Submitted to :
Egyptian Natural Gas Holding Company **EGAS**

Prepared by: EcoConServ ENVIRONMENTAL SOLUTIONS

EcoConServ Environmental Solutions
12 El-Saleh Ayoub St., Zamalek,
Cairo, Egypt 11211
Tel: + 20 2 27359078 – 2736 4818
Fax: + 20 2 2736 5397
E-mail: genena@ecoconserv.com

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FRAMEWORK

NATURAL GAS CONNECTION PROJECT
IN 11 GOVERNORATES IN EGYPT
(Final March 2014)

List of acronyms and abbreviations

AFD	Agence Française de Développement (French Agency for Development)
AP	Affected Persons
ARP	Abbreviated Resettlement Plan
ALARP	As Low As Reasonably Practical
AST	Above-ground Storage Tank
BUTAGASCO	The Egyptian Company for LPG distribution
CAA	Competent Administrative Authority
CULTNAT	Center for Documentation Of Cultural and Natural Heritage
CAPMAS	Central Agency for Public Mobilization and Statistics
CDA	Community Development Association
CRN	Customer Reference Number
EDHS	Egyptian Demographic and Health Survey
EHDR	Egyptian Human Development Report 2010
EEAA	Egyptian Environmental Affairs Agency
EGAS	Egyptian Natural Gas Holding Company
EIA	Environmental Impact Assessment
EMU	Environmental Management Unit
ENIB	Egyptian National Investment Bank
ES	Environmental and Social
ESDV	Emergency Shut Down Valve
ESIAF	Environmental and Social Impact Assessment Framework
ESMF	Environmental and Social Management Framework
ESMMF	Environmental and Social Management and Monitoring Framework
ESMP	Environmental and Social Management Plan
FGD	Focus Group Discussion
HH	Households
GASCO	Egyptian Natural Gas Company
GCR	Greater Cairo Region
GIS	Global Information Systems
GOPP	General Organization for Physical Planning
GPS	Global Positioning System
HHH	Head of the Household
HDR	Human Development Report
HP	High Pressure
HSE	Health Safety and Environment
IDSC	Information and Decision Support Center
IFC	International Finance Corporation
IGEM	Institute of Gas Engineers and Managers
IR	Involuntary Resettlement
JICA	Japan International Cooperation Agency
LDC	Local Distribution Companies (Egypt Gas and Town Gas)
LDU	Local Development Unit
LPG	Liquefied Petroleum Gas
LFL	Lower Flammable Limit
LP	Low Pressure
mBar	milliBar
MSEA	Ministry of State for Environmental Affairs
MSDS	Material Safety Data Sheet
NG	Natural Gas

NGO	Non-Governmental Organizations
P&A	Property and Appliance Survey
PAF	Project Affected Family
PAP	Project Affected Persons
PE	Poly Ethylene
PPM	Parts Per Million
PRS	Pressure Reduction Station
PSV	Pressure Safety Valve
QRA	Quantitative Risk Assessment
RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework
S HP	Steel High Pressure pipelines
SDO	Social Development Officer
SFD	Social Fund for Development
SIA	Social Impact Assessment
SRO	Social and Resettlement Officer
SSIAF	Supplementary Social Impact Assessment Framework
SYB	Statistical Year Book 2010
T/E Gas	Town Gas/Egypt Gas
TOR	Terms of Reference
Town Gas	The Egyptian Company for Natural Gas Distribution for Cities
UNDP	United Nations Development Program
UFL	Upper Flammable Limit
UNDP	United Nations Development Program
UST	Underground Storage Tank
WB	The World Bank
WHO	World Health Organization
$	United States Dollars
€	Euros

Exchange Rate: US$ = 7.00L.E as of January 2014
Exchange Rate: € = 9.60L.E. as of January 2014

Contents

List of Tables

List of Figures

1 Introduction

The Government of Egypt (GoE) has immediate priorities to increase household use of natural gas by connecting 800,000 households/yr. to the gas distribution network to replace the highly subsidized, largely imported Liquefied Petroleum Gas (LPG). The GoE is implementing an expansion program for Domestic Natural Gas connections to an additional 2.5 Million households over the next 3 to 6 years. As part of the program, the project presented in this framework study involves extending the network and accompanying infrastructure to connect 1.1 Million Households in 11 Governorates between 2014 and 2017 with the assistance of a World Bank Loan of up to US$500 Million and the Agence Française de Développement (French Agency for Development) financing of up to €70 Million. The total program for connecting the prospective 1.1 Million customers is estimated to cost US$850 Million.

The proposed investments are part of the household gas connection investments in service areas in the 11 governorates under the concessions of two distribution companies; **Town Gas** in the Giza, Ismailia, Alexandria, and Marsa Matrouh governorates, and **Egypt Gas** in Qalubia, Menufia, Daqahlia, Qena, Sohag, Gharbia, and Aswan governorates. The Project will include the following components:

- **Component 1: Gas Distribution Network and Household Connections**. This includes expansion of the intermediate and low pressure gas distribution networks, installation of control units and conversions of customer appliances to allow connection of and supply of gas to the proposed new 1.1 million households.

- **Component 2: Pressure Reduction Stations (PRSs)** for reduction of NG pressure from 70 Bar to 7 Bar and odorant addition for residential users. The construction of PRSs to connect the distribution networks in the project areas to the high pressure gas transmission networks. Currently, 25 new PRSs area being considered for financing by the proposed project.

- **Component 3: Gas Transmission Connection.** This component includes extending the gas high pressure transmission network to supply gas to the new PRSs in the project areas. Twenty high pressure pipeline connections are currently being considered ranging from 50m – 38km of about 178 km total length.

To encourage household participation, EGAS continues to apply a 2005 connection policy that sets the household connection fee for a new connection to the network at LE 2,500 nationwide of which the household pays LE 1,500 and EGAS contributes LE 1,000 that is paid to the relevant distribution companies. The household connection fee is assumed to cover the cost of installation to the distribution companies while EGAS also shares the cost of network expansion and Pressure Reduction Station.

The total cost of household gas connection is L.E. 5400 with a breakdown of, L.E. 2400: cost share of steel pipeline network and Pressure Reduction Stations, L.E. 1200: Cost share of ground network inside cities, L.E. 960: Cost share of building external networks and L.E. 840: cost share of internal networks and conversions.

To enable the connections, significant upfront network investment is required. As such, network development and connections in household premises happen simultaneously across the targeted project areas. Therefore, although the main features of the project have been identified; details of pipeline routings, locations of Pressure Reducing Stations, and exact households to be connected have not been confirmed at this stage. Such details will be completed during the course of implementation of the project.

World Bank Environmental and Social Safeguard policies require an Environmental & Social Impact Assessment (ESIA) of the proposed project. Given that the final selection of the exact paths of the gas pipelines, pressure reduction stations, and distribution networks will be made during the course of implementation of the project, the current study will develop an Environmental and Social Impact Assessment *Framework* (ESIAF). In addition to assessing environmental and social impacts based on the project details currently available, the framework sets the road map for addressing the requirements of the Egyptian Environmental Affairs Agency (EEAA) and the relevant World Bank Environmental and Social Safeguard Policies in site-specific ESIAs which are to be prepared upon finalization of project details.

This Environmental and Social Impact Assessment *Framework* Study has been prepared based on the Terms of Reference prepared by EGAS and cleared by the World Bank, aiming at providing an overview of the anticipated environmental and social safeguard issues related to natural gas distribution and connections to households in 11 governorates; and to develop environmental guidelines to be followed for the subsequent gradual phased implementation of the Project.

With regards to the social aspects, a through desktop review and analysis of primary data was carried out. Special attention was paid to potential Project Affected People as well as vulnerable groups who were investigated using multi-levels of data collection tools. In addition to deliverables required by the ToR (ESIAF and Resettlement Policy Framework), it was recommended by the WB to **deliver a stand-alone** Supplementary Social Impact Assessment Framework **(SSIAF)**. The SSIAF should be referred to for detailed social data and assessments.

No major environmental or social risks could be foreseen to prevent reaching the 1.1 million customer target over the proposed 3-year timeframe. The extensive experience gained, by EGAS and affiliates, through implementation of the previous WB- and GoE-funded Natural Gas Connection project in Greater Cairo (and all over Egypt) will play a critical role in the minimizing environmental and social risks and maximizing public ownership and acceptance.

1.1 Project Objectives

The proposed project represents an integral component of the National energy strategy which calls for greater use of natural gas for domestic users and reduction of government subsidies of the energy sector (LPG). The project will contribute to achieving the Government plan for extending domestic natural gas connections in the country and is planned for completion within 3 years (2014-2017). The following results are envisaged from the project:

- Wider NG coverage and stable household energy supply
- Reduced leakage and fire risk compared to LPG
- Reduced LPG cylinder prices due to lower demand
- Reduced hardships to the physically challenged, women, and the elderly
- Reduced costs compared to butane gas (LPG) and electricity in Egypt
- Reduced strategic dependence on imported fuel (LPG)
- Rationalization of subsidies for LPG cylinders.

1.2 Objectives of the ESIA Framework Study

The scope of the ESIAF is to assess the environmental and social impacts of extensions of new high-pressure steel pipes to the project areas (or installation of new pipelines), pressure reduction stations, and distribution networks serving the various project areas. Impacts of NG exploration, extraction, refining, and transmission are outside the scope of the ESIAF

In addition to assessment of environmental and social impacts based on the available level of project details, the specific objective of the study is to develop an ESIA Framework as a "road map" for addressing the following key modules once the final detailing of the project components is complete:

- Describing project components and activities of relevance to the environmental and social impacts assessments
- Identifying and addressing relevant national and international legal and technical requirements and guidelines pertaining to project-related environmental, social, and occupational health & safety issues;
- Performing stakeholder meetings, scoping sessions, and public consultations to maximize public ownership and stakeholder engagement
- Describing baseline environmental and social conditions, obtaining key data relevant to the NG connection project, and identifying relevant governmental, administrative, and civil society institutions
- Assessing the potential environmental and social impacts of the project in the project areas;
- Developing an environmental and social management and monitoring plan for the mitigation of negative impacts and for monitoring compliance with the relevant environmental laws

Overall, a key objective of each of the sections of this study is to provide a framework for addressing the various components of the specific ESIAs which will be prepared upon final detailing of the project. Governorate-level ESIAs covering the final project components to be implemented will be prepared, cleared, and disclosed prior to commencement of mobilization and construction. Please see Annex 4 that outlines proposed ToRs for a the governorate-level site-specific ESIA.

1.3 Contributors

The ESIAF has been prepared by EcoConServ Environmental Solutions (Cairo, Egypt) with valuable collaboration and assistance from EGAS, Egypt Gas, and Town Gas HSE and Engineering Departments. The names of the EcoConServ experts who have participated in the preparation of the ESIAF study are listed in Annex 1 to this report.

2 Project Description

2.1 Background

The National Natural Gas Grid was established 1975 with 75 km total piping length. Current total piping length reached over 35,000 km with a daily capacity of 205 m^3. National consumption of natural gas in 2012/2013 is estimated at 52 billion cubic meters, while 6.7 billion cubic meters (11%) were exported. As shown below, annual national consumption of Natural Gas is dominated by the electricity sector (power plants) and various industrial sectors. Current domestic/residential users (households) consume a mere 3% of the total annual NG production

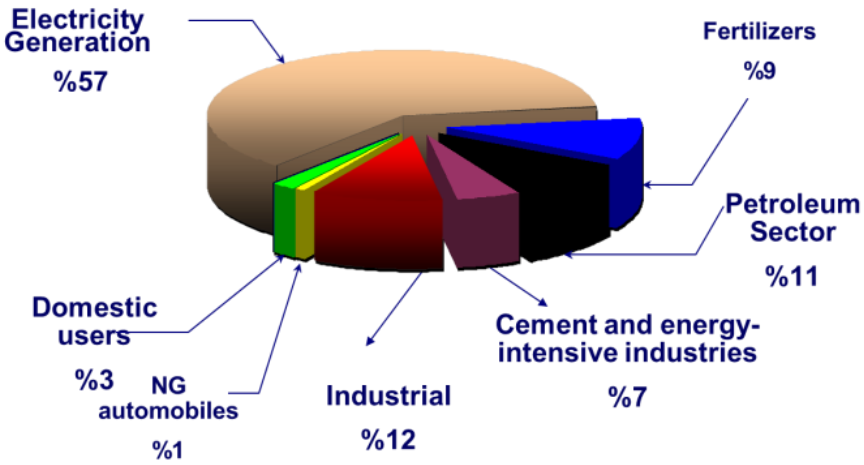


Figure 2-1: Annual consumption of Natural Gas by the various sectors in Egypt

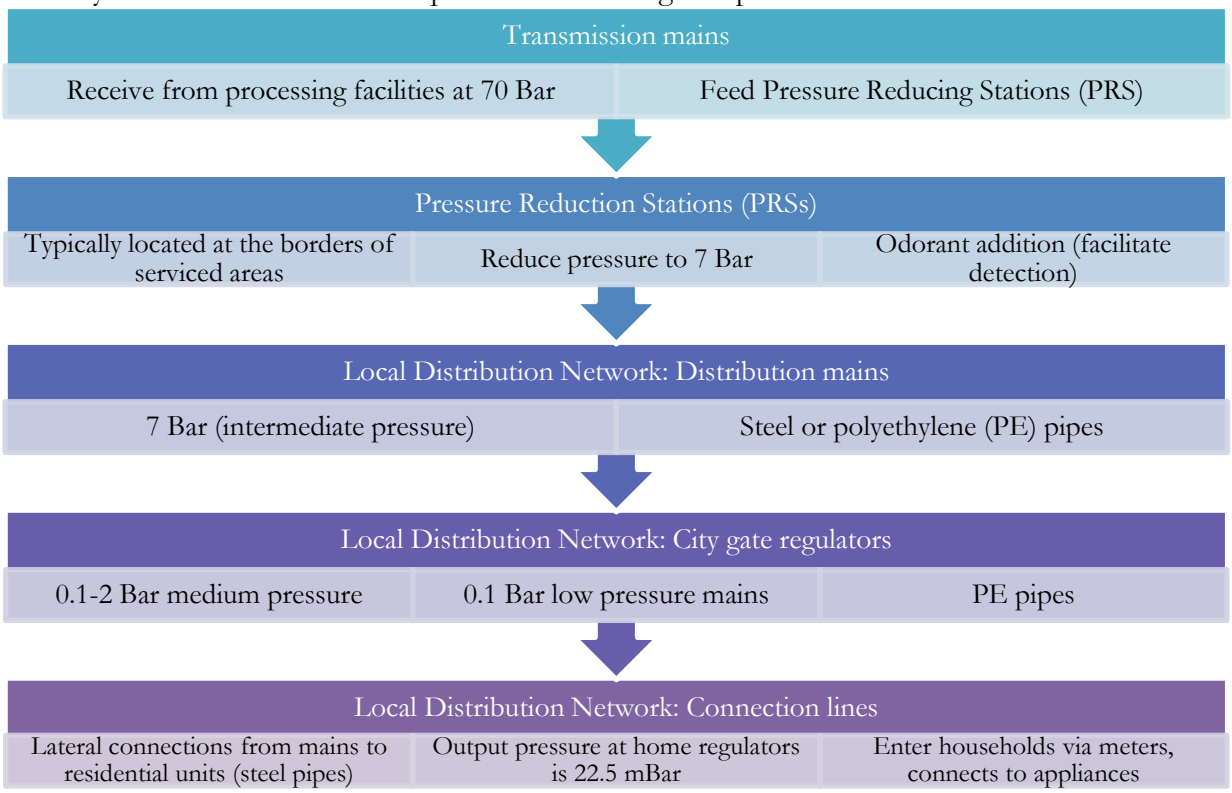
The Natural Gas Grid in Egypt is fed by numerous gas production fields and treatment facilities for transmission to industrial, commercial, domestic users, and power plants. Main gas production fields are Ras Shokeir, Ras Gharib, Abu Madi and Abu El Gharadik.

To date, the Natural Gas Network has already reached all but 2 of the 27 Egyptian governorates. Matrouh (26) and ElWadi El Gideed (27) were deemed too distant from the existing network to fulfill the minimum levels of economic and technical feasibility. Domestic user coverage (households) varies to great degree from one governorate to the next. As of November 2013, connections in Cairo, Giza, and Alexandria total 3.5 Million households out of the nationwide total of 5.7 Million households connected. As mentioned above, the project proposed in this study aims to add 1.1 Million Households in the 11 governorates to the existing 5.7 Million.

The NG is processed and injected into the high pressure lines of the national Grid (70 Bar) for transmission. Upon branching from the main lines to regional distribution networks, the pressure of the NG is lowered to 7 Bar at the Pressure Reduction Stations (PRS). An odorant is added to the NG at PRSs feeding distribution networks to residential areas[1] in order to facilitate detection. Regulators are then used to further lower the pressure to 100 mbar in the local networks, before finally lowering the pressure to 20 mbar for domestic use within the households. In addition to excavation and pipe laying, key activities of the construction phase also include installation of pipes on buildings, internal connections in households, and conversion of appliance nozzles to accommodate the switch from LPG to NG.

[1] Because natural gas is odorless, odorants facilitate leak detection for inhabitants of residential areas.

The city distribution network comprises the following components:



2.2 Coverage Framework

Preliminary project planning has applied social, economic, safety, and technical criteria to identify 96 districts and villages in 11 Governorates as targets for connecting the 1.1 million customers (households). The project shall introduce the service in new areas, which have not been connected before, and shall further extend the network in areas which are partially covered.

The Egyptian Natural Gas Holding Company (EGAS) is mandated to oversee the planning and implementation of the project. This project will be implemented by the **Egyptian Natural Gas Holding Company (EGAS)** and its affiliate local distribution companies: **Egypt Gas** and **Town Gas**, with Loan Assistance from the World Bank (WB) and the Agence Française de Développement (AFD). Town gas has been commissioned for implementation in Giza, Ismailia, Alexandria, and Matrouh while Egypt Gas will be implementing the project in the remainder of the governorates (Gharbia, Menufia, Dakahlia, Qaliobia, Sohag, Qena, Aswan).

Estimation of the number of households served

The approach to generating a preliminary estimate of the households served is based on the same procedures used in previous projects implemented by EGAS and its local distribution companies (LDCs), including a very similar WB-funded project to connect 300,000 households in the Greater Cairo area (2006-2007).

A preliminary estimate is generated through a general survey (outlined below) in order to obtain funding (GoE, WB, other funds), followed by a Property & Appliance (P&A) survey **upon approval of funding**. The outcome of the P&A survey is a detailed listing of individual households to be connected after passing safety and technical evaluations. The detailed listing is then used to finalize pipeline sizing and routing, as well as the final siting and sizing of the Pressure Reduction Stations (PRS).

Initial survey

- Data collection on potential households to be connected from all relevant authorities
- Field visits to record road and building conditions
- Approximation of the number of customers not meeting safety and technical criteria.
- Identifying the availability of utilities in the area and their conditions (Electricity, Water, telephone lines, and sewage) through data and maps from the relevant authorities.
- Identifying the location of the nearest PRS or gas networks, if available.

Property & Appliance (P & A) survey *(to be conducted upon approval of funding)*

- Obtain the latest aerial maps of the project areas from the Egyptian Survey Authority
- Identifying Global Positioning System (GPS) coordinates of the sites
- Locating each road and building and inserting them on the corresponding map
- GPS team then develops a land survey map to be used by the P&A survey team to generate a unique customer reference number (C.R.N) based on building, block, and sector
- The final (C.R.N) will be associated to the customer name, address, appliances, and data.
- An isometric drawing for each building, location of service, and riser routes is created, reviewed by the surveyors, and delivered to the *Installations department*
- Data is entered into a central database and G.I.S system for review by a *design team*
- Design team finalizes pipe sizing, type, regulator capacity & locations, routing, and number of appliances to be converted

It is standard practice for EGAS (and the Egyptian Ministry of Petroleum) to present the extent of the Domestic Natural Gas Connections coverage as the number of households connected to the network. A listing (sorted by number of connected households) contrasts the domestic connection network in the 11 governorates selected for the project with the proposed connection plan.

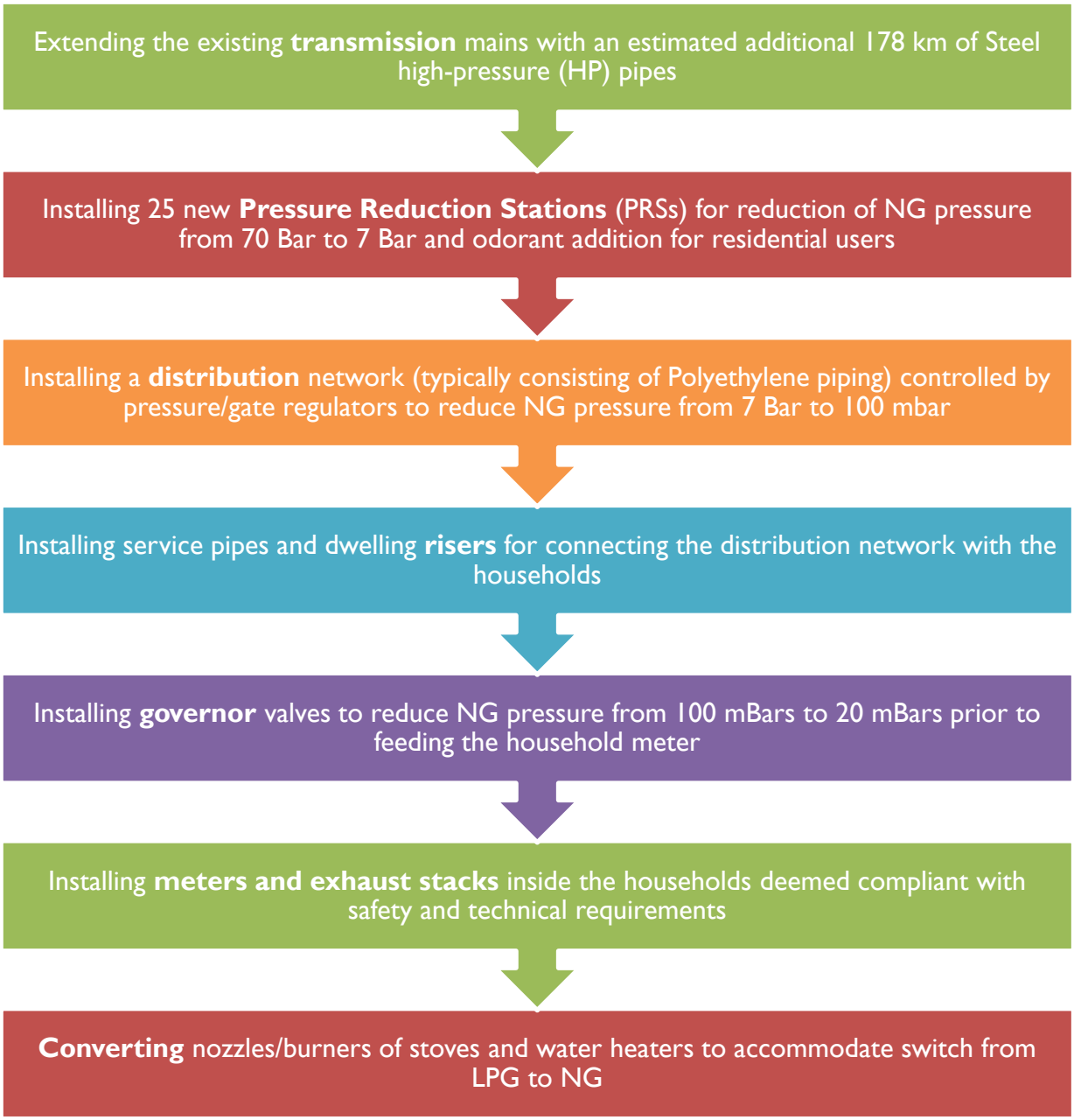
Table 2-1: Existing household coverage in the 11 governorates and connections planned (this project)

Governorate	Connected Households (To November 2013)	Additional HH planned during this project			Total (This project)
		2014-2015	2015-2016	2016-2017	Planned (HH)
Giza	992932	85000	119000	77000	281000
Alexandria	733579	10000	92000	77000	179000
Qalyubia	382012	49000	28500	50000	127500
Gharbia	243556	4000		25500	29500
Dakahlia	149060	9000	32000	90500	131500
Menufia	134511	10000	23000	13000	46000
Ismailia	84997		42000	20500	62500
Sohag	47116	14000		57000	71000
Aswan	16000	20000	27000		47000
Qena	8079	25000	66500		91500
Matruh	-	10000	10000	10000	30000
Total	**5,735,110**	**236,000**	**440,000**	**420,500**	**1,096,500**

Figure 2-2: Locations of the 11 governorates of the proposed natural gas connections project

2.3 Project Components

The project will comprise design, planning, procurement, excavation, construction, testing, and monitoring activities for:



2.3.1 Design and material take-off (MTO) including procurement

Once the final number and location of project components and households is finalized, a final design of the transmission and distribution pipelines is utilized to estimate the materials needed to implement the project. Procurement of the materials includes local and international components. Local purchases typically include PE piping for the distribution networks, transformers for protections for impressed current protection of the S-HP 70-Bar pipelines. While the main international purchases may include critical components and PRSs, S-HP pipelines, regulators, and metering stations.

2.3.2 Piping and connections

With the exception of Matrouh, 10 of the 11 governorates covered by the project are already connected to the national NG network. Matrouh, being one of the only two governorates not connected to the network, will have its own local loop (separate from the national network) for feeding the 30,000 households. The Matrouh loop will be fed by a gas field which has been dedicated to industrial applications. A 15,000 m^3/day PRS is planned for Matrouh, transmitted through 4 km of steel-HP piping.

Existing transmission mains (steel-HP) shall be extended with new pipelines (178 km total) to access project areas and cover additional loads with stable supply. Diameters of the steel-HP pipelines are typically between 6 and 24 inch, and are usually 1.2m deep inside the ground.

The distribution system shall consist of 7-Bar mains extending from the PRSs and 100-mBar system through city gate regulators, which in turn feeds low pressure networks via district regulators. Distribution mains are typically Polyethylene (PE) pipes connected to regulators. Regulators are fed by 7-Bar piping which is orange in color (referred to as PE100) with diameters between 16mm to 355mm and release 100-mBar NG in yellow piping (referred to as PE 80) with diameters starting from 250mm to 32 mm home branches.

