to potable water is 157 beneficiaries from the public sector inside urban areas as well as 618 beneficiaries from the public sector inside rural areas. On the other hand, the numbers of beneficiaries from the private sector are 13.000 beneficiaries in urban areas and 74.264 in rural areas. The total consumption of potable water inside urban areas estimates of about 40.951 m³ in the public sector and 6.250.000 m³ in the private sector. In rural areas, the consumption reaches up to 750.560 m³ in the public sector, while it reaches up to 9.934.382 m³ in the private sector.

There are only four sewage systems inside Ashmoun Markaz, they are (Ashmoun city, Samadoun, Shama and Tahway). Most houses inside these four places are connected to the sewage system. The rest of the houses use trenches that need to be emptied using the municipality emptying service. The numbers of houses that are connected to the sewage system - where found are 10240 houses in urban areas and 4723 houses in rural areas. Whereas, there were 500 houses in the urban areas and 8543 houses in the rural areas using trenches.

In 2005, the EHDR has reported that Menoufia has a high literacy rate 67.5% in 2004. Ashmoun also, is well known of the high education level of its citizens. There are over than 400 schools for different educational stages, they are distributed in all Ashmoun satellites and villages.

There are around 145 health and medical centers as well as 50 Family Planning Centers inside Ashmoun. There is also Ashmoun hospital of the one day surgery. However, the majority of these centers are lacking the basic health services in addition to the poor quality of the services provided. The frequent electricity interruptions inside Ashmoun have affected the work inside these health services significantly.

The residents of Ashmoun work in different professions, the majority of them work as employees in different governmental sectors. The stakeholders have stated that there is high involvement of women in different governmental jobs as well as working as teachers. It was difficult to obtain the unemployment rate in Ashmoun from the Information Center. Ashmoun is well known of its small and micro enterprises which reached to 459 industries in 2008, especially the production of handmade carpets, the pottery making, cutting and formation of seashells in addition to some other miscellaneous industries.

The main crops inside Ashmoun are maze, citrus fruits as well as wheat and cotton and other fruits. The productivity of the agricultural lands started to decline and the possession for the agricultural lands became scattered among farmers. Agriculture does not constitute the main income source for Ashmoun residents. The average range for the possession of the agricultural lands among farmers is between half an Egyptian acre to 5 Egyptian acres.

In 2004, Menoufia Governorate and its Markazes have been ranked number 12 in Human Development index. The real Gross Domestic Product (GDP) per capita is LE 3158.2 in Menoufia Governorate, which means Menoufia lies in the middle comparing to the poverty line. The stakeholders have stated that the economic level of most of the Ashmoun residents is in the middle. However, the majority of people can afford to buy lands for building and housing facilities. The prices for each square meters of land reached up to 15 thousand EGP (in the city area; not for agriculture purposes).

Giza City and The area along the transmission lines of Giza North/Cairo 500 and Giza North/Samalout

Giza is one of the governorates of Greater Cairo Region (Cairo- Giza- Qalyubia). Its borders meets with the borders of Behera, Matrouh as well as the borders of Fayoum, Beni Suef and Menya Governorates. The total area of the Governorate is 13.184 km².

The total population of the governorate is estimated as 5.2 million people in the first of January 2001. Out of the population there are 2815 people living in urban areas while the population of 2393 are living in rural people. The proportion of females is 48.3%.

Giza Governorate is divided administratively to 11 Markazes, 11 cities, 8 districts, Local Village Units, 150 satellite villages 637 Kafr and Naga. The capital is Giza city, which does not belong to any of its Markazes.

North Giza which is the scope of this study, lies mostly in Imbaba Markaz. The main city in Imbaba Markaz is Monshaat El Qanater city. The Markaz encompasses several villages and most of them lie in the northern region of the governorate, the Giza North/Cairo 500 and Giza North/ Samalout interconnection lines pass across El Qatta village which is one of the villages of Imbaba Markaz.

The Governorate has benefited in most of its parts from good infrastructure services due to its proximity from the Capital. The number of housing units in Giza governorate is 12003 units in total. Also, In Giza there are around 2067 schools and sections in the general education, out of them there are 1208 schools at urban areas and 859 in rural areas.

There are different health services and facilities inside Giza Governorate. There are (48) hospitals which are managed by the government as well as (194) private hospitals. The percentage of those who are working compared to the total population of Giza is 25.95 in urban areas and 23.5% in rural areas.

The total cultivated areas in Giza according to the statistics of 2000 are 190.1 thousand Egyptian Acres. The percentage of the cultivated areas to the total area is 6.1%, and the total cropped area is 430.2 thousand Egyptian Acres.

Giza is considered an agricultural and an industrial governorate at the same time where there are food industries, spinning and weaving, chemical industry and metal and mining industries. There are around 2341 industrial establishments in Giza employing 153311 laborers as well as 1678 vocational workshops employing 3050 laborers of different jobs.

Tourism is considered the primary source of income for Giza Governorate and for Egypt. There are around 61 hotels and resorts in Giza Governorate, the total number of tourism nights in 2000 reached up to 2257 thousand nights (Ministry of Tourism, 2000).

5. Potential Environmental and Socio Economic Impacts

Potential Environment and Socio Economic Impacts During Construction Phase

Impact	Likelihood and severity	Significance	Mitigation Measures Effects
Handling of construction waste	Uncertain likelihood for medium impact	Medium	Reduce impact significance to minor
Limitations on land use and risks of involuntary resettlement	Generally low likelihood for power lines	Medium	Reduce impact significance to minor following recommendations of RPF
Losing environmental benefits of trees along power lines	Low likelihood of major or medium impacts	Minor	Minimizing impact significance
Construction air emissions	Low likelihood of major or medium impacts – high likelihood of minor impact	Minor	Minimizing impact significance – only needed in loose sandy soil
Construction noise	Low likelihood of major or medium impacts – high likelihood of minor impact	Minor	Minimizing impact significance
Impacts on traffic	Low likelihood of major or medium impacts	Medium	Reduce impact significance to minor following recommendations of RPF
Impacts on Fauna and Flora	Low likelihood of major or medium impacts – high likelihood of minor impact	Minor	Minimizing impact significance
Impacts on Groundwater Resources	Low likelihood of major or medium impacts	Minor	Minimizing impact significance
Natural Disaster Risks	Low likelihood of major or medium impacts	Minor	Minimizing impact significance
Affecting the culture and privacy of local communities	Low likelihood of major or medium impacts	Minor and temporary	Minimizing impact significance
Creation of Job Opportunities and Flourishing Economies of Construction Sites	High Positive Impacts	High and temporary	No mitigation measures required
The misconceptions and its potential impacts on the reaction of local people	Uncertain likelihood for medium impact	Medium	Reduce impact significance to minor

Potential Environment and Socio Economic Impacts During Operation Phase

Impact	Likelihood and severity	Significance	Mitigation Measures Effects
Risks of scrap and hazardous waste	Low likelihood of major impacts	Medium	Reduces impact significance to minor
Safety Along the Power Lines, risks of electroflux and fire accident	Low likelihood of major impacts	Medium	Reduces impact significance to minor
Exposure to EMFs	Low likelihood of major or medium impacts	Minor	Minimizing impact significance
Risk of soil contamination	Low likelihood of major or medium impacts	Minor	Minimizing impact significance
Impacts on land use, landscape and visual	Low likelihood of major or medium impacts	Minor	No mitigation measures required
Impact on Bird Migration	Low likelihood of major or medium impacts	Unnoticeable	No mitigation measures required
Impact of Job opportunities and Flourishing Economic	High likelihood of major or medium impacts short term or long term	Major positive	No mitigation measures required
Impact of Creation Economic Burden on Poor Households	High likelihood of major impacts long term especially for the poor	Highly significant	No mitigation measures required
Securing the stability of power and meeting the demand of energy	High likelihood of major impact	Major positive	No mitigation measures required
Impact on openness and better level of awareness	High likelihood of major or medium	Major Positive	No mitigation measures required
Better Functioning Social Services especially on the Village Level	High likelihood of major or medium	Major Positive	No mitigation measures required
Improved life style and pattern of life	Low likelihood of major impacts	Medium	No mitigation measures required
Benefits to women	Uncertain positive impacts	Medium	No mitigation measures requires

6. Project Alternatives

No Project Alternative

It is believed that there will be many benefits from the project that could over-weigh its limited environmental impacts such as providing fluent power supply to the consumers, in addition to the developmental and socio-economic benefits. Therefore the no project alternative is not environmental/social requirement.

If the interconnection lines are not built, the consequences would be as follows:

- Energy capacity to the delta and west delta zone will not increase

- The power supply to the consumers will not be improved
- The consumers' financial losses from low quality power supply will not decline
- As a result, an increase in the economic activities in the region is not expected

Location Alternatives

Originally, there are three alternatives given to release the energy capacity from Giza North Power Plant. The selection of the transmission lines and routes were undertaken according to criteria that fulfilled technical and socioeconomic objectives to achieve the most feasible application.

The selected alternative is described below:

ALTERNATIVE 3 (SELECTED ALTERNATIVE)

In order to evacuate the generated power from the Giza North (3 x 750) M.W combined cycle power plant it is planned to interconnect this power plant with 500 KV and 220 KV National grids as follows:

500 KV

- Connect the existing 500 kV O. H. T. L Samalout 500/ Cairo 500 to Giza North power plant with a length of 35 km.
- Construct 500 kV single circuit OHTL Cairo 500/ Giza North with a length of about 30 km.

220 KV

- Construct 220 kV double circuit OHTL Ashmoun/Giza North with length about 15 Km.

7. Environmental and Social Management Plan

Environmental and Socio Economic Plant During Construction Phase

Potential Impact	Proposed Mitigation Measures	Project Phase	Institutional Responsibility for Implementation	Responsibility of direct supervision	Means of supervision
Effects of construction waste	Identify disposal sites for construction waste approved by the local authority	Pre-construction	EETC	EETC	Review local authority approvals
	Identify location within construction site for temporary storage of construction waste	Construction	Construction contractor	Construction supervisor consultant	Site supervision
	Adequate transportation and disposal of construction waste	Construction	Construction contractor	Construction supervisor consultant	Site supervision and occasional inspection of disposal site
	Allocate and prepare areas for temporary storage of scrap	Pre-construction	EETC	EETC	Auditing of allocated stores

Potential Impact	Proposed Mitigation Measures	Project Phase	Institutional Responsibility for Implementation	Responsibility of direct supervision	Means of supervision
	Keeping tidiness and cleanliness of the utility store	Construction	Storekeepers selected from EETC	EETC	Auditing of stores
Excavation and Trenching	Identify the excavation according to the drawing design	Pre-construction Construction	Construction Contractor	Construction supervisor	Site supervision and occasional inspection
	Clear safety signs and boundary for the excavation sites				
	Safety and clear area around the excavation site including the safety helmets and boots compulsory for workers				
Land use restrictions and possible resettlement	Choose routes of power lines not passing through highly produced fruits and could be rejected by public concern	Design and planning	Design consultant	EETC	Design review
	ROW and transmission route should avoid the damage of animals birds and sensitive archeological site	Design and planning	Design consultant	EETC	Design review
	If the resettlement occur, information and RPF should be implemented accordance with WB and EIB standard	Construction	EETC and local authorities	EETC and local authorities	Site supervisors
Trees removal for power lines right-of-way	Plantation of trees near removed trees	Construction	EETC	EETC	Review reports and occasional audits
Construction air emissions	Spraying soil before excavation in loose sandy soil	Construction	Construction contractor	Construction supervisor consultant	Site supervision
Construction noise	Provide ear muffs to construction workers usually located near noisy machines	Construction	Construction contractor	Construction supervisor consultant	Site supervision
	Organize working hours so that noise exposure to workers will be minimized	Construction	Construction contractor	Construction supervisor consultant	Site supervision
Impacts on traffic on roads	Prevent storage of construction materials, equipment or machinery on traffic lanes	Pre-construction and construction	Construction contractor	Construction supervisor consultant	Site supervision
	Facilitate alternative access roads to villages during temporary occupation of narrow roads. This mitigation is not applied at Badr Substation site as it is on the highway access road.	Construction	Construction contractor	Construction supervisor consultant	Site supervision

Potential Impact	Proposed Mitigation Measures	Project Phase	Institutional Responsibility for Implementation	Responsibility of direct supervision	Means of supervision
	Drivers of heavy trucks or loaders should be carefully turn as the high speed vehicles on the highway	Pre-construction and construction	Construction contractor	Construction supervisor consultant	Site supervision
	Drivers of construction machinery should receive sensitization/training on safety issues	Construction	Construction contractor	Construction supervisor consultant	Site supervision
Safety of Mechanical Equipment	Drivers should have a certified and valid license	construction	Construction contractor	Construction supervisor consultant Contractor	Site supervision Review of supervisor's reports
	All mechanical equipments should be checked prior to use				
	Appropriately tagged all mechanical equipments that are locked or out of service				
Impacts of culture and privacy of local communities	Maximize the use of local workers as much as possible	Construction	Construction contractor	Construction supervisor consultant	Review of contractor's reports
Raising awareness	Inform the community about the different stages of the project, safety measures and transportation route	Construction Contractors	Construction Contractors	Construction Contractors	Construction Contractors

Environmental Monitoring Plan Matrix during Construction Phase

Potential Impact	Monitoring Indicator	Monitoring Location	Monitoring Methods	Monitoring Frequency	Monitoring Responsibility
Disposal of construction scrap	Quantities of scrap item by type	Utility store	Inspection and recording of admitted items	Quarterly reporting	EETC storekeeper
Excavation and trenching	Areas of excavations and trenching Safety areas around the excavation	Construction site	Inspection and marked the safety areas for excavation especially the deep whole	Upon excavation and trenching	Site supervisor consultant Construction contractor
Land use restrictions and possible resettlement	Areas of restricted use penetrated by ROWs	Construction site	Area measurements on maps and on ground using surveying tools	Once during design phase	Design consultant
Trees removal during construction of power lines	Number of removed trees	Construction site	Visual counting of removed trees	Upon removal of trees, reporting will be once monthly	Site supervisor consultant
Safety on roads	U turn from the main highway to the site Marked sign on the entrance to the site	Highway road and the U-turn on both side	Clear sign on both U-turn side on the highway and at the	Upon turning or entering the location	Site supervisor and contractor

Potential Impact	Monitoring Indicator	Monitoring Location	Monitoring Methods	Monitoring Frequency	Monitoring Responsibility
			entrance to the site		
Safety of mechanical equipment	Performance of the equipment and the visible damage	Construction site	Inspection and recording of the performance	Upon the use of the mechanical and heavy machineries	Construction contractor
Culture and privacy of local communities	% of local labor to total labor	Construction site	Reporting labor origin governorates and calculating the natives ratio	Quarterly	Construction contractor
Raising awareness	Clear sign on the project site and along the transmission lines route	Construction sites	Marked the project site and warning sign as well along the interconnection lines	Monthly	Construction Contractor

Management and Monitoring Activities During Operation Phase

Environmental Management Plan Matrix during Operation Phase

Potential Impact	Proposed Mitigation Measures	Project Phase	Institutional Responsibility for Implementation	Responsibility of direct supervision	Means of supervision
Generation of scrap and hazardous waste	Allocate and prepare areas in substation site for temporary storage of scrap	Pre-construction	EETC	EETC	Auditing of allocated stores
	Keeping tidiness and cleanliness of the utility store	Operation	storekeepers	EETC operator / Environmental section	Auditing of stores
	Controlling the hazardous and special waste either to sell or to recycle.	Operation	EETC operator	EETC operator / Environmental section	Documentation of the waste management
	Controlled disposal of non sold hazardous and special waste	Operation	EETC operator	EETC operator / Environmental section	Documents review and occasional inspection of disposal site
	Implement waste minimization measures in design and construction	Design and Construction	Design consultants for design, and contractors during construction	Construction supervising consultant	Site supervision
	Carry out awareness campaign about safety precautions with specific emphasis on women and children	Operation	NGOs local promoters and training consultant	EETC	Review NGOs training of trainers and visits of local promoters
Exposure to EMFs	Select routes of power lines as far as possible from developed areas	Design	Design consultant	EETC operator / environmental section	Review design reports

Potential Impact	Proposed Mitigation Measures	Project Phase	Institutional Responsibility for Implementation	Responsibility of direct supervision	Means of supervision
	Fix a ROW distance on both sides of power lines where no permanent structures should be established	Pre-Construction	EETC and Local Authorities	EETC operator	Review correspondence with local authorities
	In case EMF monitoring results gave high EMF readings in populated areas, EMF reduction measures should be taken according to recommendations of an engineering consultant	Operation	Specialized Engineering Consultant	EETC / environmental section	Review consultant reports and implementation of measures
Risk of soil contamination	Care should be taken during transformer oil changing, which should be over an impermeable layer of soil	Operation	EETC operator	EETC / environmental section	Occasional visits to substations especially at the transformer location
	Adequate collection and disposal of contaminated soil	Operation	EETC operator	EETC / environmental section	Occasional visits to substations especially at the transformer location

Environmental Monitoring Plan Matrix during Operation Phase

Potential Impact	Monitoring Indicator	Monitoring Location	Monitoring Methods	Monitoring Frequency	Monitoring Responsibility
Disposal of hazardous waste and scrap	Quantities of waste items by type	substation utility store	Inspection and recording of admitted items	Quarterly reporting	Substation's storekeepers
Safety of power lines and substation	Number of electrocution or fire accidents by type	Substation operator	Counting accidents and reporting its causes	Once an accident happens	Substation's operator
Exposure to EMF	EMF (mG)	Selected locations where developed areas are closest to power lines	Measurements through EMF meter	Quarterly, or as required	EMF Expert (substation's operator)
Risk of soil contamination	Volume of contaminated soil	Locations of release	Approximate estimation of the volume by measuring surface area and approximate depth	Once an accident happens	Substation's operator

Raising Awareness

During different stages of the project, different awareness raising activities should be carried out with the public in order to minimize the impact, environmentally and socio economically and to introduce and inform the community about the different stages of the project as well as expected duration of its completion. Training plan for socio-economic issues as well as awareness raising activities is presented on the table below.

Topic	Contents	Type of training	Expected participants	Proposed time	Expected outcome
Awareness raising	<ul style="list-style-type: none"> -Introducing the new project. -The benefits of the new project. - Explain the different alternatives of the project. -The importance of mobilizing the local resources to replace the removed trees with new ones. 	<ul style="list-style-type: none"> -Organizing community conferences/symposia. -Printing pamphlets. - Using local media. - Making banners. 	The local residents	Before the start up of the project and during the construction phase.	<ul style="list-style-type: none"> - people are convinced of the importance of the new project. - people are participating in replacing the removed trees.
Health and safety measures	<ul style="list-style-type: none"> -The importance of applying safety measures during construction. -The needed precautions that ensures the health and safety of people. - The tools that can be used for the protection of laborers as well as the local people. -How to apply safety audits. 	Classroom, on-job training, and field inspections.	The local residents- the laborers and crew	Throughout the construction phase and Operation phase	Both the local people as well as the project crew are applying the safety measures during construction and operation phases.
Communication skills	<ul style="list-style-type: none"> -How to communicate with the public. -Different methods of communication. -The negotiation skills. 	Classroom, practical training.	The project staff	Throughout the construction phase and Operation phase	The communication and negotiation between the local people and the project staff is moving smoothly.

Environmental Safeguard Training

The EETC will ensure that the substation is manned 24 hours 7 days per week. Typically, a 220/66 substation, as mentioned above, is employed by about 50 staff with around 15 engineers, 3 shifts per day. For a 500/220 substation, the number of the workers are

estimated to be about 100 staff with around 25 engineers. All the employed staff will be trained on the following:

- specific job roles and procedures;
- occupational health and safety; and
- contingency plans and emergency procedures.

Training will include:

- induction training on appointment;
- specialist training (as required for their prescribed job role); and
- refresher training as required.

In addition to this environmental training for all staff employed at the project, special environmental training will be given to the staff during the operation phase to implement the ESMP. They will receive training in the following:

- Day-to-day monitoring activities;
- Collection and analysis of data;
- Use of monitoring equipment, operation and maintenance;
- Industrial hygiene;
- Occupational health and safety; and
- Emergency and contingency procedures.

During the consultation with one of the operators in the existing substation, trainings on safety standards and regular trainings are held for the staff members. The regular refreshment training is held besides the operation and maintenance training such as:

- Civil protection
- Fire fighting and fire accident
- Smoke detection
- Fire equipment maintenance

In addition, in every substation, EETC provides the emergency plan map.

8. Consultation with Stakeholders

Consultations During the Scoping Phase

In order to examine the social and environmental considerations about the project, a consultation process took place with different stakeholders. The consultation with stakeholders is divided into two stages: the consultation activities during the scoping phase and the consultation workshop after the completion of the first draft report of the ESIA.

There was a good combination between primary sources from the Information Center of each Executive Local Council and secondary sources in addition to the variation between quantitative data and qualitative data, which helped in achieving the objectives of the study. Dividing the consultation process into two stages is beneficial for the triangulation of information as it gives each party a chance to correct or add to the information. The

methodology considered the gender representation during the process and respected the cultural privacy of each community.

Public consultation workshop

In order to have the stakeholders attend the public consultation workshop that was organized on 31st May, 2011 in Cairo, a public Advertisement was announced in a local newspaper in addition to personal invitations being directed to representative stakeholders from the targeted regions (Ashmoun- Cairo 500- Giza North). During the workshop, the Giza North Interconnections project was introduced and detailed with the local stakeholders.

In order to hold accountability and transparency with the targeted groups, they were promised that EcoConServ would disclose the information and the findings for them after finalizing the research and after developing the first draft of the report. After conducting the public consultation workshop, the outcomes of the public consultation will be integrated into the contents of the ESIA to ensure the compliance with the WB policy requirement on disclosure of information as stated in OP 17.50. Moreover, there will be an on-going consultation during the different phases of the project. As part of the information disclosed to the public about the main findings of the study, a leaflet in Arabic can be printed out and distributed amongst people in public gathering places.

Future consultations

To avoid the misconception from the local people about the project, it is planned to organize future announcements and consultations with the local people before and during construction. The EETC will be responsible for informing local people through the following activities:-

- Coordinate with the local NGOs to organize community conferences for local people.
- Using the local media methods (Local Radio- local newspapers).
- Printing pamphlets and distribute them amongst people in the public gathering areas.
- Hang banners in public places.
- Announcement through mosques and churches.
- Announcement through the local municipality.

Findings of the consultations during the scoping phase

Giza North/ Ashmoun

- The majority of houses inside Ashmoun have access to electricity, only the new houses that have not claimed their possession to the houses have no access to electricity. The households, that are not connected to the electricity, still using alternative sources of fuel (ie.kerosene and generators) They also use combined alternatives of energy source to reduce the cost.
- Women are the key player in managing the energy inside their houses and responsible for rationalizing the electricity consumption as well as finding alternative sources. In the other hand, men are the responsible ones for finalizing the

- procedures of the connection for their houses. Their role is also to pay for the cost of different energy sources.
- Rural women are found to be more vulnerable to the negative impact of absence of electricity inside their houses as they have to do most of the domestic work manually.
 - The interruptions of electricity usually take place during peak times and in the evening. Inside village, the situation is even worse as the power cuts off for 3 to 4 hours twice to three times a week. In summer time the electricity interruptions are more frequent than winter.
 - The employed electricity meter reader is not visiting the houses regularly, which resulted in accumulating the fees on households; people find themselves unable to pay for the bills when the fees collector ask them to pay, as they have to pay fees for several months confluent at once.
 - Distribution Company is not liable for any consequential or economical loss experienced due to a power cut; the citizen is the one who bears the loss of the appliance damage.
 - The procedures that are followed for connecting electricity for the new houses are complicated and time consuming.
 - Most of the families know what are the parties who to report to in case of having any complaint from the service or dissatisfaction with the service. However, the majority of the families expressed their dissatisfaction with the system of complains which require them to pay first and complain later
 - There is no proper maintenance for the street lampposts and in most of the time they are turned off .
 - There is no installment system for electricity, but there is the so-called settlement of the bill value if it is high and unaffordable by the citizen. The value of the bill can be divided over several months, but the procedure is too long.
 - The local people are aware that the service provider in Egypt is a holding company; they assume that the company gained good profits in the past from electricity provision
 - The new project may add economic burden on local people especially the poor families, in case of adding indirect recovery cost to the electricity bill.
 - The new project may not compensate the small farmers properly or the compensations may not be satisfactory.
 - There is a fear of affecting some businesses owners or owners of buildings along the route of the new power lines.
 - The majority of the stakeholders are satisfied about the current service provider which is the transmission company and distribution companies, they think they are technically capable to run the service. The others make reservations on them, they suggest for having a better performance from the staff of the company
 - The project idea has been introduced to the different stakeholders; they have no objections about it technically. However, they asked to reduce the number of OHTL and towers and replace it with underground cables, which are safer and less restrictive on the livelihoods of people.
 - Some of them suggested nominating a trustworthy intermediate party to be responsible for reading the meters as well as fees collection. The local NGOs/CDAs were highly suggested by the majority of people to take that role. The NGOs also

were suggested to be responsible for raising the awareness of people about their rights.

Giza North/Cairo 500 OHTL

- The route of the interconnections starts at Giza North 500 kV Substation and ends at Cairo 500 Substation. The route passes by El Qatta and Nekla villages which currently affiliate to Giza Governorate and El Marioutia from the southern side near Cairo 500 Substation. It is estimated that 50% of the route is passing through agriculture land (mostly of reclaimed land), while the remaining part of the route crosses canals (two main canals El Naseri and El Behairy), the rail way and desert areas.
- Currently, the site of Giza North Power station is under preparation. The Contractor in charge of the civil works started to clear the site. According to the Giza North Project Manager, the land was privately owned and they purchased it from the owners. In order to minimize any potential conflicts between the Electricity Production Company and the owners of the land, the former provide very satisfactory levels of compensations for purchasing the land. Moreover, other opportunities are provided to the local communities as part of the project. This includes several job in different fields.

" We hire more than 50 of the local residents of El Katta, Abu Ghalb and Al Wardan in the project. They are mainly guards and technicians. The local communities have shortage in special specializations like engineering"

- Eng. Rafaat Abdel Aziz – Giza North Project Manger

- According to the discussion with the Eng. Ramadan Ragab, the manager of Cairo 500 Substation, in order to accommodate the new interconnection to Cairo 500 substation, a new cell will be needed (50 m x 200 m). The land for this purpose need to be purchased from the community since there is no choice with State-owned land.
- EETC provides compensation to farmers for the destruction of crops during the construction phase. According to the interviewees at Cairo 500 substations, the owners of lands could not object on the route passing their lands because these are public interest projects. However, it was widely agreed that the land value is reduced as a result of locating the towers and the route.
- Regular training on maintenance, operation, and occupational health and safety issues is usually provided to the field personnel. However, there is limited understanding for environmental issues due to the limited number of trainings in this field.

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List of Acronyms and Abbreviations

ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
BOD	Biological Oxygen Demand
CO	Carbon monoxide (CO)
COD	Chemical Oxygen Demand
dB	decible
DIN	Deutshes Institute Fuer Normung (German Standards)
EGP	Egyptian Pound
Eur	Euro
EETC	Egyptian Electricity Transmission Company
EEHC	Egyptian Electricity Holding Company
EEAA	Egyptian Environmental Affairs Agency
EIB	European Investment Bank
EMF	Electric Magnetic Field
ESIA	Environmental and Social Impact Assesment
EU	European Union
GIS	Gas Insulated Substation
HVDC	High Voltage Direct Current
ICNIRP	The International Commission on Non-Ionizing Radiation Protection (ICNIRP)
IEEE	Institute of Electrical-and Electronics Engineers
IUCN	the International Union for Conservation of Nature IUCN
KSA	King of Saudi Arabia
kV	kilo Volt
LC	least concern
OHTL	Over Head Transmission Line
OPGW	optical ground wire cable
OP	Operational Policy
PCB	Polychlorinated Biphenyls
PRA	Participatory Rapid Appraisal
PVC	Polyvinyl chloride
Km	Kilo Meter
mG	mini Gauss
MVA	Mega Volt Ampere
MW	Mega Watt
MWA	Mega Watt Ampere
NECC	National Energy Control centre
NEMA	National Electrical Manufactures Association
NO2	Nitrogen dioxide (NO2)
ROW	Right Of Way

RPF	Resettlement Policy Framework (RPF)
SCADA	supervisory control and data acquisition
SO2	sulfur dioxide (SO2)
TL	Transmission Line
TSP	Total Suspended Particulate
UV	Ultra Violet
WB	World Bank

1. Introduction

1.1. Background

The Egyptian Electricity Transmission Company (EETC) is one of sixteen affiliated Companies under the Egyptian Electricity Holding Company (EEHC). The main role of the EEHC is the management, operation and maintenance of electric power transmission grids on high voltage and extra-high voltage all over the country, with the optimal economic usage of those grids. EEHC goal is to meet the growth in electricity demand while optimizing the use of all resources and maximizing profit.

EEHC supervises the implementation of the sixth five year plan to meet the demand for electric power during the period (2007/2008- 2011/2012) so is the establishment of power stations with total installed capacity of 7000 MW (after the cancellation of project Nuweiba of 750 MW capacity). In addition to an emergency plan to add 1500 MW and to meet the loads of summer 2011, and 1000 MW to meet the loads of summer 2012. EEHC set the seventh five-year plan during the period (2012/2013-2016/2017) so is the establishment of power stations with total installed capacity of 12400 MW, and where 11100 MW are operating during the years of the plan, in addition to 1300 MW to run in 2017/2018³.

With the global rising demand for energy sources, the decline and depletion of the supply of traditional sources of energy, in addition to the continued increase in prices and instability, it is important to seek the ways for supplying energy with a high reliability manner. The European Union - as an importer of energy - has realized the importance of seeking different ways of supplying energy as well as supporting Egypt in facing the challenges of achieving a balance between the increased energy demand and the availability of permanent and non-exhaustible sources of energy. The Ministry of Electricity and Energy (MoEE) has discussed different proposals with EU in the field of electricity generation in order to encourage the trend towards the implementation of new projects for renewable energy, and benefit from the European experience in the organization of the energy market and its rational use.⁴

The European Investment Bank (EIB) is the European Union's financing institution, which encompasses 27 Member States of the Union as shareholders. The EIB's role is to provide long-term finance in support of investment projects. The EIB supports the EU's policy objectives especially for the energy related areas to insure having sustainable, competitive and secure energy through producing alternative energy and reducing dependence on imports.⁵ The EIB has agreed to fund the construction of Power Plant, several substations and interconnection lines for transforming electricity in Egypt in cooperation with the EETC. Figure 1 below shows the location of the proposed Giza North Power Plant, Ashmoun and Cairo 500 substations.

³ EEHC Annual Report 2009-2010

⁴ AlMasry- Alyoum Newspaper: Edition no. 874, November, 4th, 2006. Available online at: <http://www.almasry-alyoum.com/article2.aspx?ArticleID=35729&IssueID=476>

⁵ Source: European Investment Bank. Available online at: <http://www.eib.org/about/index.htm?lang=en>

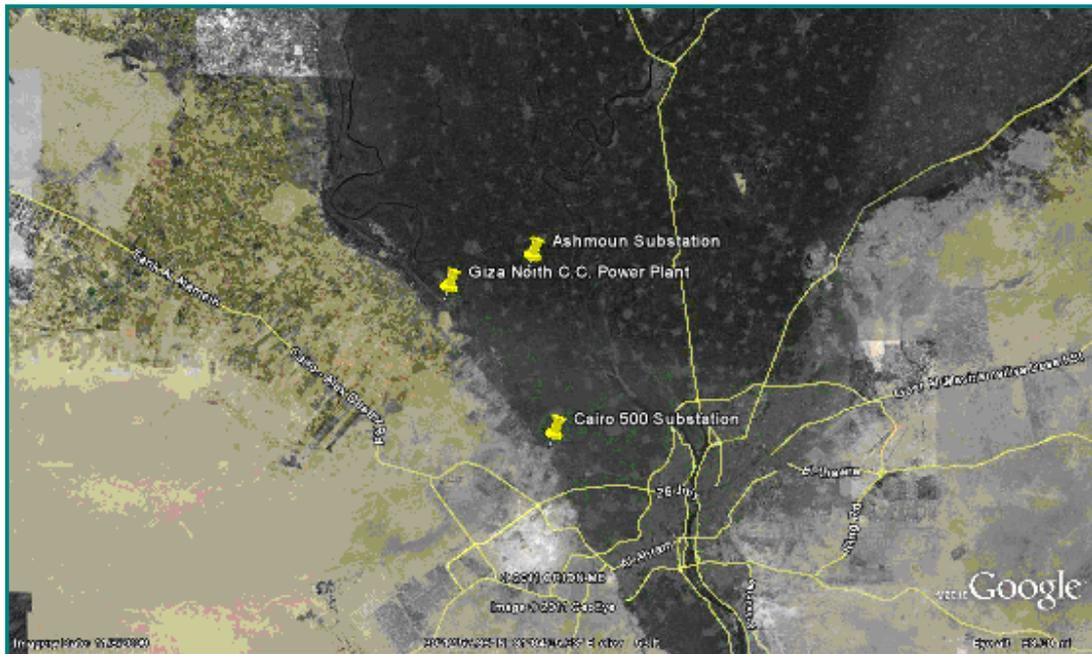


Figure 1. Giza North C.C. Power Plant, Ashmoun Substation and Cairo 500 Substation

The EETC is committed to prepare the documents and procedures concerning the Environmental and Social Impact Assessment of Giza North C.C. Interconnecting Lines as required by the Egyptian Environmental Affairs Agency (EEAA), World Bank (WB) and the EIB.

The proposed project is designated as a Category (B) project under the EIB guidelines as well as the WB guidelines and a Category (B) project under the EEAA regulations. Therefore requires, as per international standard and national regulations, a full Environmental and Social Impact Assessment. Financing from EIB is conditional upon obtaining the environmental clearance from all the Egyptian regulatory authorities.

EcoConServ is been asked to prepare the environmental and socioeconomic study to investigate the potential of the OHTL interconnections to influence the environmental and social conditions around them. The effects of the planned activities are detailed in this Environmental and Social Impact Assessment including impacts and environmental management and monitoring plan.

1.2. Initiation of the Giza North Interconnections Project

The key objective of the proposed project is to evacuate the energy generated at the Giza C.C. Power Plant into the 500 kV backbone network and to improve stability and access of electricity in the selected project areas in a financially and environmentally sustainable manner. The proposed project is to construct three Over Head Transmission Line (OHTL) from Giza North Combined Cycle (C.C.), which is currently under the site preparation and it

is expected to start the operation by the first quarter of 2012), to the substations (Ashmoun and Cairo 500) in order to connect it with the existing national grid⁶.

The main objectives of the proposed Project are to:

1. Evacuate the power generated in the Giza North Power Plant.
2. Improve the voltage level and system stability
3. To meet the increase in load demand and improve the voltage profile of the substations in Cairo and the West Delta zone.
4. Release the load of Samalout 500/Cairo 500 and interconnect it to Giza North Power Plant.

1.3. The ESIA Objectives

According to the ToR, this consultancy task has one main output; the Environmental and Social Impact Assessment (ESIA), which has the following objectives:

- Assess the potential environmental and social impacts of the project in areas of implementation
- Compare the impacts in relation to relevant national and international requirements and guidelines
- Develop an environmental and social management framework for mitigation of the potentially negative impacts and for monitoring compliance with relevant environmental laws
- Assess the capacity of the implementing agencies to implement the developed environmental and social management framework
- Develop a capacity building program to cover any identified gaps in the capacity of implementing agencies regarding environmental and social measures
- Hold public consultation events to be publicly announced and well attended by relevant stakeholders of the project in each site.

1.4. The ESIA Methodology

The ESIA focuses on identifying the strategic environmental and social issues. The ESIA included collecting data from previous reports and studies for obtaining background data about environmental and socio-economic characteristics of the project area. Literature review included both reports provided by the client as well as web based resources, which helped in assessing:

- The environmental and socio-economic characteristics of the project areas
- Project background and proposed interventions
- The legal, institutional and organizational framework and background of the electricity sector and the historical background
- The Egyptian legislations and the WB safeguard policies related to resettlement issues as well as the EIB guidelines
- Environmental and social standards and guidelines for related environmental and social issues

⁶ The National grid map of Egypt and the location maps of the proposed sites within the Egyptian context are presented in Annex I and Annex II.

In addition to literature review, structured site visits were undertaken to collect primary data in order to get stakeholders perceptions about some issues, especially social issues, such as:

- The current environmental situation on site and surrounding the project area as well as the natural condition of the project area
- The current energy sources and their impacts on the families' livelihoods particularly on the vulnerable groups (children, women, the poor),
- Gender issues related to energy management on the level of household and village,
- Existing service providers, their strengths and weaknesses,
- The short and long term impacts predicted from the project,
- Ideas for maximizing the positive benefits especially on people's livelihoods and the economic development of the project,
- The social power dynamics and the different interests of different stakeholders,
- Consult with project-affected groups and local non-governmental organizations about potential resettlement issues, and take their views into account.

2. Legislative and Regulatory Consideration

2.1. Environmental Regulations in Egypt

2.1.1. Law 4/1994 for the Protection of the Environment

Law 4/1994 and its executive regulations, subject to the Cabinet Decree 338/1995, as revised in some of its provisions in Cabinet decree 1741/2005, is the main environmental protection legislation in Egypt. The published Environmental Impact Assessment (EIA) guidelines (October 2001/January 2005/ January 2009) form the key regulation on environment protection.

EIA Regulations

The Executive Regulations relating to Law 4/1994 identifies establishments or projects which must be subjected to an Environmental Impact Assessment based upon the following main principles:

1. Type of activity performed by the establishment.
2. Extent of natural resources exploitation.
3. Location of the establishment.
4. Type of energy used to operate the establishment.

Projects are classified into three groups or classes reflecting different levels of assessment required for their anticipated environmental impacts according to the severity and extent of these impacts, as follows:

- Category .A. list projects for establishments/projects with minor environmental impacts
- Category .B. list projects for establishments/projects which may result in substantial environmental impacts.
- Category .C. list projects for establishments/projects which require complete EIA due to their potential significant impacts.

Provisions for Project Activities

Based on Law 4/1994 and its Executive Regulations, the following are some provisions, pertinent to the activities of the proposed project:

- Preparation of an ESIA study of the project and its presentation to the competent administrative authority, which, in turn shall refer it to EEAA for consultation (articles 19 through 23 of the Law and 10 through 16 of the regulations). In terms of EEAA classifications, the project is classified as a Category B Project, due to the substantial environmental and social impacts.
- Obtaining a license for the handling of hazardous materials from the competent administrative authority (Ministry of Housing). Onsite generation rates of hazardous

wastes shall be reduced. Safe storage of hazardous waste in solid containers with clear and visible marks for their hazard type and maintenance of an integrated record for waste handling is required by law (articles 29 and 33 of the law and 25;26;27;28;31 of the regulations). The expected types of hazardous waste and the proper ways of their handling are detailed in chapters 5, 7 of this study.

- Disposal of excavation/construction waste at licensed locations through the local authority. These locations should be at least 1.5 km away from residential areas, at a lower elevation than the surrounding area, and leveled after being filled in with waste (article 41 of the regulations).

Maintenance of work place noise levels and exposure periods within the regulatory limits. Strict prohibition of ambient noise higher than regulation limits for housing zones (articles 42-44 of the law and annex 7 of the regulations). Permissible maximum limits of noise intensity inside the work place are presented in Table 2-1, the maximum exposure periods for different noise levels are presented in Table 2-2 and Table 2-3 and the maximum ambient noise levels in different areas are presented in Table 2-4. These levels apply to areas surrounding the project site.