Connections work will connect the distribution network to the households.

Gas will be fed into the property at 100 milli-bars maximum, through risers and laterals for flats and an external meter box service termination for singly occupied premises.

Sizes of risers depends on the number of dwellings in the block of flats but laterals will be normally 1 inch or 3/4 inch.

Gas meters will be installed with a suitable regulator (governor) at internal pressures of 20 mbar.

Internal piping inside the household will be steel pipes of 1 inch, 3/4 inch and 1/2 inch diameter and will generally supply a cooker and a water heater. Connections from steel pipes to appliances are typically flexible rubber tubing in the case of stoves and copper tubing for water heaters

Conversion of home appliances shall be carried out on an expected 2,000,000 appliances (assuming each household contains 2 appliances- stove and water heater. The majority of appliances will be converted by drilling out existing injector nozzles to accommodate the targeted gas flow. Burner drilling is necessary to increase the flow of low-pressure NG in order to maintain the calorific value that was previously available from high-pressure LPG. Typically, injector nozzles are drilled to become 1.25 to 1.5 times larger in diameter.

The network and PRSs shall be designed and commissioned according to the standards of the Institute of Gas Engineers and Managers (IGEM) of the UK, which includes compliance with high safety standards required for the transmission and distribution networks as well as the PRSs.

2.3.3 Pressure Reduction Stations

PRS siting is guided by minimizing the possible negative impacts on surroundings: the safety of neighboring areas from possible gas release accidents and noise associated with reducers operations. The following buffer zones are recommended between certain parts of the PRS and neighboring building and inhabited areas:

- Minimum distance between high pressure line (70 bar) and buildings outside the PRS should be 90 meters from the center line

- PRS should have free areas from each side to allow for emergency vehicle.
- 20 meters minimum between reducers and nearest building to minimize noise impacts.

Although the exact locations of the new PRSs are not yet finalized, it is anticipated to have them installed at the areas shown in the table below. As part of the procurement process, once the WB loan is approved, Town Gas and Egypt Gas will submit requests to local authorities for allocating suitable land plots in each of the areas below. The PRSs are typically located in low-population-density areas on land plots of about 40-50m x 40-50m for each PRS. The PRSs should be accessible by road to ensure quick response in the case repairs or emergencies.

The table also shows the anticipated capacities (in standard cubic meters per hour) and the associated lengths of high-pressure steel piping. The capacities are related to the anticipated demand of the households to be connected in the area. While the lengths of the high-pressure piping are related to distances from existing high-pressure lines of the National Grid.

Table 2-2: Required locations / capacities of PRSs with associated steel 70-Bar pipeline lengths[2]

Town Gas			
Governorate	PRS location	PRS Capacity (sm^3/h)	70-bar steel lines (m)
Giza	Giza North	20,000	3000
	Giza South	40,000	6500
	Atfih	5,000	200
Alexandria	ElAmriya	20,000	3000
Ismailia	ElQantara Sharq	20,000	1000
	ElQantara Gharb	10,000	200
	Fayed	5,000	200
	Abu Swair	5,000	3000
Matrouh	Matrouh	15,000	4000
Town Gas Total		9 PRSs	21 km
Egypt Gas			
Qaliobia	Qaha	5,000	50
Gharbia	Qotoor	5,000	100
Dakahlia	Belkass	5,000	100
	ElManzala	5,000	16000
	Mit Salseel	5,000	12000
	Dekernes	5,000	25000
Qena	Qena	20,000	7000
	Nagada	5,000	6000
	Qift	5,000	100
	ElWaqf	5,000	8500
	Abu Tisht	5,000	6000
Sohag	Tama	5,000	5000
	Jerja	20,000	5000
	Jehaina	15,000	5000
Aswan	Kom Ombo	10,000	23000
	Edfu	10,000	38000
Egypt Gas Total		16 PRSs	157 km
Total Egypt Gas and Town Gas		25 PRSs	178 km

[2] Exact locations of the required PRS's are currently not identified and will be determined at later stages

2.4 Activities of the Construction Phase

2.4.1 Mobilization of equipment[3], materials and workers

According to an approved implementation plan, the contractor mobilizes construction equipment and materials. The contractor will be assigned a location by the local authority for storing materials and equipment in the active "Sector". These storage locations shall include:

- Excavation machinery: trenchers, backhoe, jack hammers, loaders, cranes, manual tools;
- Mobile electrical equipment: generators;
- Piping materials, such as pipes, valves, elbows, coating materials;
- Stockpiles of sand and filling materials;
- Repair machinery, such as compaction machinery, asphalt laying machinery, concrete mixers;
- Management caravan for the site engineers and staff;
- Worker camps, if needed

2.4.2 Excavation and pipe laying

In general, the least expensive and most commonly used excavation technique is the Open cut technique. Alternatively, borings may be excavated using hydraulic drive, and finally Horizontal Directional Drilling (HDD) technique. HDD is only utilized in the case of railway crossings, waterways, and major streets where traffic cannot be interrupted. In the case of HDD under railway crossings steel or reinforced concrete sleeves will be installed to further protect the piping from fatigue. It should be noted that intersections with waterways of the Nile or its major branches are not anticipated in this project.

Site preparation and excavation

Prior to excavation works, pipeline routes shall be identified and marked in the field. Excavation works start by removing the asphalt layer using either a mechanical trencher or a jack hammer. The mechanical trencher also removes broken asphalt and the base stone layer. In case the jack hammer is used, road layers are then removed by excavator.

The road base soil, underneath asphalt and stones, is then excavated either by a backhoe excavator or by manual excavation. The advantage of manual excavation is that it reduces the risks of breaking water, sewerage, electric or telecommunication lines which are unmapped. Typically the trench for PE pipes is 0.4-0.6 meter wide, and about 1.5 meter deep, depending on pipe diameter[4]. For steel pipes the trench width is 0.6-0.8 meters with the same depth, also depending on diameter.

Excavated soils, broken asphalt and other waste materials during excavation are loaded onto trucks, which transfer it to disposal areas. Because of the limited available space on most Egyptian streets, loading waste trucks shall be done upon excavation, whenever possible, in order to avoid stockpiling waste on site.

[3] Updated manufacturer catalogues including specifications and environmental parameters should be included as an annex to the site-specific ESIA report. Emphasis should be placed on high noise and air emitters such as the paving breaker and excavators.

[4] There should be 1 meter soft sand cover and a yellow warning tape marked "Gas" above the pipe

In some cases, where groundwater table is shallow, the trench should be dewatered before pipe laying. Dewatering pumps discharge into a drain or sewer manhole, according to the conditions of the area and arrangements with local authorities.

Pipe laying

During the excavation works, welding works may take place above-ground. Once the trench is excavated, the pipe stretch shall be laid down.

Welding may involve a built-in coil electrical fusion weld (fittings with heating coils installed inside) or butt welds (hot plate softening the tips of the PE pipes before joining). In both cases, adequate electrical units are needed onsite (diesel generators, cables).

Arc welding is used with HP steel pipes. Steel pipes are protected from corrosion by isolating coats, and by fixing an anode for cathodic protection. For long segments of the steel-HP pipelines, the impressed current protection system is employed with the aid of electrical components such as transformers.

Backfill and road repair

Natural gas PE pipes should be surrounded by sand in order to absorb loads from the road. After laying and welding works, the trench is then filled with sand either by a front loader or manually.

The sand should be effectively compacted in the trench in order to avoid road settlements, and subsequent cracks. A yellow warning tape marked "Natural Gas" is placed on top of the sand layer.

In some cases, an inverted U-shaped reinforced concrete slab is constructed around the pipeline after laying in order to improve shock resistance.

Typical schedule for construction

Because of heavy traffic conditions normally occurring in most Egyptian cities, natural gas line construction should be expedited in order to avoid traffic blockings. Before excavation, the Traffic Department grants a conditional time-limited permission (documented in a legal report). In normal cases, the construction schedule for a pipe stretch of 350-400 meters is:

- 07:00 – 11:00 Excavation and above-ground welding
- 11:00 – 12:00 Pipe laying and tie-in welding
- 13:00 – 16:00 Filling and compaction
- 16:00 – 17:00 Base stone filling
- Pending arrangement with local authorities Asphalt laying/street restoration

In many cases across the proposed project areas, underground utilities have been installed long ago, without accurate documentation of routes and depths. The contractor performs careful manual excavation to avoid paying for possible damage.

If a utility line break occurs, the site manager notifies the Police Department and the respective authority (according to type of utility pipe). The authority then starts repairing the line as soon as possible, and later claims the repair costs back from the contractor.

High Pressure Steel Piping

General features of the construction activities are also applicable to excavation and installation of the 70-bar high-pressure piping. However, HP piping is usually installed outside cities and urban

centers. Within the context of the 11-governorates, construction arrangements may vary greatly as the HP may traverse a variety of physical, geological, and biological environments. For example, installation of the HP piping in Matrouh, Aswan, Qena, and Sohag will most likely take place in the desert component which is by and large uninhabited and exhibits minimal flora/fauna. HP installation in the Delta governorates may require arrangements to minimize impacts on the ultra-high population density areas and the crowded plots of agricultural land.

In some of the project areas, significant environmental and social issues may be triggered according to the exact alignment of the high pressure lines. The alignment and its impacts must be addressed comprehensively in the specific ESIAs and the preparation of RAPs (if needed)

2.4.3 Leakage testing

Following construction activities, the piping should be tested to locate possible leaks using either hydrostatic testing or pneumatic air-gas testing. In the former, the pipe is filled with water and then pressurized to the desired level, along with pressure testing at different locations to detect leaks, then water is drained. In the second process, air, or an inert gas, is used instead of water. In both cases, pressure is increased to 1.5x the operating pressure. Pressure drop indicates leakage.

Hydrostatic testing is more complicated than the pneumatic, as it requires highly efficient water drainage. This drainage takes place by the "pigging process", which includes forcing an object, the "pig", through the pipe by liquid or air pressure to totally drain the line before NG is fed. In the case of pneumatic testing, Nitrogen gas purge to remove air after the test.

In order to prevent deformation, dislocation, and rupture of the pipes, leakage testing through pressurization must be performed AFTER backfilling the excavation under (10 cm), around (10 cm), and above the pipes (20 cm, at least).

2.4.4 Connections to households

After testing the piping for leakage, connections to the buildings commence. The connection starts from the main line (PE) and crosses the road to the buildings on both sides. At the edge of the building, a riser (steel) feeds different laterals which ends at the customer gas meter then to different appliances. Traffic may be affected by the connection works.

The underground portion of the riser is sleeve-protected, while above-ground pipes are painted. Risers and laterals are fixed on walls by steel clips. This will involve drilling the walls to attach the necessary bolts and rivets. The laterals enter the household through the wall.

Connections are tested for leakage by increasing pressure to 2Bar and monitoring pressure drop.

2.4.5 Conversion of appliances

The installation contract between the household owner and the implementing company includes the cost of converting 2 appliances. Conversion involves increasing the diameter of the gas injectors of the stove and water heater to accommodate the difference in operating pressures and calorific value of natural gas in comparison with LPG. Conversion works are practiced at the client's flat, by changing the injectors' properties of the appliance. Typical drill bit sizes used for conversions are either 35 or 70mm.

Conversion also involves flue gas outlet/stack installation for bathroom heaters. The stack must lead to external/ambient atmosphere outside the HH. In order to allow the installation of the conversion of the heater and installation of the stack, the bathroom volume must exceed 5.6 cubic meters. Installation of the stack may require scaffolding and breaking of the wall or ceiling.

Construction works for PRSs and regulators

Once the locations and capacities of the PRSs are finalized, relevant authorities are contacted to identify and acquire areas with the required dimensions and specifications.

Constructing Pressure Reduction Stations and City gate Regulators are regular construction works in addition to connections between transmission mains and distribution mains. The PRS comprises two types of pressures, the first is the upstream pressure, which is a high pressure ranging from 30 to 70 Bar, while the second pressure is the downstream pressure, which is a low pressure (7 Bar). Construction involves Civil works: electrical, fire-fighting, fire alarm and Mechanical works: various PRS components.

2.5 Activities of the operation phase

2.5.1 Operation of the PRS

Inlet stage

The inlet components of the PRS should be completely isolated from the cathodic system applied to the feeding steel pipes. This is achieved by installing isolating joint with protection.

Filtration stage

The aim of the filtration stage is to remove dust, rust, solid contaminants and liquid traces. Two filters and two separators are installed in parallel; each filter-separator operates with the full capacity of the PRS. During the operation of filter-separator line, the other line is kept on standby. Filter-separator lines are equipped with safety devices such as differential pressure gauges, relief valves, liquid indicators, etc.

Heating stage

Because the difference between the inlet and outlet pressure is relatively high, icing normally occurs around outlet pipes. This may cause blockings and accordingly reduce or stop the gas flow. To avoid such circumstances, a heater is installed to keep the temperature of outlet pipes over 7°C. Each PRS is equipped with two heaters in parallel in order to allow for a standby heater in emergencies.

Reduction stage

Each PRS includes two reduction lines in parallel, also to allow for a standby line. The lines are equipped with safety gauges, indicators and transmitters to maintain safe operation conditions. According to the IGEM standards, the reduction unit should be installed in a well-ventilated-closed area or, alternatively, in an open protected area.

Measuring stage

After adjusting the outlet pressure, gas flow and cumulative consumption are then measured to monitor NG consumption from the PRS and to adjust the dosing of the odorant as indicated below. Measuring devices should be sensitive to low gas flow, which normally occurs during the first stages after connecting a small portion of targeted clients.

Odorizing stage

The objective of the odorant is to enable the detection of gas leaks in residential units at low concentration, before gas concentration becomes hazardous. The normally used odorant is composed of Tertiobutylmercaptin (80%) and Methylsulphide (20%). The normal dosing rate of the odorant is 12-24 mg/cm^3. The system consists of a stainless steel storage tank, which receives the odorant from 200-liter drums, injection pumps and associated safety devices. Operation of

the odorant unit is controlled automatically, and could be switched to manual operation if needed.

Outlet stage

The outlet stage includes an outlet valve gauge, temperature indicators, pressure and temperature transmitters and non-return valves. The outlet pipes are also, like inlet pipes, isolated from the cathodic protection by an isolating joint.

2.5.2 Operation of the network

The operation of the system is undertaken by LDCs. Normal operation will include routine audits on pressures and condition of the network. Normal maintenance and monitoring works for the network include:

- Monitoring valves at selected points on the pipeline. Gas leaks are routinely monitored using gas detection sensors;
- Checking cathodic protection on "Flange Adaptors" by taking voltage readings and changing anodes whenever needed.

In case of a leak detection, or damage to part of the network, the damaged pipe is replaced. The following procedures are usually followed:

- Stopping leaking line by valves when available or by squeezing the lines before and after the damaged part.
- Excavating above the effected part (in case of distribution main or underground line)
- Venting the line
- Removing affected pipe, replacing effecting part and welding it with the two ends, filling and road repair

2.5.3 Repairs in households

Repairs in residential units include appliance adjustments or piping/metering replacement.

2.6 Closing note

The variation of physical/geological/biological/socioeconomic features or of institutional capabilities across the 11 governorates of the project may dictate modifications of the project components. The scope of the possible modifications is not expected to be wide. It may be limited to fine-tuning to adapt to local contexts and realities in the various project areas.

Over the years of implementing natural gas connection projects across Egypt, protocols to deal with national and local administrative requirements have been institutionalized between companies of the Natural Gas sector and the various government/administration entities. Such protocols comply with national legislation and administrative procedures and have become familiar and standard.

As an example, established protocols for street restoration (where Local Governmental Unit issues the permit for excavation) involve the following:

1. A preliminary meeting is held in the presence of :

- Representative of the LDC executing the excavation works

- Representative of the LDC and a representative of the Contractor executing the excavation work (in case a contractor is executing the works on behalf of the LDC)

- Local Governmental Unit (LGU) Representative that identifies the start date on the Excavation permit and an estimate of the restoration fees that the LDC pays

2. The meeting is minuted and signed by the above participating parties and stamped. The minutes is considered as the permit for excavation
3. The permit is maintained by the LDC Engineer responsible for the excavation works as an evidence during any checking by the Traffic Department or the LGU
4. A copy of the of the Permit is also sent to the Governorate, LGU and the Utilities Department at the LGU ادارة المرافق بالحى
5. The permit states that coordination should take place with the General Utilities before starting work especially the Traffic Department, sewerage, water, telephones and electricity departments. Also the permit states that the restoration fees to be paid in advance before starting works
6. The permit contains the address, the district no. and start date and the duration of the permit which is usually a month subject for renewal
7. Restoration fees are paid at the LGU, a copy of the receipt is maintained at the financial department of the LDC
8. When the exact fees is determined the difference from the estimated price is paid before excavation works
9. There are two categories of restoration fees according to the layers of asphalting, in the main roads two layers are made this a category 2 (a rough layer followed by a smooth one) the fees is higher than the one layer category 1 restoration which is made for non – main streets

Overall, none of the administrative requirements are foreseen to hinder timely project implementation as administrative protocols have become quite efficient and familiar to government officials over the years.

In addition describing the project based on the level of detail available, this chapter of the study outlines the framework of the project description chapter in the site-specific ESIAs which will be prepared once final project detailing is complete. Project description should include, as applicable:

- Existing HP lines, PRSs, Connected zones within the project area, if any
- Results of the Property and Appliance Survey: areas meeting technical criteria, area excluded from connections, number of anticipated households to be connected, maps
- Routes/alignments of new HP lines and installations (eg. electric corrosion protection), if any
- Locations and specifications of Pressure Reduction Station(s), if any
- Routes/alignments of the local interconnection networks
- Specifications and types of materials to be used for project components in the area
- Equipment and vehicles to be used during the construction phase
- Specifications and emissions of the equipment to be used in the area
- Assigned temporary storage areas for materials and equipment
- Description of the activities of the construction phase
- Work plan for excavations and restoration (re-pavement)
- Typical daily work schedules during the construction phase
- Local Socioeconomic considerations

3 Legislative and Regulatory Framework

3.1 Preface

The World Bank has defined 10 environmental and social safeguard policies that must be considered to its financed projects (for both framework and specific assessments), if applicable. Applicability of such policies to this project is overviewed and discussed in subsequent sections

There are no specific Egyptian legal or regulatory requirements for preparing framework documents such as this one. However, this chapter of the ESIAF is meant to outline the legal and regulatory guidelines to be addressed in preparation of the specific ESIAs upon finalization of project detailing.

It is important to note that, in the case of ESIA FRAMEWORK studies such as this one, the EEAA issues a "No Objection" rather than an approval. The conditions of the "No Objection" verdict are expected to stipulate that detailed ESIA studies must be carried out upon finalization of project detailing (final pipeline routes, exact locations of PRSs, etc.).

Following loan approval by the World Bank and the Agence Française de Développement, design and alignment details will be finalized. Once final project designs, alignments, components, and activities are determined, site-specific ESIAs should be prepared and presented to the Egyptian Environmental Affairs Agency for approval and environmental permitting.

3.2 ESIA NATIONAL ADMINISTRATIVE AND LEGAL FRAMEWORK

The following is a brief description of the different national authorities and institutions of relevance to the site-specific ESIAs to be prepared once this project is detailed. The proposed Natural Gas connection project is classified as "C" under the Egyptian requirements. Class C projects require full ESIAs including public consultation sessions. It will be the responsibility of the site-specific ESIAs to investigate and update Egyptian legal/institutional requirements beyond those outlined in this framework.

The main legal instrument dealing with environmental issues in Egypt is Law 4/1994, amended by Law 9/2009 and Executive Regulation 1095/2011 modified by 710/2012, commonly known as the Law on Protection of the Environment. The law deals mostly with the protection of the environment against pollution. Prime Ministerial Decree 631 of 1982 established the EEAA as the competent body for environmental matters in Egypt. Law 4 also stipulates the role of the EEAA as the main regulatory agency for environmental matters.

According to Article 1 of Law 4, the legal entity responsible for a given project is required to carry out an assessment of the project's potential impact on the natural and socio-cultural environment before implementing that project. The findings of the assessment are submitted to the EEAA for review and approval before other relevant governmental authorities can issue their permits for implementing the project.

An ESIA is required to be viewed as an integrated part of the project planning process, according to EEAA requirements. The ESIA will help to ensure that environmental concerns are taken into account along with technical and economic considerations.

The Egyptian Environmental Affairs Agency (EEAA) is an authorized state body regulating environmental management issues. Egyptian laws identify three main roles of the EEAA:

- It has a regulatory and coordinating role in most activities, as well as an executive role restricted to the management of natural protectorates and pilot projects.
- The agency is responsible for formulating the environmental management (EM) policy framework, setting the required action plans to protect the environment. Following-up their execution in coordination with Competent Administrative Authorities (CAAs).
- In specific to this project, EEAA is responsible for review and approve of the environmental impact assessment studies as for new projects/expansions undertaken.

EMU (Environmental Management Unit at Governorate and District level) is responsible for the environmental performance of all projects/facilities within the governorates premises. The governorate has established environmental management units at both the governorate and city/district level. The EMU is responsible for the protection of the environment within the governorate boundaries and are mandated to undertake both environmental planning and operation-oriented activities. The environmental management unit is mandated to:

- Follow-up on the environmental performance of the projects within the governorate during both construction and operations to ensure the project abides by laws and regulations as well as mitigation measures included in its ESIA approval. Investigate any environmental complaint filed against projects within the governorate
- The EMU are affiliated administratively to the governorate. yet technically to EEAA.
- The governorate has a solid waste management unit at the governorate and district level. The units are responsible for the supervision of solid waste management contracts.

The CAA for the Domestic Natural Gas Connections (DNGC) project is the Egyptian Natural Gas Holding Company (EGAS). Law 4/1994 stipulates that applications for a license from an individual, company, organization or authority, subject to certain conditions, require an assessment of the likely environmental impacts.

The CAAs are the entities responsible for issuing licenses for project construction and operation. The ESIA is considered one of the requirements of licensing. The CAAs are thus responsible for receiving the ESIA forms of studies, check the information included in the documents concerning the location, suitability of the location to the project activity and ensure that the activity does not contradict with the surrounding activities and that the location does not contradict with the ministerial decrees related to the activity. The CAA forwards the documents to EEAA for review. They are the main interface with the project proponents in the ESIA system. The CAA is mandated to:

- Provide technical assistance to Project Proponents
- Ensure the approval of the Project Site
- Receive ESIA Documents and forward it to EEAA
- Follow-up the implementation of the ESIA requirements during post construction field investigation (before the operation license)

After submission of an ESIA for review, the EEAA may request revisions in the ESIA report within 30 days, including additional mitigation measures, before issuing the approval of the report. EGAS will have the right to issue an appeal within 30 days from its receipt of the EEAA's decision. It should be noted that once the ESIA has been approved, the ESMP as will be presented in the report, will be considered an integral part of the project; and the EGAS will be legally responsible for the implementation of that plan, depending on their involvement in construction or operation. It is therefore worth mentioning that the EGAS and its project implementing entities (Town Gas and Egypt Gas) must ensure that all mitigation measures and

environmental requirements described in the ESMP have been clearly referred to in the tender documents for the construction works, the construction contracts, and have been respected. EGAS will follow-up on the construction contractor to ensure that the ESMP is adequately implemented in the construction phase.

3.3 Applicable Environmental and Social Legislation in Egypt

3.3.1 Law 217/1980 for Natural Gas

Organizes supply and connections of natural gas in residential areas, industrial areas and power plants. The law gives the Egyptian General Petroleum Corporation, together with one of the Petroleum Public Sector companies the responsibility for making the natural gas supply. The Law stipulates the following safeguards, which should be followed, during installation of natural gas in residential areas:

- The entity responsible for natural gas connections should undertake these connections in a manner that should not affect the safety of the connected building, its occupants or other parties. If such connections resulted in any damage to the building owner or occupant he should be subject to compensation (Article 2).
- All natural gas pipelines and structures should be established on state-owned land without payment of any duties (Article 2).
- It is not allowed for the entity in charge of licensing buildings to grant license for buildings, or for amendments of existing buildings, which are connected with natural gas, without approval from the entity responsible for natural gas connections. Violation to this article may lead to a change of the ownership of the violating building to be publicly owned (Article 3 and 4).

It is not allowed to undertake excavation, building, demolition, pavement or any maintenance works in roads, squares and areas planned to be connected with natural gas, except in coordination with the entity responsible for natural gas connections. The entity responsible for natural gas connections is authorized to remove violations and claim associated removal costs from the violator (Article 5).

3.3.2 Law 4/1994 for the Environment (amended by Law 9/2009)

Ambient Air Quality and Gaseous Emissions

Articles 35 and 34 of Law 4 of its Executive Regulations amended by Decree 1741/2005 provide the maximum load of the ambient air and the permissible levels of air pollutants in emissions in Annex 5 and Annex 6 respectively. Annex 5, and Annex 6 of Law 4/1994 have been modified by ministerial decree 1095/2011 modified by 710/2012. Tables 1, 2, 3, and 4 present the maximum load of the ambient air and the permissible levels of air pollutant pertinent to the project accordingly.

Noise Pollution

Article 42 of the Law 4/1994 requires all organizations and individuals to maintain emanating sounds from different operating machinery or other sources below the permissible limits. Licensing authorities are to ensure that in a given area, the overall emanated sounds from fixed sources are within the allowable limits. In addition, licensing authorities are to ensure that machinery and equipment used by establishments fulfill the law's requirements.

Maximum permissible limits of sound intensity according to Annex 7- Table 1 of the Executive Regulations (1095/2011 modified by 710/2012) specify that noise intensity during an eight-hour work shift shall not exceed 85 decibels.

Waste management

Article 37 of Law 4/1994, articles 38 and 39 of its Executive Regulations, and Law 38 of 1967, amended by Law number 31 of 1976, deal with the collection, transportation, and safe disposal of solid wastes.

Article 39 of Law 4/1994 and Article 41 of its Executive Regulations requires precautions to be taken during any digging, construction, demolition activities, or transport of resulting waste, in order to avoid air pollution.

Articles 29 to 32 of Law 4/1994 provide regulations for the handling and storage of hazardous materials, including hazardous waste. Article 33 of Law 4/1994 specifies that all precautions must be taken when handling or storing hazardous material in any form (i.e.: gaseous, liquid, or solid).

Articles 34 to 36 address the responsibility of companies in ensuring safety of workers against chemical risks.

Articles 26, 31, and Decree 211/2003, specify conditions for the storage of flammable material, fuel, raw material, products and equipment.

Article 36 specifies that the workers should be made aware through written or oral instructions of the hazards related to the chemicals they are handling; they should also be trained on proper handling procedures.

Petroleum and Mineral Resource minister decree number 1352/2007 defines hazardous waste materials generated from petroleum industry. In addition ministerial decree number 1352/2007 prohibits handling of hazardous waste, except for entities authorized by EGPC.

Biodiversity

The main law concerned with natural protectorates is Law 102/1983. The Prime Ministerial Decree 1067/1983 designates the EEAA as the authorized administrative body charged with the implementation of law 102/1983.

At this stage, it is not expected that natural protectorates will come within the area of influence of the project. However, HP pipelines

The protection granted to the animal species listed in Annex 4 of Law 4 extends to:

- Animal species listed by Ministerial Decree 28/1967 for Article 117 of Law 53/1966, amended by Law 116/1983.
- Other animal species determined by international conventions to be ratified by Egypt.

Any other birds or animals for which a decree shall be issued by the Minister of Agriculture with the agreement of the EEAA.

3.3.3 Law 38/1967 for General Cleanliness

Article 15 of the Executive Regulations stipulates that vehicles hauling construction waste should have a tight cover to prevent dispersion or falling of its contents.

3.3.4 Law 93/1962 for Wastewater

Law 93/1962 regulates the disposal of wastewater, and liquids in general, to the sewerage network. The Executive Regulations (Decree 44/2000) in Article 14 details the physical/chemical standards that should be complied with. The articles of this Law apply to the project in two main aspects:

- In case damage is caused to the sewerage network during excavation; and
- In case dewatered water from excavated trenches is discharged to the sewerage network.

3.3.5 Law 117/1983 for Protection of Antiquities

Law 117 of 1983 concerning the protection of antiquities gives the Supreme Council for Antiquities (SCA) the responsibility of management and protection and management of antiquities and archaeological sites. The law requires prior approval by that authority of plans for construction work on archaeological sites. Any legal person encountering any evidence of archaeological presence is required by law to report his finding to the General Authority for antiquities.

3.3.6 Traffic planning and diversions

Traffic Law 66/1973, amended by Law 121/2008 deals with traffic planning during construction of projects. Law 140/1956 on the utilization and blockage of public roads and Law 84/1968 concerning public roads govern the utilization or temporary obstruction of public roads. The Executive Regulations of Law 140 contain specifications for the management of construction and demolition debris. The law also allows the competent administrative authority to charge a fee for occupation of public ways.

3.3.7 Work environment and operational health and safety

Several laws and decrees tackle occupational health and safety provisions at the work place, in addition to Articles 43 – 45 of Law 4/1994, which address air quality, noise, heat stress, and the provision of protective measures to workers. These laws and decrees apply to the work crew that will be involved in construction activities.

Law 12/2003 on Labor and Workforce Safety and Book V on Occupational Safety and Health (OSH) and assurance of the adequacy of the working environment. The law also deals with the provision of protective equipment to workers and fire-fighting/emergency response plans. Moreover, the following laws and decrees should be considered:

- Minister of Labor Decree 48/1967.
- Minister of Labor Decree 55/1983.
- Minister of Industry Decree 91/1985
- Minister of Labor Decree 116/1991.

The environmental aspects that have to be taken in consideration for the workplace are noise, ventilation, temperature, and health and safety. Noise regulations and standards for the work environment are described previously.

Table 3-1 Limits of heat exposure permissible in the work environment

Type of Work	Low Air Speed (°C)	High Air Speed (°C)
Light Work	30	32.2
Moderate Work	27.8	30.5
Heavy Work	26.1	28.9

Table 3-2 Limit of exposure to temperature permissible in work environment

System of Work and Rest per Hour	Light Work (°C)	Moderate Work (°C)	Heavy Work (°C)
Continuous Work	30	26.7	25
75% Work, 25%Rest	30.6	28	25.9
50% Work, 50% Rest	31.4	29.4	27.9
25% Work, 75% Rest	32.2	31.1	30

3.3.8 EEAA ESIA guidelines related to the Public Consultation

Consultation with the community and concerned parties, where all the stakeholders are invited, should clearly provide attendees with the necessary information about the project. Paragraph 6.4.3 of EEAA EIA guidelines provides detailed information about the scope of public consultation, methodology and documentation thereof

- Paragraph 6.4.3.1 Scope of Public Consultation
- Paragraph 6.4.3.2 Methodology of Public Consultation
- Paragraph 6.4.3.3 Documentation of the Consultation Results
- Paragraph 7 Requirement and Scope of the Public Disclosure

3.3.9 Land Acquisition and Involuntary Resettlement

Law No. 10 of year 1990 on Property Expropriation for Public Benefit identifies infrastructure projects as public benefit activities. It describes acquisition procedures as follows:

1. The procedures start with declaring the project for public interest pursuant to the presidential decree accompanied with a memorandum on the required project and the complete plan for the project and its structures (Law 59/1979 & Law 3/1982 provided that the Prime Minister issues the decree for Expropriation);
2. The decree and the accompanying memorandum must be published in the official newspapers; A copy for the public is placed in the main offices of the concerned local Government unit.

This law has specified, through Article 6, the members of the Compensation Assessment Commission". This Article states that the commission is made at the Governorate level and consists of a delegate from the concerned Ministry's Surveying Body (as President), a delegate from the Agricultural Directorate, a delegate from the Housing and Utilities Directorate, and a delegate from the Real Estate Taxes Directorate in the Governorate. The compensation shall be estimated according to the prevailing market prices at the time of the issuance of the Decree for Expropriation.

This project will not require land acquisition or involuntary resettlement given that the project land area has been allocated by the Egyptian Government and has no inhabitants.

3.3.10 Relevant international treaties to which Egypt is a signatory

Egypt has signed and ratified a number of international conventions that commit the country to conservation of environmental resources.

- International Plant Protection Convention (Rome 1951)
- African convention on the conservation of nature and natural resources (Algeria 1968)

- UNESCO Convention for the protection of the world cultural and natural heritage (Paris, 16 November 1972)
- Convention on International Trade In Endangered Species Of Wild Fauna And Flora (CITES) (Washington 1973)
- International tropical timber (Geneva 1983)
- Basel Convention on the control of trans-boundary movements of hazardous wastes and their disposal (1989)
- United Nations framework convention on climate change (New York 1992). The convention covers measures to control greenhouse gas emissions from different sources including transportation.
- United Nations Framework Convention on climate change and Kyoto Protocol (Kyoto 1997)
- Convention on biological diversity (Rio de Janeiro 1992), which covers the conservation of habitats, animal and plant species, and intraspecific diversity.
- Convention for the protection of the ozone layer (Vienna 1985)
- Convention for the prevention and control of occupational hazards caused by carcinogenic substances and agents (Geneva 1974)
- Convention for the protection of workers against occupational hazards in the working environment due to air pollution, noise and vibration (Geneva 1977)
- International Labour Organization: core labour standards are to be followed during the project implementation. Egypt has been a member state of the ILO since 1936, and has ratified 64 conventions which regulate the labor standards and work conditions. In 1988, Egypt ratified the Occupational Safety and Health Convention of 1979 (No 152).
- Cultural Heritage: respecting cultural heritage and not financing projects which threaten the integrity of sites that have a high level of protection for reasons of cultural heritage, e.g. UNESCO World Heritage sites
- Consultation, Participation and Public Disclosure: The Aarhus Regulation promotes transparency of environmental information and the inclusion of stakeholders in projects. Consultation serves to identify and manage public concern at an early stage. The regulations include provisions for the public disclosure of key project information such as the Non-Technical Summary and the ESIA.

3.4 World Bank Safeguard Policies

The World Bank (WB) has identified 10 environmental and social safeguard policies that should be considered in its financed projects. The proposed project is classified as Category A according to the World Bank. This mandates a full Environmental and Social Impact Assessment (ESIA).

World Bank Safeguard Operational Policies and their applicability to the proposed project:

Safeguard Policy	Triggered	Justifications
Environmental Assessment (OP/BP 4.01)	Yes	The project is classified as Category A which requires full environmental assessment.
Natural Habitats (OP/BP 4.04)	No	Location and alignment of project components is mainly along (or close to) previously paved paths. Protected Areas, if encountered, will be avoided
Forests (OP/BP 4.36)	No	Proposed project areas contain No forests.
Pest Management (OP 4.09)	No	The proposed project will not involve purchasing or using Pesticides.
Physical Cultural Resources	Yes	Some of the proposed project activities, mainly

Safeguard Policy	Triggered	Justifications
(OP/BP 4.11)		pipeline laying, will pass through governorates which are famous for archeological findings. The project will make sure to avoid any declared archeological sites however procedures for chance finds will be included.
Indigenous Peoples (OP/BP 4.10)	No	No indigenous people are identified in Egypt.
Involuntary Resettlement (OP/BP 4.12)	Yes	There might be a need for temporary land acquisition during some of the project activities such as pipe laying in privately owned agriculture lands
Safety of Dams (OP/BP 4.37)	No	Not relevant to the proposed project
Projects on International Waterways (OP/BP 7.50)	No	Not relevant to the proposed project
Projects in Disputed Areas (OP/BP 7.60)	No	Not relevant to the proposed project

3.4.1 OP 4.01 – Environmental Assessment

According to the World Bank Operational Policy OP 4.01, the Natural Gas Connection Project is classified among Category A projects. Projects under this Category are likely to have significant adverse environmental impacts that are sensitive[5], diverse, or unprecedented.

The environmental impacts that are likely to be caused by the project shall be analyzed in this study. Mitigation measures shall be identified for all expected negative impacts, along with an Environmental Management and Monitoring Framework presenting mechanisms for implementation of these mitigation measures.

3.4.2 OP 4.11 – Physical Cultural Resources

Project areas may include sites, buildings and monuments that fall under the definition of Physical Cultural Resources[6]. Because the project will include significant excavations in many, which may be near sites of cultural value, there has been specific attention in this study to identify the locations of such sites, and to develop mitigation measures for controlling the effects on such sites. These mitigation measures are also reflected in the Environmental Management and Monitoring Framework.

3.4.3 OP 4.12 – Involuntary Resettlement

According to the WB's safeguard policy on Involuntary Resettlement, physical and economic dislocation resulting from WB funded developmental projects or sub-projects should be avoided or minimized as much as possible. The purpose of the RPF is to set down the principles for social impact mitigation, as well as clarify the organizational arrangements that may be needed during sub-project preparation and implementation phases. This includes compensating all project affected persons (PAPs) for the loss of lands, properties, and livelihoods resulting from displacement and resettlement, as well as assisting these people in relocation and rehabilitation.

[5] A potential impact is considered "sensitive" if it may be irreversible (e.g., lead to loss of a major natural habitat) or raise issues covered by OP 4.10, *Indigenous Peoples*; OP 4.04, *Natural Habitats*; OP 4.11, *Physical Cultural Resources*; or OP 4.12, *Involuntary Resettlement*.

[6] Physical Cultural Resources are defined as movable or immovable objects, sites, structures, groups of structures, and natural features, and landscapes that have archeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance.

A Resettlement Policy Framework has been prepared in order to outline a proposed approach and workplan to guide the implementation, handover, and monitoring and evaluation of the resettlement process, in case OP 4.12 is triggered at any point.

3.5 Gap analysis for key environmental concerns: Egyptian laws and WB Policies

3.5.1 Air Quality

Requirements of Egyptian legislation		Requirements of WB	
Reference	***Inflections***	***Reference***	***Inflections***
Article 34 of Law 4/1994 amended by law 9/2009 and **Article 34** of its Executive Regulation (ERs), and Decree 710/2012 Annex 5 of the ERs	Standards of outdoor air pollutants	OP 4.01 IFC GENERAL EHS GUIDELINES	Ensure the environmental sustainability of investment projects Ambient air quality
Executive regulation and Decree 1095/2011) Annex 6 Table 12	States that it is not allowed using the Asphalt mixing units at a distance less than 500 m away from a residential building.	-	-

Table 3-3: Max. Emission allowable limit for Asphalt mix units (mg/m3)

Total VOCs	CO	Total particulate matters
50	500	50

Table 3-4: Indicative limits for air quality

	Egyptian legislations μg/m^3				WB Requirements μg/m^3			
Ambient air parameters								
	Ambient air pollutants threshold				**IFC Ambient air pollutants threshold** (based on WHO limits**)**			
Exposure period	1 hr	8 hr	24 hr	1 year	1 hr	8 hr	24 Hr	1 year
Carbon monoxide CO μg/m^3	30	10	N/A	N/A	N/A	N/A	N/A	N/A
Sulfur dioxide SO_2 μg/m^3	350	N/A	150	60	N/A	N/A	125	N/A
Nitrogen oxides NO_x μg/m^3	300	N/A	150	60	200	N/A	N/A	40
Particulates PM_{10} μg/m^3	N/A	N/A	150	70	N/A	N/A	150	70
Particulates $PM_{2.5}$ μg/m^3	N/A	N/A	80	50	N/A	N/A	N/A	N/A
TSP μg/m^3	N/A	N/A	230	125	N/A	N/A	230	80
Ozone	180	120	N/A	N/A	N/A	160	100	N/A

3.5.2 Water Quality (In case of dewatering during excavation)

Requirements of Egyptian legislations			Requirements of WB	
Reference	*Inflections*		*Reference*	*Inflections*
Article 60, Executive Regulations of Law 48 for the year 1982	Standards of Ambient water quality of this document		OP 4.01	Ensure the environmental sustainability of investment projects
Article 61 The Executive Regulations of Law 48 for the year 1982	maximum limits for draining the processed liquid industrial wastes into freshwater bodies and groundwater reservoirs		IFC GENERAL EHS GUIDELINES	Discharges of process wastewater, sanitary wastewater, wastewater from utility operations or storm water to surface water should not result in contaminant concentrations in excess of local ambient water quality criteria
Ministerial Decree No. 44/2000 Decree 1095/2011) of Law 93/1962	Controlling the discharge of wastewater into the sewage system and public network		IFC GENERAL EHS GUIDELINES (Wastewater and Ambient Water Quality Table 1.3.1)	Effluent pollutants threshold
law 93/1962 and Ministerial Decree No. 44/2000	It encompasses this statement: it must be to acquire the wastewater discharge licenses from the concerned authorities during the construction and operation phase.			
Law 38/1967 and its executive regulations (decree 134/1968)	Concerning cleanliness and sanitation and regulates the collection, transportation, storage and disposal of solid waste.			

Table 3-5: Indicative Limits for discharge of liquid effluent into sewer systems

Parameters/pollutant	Effluent threshold (Egyptian 93/1962 Modified by ER 44/2000)	Effluent pollutants threshold (WB requirements)
pH	6-9.5	6 – 9 pH
BOD mg/l	600	30
COD mg/l	1100	125
Total nitrogen mg/l	N/A	10
Total phosphorus mg/l	N/A	2
Oil and grease mg/l	100	10
Total suspended solids mg/l	800	50
Total coliform bacteria (Most Probable Number/100 ml)	N/A	400

3.5.3 Noise

(Egyptian requirements)			(WB requirements)	
Article	Inflections		Reference	Inflections
Article 42 of Law 4/1994 amended by law 9/2009 and **Article 44** of ERs (amended by Decree 1095/2011 amended by Decree 710/2012).	Maximum allowable limits for ambient noise intensity Maximum exposure duration		OP 4.01	Ensure the environmental sustainability of investment projects
			IFC GENERAL EHS GUIDELINES Table 1.7.1 Table 2.3.1	Maximum increase in background nearest receptor location off-site. Noise limits for different working environments are provided

Table 3-6: Standards and Limits for Ambient Noise

Egyptian Law 4 Requirements				Requirements of WB		
	Permissible limit for noise intensity (decibel)			Receptor	One hour L_{Aeq} (dB_A)	
TYPE OF AREA	DAY 7 a.m. to 10 p.m.	NIGHT 10 p.m. to 7 a.m.			Day time From 10 pm to 7 am	night time from 22: 00-7:00
Sensitive Areas (schools- hospitals- public parks- rural areas)	50	40		Residential	55	45
Residential areas in with limited traffic and public services are available	55	45		Industrial	70	70
Residential areas in the city where commercial activities are available	60	50				
Residential areas located adjacent to roads which width is less than 12m, and workshops or commercial or entertainments activities are found	65	55				
Areas located adjacent to roads which width is 12m or more, or light industrial areas.	70	60				
Industrial areas (heavy industries)	70	70				

Table 3-7: Standards and Limits for Noise Levels in the Work Environment

Egyptian Law 4/1994 Requirements			WB Requirements		
TYPE OF PLACE AND ACTIVITY	MAXIMUM PERMISSIBLE NOISE [level equivalent to decibel (A)]		Location /activity	Equivalent level LAeq,8h	Maximum LAmax,fast
Work place with up to 8 hour shifts and aiming to limit noise hazards on sense of hearing*	85		Heavy Industry (no demand for oral communication)	85 dB(A)	110 dB(A)
Hospitals, clinics, public offices, etc.	80		Light industry (decreasing demand for oral communication)	50-65 dB(A)	110 dB(A)
Administrative offices – control rooms	65		Open offices, control rooms, service counters or similar	45-50 dB(A)	N/A
Work rooms for computers, typewriters or similar equipment	70		Individual offices (no disturbing noise)	40-45 dB(A)	N/A
Work rooms for activities requiring routine mental concentration	60		Hospitals	30-35 dB(A)	40 dB(A)
Hotels, bedrooms, and similar residential units	35				

* At the workplace, exposure time (8 hours) is halved for every additional 3 dBA over the maximum allowable limit. Above the maximum limit (85dBA for 8-hour shifts), wearing proper ear muffs is a must.

- Noise level at any time at the work place shall not exceed 135 dBA
- Noise shall be measured inside working environment in LAeq unit in accordance with ISO 9612/ ISO 1996 or Egyptian standards

3.6 Closing note

The Legal framework chapter in this ESIAF is meant to shed some light on the most relevant environmental and social legislations and regulations which the project should adhere to and take mitigation actions to comply with. These should be revisited and updated in the site-specific ESIAs according to the features of the detailed project.

Overall, Egyptian legislation provides environmental compliance procedures and emission limits which are at least comparable with WB/international requirements, if not more stringent. EGAS and the local distribution companies are bound by internal policies which obligate them to comply with national legal requirements. In the case that national requirements are non-existent for specific issues or pollutants, WB requirements will be adopted.

4 Description of the Environment

4.1 Introduction of the 11 governorates

The geographical spread of the project over 11 governorates, from the southern governorates (Aswan, Qena, and Sohag) to the northernmost (Alexandria) and from eastern governorates (Ismailia) to the westernmost (Matrouh), yields a diverse array of baselines for the project areas.

As an integral component of the ESIA framework, this study sets the basis for describing the project physical, biological, and socioeconomic environment upon finalization of design and various project details. In the specific ESIAs, the focus of the baseline descriptions of the project areas should be on aspects and components of high relevance to the environmental and social impact assessment of the natural gas connections project.

Data from secondary sources such as published reports, governorate information centers, and environmental profiles is important and essential. Data such as flora and fauna, rainfall, wind speeds, geology, hydrogeology, surface & groundwater, land-use, socioeconomic traits, etc. may play an important role in the environmental and social profiling of the project in the area-specific ESIAs. In addition, field measurements, coordination with stakeholders/government entities, and extensive document acquisition must take place in order to provide data on baseline components.

However, the most important source of project-relevant baseline data should be the detailed outcomes of the initial survey and the Property & Appliance survey which are carried out by the local distribution companies (Egypt Gas and Town Gas). As described previously, these surveys yield a wealth of detailed descriptions and maps of the project areas which is used to finalize the project design, components, and coverage.

In addition to the abovementioned sources for baseline data (especially the P&A survey), the following table presents the baseline components of high relevance to the project and a non-exhaustive listing of suggestions on the best sources of relevant data.

Component	Proposed data sources	Governorates potentially sensitive to component
Traffic	- Studies/data by the technical departments of the Ministry of Interior - Local police and traffic authorities in the project area - Interviews with dwellers in the project areas - Studies and maps from the General Organization for Physical Planning (GOPP)	All 11 governorates
Air quality	- Field measurements around equipment and machinery directly prior to commencement of project activities	All 11 governorates
Noise	- Field measurements at source and at sensitive receptors directly prior to commencement of project activities	All 11 governorates

Component	Proposed data sources	Governorates potentially sensitive to component
Underground utility lines and piping	- Data collection and acquisition of updated documents from the central and regional offices of the Potable Water and Wastewater Authority; the Electricity Holding and Transmission Companies; the Ministry of Telecommunications - Field surveys and mapping in the presence of representatives of the above entities - Interviews with locals and residents of the project areas - Using non-destructive remote sensing technologies - Using limited/exploratory boreholes	All 11 governorates
Weak structures	- Field surveys and mapping building-by-building - Consulting structural specialists in areas with clear signs of vulnerability - GOPP reports and maps related to conditions of structures	All 11 governorates
Culturally-valuable sites and antiquities	- Coordination with the central and regional offices of the Supreme Council of Antiquities - Consultations with locals and project areas residents - Field surveys and mapping	Aswan, Qena, Sohag, Giza, Ismailia, Matrouh, Alexandria
Solid, liquid, and hazardous waste disposal sites	- Field investigation - Acquisition of maps and data from local government units and relevant offices - Data/maps from the Egyptian Environmental Affairs Agency (EEAA) - Data and maps from the GOPP - Interviews with locals and residents - Interviews with certified waste management companies and local service providers - Interviews with informal waste handlers / scavengers "النباشين" - Interviews with operators of the Nasreya and UNICO hazardous waste treatment facilities in Alexandria	All 11 governorates
Geological and geotechnical history of the area	- Field surveys and geotechnical investigations - Interviews with locals and project area residents - Data collection and map acquisition from local government units - Geotechnical Due Diligence in areas close to water bodies or zone of high underground water tables	Qena, Alexandria and Delta governorates
Government-owned land	- Field surveys and land mapping for placement of PRSs - Obtaining documents and maps from the Property of the Country "Amalak El Dawla" office in the local government or Markaz unit	All 11 governorates

Component	Proposed data sources	Governorates potentially sensitive to component
Protected Areas and sensitive ecological systems	- EEAA Protected Areas sector - Environmental profile of the governorate	Probably none of the 11 governorates but due care should be given to possible upsets to ecological systems other than official Protected Areas during installation of the HP pipelines as they are usually located outside populated areas
Cultural, social, and political traits	- Field investigations - Interviews with locals and project area residents - Interviews with government officials and relevant stakeholders	All 11 governorates
Restoration and Repavement plans	- District local authorities - Data collection from the Directorate of Roads and Bridges	All 11 governorates
Growth, future land use, and planned developments	- GOPP reports, data, and maps - Urban/physical planning offices of the Governorate	All 11 governorates

It should be noted that some of the data above may simply be unavailable or incomplete despite having been implemented fully by a government and/or private entity. In such cases, the implementing company must generate the data using the necessary means (field investigations, measurements, stakeholder engagement, etc.).

4.2 Selected background data

Alexandria Governorate
The governorate is bordered to the north by the Mediterranean Sea, to the east by El Behera and to the west by Matrouh Governorate. Alexandria's total area comes to 2300.0 km^2, and is divided into one Markaz, one city, 7 districts, and 3 rural local units. Alexandria is an industrial governorate where 40% of Egyptian industries are concentrated, especially chemicals, food, spinning and weaving as well as oil industries and fertilizers. Borg Al-Arab city was established to be an industrial, housing and agricultural city to absorb the current and future population increase.

Matrouh Governorate

Matrouh Governorate occupies a unique location on the Mediterranean Sea serving as the hub between Egypt and the Arab Maghreb (North Africa).

The governorate's total area comes to 166563 km^2, forming 16.5% of the country's total area. It is divide into 8 Markaz, 8 cities, and 56 rural local units with 1 affiliated village.

Main activities of the population are trade, sheep and camel breeding as well as cultivation of figs and olives.

Daqahlia Governorate

Daqahlia Governorate is located in the Delta Region. The governorate's total area comes to 3538.20 km^2, forming 0.4% of the country's total area. It is divided into 16 Markaz, 19 cities, 2 districts, and 120 rural local units with 366 affiliated villages. The governorate's population reaches 5.6 million recording a normal increase rate of 22.30 per thousand.

Daqahlia serves as the base of the rich Nile Delta triangle, and is ranked among the main agricultural governorates. It is advantaged by rich water resources and fish wealth. It is also famous for the production of meat, poultry and dairy products.

Daqahlia also hosts major industrial facilities spreading all over the governorate, and is famous for large and diversified industries, most important of which are chemicals - spinning and weaving garments - hydrogenated oils - soap - rice milling - grain mills – cotton ginning - milk - and printing and publishing . In addition, small and indigenous industries are common in villages and hamlets.

The governorate won worldwide fame for hosting specialized medical centers and hospitals. Some of these centers include: urology and nephrology, and ophthalmology.

Qalubia Governorate

Qalubia Governorate is part of the Greater Cairo region. It lies in the east of the Nile at the top point of the Delta. It is bordered to the south by Cairo and Giza Governorates and to the north by Daqahlia and Gharbeia Governorates, to the east by Sharqiah Governorate and Menufia to the west. Shoubra El Khaima city is the starting point of the agricultural highway to Lower Egypt governorates, as such Qalubia is held as liaison connecting between lower Egypt and Upper Egypt governorates.

The governorate's total area comes to 1124.30 km^2, forming 0.1% of the country's total area. It is divided into 7 Markaz, 10 cities, 2 districts, and 50 rural local units with 147 affiliated villages.

In addition, Shoubra El Khaima hosts the largest industrial cluster including several factories of: spinning and weaving, electric appliances, plastics, vehicles, oil refining, food packing and processing, metal products, in addition to Abo Za'bal industrial zone which is famous for fertilizers and chemicals industries.

Gharbeia Governorate

Gharbeia is located in the center of Delta region

The governorate's total area comes to 1942.30 km^2, forming 0.2% of the country's total area. It is divided into 8 Markaz, 8 cities, 4 districts, and 70 rural local units with 251 affiliated villages.

The governorate is renowned for growing traditional crops such as cotton, rice, wheat, beans, maize and fruits, in addition to Jasmine, and medical herbs and plants, of which, extracts and pastes are exported. The governorate is also famous for growing potatoes for exports and local market.