Table 2-1: Maximum Permissible limits of noise intensity exposure inside production sites

Type of Site & Activity	Maximum limits (L.Aeq) Decibel
8 hour shift for limiting harmful effects upon hearing	90
places having vocal signals and good hearing requirements	80
Computer and typewriting offices	70
Operation follow up and control rooms	65
Rooms of mental concentration routine activities	60

Table 2-2: Maximum noise exposure periods in work sites

Noise Intensity Level (A) (L.Aeq) – Decibel	95	100	105	110	115
Exposure period (h)	4	2	1	1/2	1/4

Table 2-3: Noise intensity and maximum number of intermitted impacts from heavy hammers

Noise Intensity Level (L.Aeq) – Decibel	135	130	125	120	115
Number of permissible impacts	300	1000	3000	10000	30000

Table 2-4: Maximum permissible limit of noise levels in different areas

Type of Area	Permissible Limits of Noise Intensity (L.Aeq) Decibel		
	Daytime 7am-6pm	Evening 6-10pm	Night 10pm-7am
Rural housing areas, hospitals and parks	45	40	35
Housing districts of light noise	50	45	40
City housing districts	55	50	45
Housing districts, including workshops, stores or	60	55	50

Type of Area	Permissible Limits of Noise Intensity (L.Aeq) Decibel		
	Daytime 7am-6pm	Evening 6-10pm	Night 10pm-7am
on public road			
Commercial, administrative areas and town center	65	60	55
Industrial zones(heavy industries)	70	65	60

- Taking precautionary measures to control fugitive dust emissions during excavation and construction works. These measures include:
 - Storage of excavation/construction waste should not cause obstruction to pedestrian movements. Waste liable to dispersal shall be covered to avoid air pollution.
 - Transport vehicles shall be provided with tightly closed boxes to minimize to prevent loose particles of waste and debris from escaping into the air or dropping on the road (article 39 of the Law and 41 of the regulations). These actions are applicable to site preparation works during the construction phase.
- Compliance with the maximum permissible limits of air pollutants in the gas emissions at the project site (articles 34 through 47 of the law and Annex 6 of the regulations). Primary emission sources are construction machinery and transport vehicles. The following table presents the maximum permissible gas emissions and periods of exposure.

Table 2-5: Maximum limits for air pollutants in ambient air

Pollutant	Maximum Limit ($\mu\text{gm}/\text{m}^3$ unless otherwise prescribed)	Exposure Period
Sulphur Dioxide	350	1 hour
	150	24 hours
	60	1 year
Carbon Monoxide	30 (mgm/m^3)	1 hour
	10 (mgm/m^3)	8 hour
Nitrogen Dioxide	400	1 hour
	150	24 hours
Ground Level Ozone	200	1 hour
	120	8 hours
Suspended Particulates Measured as Black Smoke	150	24 hours
	60	1 year
Total Suspended Particulates (TSP)	230	24 hours
	90	1 year
Respirable Particulates (PM_{10})	150	24 hours
	70	1 year
Lead	0.5	1 year ^a
	1.5	6 Months ^b

a Daily averages in urban areas; b Daily averages in industrial areas

Table 2-6: Maximum Limits for Air Pollutants in Vehicle Emissions

Type of Vehicle	Parameter	Vehicles Manufactured Before 2003	Vehicles Manufactured Starting 2003	Method of Measurement
Gasoline	Hydrocarbons (ppm)	900	600	at 600-900 rpm
	CO %	4.5 Volume	2.5 Volume	at 600-900 rpm
Diesel	Opacity	30	30	at maximum acceleration

Law 38/1967 on Public Cleanliness

The conditions mentioned in the previous paragraph are also mentioned in Law 38/1967 for General Cleanliness and its Executive Regulations. Article 15 of the Executive regulations stipulates that vehicles hauling construction waste should have tight cover to prevent dispersion or falling of its contents.

Law 93/1962: Discharge of Liquid Waste

The law regulates the discharge of liquid waste to sewerage networks, thus protecting such networks and sewerage utilities from polluting discharges. Provisions of this law apply to all parts of sewerage networks including final inspection chambers and their joints to the main network and all pipelines whether constructed under public or private roads. Decree 649/1962 was revised (regulations of law 93/63) by Minister of Housing decree 44/200 including the revised specifications of liquid waste, prior to their discharge to the sewerage network. Late 2003, Minister of Housing decree 254/2003 (as 8th chapter of decree 44/2000) was issued for the bases and specifications of the treatment, handling and safe re-use of sludge, and decree 171/1005 for the Egyptian Codes for use of treated wastewater in agriculture.

Following, are some pertinent articles for the project activity.

- Wastewater discharged to the sewerage network should comply with the standards stipulated in the regulations (decree 44/2000). Article 14 details the physical/chemical standards that should be complied with as indicated in Table 2-7.
- Domestic wastewater should be treated prior to re-use in irrigation. The regulations classified the re-use of treated water in irrigation into three different categories, in terms of the irrigated crops. Table 2-8 provides the treated water target standards that should be complied with for irrigation water for unlimited use (article 10 of the regulations).
- Disposal of sludge resulting from wastewater treatment processes by land filling at a sanitary landfill, or incineration in an environmentally compliant incinerator (article 7 of decree 254).

Table 2-7: Maximum pollutants to be discharged in drainage networks (Law 93/1962)

Parameter	Standards & Specifications
pH	6-9.5
Temperature	43

Parameter	Standards & Specifications
COD (diachromat)	1100 ppm
Suspended Solids	800/1000 ppm
Dissolved Solids	10 ppm
Oil& Grease	100 ppm
Total Nitrogen	100 ppm
Total Phosphorus	25 ppm
Cyanide	0.02
Phenol	0.05
Precipitated materials (after 10 min)	8 cm/L
Precipitated materials (after 30 min)	15 cm/L
Total heavy metals	5.0 mgm/L
Hexagonal Chrome	0.5 mgm/ L
Cadmium	0.2 mgm/ L
Lead	1.0 mgm/ L
Mercury	0.2 mgm/ L
Silver	0.5 mgm/L
Copper	1.5 mgm/L
Nickel	1.0 mgm/L
Pewter	2.0 mgm/L
Arsenic	2.0 mgm/L
Boron	1.0 mgm/L

Table 2-8: Maximum pollutants in treated sewerage water for unlimited irrigation works

Parameter	Standards & Specifications
BOD	20 ppm
COD (diachromat technique)	40 ppm
Suspended Solids	20 ppm
Oil& grease	5 ppm
Number of intestinal nematode cells	1 colonies/L
Number of fecal coli form cells	100 colonies/L
TDS(subject to plant withstanding)	2000 ppm
Rate of Sodium absorption (porosity, subject to plant& soil type)	20%
Chlorides	300 ppm
Boron	3.0 ppm
Cadmium	0.01 ppm
Lead	5.0 ppm
Nickel	0.2 ppm
Zinc	3.0 ppm
Arsenic (green fodder only)	0.1 ppm
Chrome	0.1 ppm
Molybdenum (green fodder only)	0.01 ppm
Manganese	0.2 ppm
Iron	5.0 ppm
Cobalt	0.05 ppm

Law 4/1994 requires that, for establishments requiring licenses, an Environmental Impact Assessment (EIA) must be prepared and submitted to the Egyptian Environmental Affairs Agency (EEAA) for review.

The EETC will send the ESIA to EEAA for review and provide its opinion. Once EEAA has approved the project, a license to proceed can be issued. No additional environmental or social clearances are required other than the EIA approval to advance with the project activities. The law requires that any new project should comply with all the relevant articles pertinent to environmental attributes, which could be impacted from project activities.

2.1.2. Electricity Law No. 63 of the Year 1974

In addition to Environmental Impact Assessment requirements, concerning the electricity sector installation, the People Assembly passes the bill of Electricity Law 63 (article 1 and 2) that regulates mechanism and the responsibilities of the owner or squatter that passes the land (overhead or underground cable) and the limit of the distance set for the different capacity of the power lines.

Electricity Law 63/1974 has discussed in article 6 the limits of distances to be measured from the axis of the OHTL routes as well as the underground cables, which should be kept away from the infrastructures and development areas, to be as follows:

1. 25 meters in case of Ultra High Voltage OHTL
2. 13 meters in case of High Voltage OHTL
3. Five meters in case of High Voltage underground cables
4. Two meters in case of Medium and low Voltage underground cables

Both articles 7 and 8 have discussed the compensation that shall be paid to the owners of properties in case any damage will affect them. It also discussed that amount of the compensation shall be agreed upon through a committee to be selected by the Minister of Electricity and Energy, with the membership of the following candidates:

1. A representative of Ministry of Agriculture and Land Reclamation,
2. A representative of the Egyptian Survey Authority,
3. A representative of the Governorate,
4. Representatives of the Local Popular Council,
5. Plus an invitee to be selected by the committee.

Articles 10 and 11 of the Law emphasized on the importance of reaching an agreement with the owners on the compensation amount.

2.1.3 Electricity Law No. 67 of the Year 2006

This electricity Law was issued for the sake of protecting the consumer. As stated in Article 2 of this law, the consumer's rights must not be compromised, including the consumer's right to have access to knowledge on the protection of his legitimate rights and interests in order to ensure that he is aware of the party whom he can refer to in case of any complaints.

The consumer also has the right to bring lawsuits on all that would prejudice or damage his rights or restrict them. As stated in Article 2, the service users have the right to obtain a fair compensation in case of damage caused to them or their properties or money as a result of buying or using or receiving the service. Both articles 3 and 6 provide that it is incumbent on the service provider to identify the service related data in a clear way showing the prices, specifications and characteristics. The service provider also must supply the consumer with correct information about the nature and characteristics of the product – which is indicated in this report as "the electricity" - to avoid misleading the consumers or the beneficiaries of the service causing them to fall into error or mistake.

As indicated in Article 5 of the same law, the service provider must submit an invoice to the consumer showing the price of the product and describing its specifications, nature, quality and quantity. According to articles 7 and 9, the service provider is committed to give back the service fees to the consumer if proved to have any defect or deficiency in the service. Article 11 of the law would help the poor within any community as it reflects the possibility to have access to service installments in case of obtaining the consent of the service provider or supplier to do so. Under this law in Article 12, an agency should be established for the protection of the consumer and his interests. The Egyptian Electric Utility & Consumer Protection Regulatory Agency is the organ competent for the protection of the consumer in the electricity sector.

2.1.4. Legislation Related to Resettlement and Compensation

Egyptian constitutions (1971) as amended to (2007) dealt with resettlement issues, specifically Articles 29, 32 and 34 that regulates issues around private ownerships. "Private ownership shall be safeguarded and may not be put under sequestration except in the cases specified in the law and with a judicial decision. It may not be expropriated except for the general good and against a fair compensation in accordance with the law. The right of inheritance is guaranteed in it."

Articles 30 and 33 are about issues related to public ownership that shall be protected. Article 31 is about the co-operative ownership which shall be self managed and protected by the Law.

As amended by the constitutional reform of March 26, 2007. Article 37 (8) ensures the protection of the land ownership and the farmers from abuse. *"The law shall fix the maximum limit of land ownership with a view to protecting the farmer and the agricultural laborer from exploitation and asserting the authority of the alliance of the people's work forces at the level of the village."*

The summary of the policy triggered under the Egyptian Laws and Regulations and their justifications is shown in table 2.10.

2.2. World Bank Safeguard Policies and Guidelines

2.2.1. OP 4.01 – Environmental Assessment

The EETC Giza North Interconnections project has been classified as a Category B project, requiring an environmental assessment in accordance with the Bank's Operational Policy on Environmental Assessment (OP 4.01). Projects under Category B in general could have potential adverse environmental impacts on human populations or environmentally important areas - including wetlands, forests, grasslands, and other natural habitats. The impacts are site-specific, reversible and temporary in nature.

The environmental impacts that are likely to be caused by the project have been analyzed in this ESIA. Mitigation measures were identified for all expected negative impacts, along with an Environmental and Social Management Plan (ESMP) presenting mechanisms for implementation of these mitigation measures.

2.2.2. OP 4.01 – Environmental Assessment

The construction of such interconnections has been classified as a Category B project, requiring an environmental assessment in accordance with the Bank's Operational Policy on Environmental Assessment (OP 4.01). Projects under Category B in general could have potential adverse environmental impacts on human populations or environmentally important areas including wetlands, forests, grasslands, and other natural habitats. The impacts are site-specific, reversible and temporary in nature.

The environmental impacts that are likely to be caused by the project have been analyzed in this ESIA. Mitigation measures were identified for all expected negative impacts as presented in chapter 5, along with an Environmental and Social Management Plan (ESMP) presenting mechanisms for implementation of these mitigation measures, in chapter 7.

2.2.3. OP 4.12 – Involuntary Resettlement

Under development of projects, people may face hardships in the incidence of losing their assets or money. This operational policy is the safeguard policy that addresses and mitigates the impacts of Involuntary Resettlement related to each project. The affected persons who are eligible for assistance will be identified. Moreover, a procedure will be developed in order to compensate the displaced persons or provide them with some guidance for resettlement in order to improve their livelihoods or at least to restore them.

The safeguard policy targets the direct economic and social impacts that are caused by the taking of land or restricting the access to assets or public places which may result in relocation or loss of shelter, loss of assets or access to assets, or loss of income resources or means of living. The displaced persons are any of the following three groups:

1. Those who have formal legal rights to the land
2. Those who do not have formal legal rights to the land but have a claim to such land or building

3. Those who have no recognizable legal right or claim to the land they are occupying

2.2.4. OP 17.50 - Disclosure

The OP 17.50 policy of the WB on Disclosure was announced in July 2010. It entails making the project's information available to the public in transparent and accountable ways in order to maximize the people's sense of possession and ownership for the project. The dissemination of information to local groups and stakeholders in each targeted area is also essential for the effective implementation and sustainability of projects.

The disclosure of information should take place through different mechanisms. It can be through holding orientation workshops with the targeted groups, printing out pamphlets summarizing details about each project, meetings with the service providers, the publicity through the websites of both the Ministry of Electricity and Energy and The Egyptian Electric Utility & Consumer Protection Regulatory Agency. As well as benefiting from the different social interaction websites which become accessible by the majority of people in Egypt.

During the scoping phase for the preparation of the ESIA report, individual consultation and discussion were conducted in order to discuss the findings of the project. Summary of the World Bank Safe guard policies is presented in Table 2.10.

In addition to the World Bank safe guard and policies, regarding EIA, WB has established guidelines concerning air and water pollution. The guidelines will be discussed on the next chapter together with the actual air and water on the site as well as noise pollution.

2.3. European Investment Bank (EIB) Environmental Guidelines

The European Investment Bank (EIB) promotes European Union (EU) policies through its financial and other support to sustainable investment projects. Its approach is based on the environmental principles enshrined in the Treaty of preservation of the environment, protection of human health, rational utilization of natural resources and promotion of measures at international level, establishing the European Community and the standards and practices incorporated in European Union (EU) secondary legislation on the environment.

The EIB adopted an Environmental Statement in 1996 to underline its commitment to protecting and improving the natural and built environment according to EU policy. A revised Statement was issued in 2002 and again in 2004, aligning the Bank with the Sixth EAP in support of sustainable development both within the EU and outside.

Beyond the EU-27 and the Candidate and potential Candidate countries, the environmental standards of the Bank are also subject to local conditions. EU environmental principles, practices and standards are described and explained in a large body of EU law and other official documents, notably the 6th Environmental Action Program (6EAP)⁷ and its Thematic Strategies⁸, as well as - for activities outside the EU - by the mandates of the Bank. The

⁷ "Environment 2010: Our future, Our Choice" - The Sixth Environmental Action Program, COM/2001/0031.

⁸ There are 7 approved Thematic Strategies, for air, waste, marine, soil, pesticides, resource use and the urban environment. Link

Board of Directors approved the latest Bank environmental policy in the “Environmental Statement 2004” (the Environmental Statement). The same principles, practices and standards are the foundation for the “European Principles for the Environment” (EPE)⁹.

The Environmental Impact Assessment (EIA) is the term used to describe a formalized process, including public consultation, in which all the relevant environmental consequences of a project are identified and assessed before authorization is given. In the EU, if an EIA is required, the EIA is governed by EIA Directive 85/337/EEC, amended by Directives 97/11/EC and 2003/35/EC.

In addition, The EIB applies a number of core environmental and social safeguard measures that reflect international good practice to all its lending activities. It requires that all its projects:

- Apply the European Principles for the Environment, i.e. comply with EU environmental principles, standards and practices, if practical and feasible in some regions;
- Comply with the EU environmental Acquis⁵ on environmental assessment as defined in the EIB Sourcebook on EU Environmental Law 6
- Comply with international conventions and agreements ratified by the EU;
- Comply with the EU social Acquis⁷ as defined in the EIB Reference Book on EU Social Legislation and through the EIB Social Guidance Notes;
- Apply “best available techniques”, as appropriate;
- Apply good environmental management practices during project implementation and operation; and,
- Adhere to other specific international good environmental and social practices.

All types of projects will be screened and categorized according to their potential environmental and social impacts. The screening will be carried out as early as possible in the process and will consider potential negative environmental and social impacts whether direct, indirect, regional or cumulative in nature, of the operation and of its associated facilities relevant to the project’s successful operation. In addition, this initial screening should identify the extent and the complexity of potential impacts and risks in the project’s areas of influence, thereby determining the appropriate environmental and social assessment or due diligence requirements for the selected operation. Table 2-9 illustrates the Table D of EIB project categorization to be applied.

Table 2-9: Table D of EIB Initial Project Categorization

Categorization	Definition
A	Minimal or no adverse impacts – Low risk
B	Local and short-term negative environmental and associated social impacts and for which effective mitigation measures are readily available – Low to moderate risk
C	Significant adverse environmental and social impacts which are complex, sensitive and diverse, have a wide area of influence or are long-term –

⁹ Link to the “European Principles for the Environment”, www.eib.org/epe.

Categorization	Definition
	Moderate to high risk
D	Not acceptable in EIB terms

The project lay within category B that local and short term negative environmental and associated social impacts and for which effective mitigation measures are readily available – Low to moderate risk.

EIB policy towards EIA is summarized in its Environmental Statement 2004. The Bank applies the principles and practices of the EU EIA Directive (85/337, amended by 97/11 and by 2003/35/EC to incorporate the provisions of the Aarhus Convention, and since its introduction in July 2004, the SEA Directive (2001/42) - to all its regions of operation. The EIA Directive includes screening criteria, for purposes of determining the need for an EIA.

According to the EU EIA Directive, it is the responsibility of the host country and its competent Authorities to ensure that the "public concerned" are informed and consulted on the proposed project (Articles 6 and 9). Bank staff as part of their environmental assessment checks that these requirements have been fulfilled.

People whose livelihoods are negatively affected by a project should have their livelihoods improved or at minimum restored and/or adequately compensated for any losses incurred. As such, where physical or economic displacement is unavoidable, the Bank requires the promoter to develop an acceptable Resettlement Action Plan. The plan should incorporate and follow the right to due process, and to meaningful and culturally appropriate consultation and participation, including that of host communities.

Public consultation and participation is a requirement not only of the EIA Directive but also of a number of other EU environmental laws. The EIB recognizes the added value that interested and well-informed members of the public, especially those people affected by a project in the host country, can bring to the project environmental assessment process. Consultation and participation of concerned stakeholders during project preparation are expected to enhance sustainability and contribute to project success.

Consultation and participation is essential for investment sustainability through increased local ownership and support through informed involvement. Moreover, meaningful dialogue and participation is crucial to promoting and supporting the rights of people affected by a project. This includes the rights to due process via recourse to independent appeal and arbitration procedures in the case of disputes. As such, public consultation is a general requirement of the environmental and social safeguards of the Bank, as well as being applied to specific social issues, e.g. involuntary resettlement¹⁰. Summary of the EIB policies concerning the environmental and social aspects of the project is presented in Table 2.10.

Table 2.10 Egyptian Laws and Regulations, WB and EIB's Policies triggered

No	Safe guard	Policy Triggered			Justification
		Egypt	WB	EIB	
1	EIA	Yes	Yes	Yes	• This policy applies to all project requiring a Category B of

¹⁰ Involuntary Resettlement is provided in separate report named RPF

No	Safe guard	Policy Triggered			Justification
		Egypt	WB	EIB	
					<p>Egyptian Laws and Regulations 4/1994, WB Policy (OP 4.0) and Table D of EIB project categorization to be applied.</p> <ul style="list-style-type: none"> EIA Policy summarize in Environmental Statement 2004 governed by Directive 85/337/EEC, amended by Directives 97/11/EC and 2003/35/EC according to the EIB Guideline. All Environmental and Social aspects included in this interconnections project are adequately examined
2	Involuntary Resettlement	Yes	Yes	Yes	<ul style="list-style-type: none"> Involuntary Resettlement is adequately analyzed and presented on separate report named RPF. This policy applies to the all project triggering OP 4.12 (WB) as well as EIB Statement 2004 toward EIA. There are three interconnection lines will be connected from the Giza North Power Plant to the : 220 kV OHTL to Proposed Ashmoun SS (1 line) and 500 kV OHTL to Existing Cairo 500 (2 lines).
3	Public Consultation	No	Yes	Yes	<ul style="list-style-type: none"> Although it is not required under the EEAA Environmental Law, but Public Consultation Process has been held in accordance with WB Guideline for Preparation of a Public Consultation and Disclosure Plan (January 1996). This policy apply to all project triggering OP 17.50 for the WB and concerning the Public Concern under the EIB statement.
4	Disclosure	Yes	Yes	Yes	<ul style="list-style-type: none"> The disclosure mechanism will take place through the related websites.

3. Project Description

To release the new power from Giza North Power Plant (currently under the site preparation), one of the OHTLs will be constructed to connect the power plant to the proposed Ashmoun SS. Another two OHTLs will also be constructed to interconnect the power plant to the existing Cairo 500 SS and the existing Samalout 500/Cairo 500 line. The purpose of the project is to meet the excessive loads and the increasing demand of energy consumption in Cairo and the West Delta zone.

3.1. Project Objectives

The objectives of the project are:

- Evacuate the power generated by the Giza North power plant;
- Meet the increase in load and improve the voltage profile of the substations in Cairo and the West Delta zone; and
- Relieve the load of neighbouring 220 kV Ashmoun substation.
- Relieve the load of Samalout 500/Cairo 500 from Cairo 500 substation and interconnect it to the Giza North Power Plant.

3.2. Project Components

According to the selected alternative (out of three alternatives) to interconnect the generated power from the Giza North Power Plant, the project components are presented as follows:

1. Connecting the proposed Ashmoun substation to Giza North Power Plant via a 220 kV double circuit OHTL (about 15 km length).
2. Connecting the existing Cairo 500 substation to Giza North Power Plant via a 500 kV single circuit OHTL with length about 30 km.
3. Connect the 500 kV OHTL Samalout 500/ Cairo 500 to Giza North Power Plant with a length of 30 km.

3.3. Project Cost and Duration of the Project

The estimated total cost of the project is about EGP 116 Millions (with is estimated as EGP 1.4 Million to construct 1 km of 500 kV OHTL and 1.2 Million to construct 1 km of 220 kV OHTL) which is intended to be provided by the European Investment Bank (EIB) and the Government of Arab Republic of Egypt.

The total duration of the project estimated to be 15 months including all the preparations, study, surveys, tenders, procurements and construction period.

3.4. Description of the Construction Phase

The EETC has defined certain measures to minimize the cost during construction and to maintain its safety. Prior to the construction phase the electric and mechanical design of the system would be undertaken and accordingly followed by the tender procedures. The construction of the interconnection to the national on-grid distribution network involves the following general steps:

- Construct the transmission line from Giza North Power Plant to the proposed Ashmoun Substation. Another two transmission lines will be constructed to interconnect Giza North Power Plant to both Cairo 500 Substation and Samalout 500/Cairo 500 line.
- After the preparation for receiving the power from Giza North is complete, the electricity power will be transmitted and fed into the line to the existing Cairo 500 Substation and proposed Ashmoun Substation.

For the 220 kV OHTL interconnection between the proposed power plant to the proposed substation at Ashmoun (15 km length), approximately around 50 steel towers will be installed (estimated around 300 m distance between two towers). In addition for the interconnection 500 kV power line from Giza North to Cairo 500 (30-35 km), around 79 steel towers will be installed and around 81 towers will be installed for the transmission line between Giza North to the Cairo 500 SS (for releasing the power of the existing line Samalout 500/Cairo 500 from the Cairo 500 SS side; this line afterwards will be named Giza North/Samalout 500).

Generally, construction of the line will involve very limited amount of excavation waste for fixing the towers. Most of the excavated soil (if any) will be filled into each tower footing for fixation. The expected shallow foundations will not, most probably, require any dewatering. In addition, the number of construction workers are not expected to be a big number as well. Therefore, the management of wastes during the construction will be managed on site and by contractor.

3.5. Description of the Operational Phase

In addition to the extensive managerial and administrative activities that are expected to be undertaken by service providers, the operation of the on grid system that is connected to the substations involves technical activities for operation and maintenance. The waste resulting from such operations will be replaced items during the regular maintenance and the expected domestic solid and sewage.

Besides the regular maintenance and monitoring activities along the transmission lines, maintenance and operation is also involved in the substations as well. Such substations typically do not involve a big number of operators and workers. The 220/66 substations in general would employ around 50 workers with about 15 engineer-operators per shift (three shifts every 8 hours). However, for the 500 kV/220 kV substations, the number of workers are expected to be doubled with around 100 workers in total per shift and around 25 engineer-operators.

The waste generated from the domestic wastewater as well as the solid waste at the substation are expected to be limited. However, the impact of the wastes to the environment during the operational phase will be described in more detail in Chapter 5.

The normal operation of substations will not involve activities of environmental significance, except for some safety issues, which will be discussed in Chapter 5. The most important waste-producing activities during the operation along the line is the replacement of wires. The common practice for such material produced from the transmission line is to collect and store it at the selected isolated storage, and to send it out to the specific factories for recycling purposes every 3-6 months. Mitigation measures and management plan for waste accessories are discussed in Chapter 7.

4. Description of Baseline Environmental and Socioeconomic Conditions

The following sections present the baseline survey of the transmission lines to interconnect with Giza North power plant. Information and pictures included in this section were gathered during the site visits conducted by the Environmental Management Experts.

4.1. General Description of Giza North Power Plant, Cairo 500 Substation and Ashmoun Substation

One of the main objectives of the project is to interconnect the Combined Cycle Giza North power plant with surrounding substations and transmission lines to release the generated power. The existing Cairo 500 Substation and the proposed Ashmoun Substation will be connected to the power plant. Figure 4.1. shows the location of the Power Plant and the substations.



Figure 4.1. Giza North Power Plant, Ashmoun Substation and Cairo 500 Substation Map

The general description of the Power Plant and the substations is presented as follows:

Giza North Power Plant

The Giza North Power Plant is intended to be operational by the year 2012/2013. The power plant site is located on the eastern bank of the El-Rayyah (Canal) El-Beheiry, a main branch of the Rosetta Branch of the River Nile, approximately 40 km northwest of Cairo City, and at the kilometer 20 southeast El-Khatatba along the immediate side northeast the Mansheyet El-Qanater/Itay El-Baroud Road, which runs parallel to the El-Rayyah EL-

Beheiry. The site is within the administrative boundary of the Giza governorate, the Markaz of Imbaba and Menshat El-Qanater. The site, also, is situated about 5-6 km of El-Kata agricultural complex, an area being developed for agricultural use. The area surrounding the site is locally known as the El-Kata area. Giza North power plant covers around 70 Feddans and is delimited by:

- Latitudes 30 14 35 & 30 15 09 N; and
- Longitudes 30 56 39 & 30 56 59 E

The site is situated in the heart of the cultivated lands. It forms the flat area which is a part from the Nile Delta plain. Many small villages (Ezzab /Kafr) are littered around the area. The site is located a small distance to the immediate north of the existing poultry farm at km 22 El-Khatatba and 5 km north west Ezbet Sayyed Ibrahim, the nearest residential community to the site. The project site is owned by the Cairo Electricity Production Company (CPEC), an affiliate company to the Egyptian Electricity Holding Company (EEHC), and consists of flat land measuring approximately 337m by 876m with a total allocated area of 275,000 m².

Photolog of the proposed Giza North Power Plant



Ashmoun Substation

The proposed Ashmoun substation is located inside an enclosed old electric power station of Ashmoun, surrounded by walls at all sides with a small internal road. A new and active electric power structures was observed in the site, Also, an abandoned old inactive power structure and equipment were observed in a portion of the area of the site where the new substation is proposed to be located, also, an old and abundant storage tank was observed which served as cooling system for the old station. (See photo log for Ashmoun site below). Project area for the proposed Ashmoun substation covers about 2 Feddans and is delimited by:

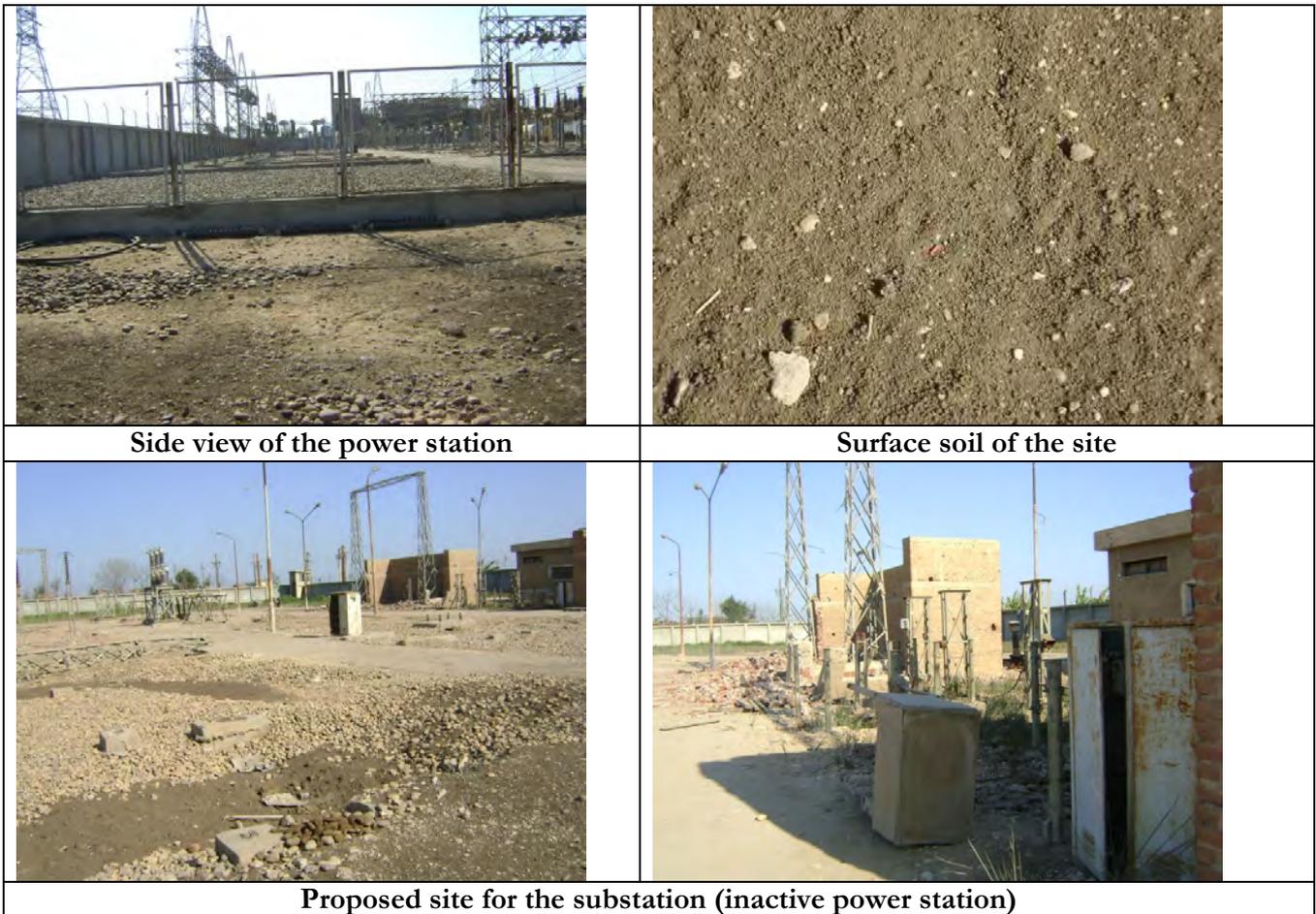
- Latitudes 30 17 56 & 31 0 18 N; and
- Longitudes 30 17 59 & 31 0 19 E

Ashmoun Markaz and city belongs to and lies in the northern part of the Menoufia Governorate. Ashmoun is located on the eastern side of Rasheed sub-branch, and on a distance of about 25 Km from Cairo. The Nile sub-branch of Damietta separates Ashmoun from Qalyoubia Governorate, and the sub-branch of Rasheed separates Ashmoun from both Giza and Behaira Governorates. The main borders of Ashmoun are as follows:

- Monshaat Al Qanater city from the south,
- Both Menouf and El Bagour Markazes from the north,
- Qalyoubia Governorate to the east, and
- Both Giza and Behaira Governorates from the western side.

Photolog of the Existing and the Proposed site of Ashmoun Substation



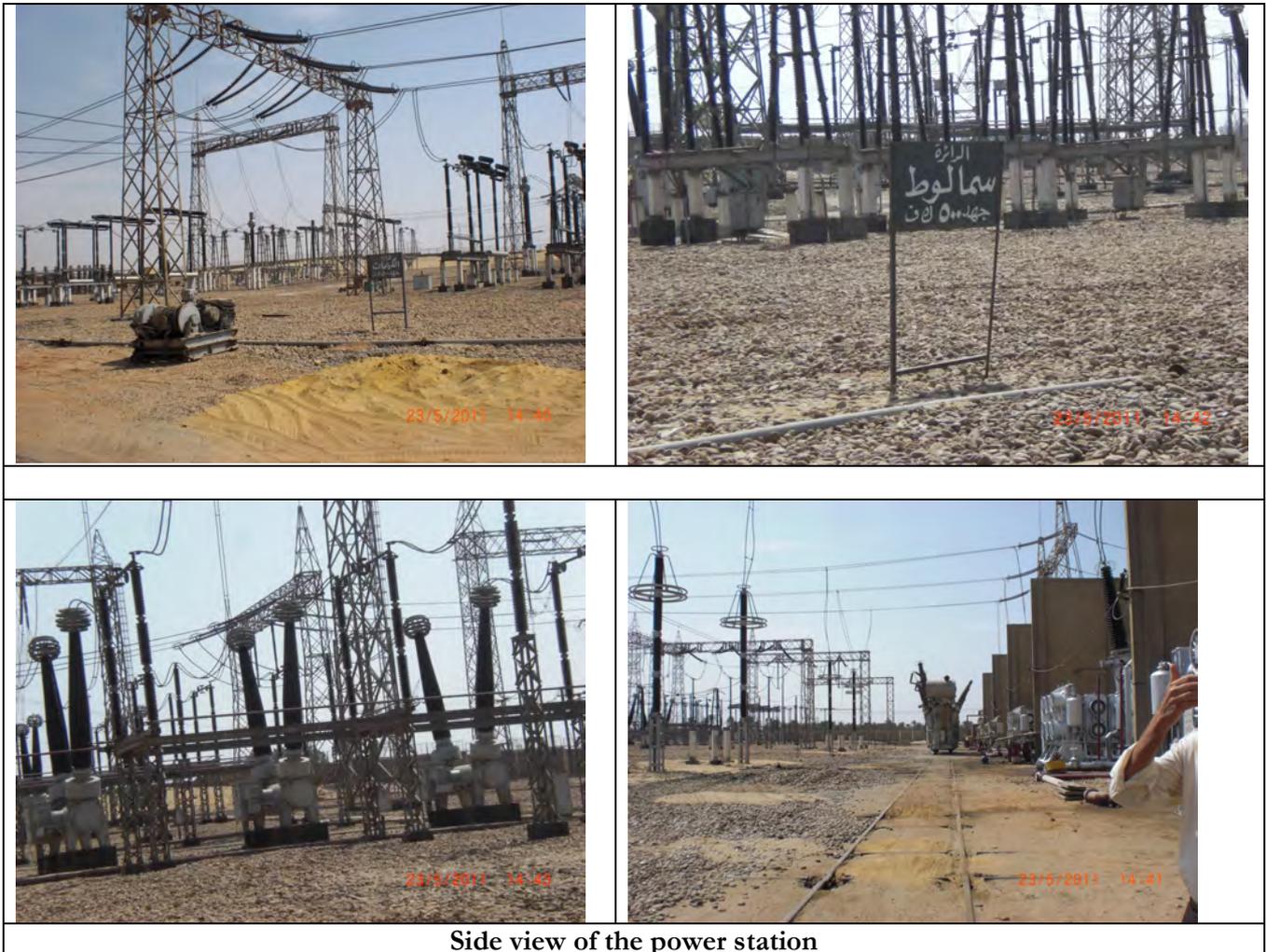


Cairo 500 Substation

Cairo 500 Substation was observed during the site visit. The substation is established since 1964. It is located about 2.25 km away on the northern-east side of Abu Rawas Industrial compound, about 2.0 km away from the regional road of Abu Rawas-Berkash and 5.50 km away from the Cairo-Alexandria Desert Road. The substation area is around 350 m * 800 m with the coordinates of Longitude 30° 6'1.04"N and Longitude 31° 3'41.81"E.

According to discussions with Eng. Ramadan Ragab, the manager of Cairo 500 Substation, in order to accommodate the new interconnection to Cairo 500 substation, a new cell will be needed (50 m x 200 m). Land for this purpose need to be purchased from the community since there is no choice with State-owned land.

Photolog of the Existing Cairo 500 Substation



Side view of the power station

4.2. The Over Head Transmission Lines

Giza North - Ashmoun

The Proposed Ashmoun Substation will be connected to Giza North Power Plant via a 220 kV double circuit OHTL of about 15 km distance. The total number of towers to be constructed for the proposed Ashmoun interconnection to the Giza North Power Plant is 50 towers. The expected area of affected land required for establishing the towers will be 7200 m².

length of about 30 km to Giza North 500 to become Giza North/Samalout 500. The routes of both lines will be laid in parallel.

The route of the interconnections start at Giza North 500 kV Substation and ends at Cairo 500 Substation. The routes passes by El Katta and Nekla villages which currently affiliate to Giza Governorate and El Marioutia from the southern side near Cairo 500 Substation. It is estimated that 50% of the route is passing through agricultural land (mostly reclaimed land), and the remaining will pass by empty uncultivated lands. As part of the agriculture land, the route will also cross two main canals (El Naseri and El Behairy canals), with width of 100 m and 75 m respectively, and the rail way (about 50 m distance between the two canals). The following photo shows the crossing points.

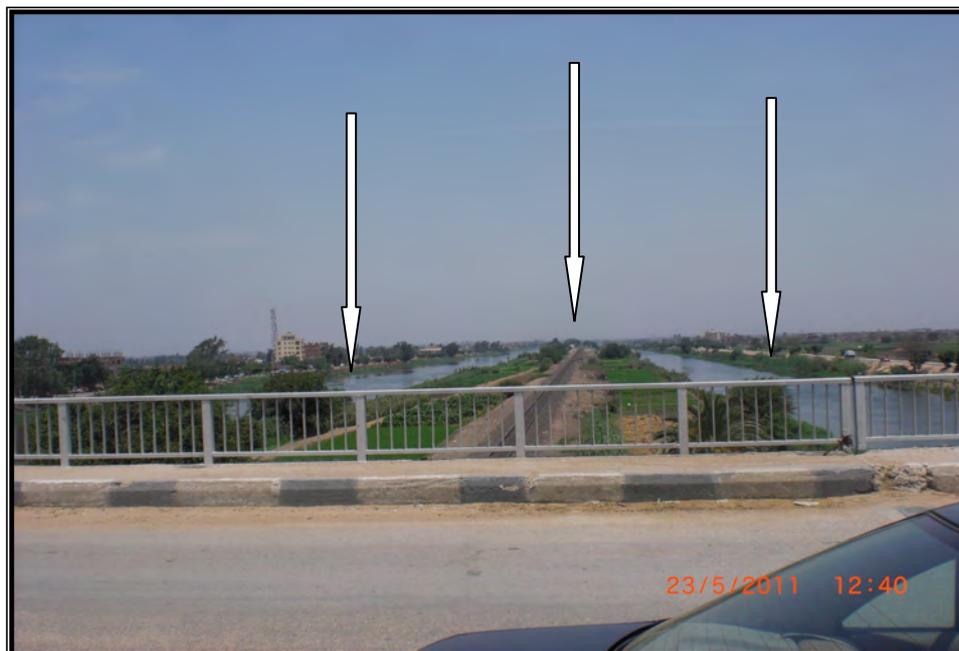


Figure 4.3 indicates the route of the 500 kV OHTL Cairo 500/Giza North and Giza North/Samalout 500 interconnections. In addition, Table 4.1. and Table 4.2. describe the route coordinates and the number of towers that will be installed for both lines. The results indicated below are not final as the survey to define the exact route is still ongoing. The expected area of the affected land required for establishing the towers will be 6400 m² (31600 m² for Giza North/Cairo 500 and 32400 m² for Giza North/Samalout 500).



Note: — Giza North/Samalout 500 interconnection line
— Giza North/Cairo 500 interconnection line

Figure 4.3. Route of the 500 kV Giza North-Cairo 500 and Giza North-Samalout OHTL

Table 4.1. Coordinates and Number of towers for Giza North/Cairo 500 and Giza North/Samalout

Id	Giza north / Cairo500	Giza North / Samalout
1	N30 14 39.4 E30 56 46.6	N30 14 40.9 E30 56 45.2
2	N30 14 20.3 E30 56 19.1	N30 14 21.3 E30 56 16.8
3	N30 14 15.8 E30 56 05.7	N30 14 17.3 E30 56 04.7
4	N30 14 03.8 E30 55 59.1	N30 14 04.8 E30 55 57.5
5	N30 13 50.1 E30 55 43.2	N30 13 52.1 E30 55 42.8
6	N30 13 48.3 E30 55 31.2	N30 13 49.6 E30 55 30.1
7	N30 13 24.5 E30 54 59.2	N30 13 25.2 E30 54 56.7
8	N30 12 49.9 E30 55 03.6	N30 12 50.5 E30 55 01.2
9	N30 12 30.5 E30 54 49.0	N30 12 42.7 E30 54 52.6
10	N30 12 05.0 E30 54 19.3	N30 12 32.3 E30 54 46.5
11	N30 11 43.3 E30 54 06.1	N30 12 06.6 E30 54 17.4
12	N30 10 12.2 E30 55 05.4	N30 11 44.0 E30 54 03.2
13	N30 07 26.8 E30 57 38.4	N30 10 11.8 E30 55 03.1
14	N30 06 24.1 E30 59 13.0	N30 07 25.0 E30 57 36.2
15	N30 06 12.3 E31 01 03.6	N30 06 21.5 E30 59 11.8
16	N30 06 07.8 E31 01 52.6	N30 06 09.7 E31 01 03.9
17	N30 06 13.9 E31 02 53.6	N30 06 06.2 E31 01 52.1

Id	Giza north / Cairo500	Giza North / Samalout
18	N30 05 47.5 E31 03 26.6	N30 06 11.2 E31 02 40.7
19		N30 06 08.4 E31 02 57.2
20		N30 05 45.3 E31 03 26.0

Table 4.2. Towers type and numbers of towers for Giza North/Cairo 500 and Giza North/Samalout 500 interconnection lines

Tower type	Number of Towers		Total
	Giza North/Samalout 500 500 kV	Giza North/Cairo500 500 kV	
Angle Towers 0-30	11	8	19
Angle Towers 30-60	6	7	13
Angle Towers 60-90	1	1	2
Terminal tower	2	2	4
Suspension Tower	61	61	122
Sub total	81	79	160
	Total		

Regarding the steel tower, the EETC already has its own towers design. The towers are lattice steel self supporting double circuit towers should be used. The tower design to carry 3 phase conductors, one earth wires and one Composite Ground Wire with Optical Fiber (OPWG). Towers shall be self supported steel lattice tower designed to carry the line conductors with the necessary insulators. Tower foundation shall be insulated footing in case of desert land. Raft and deep foundation may be used in case of agriculture land. Tower foundations shall be of reinforced concrete pad & chimney. Each tower type shall have its own foundation design. The tower design for 500 kV is presented at Annex IV.

Applicable Standards are as follows:

<u>SN</u>	<u>Standards</u>	<u>Title</u>
1	IEC	International Electro technical Commission
2	ANSI	American National Standards Institute
3	IEEE	Institute of Electrical-and Electronics Engineers
4	NEMA	National Electrical Manufactures Association
5	ASTM	American Society for Testing and Materials
6	DIN	Deutshes Institute Fuer Normung (German Standards)

4.3. Climatic Conditions

The power line of Giza North/Ashmoun crosses a region of arid climate of the Northeast Africa, characterized by a warm winter and hot summer, low rainfall and high evaporation intensity. The relative humidity is moderate and active wind of intermediate speed is recorded, rainfall is in the range between 25 to 45 mm/year as shown in Figure 4-4. It is shown in this figure also that the pathway of the power line crosses a big portion of the desert and partially traditionally or old cultivated land.

The route of the transmission lines of Giza North/Samalout 500 and Giza North/Cairo 500 crosses a region of arid climate of the Northeast Africa, characterized by a warm winter and hot summer, low rainfall and high evaporation intensity. The relative humidity is moderate and active winds of intermediate speed is recorded, rainfall range between 25 to 100 mm/year as shown in figure 4-4. It is shown in this figure also that the transmission line crosses a big portion of the traditionally or old cultivated land.

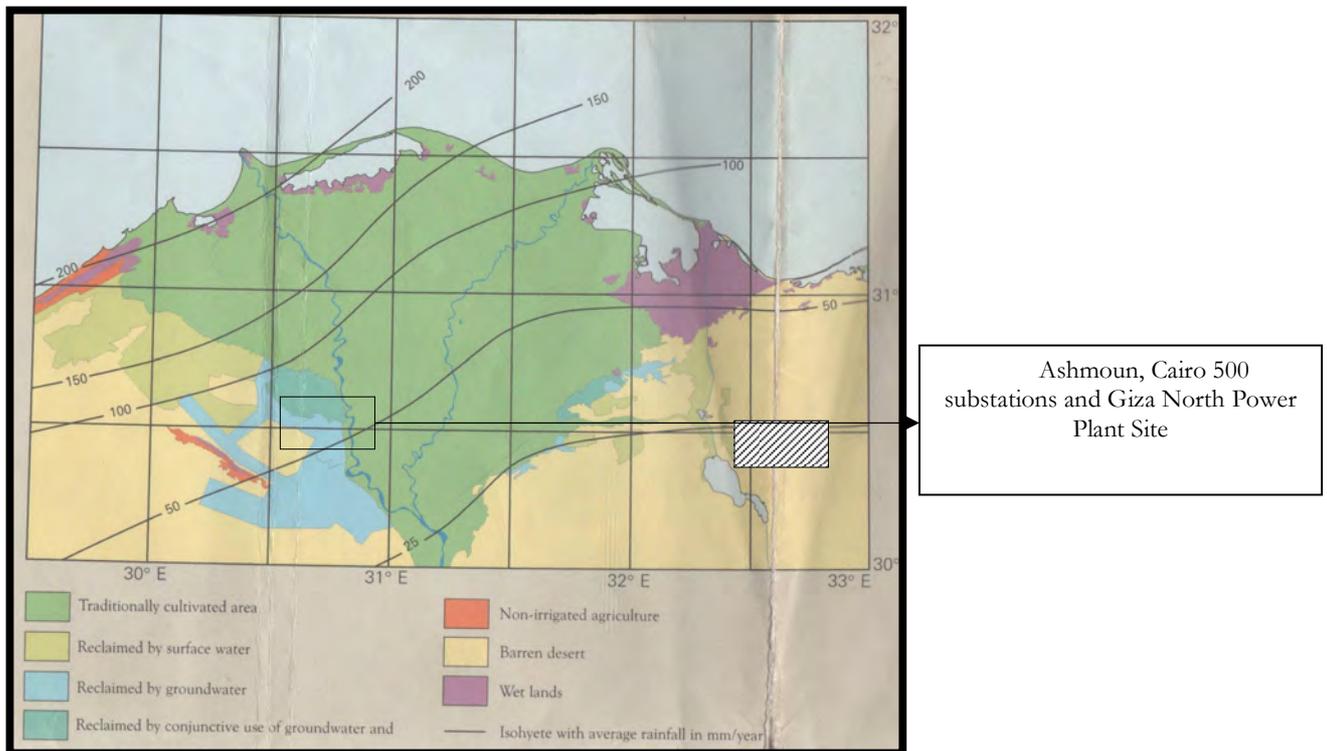


Figure 4.4. Land use and rainfall.

The annual minimum and maximum air temperature in this region vary from about 13⁰C to about 28⁰C, however the temperature frequently rise to about 35⁰C during summer season.

4.4. Soil

Only one type of soil characterize the region through the pathway of the pipeline which is the *Calcaric fluvisols*, relatively young soils (clay to loam) developed on recently deposited colluvial, fluvial, lacustrine, or marine sediments in the Nile Valley and Delta as shown in figure 4-5.(sky blue color)

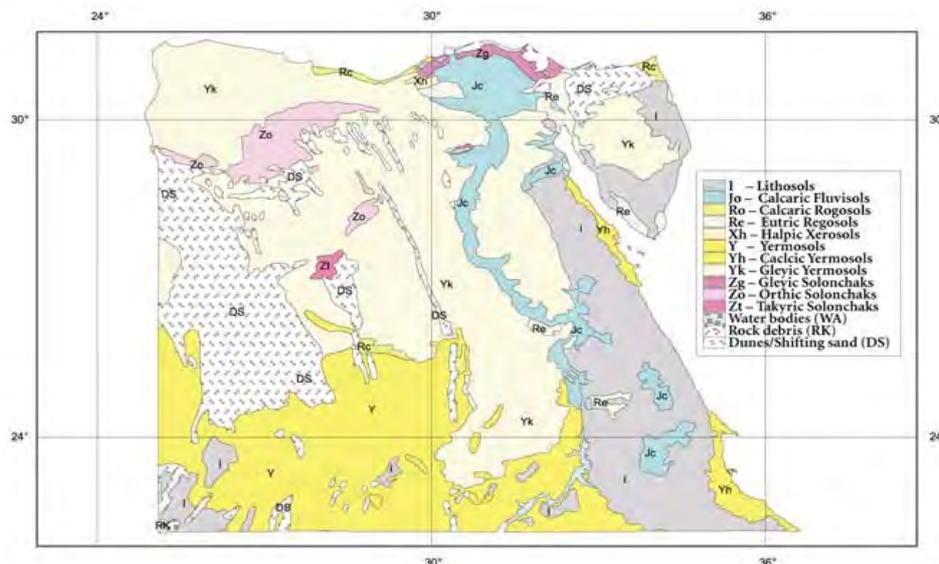


Figure 4.5. Soil map of Egypt

Fluvisols still show some sedimentary stratification. Organic matter content decreases irregularly with depth (although it remains above 0.35 percent in the upper 1.25m) and the soils have sulphide-rich material within 125cm of the surface. Generally fluvisols exhibit little horizonation, except for a weakly developed A-horizon and peaty horizons. Calcaric fluvisols, however, are strongly calcareous, having significant amounts of free calcium carbonate at depths of 20-50 cm and pH 7. These are the most intensively farmed soils in Egypt and have a high development potential due to the ease of irrigation low water erosion potential, and their ability to be double-cropped. They do not, however, have very high nutrient levels, so the maintenance of fertility by traditional manuring practices or by high rates of fertilizer application is of particular importance in crop production. There are also potential wind erosion problems in silt-rich areas if the topsoil is allowed to dry out. The major management task is to control water supply and conserve soil moisture.

The Nile fluvisols are extensively irrigated and the management of irrigation scheduling and drainage is time-consuming. In addition, in areas with high clay content, poor irrigation practices often lead to subsoil compaction and pan formation, secondary salinization, and gleying.

4.5. Geomorphology

Two main geomorphologic units can be identified in the area as follows:

C. The Old Fluvial Plain (Unit 5), Giza North Power Plant and interconnections to Cairo 500 substation

This unit is underlain by dark brown gravels and coarse sands with different degrees of cementation and occupies the outer fringes of the present floodplain. The surface of this plain is gently undulating and displays classical examples of landforms by wind deflation. The surface is also incised by the downstream portions of a good number of dry drainage channels (wadis), which have their uptake areas located in the adjacent elevated structural plains and plateau. Such lines acted as active rivers in Middle Pleistocene times (0.2 to 0.7 million years BP) and contributed to the supply of the Nile Delta sediments. Of particular interest is the occurrence of two negative landforms marking the outer limit of the Nile Delta.

D. Young Alluvial Plain (Unit 4), Ashmoun Substation and Giza North/Ashmoun Interconnection

This unit occupies the banks of the Nile River. The surface of this flood plain consists of a top layer of clay-silt and underlain by sand and gravels which is water bearing formation of the alluvial aquifer. The Nile floodplain has an elevation of 21m (amsl), to the east side of the flood plain, the ground surface rises towards El Mokattam to reach 150m (amsl), to the west side, the surface rises 100m (amsl) at the Pyramid plateau.

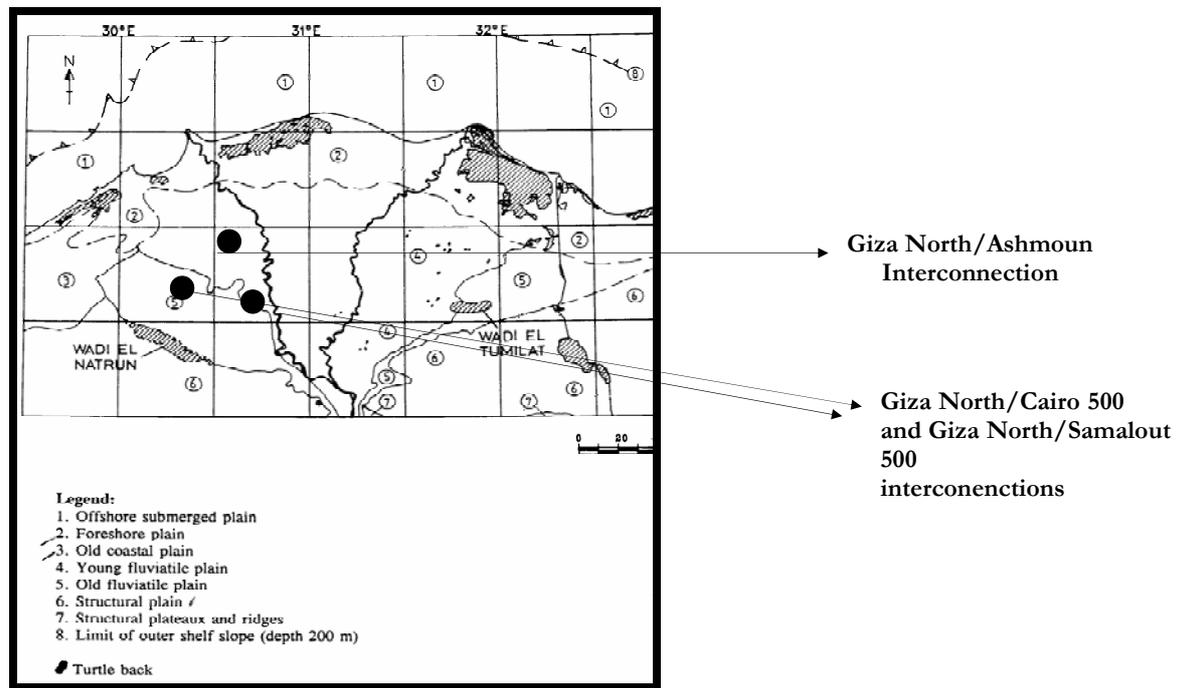


Figure 4-6: Geomorphologic features

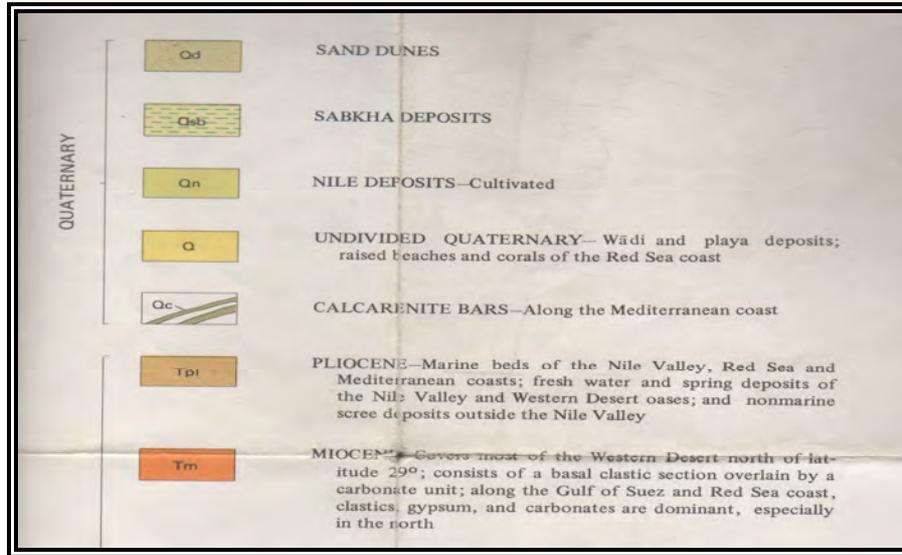


Figure 4-8 : Legend of the Geologic Map

b. Tectonic Framework of the area

- Structure geology

The selected area for the project implementation is characterized by almost featureless plain with the exception of the small folded and faulted Abu Roach complex which offers a few prominent topographical or geologic features. Figure 4-9 shows major faults in the area, the majority of these faults are steep normal faults and most have a long history of growth.

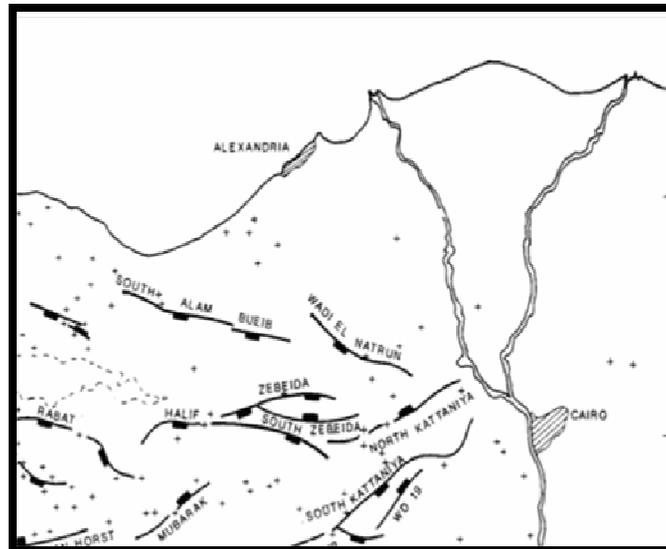


Figure 4-9: Major faults in the area (Said, 1990)

The most famous fault in the area is the Abu Roash fold which owes its origin to compressional movement which affected the area during the late Cretaceous-early Tertiary tectonic event; this fold has a northeast-southwest trend.

• Seismicity

Seismicity in the area is characterized by the occurrence of small, moderate and large earthquakes which has increased in recent years but they are limited within the crust, only micro-earthquakes were frequently observed. Figure 4-10 shows the intensity distribution of earthquakes in Egypt, and, Figure 4-11 shows epicenter of recent medium to large earthquakes (A) and the epicenter of small earthquakes.

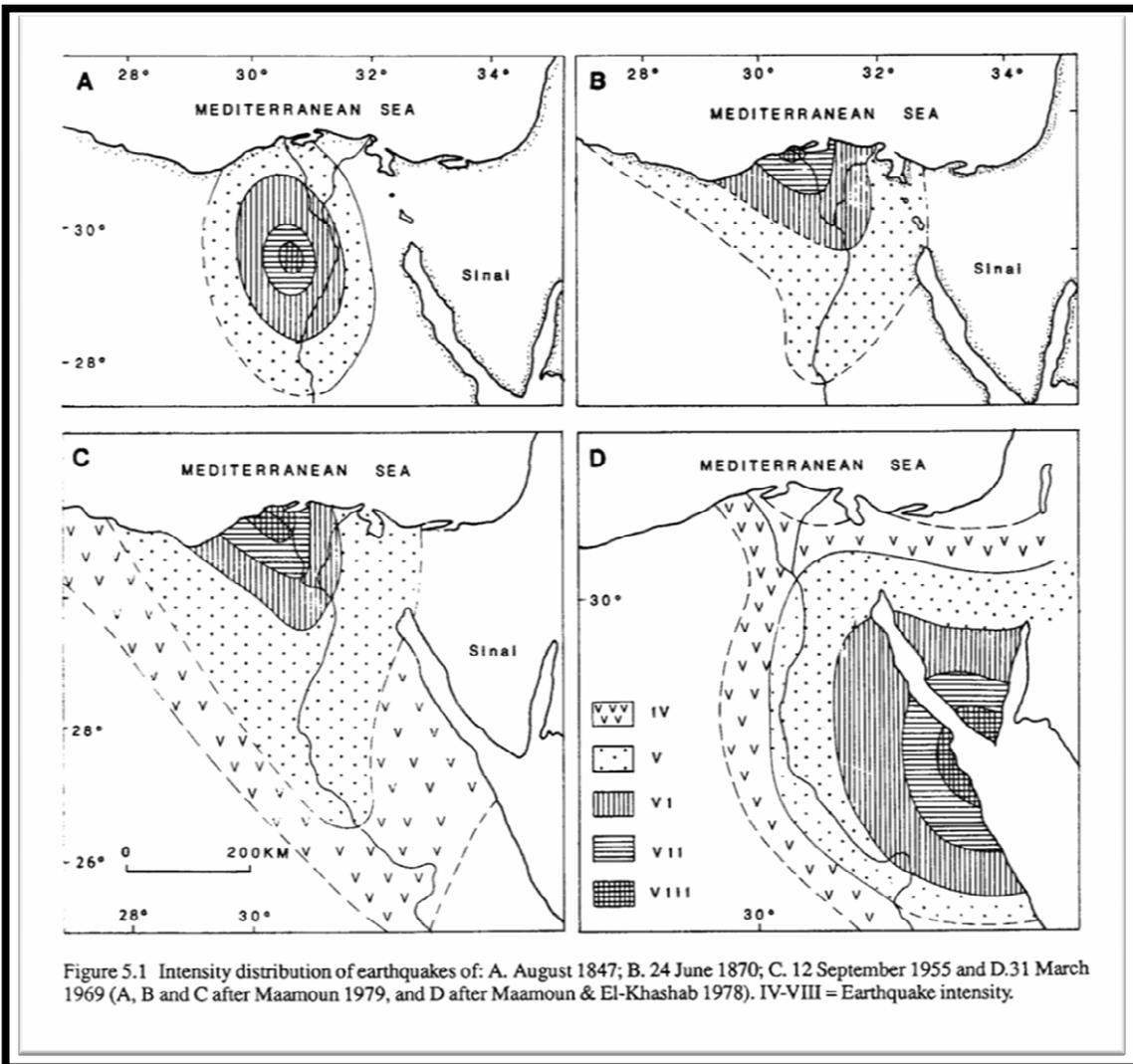


Figure 4-10: Intensity distribution of earthquakes in Egypt.

Figure 4-11 A shows the locations of earthquakes recording stations in the delta area, Figure 4-11 B shows the epicenter of Earthquakes recorded throughout the geologic history which range from large earthquakes in old geologic time to low earthquakes intensity at present time. Recently no earthquakes even of low intensity were recorded throughout the pathway of the power lines.

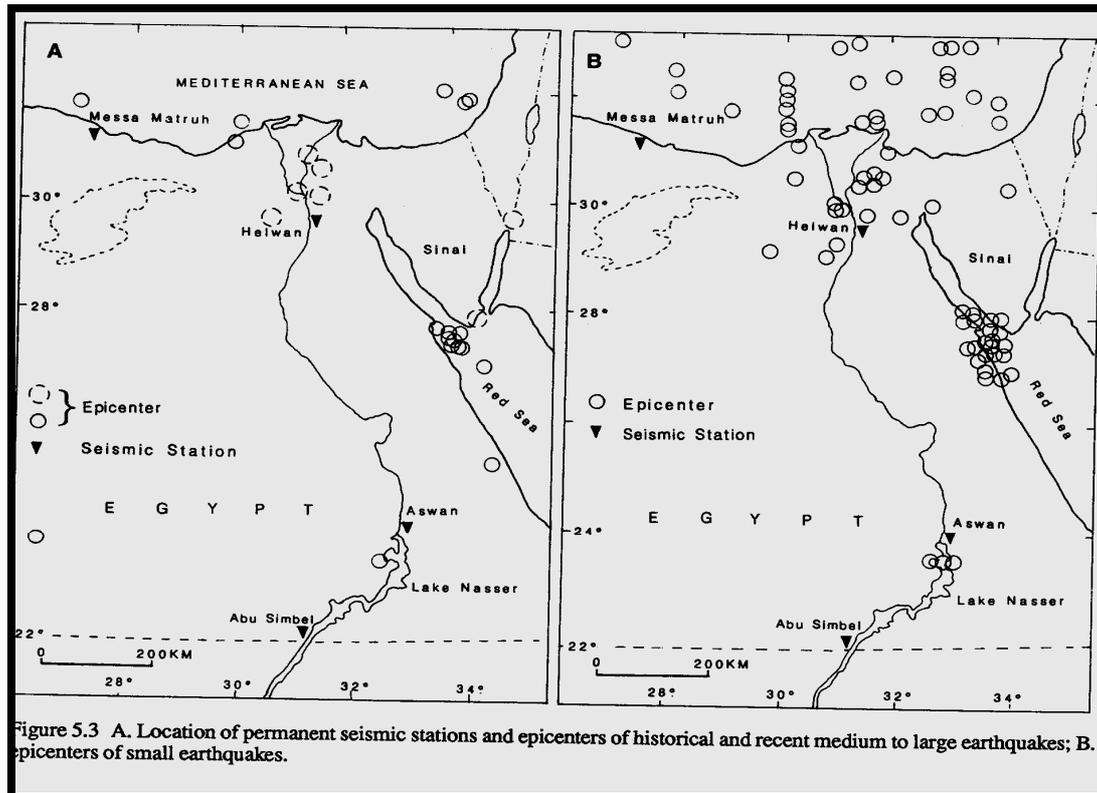


Figure 4-11 A, B: Earthquakes throughout the geologic history. (Said, 1992)

4.7. Groundwater Hydrology (Hydrogeology)

The pathway of the power lines run through Nile Delta Aquifer and partially the Moghra Aquifer, Figures 4-12 and 4-13.

Nile Delta aquifer

The most important regional aquifer within the mapped area is the Nile Delta aquifer. This aquifer consists of the Pleistocene graded sand and gravel, changing to fine sand and clayey facies in the north. It covers the greater portion of the Nile Delta area. In the floodplain of the Nile the aquifer is semi-confined, as it is overlain by Holocene silty and sandy clay. In the northwestern part of the mapped area, a calcareous loam layer acts as a semi-confined layer outside the floodplain. The thickness of the semi-confining layers is generally between 0 and 20 m but increases near the coast.

In the desert fringes, outside the floodplain, the semi-confining layer is missing and phreatic conditions prevail. The Nile Delta aquifer is underlain by Pliocene marine clay. The position of the base of the aquifer relative to mean sea level is indicated on the map by green contour lines. It ranges from sea level at the edges in the west and east to more than 1000 in the center of the Nile Delta. The (saturated) thickness of the aquifer ranges between 0 and more than 800 m. The permeability ranges between 35 and 75 m/day but decreases near the coastline, due to an increase of the clay content. The transmissivity range between less than

500 m²/day at the edges in the desert fringe to more than 25,000 m²/day in the apex of the Nile Delta.

Moghra aquifer

The Moghra aquifer consists of Lower Miocene Fluvialite and fluvio-marine coarse sand and gravel of the Moghra Formation. The facies changes to clay near the Mediterranean Sea and in the Delta, thus bordering the productive zone of the aquifer. The aquifer is found in the western portion of the mapped area and extends westward towards the Qattara Depression and, southward in the direction of El Fayoum depression.

South of the latitude of 30° 30' N the aquifer is exposed, but not completely phreatic, due to intercalated clay layers. North of that latitude is confined by Pliocene deposits. The aquifer is underlain by Oligocene rocks (basalt or shale). At the southern border of the map it may be underlain by sandy Oligocene deposits. The base of the aquifer slopes from ground level near Cairo to 1000 m below mean sea level near west of Alexandria. The (saturated) thickness is between 70 and 700 m. Permeability ranges between 25 m/day in east Wadi el Farigh to less than 1 m/day in the Qattara area (west of the mapped area) and near the coasts (JVQ, 1979, Uppsala University 1985). Transmissivity ranges between 500 and 5000 m²/day.

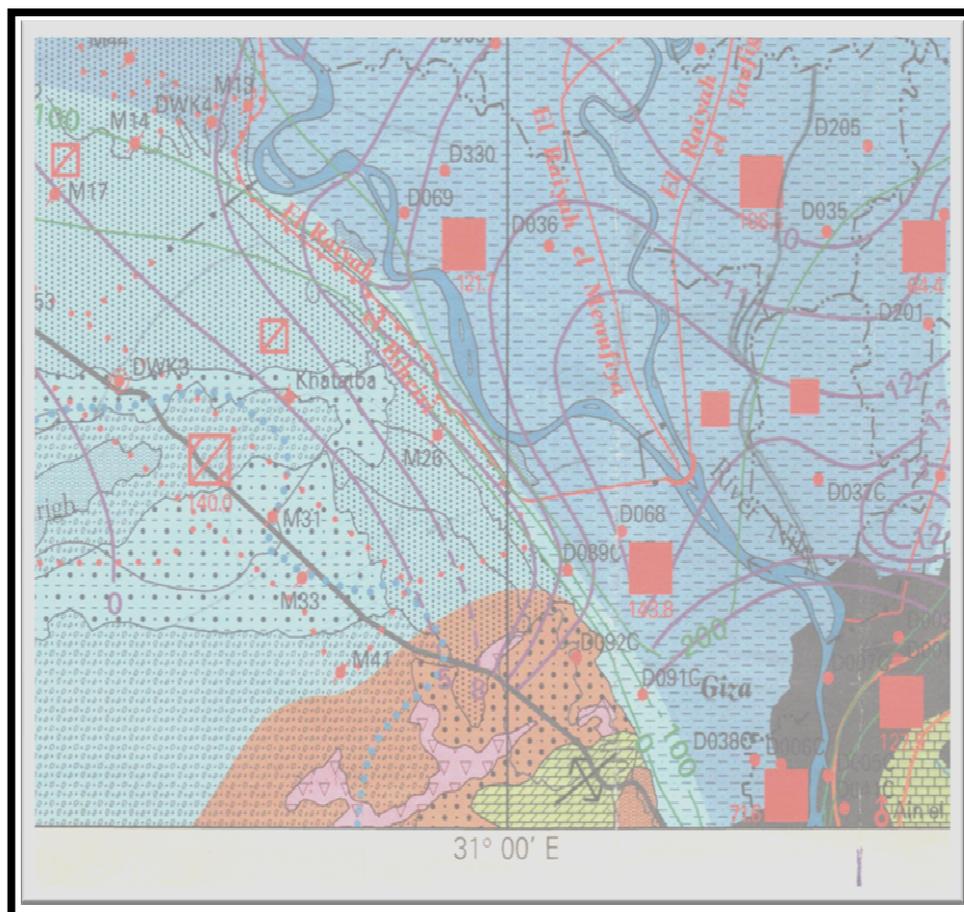


Figure 4-12: Hydrogeologic Map of the Area. (RIGW, 1992)

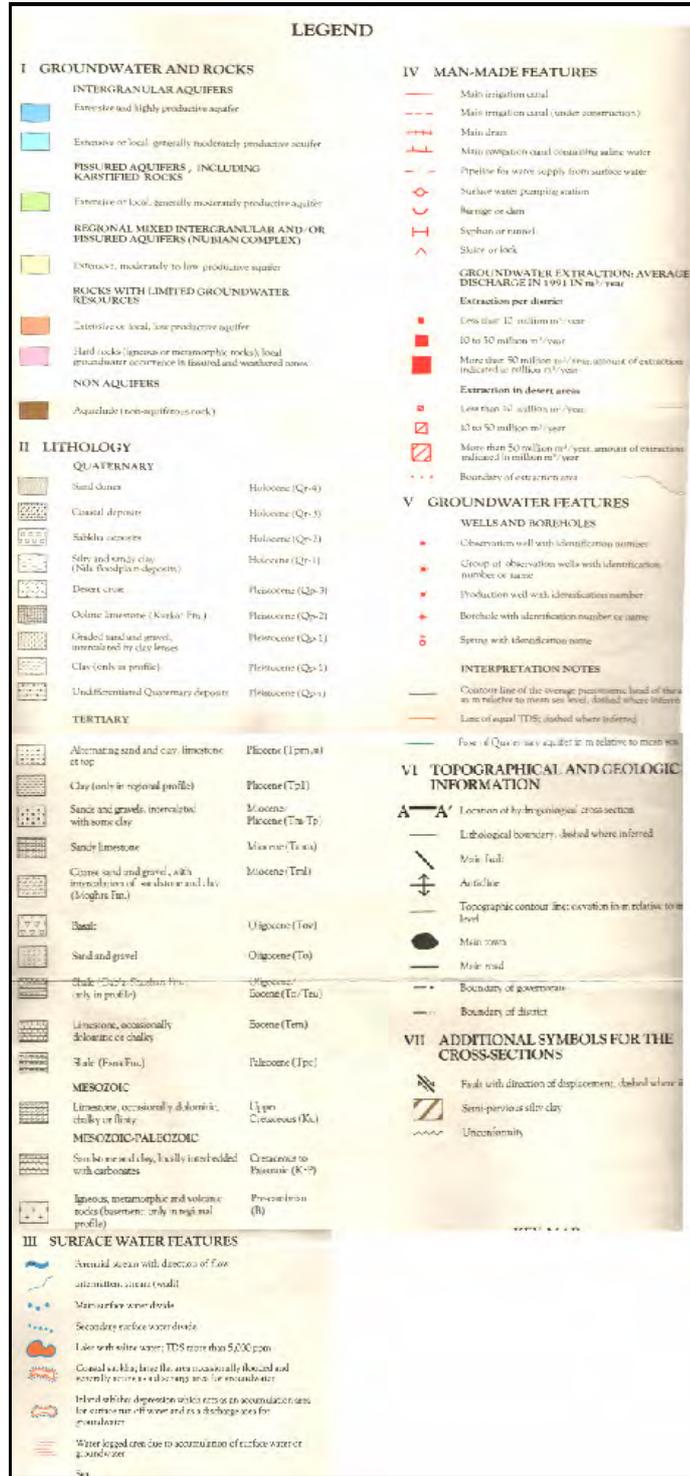


Figure 4-13: Legend of Hydrogeologic Map

◆ Groundwater Flow:

Groundwater flow is being observed by RIGW since 1950, consequently a large amount of data is available, it was observed that the piezometric level decrease gradually from more than 40 m+msl to 15 m+msl in the north as shown in Figure 4-14. The average piezometric gradient is about 11 cm/km. Groundwater flow direction is by definition perpendicular to the piezometric contour lines and therefore the flow direction is from south to north.

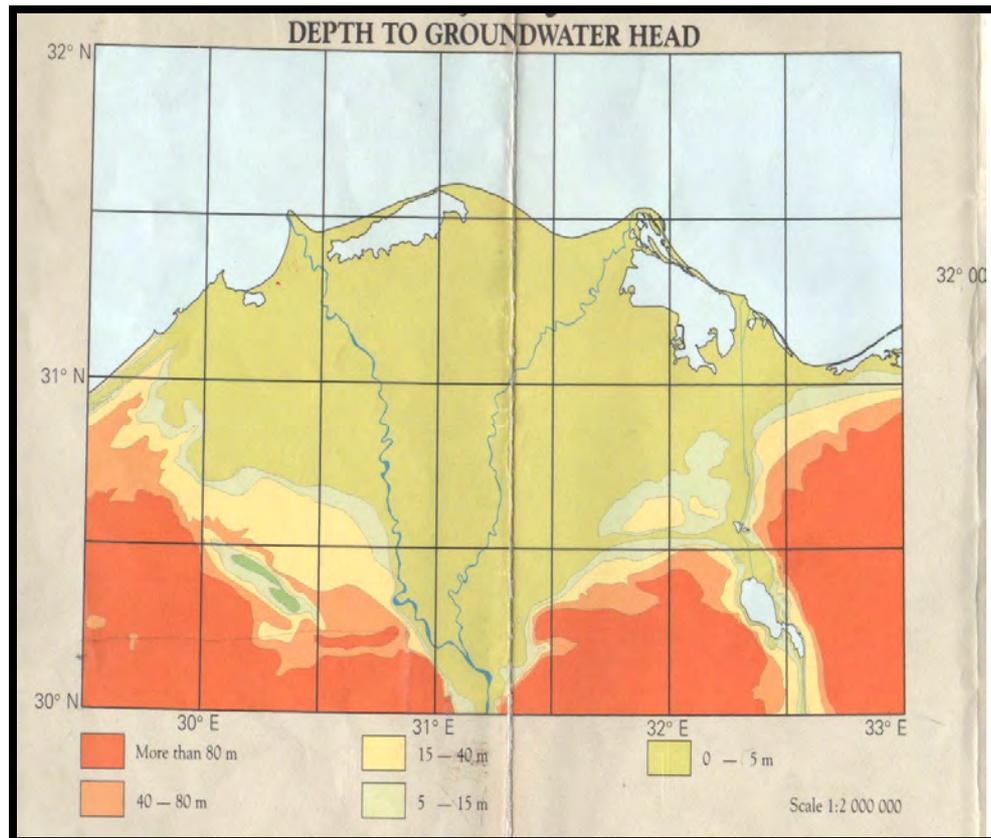


Figure 4-14: Depth of groundwater (0-5 m)

◆ Hydraulic Parameters:

The hydraulic parameters of the groundwater aquifer are as follows

- Vertical permeability of the top layer varies from 35 to 75 m/day
- Aquifer Hydraulic conductivity varies from 50 to 70 m/day.
- Transmissivity varies from 5000 to 25000 m²/day, and,
- Aquifer Storativity varies from 0.0005 to 0.01.

◆ Recharge and Discharge:

Recharge sources are:

- ◆ Seepage from the river and main canals

- ◆ Deep percolation from irrigation of cultivated lands
- ◆ Seepage from drinking water supply networks
- ◆ Infiltration/seepage from the sewage trenches.

Discharge occurs as:

- ◆ Groundwater return flow to the Nile.
- ◆ Interception by sewage system.
- ◆ Groundwater extraction.

◆ **Hydrochemistry:**

Many authors, institutes and researchers studied the groundwater quality of greater Cairo water for the purpose of different projects and/or studies, however, the groundwater quality could be summarized in the following main points:

1. Groundwater type is bicarbonates, indicating that the source of recharge is surface water.
2. Sodium Chloride and Sodium Sulfate are also present in the deep aquifer which may indicate fossil water and/or recharge from domestic sources.
3. TDS generally range between 1000 and 2000 ppm.

4.8. Flora and Fauna

The study area was surveyed and assessed using both line transects, active search techniques and documenting photography for all investigated area as well as different recorded species. These techniques were used for both floral and faunal studies at along the route of Giza North/Ashmoun and Giza North/Cairo 500.

4.8.1 From Giza North to Ashmoun Substation

Common natural vegetation such as weeds and reeds were grown throughout the area and provided a suitable shelter for some common reptiles and birds.

Fauna

Mammalian Fauna (Mammals)

One mammalian species (Red Fox *Vulpes vulpes*) was recorded by direct observation during the study while escaping to a small building which located inside the Ashmoun substation. The Red Fox is one of the most adaptable, common and widespread mammals of Egypt and listed as LC, Least Concern by the International Union for Conservation of Nature IUCN.