Gharbeia is a lead governorate in livestock and poultry breeding. In the industry field, it hosts large industries including spinning and weaving.

Menufia Governorate

Menufia Governorate is part of the Delta Region .The governorate's total area comes to 2499 km^2, forming 0.2% of the country's total area. It is divided into 9 Markaz, 10 cities, 2 districts, and 70 rural local units with 245 affiliated villages.

It is known of its fertile soil, agriculture is the main activity in the governorate. It is famous for growing cotton, maize, wheat and vegetable.

The governorate contributes also to the industrial activity as it hosts large industries such as spinning and weaving. Furthermore, it is famous for the silk carpet industry for exporting purposes. The governorate experienced a huge industrial movement reflected in establishing several industrial facilities and other developmental projects that created job opportunities.

In addition, the governorate hosts many industrial zones which provide great investment potentials and incentives.

Ismailia governorate

Ismailia is Egypt's eastern gateway to the Asian Continent and the Asian Arab and Islamic countries. The governorate lies on Suez Canal banks and is bordered by Port Said to the north and Suez to the south.

The governorate's total area is 5067 km^2, forming 0.5% of the country's total area. It is divided into 6 Markaz, 7 cities, 3 districts, and 33 rural local units with 5 affiliated villages.

Ismailia offers several investment opportunities, most important of which are: industrial investment carried out in the first and second industrial zones. The industrial zones had been connected to roads accessing the Egyptian ports and the duty free zone in Ismailia,

Giza Governorate

Giza is one of Greater Cairo region urban governorates.

The governorate's total area reaches 13184 km^2, forming 3% of the country's total area. The governorate is divided into 9 Markaz, 11 cities, 8 districts in addition to 48 rural local units with 120 affiliated villages.

Giza is privileged with plenty of ancient Pharoanic monuments, placing it second after Luxor city in this regard. Most Important monuments include Giza pyramids, the Sphinx, Cheops Ship.

Sohag Governorate

Sohag Governorate belongs to south Upper Egypt Region which includes Aswan, Sohag, Luxor, Qena, and the Red Sea The governorate's total area comes to 11218.10 km^2, forming 1.1% of the country's total area. It is divided into 11 Markaz, 11 cities, 3 districts, and 51 rural local units with 213 affiliated villages.

Agriculture serves is the main economic activity of the governorate which is known for growing wheat, cotton, and onions, as well as livestock and poultry production.

The governorate pays great attention to the industrialization and motivation of investors. This trend is reflected in the industrial complex (Nile Company for Oil and Detergents, spinning and weaving, onion dehydration, beverages and sugar in Gerga).Recently, Sohag established four industrial zones in El Kawthar district and 3 other industrial zones: west Tahta, west Gerga, and Ahayiwia Shark.

Qena Governorate

Qena Governorate is part of the south Upper Egypt Region. The governorate's total area comes to 8979.80 km^2, forming 0.9% of the country's total area. It is divided into 9 Markaz, 9 cities, and 41 rural local units with 111 affiliated villages. Qena is an agri- industrial governorate. It ranks first in the production of sugar cane, tomatoes, bananas, sesame, and hibiscus.

Several factories operate in the governorate including 3 sugar factories, and one spinning and weaving, in addition to the Aluminum Complex standing as the largest industrial facility in the Middle East .

Qena also hosts two industrial zones; the First Industrial Zone situated in Kalaheen at Qaft Markaz. The Second Industrial Zone is at Yahaw in Nagg`a Hammady. Another small industries cluster is located in Salehia at Qena markaz.

Aswan Governorate
Aswan governorates is part of the southern Upper Egypt region. It serves as Egypt's southern gate and liaison between northern and southern parts of the Nile Valley and concurrently between Egypt and Africa. The governorate's total area is 62726 km^2, forming 6.2% of the country's total area. It is divided into 5 Markaz, 10 cities, and 37 rural local units with 90 affiliated villages. Agriculture is the main activity in the governorate, which is famous for growing sugar-cane, hibiscus, wheat, dates and henna. The governorate contributes as well to industry, most importantly: sugar, chemical fertilizers, phosphate, and fish processing and packing. The industrial zone in El Shalal had been completed including installation of water, and electricity supply, as well as modern roads networks. Accordingly, many job opportunities were created for the people of the governorate

For the current study, the ESIAF team developed the proposed tools and collected primary data from wide range of stakeholders using multiple qualitative and quantities tools including 1906 households survey questionnaire. The results presented below in the socioeconomic baseline section is a combination of the collected primary data as well as the secondary data review.

4.3 Basic Demographic Characteristics

The ESIAF paid attention to describe the main characteristic of the project areas. However, due to the wide geographical scope of the NG project, the ESIAF report will shed light briefly on the project sites characteristics. Additional detailed information is presented in the Supplementary Social Impact Assessment Framework report developed as a stand-alone document related to the NG project. Yet, it will be essential to collect more site oriented data during the preparation of the specific ESIA.

4.3.1 Population Characteristics

The total number of the targeted NG project installation is 1.1 million household connections. That will serve around 4,564,105 beneficiaries.[7] The population of the 11 governorates is 39.794.78 million people. The highest proportion of people (17.6%) inhabits Giza Governorate. The least strata of people (1.0%) inhabit Matrouh Governorate.

The average household size reaches 5.33 person in Matrouh Governorate. However, the household size is only 3.83 person in Alexandria Governorate. The urban governorates are characterized of low household size. The average household size was the basis of estimated population to be benefited from the project.

Age Structure

The age categories of the population in the 11 Governorates showed a dominant growing young community as 50 % of the governorates' population falls under the age category 15- less than 45

[7] The number of beneficiary household in each governorate was multiplied by the average household within the governorate

years. Those who are less than 15 years old represent about 17.71% of the population. While those aged between 45- less than 60 years old represent about 14.39%.

Rate of Natural Increase

The crude birth rate varies between 28 live birth per thousand person in Qalubia Governorate to 46.2 birth in Matrouh Governorate. The mortality rate diversifies between 4.9 in Matrouh Governorate and 7.9 in Alexandria Governorate, consequently, the population increase rate varies between 22.3 per thousand person in Daqahlia Governorate to 41.3 person in Matrouh Governorate.

4.3.2 Living Conditions

The study team tried to investigate the living conditions in order to obtain clearer view about the household characteristics of the potential beneficiaries. However, more localized socioeconomic investigations should be carried out during the site specific ESIA.

Household Size

The average family size of the sample surveyed in the 11 governorates is about 4.61 persons. However, the dominant value is 4 persons per household. The segregation of sample by the size of household reflected that 64.2% of the sample surveyed constitute of 4-6 persons, while a quarter of the sample surveyed are less than three persons. Slight variation was reported among the governorates as 21.3% of Sohag households reported an average of 7-9 persons, whereas, Daqahlia and Gharbeia household size did not exceed 6 persons.

Dwelling characteristics

The type of dwelling should be highlighted in order to identify the probability to install the NG to those houses. Around two thirds of the sample surveyed live in an apartment, while 31.7% live in a separate house. The governorates varied among each other regarding the type of dwelling. Around 92.0% of the sample surveyed in Qalubia live in an apartment, while 52.9% of the sample in Sohag live in a separate house. Due to the nature of dwelling, it is anticipated that the apartment buildings beneficiaries will benefit from the project, as well as those who live in a separate house.

The construction materials of the walls and ceilings are one of the main bases and conditions required to install the NG. It was reported that 42.4% of the total sample surveyed live in housing projects type. Around third of sample surveyed live in newly constructed house. 12.% live in old buildings and the same percentage live in squatter building. The diversity among the sample from the 11 governorate was obvious.

Almost all of the sample surveyed live in buildings constructed of concrete and red bricks. Few percentage of the buildings are constructed of white bricks. Dwellings constructed of wood and mud were limited. Indicating that, the houses are suitable for the installation of the NG.

Regarding the legality of the houses, the group discussions reflected that few percentage of the houses are constructed with no legal documents. Thus, they are not entitled for NG installation. The research team reported back observations from the field indicting that the government authority began to demolish the illegal constructed houses.

Regarding street conditions, the majority of them varies between 3-20 meters width. That was an indication of the high probability to get the NG installed in. As for ceiling construction

materials[8], almost 90.0% of the sample surveyed have a ceiling constructed of concrete. About 10.0% of the sample in Menufia governorate have ceiling constructed of wood, while few percentage of the sample in Sohag have ceilings constructed of palm tree reeds.

4.3.3 Access to Basic Services

Access to Electricity

Access to electricity in Egypt is high at (99.0%) (EHDR 2010). That is primarily due to the care given to improve living conditions for people in Egypt in particular access to electricity. Even squatter areas have access to electricity regardless of their formality and legality. That indicates to the stability of infrastructure in most of areas.

The census showed that the majority of households use electricity as the main source of light represents 99.0% of the population in all Governorate. However, the continuity of electricity current is not satisfactory to the residents of rural areas.

The governorates depend almost entirely on Nile water for all its water needs. Accessibility to potable water is high in the 11 governorates. Access to potable water is about 99.0% in urban areas, while it reaches 96.0% in Upper Egypt governorates. In Sohag, the majority of households have governmental water that was extracted from wells not from the Nile.

The quality of water supplies is still not satisfactory for the majority of community people. The color of water, taste and smell reflect the bad condition of water supply.

Human development report 2010 presented limited information about access to sewage systems which is one of the requirements to install the NG. The coverage of sewage in urban governorates (Alexandria) is about 96.8%. While the coverage of Lower Egypt (Delta Region Governorates) is around 64.6%. The coverage of urban areas is about 93.0% while it reaches only 52.6% of rural areas in Lower Egypt. The sanitation coverage in Upper Egypt is limited. 37.2% of the Upper Egypt areas are covered with sewage . 76.5% of the urban areas are covered by sewage while 13.5% of the rural areas only are covered with sanitation. Boarders governorate (Matrouh) have limited access to sewage systems. About 42.8% of the borders governorates are served by sewage.

The sample surveyed reflected the high connectivity to sewage network. However, 14.1% of the sample reported that they have no access to sewage system.

4.3.4 Human Development Profile

Egypt's Human Development Report (2010) ranked the governorates according to their human development index scores. Tracking the level of Human Development achieved in different governorates since 2005, five governorates occupied the first five rankings in HD level, namely Port Said, Suez, Cairo, Alexandria and Damietta, while the governorates that occupied the bottom five ranks are Fayoum, Assiut, Menia, Beni Sue and Sohag. EHDR 2010 records changes in the ranking of governorates. Sohag and Qena governorates were ranked as the lowest ones, followed by Aswan and Qalubia. However, Alexandria and Ismailia were classified as of better human development conditions. Unfortunately, Matrouh was not classified.

[8] The celling materials is one of the modalities required to install the NG

Ismailia has entered the top five governorates for the first time since 1995. Whereas Qena has joined the bottom group. Ismailia has a rise of 0.025 in its human development index in EHDR 2010 compared to EHDR 2008.).

Education

Education is perceived as the first shell that can help population to withstand poverty. The review of secondary data showed that the intermediate education is prevailed among all governorates. However, basic education (primary and secondary) was the prevailed type of education in Matrouh governorate (24.4%). Aswan governorate has more strata of intermediate education (31.5%). Illiteracy in Sohag governorate was relatively higher as(36.5%) of the population were classified among illiterate group. University education proportion was high in Alexandria and Giza Governorate. Educational status influenced the mentioned above human development index.

Unemployment and Work Status

Unemployment rate for poor youth is lower than the non- poor, at any age. Poor young people cannot afford to stay unemployed. Thus, the incidence of unemployment may be low, although youth are still in poverty. Unemployment rates continue to be high for secondary and university graduates, especially for the poor. It seems that even if a poor person is able to break the vicious circle of education and poverty, he/she still cannot compete in the job market as a result of low quality education, labor market mismatch, or because of a lack of connections in identifying job opportunities.

The total labor force is relatively high in Menufia (38.0%), Alexandria (35.5%) and Gharbeia governorates (34.4%), while the lowest labor force reported was in Sohag (26.0%) and Qena (28.5%). Regardless of the level of education, it was obvious that the unemployment rate is higher among vocational school and university graduates. For example, in Alexandria the unemployment status was up to 51.0% among vocational; secondary school graduates, while it was only (13.5%) among below secondary education groups. Indicating that, vocational and university graduates are not qualified enough to get into the labor market. The unemployment rate varies among the governorates. Generally speaking, unemployment is higher in urban areas than in rural areas. Agricultural activities always absorb more working groups regardless to their educational level. Thus, the rural areas are of less unemployment rate.

With regards to the human activities in the 11 governorates, the Egyptian Human Development report provided detailed information about the labor force. The highest labor force among age category 15+ years was reported in Menufia Governorate (35.1%), whereas it was the lowest in Qena (26.9%). The percentage of women in labor force is the lowest in Giza governorate (14.4%) However, it was the highest in Menufia governorate.

Regarding to the segregation of working population by human activities, it was obvious that services are the most dominant human activity in most of the 11 governorates. It was higher in Matrouh governorate (74.0%), Alexandria (63.3%) and Giza (56.%). However, industrial activities were higher in Alexandria (33.7%) and the lowest in Sohag governorate (14.8%). Agricultural activities were more dominant in Qena (42.3%) However, it was the lowest in Alexandria governorate (3.0%). That was anticipated as Alexandria is one of the urban areas.

4.3.5 Poverty index

Sohag and Qena are of poorer conditions than the other governorates. The GDP per capita in

Qena is 6387.3 EGP, while in Sohag is 7329.7 EGP. The lowest 40.0% of people represented 25.8% in the two governorates. Poor persons represent (47.5%) of the total people in Sohag. The ultra-poor represents (18.5%) of the poor people in Sohag. Detailed discussion of poverty index is reported in the Sector Wide Social Assessment .

4.3.6 Income and expenditure

NG installation project necessitates a clear determination of poverty through analyzing the income and expenditure of household. Reliability of expenditure data is higher than income. People are more willing to talk about expenditure rather than income. Thus, the study focused on the breadwinner who supports family financially, the expenditure and income of households.

Regarding the occupation of breadwinner, a big proportion of the sample surveyed (33.9%) work as services and sales person. However, 18.1% of the total sample work as skilled laborers. (16.2%) of the total sample work as administrative staff, as well as, (11.2%) work as specialists.

Gaining information about the income of the potential beneficiaries shed light on the potential affordability to pay for the NG connections, either in cash or by installment. Thus, the ESIAF collected data about the monthly income and expenditure. Following is the analysis of the income and expenditure among the sample surveyed.

The results of the primary data collected during the ESIAF related to the monthly income revealed that (25.9%)of the total sample surveyed earn between 1000-1500 EGP per month. While those who earn less than 1000 EGP are about fifth of the sample. About a quarter of the sample surveyed earn more than 2000 EGP. As it was anticipated, variations among governorates are obvious. The proportion of those earn less than 1500 EGP per month among the surveyed sample in Sohag is the highest representing about (80.0%). However, those earn more than 1500 EGP per month in Matrouh is about (84.0%) of the population.

Expenditure analysis results were to some extent consistent with the income distribution among the sample surveyed . About (25.0%) of the total sample surveyed spend between 1000- less than 1500 EGP. While Those who spend less than 1000 EGP represent about (22.0%). Variations in the 11 governorates were clear as the majority of Sohag sample spend less than 1000 EGP. However, it was obvious that the expenditure is relatively higher than the income.

Stability of income is one of the factors that might play for the benefit of the project as paying by installment is one of the payment option. About (20.0%) of the total sample surveyed reported their income decreased during the previous year. However, about third of the sample surveyed reported increasing in their income. The increase in income was justified by the sample. In Matrouh Governorate, they justified the increase of income due to the political situation that drove more people to visit Matrouh rather than Alexandria. Stability in income will enable people to pay by installment. However, such information might lead us to predict that people will not be able to pay big amounts of money. Thus, long term installments might be considered.

4.3.7 Fuel currently used in households

Secondary information provided by Butagasco (company filling and distributing LPG cylinders) reported that the LPG stores in the project areas vary according to the total population of the area. Qalubia governorate hosts 31 stores, while Matrouh and Aswan host only 4 stores.

The sample surveyed reported that the main type of fuel used for cooking is the LPG cylinders. The source of aforementioned type is mainly the LPG informal distributors (55.3%). The

second source is the LPG cylinder store (31.8%). The distribution system suffers due to the chaotic distribution mechanism. Many groups try participating in the distribution activities. The formal legal ones are those groups working in the LPG distributor stores affiliated to Butagasco and those who received loan from the Social Fund for Development. However, the informal group is the venders, grocers, house guards and NGOs. The Local Governmental Unit participates only during the shortage of LPG (mainly winter time in all governorates and summer time in Matrouh). It is worth noting that the LPG fuel is used also for baking in house backing ovens that can't be operated by the NG. That was one of the main concerned raised by the community during the consultation activities.

During the course of LPG cylinders shortage, the informal LPG distributors earn about 50 EGP per day (working for 10 days a month). Nevertheless, they earn around 70 EGP per day on average all over the year. Those who receive loan from the SFD in Qena governorate earn between 100 EGP per day during the peak time. They might earn more all over the year. The governmental LPG distributors (formal groups) who work in the LPG store get about 2-3 EGP per each LPG cylinder as so called *tips* . Poor people are obliged to pay for them.

With regards to the fuel used for water heating, it is mainly electricity that operates electric water heating. However, in Sohag governorate the LPG was the main type of fuel. Kerosene was not of the same importance as electricity and LPG. (52.3%) of the sample surveyed in Sohag governorate and (55.3%) of the sample in Menufia reported that they use the LPG fuel for water heating. It was anticipated that the rural areas might have used alternative types of fuel, however, this was not the case. Remote areas in Matrouh city use dry wood for heating and baking. Particularly during the absence of LPG cylinders.

4.3.8 Problems faced with the current household fuel

The data collection process took place during the shortage of LPG cylinders. That shed light on the problems the community members face to get the LPG cylinders. With regards to The current type of fuel used for cooking, (62.5%) of the sample surveyed reported the LPG cylinders are not easy to be obtained. The greedy LPG distributors raise the price of LPG informally. (37.7%) of the sample complained due to the high price of the LPG cylinder. Almost fifth of the sample surveyed complained about the long queues they have to stand in to get an LPG cylinder. (21.4%) of the sample surveyed reported that they suffer due to the high cost of electricity bill. It is worth mentioning that the electricity problems is less than the LPG. (55.6%) of those who have electric water heating reported that they face no problem with the electricity.

4.3.9 Perception towards the project

Throughout the various consultation and engagement activities, the work teams experienced and recorded remarkable and overwhelming public acceptance, even eagerness, by the community and the governmental stakeholders towards the proposed project. The indignity and financial hardships experienced by scores of Egyptian families (especially women) in obtaining LPG cylinders (the current household fuel) was revealed through testimonies all over the country. Aside from a limited number of concerns regarding street rehabilitation after construction works and options of installation fee payment; the glaring message from governmental and community consultations was to commence implementation ASAP (with repeated requests to expand coverage beyond what is planned for the project).

Community perceptions were investigated in order to gain better understanding for the hosting communities' attitudes towards the project. It is very obvious that over 97% of the sample have positive perception about NG. 52.9% of the sample surveyed reported that NG is available all the time while 43.9% shed a light on the agony they face to get the LPG through long queues they have to stand in for hours. ***"I had to skip my school today to go to the LPG storeroom in order to get one… that was in vain… Should I skip school again tomorrow?"*** reported a young student in Sohag Governorate. The women had to carry their children to go to the LPG storeroom. Other respondents reported that the LPG does not have a fixed and unified price, pointing out that the storeroom sells LPG cylinders for 8 EGP, while mobile distributers sell them for about 15-25 EGP. During winter in most of the governorates the LPG cylinders might be exchanged for up to 50 EGP.

4.3.10 Willingness to pay

The majority of sample surveyed expressed their willingness to be connected to the NG regardless to the amount of money they can afford to pay. Such attitude was attributed to the shortage of LPG cylinder during the data collection process.

The methods of payments discussed revealed that only third of the sample surveyed are willing to pay in cash. That proportion increased to 45.9% in Gharbeia governorate. The disparities among the 11 governorates was obvious. However, the survey team discussed with the whole samples all options of payments in order to get more detailed information about the exact willingness and affordability to pay among the sample.

The households surveyed reported that the least they can pay on average for the total installation about 800 EGP in cash. Concerning the highest value they can pay on average was about 1500 EGP.. The majority of them reported 1500 EGP due to their information about the actual NG installation cost.

With regards to paying in installments, the average of the least advance payment is about 200 EGP, while the highest advance payment reported was 500 EGP. Both male and female headed families were willing to pay less than 500 EGP as advance payment. Such amount of money increased to reach less than 1000 EGP

Monthly installment value was investigated among the whole sample. The least average of installment they afford paying monthly is 39.59 EGP. However, the highest value they can pay as an installment per month is about 71.62 EGP. The discussion of paying by installment led us to the patterns of installments proposed by EGAS. (33.6%) of the sample surveyed reported that they can pay 28 EGP for 84 months

4.4 Closing note

As outlined at the beginning of this chapter, certain baseline characteristics (especially those resulting from the P&A survey and social profiling of the project areas) are of high

relevance to the proposed natural gas connections project. These should be addressed comprehensively during the specific ESIAs in order to identify possible impacts which may vary in significance from one project area to the next. It should be noted, however, that the baseline characteristics identified are non-exhaustive and that the specific ESIAs must add other project-related characteristics to the baseline, as appropriate.

For socioeconomic baseline data primary data collection should be utilized during the site-specific ESIAs. The proposed tool is a structured questionnaire that should be applied with at least 500 individuals within the vicinity of the project areas. Such tool should cover the following indicators:

1- Household characteristics
2- Economic wellbeing and wealth index indicator
3- Type of fuel used for cooking and water heating
4- Perception of the community towards the project
5- The willingness and affordability to pay
6- The project affected persons and vulnerability
7- Compensation mechanism
8- Citizen engagement strategy

5 Environmental and Social Impacts

5.1 Introduction

The environmental and social advantages of switching household fuel from LPG cylinders to natural gas pipelines are quite diverse. On the residential level, the proposed project provides improved safety, reduced physical/social/financial hardships, and secure supply. On the national level, it promotes the utilization of Egyptian natural resources and reduces the subsidy and import burden. Even on the global level, the project involves cleaner fuel with reduced carbon footprint.

A thorough analysis of environmental and social impacts is important to detail an effective management and monitoring plan which will minimize negative impacts and maximize positives.

5.2 Positive Impacts

5.2.1 During the construction phase

Provide direct job opportunities to skilled and semi-skilled laborers

- The total number of new long-term job opportunities is estimated at 6,000 jobs
- Up to 2,400 semi-skilled workers on a temporary basis
- Up to 570 local construction workers for water heater vent installations
- Up to 10,000 daily wage workers for street drilling

Create indirect opportunities

- The training center is needed to train young people form community.
- The LPG cylinder traders will benefit from purchasing the unused LPG cylinders
- Increased economic activity in project (food products, water and construction materials)
- During construction, workers and engineers may need accommodation
- National pipes and scaffold factories will be flourished
- Drivers and mini-bus owners will benefit from the transportation of the workers.

5.2.2 During the operation phase

- Constantly available and reliable fuel for home use
- Reduced expenditure on LPG importation and subsidies (1273.8 million EGP savings)
- Significantly lower leakage and fire risk compared to LPG
- Improved safety due to low pressure (20 mBar) compared to cylinders
- Customer service and emergency response by qualified personnel/technicians
- Eliminate LPG hardships to the physically challenged, women, and the elderly
- Elimination of insects and dirt typically associated with LPG cylinders
- Limiting the LPG cylinder "black market" due to lower demand
- Limiting possible child labor in LPG cylinder distribution
- Hiring of up to 600 fee collectors in the 11 governorates

Detailed discussion of the potential positive socioeconomic impacts is presented in the Supplementary Social Impact Assessment Framework (SSIAF).

5.3 Potential Negative Impacts during Construction

In addition to international guidelines and best-practice which outline typical negative impacts which may potentially arise from such a gas connections project, monitoring reports from the Greater Cairo gas connections project and the analysis of ESIAF consultant identify the following aspects as key areas of possible concern:

- Traffic congestion and loss of access due to excavation and installation works
- Air emissions from heavy machinery and generators; dust from excavation activities
- Noise levels from heavy machinery and asphalt breaking; as well as other construction/demolition for extending NG piping into households
- Risk of damage/breakage of underground utility lines and piping (drinking water, wastewater, electricity cables, telephone lines) during excavations
- Possible disruption or displacement of ecological systems (especially in excavation and installation of the 70-bar steel pipelines)
- Potential risk to weak structures may arise in areas where building standards are not followed or in areas where high groundwater levels affect integrity of foundations
- Structural and aesthetic effects on culturally-valuable sites and antiquities
- Management of solid, liquid, and hazardous waste from handling and temporary storage to transportation and final disposal
- **(رد الشئ لأصله)** could be translated as "rehabilitation" or "restoration". It is an Egyptian legal/institutional expression that signifies the responsibility to return an item to its original state. In the context of the proposed project, it is applied to the responsibility of the implementing company (Town Gas or Egypt Gas) detailed in the terms agreed with the local governmental units to provide the necessary resources to re-pave roads and streets to the original state after natural gas excavation and installation works. This issue is of importance as delays in street restoration may lead to varying degrees of damage to vehicles, loss of access and business, traffic congestions with associated delays and emissions, and a potentially significant level of public discontent.
- **Socioeconomic impacts**

  1- Impacts on assets (land) and livelihoods of the farmers (crops)

    - Penetrating into the cultivated land will result in temporary damage to the crops and consequently on the livelihoods of the farmers. That will trigger the World Bank OP. 4.12 which requires developing a Resettlement Action Plan in order to have a unified mechanism to minimize the impacts on the livelihood of the land and crops owners and tenants.178 km of pipes at a width of approximately 50 cm are needed along the inter-city networks (in streets). The potential cultivated lands in the entire 178 km are difficult to determine at this stage as the routes had not yet been defined at the time of the submission of this report.
    - A total of 25 pressure reduction stations (usually selected to be on government owned land), measuring approximately 40 x 40m 9each, are needed to construct pressure reduction stations. Where it is not possible to use state owned lands,

[9] Estimated dimension provided by EGAS

EGAS always purchases the lands. Priority is always given to obtaining land through state owned land.
The purchase process of EGAS involves that their technical staff propose three plots of lands that are suitable to construct the Pressure Reduction Stations in. They communicate with the owners in order to receive a preliminary price from the owners. In case the price is acceptable EGAS and GASCO purchase the lands. This process is defined as "willing buyer willing seller approach". It is worth mentioning that GASCO purchase the lands since GASCO is the responsible entity for connecting the NG grid to the PRS.

2- **Due to the fact that the installation should be based on certain technical and safety specifications, some of the areas and houses will not be accepted to be connected to the NG. Because the project is widely needed and a demand driven project, that might raise some sensitivities and negative reactions from the community members who will not be served.** Particularly after informing people that the NG connection project will cover certain areas. Those who attended the various public consultations expressed their frustration that NG might not yet be connected in their areas. This is not an impact of the project but a fear that could threaten the project implementation. Transparent information sharing and awareness raising can contribute to minimizing this fear.
3- The main concern reported by the majority of respondents from the community is **the negative implications resulting from damaging the streets in both paved and unpaved roads. This** could be in the form of local communities inconvenience and disturbance. The most important implications are:
    - Negative effects on the business of neighboring shopkeepers due to digging close to such shops. The digging activities affect having access to the shops.
    - Congestion and traffic disturbance for both pedestrians, cars as well as the livelihoods of taxi, microbus and Tuk Tuk drivers. In coastal governorates traffic congestion might affect tourism. Thus, clear traffic diversion plan should be settled.
    - Risks to existing infrastructure, especially the existing pipeline that is not mapped and must be identified through excavation holes. It is crucial to have updated maps of these lines and pipes in order to avoid damaging them. If such maps are not available, excavation holes must be dug before any construction,

To deal with the issues above the construction scheduled should be implemented in a timely manner and all the measures stated in the environmental management framework should be adhered to. This includes streets and infrastructure restoration. In the meantime, a detailed time plan should be prepared and disseminated in the project-affected areas to ensure transparent sharing for information. The impact assessment of Greater Cairo project 2013 revealed that the practices of NG companies during construction are overshadowed by their performance and attention paid to the

infrastructure and they are doing all the effort to cause the least level of inconvenience

4- There was a fear that negligent workers may cause accidents harmful to themselves or to the community members, particularly children, especially close to the digging sites. Therefore awareness-raising sessions should be provided to workers and community members to promote safety and health while safety supervisors are hired to oversee digging sites. These supervisors can be chosen from among community members by NGOs and will be largely responsible for children and their safety around the construction site. Concerning workers, they should be trained on the occupational health and safety measures and they should be strictly monitored. The measures in the environmental management framework should be followed by the contractors. Accumulation of waste in the construction areas might become a hub for insects and unfavorable smells which will negatively affect the surrounding communities. This is one of the potential unfavorable impacts. Therefore, a detailed plan should be prepared to dispose wastes as indicted in the environmental management framework

- Concerning workers, they should be trained on the occupational health and safety measures and they should be strictly monitored. The measures in the environmental management framework should be followed by the contractors. Accumulation of waste in the construction areas might become a hub for insects and unfavorable smells which will negatively affect the surrounding communities. This is one of the potential unfavorable impacts. Therefore, a detailed plan should be prepared to dispose wastes as indicted in the environmental management framework

In addition to the above framework for impacts, it is strongly recommended to update the expected impacts once the detailed project design is finalized. Detailed design should include implementation plans, work schedules, exact pipeline routes, PRS locations, and measures required for installation of the lateral pipelines and HH installations.

5.3.1 Reduction of Traffic Flow *(disruption of local and regional traffic)*

Mobilization of heavy machinery, asphalt breaking, excavation, placement of piping, and backfill activities are bound to limit traffic and accessibility during construction. This may entail narrowing major roads by longitudinal and/or lateral excavation or totally blocking narrow or side roads.

In addition to reducing the lanes/space available for traffic, impacts may also entail limiting or prohibition of parking along the length of the works.

Traffic in almost all Egyptian cities may be adversely affected by such congestions. Coordinating with and obtaining approvals from local government and traffic police is vital to avoid delays and objections to the work program.

Access to buildings and shop entrances may be limited or constricted in cases where excavations form obstacles for persons and cargo.

Traffic and access limitation effects are temporary, local, and range from low to high severity.

5.3.2 Air Emissions

Air emissions (gases and particulates) during construction shall arise from:

- Particulate matter and suspended solids from excavation/backfilling operations
- Possible dispersion from stockpiles of waste or sand used for filling trenches.
- Exhaust from excavation equipment and heavy machinery (excavators, trenchers, loaders, trucks) containing SO_x, NO_x, CO, VOCs, etc.

Law 4/1994 (modified by law 9/2009) stipulates strict standards to preserve the air quality. As outlined in the legal framework section, the proposed measures to control excavation, soil stockpiling, soil haulage and exhaust from vehicles.

An indirect potential source of air emissions is traffic congestions resulting from excavation works.

Soil stockpiling is usually minimal at the site, and is normally backfilled within the same day.

Air emissions impacts are expected to be temporary, local, and of low severity.

5.3.3 Noise

Construction activities will likely increase noise levels due to excavation and heavy machinery. Typical construction noise includes noise intensity due to engine operation, and intermittent impacts which may take place during demolition of asphalt, either by a trencher or by a jack hammer. As discussed previously, Law 4/1994-9/2009 has defined standards for noise intensity and exposure periods in the work place, in addition to certain limits for ambient noise levels for different types of urban and rural areas.

Noise impacts on construction workers, technicians and engineers in direct vicinity of the excavation works and heavy machinery are considered more significant than those on residents, because they are exposed to high levels of noise for relatively longer periods. Residents are considered secondary receptors of elevated noise levels, as the noise intensity will be relatively attenuated at their locations. Traffic congestions, which could be caused by excavation works, may increase ambient average noise intensity levels.

Noise impacts are expected to be temporary, local, and of low to medium severity.

5.3.4 Risk on Infrastructure and underground utilities

In many locations across Egypt, underground utilities and infrastructure pipelines (such as water, sewerage and telecommunication) have been installed years ago without accurate documentation and maps for its routes and depths. Therefore, the risk of damage to such utilities during excavations for Natural gas pipeline installation is considerable.

The most significant potential environmental impact will arise in case a sewerage pipe is broken and wastewater potentially accumulating in the trench. There is also the possibility of overflowing to the streets causing significant nuisance to the surrounding environment.

Breaking a water supply pipe may result in cutting the supply to a number of residential units,

which may lead residents to use other sources of water which may be either expensive or unsafe.

The effects of cutting telecommunication and electricity cables are mainly socioeconomic.

Once underground utilities are mapped or uncovered, horizontal and vertical clearances between natural gas lines and electricity lines must be respected for safety considerations.

Impacts on underground utilities are expected to be temporary, local, but of medium severity.

5.3.5 Possible effects on structures

Excavation for natural gas pipelines is usually shallow and does not exceed 1.0 meter depth. If groundwater was not encountered during excavation of normal trenches there will be no effects. In case if groundwater is encountered and dewatering is applied, there might be effects if the dewatering was sustained for a long duration. Dewatering in silty and sandy soils can move fine soil particles and wash it away through the surface pump, which creates voids and spaces in the soil surrounding the excavation and the nearby buildings.

Weak and old structures are quite sensitive to differential settlements, which may be caused by dewatering.

Another possible impact on structurally-vulnerable buildings is weakening the structural system during drilling holes in the walls for riser connections on the side of the building or for internal connections to the household. Usually, wall drilling in load bearing masonry walls does not have an effect on the structural system. The hole for the pipe usually is small compared to the wall section. Moreover, beams can easily be avoided by carefully selecting the distance of the drilling from the ceiling. For skeleton type buildings, although drilling in columns or beams could have a significant effect on the structure, this risk is well understood among connection workers and could be avoided.

Structural impacts on vulnerable buildings may be permanent and highly severe.

5.3.6 Effect on Culturally Valuable Sites

Egypt contains some of the world's oldest and most valuable antiquities and monuments. Effects on culturally valuable sites (antiquities, monuments, architectural heritage) may involve:

1. Structural damage to a monument due to dewatering during excavation.
2. impacts on monument's foundations due to excavation works.
3. Damage to the monument body by vibration of machinery.
4. Reducing the aesthetic appeal of the site or building.
5. Improper management of discovered antiquities during excavation (chance finds).

Dewatering may lead to differential settlement of the soil surrounding the monument foundations.

Shallow foundations may be affected by excavation works. This may cause differential settlement and may cause cracks and stability risks to the monument body.

Vibrations caused by machinery such as a trencher and jack hammer may cause cracks and surface damage to the stones of the monument, and risks to its stability.

According to the CULTNAT classification, a site may be classified as architecturally-valuable for its artistic design, its elevation view, artistic balcony, windows, domes or other components. Fixing gas risers and connections next to such components may reduce their artistic value.

Chance finds during excavation are highly unlikely within the cities as the streets have been previously excavated for installing underground utilities. However, it may occur during the excavations for the S HP mains which may traverse uninhabited areas. The likelihood of chance finds may be higher in the Upper Egypt governorates where numerous finds have been reported. The Antiquities Law provides clear guidelines for action in the case of chance finds. It also states that a representative of the antiquities department must be present during excavations in areas adjacent to antiquities sites. Please see Annex 2 that outlines procedures in case of chance finds.

Impacts on culturally valuable sites and buildings may be permanent and highly severe.

5.3.7 Effect on ecological systems

Excavations and pipe laying will take place for both the HP steel lines and the PE distribution lines. The distribution lines will mostly be aligned along routes previously excavated or paved. However, HP steel lines may be aligned under ecological systems requiring reinstatement and/or offsetting during excavation

No official protected areas will be encountered in the alignment of any of the lines, HP or PE.

Impacts on ecological systems are expected to be temporary and low in severity.

5.3.8 Solid and Liquid Waste Disposal

Wastes that are generated during the construction phase include:

- Excavated soil and excess sand;
- Concrete and bricks waste;
- Broken asphalt;
- Containers of chemicals and lubricant oils used for construction machinery;
- Possibly damaged asbestos water pipes during excavation; and
- Dewatered product from trenches.

Excavated soil and concrete/bricks waste are inert materials. Improper disposal of such wastes will only have aesthetic effects on the disposal site. The legal standards of Law 4/1994-9/2009 for the Environment and Law 38/1967 stipulate that these wastes should be disposed of in licensed sites by the local authority, which minimizes any aesthetic effects of such waste.

The asphalt waste may contain hazardous components, such as tar, lubricating oils, some heavy metals, etc. However, its solid nature minimizes the transport risk of such components to the environment. Disposal of asphalt waste to a construction waste disposal site is common practice in Egypt, and is not normally associated with significant environmental risks because of the dry weather nature of the country.

Empty containers of chemicals and lubricating oils, are considered hazardous waste. They should be disposed of in an approved hazardous waste handling facility. This is not a direct result of construction activities, but rather relates to maintenance of equipment. By preventing

fueling/lubricating activities on construction sites no empty containers will need disposal.

Asbestos waste is also hazardous waste. If an asbestos pipe is broken during the excavation process, wasted parts of the pipe must be sprayed with water, to prevent emissions of asbestos-containing dust, and transported to an approved hazardous waste landfill, or a well contained cell in the construction waste disposal site. Asbestos waste may pose significant health risks to workers, pedestrians and residents of neighboring areas. Therefore, efficient management of such waste, if generated, will be very important. The probability of generating asbestos waste is relatively low as the damage is usually fixed through hole-repair rather than pipe replacement.

Improper drainage of dewatering water may result in forming stagnant water ponds around the construction site, which can develop, if not drained, infiltrated or evaporated, to form nuisance and an environment for breeding of insects.

Normally dewatered product is relatively clean water, which should be drained to the sewer system. When dewatering is performed from a contaminated trench or near a source of pollution seepage to groundwater, contaminated water is collected for certified treatment/disposal. Discharging contaminated water with significant amounts of chemicals and hydrocarbons is not legally acceptable neither to sewers nor to fresh watercourses according to Laws 93/1962 and 48/1982, respectively.

Overall, waste management impacts are temporary but may range from low to high severity

5.3.9 (رد الشئ لأصله) Restoration

As explained above, the literal translation of "رد الشئ لأصله" is "restoration to original state". The implementing entity (Egypt Gas and Town Gas) is legally responsible for restoring the streets to their original state after completion of excavation and installation works.

The current arrangement is that the implementing entity performs the backfilling of the excavated trenches and agrees a restoration fee with the local government unit (district) to cover the balance of the restoration and pavement cost. The local unit uses the fee to include the restoration and re-pavement of the streets in its "pavements plan". In many cases, the pavement plan is several months away and the streets remain unpaved, causing nuisances and potential damage to vehicles. Another source of delay is that the local unit sometimes do not possess the equipment and materials required for re-pavement. In that case, the local unit commissions the regional "Roads and Bridges directorate" to perform the restoration. This may lead to further delays in re-pavement and prolongs impacts on the public and vehicles.

Although the restoration impact may be temporary, localized, and of low severity, it is perceived by the public as major inconvenience.

5.3.10 Potential Impacts of PRS Construction

The negative impacts or risks associated with PRSs construction are related to handling of construction waste, noise and air pollution from construction machinery which have all been discussed earlier.

5.4 Potential Negative Impacts during Operation

5.4.1 User health and safety

In addition to a full array of safety and emergency precautions taken by EGAS and the implementing entities, user safety is prioritized by stating emergency precautions on the household gas meter and by setting up emergency response centers.

Impacts on user health and safety may occur through improper handling of piping and valves by the user. This may be due to a lack of awareness, illiteracy, or failures in piping or sealants.

User safety impacts could be permanent and highly severe.

5.4.2 Improper handling of the Odorant

The odorant containing Tertiobutylmercaptin (80%) and Methylehylsulphide (20%) is classified as a hazardous substance. The MSDS of the odorant identifies the following hazardous properties: Highly flammable, flammable and toxic products upon thermal decomposition, irritant, and toxic to aquatic flora and fauna.

It will also be required to keep a register for management practices followed in PRSs.

Improper handling of the odorant includes:

- Storage in unsafe conditions, in terms of occupational health and safety.
- Leakage to the environment as:
    - Discharge of remaining odorants in containers, after use, in land or sewers;
    - Disposal of used containers with domestic waste, or by open disposal; and
    - Recycling of used containers for other materials.

Impacts of improper odorant handling may be permanent and highly severe.

5.4.3 Noise of PRS

The pressure reducers normally cause noise generated from the reducers' pipes. The generated noise is constant (not intermittent). Assuming ambient noise levels are complying with Law 4/1994-9/2009 standards for low noise residential areas, a 20-meter buffer distance kept between the reducers and the PRS fences should lead to minimal impact outside the PRS borders.

Impacts of PRS noise may be permanent and severe.

5.4.4 Safety Aspects of PRS Operation

The safety risks associated with PRSs' operation (leakage, fire hazard, explosion, suffocation) should be assessed for the workers and the public at large, using Quantitative Risk Assessment (QRA) modeling and comparing the results with international risk management guidelines as a reference (As performed for Greater Cairo connections project). The conclusion of the Greater Cairo QRAs for the PRS is that the risk is within the acceptable limits, if safety precautions have been considered and strictly followed in the design, operation and maintenance of such facilities.

Impacts of PRS safety may be permanent and may vary from low to highly severe.

5.4.5 Integrity of the pipelines

Low-probability events may impact the integrity and safety of the NG network and components during the years of the operation phase.

- Geological and geotechnical events: earthquakes may result in geotechnical instabilities that lead to network breakage or leakage in multiple locations simultaneously. The geological and geotechnical history of the area may also lead to possible events. Some of the project areas were previously swamp areas which have been dried up and backfilled. Such areas are prone to settlements and instabilities due to dewatering
- Sabotage: pipelines and other components may be targeted for sabotage.

Despite the low probability of both scenarios, impacts may be permanent and highly severe.

5.4.6 Potential negative Socioeconomic impacts during operation

The analysis of social impacts of any project lies at the core of assessing the relevance of the project based on its benefits versus its drawbacks to communities including the hosting community. In case the potential project's estimated positive impacts on the community overweight the negative impacts, then the project is likely to be beneficial in terms of social outcome. The discussion of positive impacts is presented in details within the Supplementary Social Impact Assessment. As a summary of discussion:

1- Under certain technical and safety conditions it is not possible to avoid visually impacting the entrance of the apartment and dwellings with installed pipes.
2- For those who will pay in installments, this may be an added financial burden on the poor families or those who do not have secured source of income
3- Minor impact on LPG cylinders distributors. (Governmental sector- private sector who have license to distribute LPG cylinders- non official distributors). There could be a negative economic impact on the LPG cylinders distributors. . However, this is unlikely to happen because of their high mobility which allow them to go to other areas which are not connected to NG within the neighborhood. Even within the areas that will be connected, demand on LPG will be reduced but will not vanish fully because houses which are not technically compatible, houses with baladi ovens, shops…etc. will still maintain the need for LPG. The survey showed that 6 LPG cylinder distributors are taking loans from SFD for their small business in Qena Governorate. During the implementation of Greater Cairo project, EGAs used to address SFD to obtain records in order to ensure that beneficiaries of loans for the same purpose are repaying back the loans and are not interrupted. This has been done as a measure from EGAS side to ensure that no negative impacts are affecting this group. EGAS is intending to follow the same measure.
4- Safety hazard resulting from the possibility of Leakage. Although of limited probability, such impact should be mitigated through preparing awareness raising campaigns and clear information dissemination system

5.4.7 Proposed criteria for assessment impacts during site-specific ESIAs

Each impact is quantified and evaluated according to size, intensity, frequency and exposure time using the point system outlined below. Negative value of severity indicates negative impacts and positive values positive impacts.

Impacts have also been assessed if they are of **short-term or long-term** duration, and whether they are **reversible or irreversible**, in the latter case resulting in a permanent change to baseline environmental conditions.

Severity (S)	Frequency (F)
-1 Minimal	1. Once every year
-2 Low	2. Once every 6 months
-3 Moderate	3. Once per month
-4 High	4. Once per day
-5 Very High	5. Continuous

Environmental aspects and impacts are identified using Severity and Frequency (SF) where SF= Severity(S) x Frequency (F). Impacts for which -1 > SF > -10 and 1< SF < 10 are considered insignificant. When SF < -10 factors such as reversibility of the impact should be considered, and possible mitigation measures will be described as needed in the site-specific ESIAs.

6 Analysis of Alternatives

6.1 No Project Alterative

The Natural Gas Connections Project to 1.1 Million Households in 11 governorates is part of the plan developed by the Ministry of Petroleum to connect 2.5 Million households over the next 3-6 years. This plan is expected to yield many economic and social benefits in terms of providing a more stable, energy source, achieve savings in LPG consumption and enhance safety in utilizing energy.

The No-Project alternative is not favored as it simply deprives the Egyptian Public and Government of the social, economic, and environmental advantages detailed in positive impacts during operation sections of this report.

- Constantly available and reliable fuel for home use
- Reduced expenditure on LPG importation and subsidies
- Significantly lower leakage and fire risk compared to LPG
- Improved safety due to low pressure (20 mBar) compared to cylinders
- Customer service and emergency response by qualified personnel/technicians
- Eliminate LPG hardships to the physically challenged, women, and the elderly
- Elimination of insects and dirt typically associated with LPG cylinders
- Limiting the LPG cylinder "black market" due to lower demand
- Limiting possible child labor in LPG cylinder distribution

6.2 Energy Alternatives

Three alternative energy sources could be considered as alternatives for supplying stable reliable and low cost energy to 1.1 Million Households: (a) expand LPG usage, or (b) convert to electricity, or (c) use renewable energy sources:

- **LPG:** The majority of LPG in Egypt is imported and subsidized by the Government to ensure that it is affordable by the lower income groups. Introduction of piped natural gas to replace LPG will help to remove those subsidies and reduce imports. The proposed project is also expected to produce very positive improvements in the safety of gas utilization. In the natural gas industry in Egypt, appliance standards, fittings and conversions are strictly controlled and only trained and qualified personnel carry out installations and respond to emergencies. In the case of LPG, this does not apply so the conversion of existing LPG appliances helps to eliminate existing unsafe installations and unsafe use of LPG.
- **Electricity**: The second possible alternative is to convert all homes to use electricity for all energy supply applications. Whilst electricity is more efficient at the point of use, there are considerable inefficiencies in power generation from fossil fuels with about 50% efficiency if combined cycle plants are available. Additional power stations would be needed to cope with the additional demand created by utilization of electricity in homes, which most probably would operate also by natural gas. Power losses in transmission and distribution are also significantly higher than their natural gas equivalents which would add to the overall inefficiency.
- **Renewables**: it is immensely important to expand the utilization of renewables in Egypt. Renewables are needed to diversify the energy basket, reduce pollution and GHG

emissions, and to serve remote/off-grid locations. However, the renewables market does not present feasible, practical, and affordable alternatives to connecting 1.1 Million households at this point in time. Biogas requires large amounts of agricultural and domestic waste, while solar panels and heaters remain in pilot phase. Numerous ongoing efforts aim to promote such renewable energy sources. However, they seem to be facing techncoeconomic and institutional barriers to mainstreaming at this stage.

Energy alternatives do not provide favorable options to the proposed NG networking

6.3 Piping material Alternatives

With regards to the materials the piping inside the households, international standards state that either copper or steel may be used. Several considerations support the use of steel piping in Egypt. These include strength, cost, and some aspects of public attitudes (copper is known in Egypt as an attractive target for theft due to its high value). Aside from the aspect of minimizing corrosion (and therefore risk of leakage), selection of one of the piping materials over the other does not seem to offer contrasts in the environmental and social impacts (except a marginally lower pressure loss with copper piping). Therefore, as long as precautions and safety margins are respected steel seems to be the more practical and safer choice.

6.4 Sequence of work progress (in various areas) Alternatives

As mentioned previously, two companies will be undertaking the household gas connection activities in the 11 governorates under the concessions of two distribution companies; **Town Gas** in the Giza, Ismailia, Alexandria, and Marsa Matrouh governorates, and **Egypt Gas** in Qalubia, Menufia, Daqahlia, Qena, Sohag, Gharbia, and Aswan governorates.

Progressing with constructing the transmission (HP) and distribution networks in the various project areas could be practiced through two alternatives:

- Alternative 1: Complete the construction of the networks in more than one area simultaneously.
- Alternative 2: Complete networks in sequence area by area.

Advantages of Alternative 1 over Alternative 2 are:

- Shorter implementation schedule
- Utilization of economies of scale in lower cost for the additional equipment and components procured to cover multiple areas simultaneously

Advantages of Alternative 2 over Alternative 1 are:

- Less resources and capital investments required
- Less management and coordination resources required

Overall, the key contrast between the two alternatives is related to CAPEX and OPEX of the available assets and human resources. If sufficiently distant from each other, it may be favorable to expand the work progress over many areas (within the available resources) while paying special attention to coordination of sequential work outputs of the parallel teams. The main advantage of working in parallel would be to minimize project implementation time.

The environmental benefits and negative impacts of the two alternatives are similar if the areas being implemented are distant from each other (in different governorates or areas with large distances between them. However, working in parallel in areas which are close to each other (such as districts) may lead to heavier environmental and social impacts (such as traffic congestions, as well as air and noise emissions).

6.5 Sequence of work progress (within area) Alternatives

Construction of the gas network inside the city comprises two main components, the first is the distribution network in the longitudinal roads direction, and the second is the lateral connection network to the residential units perpendicular to the road direction.

Progressing from constructing the distribution network to constructing the connection network, this could be practiced through two alternatives:

- Alternative 1: Complete the construction of the distribution network and then start the connection network at a later stage.
- Alternative 2: Complete both networks simultaneously in one stage.

Advantages of Alternative 1 over Alternative 2 are:

- Technical problems during line testing could be avoided, as detecting leaks in the main pipe will be much easier if no connections are placed;
- Lower risks for re-excavating parts of the line including leaks; and
- Shorter traffic disturbance time for the first excavation stage because no lateral intersection with the traffic flow.

Advantages of Alternative 2 over Alternative 1 are:

- Amount of excavation/filling works are slightly less, because intersections between mains and connection trenches are excavated only once;
- Makes mobilization of equipment and areas of storage occupied only once; and
- Traffic disturbance occurs only once.

The environmental benefits and negative impacts of the two alternatives are close. The amount of excavations in the two alternatives are approximately equal, however, the second alternative has a clear advantage of causing disturbance only once for the same street, in addition to less air emissions and traffic disturbance caused during equipment mobilizations. Therefore, if all other technical or financial factors are equal then the second alternative may be slightly more advantageous from an environmental perspective. However, because phasing of connection works will depend mainly on developing contracts with new customers, no objections are foreseen in going along with Alternative 1.

6.6 Routing Alternatives

Siting and routing alternatives are guided by technical, environmental, and social considerations. The foremost factor of selection is the safety of the installations and minimal explosion, leakage, or fire risks. International (British) standards are referred to upon project detailing. Feasibility studies and detailed Property & Appliance surveys assess and recommend connections to areas with adequate environmental conditions (conditions of buildings, and complete utilities networks) as well as to lower income/high population density areas.

6.7 Installation costs

The average natural gas connection installation cost is about 2,500 EGP[10] and consumers contribute a part of 1500 LE. This payment can be made either upfront or in installments over a period of time.

Typically, the households opt for flexible monthly payment plans facilitated by the LDCs and local banks. Limited number of NGOs also provided financial assistance for installing gas connections for households in very low income neighborhoods.

The government of Egypt does not provide additional subsidy to the poorer groups, However, they provide facilitation payments strategies through offering the following types of installments:

1- 138 EGP/Month for 12 months
2- 74 EGP/Month for 24 months
3- 52 EGP/Month for 36 months
4- 42 EGP/Month for 48 months
5- 35 EGP/Month for 60 months
6- 31 EGP/Month for 72 months
7- 28 EGP/Month for 84 months

6.8 Closing note

Site-specific ESIAs to carried out on the 11 governorates should consider and analyze additional (site-specific) alternatives, as needed.

[10] *Converting Households from LPG to Natural Gas- Social Impact Assessment Study- 2013*

7 Environmental and Social Management & Monitoring Framework

7.1 Objectives of the ESM&MF

The objective of this Environmental and Social Management and Monitoring Framework, is to outline a mechanism for minimizing or eliminating potential negative impacts and for monitoring the application and performance of mitigation measures. The ESMMF identifies roles and responsibilities for different stakeholders for implementation and monitoring of mitigations. This section also presents an assessment of the institutional capacity for implementing the ESMMF.