Avifauna (Birds)

Table 4-4: Registered Fauna on the site and their status

STATUS		RELATIVE ABUNDANCE (RA)	
RB	Resident Breeder	C	Common
IB	Introduced Breeder	F	Fairly Common
MB	Migrant Breeder	UC	Uncommon
WV	Winter Visitor	R	Rare
PV	Passage Visitor		
V	Vagrant		

Common Name	Scientific Name	Arabic name	Status	RA
Barn Swallow	<i>Hirundo rustica</i>	عصفور الجنة	RB, PV, WV	C
Cattle Egret	<i>Bubulcus ibis</i>	أبوقردان	RB,PV,WV	C
Hooded Crow	<i>Corvus cornix</i>	غراب بلدى	RB	C
House Sparrow	<i>Passer domesticus</i>	عصفور دورى	RB	C
Little Egret	<i>Egretta garzetta</i>	بلشون أبيض	RB, PV, WV	C
Palm Dove	<i>Streptopelia senegalensis</i>	بمام مصري	RB	C
Spur-winged Plover	<i>Vanellus spinosus</i>	زقزاق بلدى	RB, PV, WV	C
Senegal Thick-knee	<i>Burhinus senegalensis</i>	كروان سنغالى	RB	C
White Wagtail	<i>Motacilla alba</i>	أبوفصادة أبيض	PV, WV	C

Herpetofauna (Reptiles and Amphibians)

Bean Skink *Trachylepis quinquetaeniata* is the only recorded species from the investigated area of study, is a common and widespread reptilian species. This species is an adaptable species with flexible Ecological requirements, qualifying it to have good colonizing capacities, occupying new suitable habitats rapidly.

Invertebrate Fauna

The ecosystem of the studied area provides habitats for some common invertebrate species, such as ants, Dragon flies, grass hoppers, spiders and other common insects.

Flora

The flora of the area is represented by a dry grassland habitat dominated by Halfa *Juncus rigidus* and Common Reed *Phragmites australis* as well as other natural vegetation including weeds.

Conclusion

According to the recorded species; no endemic or threatened species were documented during this study. On other hand the investigated habitats are not unique, but very common and widespread in neighboring areas which provide alternative habitats for the sympatric faunal species to move to these habitats and continue their life cycle.

PLATES

The following figures represent the documented species of fauna and flora at Ashmoun:

Figure 4-15: Fauna

(A), (G) & (I) Bean Skink *Trachylepis quinquetaeniata*. B) Senegal Thick-knee *Burhinus senegalensis* C) White Wagtail *Motacilla alba* D) Spur-winged Plover *Vanellus spinosus* E) House Sparrow *Passer domesticus* F) Hooded Crow *Corvus cornix* H) Red Fox *Vulpes vulpes* (tracks)

Figure 4-16: Flora

The plates is showing the general view for the vegetation community in the area which mainly represented by Halfa *Juncus rigidus* and Common Reed *Phragmites australis*



Figure 4-15: Faunal species at Ashmoun site



Figure 4-16: Floral species at Ashmoun site

4.8.2 From Giza North Power Plant to Cairo 500 Substation

The assessment of fauna of the planned route of the transmission line was conducted through review of existing published literature about the fauna of these areas and through survey of faunal species and habitats of the planned route, detection of recorded species based on direct observation of faunal species or their signs such as tracks, nests, dens, droppings, etc.

The known parts of the planned route of the transmission line were surveyed as well as the potential route of the unclear parts of the planned route of the transmission line as one

transect starting from the start point at Giza North Power Station to the end point of Cairo 500 SS. In regard to the unclear parts of the route, the potential areas for the route were generally covered in the survey. All recorded different faunal species and habitats as well as other animal signs were recorded by direct observation during the survey and active search process for fauna.

Species were recorded from the habitats that planned to be crossed by the transmission line as well as from the known of the planned route of the transmission line. All recorded habitats and species were documented by photographs for the report of the study and for further confirmation of identification of different recorded species. All recorded species were identified according to the most recent published taxonomic work for the fauna of Egypt.

Recorded Species

Fauna

The following paragraphs are for the faunal species potentially occurring in the ecosystems that are planned to be crossed by the planned route of the transmission line based on the most recent published literature for the fauna of Egypt or\and the already recorded fauna during the field visits of the conducted study. The previously mentioned ecosystems is providing habitats for several species of vertebrate fauna as well as several other invertebrate species, such as snails, worms, ants, Dragonflies, Damselflies, spiders, beetles and other insects such as the common butterfly Long-tailed Blue *Lampides boeticus*, Mole Cricket *Gryllotalpa gryllotalpa* and Bluetail (Damselfly) *Ischnura senegalensis*.

The River Nile's water bodies are representing the aquatic (freshwater) ecosystem with many fish species such as *Tilapia zilli*, *Oreobromis niloticus* and *Clarias gariepinus* in addition to other native invertebrates such as *Valvata nilotica* and invasive species such as the crayfish *Procambarus clarkia*.

According to the most recent published literature about the herpetofauna of Egypt (Baha El Din S., 2006), potentially occurred reptiles and amphibians are ranging in number from 22 to 38 species, the highest concentration and greatest species richness is near the margins of Delta. Characteristic species of these habitats are *Bufo regularis*, *Ptychdena mascarenensis*, *Chamaeleo africanus*, *Malpolon monspessulanus*, *psammophis sibilans*, *Naja haje*, *Hemidactylus tursicus*, *Tarentola annularis* and *Trachylepis quenquetaeniata*.

There are many bird species potentiallyI in the ecosystems that are planned to be crossed by the transmission line pathway. The majority of these birds are resident common species. The route of the transmission line doesn't occur in any of the 34 IBAs (Important Bird Areas) of Egypt. All recorded bird species during the study are common species such as, Hooded Crow *Corvus cornix*, Barn Swallow *Hirundo rustica*, House Sparrow *Passer domesticus* and Cattle Egret *Bubulcus ibis*. The record species presented on the table below.

Table 4-5: Registered Fauna on the site and their status

STATUS		RELATIVE ABUNDANCE (RA)	
RB	Resident Breeder	C	Common
IB	Introduced Breeder	F	Fairly Common
MB	Migrant Breeder	UC	Uncommon
WV	Winter Visitor	R	Rare
PV	Passage Visitor		
V	Vagrant		

Common Name	Scientific Name	Arabic name	Status	RA
Barn Swallow	<i>Hirundo rustica</i>	عصفور الجنة	RB, PV, WV	C
Cattle Egret	<i>Bubulcus ibis</i>	أبوقردان	RB,PV,WV	C
Common Bulbul	<i>Pycnonotus barbatus</i>	بلبل	RB	C
Common Moorhen	<i>Gallinula chloropus</i>	دجاجة الماء	RB, PV, WV	C
Eurasian Hoopoe	<i>Upupa epops</i>	هدهد	RB, PV	C
Hooded Crow	<i>Corvus cornix</i>	غراب بلدى	RB	C
House Sparrow	<i>Passer domesticus</i>	عصفور نورى	RB	C
Kestrel	<i>Falco tinnunculus</i>	صقر الجراد	RB, PV, WV	C
Little Egret	<i>Egretta garzetta</i>	بلشون أبيض	RB, PV, WV	C
Palm Dove	<i>Streptopelia senegalensis</i>	يمام مصري	RB	C
Pied Kingfisher	<i>Ceryle rudis</i>	صياد السمك الأبقع	RB	C
Senegal Thick-knee	<i>Burhinus senegalensis</i>	كروان سنغالى	RB	C
Spur-winged Plover	<i>Vanellus spinosus</i>	زقراق بلدى	RB, PV, WV	C
White-throated Kingfisher	<i>Halcyon smyreninsis</i>	قاوند	BR	C



Very common House Sparrow *Passer domesticus* (male)

Regarding the planned transmission line effect on the resident as well as migratory birds; for resident breeding birds, they can adapt well to obstacles in their habitats.

There are many Mammalian species that potentially occur in the study area based on the most recent published literature, (Basuony M.I. et al, 2010). Characteristic species of these habitats are red fox *Vulpes vulpes*, Black Rat *Rattus rattus*, House mouse *Mus musculus*, and Nile Kusu *Arvicantis niloticus*. There are some important mammals that anticipated to be found in these ecosystems such as the endemic Nile Swamp Cat *Felis chaus nilotica* and the endemic gerbil *Gerbillus perpallidus*.

In spite of potentiality of occurrence of the Nile Swamp Cat in these ecosystems, this cat is recorded as common species and categorized as LC, Least Concern according to IUCN (International Union for Conservation of Nature) criteria and categories, also the transmission line and its towers will not passively affect both species, the cat and the gerbil or their habitats. No endanger or rare mammalian fauna have been recorded during the study.

Flora

The dominant floral species in the artificial-terrestrial habitats of cultivated agricultural lands, rural and urban areas as well as in canals' banks are common plant species such as cultivated plants, natural vegetated plants and invasive plants; the cultivated plants such as *Zea mays*, *Ricinus communis* and *Musa nana*, the naturally vegetated plants such as *Phragmites australis* and *Mentha longifolia*, and invasive species such as *Eichhornia crassipes* and *Cynodon dactylon*. Other plants are also well represented such as, *Acacia nilotica* and *Tamarix nilotica* as well as Palm groves of *Phoenix dactylifera*. For different habitats, other common plants are also represented such as *Panicum turgidum*, *Alhagi graicorum* and *Juncus acutus*.

Castor oil plant, *Ricinus communis* and Common Water Hyacinth *Eichhornia crassipes*



General View for the dominant floral species throughout the studied cultivated land areas

Conclusion

According to the planned route of the transmission line, types of habitats, number and dimensions of towers as well as the recorded and reviewed species, there is a very low impact on the faunal species and their habitats as majority of the planned route will be occur in insensitive areas which represented by artificial-terrestrial habitats including plantations, rural gardens, cultivated agricultural lands, urban areas, asphalt roads and railways as well as desert habitats, all these habitats including water bodies and other structures that planned to be crossed by the route of the transmission line have been studied and there is no sensitive habitats for the planned transmission line or its towers.

No records of endangered, endemic or rare species from the route and few common faunal species have been recorded from the habitats which planned to be crossed by the planned transmission line; also all recorded floral species are common species. The planned transmission line has the low impact on the faunal species (including migratory birds) and their habitats as well as on floral species.

Finally according to all previously mentioned reasons in this section of conclusion as well as in other sections of each class of different species that indicate in general that the transmission line has no significant passive effect on the fauna and flora which occurred in these ecosystems and related habitats.

4.9. Bird Migration

In general, it's so important for any faunal assessment of any proposed transmission line's route to be studied from the prospective of the impact on bird migration and this is due to the special and unique geographical position of Egypt

for migratory birds of palearctic zoogeographical region as a passage to winter in Africa.

These birds migrate to Egypt two times per year in both autumn and spring seasons in large numbers. the location and direction of any transmission line as well as the design (bird-friendly or not) and number of towers are significant features for assessing the impact on migratory birds. Also the accumulation of power lines is very important as in many locations there are already considerable numbers of multiple power lines and the accumulative impact of many lines is greater than one line by itself. That's mean the more lines in the same location the great potential for collisions and electrocution. So, these previously mentioned information as well as a field studies are so important in order to assess the real potential impacts for the of any planned or proposed transmission line.



The very common Hooded Crow *Corvus cornix*

As migratory birds remain in the stopover sites for a limited time during migration they have a very little chance to adapt to the obstacles in these habitats, so they are mostly exposed to the two main dangerous threats collision and electrocution while flying between feeding areas and resting areas.

Regarding Giza North-Cairo 500 and the parallel line of Giza North- Samalout as well as Giza North-Ashmoun planned transmission lines, there are located in an area which has no clear significant role regarding bird migration. Also they are not located in a main migratory bird route specially for large birds, as they are the most probable exposed birds to the danger

of both collision and electrocution; the main reason for that the small birds don't usually get electrocuted because they fail to complete a circuit either by touching a grounded wire or any other structure.

4.10. Air and Noise Quality

Air quality and noise measurements will be conducted at one point along the transmission line of North Giza/Ashmoun to represent the agriculture environment along the route. In addition, two points will be selected along the transmission line of Giza North/Cairo 500 and Giza North/Samalout 500 (the both lines will be laid in paralel; therefore the baseline environment will be similar). The two points selected along the route of Giza North to Cairo 500 substation due to the different environment of the site, one point will represent the cultivated land, and the other point will represent the uncultivated land along the route.

The measurements are done by the Air Pollution & Noise Monitoring Department in The Central Laboratory that belongs to the Egyptian Environmental Affairs Agency (EEAA). Air quality Measurements will be done for the evaluation of hourly concentrations of sulfur dioxide (SO₂), nitrogen dioxide (NO₂), carbon monoxide (CO) and Ozone (O₃). Air samples will be taken on filters for the evaluation of the concentrations of Total Suspended Particulates (TSP) and Particulate Matters having a diameter less than 10 micrometer (PM10). Also the sound levels are hourly monitored. All measurements are for 8-hour average.

4.11. Socio Economic Characteristics

The information in this section is compiled from the secondary sources of information in addition to the consultation with stakeholders as well as based on field visit observations.

4.11.1 Description of Socioeconomic Conditions of Ashmoun

Ashmoun is one of the ancient cities since the pharos times. Ashmoun's name is derived from "Ash" which means land and "Amon" which points to the God Amon of the pharaohs. Therefore, the meaning of Ashmoun name is "the land of the moon". Ashmoun is well known of its archeological inheritance especially in its villages such as Saqiet Abu Shaara, El Koum El Ahmar, Koum Osim, Tahaway, EL Barania and others. In Ashmoun city, there are only two archeological sites, which are the Roman fort and the old Omar Mosque. Ashmoun has once won the title of *the most beautiful city in Egypt*.

Demographic Profile

The total population of Ashmoun Markaz is 705925 (information Center of Ashmoun 2010), the females are representing 48% of the total population. The population of Ashmoun city is 90768. Those who are residing in the rural areas inside Ashmoun are estimated to be 615157, and in urban areas there are 90768 persons. The population size varies among the different districts and local units of Ashmoun. Table 4-6 provides more details on the population of each village and local unit inside Ashmoun.

Table 4-6: Population in each village and local unit inside Ashmoun

Ser.	Name of the Local unit and its villages	Total population		Total	Total of each local unit
		Males	Females		
1	Ashmoun City	46789	43979	90768	90768
2	Darawa	10150	9070	19220	
3	Sarawa	6936	6467	13403	
4	Kafr Sarawa	3632	3338	6970	
	Total of Ashmoun Local Unit	20718	18875	39593	39593
5	Sobk EL Ahad	13516	12611	26127	
6	Mahalet Sobk	7312	6600	13912	
7	Shoshay	5662	5181	10843	
8	Kafr El Sayed	1307	1150	2457	
	Total of Sobk El Ahad Local Unit	27797	25542	53339	53339
9	Samadoun	23717	21915	45632	
10	Mageria and Kafr Megahed	6934	6451	13385	
	Total of Samadoun Local Unit	30651	28366	59017	59017
11	Saqiet Abu Shaara	8285	7826	16111	
12	Samalay	4285	4030	8315	
13	Shenway	4653	4172	8825	
14	El Faraonia	4914	4492	9406	
15	Kafr El Hamaa	6402	5820	12222	
16	Kafr El Faraonia	5212	4802	10014	
	Total of Saqiet Abu Shaara Local Unit	33751	31142	64893	64893
17	Santaris	11315	10256	21571	
18	El Qanatrien	3664	3604	7268	
19	Manial Douieb	3114	2739	5853	
20	Kafr Abu Mahmoud	2365	2297	4662	
	Total of Saqiet Abu Shaara Local Unit	20458	18896	39354	39354
21	Shama	12590	11788	24378	
22	Saqiet El Manqady	4223	4052	8275	
	Total of Shama Local Unit	16813	15840	32653	32653
23	Geris	14184	12861	27045	
24	Mounasa	5003	4655	9658	
25	Abu Awaly	5473	4896	10369	
26	Monshaat Geris	2701	2509	5210	
	Total of Geris Local Unit	27361	24921	52282	52282
27	Talia	18620	16890	35510	
28	El Khour	4569	4018	8587	
	Total of Talia Local Unit	23189	20908	44097	44097
29	El Barania	10329	9443	19772	

Ser.	Name of the Local unit and its villages	Total population		Total	Total of each local unit
		Males	Females		
30	Manial Arous	4051	3627	7678	
31	EL Kawady	3860	3656	7516	
32	El Ghanamia	2669	2423	5092	
33	Kafr Mansour	4163	3628	7791	
	Total of El Barania Local Unit	25072	22777	47849	47849
34	Tahway	11211	10355	21566	
35	Delhemo	6827	6040	12867	
36	Kafr El Taraina	4023	3578	6701	
	Total of Tahway Local Unit	22061	19973	42034	42034
37	Shatanouf	13289	12102	25391	
38	Bohet Shatanouf	5419	4928	10347	
39	Shea'shaa'	4683	4425	9108	
40	Manial Gouida	2155	1961	4116	
41	El Helwasy	2629	2453	5082	
42	Kafr Aoun	640	622	1262	
	Total of Shatanouf Local Unit	28815	26491	55306	55306
43	Shenshour	10990	9892	20882	
44	Barashim	1646	1409	3055	
45	Koum Ayad	783	805	1588	
	Total of Shenshour Local Unit	13419	12106	25525	25525
46	Qouras	3508	3418	6926	
47	Kafr Qouras	3190	3217	6407	
48	Abu Raqaba	3696	3429	7125	
49	Shwag	2722	2362	5084	
50	El Nea'naa'ia	3833	3495	7328	
51	Kafr Abu Raqaba	1305	1163	2468	
	Total of Qouras Local Unit	18254	17084	35338	35338
52	Ramlet El Angab	4726	4606	9332	
53	Kafr El Gharib	1370	1290	2660	
54	Lebeisha	2400	2307	4707	
55	El Angab	3680	3498	7178	
	Total of Ramlet El Angab Local Unit	12176	11701	23877	23877
Total Urban		46789	43979	90768	
Total Rural		320535	294622	615157	
Total population of Ashmoun district		367324	338601	705925	705925

Administrative Districts of Ashmoun

Ashmoun local units cover an area of about 71390 Egyptian Acres (299838 km²). The inhabited areas cover 4074 Egyptian Acres (17111 km²), whereas agricultural lands cover about 63277 Egyptian Acres (265763 km²), see Table 4-7.

Table 4-7: Residential and agricultural areas in Ashmoun local units

Local Unit	Total area		Total planted area		Total areas for public use		The residential areas	
	Egyptian Acres	Egyptian Acre unit "Qirat" (175 m ²)	Egyptian Acres	Egyptian Acre unit "Qirat" (175 m ²)	Egyptian Acres	Egyptian Acre unit "Qirat" (175 m ²)	Egyptian Acres	Egyptian Acre unit "Qirat" (175 m ²)
Ashmoun City	6151	--	5513	16	132	12	500	4
Shenshour	3224	4	2884	2	158	3	180	4
Ramlet El Angab	2992	8	2713	4	174	--	105	11
Shema	2864	20	2553	19	131	17	179	19
Geris	5826	7	5215	8	453	11	165	23
Tahaway	4394	7	4110	7	100	16	179	19
Shatanouf	5400	--	4739	1	225	6	436	15
Saqiet Abu Shaara	6604	3	5763	23	300	--	559	19
Sobk El Ahad	5898	21	5310	23	304	11	288	11
Talia	11098	9	10122	14	442	16	538	23
Santaris	4397	10	3872	23	240	10	283	23
Qouras	3230	12	2838	11	202	14	184	23
Darawa	4056	23	3081	21	741	1	234	10
Samadoun	5251	19	4577	16	431	18	241	18
Total	71390	23	63277	20	4038	15	4074	2

The state owned lands inside Ashmoun are only the construction and building lands; there are no state owned agricultural lands, see Table 4-8.

Table 4-8: Type of lands in Ashmoun

Ashmoun Markaz	Total estimation- Empty				Total estimation of squats- has been settled	Total estimation of squats- not settled yet
	Total area in m ²	Ownership			Total area in m ²	Total area in m ²
		irrigation	Endowment	State owned		
Rural	743597.10	--	--	743597	172388.56	571208.54
Urban	60090	--	--	60090	23635.92	36454.08
Total	803687.10			803687.10	196024.48	607662.62

Infrastructure Accessibility

The residents of Ashmoun have good access to basic infrastructure such as electricity, potable water and sanitation. There are also well constructed and paved roads inside Ashmoun. Table 4-9 illustrates the type and length of roads inside Ashmoun.

Table 4-9: Types of roads in Ashmoun

Location	Type of road	Paved In kms	Dusty In kms	Under construction
Ashmoun	Internal	176.85	45.85	NA
	Regional	--	--	--

Access to Electricity

There are about 48 electricity transformers distributed among the different villages and satellites of Ashmoun Markaz. The number of these stations is shown in Table 4-10 below.

Table 4-10: Transformer stations in Ashmoun

	Capacity of Transformers stations kVa	Numbers
1	800 kVa	1
2	500 kVa	16
3	300 kVa	2
4	250 kVa	13
5	200 kVa	6
6	160 kVa	1
7	100 kVa	2
8	64 kVa	1
9	63 kVa	6
	Total	48 stations

The majority of Ashmoun residents have access to electricity; the number of beneficiaries from electricity service is shown in Table 4-11.

Table 4-11: Beneficiaries from the electricity service in Ashmoun

Total Number of beneficiaries from electricity service	Estimations based on consumptions		
	Residential	Commercials	Industrial
16096	21284640	126500	16500

Table 4-12 illustrates the number of subscribers to the electricity service in each local unit as well as the consumption rate per person inside each local unit:

Table 4-12: Subscribers to the electricity service in Ashmoun

Ser.	Name of the local unit	The number of residential subscribers	The number of commercial subscribers	The number of industrial subscribers	Average consumption per person
1	Ashmoun	15445	1256	1419	157 kv
2	Shenshour	5078	273	188	128 kv
3	Samadoun	9434	403	306	126 kv
4	Geris	8509	241	196	118 kv
5	Ramlet El Angab	4199	135	91	120 kv
6	Shama	4933	221	212	139 kv
7	Tahway	5966	268	205	129 kv
8	Saqiet Abu Shaa'ra	8327	369	91	NA
9	Darawa	9141	486	83	NA
10	Santaris	7962	793	79	NA
11	Qouras	6402	521	42	NA
12	Shatanouf	9481	495	87	NA
13	Sobk El Ahad	10719	827	71	NA
14	Talia	4980	515	120	NA
15	El Barania	8007	580	110	NA

Owing to the unreliability of the current service, the majority of households who are residing in both the urban and rural areas were not able to operate the electrical appliances inside their houses. Some of the electrical appliances got damaged as a result of the sudden supply of electricity after a cut off period.

Table 4-13 summarizes the times of electricity interruptions and the negative impacts as a result of these interruptions:

Table 4-13: Data on electricity interruptions in Ashmoun

Name of the local unit	Total number of times of power outage	The recorder negative effects of power interruptions			Procedures
		Hospitals	Water plants	Mills and bakeries	
Tehway	-(4) times in the evening and at night -(6) times during the day -The average	The work inside the dental clinic has been stopped	Operating the plant using diesel because of power cuts	-No mills -The bakeries are being operated using power generators	The power generators and diesel are being used during the electricity cuts

Name of the local unit	Total number of times of power outage	The recorder negative effects of power interruptions			Procedures
		Hospitals	Water plants	Mills and bakeries	
	of outage (2-3 hours)				
El Barania	-(4) hours twice a month	---	---	---	No recorded damages
Ramlet El Angab	Every day for 2 hours in the evening	No significant effects	No significant effects	No significant effects	The power generators are being used
Qouras	Every day for 3 hours	No hospitals	Is being operated by diesel	The mills and bakeries are being operated by diesel	Frequent complaints from the electricity cuts
Samadoun	Every day for 4 hours	No significant effects	Is being operated by diesel	No mills	Damage for the electrical appliances
Santaris	3 days a week	The vaccinations got spoiled	---	-A big delay in baking bread -The damage of the electrical appliances inside houses	Damage for the electrical appliances adding stress and panic as well as economic burden on households.

Source of Potable Water

There are around 45 water plants distributed inside Ashmoun Markaz. The total number of residents who have access to potable water is 157 beneficiaries from the public sector inside urban areas as well as 618 beneficiaries from the public sector inside rural areas. On the other hand, the numbers of beneficiaries from the private sector are 13.000 beneficiaries in urban areas and 74.264 in rural areas. The total consumption of potable water inside urban areas estimates of about 40.951 m² in the public sector and 6.250.000 m² in the private sector. In rural areas, the consumption reaches up to 750.560 m² in the public sector, while it reaches up to 9.934.382 m² in the private sector.

Table 4-14 illustrates the number of beneficiaries in different villages and local units, as well as the consumption rate of potable water.

Table 4-14: Consumption rate of potable water

Ser.	Location	Public sector				Private sector			
		Number of beneficiaries		Water consumption m ³		Number of beneficiaries		Water consumption m ³	
		Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
1	Ashmoun City	157	--	40951	--	1300	--	6250 thousand m ³	--
2	Darawa	--	2	--	400	--	2240	--	504000
3	Sarawa	--	12	--	200	--	1948	--	360000
4	Kafr Sarawa	--	1	--	30	--	880	--	18000
5	Sobk EL Ahad	--	25	--	13000	--	3700	--	486019
6	Mahalet Sobk	--	10	--	60000	--	1717	--	172761
7	Shoshay	--	11	--	30000	--	1182	--	127065
8	Kafr El Sayed	--	2	--	1200	--	402	--	48801
9	Samadoun	--	26	--	4342	--	4415	--	456575
10	Mageria	--	10	--	2670	--	1765	--	183950
11	Saqiet Abu Shaara	--	16	--	15764	--	2111	--	202949
12	Samalay	--	6	--	3521	--	1374	--	129587
13	Shenway	--	4	--	1528	--	1065	--	129025
14	El Faraonia	--	5	--	3266	--	934	--	78417
15	Kafr El Hamaa	--	5	--	2204	--	1154	--	149606
16	Kafr El Faraonia	--	4	--	3611	--	1215	--	105335
17	Santaris	--	43	--	23082	--	2706	--	480928
18	El Qanatrien	--	12	--	2862	--	666	--	69094
19	Manial Douieb	--	7	--	1380	--	472	--	43472
20	Kafr Abu Mahmoud	--	11	--	734	--	596	--	77772
21	Shama	--	26	--	1500	--	3563	--	74400
22	Saqiet El Manqady	--	13	--	650	--	1018	--	10800
23	Geris	--	26	--	148408	--	3243	--	255433
24	Mounasa	--	3	--	17124	--	661	--	62795
25	Abu Awaly	--	10	--	5780	--	1004	--	123444
26	Talia	--	12	--	3600	--	2611	--	783250
27	El Khour	--	4	--	1200	--	751	--	224100
28	El Barania	--	12	--	12986	--	2272	--	457180

Ser.	Location	Public sector				Private sector			
		Number of beneficiaries		Water consumption m ³		Number of beneficiaries		Water consumption m ³	
		Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
29	Manial Arous	--	5	--	4147	--	1123	--	316719
30	EL Kawady	--	5	--	131126	--	1202	--	304490
31	El Ghanamia	--	4	--	3143	--	811	--	224976
32	Kafr Mansour	--	2	--	22855	--	829	--	153406
33	Tahway	--	41	--	45392	--	6114	--	977100
34	Shatanouf	--	40	--	960	--	2932	--	351840
35	Bohet Shatanouf	--	20	--	480	--	1251	--	450300
36	Shea'shaa'	--	15	--	360	--	1080	--	59200
37	Manial Gouida	--	5	--	120	--	536	--	128640
38	El Helwasy	--	9	--	216	--	810	--	194400
39	Kafr Aoun	--	3	--	72	--	200	--	12000
40	Shenshour	--	62	--	155000	--	3810	--	797500
41	Qouras	--	39	--	13924	--	4080	--	642790
42	Ramlet El Angab	--	40	--	11723	--	3830	--	57450
Total Urban		157	--	40951	--	13000	--	6250000	
Total Rural		--	618	--	750560	--	74264	--	9934382
Total of the Markaz		157	618	40951	750560	13000	74264	6250000	9934382

Sanitation

There are only four sewage systems inside Ashmoun Markaz, they are (Ashmoun city, Samadoun, Shama and Tahway). The majorities inside these four places are connected to the sewage system. While the rest of the houses are using trenches that need to be emptied using the municipality emptying service. The numbers of houses that are connected to the sewage system - where found are 10240 houses in urban areas and 4723 houses in rural areas. Whereas, those who are using trenches are 500 houses in the urban areas and 8543 houses in the rural areas, see Table 4-15.

Table 4-15: Sewage networks in Ashmoun Markaz

Ser.	Location	Length of the sewerage network in kms		The number of households connected to the sewage network		The number of households that are not connected to the sewage network		The number of households who are using trenches	
		Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
1	Ashmoun city	56	--	10224	--	500	--	500	
2	Samadoun	--	30	--	1500	--	4500		4800
3	Shama	--	30	--	1000	--	--		2800
4	Tahway	--	24	--	2223	--	943		943
Total Urban		56		10224		500	5443	500	
Total Rural			84		4723				8543
Total Markaz		56	84	10224	4723	500	5443	500	8543

Education

In 2005, the EHDR has reported that Menoufia has a high literacy rate 67.5% in 2004. Ashmoun also, is well known of the high education level of its citizens. There are over than 400 schools for different educational stages, they are distributed in all Ashmoun satellites and villages. Table 4-16 summarizes the number of schools as well as the number of students in each educational stage.

Table 4-16: Schools in Ashmoun

Ser.	Educational stages	Total number of schools	Total number of classes	The number of students		Total
				Males	Females	
1	Pre-school	75	205	3542	3131	6693
2	General primary stage	135	2256	42042	39633	81675
3	Preparatory stage	67	929	16511	16872	33383
4	General secondary education	13	173	2664	327	5434
5	Technical commercial secondary education	6	179	2186	3418	6104
6	Advanced Technical and commercial secondary education	1	26	170	642	794
7	Services technical secondary education	3	5	5	4	9
8	Technical secondary education	2	93	2286	367	2653

Ser.	Educational stages	Total number of schools	Total number of classes	The number of students		Total
				Males	Females	
9	Vocational secondary education	1	7	188	--	188
10	Agricultural secondary education	1	33	478	329	807
11	Vocational secondary education	1	8	84	82	166
12	Private primary education	5	30	444	327	771
13	Private education for students with special needs	3	19	131	72	203
14	Azharian primary education	38	4200	7769	6233	14002
15	Azharian preparatory education	45	222	2692	2651	4843
16	Azharian secondary education	35	153	1705	3389	3389
Total		431	8538	83664	77477	161141

Health

There are around 145 health and medical centers as well as 50 Family Planning Centers inside Ashmoun. There is also Ashmoun hospital of the one day surgery. However, the majority of these centers are lacking the basic health services in addition to the poor quality of the services provided. The frequent electricity interruptions inside Ashmoun have affected the work inside these health services significantly. According to the statistics of Ashmoun Information center in 2010, the total births in Ashmoun Markaz are 10596 and the deaths are 1643, see Table 4-17.

Table 4-17: Data on births and deaths in Ashmoun and surrounding villages

ser	Location	Number of Births	Number of Deaths	Natural increase in population
1	Ashmoun City	1336	255	1081
2	Shenshour	331	79	252
3	Tahway	580	80	500
4	Samadoun	864	123	741
5	Shama	487	83	404
6	Saqiet Abu Shaara	809	143	666

ser	Location	Number of Births	Number of Deaths	Natural increase in population
7	Sobk El Ahad	714	119	595
8	El Barania	639	113	526
9	Talia	573	223	460
10	Geris	754	98	656
11	Shatanouf	734	119	615
12	Darwa	580	97	483
13	Santaris	446	77	369
14	Ramlet EL Angab	319	61	258
15	Qouras	570	83	487
	Total	10596	1643	8953

Work Status

The residents of Ashmoun work in different professions, the majority of them work as employees in different governmental sectors. The stakeholders have stated that there is high involvement of women in different governmental jobs as well as working as teachers. It was difficult to obtain the unemployment rate in Ashmoun from the Information Center. Ashmoun is well known of its small and micro enterprises which reached to 459 industries in 2008, especially the production of handmade carpets, the pottery making, cutting and formation of seashells in addition to some other miscellaneous industries.

The majority of the local people and especially women are involved in the production of the handmade carpets especially in Saqiet Abu Shaara, Saqiet EL Manqady as well as Geris villages. In Saqiet Abu Shaara, there are around 290 handmade home based- industrial activities all of them are for producing handmade carpets. The owners of these small industries are mainly men only 18 of them are female owners. In Saqiet El Manqady, the majority of the small industries owners work in cutting and forming seashells. While, in Geris the main small industry is the pottery making.

Agriculture

The main crops inside Ashmoun are the maze, the citrus fruits as well as wheat and cotton in addition to other fruits. Although, Ashmoun was famous of its productivity of the finest cotton; however, there is a dramatic decline in its production rate. Table 4-18 summarizes the production of the main crops and fruits inside Ashmoun.

Table 4-18: Main crops in Ashmoun

Main crops	Total area in Egyptian Acres		Total productivity		Average of production	
	Egyptian Acres	Egyptian Acre unit "Qirat" (175 m ²)	Egyptian Acres	Egyptian Acre unit "Qirat" (175 m ²)	Egyptian Acres	Egyptian Acre unit "Qirat" (175 m ²)
Cotton	4	--	28	--	7	--
Wheat	14132	--	269890	360	19	39
Maze	32239	22	738564	411	22	908
Citrus fruits	4831	7	41065	965	8	5
Grapes	373	22	2654	832	7	100
Guava	12	5	156	25	12	5
Pears	1479	11	6213	732	4	200
Plums	397	5	1231	351	3	100

The productivity of the agricultural lands started to decline and the possession for the agricultural lands became scattered among farmers. Agriculture does not constitute the main income source for Ashmoun residents. The average range for the possession of the agricultural lands among farmers is between half an Egyptian acre to 5 Egyptian acres.

Economic Welfare

In 2004, Menoufia Governorate and its Markazes have been ranked number 12 in Human Development index. The real Gross Domestic Product (GDP) per capita is LE 3158.2 in Menoufia Governorate, which means Menoufia lies in the middle comparing to the poverty line.

The stakeholders have stated that the economic level of most of the Ashmoun residents is in the middle. However, the majority of people can afford to buy lands for building and housing facilities. The prices for each square meters of land reached up to 15 thousand EGP (in the city area; not for agriculture purposes).

4.11.2 Description of Socioeconomic Conditions of Giza Governorate

Giza Governorate celebrates its National Day on 31 March of each year on the anniversary of the struggle of Giza –Shobak village which belongs to Badrasheen Markaz against British occupation in 1919. It is characterized by maintaining the ancient Paranoiac monuments such as the pyramids, the sphinx, Saqqara pyramid encompassing the momentum of Dahshour region, and Meit Rahina City, making it one of the most governorates that attract tourists.

There are many museums and parks, which play a major role in foreign and domestic tourism including but not limited to the Museum of Nagy, the zoo, the Agricultural Museum, Museum of Modern Art, as well as leisure tourism in El Haram Street. It is also famous for its mineral and sulphurous water wells as well as the fresh, cold and hot water wells, making Giza one of the most important natural resorts for the medical and hospital tourism. It is also famous for its environmental industry which is favoured by both tourists and the Egyptian, the most famous cities in Giza which are producing environmental products such as the local custom "Galabya" is Kerdasa and El Harania.

Geography

Giza is one of the governorates of Greater Cairo Region (Cairo- Giza- Qalyubia). Its borders meet with the borders of Behera, Matrouh as well as the borders of Fayoum, Beni Suef and Menya Governorates. The total area of the Governorate is 13.184 km² , it is detailed as follows:

Total area	13184 km ²
Total inhabited area	1191 km ²
Housings and scattered areas	84 km ²
Cemeteries and public benefit places	120 km ²
Lakes and wastelands	9 km ²
Agricultural lands within the skirt	776 km ²
Agricultural lands outskirts	202 km ²
The percentage of the inhabited area to the total area	9%
The population density to the total population	40.0 thousand people/km ²
The population density to the total inhabited areas	4.37 thousand people/km ²

Source: Egyptian General Authority for Surveying, 2000

Demographic Profile

The total population of the governorate is estimated as 5.2 million people in the first of January 2001. Out of the population there are 2815 people living in urban areas while the population of 2393 are living in rural people. The proportion of females is 48.3%.

	Urban	Rural	Total
Total Population 2001	2815	2393	5208
Percentage of females	48.6%	48%	48.3%
Birth rate 2000	26.11 Births/thousand people	28.4 Births/thousand people	27.16 Births/thousand people
Death rate 2000	6.92 Deaths/thousand	5.46 Deaths/thousand	6.25 Deaths/thousand

	Urban	Rural	Total
	people	people	people
Natural Increase rate 2000	19.19 per thousand	22.94 per thousand	20.91 per thousand

Source: CAPMAS, 2000-2001.

Administrative Districts of Giza

Giza Governorate is divided administratively to 11 Markazes, 11 cities, 8 districts, Local Village Units, 150 satellite villages 637 Kafr and Naga. The capital is Giza city, which does not belong to any of its Markazes.

The 11 Markazes of Giza Governorate are:

- Giza Markaz
- Imbaba Markaz.
- Osim Markaz
- El Waraq Markaz.
- Kerdasa Markaz.
- El Badrashin Markaz.
- El Hawamdeia Markaz.
- El Aiat markaz.
- El saf Markaz.
- Atfieh Markaz.
- El Wahat EL Baharia Markaz.

The eight districts of Giza are:

- North Giza district.
- South Giza district.
- El Dokki district.
- El Agouza district.
- El Omrania district.
- El Haram district.
- Boulaq El Dakroul district.
- El Waraq district.

North Giza which is the scope of this study, lies mostly in Imbaba Markaz. The main city in Imbaba Markaz is Monshaat El Qanater city. The Markaz encompasses several villages which are listed below and most of them lie in the northern region of the governorate, the new route of the project is passing across El Qatta village which is one of the village of Imbaba Markaz as listed below:

- El Koum El Ahmar.
- Bashtiel.
- El Akhsas.
- Shenbary.
- Gezzieret Mohamed.
- Baharmas.

- El Qatta.
- El Sad.
- El Manashy.
- El Mansouria.
- El Baragil.
- El Galatma.
- Bartas.
- Kafr Hegazy.
- El Qartein.
- Tanash.
- Abu Ghaleb.
- Wardan.
- El Omal city.
- El Tahrir city.
- Ard El Haddad.
- El Waraq El Arab.
- Ezbet El Mofty.
- El Mounira EL Gharbia.
- El Mounira EL Sharqia.

Infrastructure Accessibility

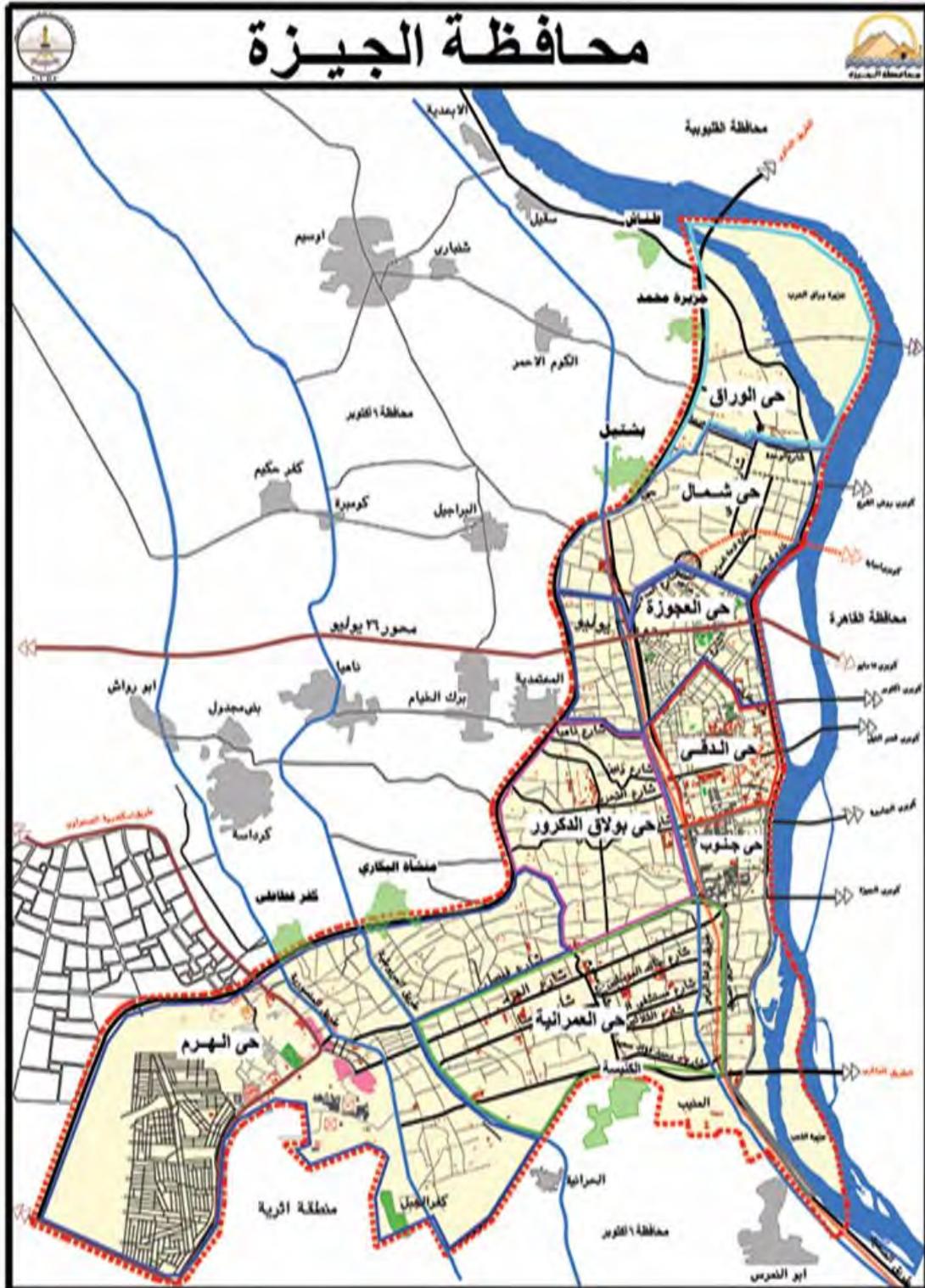
Giza Governorate has benefited from good infrastructure services due to its proximity from the Capital. If we compared Giza with other governorates, Giza has good facilities and infrastructure services such as housing, roads, potable water, sewage system, as well as electricity.