As explained previously, the proposed project is to be implemented in 11 governorates. Naturally, institutional and technical capacities, as well as physical and social environments, may vary between the governorates. Identical mitigation measures for all governorates may not provide the flexibility required for dealing effectively with some of the negative impacts which require taking the local context into account.

Wherever applicable, the ESMMF is designed to accommodate alternative context-specific mitigations and monitoring measures.

This study outlines a FRAMEWORK for environmental and social impact assessment and management (mitigation and monitoring). The measures described herein with are indicative and should be considered non-exhaustive pending final detailing of the project to take the local context into account when designing mitigations and monitoring.

As mentioned previously, EGAS has successfully completed a similar World-Bank-Funded project for household connections in the Greater Cairo area. The main features of the environmental management and monitoring matrices, reporting schemes, and institutional setups in this study reflect those developed through regular monitoring and progress reports for the Environmental & Social Impact Assessment and Management & Monitoring Plans of Greater Cairo connections project which started in 2006/2007.

For the current study, the specific environmental and social impacts arising from the wide geographical, socioeconomic, physical, and developmental variations between the areas of the proposed project (11 governorates) will be addressed in the detailed site-specific ESIAs which will be prepared once final project detailing is complete upon WB loan approval.

At the available level of project details, the impact significance (summarized in the table below), is based on two main criteria:

1- Duration: of the possible outcome (in case it does take place) of the impact.
   a. Temporary, Permanent
2- Severity: Difficulty of repair or remedy of the outcome (in case it does take place).
   a. Low, Medium, High

Table 7-1: Summary of impacts significance

	Potential Impact Significance (Duration, Difficulty to mitigate)									
Activity	**Traffic**	**Air quality**	**Noise**	**Underground utilities**	**Vulnerable structures**	**Cultural sites**	**Waste disposal**	**Ecological systems**	**Socioeconomic aspects**	**Health and safety**
Construction Phase										
Mobilization	Temporary, low	N/A	Temporary, low	N/A	N/A	N/A	Temporary, low	Temporary, low	Temporary, medium	N/A
Excavation	Temporary, high	Temporary, medium	Temporary, high	Temporary, high	Permanent, high	Permanent, high	Temporary, high	Temporary, low	Temporary, medium	Temporary, low
PE Pipe laying	Temporary, low	Temporary, low	Temporary, low	N/A	N/A	N/A	Temporary, low	N/A	N/A	Temporary, low
HP piping installation	Temporary, low	Temporary, low	Temporary, low	N/A	N/A	N/A	Temporary, low	Temporary, low	N/A	Temporary, low
PRS construction	Temporary, medium	Temporary, medium	Temporary, high	N/A	N/A	N/A	Temporary, medium	N/A	Temporary, medium	Temporary, low
Leakage testing	Temporary, low	Temporary, low	Temporary, low	N/A	N/A	N/A	Temporary, low	N/A	N/A	Temporary, low
Street restoration	Temporary, high	Temporary, low	Temporary, high	N/A	N/A	N/A	Temporary, medium	N/A	Temporary, low	Temporary, low
Connections	Temporary, medium	Temporary, low	Temporary, high	N/A	Temporary, medium	N/A	Temporary, medium	N/A	Temporary, low	Temporary, low
Conversions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Temporary, medium	N/A
Operation Phase										
PRS operation	N/A	N/A	Permanent, low	N/A	N/A	N/A	Permanent, medium	N/A	Permanent, low	Permanent, high
Network operation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Permanent, low
Repairs	Temporary, medium	Temporary, medium	Temporary, medium	Temporary, high	Permanent, high	Permanent, high	Temporary, high	Temporary, low	Temporary, medium	Temporary, low

7.2 Management and Monitoring activities During Construction Phase

7.2.1 Management of Traffic

The mitigation measures proposed to maintain the existing level of service and to minimize disruptions to vehicular movements:

1. Construction During Off-peak Periods: Times of construction are identified by the local Traffic Department in a conditional excavation permit issued to the implementing company, based on the Traffic Department operational experience in the area,
2. Signage and Markings: Construction works require proper information disseminated to motorists. This can be done by provision of informational and directional signs posted prior to the construction. Pedestrian crossings can be also provided at proper locations.
3. Traffic Detour: To maintain traffic in critical streets at a reasonable level of service, the Traffic Department may implement traffic detouring
4. Re-structuring the Road Right-of-Way: The arterial road network generally exhibits a wide right-of-way. Normally, it would be possible to re-structure the road's cross section to accommodate the construction works and maintain traffic movements along the road.

All above mitigation measures will be implemented by, or in coordination with, Traffic Departments.

Monitoring will be carried out by the local Traffic Department to make sure that flow reduction is within acceptable levels. Coordination should be established between the Traffic Department and the HSE Departments to ensure following the identified mitigation measures. Town Gas and Egypt Gas HSE should record any comments by the Traffic Department regarding violation of excavation permits by the contractor.

7.2.2 Management of Air Emissions

The following mitigation measures are considered minimum standards:

1. Excavated soil stockpiles and stored sand should be located in sheltered areas. Stored fine sand should be covered with appropriate covering material[11], such as polyethylene or textile sheets to avoid soil dispersion.
2. Transportation of excavation/construction waste should be through licensed and sufficiently equipped vehicles with a suitable special box or provided with a cover to prevent loose particles of waste and debris from escaping into the air or dropping on the road.
3. Disposal of excavation/construction waste should be in locations licensed by the local authority.
4. Air emissions of excavation machinery and diesel-powered electrical units should be within allowable legal limits.

Because dust emissions from construction works are a non-point source pollution, it will not be possible to monitor direct emission levels. On the other hand, monitoring ambient total

[11] Monitoring reports from the Greater Cairo project indicate that this may be significant source of air emission. Sufficient sheets should accompany work groups during the construction phase. Cost of sheets should be included in ESMP budget

suspended particles or PM_{10} could be misleading because of the interference of other pollution sources. Therefore monitoring activities shall focus on making sure that point sources from the exhaust of excavation machinery are within the standards stipulated by the Law, and that mitigation measures are well documented.

7.2.3 Management of Noise

Mitigation measures for avoiding unacceptable, and illegal, noise levels include:

1. Prevent exposure of construction workers to different noise levels and noise impacts according to the Egyptian legal standards. This could be achieved through adjusting working hours, breaks, and exposure duration to be within permissible limits.
2. Provide construction workers with ear muffs.
3. Minimize construction through nighttime whenever possible. Implementing this measure should be balanced with avoiding peak hours of heavy traffic. If construction works are to take place on important traffic roads, avoiding traffic disturbance in day time may outweigh reducing noise levels in afternoon or night times and vice versa.

Monitoring of noise levels during construction shall include:

1. Measurements of noise intensity at the locations of construction, where workers are exposed to the noise.
2. At locations where mechanical hammers are used, measurements of noise intensity of impacts, and the corresponding number of impacts at the construction location.
3. Recording of the reaction and complaints of the neighboring areas regarding the noise levels.

It is worth noting that monitoring ambient noise levels at locations of residential areas may be misleading because of the interference of other factors.

Mitigation of noise impacts during construction of the PRSs should follow the same measures outlined in this section.

7.2.4 Management of Excavation Activities Posing Risk on Utilities

Town Gas and Egypt Gas follow established procedures to deal with emergency situations related to breaking underground utility and infrastructure lines. The company supervisor calls the Police Department and emergency department in the relevant utilities company for immediate repair of the damage, which the contractor is invoiced for. The mitigation measures below focus on preventive measures and documentation:

Mitigation measures for avoiding breaking underground utilities and infrastructure pipes:

1. Collecting most accurate maps for underground utilities and infrastructure routes from Information Centers in the various Governorates and asking them for site markings, whenever available, and making such data available to the contractor prior to commencing the works.
2. Excavating manual trial pits in each street to allocate the pipes before using mechanical excavation.
3. In case an underground utilities and infrastructure pipe has been damaged, standard procedures should be followed, as described before, in addition to preparing a

documentation report for the accident. The documentation report should include:

a. Time and place of accident;
b. Name of contractor;
c. Type of underground utilities and infrastructure line;
d. Description of accident circumstances and causes;
e. Actions taken and responses of different parties, such as infrastructure company;
f. Duration of fixing the damage; and
g. Damage caused (description shall be according to observation, expertise judgment, reports of infrastructure company).

4. Analysis and statistics should be undertaken periodically for the accidents that have taken place, with recommendations to reduce such risks in consequent excavation activities.

Monitoring activities for such risks, are basically documenting, analyzing reasons that led to the accident and updating procedures to avoid future accidents. Monitoring environmental consequences of such accidents, such as depth of effected soils, volumes of effected groundwater, and other social effects are believed to be unnecessary actions by the implementing company, though it might be recommended for the authority owning the infrastructure line (Water and Sewage Authority or Telecommunication Authority) for their research activities.

7.2.5 Management of Activities Posing Risk on Structures Stability

1. Screening of the project areas to identify areas/sectors including buildings with potential structural problems. Areas with potential problems should be excluded from the project to avoid any structural problems on existing buildings. This screening process should be done by a technical committee formed from the Design, Projects and Operations Departments of Town Gas or Egypt Gas.
2. In areas of high groundwater level a tight excavation/dewatering schedule should be implemented through preplanning and supervision of implementation to avoid lengthy dewatering activities.
3. Minimize excavation intensity and vibrations from heavy equipment in the vicinity of vulnerable structures.

Monitoring activities will be mainly performed through supervision of the work of Town/Egypt Gas, and reviewing site reports by the HSE supervisor.

7.2.6 Management of Culturally Valuable Sites

Law 117/1983 for the Protection of antiquities has set certain standards that should be followed during excavation works near a registered antiquity site. Proposed mitigation measures include:

1. Identifying a comprehensive list of all registered antiquities falling within the domain of the project and possibly at risk from construction activities.
2. Provide supervision by the Supreme Council of Antiquities on implementation of construction works at identified locations.
3. If dewatering activities are to take place, the process should be undertaken under the supervision of foundation engineers who shall perform necessary soil investigations.
4. Reduce vibration, in identified locations of antiquities:
    a. using manual tools whenever possible;
    b. phasing work to eliminate vibrations from several machinery; and
    c. Establish cutoff barrier through a vertical trench to absorb vibrations.
5. Fixing gas risers on the back of architecturally valuable structures.
6. Chance find process, in case an antiquity is found during excavation, includes stopping

excavation works, and contacting the Supreme Council of Antiquities to handle the site.

Monitoring activities will be site specific according to the requirements and conditional permits granted by the Supreme Council for Antiquities.

1. Monitor vibration levels at the monument location during excavation.
2. Undertake geophysical survey for some locations prior to construction, according to the instructions of the Supreme Council of Antiquities.

The Town/Egypt Gas HSE site supervisor will be responsible for documenting the monitoring activities in monthly reports delivered to EGAS.

These mitigation measures, if required, shall be implemented by the Council, while the costs will be covered by Town/Egypt Gas

7.2.7 Management of Waste Disposal

Solid Waste

1. Allocating certain areas, in each Sector, for stockpiling waste soil and construction waste, in coordination with the local authority.
2. No soil stockpiling is allowed on banks of waterways.
3. Normally asphalt waste could be disposed of with construction waste according to the previously mentioned procedures.
4. Solid waste from unlikely scenarios such as worker camps should be addressed in site-specific ESIAs, as appropriate

Liquid and hazardous waste

1. As an important pollution prevention measure, fueling, lubricating or adding chemicals for excavation should not take place at the construction site. Accordingly, no empty chemicals/oils containers will be generated by direct project activities.
2. Further to the above measure, in case waste containers of hazardous materials are generated in the construction site due to unusual circumstances, the contractor should collect these containers and transfer it to the hazardous waste landfill in Nasserya or UNICO in Alexandria[12]. This measure should be specified in the construction contract and supervised by Town/Egypt Gas site supervisor.
3. In case of damaging of asbestos pipes during excavation, the Water Authority, which will carry out the repairs, will be responsible for handling the waste asbestos according to their procedures.
4. Preplanning drainage of dewatering water and taking necessary permits from the sewage authority, or irrigation authority. No land disposal should be accepted for the water
5. If dewatering is taking place from a contaminated trench, or contains hydrocarbons that could be observed or smelled, contaminated water should be collected in barrels and transported to a wastewater treatment facility. Alternatively such waste could be transferred to the hazardous waste facility in Nasserya/Alexandria.
6. Asphalt waste may contain hazardous components, such as tar, lubricating oils, heavy metals, etc. However, its solid nature minimizes the transport risk of such components

[12] The Nasserya hazardous waste facility is currently being operated under supervision of Alexandria Governorate while UNICO (also in Alexandria) is approved by EEAA to treat and dispose of petroleum wastes.

to the environment. Disposal of asphalt waste to a construction waste disposal site is common practice in Egypt, which is normally not associated with significant environmental risks because of the dry weather nature of the country.

Monitoring activities shall depend mainly upon observation of waste stockpiles of soil and construction waste to ensure the frequency of removal from site, and whether they contain hazardous components. For contaminated water produced during the dewatering process.

7.2.8 (رد الشئ لأصله) Management of Street Restoration after asphalt breaking

As mentioned in the impacts section of the study, restoration and re-pavement of streets post-construction and excavation is one of the impacts which are highly perceived by the public. The implementing entity agrees a restoration fee with the local administration unit in charge of the area. The fee is used by the local unit to include the restoration in their re-pavement plans. In some cases, the restoration and re-pavement job is delegated by the local unit to the Roads and bridges directorate who, in turn, schedule the re-pavements in their own plans. Alternatives to minimize the impact include:

- Notifying the public of the details and schedule of the local units re-pavement plans
- Requesting the Roads and Bridges directorate to create a contractor register for the implementing company to select from directly without going through the administrative cycle of the local unit (الحى)
- Maintaining the current arrangement with local units reputed for efficient and rapid actions (as applicable); especially in areas where the public strongly monitors and pressures local units (as is the case in the city of Qena)

7.2.9 Management of grievances *(Environmental and Social Grievance Redress Mechanisms)*

Establishing a grievance redress mechanism (GRM) is one of the most fundamental procedures that warrantee smooth and amicable implementation for the project activities. The importance of having a local based GRM is to ensure that complaints are passing through appropriately announced channels and are handled properly and timely. A functioning GRM is considered to be a good feedback mechanism from the customer and one tool of the citizen engagement.

In order to propose practical procedures for the GRM, the Consultant started with analyzing the current grievance mechanism adopted by NG companies. The analysis of current procedures is summarized as follows:

Table 7-2: Current grievance mechanism adopted in the NG companies

Activities	Egypt Gas	Town Gas	EGAS
During the construction phase			
Tiers of grievances	First tier is applied on the level of Town Gas and Egypt Gas		Second tier on the level of EGAS
Communication channels	They receive the complaints through the following channels: 1- Hotline 129 2- Website and E- mail 3- Postal Mail 4- On site complaints		1- Mails 2- Visit EGAS

Activities	Egypt Gas	Town Gas	EGAS
Roles	They receive the complaints as follows: 1- In the construction site where the responsible person in the site tries to solve the problem immediately 2- In case of not solving the problem, the complainant goes to the project manager who takes practical procedures to solve the problem In case of not solving the problem the complainant targets to the third level which is the Central Department		In case of not solving the problem on the first level of grievance the complainant raise his complaint to EGAS They contact the client for more details about his complaint They transfer the complaint to the implementing company in order to solve the problem. They follow up the complaint until satisfactory solution is attained
Monitoring	The Internal Monitoring Specialist (IMS) follow up the implementation of corrective procedures After solving the problem, the IMS finalizes the complaint and inform the complainant about the solutions adopted in order to measure his/her satisfaction with the solutions		They monitor the performance of Egypt Gas and Town Gas
Documentation	The person in charge of complaints receives and analyzes the complaints. S/he proposes some solutions and gets in contact with the implementing department in order to propose solutions for the complaints. The IMS document a summary of the complaint in a complaint log (CL) An analysis is conducted to identify the main triggers for complaints by the end of each year. Some recommendations are developed in order to enhance the performance of the companies The complaints are documented and kept in the company for three years		No records or documentation for all grievances
Reporting	Quarterly report is developed to EGAS		Quarterly progress report is developed to Funding Agency

Activities	Egypt Gas	Town Gas	EGAS
During the operation phase			
The above mentioned procedures are adopted with the addition of the 'Customer Service Office' in Egypt Gas and Town Gas. Its roles are as follows: - Receive any complaints related to the NG installation during the operation phase. - Provide information about the entity responsible for problem solution			

The above mentioned mechanism managed to limit the number of complaints that required judicial intervention, raising only a limited number of cases to courts, which testifies to the functionality of the proposed mechanism. On the other hand, this mechanism lagged behind when it came to information dissemination to members of the community and providing feedback to the complainants.

Since the resettlement work will be carried out with the full participation of the PAP, it is expected that no major grievance issue will arise. However, to ensure that the PAP have avenues for redressing their grievance related to any aspect of land acquisition and resettlement, detailed procedures of redress of grievances have been established in this RPF. The objective is to respond to the complaints of the PAP speedily and in a transparent manner, without resorting to complicated formal channels to the extent possible.

The ESIAF has prepared detailed grievance mechanism that will be shared with the community beneficiaries. Leaflets, posters and brochures will be prepared and distributed to the beneficiaries, NGOs, local governmental units, mosques and churches. Thus, sufficient and appropriate information about the GRM will be shared with the communities prior to the construction phase. Following are the various stages of grievances

First stage of grievances

In order to ensure high level of responsiveness to the local communities, it is essential to ensure that a local grievance mechanism is functioning and that communities are aware of it. Egypt GAS and Town Gas will assign a Social Development Officer (SDO)(can be more than one) who will be working closely with the assigned SDO of EGAS. It is the SDO responsibility to ensure that the GRM system is widely known and well explained on the local level.. Moreover, s/he will follow up on the complaint until a solution is reached. The turnaround time for the response/resolution should be 10 days and the complainant should know that he/she should receive response by then

The grievances should be presented to the following:

- The Foreman working on the ground,
- The project manager,
- The central department

It is worth noting that most of the previous experience of EGAS is suggesting that complaints are usually handled efficiently and resolved on the local level. In case the problem is not solved, the complainant may reach out to the second level of grievance.

Second stage of grievances:

If the aggrieved person is not satisfied with the decision of the SDOs of Town Gas or Egypt Gas at Stage 1, He can present the case to EGAS SDO where he should provide resolution within 15 days, Following is the second level of grievances:

1. The Social Development Officer in EGAS will handle technical, environmental and land acquisition complaints. He should receive the unsolved problems. Thereafter, he gets in contact with the petitioner for more information and forwards the complaint to the implementing entities for a solution.
2. The SDO should follow the complaints and document how they were solved within **15** days.
3. The SDO should update the complainant on the outcome of his/her complaint.

Grievance channels

Due to the diversity of the context in different Governorates and the socioeconomic characteristics of the beneficiaries, the communication channels to receive grievances were locally tailored to address all petitioners concerns and complaints . The following are the main channels through which grievances will be received:

1. Foremen act as the main channel for complaints. They are always available in the street. However, complaints raised to him/her are mostly verbal. Thus, s/he should document all received grievances in writing form using a fixed serial number that the complainant should be informed about to be able to follow up on the complaint
2. Hotline
   - 129 is the hotline in Town Gas and Egypt Gas
3. Egypt Gas Website:
   - www.egyptgas.com.eg
4. Trustworthy people, community leaders and NGOs/CDAs will be an appropriate channel, particularly, in rural areas and Bedouin communities.

Response to grievances

Response to grievance will be through the following channels

1. The response to grievances should be through an official recognized form to ensure proper delivery to the complainant. It is the responsibility of the SDOs to ensure that complainants were informed about the results of handling their complaints.
2. Response to grievances should be handled in timely manner as mentioned above, thereby conveying a genuine interest in and understanding of the worries put forward by the community.
3. EGAS, Town Gas and Egypt Gas should maintain record of complaints and results.

Monitoring of grievances

All grievances activities should be monitored in order to verify the process. The monitoring process should be implemented on the level of EGAS, Town Gas and Egypt Gas. The following indicators will be monitored:

1. Number of received grievances monthly (Channel, gender, age, basic economic status of the complainants should be mentioned)

2. Type of grievance received (according to the topic of the complaint)
3. Number of grievances solved
4. Number of unsolved grievances and the reasons behind not solving them
5. Satisfaction levels with proposed solutions
6. Documentation efficiency
7. Time consumed to solve the problem
8. Efficiency of response to received grievance
9. Dissemination activities undertaken

Institutional Responsibility for the Grievances

The entity responsible for handling grievances, will mainly be the Environmental Affair Department within the implementing agency (EGAS). The Social Development Officer (SDO) working within EGAS in cooperation with the two NG companies will address all grievances raised by community members, particularly the ones related to resettlement activities. The main tasks related to grievances of the SDO are:

1. Raise awareness about channels and procedures of grievance redress mechanisms
2. Collect the grievances received through different communication channels
3. Document all received grievances
4. Transfer the grievance to the responsible entity
5. Follow up on how the problem was addressed and solved
6. Document, report and disseminate the outcome of received grievances
7. Ensure that each legitimate complaint and grievance is satisfactorily resolved by the responsible entity
8. Identify specific community leaders, organizations and citizen groups required to enhance the dialogue and communication through a public liaison office to avoid or limit friction and respond effectively to general concerns of the community
9. Monitoring grievance redress activities

All grievances received verbally or in written shall be documented in a grievance register. The stand-alone SSIAF illustrates the forms needed to document the grievances

7.3 Environmental Management Matrix during CONSTRUCTION

Table 7-3: Environmental Management Matrix during CONSTRUCTION

Impact	Mitigation measures	Responsibility of mitigation	Responsibility of direct supervision	Means of supervision	Estimated Cost of mitigation / supervision
Traffic congestion and diversion	Construction during off-peak periods Traffic department to grant excavation license limited to specific hours	Implementation entities contracted by the local distribution companies : Town Gas/Egypt Gas (to be referred to as "Contractor" from this point forward)	Town Gas /Egypt Gas Health, Safety, and Environment (HSE) Department Relevant Traffic Department	Contractor has valid conditional permit + Field supervision	Contractor management costs (included in bid price) Town Gas/Egypt Gas management costs
	Announcements using local broadcasts Signage indicating location/duration of works prior to commencement of work	Local administration Contractor	Town/Egypt Gas (T/E Gas) HSE + Traffic Department	Ensure inclusion in contract + Field supervision	Contractor management costs (included in bid price) LDC management costs
	Consider the feasibility of using the Horizontal Directional Drilling (HDD) technique under critical intersections to avoid heavy traffic delays (and associated noise/air emissions)	Contractor	T/E GAS HSE Traffic department	Field supervision	Contractor management costs (included in bid price) T/E GAS management costs
	Traffic detours and diversion	Traffic Department	Traffic Department	Ensure detouring efficiency	Additional budget not required
	Road restructuring and closing of lanes	Traffic Department	Traffic Department	Ensure adequate traffic flow	Additional budget not required

Impact	Mitigation measures	Responsibility of mitigation	Responsibility of direct supervision	Means of supervision	Estimated Cost of mitigation / supervision
Air emissions	Best practice in controlled wetting and compaction of excavations to minimize dust emission	Contractor	T/E GAS HSE	Contractual clauses + Field supervision	Contractor management costs (included in bid price) T/E GAS management costs
	Sound isolation, storage, transportation and disposal of stockpiles	Contractor	T/E GAS HSE	Contractual clauses + Field supervision	Contractor management costs (included in bid price) T/E GAS management costs
	Compliance to legal limits of air emissions from all relevant equipment	Contractor	T/E GAS HSE	Review manufacturer catalogues and exhaust certificate or request emission measurements	Contractor management costs (included in bid price) T/E GAS management costs
Noise	Ear muffs, ear plugs, certified noise PPE	Contractor	T/E GAS HSE	Contractual clauses + Field supervision	Contractor management costs (included in bid price) T/E GAS management costs
	Avoid noisy works at night whenever possible	Contractor	T/E GAS HSE	Field supervision	Contractor management costs (included in bid price) T/E GAS management costs
Damage to U/G utilities	Pre-planning and coordination with central, regional, and local departments of potable water, wastewater, electricity, and telecom authorities to obtain maps/ data on depth and alignment of underground utilities	Contractor	T/E GAS HSE	Official coordination proceedings signed by representatives of underground utility authorities Examination of site-specific reports and records Field supervision	Contractor management costs (included in bid price) T/E GAS management costs

Impact	Mitigation measures	Responsibility of mitigation	Responsibility of direct supervision	Means of supervision	Estimated Cost of mitigation / supervision
	Limited trial pits or boreholes to explore and identify underground utility lines Non-intrusive Radio- cable and pipe locator to detect underground utilities	Contractor	T/E GAS HSE Supervisor	Contractual clauses + Field supervision	Contractor costs (included in bid price) T/E GAS management costs
	Preparation and analysis of accidental damage reports	Contractor	T/E GAS HSE	Review periodic HSE reports	Contractor costs (included in bid price) T/E GAS management costs
	Repair and rehabilitation of damaged components	Contractor	T/E GAS HSE Local Government Unit Local Police	Contractual clauses + Field supervision	Included in contractor cost but must be evaluated on a case-by-case basis
Effects on cultural sites	Identify areas of antiquities, monument repair zones	Contactor & Supreme Council for Antiquities and Local Council	T/E GAS HSE	Review permitting procedures and ensure review of Council	T/E GAS management costs
	Supervise intensity and locations of construction activities	Expert from Supreme Council of Antiquities	T/E GAS HSE	Review field reports + field supervision	Indicative cost to be revised and included in contractor bid $715 / site for supervision and measurement of vibration for locations identified as "monument-critical" T/E GAS management costs

Impact	Mitigation measures	Responsibility of mitigation	Responsibility of direct supervision	Means of supervision	Estimated Cost of mitigation / supervision
	Control dewatering process	Contractor	Supreme Council Expert + T/E GAS HSE	Field supervision	Indicative cost to be revised and included in contractor bid $2,850 /site as "monument-critical" T/E GAS management costs
	Reduce vibrations	Contractor	Supreme council Expert + T/E GAS HSE	Contractual clauses + Field supervision	Indicative cost to be revised and included in contractor bid $2,150/site as "monument-critical" T/E GAS management costs
	Preserve architecturally valuable sites	Contractor	T/E GAS HSE	Field supervision	Contractor costs (included in bid price) T/E GAS management costs
	Preserve any found antiquity	Contractor + T/E GAS HSE supervisor	T/E GAS HSE	Field inspection throughout works and review field reports	Contractor costs (included in bid price) T/E GAS management costs