The number of housing units in Giza governorate is 12003 units in total. There are different types of housing in Giza Governorate based on the statistics of 2000, the majority of these units are built by the governmental sector (9674 units), it varied between low cost housing (1110 units), economic housing (7975 units), and the average cost of housing reached up to (589 units). The remaining housing units are constructed by the private sector (2329 units). (Source: Ministry of Housing, Utilities and Urban Communities, 2000).

Total lengths of paved roads (main roads)	2034 km
Total population per every paved road	2560 people/km road
Total lengths of dusty roads	200 km

Source: Genral Authority for Roads and Bridges, 2000.

The following map shows Giza Governorate.



Access to Electricity

The following table describes the total number of beneficiaries from the electricity service which is used mainly for lighting.

	Urban	Rural	Total
Consumed Electricity for lighting	3072 Million k.w.h/ year	423 Million k.w.h/ year	3495 Million k.w.h/ year
Consumed Electricity for Industrial use	1488 Million k.w.h/ year	17 Million k.w.h/ year	1505 Million k.w.h/ year
Consumed Electricity for lighting per capita	1091 Million k.w.h/ year	177 Million k.w.h/ year	671 Million k.w.h/ year

Source: Ministry of Electricity and Energy, 2000

Source of Potable Water

The following data are obtained based on the statistics of 2000, it includes also the new cities within the governorate.

	Urban	Rural	Total
Total amount of produced potable water	1472 thousand m3/day	235 thousand m3/day	1707 thousand m3/day
Total amount of consumed potable water	1264 thousand m3/day	165 thousand m3/day	1429 thousand m3/day
Total amount of produced potable water per capita	449 thousand m3/day	69 thousand m3/day	274 thousand m3/day
Total amount of consumed potable water per capita	523 thousand m3/day	98 thousand m3/day	328 thousand m3/day

Source: Ministry of Housing, Utilities and Urban Communities, 2000.

Sanitation

The following data is based on the statistics of 2000, it includes also the new cities within the governorate.

	Urban	Rural	Total
Total capacity of sewage	1071 thousand m3/day	930 thousand m3/day	2001 thousand m3/day
Total capacity of sewage per capita	380 thousand m3/day	389 thousand m3/day	384 thousand m3/day

Source: Ministry of Housing, Utilities and Urban Communities, 2000.

Human Development Profile

Education

In Giza there are around 2067 schools and sections in the general education, out of them there are 1208 schools at urban areas and 859 in rural areas. These schools are enrolling (1258.4) thousand students that are distributed to (756.9) thousand students in the urban areas and (501.5) thousand students in the rural ones. The percentage of females out of these numbers represents 47.3% in total, distributed to 48.7% in urban areas and 45.2% in rural areas. In the Azharian education sector, there are 216 Adzharian institutes, distributed to (80 institutes in urban areas) and (136 institutes in rural areas). These institutes are enrolling (66.2 thousand students), 26.1 thousand students in urban areas and 40.1 thousand students in rural areas. Moreover, there are also around 27 faculties as well as 26 institutes enrolling 170 thousand students, out of them ' the females are representing 45.1%.

	Males	Females	Total
Targeted number of illiterate people	36.4 Thousand people	60.4 Thousand people	96.8 Thousand people
Those who are enrolled in literacy classes	20.4 Thousand people	25 Thousand people	45.4 Thousand people
The percentage of the enrolled to the targeted	55.9%	41.55	46.9%

Source: General Agency for Literacy and Adult Education, 2000.

Health

There are different health services and facilities inside Giza Governorate. There are (48) hospitals which are managed by the government as well as (194) private hospitals. The statistics of 2000 have shown that the new born mortality rate is 5.1 deaths/ 1000 live births. The infant mortality rate is 51 deaths/ 1000 live births, and the mortality rate for under- five children is 26 deaths/ 1000 live births.

Work Status

The percentage of those who are working compared to the total population of Giza is 25.95 in urban areas and 23.5% in rural areas. The following table is illustrating the number of

people who are at labor force in Giza Governorate. The majority of the employed people are working in the industrial sector and tourism sector.

	Urban	Rural	Total
Labor force for the age category (15-64) years	728 Thousand people	562 Thousand people	1290 Thousand people
Employed	689 Thousand people	546 Thousand people	1235 Thousand people
Unemployed	39 Thousand people	16 Thousand people	55 Thousand people
Percentage of labor force to total population	25.9%	23.5%	24.8%
Percentage of unemployment to total labor force	5.45	2.8%	4.3%

Source: Central Agency for Population and Mobilization And Statistics, 1999.

Agriculture

The total cultivated areas in Giza according to the statistics of 2000 are 190.1 thousand Egyptian Acres. The percentage of the cultivated areas to the total area is 6.1%, and the total cropped area is 430.2 thousand Egyptian Acres. The main crops in Giza Governorate are the wheat, maze and sesame. The following table illustrating the total cultivated area for each crop as well as the productivity of each crop.

Crop	Total cultivated area in thousand Egyptian Acres	Productivity of each crop	Productivity	
			In Giza	In Egypt
Wheat	28.4	590 thousand measure	20.8 measure/acre	17.8 measure/acre
Maze	62.6	225 thousand measure	3.6 measure/acre	3.36 measure/acre
Sesame	1.788	0.911 thousand measure	0.510 measure/acre	0.509 measure/acre

Source: Ministry of Agriculture and Lands Reclamation, 2000.

Economic Welfare

Giza is considered an agricultural and an industrial governorate at the same time where there are food industries, spinning and weaving, chemical industry and metal and mining industries. It has one of the biggest industrial zones in Egypt at an area of 1000 ares lies along the Cairo / Alexandria Desert Road, which includes giant industrial companies.

Moreover, there will be new industrial zones which are underway to be constructed and operated such as:

- El Korimat Industrial zone in Atfieh Markaz which lies close to the raw materials of maple industries and making bricks.
- Tahma Industrial zone in Aiat Markaz which is suitable for starting up small and medium enterprises.
- El Saf industrial zone which is specialized in producing refractories.
- Berqash industrial zone which is specialized for food industries.

There are around 2341 industrial establishments in Giza employing 153,311 laborers as well as 1678 vocational workshops employing 3050 laborers of different jobs.

The following table illustrates the number of industrial establishments which represent different sectors.

	Industrial establishments	Number of employed people
Food, drinks and tobacco	512	38677
Textiles, clothing and leather	342	24209
Wood and wood products, upholstery	150	4318
Paper & its products, printing and publishing	167	4195
Basic chemicals and products	325	20057
Materials and Chinese ceramics and refractories	250	17598
Basic metal	53	5254
Metal products and machinery and transport equipment	528	38714
Other manufacturing industries	14	289
Total	2341	153311

The total number of vocational workshops is 1678 workshops that are employing 3050 laborers. The workshops are mainly in the sectors of metal products and wood and cork production as well as textiles.

Tourism is considered the primary source of income for Giza Governorate and for Egypt. There are around 61 hotels and resorts in Giza Governorate, the total number of tourism nights in 2000 reached up to 2257 thousand nights (Ministry of Tourism, 2000).

According to EHDR of 2004, Giza Governorate and its Markazes have been ranked number (10) in Human Development index. The real Gross Domestic Product (GDP) per capita is 4613.1 EGP in Giza Governorate, which means it lies in the middle comparing to the poverty line.

The economic level of most of the residents is in the middle except those who are living in Giza city which are comparatively high. The number of people who benefited from the Safety net schemes which has been offered to the people of Giza in 2000 reached up to 42413 cases, who received 12347 EGP. The amount of consumed subsidized flour which is used mainly for baking subsidized bread reached up to 4707 thousand ton in 2000 (Ministry of Food supplies and Foreign Trade, 2000).

5. Potential Environmental and Socio Economic Impacts

The assessment of potential impacts has been done through analyzing different project activities and envisaging possible changes to the environment. Each potential impact was qualitatively analyzed to classify its significance to three degrees: major impacts, medium impacts and minor impacts¹¹. Major impacts are impacts with a reasonable likelihood that is likely to cause violation of applicable standards. Medium impacts are impacts with a reasonable likelihood that are likely to cause violation of applicable standards only in combination with the impact of other sources. Minor impacts are impacts which are not likely to cause violation of applicable standards whether on its own or in combination with other sources. The likelihood of each impact has been qualitatively evaluated to two degrees: highly probable and low probable.

An Environmental and Social Management Plan (ESMP), presented in Chapter 7, includes mitigation measures that minimize the negative impacts using available technologies and managerial procedures.

5.1 Impacts during Construction Phase

5.1.1. Impacts of Construction Waste

Construction waste is expected to be limited in amount. The excavation of soil for fixing of steel towers will generate very little amount of soil that will be filled back in the hole for support. The total of approximately 50 steel towers for interconnection line of Giza North/Ashmoun substation (around 15 km length) and 160 steel towers for interconnection line of Giza North/Samalout 500 and Giza North/Cairo 500. Other types of construction waste could include trimmings of steel, tiling materials, concrete, etc, in addition to wasted or faulted materials of the towers, conductors, insulators, etc.

The domestic wastes (wastewater and solid waste) generated are relatively small as only small number of workers will be employed during the construction. As the location of the site is in agricultural lands (100% for Giza North/Ashmoun OHTL and around 50% of Giza North/Samalout 500 and Giza North/Cairo 500) and empty lands (desert area) for the rest of the OHTL of Giza North/Samalout and Giza North/Cairo 500. As the site does not have any access to municipal network, the onsite conventional wastewater treatment is proposed to be installed. In the other hand, domestic solid waste generated will be managed by the sites under the construction supervisor. However, the management of construction wastes along the transmission lines will include mitigation measures to collect and store waste on-site and in disposal sites to ensure that disposal is undertaken in a safe and environmentally acceptable manner.

¹¹ According to EEAA EIA Guideline, January 2009

Impact Significance

The effects of improper disposal of conventional construction waste depend on the aesthetic value, and the drainage characteristics of the disposal site. Because of the uncertainties about these factors, this impact has been classified as medium significance. By implementing the mitigation measures recommended in the ESMP, including adequate disposal of construction waste, the impact significance could be reduced to minor impact.

5.1.2. Limitations of Land Use and Risks of Involuntary Resettlement

As discussed in chapter 2, the Electricity Law No. 63 of the Year 1974 has identified the limits of distances to be measured from the axis of the OHTL routes as well as the underground cables in order to identify the Right Of Way (ROW) zone. There will be possible effects of electromagnetic fields from the OHTL, which will create certain restrictions on some land uses under the power lines. A ROW of 13 meters for OHTL (of 220 kV) and 25 meters for for OHTL (of 500 kV) will be kept as a buffer zone for maintaining the public safety from electric hazards and high exposure to EMFs.

The ROW zone as identified by the Electricity Law No. 63 of the Year 1974 will restrict having new buildings and plantation of trees on the route in order to maintain the safety of the line; therefore in case of OHTLs, there will be a limitation on agriculture crops such as wheat- maze- citrus fruits-potatoes and clover as well as trees plantation.

The type of affected lands vary from an area to another as follows:

- Giza North/Ashmoun OHTL total of 7200 m² affected lands are all agricultural lands.
- Giza North/Cairo 500 OHTL total of 31600 m² affected lands are 50% agricultural lands and 50% uninhabited areas. It will cross both Nassery and Behairy Nile sub-branches as well as the railways. The permissions from the Irrigation and the Railways Departments are almost obtained. For the rest of the affected lands, there are no available figures about the exact numbers of the owners of these lands. During the scoping phase it was not clear whether the lands are possessed by individuals or state owned lands. However, before the start up of the project a field survey should be conducted in order to identify who are the owners of these lands along the targeted areas and to identify their actual number.
- Giza North/Samalout 500 OHTL is moving in parallel with Giza North/Cairo500 interconnection crossing 50% agricultural lands and 50% un-inhabited areas. The followed procedures as mentioned above will be conducted in parallel with the Giza North/Cairo 500.

None of the local people have managed to identify the number of the people who own these agricultural lands between each site. However, the stakeholders claimed that the agricultural farmlands possessed by individuals within the governorate are characterised of being very small.

The interconnection between Giza North/Ashmoun

The OHTL between Ashmoun and Giza North Power Plant will pass across Abu Awaly village and part of Ashmoun city. According to the statistics obtained from the Information Center of Ashmoun, The possession of the agricultural lands in Asmoun city is as follows:

- Those who possess a land less than one Egyptian Acres are: 2220 persons
- Between 1-3 Egyptian Acres are: 768 persons
- Between 3-5 Egyptian acres are: 150 persons
- Between 5-10 Egyptian Acres are: 66 persons
- Between 10-20 Egyptian Acres are:21 persons
- Between 20-50 Egyptian Acres only: 7 persons

While in Abu Awaly village, they are as follows:

- Those who possess a land less than one Egyptian Acres are: 411 persons
- Between 1-3 Egyptian Acres are: 375 persons
- Between 3-5 Egyptian acres are: 33 persons
- Between 5-10 Egyptian Acres are only : 5 persons

Giving that the majority of people in Ashmoun city and Abu Awaly village possess lands less than one Egyptian Acre and assuming that the majority are possessing 2100 m²; therefore, the expected number of affected persons in the area between Ashmoun and North Giza will be estimated as follows ($7200 \text{ m}^2/2100 \text{ m}^2= 3$ persons). It is anticipated to have approximately 3 affected persons who should be compensated in satisfactory ways.

The interconnection between Giza North/Cairo 500

As indicated above, assume that the majority of people are possessing 2100 m². Therefore, the expected number of affected persons in the area between Cairo500 and Giza North 500 will be estimated as follows: ($31600 \text{ m}^2/2100 \text{ m}^2= 15$ persons). It is anticipated to have approximately 15 affected persons who should be compensated in satisfactory ways.

The interconnection between Giza North/Samalout

Assuming that the majority of people are possessing 2100 m²; therefore, the expected number of affected persons in the area between Giza North/Samalout 500 will be estimated as follows ($32400 \text{ m}^2/2100 \text{ m}^2= 15$ persons). It is anticipated to have approximately 15 affected persons who should be compensated in satisfactory ways. However, there is a possibility that the affected land at both Giza North/Samalout 500 and Giza North/Cairo 500 are the same.

The total expected number of affected persons from the three interconnections= 33 persons (assuming that the lands that will be possessed for installing the OHTLs of both Giza North/Samalout and Giza North/Cairo 500 are not owned by the same person).

It is essential before the start up of the project to carry out a field survey in order to identify the number of land owners and farmers who will be affected as a result of constructing the towers of the OHTLs. Moreover, the area and the type of lands should be identified as the price will differ accordingly.

The farmers and land owners have to be compensated for having the footing of the OHTL constructed on their lands. The number of affected people may be more or less than the estimated number. Therefore, it is essential before the start up of the project to carry out a field survey in order to identify the actual number of the land owners and farmers who will be affected as a result of constructing the towers of the OHTL.

There will be possible effects of electromagnetic fields from the transmission lines that will create certain restriction on some land uses under the transmission lines. A certain area under the OHTL will be kept as a buffer zone (25 meters for 500 kV power line and 13 meters for 220 kV power line) for maintaining the public safety from electric hazards and high exposure to EMFs.

The ROW zone as identified by the Law will restrict having new buildings and plantation of trees on the route in order to maintain the safety of the line; therefore there will be a limitation on agriculture crops such as wheat- maze- citrus fruits-potatoes and clover as well as trees plantation. The habitats of nesting birds should be identified first before any construction to take place in order to avoid the demolition of these habitats.

There are no direct effects related to power lines to animals passing under them nor to birds flying above them; therefore, the construction of power lines is unlikely to cause any limitations on grazing activities or effect on the birds' migration.

Location of power lines will be most suitable to be found on sides of existing rural roads to facilitate access to these lines for construction and maintenance. The land use limitations for power lines along roads are not expected to be an issue of concern.

It was observed during the field survey that there are some buildings were found built on the agricultural lands. The representatives of the company confirmed that the route of the power line has been identified and planned to be away from these lands and buildings. The company representatives think it will be much easy for them to convince those landlords or tenants as this project is considered one of the public benefit projects. However, it is important to compensate those squatters in accordance with the WB OP 4.12. In order to avoid any physical involuntary resettlement and land acquisition, efforts will be made to avoid setting any of the projects components on citizens owned land, and to find several alternatives and options for the power line route before the start up of the projects. It is also essential to obtain the consent of people about each proposed route.

During consultation, people stated that in previous projects implemented by MoEE, they were compensated for their lands and other possessed properties through a valuation Committee that was formed, with the membership of (a representative of Ministry of Agriculture and Land Reclamation- a representative from the local agricultural cooperative- a representative of the Egyptian Survey Authority- a representative of the Governorate/ Markaz/ village- and representatives of the Local Popular Council- local natural

leaders). They also claimed that before reaching an agreement on the amount of compensation, several negotiations took place.

The average price for the agricultural land is estimated to be 250 thousand EGP/ Egyptian Acres; however, this price varies according to the type of the land and the types of the cultivated crops. On the other hand, the average price for the construction lands vary according to the location. Nowadays, the market average prices for building lands estimates between 1000- 2500 EGP per square meters

Impact significance:

For the construction of the towers for the OHTL along the routes to and from each substation, there will be an affected land due to these constructions, it is estimated about (7200 m²) for Giza North/Ashmoun, and about (64000m²) for both Giza North/Samalout 500 and Giza North/Cairo 500. The construction will affect the plant growth in the agricultural lands along the way as well as affect the buildings constructions. Therefore, the significance of this impact is medium as it has a direct influence on the livelihood of people.

The potentials of having any involuntary resettlement are minor as the affected lands in each of the targeted areas for project constructions are scattered lands. Those citizens who own lands along the way will be entitled to proper compensation schemes.

5.1.3. Loss of Environmental Benefits of Trees along the Power Lines

Tree removal is necessary within the ROW zone which is 13 meters for the high voltage electricity power (220 kV) and 25 meters for the ultra high voltage electricity power (500 kV). The removal of trees (if found) will require compensations. The compensations have to be matched with the loss to the environment that is created by removing these trees. The EETC will have to substitute the removed trees. The ROW will also limit trees plantations along the transmission lines during operation, especially tall trees, in order to maintain the safety of the lines.

The consultations revealed that there will be around (9000) trees that will need to be removed within the targeted areas for constructing the OHTLs in the specified routes, estimated as follows:

Assuming that there are 5 meters distance between each tree, it is estimated to have around (15000) trees which will be affected within the expected affected land.

- 1) Giza North/Ashmoun 220 kV OHTL with length about 15 Km: 15000 meters/5 meter= 3000 trees
- 2) Giza North/Cairo 500 500 k OHTL with length about 30 Km (50% are cultivated lands): 15000 meters/5 meter= 3000 trees
- 3) Giza North/Samalout 500 from Cairo 500 S/S side and extending it with a length of 30 km to Giza North Power Plant (50% are cultivated lands): 15000 meters/ 5 meter= 3000 trees

The compensations for trees will vary according to the type of tree. The EETC will only be responsible for the compensation; however, as the EETC is not responsible for replanting trees, it will be the responsibility of local municipality, Agricultural cooperatives, local NGOs as well as individuals.

Identifying the value of the removed trees should be through the valuation and compensation committee that has to consider that the prices of trees vary according to its type, length, and age.

The following table can be used as guidance for the compensations, it describes the average prices of the different types of fruit trees:

Table 5.1. Average Price of the Different Type of Trees

Name of tree	Length	Price according to length
Orange all types	80 cm- 1 m	4.5 EGP
Mandarin all types	80 cm- 1 m	4.5 EGP
Apples (American)	1 m	6 EGP
Peach	1 m	6 EGP
Apricot	1 m	6 EGP
Mango (Egyptian)	1 m	8 EGP
Mango (Imported types)	1 m	12 EGP
Pomegranate (Egyptian)	1 m	5 EGP
Pomegranate (American)	80 cm	15 EGP
Grapes	3 m	40 EGP
Grafted grapes	50 cm	9 EGP
Figs	1 m	9 EGP
Guava	1 m	5 EGP
Plums	1 m	15 EGP
Pears	1 m	9 EGP
Dates palms (Saudi)	1 m	300-400 EGP
Dtaes palms (Egyptian)	1 m	80 EGP
Bananas	1 seedling	11 EGP
Olives	1 m	2-8 EGP according to each type

Obtained from: Egypt Green plant nursery.

Table 5.2. The average prices of the street and garden trees:-

Name of tree	Length	Price according to length
Ficus	1-2.5 ,	12-45 EGP
Poinciana rigia	1-2.5 m	35-50 EGP
Jacaranda acutifolia	1-2.5 m	35-70 EGP
Khaya senegalensis	1-2.5 m	50-100 EGP
Eucalyptus(Cinnamomum camphora	1-2.5 m	50-100 EGP

Obtained from: Egypt Green plant nursery.

Impact significance:

Removing the trees will have a negative impact on the environment as well as on the owners of these trees. In order to reduce the negative impact on the environment, any removed tree should be substituted by planting other trees in other areas away from the ROW by the EETC and local stakeholders. The compensation for the owners of these trees should also take place in order to minimize the significance of the impact.

5.1.4. Impacts on Air Quality

The excavation, filling, loading and unloading of soil cause suspension of airborne dust that raises the particulate matter concentration on ambient air. These emissions are temporary and its severity depends on the construction activity, meteorological conditions, silt content of the soil and moisture content of the soil.

Excavation works expected for fixing line transmission towers are very limited as the steel towers, will depend for its support on undisturbed soil, so the excavation will be for a very limited area around the pole. Also excavation for footings of steel towers and excavation works for constructing substations will be in a very limited area that is not likely to cause major dust emissions.

Another source of air emissions during construction is the exhaust emissions of construction machinery. The extent of these emissions depends on the number of machinery working at the site at one time, the type and efficiency of the engines and also the climate conditions.

Impact Significance:

The assessment of air quality for Giza North/Ashmoun, Giza North/Cairo 500 and Giza North/Samalout 500 interconnection lines will be done after the submission of the draft report. The limited excavation works make the expected dust emissions from construction works insignificant. Also, the project construction is not expected to employ intensive machinery input, therefore there will be very limited air emissions/smoke from such machinery. Furthermore, the low population density that characterizes rural areas will make it unlikely to cause adverse effects to any sensitive groups, or to cause cumulative impacts with other sources. Therefore this impact has been classified as minor impact. It has been recommended, in the ESMP, to apply water spraying if there were significant dust emissions.

Excavation works expected for fixing line transmission towers are very limited as the steel tower will depend for its support on undisturbed soil, so the excavation will be for a very limited area. In addition, excavation works for constructing substations will be in a very limited area that is not likely to cause major dust emissions. The mitigation measures is been prepared to minimize the dust emission, especially at the uncultivated empty land.

Another source of air emissions during construction is the exhaust emissions of construction machinery. The extent of these emissions depends on the number of machinery working at the site at one time, the type and efficiency of the engines and also the climate conditions.

5.1.5. Raising Noise Levels

Normally construction works include noisy activities related to the operation of construction machines, possible hammering and drilling works in addition to the noise generated from construction related trucks. The noise impacts could be analyzed in two main aspects: noise inside construction area, and the noise in the neighboring sites.

During construction, it is expected to generate noise during the day and night. There are no residents' receptors close to the project site along the transmission route. The route at Ashmoun substation will not pass through the population but the agriculture lands.

Impact Significance:

Construction noise is not likely to effect neighboring areas because of the expected low level of noisy machinery input from one hand, and the low population in rural areas of the project site from the other hand. For noise within the construction site, it is possible that construction workers could be exposed to relatively high levels of noise for short periods. This could be mitigated through application of the normal precautions normally taken by construction labor. Accordingly this impact has been classified as a minor impact which could be further minimized if construction workers used safety gear as recommended in the ESMP.

5.1.6. Impacts on Traffic

Construction of transmission lines could cause two main impacts to traffic: the first is by narrowing of roads or occupation of one or more traffic lanes by stored construction materials or construction waste. The second is by increasing traffic volumes on rural access roads by construction vehicles and machinery that are expected to pass through.

Narrowing of roads and increasing traffic volume impact the efficiency and the average speed of these road, this impacts are proportional to degree roads are narrowed and to the amount of extra traffic volume.

Impact Significance

Most of the transmission lines will be established on agriculture lands and empty lands in rural areas where there will be plenty of space for storage of construction materials and construction waste on sites, therefore there will be very little possibilities that construction contractors will actually need to store materials on road lanes. Furthermore, the extra traffic caused by construction vehicles is not expected to impact the flow of traffic on rural roads because the average traffic volume on such rural roads is usually less than the designed flow.

It has been recommended in the ESMP that storage of construction materials, wastes, and equipment should be on road sides without any occupation or narrowing of traffic lanes. In case secondary roads in villages will be occupied by construction machinery (for loading-unloading or temporary parking) alternatives access routs for villagers should be facilitated. The number of the expected plants to be affected (if any) due to the machinery movement

has to be compensated as well. The impact significance has been classified as medium and can be minimized to minor.

5.1.7. Impacts on Fauna and Flora

There are no protected areas for the conservation of Fauna and Flora located on, or in the vicinity of, the project area. The proposed site itself and the surrounding lands are cultivated and much of the area is dominated by common cultivars. Given that the potential impacts of construction and operation on the transmission lines likely to be localized and good site management practices will be implemented, no significant effects are predicted.

Impact Significance

According to the recorded species; no endemic or threatened species were documented during this study. On the other hand the investigated habitats are not unique, but very common and widespread in neighboring areas which provide alternative habitats for the sympatric faunal species to move to these habitats and continue their life cycle. The impact significance has been classified as minor.

5.1.8. Impacts on Groundwater, Geology and Hydrogeology

The pathway of the power lines run through Nile Delta Aquifer and partially the Moghra Aquifer and the OHTL do not have any impact on ground water resources. According to the baseline studies, the groundwater in such area exists at a depth of 15 m which is far away from the expected depth of excavation for the tower's footings. The power lines does not hae any impact on groundwater, geology and hydrogeology.

Impact Significance:

The impact significance has been classified as Minor.

5.1.9. Impacts on Natural Disaster Risks

An assessment of the risks to the transmission lines from seismic activity has concluded that given the engineering measures incorporated into the design of the towers and its stability, the potential environmental impacts of a seismic event during the operation are not anticipated to be significant. Reference is made to Chapter 4, where the locations of earthquakes recording stations in the delta area are inactive. Recently no earthquakes even of low intensity were recorded throughout the pathway of the pipeline.

Impact Significance:

The impact significance has been classified as Minor.

5.1.10. Affecting the Culture and Privacy of Local Communities

The EETC is normally constructing such projects through specialized construction companies working in the field of energy. Therefore, local communities are expected to be

exposed to openness and interaction with the outsiders of the project crew and workers during the construction phase. This is not a significant concern in urban areas. However, in the conservative rural areas this may affect the local people's cultural privacy.

Impact significance:

This is expected to be a minor and temporary impact. In order to mitigate that effect, it has been recommended in the ESMP to maximize the use of local labor to reduce such impact and to maximize the benefits to the local communities.

5.1.11. Creation of Job Opportunities and Flourishing Economies of Construction Sites

As stated by the representatives of the electricity companies, it is cheaper for the company to find local workers from each community in order to save the costs of transporting workers from outside. The workers who are needed for such construction works are those with low and medium skills, who represent a high proportion of the residents in the targeted areas.

The construction phase will increase the demand on different consumables such as food and drinks by the workers. This is expected to increase business demand on different service providers especially food sellers, owners of coffee shops and barbers.

On the long run and during the operation of the project, the improved electricity service inside the community will participate in increasing production and job creations especially in rural areas, particularly in commercial activities, workshops, small industries and other economic activities.

The improved service will help in better operation for electrical appliances and machineries; therefore will allow more working hours inside the existing economic activities in the targeted communities as well as creating new job opportunities.

Impact significance:

The job opportunities that are offered during the construction phase represent a temporary high positive impact as it will add to the benefits of local communities from the project.

Finding job opportunities whether temporary or permanent is the main concern of the local people. Once this is achieved, it will boost the people's sense of ownership towards the project.

Moreover, finding permanent job opportunities is a long term positive impact. It represents one of the most important impacts as perceived by the local people.

5.1.12. The misconceptions and its potential impacts on the reaction of local people

During consultations with local people and representatives from Ashmoun and North Giza areas, the likelihood of having conflicts is rare as the majorities of the local people are well educated and they deal with each others peacefully.

Although conflict is not significant in both targeted areas, the EETC should work on raising the awareness of local people on the benefits of the project to their community in order to avoid emerging any conflicts that may affect the project.

In order to avoid raising any misconceptions, the EETC has to explain to the local people that choosing any particular piece of land was based on technical requirements and specifications.

Impact significance:

The potential for conflicts and misconceptions to occur is low; however, in order to avoid any misconceptions that may arise, it is important to raise the awareness of local people about the importance of the project and the benefits that it will add to their lives. In addition, people have to be aware of the safety measures that need to be applied during the construction of the project. The impact significance is ranked as medium.

Table 5-3: Assessed Significance of Expected Impacts during Construction Phase

Impact	Likelihood and severity	Significance	Mitigation Measures Effects
Handling of construction waste	Uncertain likelihood for medium impact	Medium	Reduce impact significance to minor
Limitations on land use and risks of involuntary resettlement	Generally low likelihood for power lines	Medium	Reduce impact significance to minor following recommendations of RPF
Losing environmental benefits of trees along power lines	Low likelihood of major or medium impacts	Minor	Minimizing impact significance
Construction air emissions	Low likelihood of major or medium impacts – high likelihood of minor impact	Minor	Minimizing impact significance – only needed in loose sandy soil
Construction noise	Low likelihood of major or medium impacts – high likelihood of minor impact	Minor	Minimizing impact significance
Impacts on traffic	Low likelihood of major or medium impacts	Medium	Reduce impact significance to minor following recommendations of RPF
Impacts on Fauna and Flora	Low likelihood of major or medium impacts – high likelihood of minor impact	Minor	Minimizing impact significance

Impact	Likelihood and severity	Significance	Mitigation Measures Effects
Impacts on Groundwater Resources	Low likelihood of major or medium impacts	Minor	Minimizing impact significance
Natural Disaster Risks	Low likelihood of major or medium impacts	Minor	Minimizing impact significance
Affecting the culture and privacy of local communities	Low likelihood of major or medium impacts	Minor and temporary	Minimizing impact significance
Creation of Job Opportunities and Flourishing Economies of Construction Sites	High Positive Impacts	High and temporary	
The misconceptions and its potential impacts on the reaction of local people	Uncertain likelihood for medium impact	Medium	Reduce impact significance to minor

5.2 Impacts during Operation Phase

5.2.1 Risk of Scrap and Hazardous Waste

There shall be different types of wastes generated during the operation phase resulting from maintenance, repair and replacement activities. Among these types:

- Scrap transformers, which raise two main environmental risks, the first is that used mineral oil is considered a hazardous waste, and the second is the relatively large volume and heavy weight of wasted transformers which require special arrangements for temporary storage. It is worth noting that the EETC will not include installation of transformers that are cooled with PCB containing oil; it has been emphasized in the ESMP that the procurement policy should include instructions to screen out such transformers from the project.
- Wasted cables that will be replaced. Some of these cables may be covered with PVC insulators, which, if burned, cause harmful emissions including dioxins. Accordingly, waste cables could be of high risk if PVC cables were disposed in open dumps where it could be exposed to open fires.
- Scrap inverters, panels, fittings, insulators, cross arms, conductors, and other scrap which are expected to be from inert materials that does not cause high risk in disposal/recycling procedure.

Impact Significance:

Non-hazardous waste, which include types that are mentioned in the last point above are associated with relatively low environmental risks, however, the quantitative aspects could be an issue. Because there could be large quantities of such scrap, certain waste management procedures should be taken to avoid situations where scrap occupies large areas of land and causes aesthetic and land-use impacts. Therefore the ESMP includes measures for establishing temporary stores for scrap at project sites and keeping the tidiness and cleanliness of these stores until scrap is sold for recycling or disposed as shall be detailed in the ESMP. The ESMP includes measures for waste minimization and waste management that could reduce the impact to be of a minor significance.

The common practice for such substation in Egypt is that the non hazardous wastes including scraps and replaced cables are stored at the open insulated area and its send to specific factories for recycling purposes periodically (every 3-6 months).

5.2.2 Safety Along the Transmission Lines

There are two main safety risks associated with the operation: electric shock risks and fire risks. Electrocutation could happen for maintenance operators during repairs or to the general public because of unforeseen accidents; however the normal safety precautions that are followed in the design and construction of transmission lines, transformers, substations, etc are generally minimizing such risks both to the general public and to the maintenance workers.

Fire risks could be due to connection of transmission lines to vegetation, an issue which have been previously discussed in the impacts of construction phase and it was mentioned that power line routing will avoid, as much as possible, fields having high trees, and that trees will be removed from the ROW zone of transmission lines. Another factor which could cause fires is overloading of transmission lines, a risk that is also minimized by adequate safety precautions in the design and operation of the system.

Impact Significance:

Although electrocution accidents and fires could lead to losses in lives and properties, it is believed that the normal design, construction and operation procedures expected to be followed by the EETC will provide sufficient safety precautions so that accidents will be due to unforeseen factors that could not be considered in risk estimation. The impact has been classified as medium impact that could be reduced, following mitigation measures, to minor impact.

In addition, regarding the safety issues, EETC periodically provide the specific trainings for the operators and the workers at the substation. The training obtains include the civil protection, fire fighting and smoke detection, besides the operation and maintenance of the substations and its equipments. The map of the emergency plan in case of fire accident is also provided.

However, although EETC is already taking precaution for its operator and workers for safety standard, the ESMP is designated to minimize the impact of such accident. It is also worth noting that at Cairo 500 substation that has been established since 1964 there are no recorded accidents at the substation and its interconnection lines.

5.2.3 Effects of Electromagnetic Fields

Energized power lines and underground cables generate electromagnetic fields around the conductors, the intensity of such fields are proportional with the line voltage and electric current which changes in strength over time as the demand for electricity fluctuates. So the only way to know how strong the field is at a given distance, at any particular moment, is to measure it with a magnetic field meter.

There are some concerns that EMFs could cause health impacts to the general public by prolonged exposure. EMFs have been considered by the International Agency for Research on Cancer (IARC) as possible carcinogenic, this classification was based on some evidences; however, there is no agreement among the scientific community about certain effects of EMFs. Nevertheless, the weak evidence has led some legislation bodies and international organizations to put some standards regarding exposure to EMF. The International Commission on Non-Ionizing Radiation Protection (ICNIRP), a non-governmental organization formally recognized by the World Health Organization, has set guidelines exposure limits for public and occupational exposure to EMF as indicated in Table 5-4¹².

Table 5-4: ICNIRP Guidelines for EMF public and occupational exposure

Frequency	Public Exposure		Occupational Exposure	
	Electric Field (V/m)	Magnetic Field (mG)	Electric Field (V/m)	Magnetic Field (mG)
50 Hz	5,000	1,000	10,000	5,000
60 Hz	4,150	830	8,300	4,150

Magnetic fields have been measured next to a typical 500 kV OHTL Abu Za'bal/Suez and 220 kV OHTL at New Cairo/Gulf of Suez provided, in order to come up with representative values to compare to the guideline exposure limits. Tables 5-5 summarize the typical measured values for magnetic fields at different distances from the centerline of the OHTLs.

Table 5-5: Typical measured magnetic fields next to 500 and 220 kV OHTL

Public Exposure		Magnetic field in mG at distance from centerline			
		0 m	100 m	200 m	500 m
Recorded Values	220 kV	17	2.8	1.9	0.5
	500 kV	140	20	14.5	3.9

Although the comparison between the measured values (Tables 5-3) and the ICNIRP Guidelines (Table 5-4) may not be highly accurate because the exposure time is not considered in the comparison, the indication given from the average magnetic field readings that they are far below the safe exposure limits identified by ICNIRP both for public

¹² Source: ICNIRP (1998): "Guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz).

exposure and occupational exposure. Typically, a hair dryer produces a magnetic field of 70 mG when measured one foot from the appliance. A television produces approximately 20 mG measured at a distance of one foot.

In order to maintain safety of the general public and minimize exposure to EMFs some laws and guidelines require maintaining a suitable ROW distance so that the EMFs would effectively attenuate at the edge of this ROW. As mentioned in Chapter 2, The Egyptian electricity law No. 63/1974 indicates that the guidance ROW distance for transmission lines is 25 meters from each side for very high and 13 meters for high voltages.

In addition to the OHTL measurement, the 220 kV existing substation at 10th of Ramadhan city (representing 220/66 Substation) and Cairo 500 (representing 500/220 kV Substation) had been measured. The result is presented at Table 5.6.

Table 5.6. Magnetic Field Measurement for 220 kV and 500 kV Substation

Area	Substation of 220 kV	Substation of 500 kV
	Magnetic Field (mG)	Magnetic Field (mG)
Inside the transformer site	28.5	37
Beside the working transformer	43	46
Inside the building (control panels)	30.4	30

Impact Significance:

The ICNIRP has set a guideline figure that public exposure to EMF should not exceed 830 mG and occupation exposure should not exceed 4,150 mG, these figures for electric fields are 4.2 and 8.3 kV/m for public and occupational exposure respectively. By fixing a ROW distance of 13 meters (for 220 kV OHTL) and 25 meters (for 500 k OHTL) the impact of EMFs on the inhabitants is expected to be ineffective.

According to the measurements of the magnetic field at the existing power line and substation, the magnetic fields are far below the guideline figure. However, by maintaining the right ROW the EMF exposure will be minimized.

5.2.4 Risks of soil contamination

Risk of soil contamination is not associated with the transmission lines operation phase. The possible risk is at the substation during the changing of the transformer oil that usually takes place typically every five years.

The possibilities of contaminating the soil during oil change or caused by land disposal of used oil are not high. The severity of such impact will depend on the local conditions where the oil is released and whether contaminants migration would be likely to reach sensitive receptors, but in general, the amounts of transformers oils is a relatively little amounts and would effect a small area of land if accidentally released.

Impact Significance:

Although there is no impact significance for the transmission line during the operation in term of soil contamination risk, but the measures in the ESMP is presented to further minimized the impact at the substation.

5.2.5 Impact on Land use, Landscape and Visual

Effects on landscape will be limited to the view obstruction caused by power lines as the lines will pass through mostly agriculture lands and empty (uncultivated desert) land.

Impact Significance:

Impacts of power lines on the landscape are very limited because its obstruction to the general view from an open area could be negligible.

5.2.6 Impact on Bird Migration

Bird migration as a global major concern can be affected by operation the power line and the substation. The bird migration pattern existing on the site and its interconnection lines have been examined.

In general, it's so important for any faunal assessment of any proposed transmission line's route to be studied from the prospective of the impact on bird migration and this is due to the special and unique geographical position of Egypt for migratory birds of palearctic zoogeographical region as a passage to winter in Africa.

As described in the Bird Migration Section in Chapter 4, regarding Giza North/Cairo 500 and parallel line of Giza North/Samalout as well as Giza North/Ashmoun planned transmission lines are located in an area which has no clear significant role in bird migration, also it is not located in a main migratory bird route specially for large birds, as they are the most probable exposed birds to the danger of both collision and electrocution; the main reason for that the small birds don't usually get electrocuted because they fail to complete a circuit either by touching a grounded wire or any other structure.

Impact significance:

Impacts of power lines on the bird migration is very limited and could be negligible.

5.2.7 Impact on Creation of Job Opportunities and Flourishing economic

As it is described during the construction phase, as well as during the operation phase, the project will offer a good opportunity for technicians, electrician, engineers, guards, as well as unskilled labor for surrounding areas and the new cities nearby and the Bedouin groups as well.

Impact Significance:

The job opportunities that are offered represent a long term positive impact.

5.2.8 Impact of Creation Economic Burden on Poor Households

The Ministry of Electricity and Energy is a service Ministry, whenever the MoEE is planning to construct a new facility through its holding companies, no funds are to be collected from the citizens. The MoEE instead is trying to mobilize the governmental resources that are generally insufficient as well as seeking every possible opportunity for obtaining funds from different funding agencies.

The majority of local people already have access to electricity, and they are paying its tariffs. The WTP is not applicable in the proposed projects; however, the WTP was assessed during consultation activities. During the consultations in both Ashmoun and Abu Ghaleb as a representation of North Giza region, some of the interviewees stated that they are willing to pay for the service as long as it will get improved. The majority of local people stated that they already pay a significant amount of money for electricity installing and usage. Moreover, they affirmed their WTP for the electricity consumption if it will be calculated actually and properly.

The local people emphasized that they are rationalizing their current usage of electricity as the service is still unreliable and unable to operate different machines like refrigerators, washing machines, televisions, and electric water heaters. The new project will improve the service for them; therefore, they will use all these machines as a result they are expecting the have higher consumption rates of electricity than before.

The poor households especially those in the rural areas may face some difficulties in coping with the increase in the electricity bill, particularly those who are daily-wages breadwinners, female headed households and those who have unstable sources of income.

Impact significance:

Poor household especially in rural areas are likely to face this impact. Each project is targeting the service provision and improvement by meeting the increase in the load demand and consumption, therefore the projects will meet the demands of both the rich and the poor inside the community. However, the impact of economic burden added to the poor as a result of service supply and consumption is highly significant.

5.2.9 Securing the stability of power and meeting the demand of energy

Owing to the unreliability of the current service, the majority of households were not able to operate the electrical appliances inside their houses. Some of the electrical appliances got damaged as a result of the sudden supply of electricity after a cut off period. The project is designed to solve that problem and to secure a supply of electric energy to all consumers with high reliability and low cost; the project will also meet the continuous demand of energy that reaches to 6% per year.

After the operation of the targeted project, the livelihood conditions will get improved especially for the household who witnessed frequent cut off of electricity, and those who have not connected electricity yet. The residents inside houses will benefit from sufficient lighting, ventilation, refrigerating, and using different entertainment appliances.

Impact significance:

The potential of this impact is high as it will enhance the living conditions for families in the current and future resettlements.

5.2.10 Improved Living Standards and Enhanced Sense of Wellbeing for Rural Residents

Owing to the unreliability of the current service, the households were not able to use the electrical appliances inside their houses. After the operation of the targeted project, the livelihood conditions will get improved. The residents inside rural areas will benefit from sufficient lighting, ventilation, refrigerating, and using entertainment appliances.

Women will be able to replace the traditional manual washing with the electric washing machines which will lead to consuming less time in the several domestic activities.

Those households especially women who are using alternative energy sources like kerosene will be less exposed to the indoor fumes from kerosene.

Impact significance:

The potential of this impact is high as it will enhance the living conditions for families in both rural and urban areas. It will make a great shift in the livelihoods of rural people resulting in maximizing their sense of wellbeing.

5.2.11 Better Opportunities for Educational Attainment

The improved new service will decrease the number of hours when the electricity was interrupted. This will enable the students to study inside their homes at night. Some of them may possess computers and have access to the internet; therefore, that will lead to a better educational performance. This positive impact will encourage most of the families to send their children to schools.

The improved service will also offer a better learning environment inside schools through using more advanced educational facilities.

Impact significance:

The potential for achieving this impact is high; it will participate also in improving the livelihood inside houses and the local communities.

5.2.12 Increased Openness to the World and Better Level of Awareness

The access to television, satellite and internet will offer the people especially in rural areas opened channels with the external world. These open channels will play important role in educating people and raising their awareness in many aspects in life. This may result in transforming some communities from conservative ones into open communities.

Impact Significance:

This is one of the most significant impacts especially for the local people living in rural areas. The likelihood of attaining this impact is high and it has a significant positive impact.

5.2.13 Better Functioning Social Services especially on the Village Level

The insufficient supply of electricity hindered the street lighting. The municipalities tended to switch off the lamp posts in order to rationalize the electricity consumption. The street lighting was one of the main concerns raised by the interviewees especially women who were constrained to move freely during night. The improved service encourages the possibilities for social interaction in coffee shops, youth centers as well as community clubs.

The services facilities like schools and health centers were affected by the frequent cutout of electricity. The new projects will improve the quality of the services provided by these service providing entities as the electricity interruption will be minimal. These services can operate for longer hours and there will be no damage caused to the used electrical equipments.

Impact Significance:

The people stressed on the importance of this impact during the consultations. The likelihood of attaining this impact is high so its significance is seen as major positive impact.

5.2.14 Improved life style and pattern of life

As a result of the increased access to media that resulted from the improved service, the rural communities are expected to be exposed to the urbanized style of life. The increased access to media in turn will participate in raising the awareness of local people in rural areas and offering them better opportunities for social interaction.

Some of the local people are anticipating this impact as a good result of improving the service. On the other hand, some of the local people especially women stated that there is the risk of changing the rural life style in the way that negatively affects their livelihoods as their spouses may stay longer outside their houses for work or entertainment purposes.

The urbanization may result in focusing on the commercial and services sectors and neglecting the agriculture sector inside villages, which may result in increasing the vulnerability of the tenants of the agricultural lands especially women who are mostly involved in this sector in rural areas.

Impact significance:

The significance of this impact is medium as there are two different perceptions about the impact of urbanization in rural areas.

5.2.15 Benefits to women

Women are regarded the key role player in energy management. They are the ones who are responsible for rationalizing the electricity consumption inside houses as well as dealing with the alternative sources of energy especially in rural areas. Women are the ones who are exposed mostly to the negative impacts of the alternative energy sources like kerosene.

It is expected that the project will offer special benefits to women including saving time and efforts through the maximization of the use of the electrical appliances. The access to media through satellite and internet will increase the awareness of rural women as well as other community members.

The project will also improve the service inside households and will help in initiating household based income generation activities like producing handmade carpets, sewing and poultry and livestock breeding contributing to increasing their sense of empowerment.

During the consultation, the idea of having local female fees collectors was discussed. Most of the interviewed women welcomed that idea and predict that it will result in having accurate reading for the electricity meters resulting in regaining the trust between consumers and service providers.

The improved social interaction may increase the potentials of women involvement in social activities through volunteering with local CDAs and other local associations.

Impact Significance:

As women will be more empowered and their situation will get improved, this impact has positive consequences and it has medium level of significance. However, this impact will vary from one community to the other based on the dominating tradition inside each community.

Table 5.7. Assessed Significance of Expected Impacts during Operation Phase

Impact	Likelihood and severity	Significance	Mitigation Measures Effects
Risks of scrap and hazardous waste	Low likelihood of major impacts	Medium	Reduces impact significance to minor
Safety Along the Power Lines, risks of electrolux and fire accident	Low likelihood of major impacts	Medium	Reduces impact significance to minor
Exposure to EMFs	Low likelihood of major or medium impacts	Minor	Minimizing impact significance

Impact	Likelihood and severity	Significance	Mitigation Measures Effects
Risk of soil contamination	Low likelihood of major or medium impacts	Minor	Minimizing impact significance
Impacts on land use, landscape and visual	Low likelihood of major or medium impacts	Minor	No mitigation measures required
Impact on Bird Migration	Low likelihood of major or medium impacts	Unnoticeable	No mitigation measures required
Impact of Job opportunities and Flourishing Economic	High likelihood of major or medium impacts short term or long term	Major positive	No mitigation measures required
Impact of Creation Economic Burden on Poor Households	High likelihood of major impacts long term especially for the poor	Highly significant	No mitigation measures required
Securing the stability of power and meeting the demand of energy	High likelihood of major impact	Major positive	No mitigation measures required
Impact on openness and better level of awareness	High likelihood of major or medium	Major Positive	No mitigation measures required
Better Functioning Social Services especially on the Village Level	High likelihood of major or medium	Major Positive	No mitigation measures required
Improved life style and pattern of life	Low likelihood of major impacts	Medium	No mitigation measures required
Benefits to women	Uncertain positive impacts	Medium	No mitigation measures requires

6. Project Alternatives

6.1 No Project Alternative

The main objectives of the project are to evacuate the power generated by the Giza North power plant; relieve the loads of neighboring substations; and improve the voltage profile of the substations in Cairo, Delta, and the West Delta zone. Environmental and social impacts from the project are assessed and no significant impacts are anticipated.

It is believed that there will be many benefits from the project that could over-weigh its limited environmental impacts such as providing fluent power supply to the consumers, in addition to the developmental and socio-economic benefits. Therefore the no project alternative is not environmental/social requirement.

If the interconnection lines are not built, the consequences would be as follows:

- Energy capacity to the delta and west delta zone will not increase
- The power supply to the consumers will not be improved
- The consumers' financial losses from low quality power supply will not decline
- As a result, an increase in the economic activities in the region is not expected

6.2 Location Alternatives

Originally, there are three alternatives given to release the energy capacity from Giza North Power Plant. The selection of the transmission lines and route was undertaken according to criteria that fulfilled technical and socioeconomic objectives to achieve most feasible application.

The three alternatives are described below:

ALTERNATIVE 1

The Giza North power plant will be connected to the Egyptian Unified Power System (UPS), which is owned and operated by the Egyptian Electricity Transmission Company (EETC), an affiliate company to the EEHC, via connecting transmission lines. Connection methodology includes:

- opening the existing double circuit 220 kV Cairo 500 / Sadat City transmission line and extending it with a length of about 11-15 km (in/out, i.e. 2 x 11-15 km) to Giza North power project site.
- opening the existing double circuit 220 kV transmission line of the Menouf / Bassous for extending it with a length of about 1 km (in/out, i.e. 2 x 1 km) to the power plant site.

ALTERNATIVE 2

In order to evacuate the generated power from the Giza North (3 x 750) M.W combined cycle power plant it is planned to interconnect this power plant with 500 KV and 220 KV National grids as follows:

500 KV

- Construct Giza North substation 500 /220 kV with 2x 500 MVA transformers.
- Construct Asher 500 substation 500 /220 kV with 3x 500 MVA transformers.
- Construct 500 kV single circuit OHTL Giza North / Asher 500 with length 90. Km.
- Opening the existing single circuit 500 kV OHTL Nobaria500 / Cairo 500 to Giza North Power Plant as follows:
 - Extend the line from Giza North side to Cairo 500 S/S with a length of about 1x 5 km to become Giza North. 500/ Cairo 500 with length about 30 km.
 - Extending the line with a length of about 1x 90 km from Nobaria side to October 500 substation to become October. 500 / Nobaria500 with length about 155 Km.

220 KV

- Opening the existing double circuit 220 kV OHTL asher 1 / asher 2 and extending it with length of about 2 x 12 km in /out to asher 3 S/S .
- Construct Abu-Ghaleb S/S 220 /66 kV with 2x 125 MVA .
- Opening the existing double circuit 220 kV OHTL Cairo500 / Sadat -after rehabilitation- in /out to Abu-Ghaleb S/S and extending it with length of about 2 x 10 km
- Construct 220 kV double circuit OHTL – *bundle of three conductor*- Abu-Ghaleb / Giza North with length 10 Km.
- Construct 220 kV double circuit OHTL –Ashmoun / Giza North with length about 10 Km.

ALTERNATIVE 3 (SELECTED ALTERNATIVE)

In order to evacuate the generated power from the Giza North (3 x 750) M.W combined cycle power plant it is planned to interconnect this power plant with 500 KV and 220 KV National grids as follows:

500 KV

- Release 500 kV OHTL Samalout 500 / Cairo 500 from Cairo 500 S/S side and extending it with a length of 1x 35 km to Giza North 500 S/S to become Giza North 500 / Samalout 500 with a length about 244 km.
- Construct 500 kV single circuit OHTL Cairo 500 / Giza North500 with length about 30 km.

220 KV

- Construct 220 kV double circuit OHTL –Ashmoun/Giza North with length about 15 Km.

Generally there are few environmental constraints for locating the interconnection lines that are described in the ESMP screening criteria in Chapter 7. If these constraints were followed during the implementation and operation of the project there will be no environmental/social objection on selecting site.

7. Environmental and Social Management Plan

The Environmental and Social Management Plan (ESMP) aims at defining a mechanism for implementing mitigation measures for expected negative impacts and to monitor the efficiency of these mitigation measures based on relevant environmental indicators.

The ESMP identifies certain roles and responsibilities for different stakeholders for implementing, supervising and monitoring the environmental and social performance of the project.

The ESMP has distinguished between mitigation measures that should be implemented during the construction and operation of the project.

Roles and responsibilities for implementing the ESMP during the construction phase have been proposed based on the following set-up:

- EETC will contract authorized and specialized consultant to prepare detailed designs and tender documents, for construction of the distribution system, which will include the environmental measures that should be undertaken by the construction contractor
- During tenders evaluation EETC assure that the winning offer includes the required environmental mitigation measures to be implemented during construction
- EETC will assign supervision consulting engineering firms that will undertake supervision over the contractor to make sure that the mitigation measures specified in the design/tender document are implemented on field
- The site supervisor consultant from EETC will produce the monthly report about the performance of the contractor in implementing the ESMP measures

During the operation phase, the operator at the substation who are appointed by EETC (under environmental safety and health departement) will be responsible for monitoring the ESMP. He will be responsible for implementing the mitigation measures through periodic reports prepared by EETC including auditing and inspections that will be undertaken on random basis.

7.1 Environmental Management Plan during Construction Phase

7.1.1. Management of Construction Waste

Mitigation measures:

- EETC should communicate with the local authorities for officially assigning location for the disposal of construction waste. Agreement on these disposal sites should be reached prior to commencing construction works
- A certain location in the construction site should be assigned for temporary storage of construction waste; this location will be within the construction area of the

substation. This location should be agreed between the contractor and supervisor consultant prior to starting the project.

- Ensure that excavation done for steel towers are not more the diameter of the diameter of the butt of the tower and that the excavation is exactly as deep as the construction standards required. This will help support of un-disturbed soil to the tower and prevent the tower from leaning and failure.
- Make sure during construction supervision that the anchors are fixed at the designed depth and at the same angle of guy so that it provides the required support to the tower and prevent its early failure. It will be required that construction supervisor makes sure that contractors do not fix the anchor vertically and then bend it during the site survey
- Maintain the correct tensioning of the conductor so that it will not have high tension loads, line vibrations and premature failure. During construction phase the supervisor engineer has to make sure that after the conductor has been properly stung, it is brought up to the initial tension within 4 hours, and that it sits in the rollers for at least two hours, after being tensioned, to give it chance to equalize itself prior to tying the conductors to the insulators.
- Construction waste should be hauled at the end of each business day to the officially approved disposal sites. Adequately equipped trucks should undertake waste transportation. The supervisor consultant should make-sure that the trucks are not overloaded and that the waste is adequately contained inside the rear box or covered to prevent dust or particles movements from the truck. The supervisor consultant should also occasionally inspect that the truck drivers are disposing the waste in the approved location, and not through practicing open dumping in the midway, through irregular visits and inquiries in the disposal site.
- The store of the equipments should be a covered area provided with adequate flooring for possible access of forklifts and small trucks. The storekeeper will be assigned to manage the utility store; he should keep separate areas for each type of waste, keep internal passages inside the store for facilitating access and should order for regular cleansing of the store. The storekeeper should keep records of the admitted waste in the store, and before the store is full he should organize to sell or dump the scrap at the authorized landfill. The responsible person for environment should make sure the store has sufficient area and facilities during the design/construction phase.

Monitoring Activities:

- No monitoring activities are required for construction waste as long as the above mitigation measures are implemented
- There should be a form prepared by EETC for the storekeeper to keep records of quantities, types of scrap received in the store and the location where it has been received from.

Reporting

- The monthly report of the construction supervisor consultant should include how well does the contractor abide to the above measures and any comments noticed by the site supervisor about mismanagement of construction waste during the month.

- The storekeepers should prepare a quarterly report including received scrap items, sold items and disposed items

7.1.2. Excavation and Trenching

Mitigation measures:

- All excavations shall be made in accordance with the approved drawings.
- The sides of all excavations, which might expose personnel or facilities to danger resulting from shifting earth shall be protected by providing slope to the appropriate angle of repose or benching in the sides and ends of the excavation or ladders must be used and secured, enough to withstand at least 1 meter above the top of the excavation.
- All excavation deeper than 1.5 meters must have barriers and toe boards around the outside to prevent persons and material falling into the excavation. Barriers must be of a strength that is capable of withstanding the weight of a person falling against the barrier. Barriers shall be readily visible by day or night.
- All persons in excavation must wear safety helmets and safety boots
- Vehicles and other machineries or construction equipments must not be allowed to come within 2 meters of an excavation unless working in connection with the excavation.

Monitoring Activities

- An inspection must be conducted at the end of the works to ensure that the excavation has been left in a safe manner. Heavy loads shall not be put on the edge of the excavation.
- The observer must conduct monitoring of the safety tools for the workers and the vehicles restrictions along the excavation and trenching sites.

Reporting

- The observer should report on the monthly basis of the accident or the worker's obedience.

7.1.3. Management of Land Use Restrictions and Possible Resettlement

Mitigation measures:

- Avoid, to the maximum possible, locating routes of power lines and within the line ROW so it penetrates the highly produced fruits farms or that could be rejected by public concern.
- Inform the local people and raise their awareness about the importance of the project.
- Select ROW for locating routes of power lines, and seek alternatives whenever the routes are rejected by public people.
- Utilize alternative tower designs if possible to reduce ROW width and to minimize the land use negative impacts.
- Select ROW to avoid the damage of animals and birds habitats and sensitive archeological sites.

- Maintain habitats beneath lines.
- A certain area under the line will be kept as a buffer zone for maintaining the public safety from electric hazards and high exposure to EMFs.
- In case of resettlement, proper compensation schemes should be applied with affected persons, in accordance with WB and EIB procedures.

Monitoring activities:

- Conduct regular monitoring visits to make sure that there is no negative use on the land or the surrounding environment.
- A field visit should take place by the designer of the project in order to identify the areas of restricted uses and to identify different habitat locations, to be reported by the designer in his design report.
- Monitoring of ROW maintenance activities to apply proper control methods.
- Form a committee of local people and involve them in the investigation process.
- Monitoring possible resettlement arrangements as well as procedures are detailed in the RPF Reporting.
- Areas of restricted uses should be monitored along with the type and reason for the restriction and identification of the different habitat locations. The designer in his design report should report these areas.
- The contractor is responsible for clearing the tower site after completing his work. EETC shall help the contractor if any problem with the landowner in the agriculture area or with any other authority / agency along the line route would arise.

Reporting

- The designer should identify the locations of intersection between power lines ROW with areas of restricted uses. In case where this intersection could not be avoided, the designer should justify reasons for selecting this route in his design report.
- Reporting associated with the land acquisition problems could arise along the route line.
- Reporting possible resettlement procedures are detailed in the RPF

7.1.4. Management of Removed Trees for Right of Way

Mitigation measures:

- Plant trees, by the contractor, in nearest suitable location to the location where the trees were cut during lines construction. EETC should coordinate with the local authority the suitable location for planting such trees and he should also emphasize that the planted trees should be of native species only.

Monitoring Activities:

- Number of removed trees as well as the proposed location for replanting the new ones should be monitoring by construction supervisor consultants

Reporting:

- Monitored number of removed trees should be included in the monthly report prepared by the construction supervisor consultant
- The number of planted trees should be reported on quarterly bases.

7.1.5. Management of Construction Air Emissions

Mitigation measures:

- In areas of loose sandy soils the contractor should provide source of water for spraying soil before excavation, filling, loading and unloading. If the site supervisor consultant noticed visual/sensible increase of dust emissions, he should ask for additional spraying of water in the spot generating high emissions.

Monitoring activities:

- Daily monitored of the increase dust emission and the sufficient water spray of soil is under the supervision of the consultant.

Reporting

- The Site Supervisor Consultant will prepare a monthly progress report, which would be submitted to EETC, on implemented mitigation measures. The consultant should report on any incident of high dust emissions or smoke during construction works including the natural dust that might be encountered especially at the site that most of the area is desert land.

7.1.6. Management of Construction Noise

Mitigation measures:

- Workers that operate noisy machines or worker near them should be supplied with earmuffs and should be instructed to put them on when they get into noisy zones. Contractors should be responsible to instruct their workers to abide to this role, and the site supervisor should make sure the contractor is compliant with this role
- Working hours for workers exposed to noise equipment should be designed so that noise exposure periods do not exceed the safe limits
- Inform the nearby company to the substation about the peak time and hours for construction activities.

Monitoring activities:

- Because of the insignificance of this impact monitoring noise in construction sites will not be required.

Reporting

- The monthly report should include how well does the contractor abide to the above measures and any comments noticed by the site supervisor about high noise levels.
- A monthly report on any observations or complaints about high noise level.

7.1.7. Management of Traffic

Mitigation measures:

- An agreement between contractors and supervisor consultants should be reached about the suitable location for temporary storage of construction materials, equipment, tools and machinery prior to starting construction of each reach of the power lines. No storage of construction materials or electric tools should be allowed in traffic lanes.
- Find suitable locations for temporary storage of conventional construction wastes.
- In case a narrow access road needs to be occupied for limited period (for example by loading/unloading trucks or loaders) the occupation time should be minimize. The additional measure is to have a careful turn (if needed) for the heavy trucks or loaders due to the high-speed vehicles passing by the highway.
- The contractors should make sure that the employed drivers of construction machinery (such as trucks and loaders) have received sensitization/training on safety utilization of their machines in order to minimize accidents risks.

Monitoring Activities:

- No monitoring of physical indicators is required

Reporting

- Unusual traffic delays or accident caused during construction or any complaints received should be reported in the monthly report prepared by the construction supervisor consultant

7.1.8. Safety of Mechanical Equipment

Mitigation measures:

- All mobile mechanical equipment shall be operated by authorized personnel and has a valid license.
- All equipment shall be checked prior to use by qualified personnel.
- Brakes, lights, tire pressure and battery shall be inspected before using the equipment. Revolving lights must be used for heavy duty vehicles.
- The design capacity of any equipment shall never be exceeded. The equipment shall not be modified to alter its capacity.
- All drivers shall have valid driving license.
- Equipment that could present a hazard to personnel, if accidentally activated during the performance of installation, repair, alteration, cleaning or inspection, work shall be made inoperative prior to state of work.
- Equipment, which is subject to unexpected external physical movement such as rotating, turning, dropping, sliding etc., mechanical and/or structural constraint, shall be applied to prevent such movement.
- All equipment, which is locked or taken out of service, because of potentially hazardous condition, shall be appropriately tagged indicating the reason for taken out of service.

Monitoring Activities

- A safety observer shall be kept in case of heavy mobile equipment, which may be hazardous, by its movement. The observer shall ensure that people are kept away of mobile equipment.
- Observer shall appointed specific place for heavy equipment standby area when it is not been used or taken out of service.
- Observer shall ensure the performance of the heavy equipment, tagged the equipment which are locked or taken out of service and reported on monthly basis

Reporting

- Reporting on the monthly basis, the total number and the type of heavy equipment use during the construction phase.
- Reporting on the monthly basis the number of heavy equipment that are locked or taken out of service and the reason of the damages.

7.1.9. Management of Possible Impacts on Culture and Privacy of Local Communities

Mitigation measures:

- The contractor should be advised to use construction labor from the areas where construction works will take place. The incentives to contractors for such measure include reducing accommodation and transportation for his workers. The contractor could be advised to seek the help of local NGOs for recruiting labor from the local communities

Monitoring Activities:

- The contractor should provide list of construction workers and their governorates of origin on quarterly basis.

Reporting

- Reporting on percentage of labor recruited from local governorates should be presented by the contractor to the supervisor consultant and to EETC on quarterly basis

7.1.10. Management the Consequences of Misconceptions

Mitigation measures:

- As stated before the expected conflicts will be minimal. However, the key issue for mitigating this impact is the community participation in all phases of each project.
- Adopting the proposed service provider (NGOs or women leaders) will maximize their involvement in the project; therefore, to understand it properly.
- Form a committee representing by the natural leaders inside each community to be responsible for reconciliation in case of having any conflict arise.
- Informing the consumer and communicating with him/her is essential as it keeps them informed and gives them the sense that their interests are respected.

Monitoring:

- Consult community through different meetings, FGDs, and workshops on the current situation, perceived impacts, service providers, WTP.etc. This is being undertaken through the activities of the ESIA.
- Involve some selected members from the local community to be part of the assessment and scoping phase.

Reporting:

- The PMU will prepare an assessment study on the conflict of interests as part of its responsibilities. The PMU will nominate some people from the reconciliation committee to develop a report on any incidences of conflicts.

Table 7.1. and 7.2. represent the matrix of management plan as well as monitoring plan during construction phase respectively.

Table 0-1: Environmental Management Plan Matrix during Construction Phase

Potential Impact	Proposed Mitigation Measures	Project Phase	Institutional Responsibility for Implementation	Responsibility of direct supervision	Means of supervision
Effects of construction waste	Identify disposal sites for construction waste approved by the local authority	Pre-construction	EETC	EETC	Review local authority approvals
	Identify location within construction site for temporary storage of construction waste	Construction	Construction contractor	Construction supervisor consultant	Site supervision
	Adequate transportation and disposal of construction waste	Construction	Construction contractor	Construction supervisor consultant	Site supervision and occasional inspection of disposal site
	Allocate and prepare areas for temporary storage of scrap	Pre-construction	EETC	EETC	Auditing of allocated stores
	Keeping tidiness and cleanliness of the utility store	Construction	Storekeepers selected from EETC	EETC	Auditing of stores
Excavation and Trenching	Identify the excavation according to the drawing design	Pre-construction Construction	Construction Contractor	Construction supervisor	Site supervision and occasional inspection
	Clear safety signs and boundary for the excavation sites				

Potential Impact	Proposed Mitigation Measures	Project Phase	Institutional Responsibility for Implementation	Responsibility of direct supervision	Means of supervision
	Safety and clear area around the excavation site including the safety helmets and boots compulsory for workers				
Land use restrictions and possible resettlement	Choose routes of power lines not passing through highly produced fruits and could be rejected by public concern	Design and planning	Design consultant	EETC	Design review
	ROW and transmission route should avoid the damage of animals birds and sensitive archeological site	Design and planning	Design consultant	EETC	Design review
	If the resettlement occur, information and RPF should be implemented accordance with WB and EIB standard	Construction	EETC and local authorities	EETC and local authorities	Site supervisors
Trees removal for power lines right-of-way	Plantation of trees near removed trees	Construction	EETC	EETC	Review reports and occasional audits
Construction air emissions	Spraying soil before excavation in loose sandy soil	Construction	Construction contractor	Construction supervisor consultant	Site supervision

Potential Impact	Proposed Mitigation Measures	Project Phase	Institutional Responsibility for Implementation	Responsibility of direct supervision	Means of supervision
Construction noise	Provide ear muffs to construction workers usually located near noisy machines	Construction	Construction contractor	Construction supervisor consultant	Site supervision
	Organize working hours so that noise exposure to workers will be minimized	Construction	Construction contractor	Construction supervisor consultant	Site supervision
Impacts on traffic on roads	Prevent storage of construction materials, equipment or machinery on traffic lanes	Pre-construction and construction	Construction contractor	Construction supervisor consultant	Site supervision
	Facilitate alternative access roads to villages during temporary occupation of narrow roads. This mitigation is not applied at Badr Substation site as it is on the highway access road.	Construction	Construction contractor	Construction supervisor consultant	Site supervision
	Drivers of heavy trucks or loaders should be carefully turn as the high speed vehicles on the highway	Pre-construction and construction	Construction contractor	Construction supervisor consultant	Site supervision
	Drivers of construction machinery should receive sensitization/training on safety issues	Construction	Construction contractor	Construction supervisor consultant	Site supervision

Potential Impact	Proposed Mitigation Measures	Project Phase	Institutional Responsibility for Implementation	Responsibility of direct supervision	Means of supervision
Safety of Mechanical Equipment	Drivers should have a certified and valid license	construction	Construction contractor	Construction supervisor consultant Contractor	Site supervision Review of supervisor's reports
	All mechanical equipments should be checked prior to use				
	Appropriately tagged all mechanical equipments that are locked or out of service				
Impacts of culture and privacy of local communities	Maximize the use of local workers as much as possible	Construction	Construction contractor	Construction supervisor consultant	Review of contractor's reports
Raising awareness	Inform the community about the different stages of the project, safety measures and transportation route	Construction Contractors	Construction Contractors	Construction Contractors	Construction Contractors

Table 0-2: Environmental Monitoring Plan Matrix during Construction Phase

Potential Impact	Monitoring Indicator	Monitoring Location	Monitoring Methods	Monitoring Frequency	Monitoring Responsibility
Disposal of construction scrap	Quantities of scrap item by type	Utility store	Inspection and recording of admitted items	Quarterly reporting	EETC storekeeper
Excavation and trenching	Areas of excavations and trenching Safety areas around the excavation	Construction site	Inspection and marked the safety areas for excavation especially the deep whole	Upon excavation and trenching	Site supervisor consultant Construction contractor
Land use restrictions and possible resettlement ¹³	Areas of restricted use penetrated by ROWs	Construction site	Area measurements on maps and on ground using surveying tools	Once during design phase	Design consultant
Trees removal during construction of power lines	Number of removed trees	Construction site	Visual counting of removed trees	Upon removal of trees, reporting will be once monthly	Site supervisor consultant
Safety on roads	U turn from the main highway to the site Marked sign on the entrance to the site	Highway road and the U-turn on both side	Clear sign on both U-turn side on the highway and at the entrance to the site	Upon turning or entering the location	Site supervisor and contractor
Safety of mechanical equipment	Performance of the equipment and the visible damage	Construction site	Inspection and recording of the performance	Upon the use of the mechanical and heavy	Construction contractor

Potential Impact	Monitoring Indicator	Monitoring Location	Monitoring Methods	Monitoring Frequency	Monitoring Responsibility
				machineries	
Culture and privacy of local communities	% of local labor to total labor	Construction site	Reporting labor origin governorates and calculating the natives ratio	Quarterly	Construction contractor
Raising awareness	Clear sign on the project site and along the transmission lines route	Construction sites	Marked the project site and warning sign as well along the interconnection lines	Monthly	Construction Contractor

7.2 Management and Monitoring Activities During Operation Phase

7.2.1. Management of Scrap and Hazardous Waste

Mitigation measures:

- The site will have utility store as mentioned at the construction phase. The store should be of a sufficient area to receive the expected waste quantities and to ensure adequate maneuvering inside the store. The store should be provided with flooring that could bear loads of forklifts and small trucks. The storekeeper will be assigned to manage the utility store. He should keep separate areas for each type of waste, keep internal passages inside the store for facilitating access and should order for regular cleansing of the store. The storekeeper should keep records of the admitted waste in the store, and before the store is full he should advise the operation manager to organize the waste.
- Disposal of special waste which couldn't be recycled should be in controlled areas within the disposal sites where no scavenging or open burning takes place. This could be achieved by requesting a specific area within the disposal area that would be excavated, as required, to bury the waste and prevent access of scavengers and exposure to open fires. For estimating costs of such measure it has been assumed that EETC will contract an excavator to excavate an area in the site to dispose the special waste and transportation of accumulated wasted items will be done quarterly.
- The general public should be aware of the disposal procedure of hazardous wastes and the possible environmental risks associated with them.
- Avoid, as much as possible, the use of PVC insulated cables. This could be done through including such measure in the tender documents for materials. It may be unfeasible to use other type of insulators; however, PVC free insulators should have more technical score than PVC insulators¹⁴.
- No PCB containing oil will be used in the project. The EETC should make sure that the procurement policy includes screening out of any transformers that utilizes PCB containing oil.
- Waste minimization procedures should be adopted during the operation. The supervisor should make sure that the procedures implemented according to the design measures

Monitoring activities:

- The storekeeper should keep records of quantities, types of waste received in the store and the location where it has been received from, and destination where it has been directed to.

Reporting:

- The storekeeper should prepare quarterly report of the waste management activities including received waste items, sold items and disposed items and the disposal site.

¹⁴ The feasibility of using PVC free insulators will be left for the EETC consultant to decide; also the extra scores that will be given to non-PVC wires should be negotiated.

7.2.2. Safety along the Power Lines

Mitigation measures:

- Maintaining standard safety procedures for transmission system. The EETC will be distributed the safety standard procedures during the operational phase that put in detailed of the safety measurements include:
 - Maintain minimum clearance between line conductors and the ground according to the standard allowed
 - Provide climbing space to allow linemen to work more safely on the structures while they are energized
- Carry out an awareness raising campaign that should target the different communities where the project will be implemented in order to educate them about the precautions that they should be considering in order to ensure their safety on both community and household or family level. There should be special attention for accessing women, who are so close to issues of energy rationalization on the households' level. In addition, also to some associated risks outside house (e.g. herding activities near substation and the risk of electric shocks), and children because they are one of the most vulnerable groups to the risks of electric shocks both outside homes i.e. by playing near substations or inside homes. The awareness raising will be undertaken through local NGOs who can be trained by a specialized training consultant.

Monitoring activities:

- Number, location and causes of accidents related to the electricity distribution system

Reporting:

- Design consultant should present the safety precautions, which have been considered, as a separate section of his design report
- The training consultant appointed by EETC should report to the head of the substation (after he is appointed) of training courses that have been conducted, while the NGOs should report on the implemented awareness activities both on quarterly bases

7.2.3. Controlling Impacts of Electromagnetic Fields

Mitigation measures:

- Routes of power lines should be designed so that maximum possible distances could be maintained between the lines and developed areas
- A suitable ROW should be kept on both sides of power lines where no development buildings should be constructed. The Egyptian electricity law no 63 indicated that the guidance ROW distance is 25 meters (for very high voltage) and 13 meters for high voltages. Once the power line's exact route is identified by the surveyor (in the case of Abu Qir/Badr OHTL), EETC should advise the Local Authorities with maps of ROW areas where no permanent structures should be established.

Monitoring Activities:

- EMF should be measured frequently in different locations especially near power lines that penetrate residential areas. This monitoring should be undertaken by a specialized expert on quarterly basis for locations where power lines are close to relatively populated areas. For the substation, there is no monitoring as the site is relatively far from the populated area. In the other hand, the exact plan for such monitoring could not be identified at this stage as well as the suitable locations of monitoring points (where the lines are close to populated areas). Therefore the detailed EMF monitoring plan will be left to the EETC and local authorities to identify.

Reporting

- Results of the EMFs monitoring plant should be reported to the head of environmental department on the local authorities, with the ESMP quarterly progress report.

7.2.4. Management of Soil Contamination RisksMitigation measures:

- Oil changing procedures in substations should be over flooring lined with impermeable layer. Used oil should be collected in barrels and sent for the waste store in each of the service territories for possible recycling in refineries
- In case a leakage occurred the soil should be removed and disposed in the appointed disposal site for special waste, as discussed earlier.

Monitoring activities:

- Amount and management methods of contaminated soil

Reporting

- Reporting of accidental release should be undertaken by the Substation operators, including location and reasons for such incidents, to the environmental department of the local authorities.

Table 7.3. and 7.4. represent the matrix of management plan as well as monitoring plan during operation phase respectively.

Table 0-1: Environmental Management Plan Matrix during Operation Phase

Potential Impact	Proposed Mitigation Measures	Project Phase	Institutional Responsibility for Implementation	Responsibility of direct supervision	Means of supervision
Generation of scrap and hazardous waste	Allocate and prepare areas in substation site for temporary storage of scrap	Pre-construction	EETC	EETC	Auditing of allocated stores
	Keeping tidiness and cleanliness of the utility store	Operation	storekeepers	EETC operator / Environmental section	Auditing of stores
	Controlling the hazardous and special waste either to sell or to recycle.	Operation	EETC operator	EETC operator / Environmental section	Documentation of the waste management
	Controlled disposal of non sold hazardous and special waste	Operation	EETC operator	EETC operator / Environmental section	Documents review and occasional inspection of disposal site
	Implement waste minimization measures in design and construction	Design and Construction	Design consultants for design, and contractors during construction	Construction supervising consultant	Site supervision
	Carry out awareness campaign about safety precautions with specific emphasis on women and children	Operation	NGOs local promoters and training consultant	EETC	Review NGOs training of trainers and visits of local promoters
Exposure to EMFs	Select routes of power lines as far as possible from developed areas	Design	Design consultant	EETC operator / environmental section	Review design reports
	Fix a ROW distance on both sides of power lines where no permanent structures should be established	Pre-Construction	EETC and Local Authorities	EETC operator	Review correspondence with local authorities

Potential Impact	Proposed Mitigation Measures	Project Phase	Institutional Responsibility for Implementation	Responsibility of direct supervision	Means of supervision
	In case EMF monitoring results gave high EMF readings in populated areas, EMF reduction measures should be taken according to recommendations of an engineering consultant	Operation	Specialized Engineering Consultant	EETC / environmental section	Review consultant reports and implementation of measures
Risk of soil contamination	Care should be taken during transformer oil changing, which should be over an impermeable layer of soil	Operation	EETC operator	EETC / environmental section	Occasional visits to substations especially at the transformer location
	Adequate collection and disposal of contaminated soil	Operation	EETC operator	EETC / environmental section	Occasional visits to substations especially at the transformer location

Table 0-2: Environmental Monitoring Plan Matrix during Operation Phase

Potential Impact	Monitoring Indicator	Monitoring Location	Monitoring Methods	Monitoring Frequency	Monitoring Responsibility
Disposal of hazardous waste and scrap	Quantities of waste items by type	substation utility store	Inspection and recording of admitted items	Quarterly reporting	Substation's storekeepers
Safety of power lines and substation	Number of electrocution or fire accidents by type	Substation operator	Counting accidents and reporting its causes	Once an accident happens	Substation's operator
Exposure to EMF	EMF (mG)	Selected locations where developed areas are closest to power lines	Measurements through EMF meter	Quarterly, or as required	EMF Expert (substation's operator)
Risk of soil contamination	Volume of contaminated soil	Locations of release	Approximate estimation of the volume by measuring surface area and approximate depth	Once an accident happens	Substation's operator

7.3 Raising awareness

During different stages of the project, different awareness raising activities should be carried out with the public in order to minimize the impact, environmentally and socio economically and to introduce and inform the community about the different stages of the project as well as expected duration of its completion.

Another benefit of raising awareness is to train the community especially the women and children on the safety measures that should be applied in the areas of constructions.

These awareness raising activities can be through workshops, public meetings in public gathering places, printing pamphlets, and through the different social interaction websites.

Training plan for socio-economic issues as well as awareness raising activities is presented in the table below.

Table 7-5: Training Plan for Socio Economic Issues

Topic	Contents	Type of training	Expected participants	Proposed time	Expected outcome
Awareness raising	<ul style="list-style-type: none"> -Introducing the new project. -The benefits of the new project. - Explain the different alternatives of the project. -The importance of mobilizing the local resources to replace the removed trees with new ones. 	<ul style="list-style-type: none"> -Organizing community conferences/symposia. -Printing pamphlets. - Using local media. - Making banners. 	The local residents	Before the start up of the project and during the construction phase.	<ul style="list-style-type: none"> -The people are convinced of the importance of the new project. -The people are participating in replacing the removed trees.
Health and safety measures	<ul style="list-style-type: none"> -The importance of applying safety measures during construction. -The needed precautions that ensures the health and safety of people. - The tools that can be used for the protection of laborers as well as the local 	Classroom, on-job training, and field inspections.	The local residents- the laborers and crew	Throughout the construction phase and Operation phase	Both the local people as well as the project crew are applying the safety measures during construction and operation phases.