Impact	Mitigation measures	Responsibility of mitigation	Responsibility of direct supervision	Means of supervision	Estimated Cost of mitigation / supervision
Waste disposal	Identify distances to disposal sites and facilities nearest to the work area Classify disposal sites and facilities by type of waste accepted by the disposal. Estimate the amounts expected from each type of wastes Identify and contract certified hazardous waste handling and transportation contractors. Estimate handling and disposal fees according to type and amount of waste Estimate size of fleet required to transport wastes. Estimate tipping fees according to specific disposal sites For areas distant from facilities in Alexandria, consider setting up waste **transfer stations (possibly with primary treatment)** for storage hazardous waste Design a comprehensive handling and transportation plan for all waste types	Contractor	T/E GAS HSE	Contractual clauses + review of comprehensive waste management plan	Contractor costs (included in bid price) T/E GAS management costs
	Management of excavation waste according to the waste management plan	Contractor	T/E GAS HSE supervisor	Field supervision	Contractor costs (included in bid price) T/E GAS management costs

Impact	Mitigation measures	Responsibility of mitigation	Responsibility of direct supervision	Means of supervision	Estimated Cost of mitigation / supervision
	Prevent fueling, lubricating and any activity that would entail production of hazardous materials empty containers	Contractor	T/E GAS HSE supervisor	Field supervision	Contractor costs (included in bid price) T/E GAS management costs
	Transfer empty hazardous waste containers to Alexandria facilities (Nasreya or UNICO) and landfill(s)	Contractor	T/E GAS HSE supervisor	Field supervision and review of certified waste handling, transportation, and disposal chain of custody	Indicative cost to be revised and included in contractor bid: Allocate 5 truckloads (2 tons/truck) of hazardous waste per governorate during construction x ($715 per load for each of the 6 governorates close to Alexandria + $1,285 per load for each of the 5 distant governorates)= $53,570
	Adequate management of asbestos and any possible hazardous waste	Water Authority + contractor	T/E GAS HSE	Field supervision + review of Water Authority manifests	Contractor costs (included in bid price) T/E GAS management costs
Effect on structures from dewatering activities	Screening of areas / sectors	Technical Committee or independent consultant + contractor	T/E GAS Design Manager + T/E GAS HSE	Review committee's reports	Contractor costs (included in bid price) T/E GAS management costs
	Limited dewatering schedule	Contractor	T/E GAS HSE	Field supervision	Contractor costs (included in bid price) T/E GAS management costs
Dewatering	Arrange effective drainage during dewatering	Contractor	T/E GAS HSE	Field supervision	Contractor costs (included in bid price) T/E GAS management costs

Impact	Mitigation measures	Responsibility of mitigation	Responsibility of direct supervision	Means of supervision	Estimated Cost of mitigation / supervision
	Transfer any contaminated water resulting from dewatering to an adequate nearest facility	Contractor	T/E GAS HSE	Field supervision	Contractor costs (included in bid price) T/E GAS management costs
Restoration and re-pavement (رد الشئ لأصله)	Announce re-pavement plan indicating the responsibility whether it is the T/E GAS or the Governmental district units.	Contractor/ local administrations	T/E GAS HSE	Field supervision	Included in re-pavement budget agreed by T/E GAS or contractor with district units (الحى)
Effect on ecological systems	Survey proposed route or alignment of the steel high-pressure lines from secondary sources or through field investigations, as possible Avoid sensitive or irreplaceable ecological systems, if encountered on alignment of HP steel or PE pipelines Take necessary measures to offset or displace disrupted sensitive ecological systems	T/E GAS planning unit Contractor	T/E GAS HSE	Review of inclusion of ecological surveys in the routing or alignment of the HP steel pipelines	Contractor costs (included in bid price) T/E GAS management costs

Impact	Mitigation measures	Responsibility of mitigation	Responsibility of direct supervision	Means of supervision	Estimated Cost of mitigation / supervision
Health and safety	All soil piles will be stored a minimum of (60) cm from the sides of the excavation. For excavation 122 cm or deeper, stairways, ramps, or ladders will be used. For trenches, the employee must not exceed 750 cm of lateral travel to reach the stairway, ramp, or ladder. No employee will work in an excavation where water is accumulating unless adequate measures are taken. Ensure the provision of the appropriate personal protective Equipment	Contractor	T/E GAS HSE	Field supervision	Contractor costs (included in bid price) T/E GAS management costs

7.4 Environmental Monitoring Matrix during CONSTRUCTION

Table 7-4: Environmental Monitoring Matrix during CONSTRUCTION

Impact	Monitoring indicators	Responsibility of monitoring	Frequency of monitoring	Location of monitoring	Methods of monitoring	Estimated Cost of monitoring
Reduction of traffic flow	Comments and notifications from Traffic Department	T/E GAS HSE	During construction. Monthly reports	Construction site	Documentation in HSE monthly reports	T/E GAS management costs
Air emissions	HC, CO% and opacity	T/E GAS HSE	Once before construction + once every six months for each vehicle	Vehicles licensing Department	Measuring exhaust emissions of vehicle, electrical unit, or heavy equipment in documented reports	$100/ project area
Noise	Noise intensity, exposure durations and noise impacts	T/E GAS HSE	Regularly during site inspections and once during the night in every residential area or near sensitive receptors such as hospitals	Construction site	Noise meter	T/E GAS management costs
	Complaints from residents	T/E GAS HSE	During construction. Monthly reports	Construction site	Documentation in HSE monthly reports	T/E GAS management costs
Risk of damaging underground utilities and infrastructure	Official coordination reports with relevant authorities Accidents documentation	T/E GAS HSE	During construction. Monthly reports	Construction site	Documentation in HSE monthly reports	T/E GAS management costs

Impact	Monitoring indicators	Responsibility of monitoring	Frequency of monitoring	Location of monitoring	Methods of monitoring	Estimated Cost of monitoring
Effect on structures by dewatering activities	Specialist assessment reports Duration of dewatering and water level	T/E GAS HSE	During dewatering activities. Reported in monthly reports	Construction site	Documentation in HSE monthly reports	T/E GAS management costs
Effects on monuments and vulnerable buildings	Vibration test results	T/E GAS HSE	During construction near sites identified by the Council	Construction site	Calibrated vibration test meter	($750/meter + $160 maintenance and calibration) x 11 vibration meters = $10,000
	Investigate possible buried antiquities	T/E GAS HSE + Supreme Council for Antiquities	Once before construction if required by the council	Streets and areas identified by the Council	Geophysical survey	$715/km in areas designated as antiquities or monument repair zones (to be covered by T/E GAS)
Waste Management	Observation of accumulated waste piles	T/E GAS HSE	During construction. Monthly reports	Construction site	Observation and documentation	T/E GAS management costs
	Observation of water accumulations resulting from dewatering	T/E GAS HSE	During construction. Monthly reports	Around construction site	Observation and documentation	T/E GAS management costs
	Examination of chain-of-custody documents and implementation of waste management plans	T/E GAS HSE	Zonal reports	Construction site and document examination	Site inspection and document inspection	T/E GAS management costs

7.5 Social Management Matrix during CONSTRUCTION

Table 7-5 : Social Management Matrix during CONSTRUCTION

Impact	Mitigation measures	Responsibility of mitigation	Responsibility of direct supervision	Means of supervision	Estimated Cost of mitigation / supervision
1) Impacts on assets (land) and livelihoods of the farmers (crops)	OP 4.12 should be triggered and a resettlement Action Plan should be prepared stipulating all compensation measures	Prior to the construction in each area EGAS, Town Gas and Egypt Gas and the Governorate	Town Gas and Egypt Gas	Ensure the implementation of RAPs	13000 $ to prepare the RAPs Cost of compensation can't be defined during this stage
2) Raise community people concerns due to not being connected to NG	• Try to connect the defined districts through preparing technical solutions to those who might not be connected within the limits of the approved standards • Provide information to community members on the selection criteria for Natural Gas Connections (brochures/leaflets, awareness through NGOs) Follow the procedure of Grievance Redress Mechanism	Along the life of the project Town Gas and Egypt Gas	Town Gas and Egypt Gas	Ensure the implementation of GRM	No cost as it is part of the process
3) Impact on businesses due to no street rehabilitation	In compliance with the Environmental management plan concerning timely implementation of the construction schedule to minimize impact on local business • .Follow up the procedure of Grievance Redress Mechanism • Ensure transparent information sharing	During digging process Town Gas and Egypt Gas. The sub-contractors	Town Gas and Egypt Gas	• Ensure the implementation of GRM • Supervision on Contractors performance	No cost

4) Threat to Safety of users and houses (due to limited level of awareness and misconceptions)	Prepare Citizen engagement and stakeholder plan Awareness raising campaigns should be tailored in cooperation with the community-based organizations (distribution of brochures / leaflets)	During the construction Town Gas and Egypt Gas.	Town Gas and Egypt Gas	• List of awareness activities applied • Lists of participants • Documentation with photos • Awareness reports	2250 $ per awareness raising campaign 2250 $ for brochure and leaflets to be distributed

7.6 Social Monitoring Matrix during CONSTRUCTION

Table 7-6: Social Monitoring Matrix during CONSTRUCTION

Impact	Monitoring indicators	Responsibility of monitoring	Monitoring institution (if different from responsible)	Duration/Frequency) of monitoring	Location of monitoring	Methods of monitoring	Estimated Cost of monitoring
1) Impacts on assets (land) and livelihoods of the farmers (crops)	• Number of PAPs compensated • Number of PAPs who were not compensated • Number of complaints raised • Minutes of meetings with PAPs • Minutes of meeting with Compensation Committee	Town Gas and Egypt Gas	EGAS	Prior to the construction in each area	Site visits Desk work	Reports Minutes of meetings Complaints log	No cost
2) Raise community people concerns due to not being connected to NG	Number of complaints raised	Town Gas and Egypt Gas		Four times per year, each three months	Site and Desk work	Checklists Photos and complaints log	No cost
3) Damaging the streets	Streets quality after finishing digging Number of complaints raised due to damaging streets	Town Gas & Egypt Gas	EGAS	Four times per year, each three months	Site and Desk work	Checklists and complaints log	No cost

Impact	Monitoring indicators	Responsibility of monitoring	Monitoring institution (if different from responsible)	Duration/Frequency) of monitoring	Location of monitoring	Methods of monitoring	Estimated Cost of monitoring
4) Threat to Safety of users and houses (due to limited level of awareness and misconceptions)	• Number of awareness raising implemented • Number of participants in information dissemination	EGAS, Town Gas and Egypt Gas		Quarterly monitoring	Office	Reports Photos Lists of participants	No cost

7.7 Management and Monitoring activities During Operation Phase

7.7.1 User health and safety

Several measures are suggested to overcome obstacles to full understanding and adoption of safety measures by the clients in the social management plan. Examples include using drawings instead of written instructions to improve communication with illiterate customers, coordinating with women of local NGOs to explain safety precautions to women in the households to be connected, and constantly monitoring the performance of emergency response units.

During all consultation activities conducted, participating NGOs offered to host awareness activities related to the NG project. EGAS has already communicated with 30 NGOs during the implementation of Greater Cairo NG project. Consequently, such activities will not necessitate additional cost. The Social Development Officers should outreach with the NGOs in order to mobilize them

7.7.2 Management of Odorant Handling

The MSDS of the odorant provides information on the required storage conditions and procedures to be followed in emergencies. For the disposal of empty containers, the MSDS indicates that the remaining product could be either destroyed by oxidation using dilute solutions of hydrogen peroxide and sodium hypochlorite, or alternatively through incineration.

Town/Egypt Gas is currently practicing the oxidation of the containers. After evacuation of odorant containers (metal barrels) in the PRS holding stainless steel tank, the PRS staff adds hydrogen peroxide, sodium hypochlorite, sodium hydroxide and detergents to the remaining odorant in the container, with continuous rolling to ensure that all sides of the container have been exposed to the oxidation solution. These treatment procedures are documented in the instructions of the HSE department and followed by PRSs' staff. This process destroys the hazardous properties of the remaining odorant product; however arrangements must be made for disposal of the treatment solution remaining in the containers.

Although the oxidation process is environmentally acceptable, the accumulation of treated containers in PRSs will cause area limitations inside PRSs and could affect their efficient operation.

Town/Egypt Gas should arrange with the supplier of odorant that the vehicle transporting odorant containers should also transfer the empty containers, after evacuation, to the hazardous waste facility in Alexandria. When the truck arrives, all containers should be evacuated in the odorant holding tank, and then the containers should be closed and returned back to the truck. The truck driver should sign haulage register form with number of empty containers being shipped, which should also be signed with Alexandria facility personnel for delivery. Town/Egypt Gas should keep these records with their Environmental Register.

The monitoring and supervision of the oxidation process was taking place by the Town/Egypt Gas HSE department through bi-annual audits for each PRS. However, it is recommended to increase these audits to quarterly for each PRS, so as to include the performance of all PRSs in the Quarterly report. The audits should check waste manifests and compare it with odorant consumption data.

7.7.3 Management of Repairs and Maintenance

The same mitigation and monitoring measures discussed for the construction phase shall also apply to the repair and maintenance works that will require excavation.

7.7.4 Management of PRS noise

It is not expected that noise levels caused by the reducers will affect areas outside the PRS fences if the reducers are

located in the middle of the location (at least 20 meters away from all fences). Therefore the following mitigation measures are recommended:

1. Location of reducers should be at least 20 meters away from the PRS fences.
2. The reducers should be either in a well-ventilated closed area, or in a protected open area according to IGEM standards. If the reducers are in an open area there should be wall barriers to dissipate the noise from the PRS staff offices and the neighboring areas.

Town/Egypt Gas is currently undertaking periodical monitoring of noise levels at each existing PRS bi-annually. It is expected that the noise monitoring of the new PRSs will take the same pattern. For PRSs in residential areas, it is recommended to increase noise monitoring at different locations especially at the southern border on a monthly basis, along with recording complaints from neighboring sites.

7.7.5 Management of PRS Safety Aspects

Recommended risk reduction measures have been proposed as points of improvement in order to enhance the PRS safety standards. These risk reduction measures (recommendations) are summarized as follows:

1. Remote actuation of isolation and slam-shut valves by Town/Egypt Gas for different PRS's as well as the transmission pipelines.
2. Produce Hazardous Area Classification drawings for all Pressure Reduction Stations.
3. Planned preventive maintenance policy should be in place for the new PRSs. Also there is a need to produce a 'Station Manual' for each PRS, this manual should include formalized procedures, including precautions and a site scenario specific emergency plan, which should take wind direction, stability and interfaces with others, e.g. GASCO as well as the public living nearby, into account.
4. Control room inlet door should be located in the upwind direction away from the station (Inlet door should not face the PRS station). Alternatively, the control room should be provided by a secondary means of escape at the back side of the room, which shall be used in case of blockage of the main escape route by jet.
5. Self-contained breathing apparatus (2 units at least) to be provided at each PRS for handling odorant releases.
6. Jet fire rated passive fire protection system to be applied to all safety critical shutdown valves ESDVs or Solenoid valves in order to maintain small isolatable inventories. (As applicable)
7. Pipeline marking signs should be added indicating in Arabic and in English "Do Not. Dig" and "High Pressure Pipeline Underneath" in order to prevent such extreme hazardous situation.
8. Install an elevated wind sock in the PRS site, which can be seen - from distance and from outside the fence - to determine the direction of gas migration in case of major gas leak, in addition to provision of portable gas detectors.
9. The design should fully comply with IGE TD/3 code requirements.

A QRA report detailing such risks and mitigation measures must be prepared.

7.7.6 Management of network integrity

Rare events may threaten the integrity of the network and cause multiple failures/leaks/fires/explosions simultaneously should be addressed, despite their low occurrence probability. Such events may include the unlikely impacts from earthquakes, unexpected geotechnical settlements, and pipeline sabotage. Mitigation should involves review of geological/geotechnical history and vulnerabilities. Other measures include an emergency action plan and training drills to deal with such events with minimal damage and risk to the public.

7.8 Environmental Management Matrix during OPERATION

Table 7-7: Environmental Management Matrix during OPERATION

Impact	Mitigation measures	Responsibility of mitigation	Responsibility of direct supervision	Means of supervision	Estimated Cost of mitigation / supervision
Management of odorant and its containers	Evacuation of odorant in holding tank and ship empty containers to a certified hazardous waste facility using certified handling and transportation contractors	PRS staff	T/E GAS HSE	Quarterly auditing for each PRS	Indicative cost to be included in PRS running budget: Estimate tonnage of empty odorant containers and multiply by $360 per ton for transportation and disposal of waste from the 6 governorates close to Alexandria and $640 per ton for hazardous waste from the 5 governorates distant from Alexandria
Noise of PRS operation	Locate noisy pressure reducers away from PRS borders in residential areas	T/E GAS Design Department	T/E GAS HSE	Review of PRS layout	T/E GAS management costs
	Build barrier walls between reducers and sensitive receptors when needed (as required for PRSs in residential areas)	Contractor	T/E GAS HSE	Field supervision of PRS construction	Contractor costs
Leakage and fire	Mitigations based on Quantitative Risk Assessments	Independent consultant	T/E GAS HSE	QRA Document review	$50,000 for QRAs of all the proposed PRSs to be covered by T/E GASs
Network safety	- Detailed review of the geotechnical and geological history of the project area - Development of a full emergency response plan in case of rare events which exhibit multiple simultaneous impacts	T/E GASs	T/E GAS HSE.	- Map and local geotechnical report review - Periodical trainings and drills	T/E GAS management costs

Impact	Mitigation measures	Responsibility of mitigation	Responsibility of direct supervision	Means of supervision	Estimated Cost of mitigation / supervision
Potential risks due to PRS Operation	Remote actuation of isolation and slam-shut valves by T/E GAS for PRS and pipelines.	Designer	T/E GAS Project Dept.	PRS design Document Review	Additional budget not required
	- Produce Hazardous Area Classification drawings for all PRSs - Proper design of control room exit	Designer	Eng. / Elect. Dept. Projects Dept.	Drawing and design Document Review	Additional budget not required
	Preventive maintenance policy and station manual	PRS contractor + T/E GAS	Engineering Dept.	Policy and manual review	Included in PRS cost
	Provision of self-contained breathing apparatus (2 pieces for each station) for handling odorant leaks	T/E GAS	HSE Dept.	Inspection by operators	Include $5000 per PRS in project budget
	Apply jet fire rated passive fire protection system to all critical safety shutdown valves ESDVs or Solenoid valves (As applicable)	Designer	T/E GAS Projects Dept.	Component inspection and design document review	Included in PRS cost
	Place signs in Arabic and English "Do Not Dig" and "High Pressure Pipeline Underneath"	T/E GAS	Engineering Dept.	Signage inspection and site visits	Additional budget not required
	Install an elevated wind sock and provision of portable gas detectors	T/E GAS	HSE Dept.	Design and implementation review	$6000 per PRS
	The design should fully comply with IGE TD/3 code requirements	Designer	Project Dept.	Design document review	T/E GAS management costs

Impact	Mitigation measures	Responsibility of mitigation	Responsibility of direct supervision	Means of supervision	Estimated Cost of mitigation / supervision
Repairs and maintenance (network and households)	As in construction phase	Contractor	T/E GAS HSE	As relevant from construction phase	T/E GAS management costs

7.9 Environmental Monitoring Matrix during OPERATION

Table 7-8: Environmental Monitoring Matrix during OPERATION

Impact	Monitoring indicators	Responsibility of monitoring	Frequency of monitoring	Location of monitoring	Methods of monitoring	Estimated Cost of monitoring
Improper management of odorant during operation	Number of treated containers	T/E GAS HSE	Quarterly for each PRS	PRSs	Reviewing Environmental Register, compare with odorant delivery forms, observation of site	T/E GAS management costs
Noise of PRS operation	Noise intensity	T/E GAS HSE	Quarterly for each PRS	PRSs	Noise meter	T/E GAS management costs
Network integrity	Occurrence of earthquakes or geotechnical settlements Emergency response time and corrective actions during emergency drills	T/E GAS HSE	Bi-annual inspections and annual emergency response drills	Along the SS-HP steel pipelines and PE pipelines	Inspection, leakage detection, running the drills	T/E GAS management costs

7.10 Social Management Matrix during OPERATION

Table 7-9: Social Management Matrix during OPERATION

Impact	Mitigation measures	Timing of mitigation	Responsibility of mitigation	Responsibility of direct supervision	Means of supervision	Estimated Cost of mitigation / supervision
1) Visual intrusion	• The entrance of pipes should be selected at the back of the building (if possible) • Town Gas and Egypt Gas should develop a plan to log into the house without affecting the building. However, such plan should not affect the safety of building.	During the installation of pipes	Town Gas and Egypt Gas. The sub-contractors	Town Gas and Egypt Gas.	Modified maps and designs developed to avoid visual intrusion	No cost
2) Financial burden on economically disadvantaged due to the installments	• Petro Trade should collect the installment immediately after the installation of NG • The installments should be collected on monthly basis in order not to add burden to the poor, as it will be easier for them to pay on monthly basis • The installment should not be high	During the operation phase	Petro trade (Company responsible for collecting the consumption fees and the installments	EGAS	Banks loans log Complaints raised by poor people due to the frequency of collecting the installments	No cost
3) Impact on the informal LPG distributors	• Lists should be obtained from the Social Fund for Development • Provide the informal distributors and the SFD loan borrowers with the needed information about the areas that will not be served by the NG •	During the operation phase	Butagasco	EGAS	Lists from the Social fund for Development	No cost

Impact	Mitigation measures	Timing of mitigation	Responsibility of mitigation	Responsibility of direct supervision	Means of supervision	Estimated Cost of mitigation / supervision
4) Possibility of Gas leakage	• Information should be provided to people in order to be fully aware about safety procedures • The hotline should be operating appropriately • People should be informed of the Emergency Numbers	During the operation phase	Town Gas and Egypt Gas. Sianco (company responsible for maintenance of appliances during operation)	Town Gas and Egypt Gas.	Complaints raised due to Gas leakage	No cost

7.11 Social Monitoring Matrix during OPERATION

Table 7-10: Social Monitoring Matrix during OPERATION

Impact	Monitoring indicators	Responsibility of monitoring	Monitoring institution (if different from responsible)	Duration/Frequency) of monitoring	Location of monitoring	Methods of monitoring	Estimated Cost of monitoring
1) *Visual intrusion*	Number of complaints raised due to VI	Town Gas and Egypt Gas	EGAS	Four times per year, each three months	Site and Desk work	Checklists Photos and complaints log	No cost
2) *Financial burden on economically disadvantaged due to the installments*	• Number of economically disadvantaged people who complained • Number of those who can't pay the installment	Town Gas and Egypt Gas, Petro Trade	EGAS	Quarterly	Desk work	Complaints log Bank reports Petro trade reports	No cost
3) *Impact on the informal LPG distributors*	• Number of those who could not pay the installments to the Social fund for Development	EGAS, Town Gas and Egypt Gas	EGAS	Quarterly	Desk work	Report from the Social Fund	No cost
4) *Possibility of Gas leakage*	Complaints raised by the community people Number of leakage accidents reported/raised	Town Gas and Egypt Gas, Sianco	EGAS	Four times per year, each three months	Site and Desk work	Complaints log Town Gas / Egypt Gas l/ Sianco reports	No cost

7.12 Reporting of Mitigation and Monitoring Activities

Reporting on mitigation measures and monitoring activities is a very crucial issue. Hence, it shall be undertaken by Town/Egypt Gas HSE Departments among the monthly and quarterly report currently being prepared and submitted to EGAS Environment Department. Each monthly report during design/tendering phase should include reporting on the following items[13]:

- Results of reviewing the pipeline alignment and route by Traffic Department and by the Supreme Council of Antiquities
- Activities and reports of the Technical Committee formed to screen areas/sectors based on structural integrity of its buildings
- Collected utility maps from Competent Authorities and identified sectors containing asbestos water pipes
- Designer adherence to safety measures of PRS and buffer zones for noise
- Review of designs, tender documents and contractors' tenders by Town/Egypt Gas HSE Department, and their adherence to mitigation measures

During construction phase monthly reports should include as a minimum:

- Conditional permits and any comments or recommendations by Traffic Department and Supreme Council for Antiquities
- Evaluation of contractor's performance on applying his relevant mitigation measures
- Procedures undertaken by experts of Supreme Council of Antiquities
- Any accidents or breaking of utility pipes
- Monitoring results of excavation machinery exhaust emission, noise and vibrations near antiquity sites, if required

During Operation phase monthly reports should include as a minimum:

- Undertaken treatment activities of empty odorant containers in PRSs
- Monitoring results of PRSs noise
- Evaluation of the adherence of PRSs' staff to safety measures

Results of each 3 monthly reports shall be analyzed in each quarterly report, with recommendations to improve performance, if required, in the following quarter.

[13] If an item is not relevant to the activities of the month, the report should indicate that such activities were not active during the month

7.13 Institutional Framework for ESM&MF Implementation

7.13.1 Existing Environmental Management Structures

EGAS was established in 2001 as an entity focusing on developing Natural Gas business including upstream and downstream operations. EGAS has been certified to ISO 14001:2004 and OHSAS 18001:2007 by Det Norske Veritas (DNV) since 2005; certificates were renewed in 2008 and 2011, the third renewal is due in May 2014. The scope of the certification is "Monitoring and Supervisory Services of Safety and Environment Activities within EGAS and EGAS Affiliated Companies".

EGAS has a number of affiliate companies with different specialties in the natural gas business chain. The project shall be implemented by the Egyptian Natural Gas Holding Company (EGAS) and its affiliate company Town Gas and Egypt Gas.

Three entities will be responsible for implementation of the ESMP, namely EGAS, Town Gas and Egypt Gas.

EGAS Environmental Department organogram indicates that the Assistant Chairman for Environment is responsible for Environmental Management and supervises two Assistant General Managers and seven specialists a total of ten personnel.