Topic	Contents	Type of training	Expected participants	Proposed time	Expected outcome
	people. -How to apply safety audits.				
Communication skills	-How to communicate with the public. -Different methods of communication. -The negotiation skills.	Classroom, practical training.	The project staff	Throughout the construction phase and Operation phase	The communication and negotiation between the local people and the project staff is moving smoothly.

7.4 Environmental Safeguard Training

The Project Company (EETC) will ensure that the substation is manned 24 hours 7 days per week. Typically, for such 220/66 station, as mentioned above, is employed around 50 staff with around 15 engineers, 3 shifts per day. For 500/220 substation the number of the workers estimated to be 100 staff with around 25 engineers. All staff employed will be trained in the following:

- specific job roles and procedures;
- occupational health and safety; and
- contingency plans and emergency procedures.

Training will include:

- induction training on appointment;
- specialist training (as required for their prescribed job role); and
- refresher training as required.

The training program will be designed to ensure that appropriate skilled staff are used to operate and maintain the substation at all times. Aspects of occupational health and safety and emergency procedures are to be emphasized.

In addition to this environmental training for all staff employed at the project, special environmental training will be given to the staff during the operation phase to implement the ESMP. They will receive training in the following:

- Day-to-day monitoring activities;
- Collection and analysis of data;
- Use of monitoring equipment, operation and maintenance;
- Industrial hygiene;
- Occupational health and safety; and
- Emergency and contingency procedures.

During the consultation with one of the operator in the existing substation, it is already established the safety standard and regular training held for the staff member. The regular refreshment training held besides the operation and maintenance training are:

- Civil protection
- Fire fighting and fire accident
- Smoke detection
- Fire equipment maintenance

In addition, in every substation, EETC provides the emergency plan map.

8. Consultation with Stakeholders

8.1 Consultations During the Scoping Phase

In order to examine the social and environmental considerations about the project, a consultation process took place with different stakeholders. The consultation with stakeholders is divided into two stages: the consultation activities during the scoping phase and the consultation workshop after the completion of the first draft report of the ESIA.

8.1.1. Public consultation workshop

In order to ensure the announcement for the new project to the local people, an invitation was directed to some representative stakeholders from the targeted region (Ashmoun- Abu Ghaleb- North Giza) in order to attend the public consultation workshops that was organized on 31st May,2011 in Cairo and 1st June,2011 in Shebin El Koum. During the workshops, the new project and its interconnections has been introduced and detailed with the local stakeholders.

In order to hold accountability and transparency with the targeted groups, they were promised to disclose the information and the findings for them by EcoConServ after finalizing the research and after developing the first draft of the report. After conducting the public consultation workshop, the outcomes of the two public consultations will be integrated into the contents of the ESIA to ensure the compliance with the WB policy requirement on disclosure of information as stated in OP 17.50.

Moreover, there will be an on-going consultation during the different phases of the project. As part of the information disclosure to the public about the main findings of the study, a leaflet in Arabic can be printed out and distributed amongst them in public gathering places by the management of the new projects.

8.1.2. Assessment for the consultation methodology

The consultation process was a good opportunity to make an announcement about the project in the targeted area. It also raised the sense of ownership of the local people about the project. It was explained during the field visit and the meeting with the stakeholders that the public hearing is very crucial for the development and planning of the project as it will help in forecasting the possible mitigation measures for having better impacts on both the environment and social life.

The used PRA tools like the SSIs and observations helped in understanding the socio-economic characteristics of the targeted areas as well as the current conditions of the utilization of energy. It also ensured the inclusion of different groups inside the community especially the vulnerable and marginalized groups and obtain their views to be integrated in the current study.

There was a good combination between primary sources from the Information Center of each Executive Local Council and secondary sources in addition to the variation between quantitative data and qualitative data, which helped in achieving the objectives of the study. Dividing the consultation process into two stages as designed is beneficial for the triangulation of information as it gives each party a chance to correct or add to the information. The methodology considered the gender representation during the process and respected the cultural privacy of each community.

8.2 Future consultations

For avoiding the misconception from the local people about the new project, it is planned to organize future announcements and consultations with the local people before and during the constructions. The EETC will be responsible for informing the local people through the following activities:

- Coordinate with the local NGOs to organize community conferences for the local people.
- Using the local media methods (Local Radio- local newspapers).
- Printing pamphlets and distribute it among people in the public gathering areas.
- Hang banners in the public places.
- Announcement through mosques and churches.
- Announcement through the local municipality.

8.3 Findings of the consultations during the scoping phase

A field visit has been conducted in the third week of May,2011. The aim was to do an inspection for the site of the new project and identify the targeted areas. The representatives of the EETC at local level were interviewed in addition to other stakeholders as shown below:-

Interviewed Stakeholders:-

- 1) Eng. Eng. *Rafaat Abdel Aziz* – *Giza North Project Manger*
- 2) Eng. Yousef El Gebaly - *Giza North*
- 3) Eng. *Rammadan Ragab* – *Head of Cairo 500 Substation*
- 4) Eng. *Khaliry Abde Aziz* – *Head of the Lines Dept. Cairo 500 Substation*
- 5) Eng. *Sayed Gabra* - *Cairo 500 Substation*
- 6) Eng. *Asaad Saeed* - *Cairo 500 Substation (0114639059)*
- 7) Eng *Reda Mahmoud* – *Technician at Cairo 500 Substation*

The main findings of the field visit:-

The route of the interconnections starts at Giza North 500 kV Substation and ends at Cairo 500 Substation. The route passes by El Qatta and Nekla villages which currently affiliate to Giza Governorate and El Marioutia from the southern side near Cairo 500 Substation. It is estimated that 50% of the rout is passing through agriculture land (mostly of reclaimed land),

while the remaining part of the route crosses canals (two main canals El Naseri and El Behairy), the rail way and desert areas.

Currently, the site of Giza North Power station is under preparation. The Contractor in charge of the civil works started to clear the site by removing trees. According to the Giza North Project Manager, the land was privately owned and they purchased it from the owners. In order to minimize any potential conflicts between the Electricity Production Company and the owners of the land, the former provide very satisfactory levels of compensations for purchasing the land. Moreover, other opportunities are provided to the local communities as part of the project. This includes several job in different fields.

" we hire more than 50 of the local residents of El Katta, Abu Ghalb and Al Wardan in the project. They are mainly guards and technicians. The local communities have shortage in special specializations like engineering"

Eng. Rafaat Abdel Aziz – Giza North Project Manger

Generally speaking, the Company try to eliminate any potential clashes with the local communities by avoiding the sites whose owners are reluctant to sell for the project and select other sites.

According to the discussion with the Eng. Ramadan Ragab, the manager of Cairo 500 Substation, in order to accommodate the new interconnection to Cairo 500 substation, a new cell will be needed (50 m x 200 m). The land for this purpose need to be purchased from the community since there is no choice with State-owned land.

The operation of the lines requires input from workers in the fields of regular maintenance for the line. This is done in the form of dry cleaning which is carried out every 2 months. This method is largely considered in desert areas. The second method is through mechanical wash. Safety measures are strictly considered during these processes.

EETC provides compensation to farmers for the destruction of crops during the construction phase. According to the interviewees at Cairo 500 substations, the owners of lands could not object on the route passing their lands because these are public interest projects. However, it was widely agreed that the land value is reduced as a result of locating the towers and the route.

Regular training on maintenance, operation, and occupational health and safety issues is usually provided to the field personnel. However, there is limited understanding for environmental issues due to the limited number of trainings in this field.

See photolog for the public consultation workshop:



public consultation at Pyramisa on 31 May, 2011

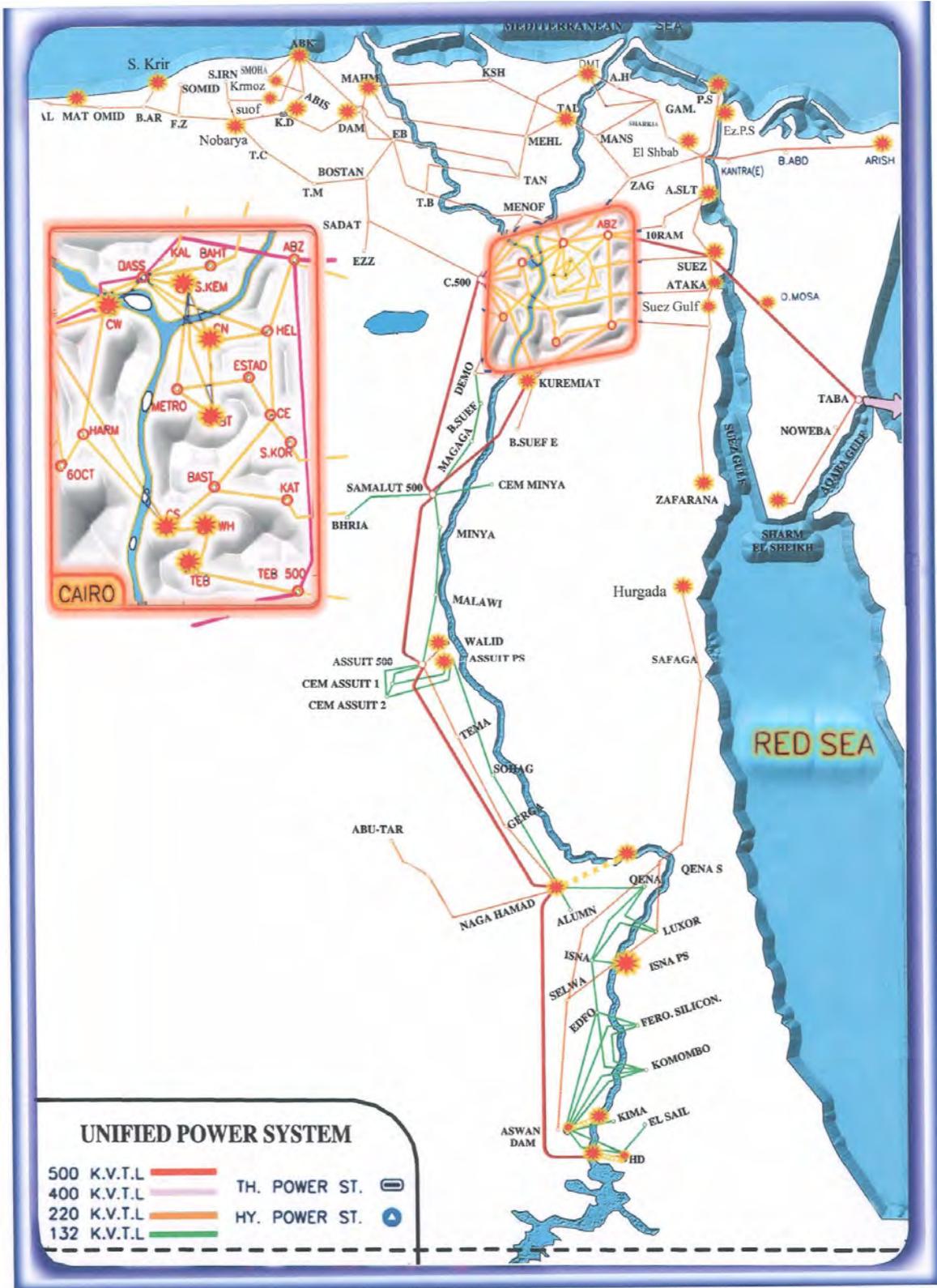
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Annex I

The Electricity map on Grid System of Egypt



Annex II

Map of the Proposed Project in the Egyptian Context

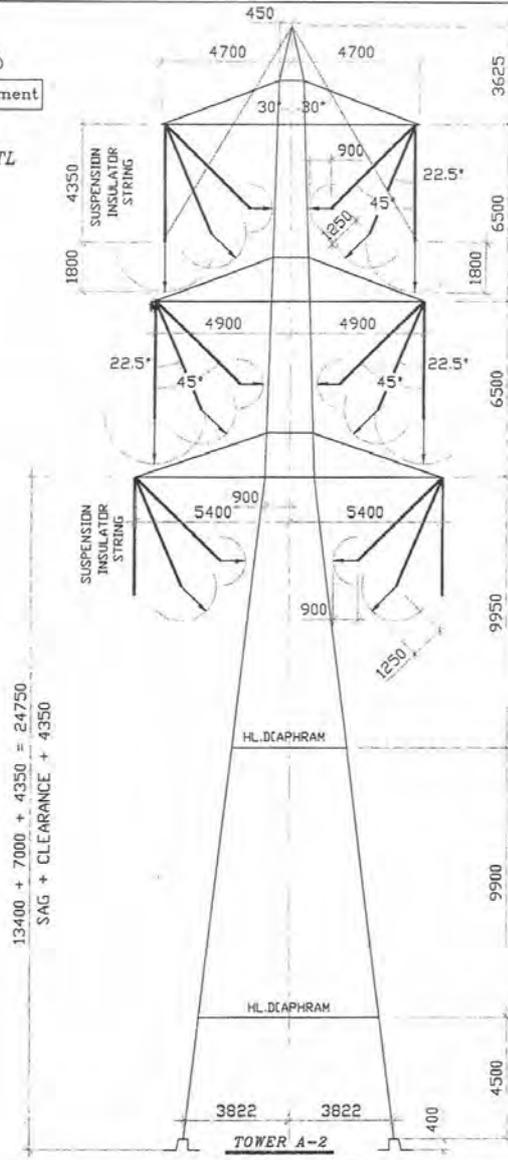
Annex III

Towers Diagram (220 kV)



Towers Department

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220 KV OHTL

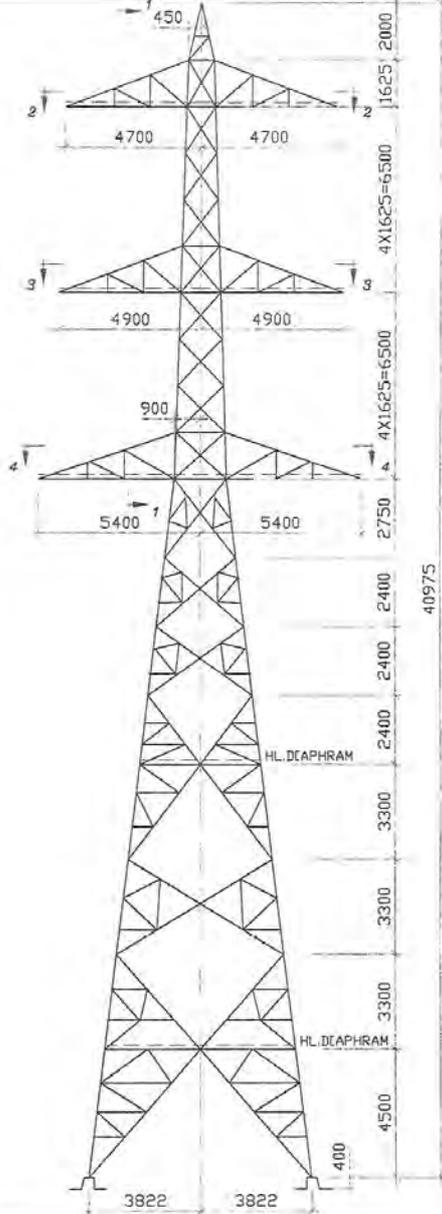


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Towers Department

E.E.T.C.
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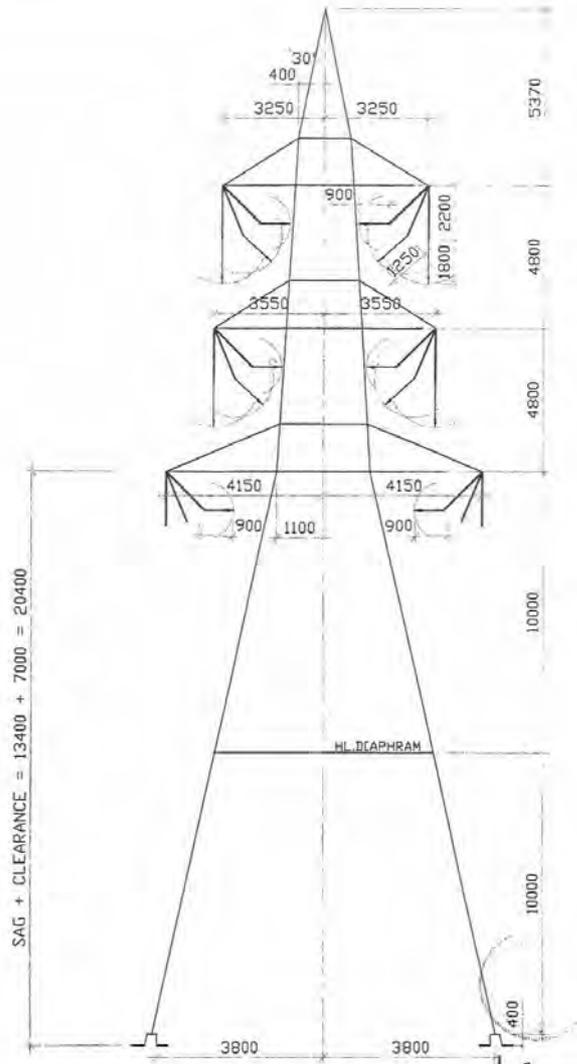
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*Amir
Fatem*



Towers Department

E.E.T.C.
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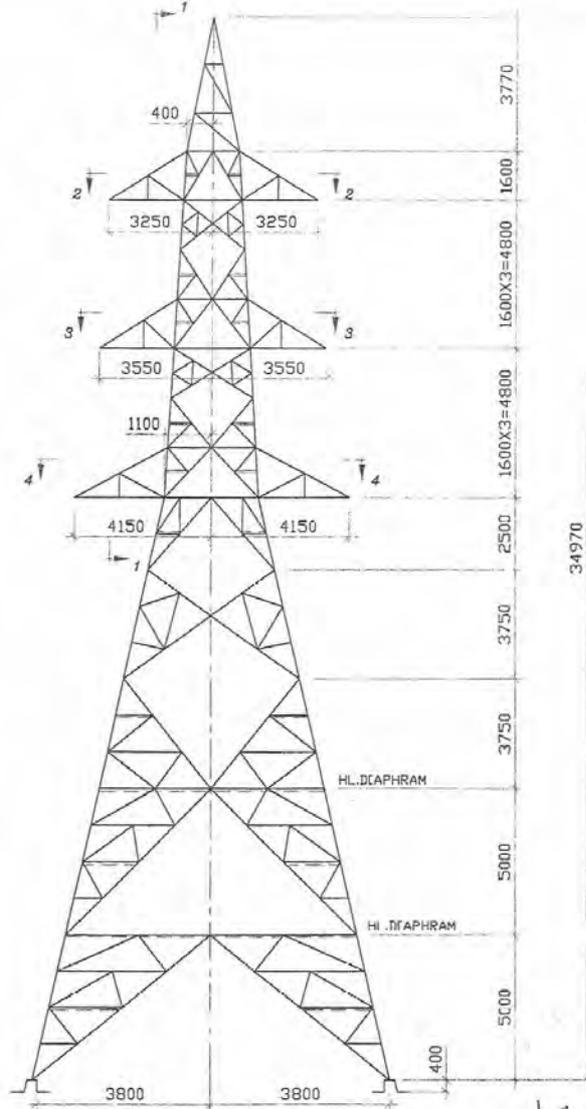


TOWER A-0



Towers Department

E.E.T.C.
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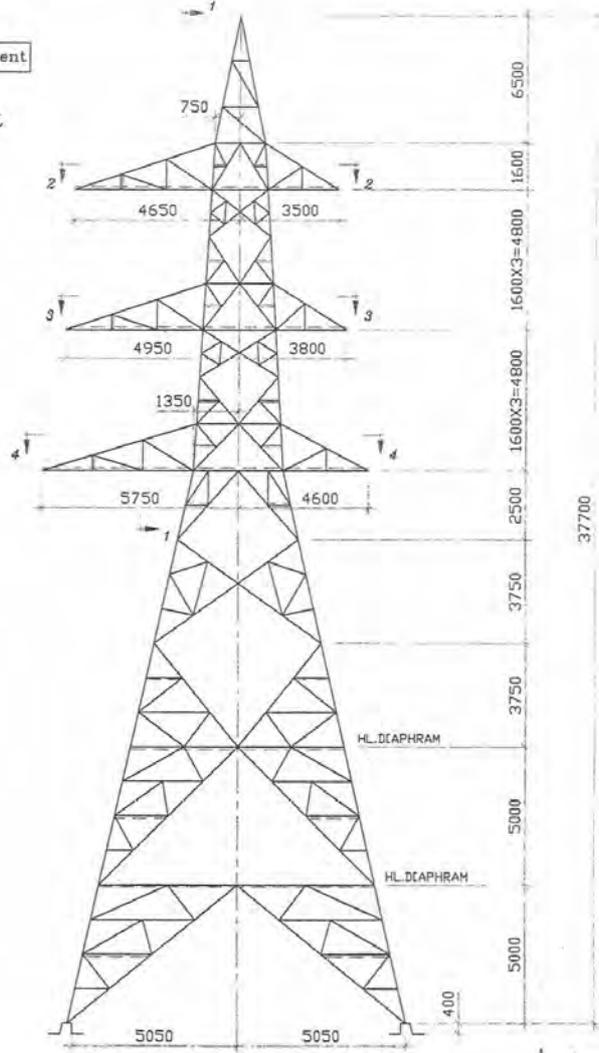
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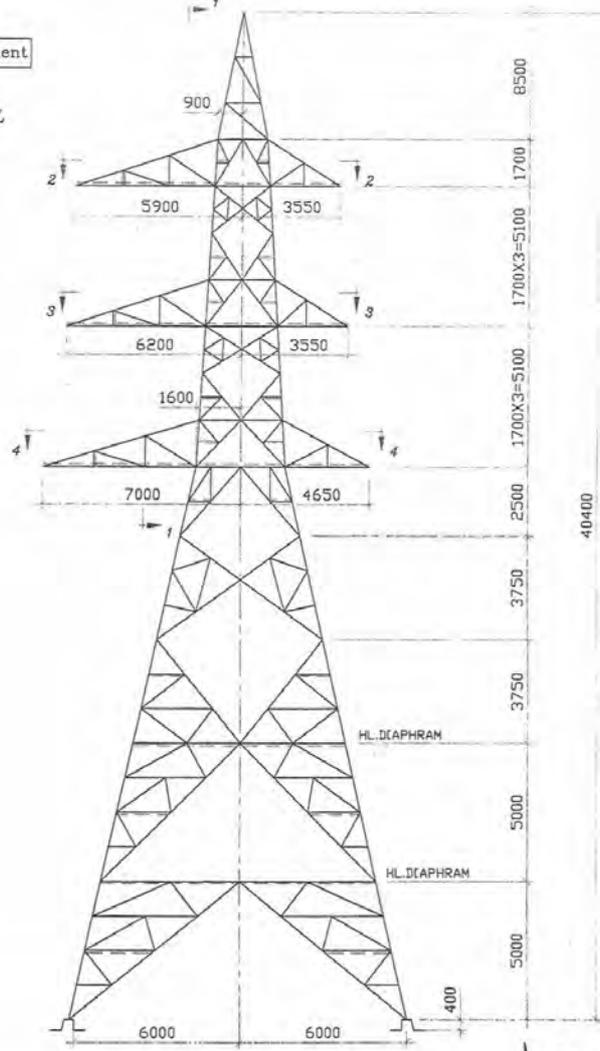
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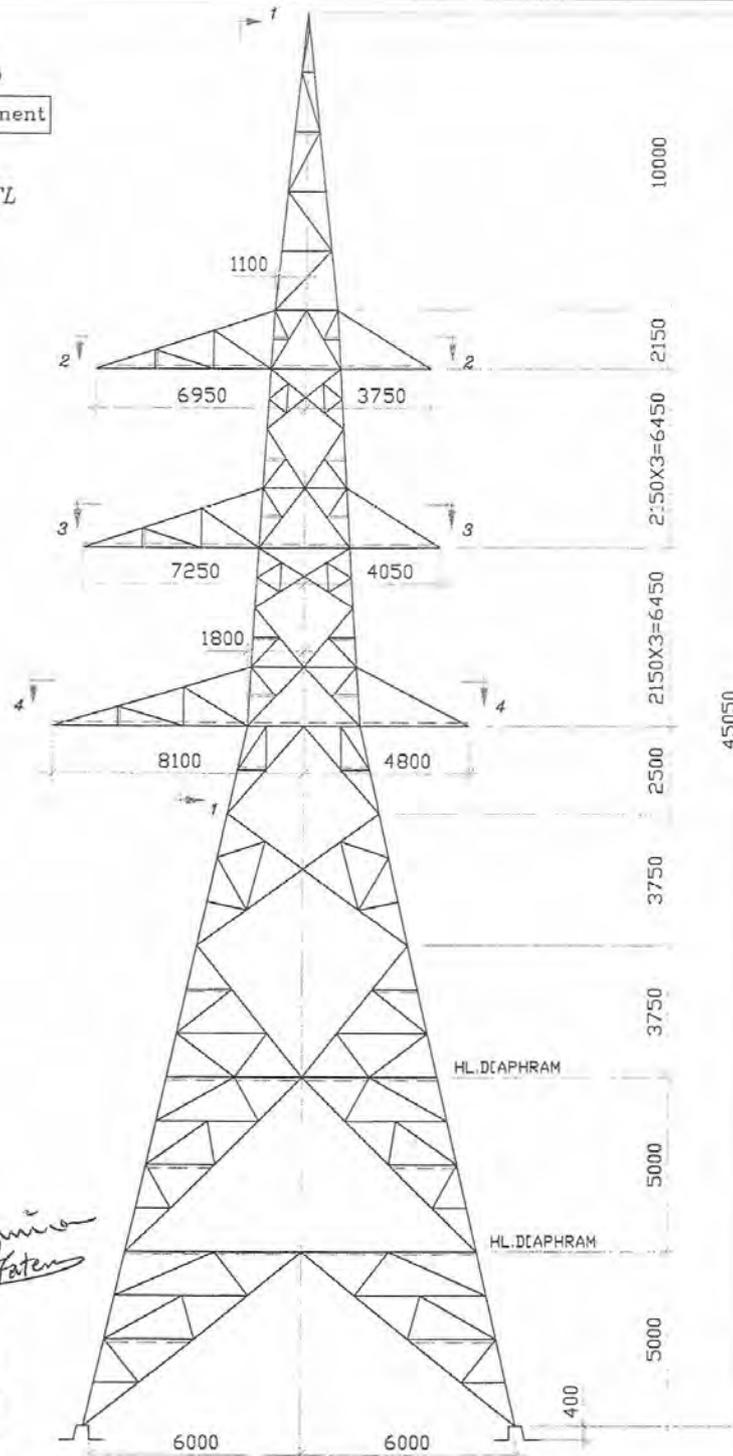
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Anura Jaten



Towers Department

E.E.T.C.
220 KV OHTL



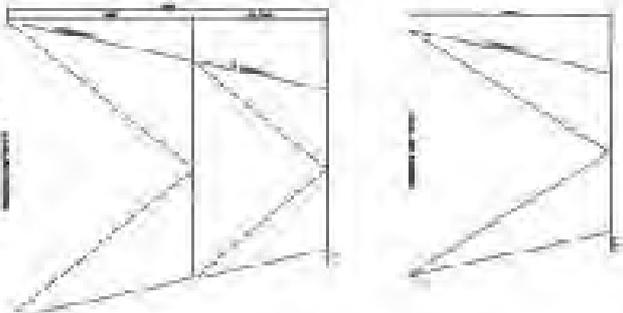
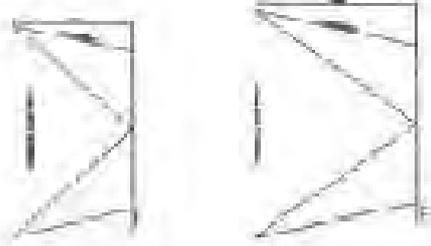
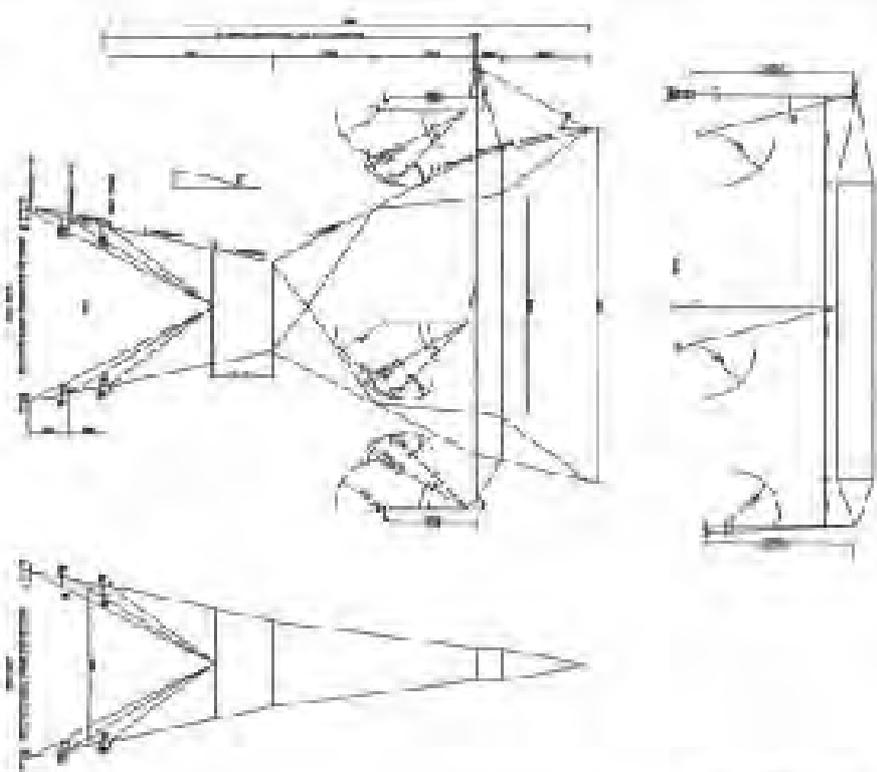
*Amir
Faten*

TOWER A-90
TOWER A-T45
TOWER A-T90

Annex IV
Tower Diagrams (500 kV)

1. PROBLEM
 2. DATA
 3. SOLUTION
 4. CONCLUSION
 5. REMARKS

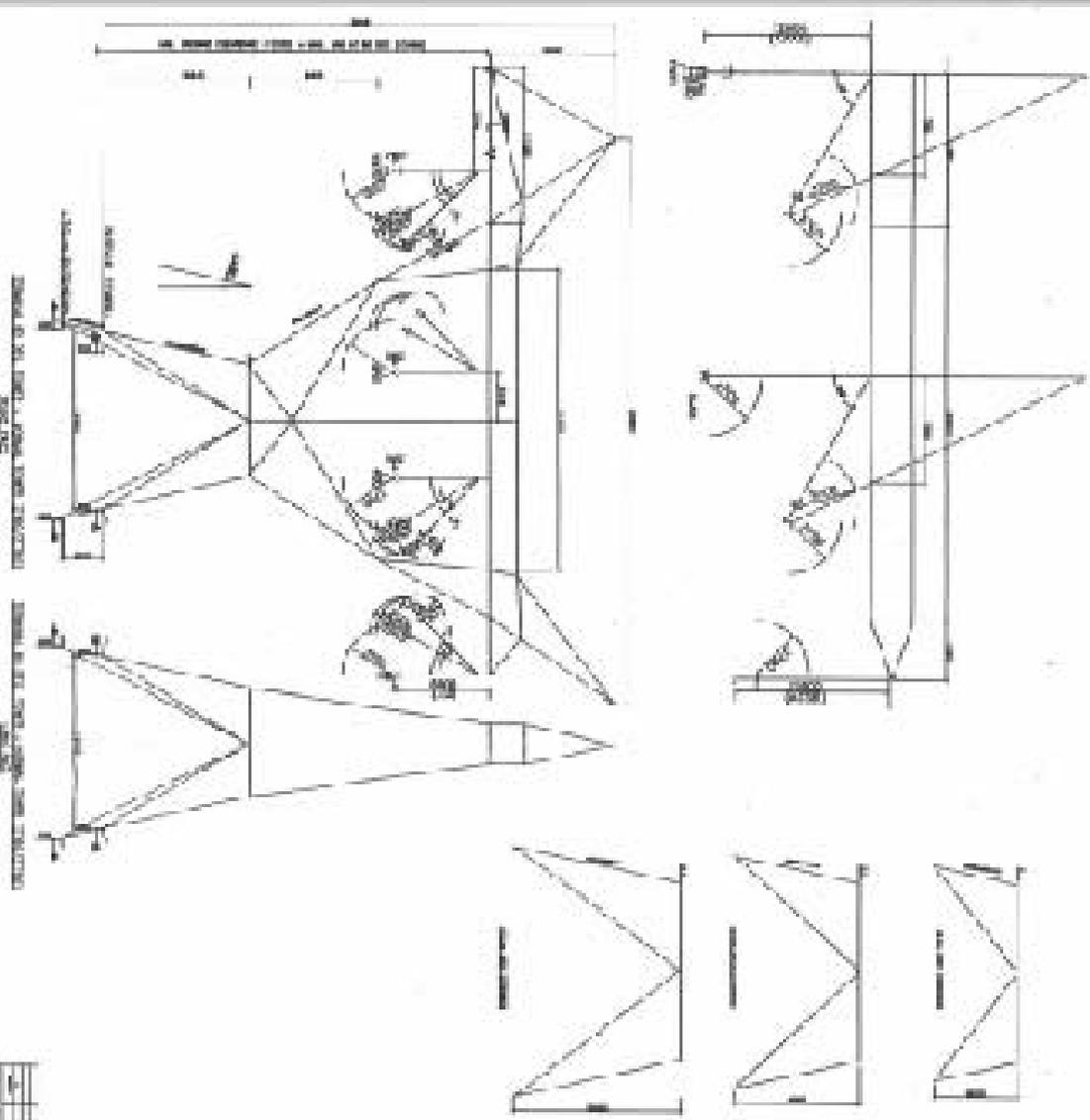
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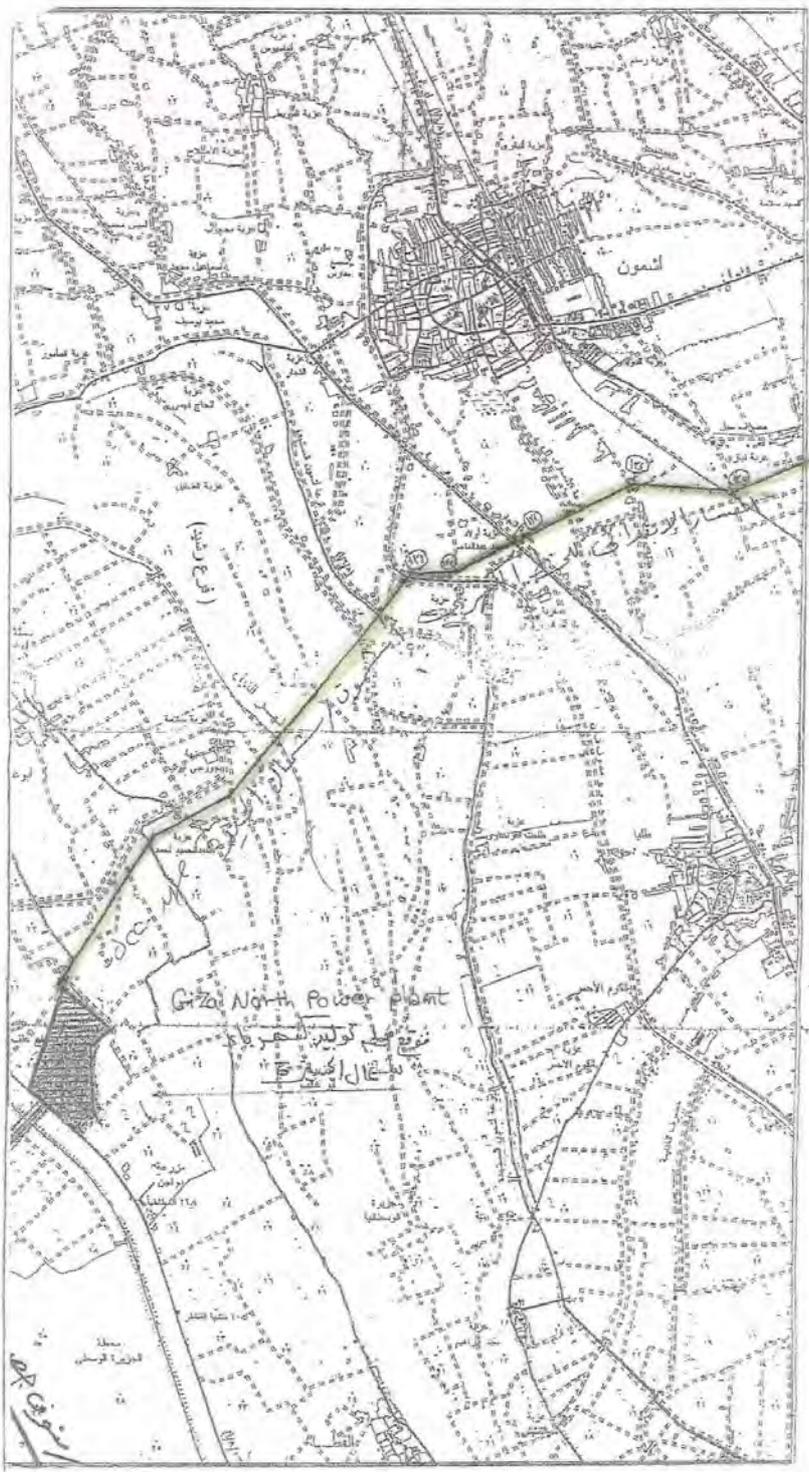
1. The structure is a trapezoidal tower with a square base and a square top. The height is 100m. The base side length is 10m. The top side length is 10m. The structure is supported by four columns. The columns are located at the corners of the base. The columns are 10m high. The columns are 10m wide. The columns are 10m deep. The columns are 10m long. The columns are 10m thick. The columns are 10m wide. The columns are 10m deep. The columns are 10m long. The columns are 10m thick.



Annex V

Map of Giza North/Ashmoun Interconnection Route

Map of Giza North/Samalout 500 and Giza North Cairo 500



The proposed
Asimoun
Substation

(K2)

(K3) كاتبة مشرفة

Giza North Power plant

محطة توليد الكهرباء
بالتجمع الخامس

اسمون

المنطقة الصناعية

محافظة الجيزة

Annex VI

Focus Groups Discussion Checklist

Date/time:
Interviewer:
Place of Interview:
Governorate:

The following questions are only for guidance, it is not necessary to ask them all in case of its inapplicability (out of these questions, some selected questions will be used for the semi structured interviews SSL):-

The current use of energy and the socio-economic impact

1. In case of absence of electricity, what are the key energy sources used for different purposes (lighting, cooking, electric appliances, heating ...etc)
2. Are these sources available for all the households? In case the answer is .No, what are the reasons for their unavailability for these houses?
3. In case of absence of electricity, who is the provider for these energy sources?
4. What are the key socio-economic impacts generated from the current situation
5. Are there any unutilized resources in the area because of the absence of energy sources?
6. Average monthly expenditure on the each of the energy sources (information should also be obtained on the family size and the number of rooms per house from persons who will answer this questions)
7. What are the sources and cost of energy for the commercial and service institutions?

Gender role in the management of energy

8. What is the role of women in the process of energy management on household or village level?
9. Are there certain groups who are more vulnerable to these impacts?

Satisfaction with the current service

10. Regularity and quality of current service (average hours per day)?
11. What are the current communication mechanisms between the consumers and the service providers in the issues related to maintenance, fees collection.etc
12. What are the key strengths and weaknesses in the current service providers?
13. Level of satisfaction with the current level of energy service?

Orient the participants of the new project:-

Community participation and people willingness to pay for the service

14. What is the level of willingness to pay for the connection fees?
15. What are participants' willingness to pay for the service delivery, operation and maintenance to the service providers? What is the average monthly payment that they can afford per month?
16. What is the participants' willingness to increase the paid amount later in order to keep up the level of service and regular maintenance?
17. Are there certain families in the area who will not be able to pay for the service fees? Do participants have any community suggestions to give those families the chance to benefit from the service in return for reduced fees? Are there any associations who can assist in that regard?
18. Are there any institutions that can help community with this payment (credit banks, loans, postal service)?

Expected socio-economic impact from the implementation of the project

19. What are the key socio-economic impacts that participants expect from the implementation of the project (on individuals, household and village)?
20. Will different community groups have equitable access to the impacts of the project?
21. Are there negative impacts expected from the construction and operation of the project?
22. Will certain groups be negatively influenced by losing livelihoods or being disadvantaged in their settlement?

Service provision institutions

23. What are the institutions/ entities that participants prefer to take the responsibility of service provision? Why?
24. What are the key civil institutions that serve the village (NGOs, Cooperatives.etc)? What is the role of women in those institutions?
25. What are their key field of services and which groups benefit from these services
26. What are the key weaknesses / challenges that face these institutions?

27. What is participants' perception for the applicability of having a new service provider to their communities? Are there any considerations related to the social pattern of the area that may challenge the application of this proposal like conflict of interests or disputes? What are the other appropriate models that participants suggest?
28. Is there specific accountable and trustworthy association in the area and participants recommend their participation in the service provision? What kind of service provision?
29. What is the level of acceptance for the engagement of women representative in the service provision entity? Mention names of women who you think are qualified for participation.
30. What are the topics that those service provision entities should be trained on in order to ensure providing good services for the community?
31. Are there any institutions concerned with credit provision for groups or individuals? What are these institutions? Who are the beneficiaries? What are the collaterals?

Project Alternatives

32. Discuss the project alternatives and the negative and positive issues related to those alternatives? Do participants see that the projects is the best alternative from the social perspective?

Involuntary resettlement and compensations

33. Issues around land tenure, land acquisition and donation if small land plots will be needed for the establishment of the substations.
 34. Average of individuals and houses that might be negatively affected
 35. Community perception on methods to compensate those people and mitigate the negative impacts.
 36. What are the suggestions for attaining equitable positive impacts and mitigate the negative impacts?
 37. What's the area/size of the land used for the electrical towers? Does the towers construction damage the crops?
 38. Do they compensate the Fellahs for the land? If yes, with how much?
 39. What types of crops do they cultivate?
 40. Does the compensation depend on the type of land or crops?
-

41. If the Fellahs need to complain about anything regarding the construction of towers on their lands, where do they usually complain?

42. Is there any need for resettlement?

43. The towers will be constructed on lands of owners or tenants?

44. Cutting trees- right of way?

Observations

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Annex VII
Lists of Participants
During Scoping Phase

The Egyptian Electricity Transmission Company (EETC)

Ser.	Name	Title	Organization	Address	Tel.
1	Dr. DalaHelmy	Director of Private sector studies	EETC	Abbaseia	0122730828 0106607559
2	Eng. Fatma Ahmed Abdel-Hamid Nada	Advisor (A) Studies	EETC	Abbaseia	0101627574
3	Eng. Lamiaa Youssef	General Manager of the private sector studies	EETC	Abbaseia	0123498208
4	Eng. EmanRashadSaeed	General Manager of the private sector studies	EETC	Abbaseia	-
5	Eng. Khaled Mohamed Moustafa	The Head of control Department	Giza Distribution Company	26 th Of October street in front of Galaa Hospital	0126533724

Ashmoun

Ser.	Name	Title	Organization	Address	Tel.
Electricity Company: Tuesday 8/2/2011					
1	Eng. Abdel Fattah Mousa	General Director of the Power Lines of Delta Electricity Zone	Delta Electricity Zone	Ashmoun	0125056789
2	Eng. Moustafa EL Habashy	Chief Engineer of the General Department of Electricity networks	Delta Electricity Zone	Ashmoun	0123727665
3	Eng. Tamany Mohamed Bayoumi	General Director of Prevention, Testing and Measurements in Delta Electricity Zone	Delta Electricity Zone	Ashmoun	0101054776
4	HamdyEzz EL Kafrawy	The Head of Ashmoun Transmission Substation	Delta Electricity Zone	Electricity Delta Zone	0104295565
The City Council: Tuesday 8/2/2011					
1	General. SamyMaree	Head of AshmounMarkaz	Ashmoun city council	Ashmoun	048-3442016
2	Ramadan MagdyMoustafa	Researcher in Ashmoun Information Center	Information Center of Ashmoun city council	Ashmoun	0126078326
3	MagdyRiad Abdel Ghafar	Head of Ashmoun Information Center	Information Center of Ashmoun city council	Ashmoun	0124444072 0145550107
4	EssamKhairy	Head of Customer service Department	Information center of Utilities	Ashmoun	0160498668
5	Shimaa Abu EL Ezz Abdel Baset	Environmental Researcher	Environmental Department	Ashmoun city council	0124973833
Ashmoun NGO meeting : Wednesday 23/2/2011					
1	Dr. Ihab Salem Ibrahim	The Head of Ashoum CDA-Pharmacist	Ashmoun CDA	Ashmoun	048- 3442846 0105340240
2	Eng. Abdu Abdel Shafy Abu Hegazy	A member in the board of Ashmoun CDA- Civil Engineer	Ashmoun CDA	Ashmoun	0105340239
3	Badr Ali Howaidy	A member in the board of Ashmoun CDA-	Ashmoun CDA	Ashmoun	0127826092 0109055533

		Accountant in the Chamber of commerce in Shebin El Koum			
Women group meeting: Saturday 12/3/2011					
1	MouhiraHanaaFanous	Employee in Asmoun city council	Ashmoun city council	Samadon village	0198220965
2	ShadiaHosnyMousa	Employee in Asmoun city council	Ashmoun city council	Shenshour village	0129718075
3	HebaRoshdy El Zahar	Employee in Asmoun city council	Ashmoun city council	Sobk Village	0111473120
4	Amina Mahmoud Abbas	Employee in Asmoun city council	Ashmoun city council	Talia Village	0121735322
5	Asmaa Saber Khalil	Employee in Asmoun city council	Ashmoun city council	Ashmoun	0128359320

Consultation and Discussion with the stakeholders at Giza North Power Plant Proposed Site:

- 1) Eng. Eng. *Rafaat Abdel Aziz – Giza North Project Manger*
- 2) Eng. Yousef El Gebaly - *Giza North*

Consultation and Discussion with the stakeholders at Cairo 500 Substation:

- 1) Eng. *Rammadan Ragab – Head of Cairo 500 Substation*
- 2) Eng. *Khaliry Abde Aziz – Head of the Lines Dept. Cairo 500 Substation*
- 3) Eng. *Sayed Gabra - Cairo 500 Substation*
- 4) Eng. *Asaad Saeed - Cairo 500 Substation (0114639059)*
- 5) Eng *Reda Mahmoud – Technician at Cairo 500 Substation*

Annex VIII

Findings during the Scoping Phase

Key findings of the Stakeholders consultations

A) Ashmoun

Introduction:-

Different stakeholder consultations were carried out. The consultations targeted both genders that were representing different age categories, different professions, different educational backgrounds as well as different villages inside Ashmoun. The used qualitative methodology has helped the stakeholders to express their opinions freely based on their experience and perceptions in managing energy in Ashmoun.

The findings of the stakeholders consultation has enriched the ESIA as most of the data and findings enclosed in this report were obtained from local people in addition to other secondary resources.

It is worthy saying that the Egyptian revolution has influenced people's views to a greater extent as they were open, informative, and aware of their needs, interests and rights.

The current use of energy and the socio-economic impact

- The majority of houses inside Ashmoun have access to electricity, only the new houses that have not claimed their possession to the houses have no access to electricity. Besides, there are some people who have been connected to electricity in illegal ways.
- Some of the villages inside Ashmoun have not benefitted from electricity yet; the households there are still using alternative sources of fuel like the kerosene in both lighting and heating.
- The available energy alternatives inside Ashmoun and its villages include: access to electricity from the current electricity facility, using large diesel generators, private power generators as well using the cheap sources of energy such as the kerosene.
- The electricity is mainly used for lighting, ventilation, operating refrigerators, washing machines, water heaters, televisions and satellites. Inside rural areas the first priority is given to both lighting and refrigerating.
- Some of the households inside rural areas combine between two alternatives of energy in order to reduce the cost; they use the electricity mainly for lighting while they use the kerosene for cooking and heating.

- The economic level of each household is affecting their choice of the energy alternative as not all the residents can rent or buy power generators, which are widely used in commercial shops, workshops and small industries.

Gender role in the management of energy

- The role of women in urban areas is different from the role of women in rural areas. In both areas, women are the key player in managing the energy inside their houses. Women are responsible for rationalizing the electricity consumption as well as finding alternative sources. The housewives are those who get in direct contact with the meter readers as well as the fees collectors because of their availability most of the time inside houses.
- Men are the responsible ones for finalizing the procedures of the connection for their houses. Their role is also to pay for the cost of different energy sources. Men are the ones who are doing the complaints procedures in the event of having any shortcomings in the service.
- Rural women are found to be more vulnerable to the negative impact of absence of electricity inside their houses as they have to do most of the domestic work manually.
- The households inside rural areas (women, men and children) who are using the cheap sources of fuels like kerosene are being exposed to the fumes of kerosene and being affected by its negative impact on their health.

Satisfaction with the current service

- The interruptions of electricity usually take place during peak times and in the evening. Inside village, the situation is even worse as the power cuts off for 3 to 4 hours twice to three times a week. In summer time the electricity interruptions are more frequent than winter.
- The unreliability of the current service is the main problem in Ashmoun and its villages due to the variations in voltage, and interruptions from time to time. Most of the electrical appliances get damaged by sudden interruption of electricity.
- The households who have suffered from the damage of their electrical appliances due to the unreliability of the service found themselves obliged to use power generators in addition to the current source of electricity from the electricity companies. Some others use voltage regulators in order to protect their electrical appliances from damage.
- Some of the households especially in the rural areas of Ashmoun found themselves forced to relinquish the use of some electrical appliances such as air conditioners, televisions, satellites, refrigerators, and sometimes water heaters.
- The employed electricity meter reader is not visiting the houses regularly, which resulted in accumulating the fees on households; people find themselves unable to pay for the bills

when the fees collector ask them to pay, as they have to pay fees for several months confluent at once.

- Distribution Company is not liable for any consequential or economical loss experienced due to a power cut; the citizen is the one who bears the loss of the appliance damage.
- The procedures that are followed for connecting electricity for the new houses are complicated and time consuming. The most costly item is to buy the electricity meter, the rest of fees are affordable by the majority of people.
- Most of the families know what are the parties who to resort to in case of having any complaint from the service or dissatisfaction with the service. They also knew where to go to when they receive unrealistic and exaggerated bills (Some mentioned that they go to the complaint office of Ashmoun City council, the others go to the electricity department in Shebin El Koum). However, the majority of the families expressed their dissatisfaction with the system of complains which require them to pay first and complain later. The system as well –according to those families- was not effective in addressing these issues.
- The street lighting is one of the biggest problems inside Ashmoun city as well as the villages; there is no proper maintenance for the street lampposts and in most of the time they are turned off .
- There is no installment system for electricity, but there is the so-called settlement of the bill value if it is high and unaffordable by the citizen. The value of the bill can be divided over several months. The citizen has to pass through long procedures to get the approvals for the bill settlements.
- Some of the interviewed people claimed that there are high voltage Overhead Transmission Lines pass across the city, these OHTL restrict the citizens from constructing new buildings or even constructing additional floors in the existing buildings.

Community participation and people willingness to pay for the service

- The consumption of electricity relies on the size of the house, its need for electricity, as well as the number of family members. In Ashmoun city, the average consumption of electricity as indicated by the electricity bills range 60-100 EGP for households, and 75-150 EGP for commercial shops. Inside villages and rural areas, the average is 25-40 EGP for households, and it reaches up to 60 EGP for commercial shops.
- The suitable power generator for the houses is 15 KVA diesel generators; the price for this generator varies between 35 to 40 thousand EGP. Only few households can afford to buy these generators, the majorities of people rent any available generator from the specialized commercials or buy second-hand ones. The voltage regulator that is used for protecting the electrical appliances costs around 200 EGP.

- The local people are aware that the service provider in Egypt is a holding company; they assume that the company gained good profits in the past from electricity provision; therefore, the local people inside the city and villages affirmed their unwillingness to pay any additional fees rather than the fees of the actual energy consumption.
- Some of the local people expressed their worry about adding any indirect recovery costs to the fees of the electricity consumptions as a result of constructing the new substation.

Expected socio-economic impact from the implementation of the project

The expected positive impacts from the construction of the new substation as mentioned by the stakeholders:-

- Meeting the continuous demand of energy.
- Reduce the frequent electricity interruptions.
- Creating new job opportunities for the local people of Ashmoun.
- Supply electricity to the currently deprived places and villages.
- The villages to have access to clean energy.
- Improve the quality of life and sense of well being for the households especially inside villages.
- The cost of purchasing or renting power generators will be reduced.
- Better access to service and social institutions especially schools and hospitals.
- Decrease the domestic workload for women inside villages.
- Enhanced the level of awareness and openness to the world through access to satellites and internet.
- Better indoor conditions such as lighting, refrigerating and ventilation.

On the other hand, the stakeholders have raised their concerns of the new project,

- The new project may add economic burden on local people especially the poor families, in case of adding indirect recovery cost to the electricity bill.
- The new project may not compensate the small farmers properly or the compensations may not be satisfactory.
- There is a fear of affecting some businesses owners or owners of buildings along the route of the new power lines.
- People are afraid of having more OHTL among houses that may add restrictions on their livelihoods. Some stakeholders suggested for avoiding that impact is to orient the citizens about the advantages and disadvantages of every proposed design; the selection of the best project alternative has to be participatory through obtaining the people's consent on the project.

Service provision institutions

The majority of the stakeholders are satisfied about the current service provider which is the transmission company and distribution companies; they think they are technically capable to run

the service. Others make reservations on them, they suggest that in order to have better performance from the staff of the company, they should be trained on the following:-

- How to read the electricity meters properly, and to have good control system over that process.
- To be trained on maintenance especially the maintenance of the electricity meters.
- Enhancing the system of complaints.
- Organize regular monitoring and inspection visits to double check on the reading of meters.
- To find new alternatives for fees collection such as introducing the idea of the pre-paid cards.

Project Alternatives

The stakeholders have expressed their views on the alternatives of the project under four main areas:-

1) The technical design of the project:-

The project idea has been introduced to the different stakeholders; they have no objections about it technically. However, they asked to reduce the number of OHTL and towers and replace it with underground cables, which are safer and less restrictive on the livelihoods of people.

2) The reading of the meters and fees collection:-

Some of them suggested nominating a trustworthy intermediate party to be responsible for reading the meters as well as fees collection. The local NGOs/CDAs were highly suggested by the majority of people to take that role. However, in case of the futility of this idea at least the company has to seek accountable and transparent systems in meters reading and fees collection.

3) Awareness raising and training: -

The NGOs also were suggested to be responsible for raising the awareness of people about their rights. They also can train them on how to read the meters and calculate the costs based on the actual consumptions.

The Company also has to establish a unit for raising the awareness of the local people , they also have to find transparent information system through updating the database in the company's website.

4) Financial support for poor people:-

Unfortunately, there are no institutions inside Ashmoun that can offer financial support for poor households. Moreover, the installment system for have new electricity connections is not offered through the company. One of the interviewed women suggested that the city or the village council can get the electricity meter for the poor citizens, and the citizens to pay the other

installation fees which are affordable for the majority of people. Some others suggest that the company has to initiate new subsidy schemes to target these poor households.

Involuntary resettlement and compensations

The proposed Ashmoun substation that will interconnect with Giza North power plant belongs to South Delta Transmission Company. The project was initiated in order to meet the increase in the load demand and energy consumption especially in Cairo zone, a new additional power plant of capacity 3x650 MW units is planned to be constructed in North Giza. Therefore, it became necessary to construct new projects to relieve the loading of the neighboring substations in this area such as (Menouf- Qalyubia- Quwesna) substations.

The stakeholders of Ashmoun substation stated that there is already existing 220 kv OHTL between Menouf and Qalyubia (33 Kms), from that OHTL tower there will be will be two OHTL one will go (In) from Menouf to Ashmoun (23 Kms) and another one will go (Out)from Ashmoun to Qalyubia (10 Kms). Moreover, there will be 220 kv connecting Ashmoun with North Giza power plant (15 Kms).

Size of land that will be affected:-

The current Menouf/ Qalyubia OHTL has around 108 power towers which occupy (33) Kms. The area of the footing of each tower is about 12x12 meters, which will be deducted from any land on which these towers will be placed. However, these areas are scattered as the distance between each OHTL is about (300 meters). Therefore the calculations suggest:-

- From Menouf/ Ashmoun: 76 towers along the 23 Kms
- From Ashmoun/ Qalyubia: 33 towers along the 10 Kms
- From Ashmoun/ Giza North: 50 towers along the 15 kms

Total: 159 towers

Therefore the expected affected land will be around 22896 m², as follows:-

In the area between Menouf/ Ashmoun: 10944 m² (76 towers x 144 m²)

In the area between Ashmoun/ Qalyubia: 4752 m² (33 towers x 144 m²)

In the area between Ashmoun/ North Giza: 7200 m² (50 towers x 144 m²)

The potentially affected persons/groups:-

By exploring the area between each two site using Google earth, all the lands lie within these area are agricultural lands

The type of impact related to land acquisition for securing the ROW:-

- The ROW zone as identified by the Law (13 meters) will restrict having new buildings and plantation of trees on the route in order to maintain the safety of the line; therefore there will be a limitation on agriculture crops such as wheat- maize- citrus fruits-potatoes and clover as well as trees plantation.
- The possible effects of electromagnetic fields of the line will create certain restriction on some land uses under the line.
- The OHTL have to be built on a concrete base of about 12x12 meters, which will turn that piece of land to unused area.
- A certain area under the line will be kept as a buffer zone for maintaining the public safety from electric hazards and high exposure to EMFs.
- The stakeholders in Ashmoun have emphasized that the route of the main power lines Asmoun/ Menouf, Ashmoun/ Qalyubia, and Ashmoun/ North Giza power plant will be away from any buildings in the way of the specified route. However, the line will pass through different agricultural lands along the three different routes. Therefore, the compensation schemes to the peasants of these agricultural lands will be applied.
- Ashmoun new substation will be built within the current substation facility. Therefore, there will not be any impact on the land acquisition for the substation.
- The habitats of nesting birds should be identified first before any construction to take place in order to avoid the demolition of these habitats.
- There are no direct effects related to power lines to animals passing under them nor to birds flying above them; therefore, the construction of power lines is unlikely to cause any limitations on grazing activities or effect on the birds migration.

Estimate numbers of affected persons:-

None of the local people have managed to identify the number of the people who own these agricultural lands between each site. However, the stakeholders claimed that the agricultural farmlands possessed by individuals within the governorate are characterised of being very small. It is essential before the start up of the project to carry out a field survey in order to identify the number of the land owners and farmers who will be affected as a result of constructing the towers of the OHTL.

Estimate numbers of trees:-

Assuming that there are 5 meters distance between each tree and the other, it is estimated to have around (4579) trees which will be affected within the expected affected land (22896 m²).

Compensation process:-

During consultation, people stated that in previous projects they were compensated for their lands and other possessed properties through a valuation Committee that was formed, with the membership of (a representative of Ministry of Agriculture and Land Reclamation- a representative from the local agricultural cooperative- a representative of the Egyptian Survey Authority- a representative of the Governorate/ Markaz/ village- and representatives of the Local Popular Council- local natural leaders). They also claimed that before reaching an agreement on the amount of compensation, several negotiations took place.

The average price for the agricultural land is estimated to be 250 thousand EGP/ Egyptian Acres; however, this price varies according to the type of the land and the types of the cultivated crops.

Some selected quotations from the stakeholders:-

"Sometimes we cannot afford to pay for the bill; therefore we will not pay any additional fees"- Women group.

"It is important for the new project is to keep the power lines away from the residential areas; some of the current power lines cause fires, others may damage the houses"- Women group.

"When the electricity cuts off and being restored back suddenly, all the electrical appliances got damages. The Electricity Company is trying to satisfy people through compensations just to avoid having complaints from them" -Ashmoun NGO's meeting.

"The role of the CDAs and NGOs is a role of advocacy and raising the awareness of people, how can we convince people if the service is not reliable, in order to carry out our role as an NGO effectively, the company has to work on enhancing the service"- Ashmoun NGO's meeting.

"If the electricity bill was exaggerated, I can ask for a settlement for the amount, if I cannot pay it at once; however, the procedures of getting the approval for this settlement are really long and boring" -Women group.

"I bought flat last year, since then, I never met the meter reader or the fees collector. I don't know how I would pay for the fees of 3000 kilo volt which have been accumulated on my shoulder?"-Women group.

"If I have to complain about any issue related to electricity, should I complain to same agency, they will never do anything for me because they won't admit that they were mistaken" -Ashmoun NGO's meeting.

"In the past, the people would accept any compensation offered to them; nowadays, no one will be satisfied easily especially after the big rise in the prices of both agricultural and construction lands"- Officials meeting.

"The citizens have to be aware of the advantages and disadvantages of every project alternative in order to be able to decide on which one has the lower negative impacts". Ashmoun NGO's meeting.

"The area of the footing of the power line is very small comparatively, it won't affect the productivity of the agricultural land; however, it will reduce the land area". Ashmoun NGO 's meeting.

"We need this new project urgently, because we have a real problem about electricity inside Ashmoun. We cannot afford to buy new electrical appliance every now and then."- Women group.

" One of the achievements of the revolution is that the people became aware of their rights and responsibilities, if there is any shortfall in the service, nobody will keep silent"- Ashmoun Transmission company.

B) Giza North Power Plant Site and Cairo 500 Substation

A field visit has been conducted in the third week of May, 2011. The aim was to do an inspection for the site of the project and identify the targeted areas. The representatives of the EETC at the local level were interviewed in addition to other stakeholders as shown below:-

Interviewed Stakeholders:-

- 1) Eng. Eng. *Rafaat Abdel Aziz* – *Giza North Project Manger*
- 2) Eng. *Yousef El Gebaly* - *Giza North*
- 3) Eng. *Rammadan Ragab* – *Head of Cairo 500 Substation*
- 4) Eng. *Khaliry Abde Aziz* – *Head of the Lines Dept. Cairo 500 Substation*
- 5) Eng. *Sayed Gabra* - *Cairo 500 Substation*
- 6) Eng. *Asaad Saeed* - *Cairo 500 Substation (0114639059)*
- 7) Eng *Reda Mahmoud* – *Technician at Cairo 500 Substation*

The main findings of the field visit:-

The route of the interconnection starts at Giza North 500 kV Substation and ends at Cairo 500 Substation. The route passes by El Qatta and Nekla villages which currently affiliate to Giza Governorate and El Marioutia from the southern side near Cairo 500 Substation. It is estimated that 50% of the rout is passing through agriculture land (mostly of reclaimed land), while the remaining part of the route crosses canals (two main canals El Naseri and El Behairy), the rail way and desert areas.

Currently, the site of Giza North Power station is under preparation. The Contractor in charge of the civil works started to clear the site by removing trees. According to the Giza North Project Manager, the land was privately owned and they purchased it from the owners. In order to minimize any potential conflicts between the Electricity Production Company and the owners of the land, the former provide very satisfactory levels of compensations for purchasing the land. Moreover, other opportunities are provided to the local communities as part of the project. This includes several job in different fields.

"we hire more than 50 of the local residents of El Katta, Abu Ghalb and Al Wardan in the project. They are mainly guards and technicians. The local communities have shortage in special specializations like engineering"

Eng. Rafaat Abdel Aziz – Giza North Project Manger

Generally speaking, the Company try to eliminate any potential clashes with the local communities by avoiding the sites whose owners are reluctant to sell for the project and select other sites.

According to the discussion with the Eng. Ramadan Ragab, the manager of Cairo 500 Substation, in order to accommodate the new interconnection to Cairo 500 substation, a new cell will be needed (50 m x 200 m). The land for this purpose need to be purchased from the community since there is no choice with State-owned land.

The operation of the lines requires input from workers in the fields of regular maintenance for the line. This is done in the form of dry cleaning which is carried out every 2 months. This method is largely considered in desert areas. The second method is through mechanical wash. Safety measures are strictly considered during these processes.

EETC provides compensation to farmers for the destruction of crops during the construction phase. According to the interviewees at Cairo 500 substations, the owners of lands could not object on the route passing their lands because these are public interest projects. However, it was widely agreed that the land value is reduced as a result of locating the towers and the route.

Regular training on maintenance, operation, and occupational health and safety issues is usually provided to the field personnel. However, there is limited understanding for environmental issues due to the limited number of trainings in this field.

Annex IX

Results from Public Consultation

Public Consultation Workshop and List of Participants

Date: May, 31st 2011

Venue: Pyramiza Giza Hotel

Objective: to discuss the findings of the Giza North Interconnections Project.

Total number of participants: 75 participants

In accordance with the WB policy as stated in OP 17.50 on Disclosure of information, the EETC hosted a Public Consultation Workshop on Tuesday May31st, 2011 in Pyramisa Hotel in Giza for making the information and the findings of the study available to the public. The workshop event was announced through advertisement in a national newspaper. Moreover, EcoConServ in coordination with the EETC invited some of the stakeholders individually either by phone or through sending them formal invitations; most of those stakeholders are those who have participated in the consultation during the scoping phase.

The participants of the workshop have represented different categories and different stakeholders from the targeted areas, the participants have represented different Governmental organizations such as (EETC, Electricity Distribution Company, Ministry of Energy and Electricity, Water and Sanitation Company, EEAA, Ministry of Environment, Roads and Transportation Directorate, Industrial Safety Directorate, Agriculture Directorate, Water Resources and Irrigation Directorate), NGOs, University Professors, Journalists, representatives from Badr city, representatives from Abu Ghaleb LGU, representatives from Giza Governorate, and representatives from Local Popular Councils at different levels (List of workshop participants is found in the end of this section).

The workshop started by an introduction about the objectives of the new planned projects, and a detailed technical description for each project which was introduced by the EETC. Then EcoConServ started by presenting the findings of the ESIA study for each project, which has been followed by allocating sufficient time for the participants to comment, discuss and raise any issues related to the ESIA assessment. It was explained before commencing the open discussion that the participants' comments and concerns will be incorporated into the final draft of the ESIA report.

It was explained that the presentation cannot cover all what have been included in the study; therefore, an Arabic executive summary was distributed among all workshop participants, and the EETC has announced that the final report will be made available to the public in the public gathering places, the local municipalities, as well as will be published in the website of the company.

By the end of the day, the participants were asked to evaluate the workshop, the impression of people about the day was positive as reflected by the evaluation forms which have been received from some of the participants. The participants have appreciated organizing such workshops in order to give a chance to the representatives of the local communities to express their concerns freely and hold transparent and accountable to the public.

The discussion as well as the comments which have been raised by the participants has reflected that there are no significant objections on any of the components of any project. However, they emphasized on applying the mitigation measures as proposed in order to alleviate any negative impacts that may arise throughout the different phases of the projects. The different issues raised during this workshop were highly considered during the production of the final version of the ESIA.

The main comments that were raised by the participants included:-

Environmental issues:

- Dr. Aboud Ibrahim Aboud- Cairo University has expressed his great concern about health impacts resulted from electromagnetic waves around electrical transmission interconnection lines during operation especially the 500 kilovolt electricity transmission lines . Eng. Maher Aziz- Consultant of the EETC on Environmental studies has clarified some basic scientific aspects related to the electromagnetic waves. It was made clear by the consultant EcoConserv that there were more than 1000 researches that were conducted in Egypt in order to measure the impact of electromagnetic waves; results from this research have proved that there is no negative impact on people on certain distances. This impact was described in Law 63/1974 through identifying secure distances and ROWs which is normally doubled to ensure the safety of people. Moreover, it was explained that it is important to minimize the time of exposure to these waves under these electricity transmission lines in order to decrease the potential negative health impact.
- Dr. Aboud also has raised the issue of the possibility of moving the location of North Giza power plant as his own land which is adjacent to the plant will be directly affected. Although, he was compensated by the EETC in a satisfactory way; however, Dr. Aboud is still hopeful to find an alternative place to be allocated for the plant instead of his land. Although, discussing the construction of North Giza power plant is out of the scope of work and it is a different project; however, Eng. Maher Aziz responded that for technical reasons, and after studying all the available alternatives, the current chosen location was the best alternative. It was also made clear that the location of the power plant should be in the areas where there is excess load of electricity. Moreover, it should be close the water and gas as well as the electricity grids. Eng. Maher has emphasized that the EETC will reclaim other lands in other areas which can reach up to 160 Egyptian Acres as a substitution for the currently chosen lands as the electricity sector is in need to generate 2000 M.W every year in order to meet the growing demand of electricity.
- Although the M&E system was illustrated during the presentation, Eng. Shahata Ali Dorra- Representative of Giza Water Company has asked about the mechanism which will be used during the construction and operation in order to ensure the compliance of the project to the national and international standards. The consultant EcoConserv has explained that there is an M&E and inspection plan was developed for both the construction phase and operation phase as part of the ESIA report. Eng. Maher Aziz has explained that there will be monthly and quarterly reports which will be developed by the company to the donors and local stakeholders, these reports will be published in the website of the company. Moreover, her added that the company is always using the policy of the open door as the local people are welcomed to visit the sites of the project and discuss any concerns with the project crew. Besides, the public consultations will be repeated throughout the lifespan of the project

Social issues:-

- Mr. Gamal Saleh- The head of Cairo EMU has asked to consider the psychological impact of the project on the morale of local people especially for those whose lands will be expropriated. He suggested finding alternative solutions for them instead of destructing their

houses. Eng. Iman Rashad has responded that the EETC never tries to destruct any houses in the way of the route of the transmission lines; they replace it with underground cables in order to avoid the involuntary resettlement as much as possible. Mr. Gamal has recommended substituting the local people by building a medical center or a hospital for them in order to convince them of the direct benefit of the project on their lives.

- Dr. Aboud has requested to make a copy of the final report available for the local people in order to enable them to monitor the proper implementation of the project based on the proposed mitigation plan. It was promised to distribute the final copy of the report among the different governmental departments and local municipalities.
- Mr. Mahmoud Moawad- from Abu Ghaleb village, a member in the Governorate Local Popular Council has requested to find jobs for local people as much as possible in order to satisfy them. The Consultant has explain that hiring the local people is included as one of the mitigation measures, however normally hiring the crew takes place based to the available expertise inside the local community. Mr. Gamal Saleh- The head of Cairo EMU has commented that it is important to think of developing a specialized program in order to rehabilitate the local people and train them on different technical skills that will enable them to work in the new projects. It was explained that hiring the staff is taking place based on fair procedures ensuring giving equal opportunities to all the candidates.
- Eng. Shahata Ali Dorra- Representative of Giza Water Company has raised the issue of the importance of organizing awareness raising programs for the local people who are not aware of the bad effects of doing different activities under the high voltage transmission lines. Eng. Iman Rashad has explained that before the construction of any building, some needed permission should be obtained especially the one from the MoEE in order to identify the ROW and the secure distances from the transmission lines which should be considered before the construction of any new buildings. It was emphasized that there is a great role which can be carried out by the Popular Committees in observing and monitoring such violations and inform the specialized authorities based on recommendations of the Egyptian Environmental Law 4/1994.
- Mr. Mahmoud Moawad has submitted a formal request to the EETC to supply Abu Ghaleb LGU with water pumping machine due to the lack of the governmental resources to purchase and install one. Eng. Maher Aziz promised Mr. Mahmoud that he will submit his request to the chief Director of EETC and stated that the company will seek the possible funding resources in order to supply the village with this needed pumping machine.
- Mr. Alaa El Din- Giza EMU has suggested taking the needed precautions in order to limit the urban sprawl of the new residential housing and to keep it away from the location of the substations and the ROW of the transmission lines through building fences or using banners for guidance. He also emphasized the importance of developing a chart showing the market average prices for every type of land and crops in order to compensate the affected people in a satisfactory way.

List of Workshop Participants:

Consultation workshop for the project of
Giza North 3x750 MW Interconnection and construction Badr substation

Pyramiza Hotel

Tuesday, May31st 2011

Registration Form

No.	Name	Job Title	Phone no.
1	Dr. <u>Ramzy Kamel Farag</u>	Journalist- The world Today "El Aalam El Youm"	0122898191
2	Eng. <u>Moustafa Raafat Bahgat</u>	The head of technical affairs sector of sewage company	0103372905
3	Eng. <u>Afaf Mahdy Mahmoud</u>	General Manager of High Voltage Lines	0109914751
4	Dr. <u>Email Abdo</u>	Journalist- Science news "Akhhbar El Elm"	0127535157
5	Eng. <u>Shahata Ali Dorra</u>	Giza Water Company	0118980066
6	Mohamed <u>Saad Yahia</u>	Legal Affairs Specialist- Ministry of Environment	0101809317
7	Eng. <u>Ibrahim Tantawy Ahmed</u>	Advisor(A)- EETC	0101731897
8	<u>Bothaina Yasin</u>	GM of Environmental Studies-EEHC	22616531
9	Eng. <u>Karima Mokhtar Abdel Hamid</u>	Engineer- EETC	0193879738
10	Eng. <u>Mohsen El Baraa</u>	GM of Technical Monitoring- EETC	0114840848
11	Mona <u>Nabil Abdel Mohsen</u>	Accountant- EETC	0106559210
12	<u>Magdy Sherif Mahmaoud</u>	News reporter- Modern Freedom Charnel "Modern Horeia"	0117500751
13	Eng. <u>Mohamed Abdel Sadek Halaby</u>	Head of Control, Prevention and communication sector-	0128237772



Consultation workshop for the project of
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Registration Form

No.	Name	Job Title	Phone no.
		North Cairo Distribution Company	
14	<u>Shabaan Ahmed Mohamed</u>	Technical Consultant- Fayoum Electricity Distribution Sector	0147826087
15	Mohamed <u>Abd Allah Ibrahim Salman</u>	Accountant in studies department- EETC	0108530024
16	Eng. <u>Maher Aziz</u>	Consultant of Environmental Studies- EETC	0123689795
17	Eng. <u>Abdel Qader Mohamed Badawy</u>	GM of Electricity- <u>Badr</u> City	0103468373
18	<u>Youssef Abdel Hamid Fahmy</u>	Head of Giza EMU	37794622-33750478 0107482852
19	<u>Alaa Hassan</u>	GM of Electricity- South Cairo	0124940808
20	Eng. <u>Ahmed Hendy Ahmed</u>	GM of Agricultural Extension	0103710594
21	Eng. <u>Ahmed El Nemr</u>	GM of North Giza Project	0106791521
22	<u>Reda Ragab Abda Allah</u>	Chemist- North Giza Power Project	0104145089
23	<u>El Sayed Mabrouk Goma</u>	Chemist- North Giza Power Project	0183468966
24	Eng. <u>Amira Abdel Hakim</u>	Ministry of Environment	0123874929



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No.	Name	Job Title	Phone no.
25	<u>Amany Salah El Saeed</u>	Head of Electricity Projects Department	25256452
26	<u>Ibrahim Ali Omar</u>	GM of Industrial Safety	25321680
27	<u>Ashraf Sayed Ahmed</u>	Head of The Environment NGO- Cairo	0101903104
28	<u>El Sayed Ali El Saywed Shouman</u>	A member of the Local and Popular Council of Giza Governorate	0105444333
29	<u>Hemida Abdel Qader Hemida</u>	A member of the Local and Popular Council of Cairo Governorate	0166103728
30	<u>Mohamed Abdel Baset Aqrab</u>	A member of the Local and Popular Council of Giza Governorate	0123013760
31	<u>Dr. Asem Yousef</u>	Cairo University	0113290120
32	<u>Dr. Aboud Ibrahim Aboud</u>	Cairo University	0123153989
33	<u>Badawy Asaker</u>	A member of the Local and Popular Council of Giza <u>Markaz</u>	0106760442
34	<u>Hossam Ali Ali</u>	Journalist	0129285048



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No.	Name	Job Title	Phone no.
35	<u>Hoda Mohamed Ismail</u>	EEAA	0104244436
36	<u>Moatar Yousef Ahmed</u>	EEHC	0107652151
37	<u>Aliaa Nabil El Tawael</u>	Representative of African and Asian Writers Union	0124433071
38	<u>ElShahawy Aql</u>	Journalist	01210286925
39	<u>Samy Awad Gerges</u>	Chef Engineer- Ministry of Irrigation and Water Resources in Giza	016143241
40	<u>Khairy Omar El Gizawy</u>	Chartered accountant	0123315996
41	<u>Eng. Sahar Attia</u>	Chartered accountant	0118513750
42	<u>Dr. Dalal Hussien Moustafa</u>	Director of Private Sector Studies Department- EETC	0122730828
43	<u>Camal Ahmed Mohamed Saleh</u>	Head of Cairo EMU	0105226706
44	<u>Mahmoud Moawad</u>	A member of the Local and Popular Council of Giza Governorate	0101191564
45	<u>Amira Maher Abdel Maqsood</u>	Engineer- EETC	0114274804



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No.	Name	Job Title	Phone no.
46	<u>Sawsan Shebl El Aasar</u>	Accountant-EETC	0111985009
47	<u>Sherin Morsy Mahmoud</u>	Accountant-EETC	0103662800
48	<u>Nour Abdel Moniem</u>	GM-EETC	0114272662
49	<u>Eng. Nagwa Mosaad Mohamed</u>	GM of studies Department- EETC	0127320960
50	<u>Eng. Sayed Atta Allah</u>	Head of Development Sector (ABB)	0122181963
51	<u>Eng. Mohamed Ali</u>	Ministry of Industry	33030958
52	<u>Eng. Fatma ahmed Nada</u>	Advisor(A)- EETC	0101627574
53	<u>Eng. Iman Rashad Saeed</u>	GM of Private Sector Substations-EETC	0101229033
54	<u>Mohamed Ezzat Allam</u>	Head of Control Sector	0124836633
55	<u>Dr. Alaa ElDin Abdel Hafez</u>	Environmental Researcher- Cabinet of Giza Governorate	0105148607
56	<u>Eng. Rashed Ahmed El Sayed</u>	Deputy of Roads and Transportation Department of Giza	0106465849
57	<u>Magdy Ahmed Abdel Aleem</u>	Head of Chemistry Department- West Cairo Project	0129030213
58	<u>Abdu El Hussieny</u>	Head of Chemistry Department- North Giza Project	---



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No.	Name	Job Title	Phone no.
59	<u>Ayman Mohamed Abu El Enien</u>	GM of Central Department of Lighting- Cairo Governorate	0105420587
60	<u>Tamer Mahmoud Lotfy</u>	Manager of Marketing in El Arabia Company- <u>Badr</u> City	0113792881
61	<u>Ezzat El Sayed Ahmed</u>	Journalist	33140864
62	<u>Seham El Nady Hassan</u>	Senior Chemist in EEHC	0101130196
63	<u>Eng. Ibrahim Waleed Amin</u>	Chairman of the committee of Industry and Energy- Council of Cairo Governorate	0122887914
64	<u>Reda Zakaria</u>	Driver- Giza	0167189661
65	<u>Mohamed Magdy Ali</u>	Engineer- MoEE	---
66	<u>Mourad Magdy Mohamed Nassar</u>	Accountant- EETC	0125015888
67	<u>Zaki Moustafa Ramadan</u>	EETC	0128284416
68	<u>Refaat Radwan Sayed</u>	Engineer- EETC	24191219
69	<u>Hala Mohamed Mohamed Ibrahim</u>	Population Development Association- Information and Public Relation Department	0140644084



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No.	Name	Job Title	Phone no.
70	Dr. Abdel Hamid Mohamed Mohamed	A surgeon- Badr City	0126828267
71	Fathy Mohamed Abdel Rahman	Journalist	0105012634
72	Iman ElNahas	Journalist	0111279012
73	Fatheia Hammad	Journalist	0103559768
74	Mamdouh Abdel Hady	Journalist	0125416593
75	Abeer Abdel Wahed	Journalist	0111670844