Recently the actual working force is one Assistant Chairman for Environment, two Assistant General Managers and four specialists. Staff members of EGAS will carry out audits and inspections on affiliate companies Town Gas and Egypt Gas are among the companies that are audited by EGAS to ensure that the Environmental Management Systems that they adopt is being implemented in compliance with the safeguard polices of the WB.

At EGAS , a new team has been assigned for the social safeguards that is composed of 4 of which 2 will work on full time basis as social officers (one as a key senior officer and the second is a junior officer) and two will be part timers.

Being the implementing body of the natural gas network in cities, each of Town Gas and Egypt Gas have a direct involvement with the environmental management and monitoring of the natural gas network. One of the standard tasks of the HSE Departments of Town Gas and Egypt Gas, that is supervised by EGAS, is to ensure that the Environmental and Social Management Plan of the project is implemented in all the phases of the Project., through establishing an Environmental Register for Pressure Reduction Stations, with frequent auditing of this register. Usually the audit is carried out bi - annually. Monitoring activities include at least the following:

1. Inspection of solid waste scrap, temporary storage, refueling &lubrication, and disposal methods;
2. Inspection of produced liquid waste such as leaked condensate hydrocarbons or chemicals used in the heaters; and
3. Checking that handling of hazardous waste is according to the requirements of the Environmental Law where a permit for handling hazardous material and Hazardous wastes is issued from EGAS Environment Department

4. Use gas analyzers to measure SO_2, CO, CH_4 and O_2 in ambient air, and detect possible leaks
5. Measure noise at different locations of the PRS
6. Other tasks as outlined in ESM&MP

The total number of staff in Town Gas HSE department is 23 that includes (4) in Alexandria, (2) in Ismailia, (13) in Cairo and Giza and (4) in the Headquarters in Cairo. It is planned to assign new staff in Marsa Matrouh.

Egypt Gas HSE staff has a total number of 16 that includes (4) in Upper Egypt, (8) in the Delta Region and (4) in the Headquarters in Cairo

It is planned that the HSE staff in both Egypt Gas and Town Gas will be responsible for the Social activities entailed with the project. Salaries /expenses will be covered as their current situation. Accordingly no extra cost is expected.

- EGAS Environment staff and Town Gas HSE personnel have received training on environmental auditing, environmental impact assessments for industrial establishments, and environmental legislation

- Environmental Departments in both EGAS and Town Gas gained experience through the implementation of the Natural Gas Connections Project in Greater Cairo 2006-2012 as they were involved in planning, tendering and construction procedures. Besides their effective role in the operational phase.. However, the Safety Department in Town Gas usually reviews designs, and assigns a full time staff member to supervise the construction contractor, making sure that adequate safety measures are considered during design and implemented during construction.

7.13.2 Roles and responsibilities of EGAS and LDCs Social Development Officers

EGAS, its subsidiary Local Distribution Companies (LDCs), and the contractors will be responsible for adopting the following procedures:

Compliance with Bank safeguards

- Preparing internal guidelines for the preparation, implementation, monitoring and reporting of social documents required by various safeguard instruments;
- Reviewing ESMF/ESMP/RPF/RAPs and other social safeguard documents prepared by consultants to ensure compliance with relevant safeguard policies of the government and the World Bank;
- Providing recommendations to EGAS/LDC management and other subsidiary companies accordingly and make necessary changes prior to submission of relevant social documents to the World Bank – ensure consistency in the level of proficiency and presentation of the documentation;
- Carrying out documentation review pertaining to social compliance (including bidding documents, reviews on-site, reports from contractors etc.) throughout project implementation;

- Coordinating and facilitating the work of consultants engaged to carry out environmental and social impact assessments and resettlement planning and external monitoring of safeguard instruments implementation;
- Organizing the technical aspects of workshops and meetings as required, as outlined in the ESMF/RPF training and capacity building section;
- Preparing training materials, and conducting technical training workshops to EGAS/LDC staff and project implementation agencies on social safeguards requirements;.

Monitoring and reporting

- Conducting internal monitoring of the implementation of the RAP and the social component of the ESMP in matters pertaining to timely payments and the provision of temporary measures to affected persons;
- Contributing to project progress reports pertaining to overall implementation of social requirements of the project;

Communication with and responsiveness to targeted communities

- Design community friendly grievance redress mechanism with clear and timely bound tiers and responsibilities and ensure dissemination on the local level.
- Conducting field visits to ensure that the established grievance redress mechanisms are functioning properly and that the individual projects are implemented in a socially sustainable manner;
- Participate in the process of disbursing compensations and keep track record of the compensation process documentation
- Reach out to local communities, including PAPs, to raise awareness about the project and the implementation schedule.
- Provide guidance to field staff as needed

7.13.3 Required Resources

Environmental Departments in both EGAS and Town/Egypt Gas have been less involved in design, planning, tendering and construction procedures of natural gas connection projects in cities. Their role has been more effective in the operational phase according to the described procedures above. However, the Safety Department in Town/Egypt Gas usually reviews designs, and assigns a full time staff member to supervise the construction contractor, making sure that adequate safety measures are considered during design and implemented during construction.

It has been concluded from the assessment of the existing practices of EGAS and Town/Egypt Gas Environmental Departments that they are following sound environmental procedures in the operation phase. However, the involvement of both departments should be emphasized during the design, tendering and construction phases.

Town/Egypt Gas management should take procedures to involve the HSE department in the approval and clearance steps of project designs, tenders evaluation, phasing of implementation and construction. The involvement of Town/Egypt Gas HSE Department

should be reported in their monthly and annual reports submitted to EGAS, who should make sure that the integration of environmental aspects is adequately addressed during design, tendering and construction.

The existing manpower for EGAS is considered suitable for their role in reviewing monthly and quarterly reports produced by Town/Egypt Gas, and performing infrequent inspection visits to PRSs. However it is recommended to increase the manpower capacity of Town/Egypt Gas through recruiting additional personnel.

Following are recommended training programs for EGAS/Town/Egypt Gas staff to build their capacity for managing the project:

Table 7-11: Recommended Training Courses for EGAS/Town/Egypt Gas staff

Training course	Type of training	Particpating parties	Proposed Scheduling	Cost in $US
Tailored training on Environmental Management and monitoring for the project	Class room + on job training	Environmental Department new staff of EGAS HSE staff of Egypt Gas and new staff of Town Gas Design, Projects and Operations department staff of Town/Egypt Gas	Before detailed design of the project	$21,500
Treatment of odorant containers	On Job training	PRS staff HSE staff of Town/Egypt Gas	To be part of the oreintation of new PRS staff and HSE staff of LDC during project operation	Included LDC manage ment costs
Safety aspects of PRS	Classroom + on Job training	PRS staff HSE staff of Town/Egypt Gas	Once before start operation of PRS To be part of the oreintation of new PRS staff and HSE staff of LDC during project operation	$14,500
Defensive driving and machinery operation safety	Classroom + on job training	Drivers and operators	Periodical	$21,500

Table 7-12 : Recommended Training Courses for Social Development Officers in EGAS – Town Gas – Egypt Gas

Training course	Type of training	Particpating Parties	Proposed Scheduling	Cost Estimate In $
• **Information about Natural Gas project**	Workshop + on the job training	Social Development Officers Community leaders	Prior to the project	2250 $
• **Promotion of Awareness Raising Activities**	Workshop + on the job training	- Social Development Officers	Once before the project implementation Refreshment course during the impelemtnation of the project	3000$
• **Communication Skills**	Two days' Workshop + on the job training	Social Development Officers	- One workshop during the beginning of the project implementation	750$
• **OP 4.12 with emphasis on involuntary actions and grievances**	One day Workshop + on the job training	Social Development Officers	- One workshop during the beginning of the project implementation	750$
• **Egyptian laws related to land acquisition (if needed)**	One day Workshop + on the job training	Social Development Officers	- One workshop during the beginning of the project implementation	750$
• **Community Participation Tools**	One day Workshop + on the job training	Social Development Officers	- One workshop during the beginning of the project implementation	750$

Training course	Type of training	Particpating Parties	Proposed Scheduling	Cost Estimate In $
• **Consensus Building Techniques**	One day Workshop + on the job training	Social Development Officers	- One workshop during the beginning of the project implementation	750$
• **Monitoring and Evaluation mechanisms (M&E)**	Two days' Workshop + on the job training	Social Development Officers Project management unit	- One workshop during the beginning of the project implementation	1500$

7.14 ESM&MP Budget Summary

A summary of the proposed budget for the Environmental and Social Management & Monitoring Plan (ESM&MP) is presented below.

Exchange Rate: US$ = 7.00L.E as of January 2014
Exchange Rate: € = 9.60L.E. as of January 2014

Cost in $US	ESM&MP component
	Mitigation Components
158,000	**Specific ESIAs for each governorate**
143,000	**Mitigation of PRS air emissions and gas analyzers for 25 PRS**
54,000	**Hazardous waste management during construction**
50,000	**Quantitative Risk Assessments**
58,000	**Various Environmental training and capacity-building programs**
72,000	**Emergency fund for repairing damage to underground utilities**
38,000	**Social Management Plan (including RAP)**
573,000	**Mitigation Subtotal**
	Monitoring Components
10,000	**Vibration monitoring**
10,000	**Air emissions monitoring**
125,000	**Breathing suits for 25 PRS**
72,000	**Contingency and unexpected costs**
217,000	**Monitoring Subtotal**
790,000	**Total** (Seven Hundred Eighty Thousand US dollars)

The ESM&MP budget total is 790,000 US dollars excluding:

- Gross cost of recruiting full-time HSE personnel ($34,000 per recruit per year)
- Cost of ESM&MP for work in antiquities areas ($2000 per km or $2500/site)

The ESM&MP budget is indicative and should be revised upon preparation of the site-specific ESIAs. The budget will be covered in the operating costs of the contractors and the LDCs.

7.15 Closing note

The ESM&MP components: impacts, mitigation, monitoring, and reporting must be refined in the site-specific ESIAs upon finalization of project design, components, routes, and workplans. The framework provided for the ESM&MP outlines the key aspects to be addressed from a more general perspective to the 11 governorates. Specifics and uniqueness of the local context of each of the governorates and the project areas within them must be fully addressed in the ensuing ESIAs.

8 Stakeholder Engagement and Public Consultation

The public consultation chapter aims to highlight the key consultation and community engagement activities and their outcomes, in addition to outlining the key aspects to be addressed when holding the consultation activities of the (11) site-specific ESIAs upon final project detailing.

Throughout the various consultation and engagement activities, the work teams experienced and recorded remarkable and overwhelming public acceptance, even eagerness, by the community and the governmental stakeholders towards the proposed project. The indignity and financial hardships experienced by scores of Egyptian families (especially women) in obtaining LPG cylinders (the current household fuel) was revealed through testimonies all over the country. Aside from a limited number of concerns regarding street rehabilitation after construction works and options of installation fee payment; the glaring message from governmental and community consultations was to commence implementation ASAP (with repeated requests to expand coverage beyond what is planned for the project).

Consultation activities (scoping, interviews, focus group discussions, public hearings/consultations) with various stakeholders and community people in the host communities were held for the proposed 1.1 million household NG connections project in compliance with:

- WB policies related to disclosure and public consultation, namely,
  - World Bank Procedure (BP 17.50)
  - World Bank Operational Policy (OP 4.01)
- Egyptian regulations related to the public consultation
  - Law 4/1994 modified by Law 9/2009

Objectives of various consultation activities are summarized as follows:

1- Define potential project stakeholders and suggest their possible project roles
2- Disseminate comprehensive information about the project to enable stakeholders to identify their concerns, needs, and recommendations.
3- Document stakeholder feedback and enhance the ESIAF accordingly
4- Identify the most effective outreach channels that support continuous dialogue with the community
5- Discuss potential resettlement plans and impacts of involuntary resettlement

8.1 Defining the stakeholder

Given the fact that the project exact routes and project details have not been finalized at this stage, stakeholder identification was based on analysis of geographical, legal, institutional, and operational scope of the project. The following table represents the stakeholders contacted and engaged for the consultation events:

Table 8-1 Main stakeholders identified for the Framework

Stakeholder	Role/ concern
Local Governmental entities	
Governorates	The main role of the governorates is the provision of support to the project through mobilizing people to gain information about the project. Media is known to shed light on activities of the governorate entities
Local Governmental units (District authorities and village authorities)	- Permissions for the lands needed for PRS should be prepared by the governorate and approved by the LGU. - Rehabilitation of roads, which is one of the major issues raised by the community, will be performed by the LGU.
Other governmental entities	
Information Centers on the governorate level	Provide NG companies with underground utilities and infrastructure maps.
Governmental Authorities	Various authorities in the governorate will support the project through permissions for excavation works, maintenance, health related issues, etc.
The Social Fund for Development	Offers loans in LPG distribution startups.
Egyptian Environmental Affair Agency (HQ and RBOs)	Responsible for reviewing and approving ESIAs, and monitoring implementation of the Environmental Management Plan
Security Department	Secure the construction sites and prevent people from in-flushing into it
Ministry of Health	Providing health facilities to the project workers
Ministry of Tourism	Relevant to project implementation in Touristic Governorates such as Aswan, Qena, Matrouh, and Alexandria.
Ministry of Antiquities	Very important to issue permissions for excavations and accompany the working teams, particularly, in Sohag and Aswan which are rich in monuments.
Media	
Television and radio representatives	Inform the community about the project and its impacts and support dissemination of ESIA studies
Press people	
Websites editors	
NGOs working on environmental and social related aspects	
NGOs on the central level	Play an active role in any awareness-raising related to the project May provide financial support to the poorer customers
NGOs on district level	
Specific union of NGOs	
Universities and Educational institutes	
Faculty of Engineering	Review and enrich the ESIA study with feedback
Secondary vocational schools	Propose needed capacity building for their students to potentially find employment with the project
Researchers/consultants	Review results of the study and provide feedback

Stakeholder	Role/ concern
Other	
Private companies	Mainly potential tenderers for construction works
Traders	Provide workers with food and amenities.
Contractors	From the project adjacent areas, may be affected.
Community people	
Community leaders	Main cornerstone in mobilizing the communities.
Heads of tribes	In Marsa Matrouh city, provide security to the pipelines. Their approval to allow the project to cross their lands should be obtained during the early stage of the project.
Potential beneficiaries	Potentially benefit from the project
Potential Project Affected Persons (PAPs)	Farmers whose lands may be traversed by project components. LPG distributors(formal and informal), LPG storage workers.
Natural Gas companies	
EGAS	Implementing agency overseeing activities of the Environmental and Social Management Plan
Egypt Gas	Local distribution company (LDC) who will implement, operate, and manage the ESMP
Town Gas	Local distribution company (LDC) who will implement, operate, and manage the ESMP
Butagasco	May be affected due to the installation of the NG
Petro trade	They are the responsible entity for collecting the consumption fees and the bank installment

The abovementioned stakeholders were consulted using various tools i.e. Individual interviews, group meetings and public consultation. Most of them have attended the public consultation hearings conducted during December 2013 in the 11 governorates. However, some of them were interviewed in their premises in order to enable them to spell out their concerns and worries freely.

8.2 Consultation Methodology and Activities

3441 community members were engaged directly. Consultations were conducted on various levels to outreach all levels of stakeholders.

Table 7-1 Summary of Consultation Sessions

Date	location	participants	Number		Methods
			Male	Female	
December 2013 During data collection phase		Potential beneficiaries, government officials, NGO representatives			Focus group discussions, individual interviews, public meetings
	Aswan	Potential	25	9	FGD

	Alex	beneficiaries and government officials	16	8	FGD
	Ismailia		16	8	FGD
	Giza		18	17	FGD
	Daqahlia		24	8	FGD
	Gharbia		16	8	FGD
	Qalubia		6	8	FGD
	Menufia		31	1	FGD
	Qena		22	10	FGD
	Matrouh		11	1	FGD
	Aswan	governmental and NGOs	5	1	In-depth
	Alex		4	1	In-depth
	Ismailia		4	0	In-depth
	Giza		11	1	In-depth
	Daqahlia		6	0	In-depth
	Gharbia		4	0	In-depth
	Qalubia		3	2	In-depth
	Menufia		4	0	In-depth
	Qena		2	2	In-depth
	Matrouh		2	0	In-depth
December 2013 During data collection phase	Giza	Potential; beneficiaries	257	299	Structured questionnaire
	Matrouh		24	35	
	Menufia		52	48	
	Aswan		39	55	
	Gharbia		25	36	
	Daqahlia		100	102	
	Qalubia		69	206	
	Alexandria		94	56	
	Ismailia		53	71	
	Sohag		78	63	
	Qena		75	67	
26th Nov 2013	Sohag	Potential beneficiaries, government officials, NGO representatives	71	9	Scoping phase
28th Nov 2013	Menufia		59	23	
24th Nov2013	Giza		68	21	
21st Dec 2013	Aswan	Potential beneficiaries, government officials, NGO representatives	119	30	Public consultation
21st Dec 2013	Menufia		61	13	
23rd Dec 2013	Qena		96	57	
23rd Dec 2013	Giza		73	26	
25th Dec 2013	Matrouh		47	4	
25th Dec 2013	Sohag		82	22	

26th Dec 2013	Alexandria		26	29	
29th Dec 2013	Daqahlia		45	12	
29th Dec 2013	Gharbia		55	24	
30th Dec 2013	Qalubia		63	8	
30th Dec 2013	Ismailia		31	48	
Total	3441		1992	1449	

8.2.1 Public scoping sessions

- Giza and Qalubia Governorates on November 24th of 2013 in Flamenco Hotel.
- Upper Egypt Governorates on November 26th 2013 in Maraga City Hall, Sohag.
- Delta governorates on November 28th 2013 in Menufia University Hotel.

Participants profile

Participants of the scoping session consultation events represented different categories of stakeholders from the targeted areas. In total, 251 persons attended those sessions, of which 198 were males and 53 were females. The males represented (78.9) % of the total participants, while females represented only (21.1%) This is relatively a high presentation of females comparing to similar projects implemented in the same Governorates.

الشركة المصرية القابضة للغازات الطبيعية (إيجاس)

جلسات الاستماع ومناقشة عامة (أولى)

لدراسة تقييم التأثيرات البيئية والإجتماعية لمشروع توصيل الغاز الطبيعى فى ١١ محافظة

فى إطار خطة الشركة المصرية القابضة للغازات الطبيعية خلال الثلاث سنوات القادمة والتى تعد جزءا متكاملاً من استراتيجية الدولة فى التوسع فى توصيل الغاز الطبيعى للوحدات السكنية لعدد ١,١ مليون عميل فى محافظات (الإسكندرية / الجيزة / مرسى مطروح / القليوبية / الدقهلية / الغربية / المنوفية / سوهاج / قنا / أسوان / الإسماعيلية). فإنه يسعد الشركة المصرية القابضة للغازات الطبيعية (إيجاس) بالتعاون مع شركة إكوكنسرف للحلول البيئية دعوة ممثلى المجتمع المدنى والجهات والأفراد المعنيين بموضوعات التنمية المستدامة والبيئة للمشاركة وإبداء الرأى بشأن المشروع وتأثيراته البيئية والإجتماعية المحتملة وذلك طبقا للمواعيد التالية:

المحافظة	التاريخ	الموعد	المكان
الجيزة	الأحد ٢٤ نوفمبر ٢٠١٣	الساعة ١٠ صباحا	فندق فلامنكو ٢ شارع الجزيرة الوسطى بالزمالك
سوهاج	الثلاثاء ٢٦ نوفمبر ٢٠١٣	الساعة ١٠ صباحا	قاعة مجلس مدينة المراغة
المنوفية	الخميس ٢٨ نوفمبر ٢٠١٣	الساعة ١٠ صباحا	فندق جامعة المنوفية بجوار كلية الزراعة

وفى حالة الرغبة فى الحصول على نسخة من مسودة ملخص الدراسة المبدئية برجاء زيارة الموقع الإلكترونى للشركة القابضة للغازات الطبيعية www.egas.com.eg

أو الحضور لمقر الشركة ٨٥ طريق النصر - مدينة نصر

وأننا لنتطلع لمشاركة سيادتكم فى هذه الجلسة

للمزيد من المعلومات برجاء الاتصال بالمكتب الاستشارى – إكوكنسرف

فاكس: ٠٢-٢٧٣٦٥٣٩٧ تليفون: ٠٢-٢٧٣٦٤٨١٨ / ٠٢-٢٧٣٥٩٠٧٨

بريد إلكترونى genena@ecoconserv.com

Photo 1: Advertisement published in El Ahram related to the 3 scoping sessions

Diversity in age and educational backgrounds was reflected in participants' contributions and enriched the session with a wide range of opinions. The visits paid to introduce the project to the community were an appropriate aperitif that drove the community people to be more willing to get information about the project. The diversity between literate and illiterates, workers and unemployed enriched the discussion to a great extent. A variety of organizations as well as representatives from governmental and community based authorities, institutes, and entities also took part in these scoping session meetings.

- 35.5% from governmental entities
- 17.7% from government environment sector
- NGOs (4.6% in Giza , 15.9% in Menufia and 20.3% in Sohag)
- Five TV, press and Radio reporters attended the 3 scoping meetings.
- Community people (technicians, service sales laborers and teachers)

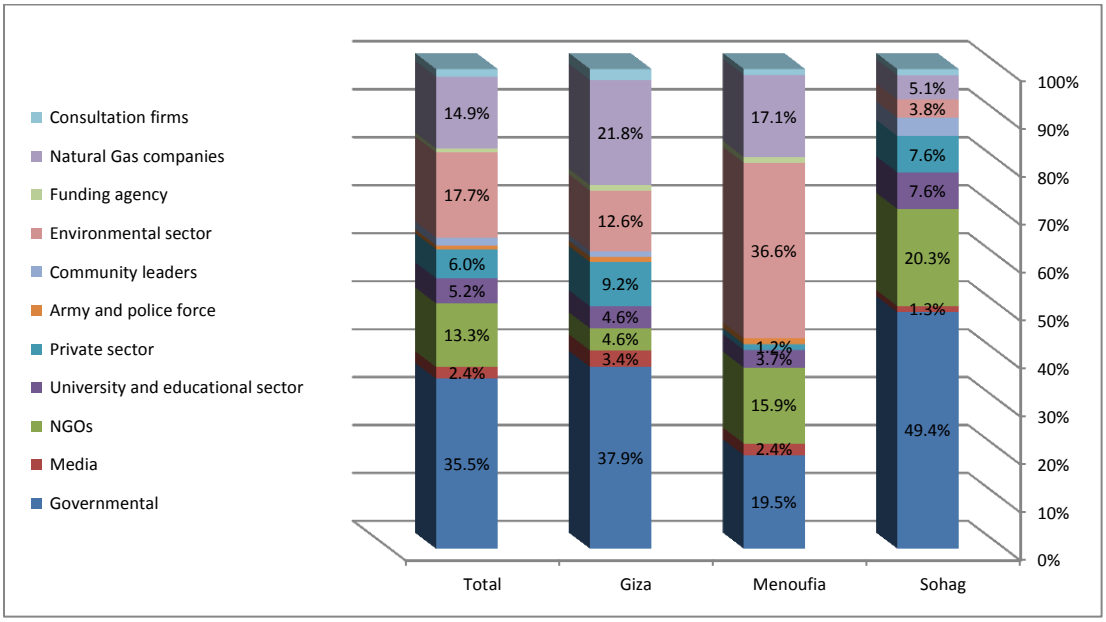


Figure 8-1: Distribution of scoping session participants by sector

Summary of discussions

All participants expressed their eagerness for commencement of project implementation without further delay and many participants demanded the extension of the project to additional areas. Following is a summary of all discussions conducted.

Subject	Questions and comments	Responses
LPG cylinder problems	Speeding up the environmental and social studies and permissions so as to launch the construction phase as soon as possible	• EcoConServ is preparing the ESIAF study required to obtain EEAA approval. • EGAS is working on obtaining other required permissions

Subject	Questions and comments	Responses
Recommendation to enhance the project performance	• EGAS should obtain detailed information about all project areas and develop a report about each area • The installation of NG should be obligatory not optional • EGAS should share infrastructure maps developed for the project with the Local Governmental units • The selection of project areas should be revisited • All towns and cities should be connected	• The exact streets will be defined at a later stage. Thereafter, an ESIAF will be prepared for each governorate • EGAS cannot oblige anyone to have NG installed • All available information will be shared with the Local Governmental Units • Project areas were selected based on certain criteria as presented • This project is one of a series of projects that aim at connecting all houses to NG
Scope of social study	It is important to meet with informal LPG distributors and house guards in the project areas	• This task is within the scope of ESIAF study
Awareness activities and NGOs roles	Will the project undertake any awareness activities? Local NGOs should be integrated in these activities	• Awareness activities are among the recommendations of the ESIAF study
Street rehabilitation	• It is crucial to study the impacts on streets and the restoration process • Street restoration should not be the responsibility of Local Governmental units	• All impacts will be fully investigated • Restoration alternatives are 1.Restoration will be fully undertaken by NG companies (Town Gas – Egypt Gas)or 2.NG companies will pay local governmental units to carry out restoration works
Considering alternative sources of energy	In addition to NG, EGAS should consider also making use of solar energy and biogas	• This particular project is limited to NG. However, solar and wind energy projects are being implemented by the New and Renewable Energy Authority on the national level
NG installations for houses constructed with no official permits	It is crucial not to install the NG to illegally constructed houses.	• One of the requirements for installing NG is the provision of an electricity bill. Houses constructed without the necessary permits do not have access to 'state electricity' and will not be able to provide the required bills.
NG installation to areas with no sewage system	Areas with no access to a sewage system should not be deprived of NG as well. This is not fair.	• NG should be the last facility to be installed. This is mainly due to safety requirements

Subject	Questions and comments	Responses
Vulnerable groups working in LPG distribution	EGAS should consider meeting the poor and marginalized groups working in LPG distribution	• Vulnerable groups are an essential component of this study. Due attention will be given to them. They will be investigated during the ESIAF
Poor people	EGAS should provide a subsidy enabling the poor to install NG	• The NG connection is already subsidized by the state. Thus, it is recommended that other entities step in to provide additional support to the poor
Visual intrusion	The pipelines damage the entrance of houses and diminish the aesthetic value of buildings	• We try to follow the maximum safety procedures while at the same time minimizing damage to houses. Plans to minimize visual intrusion have been developed

8.2.2 Data collection activities

- 44 mini group meetings were conducted in 29 project areas, attended by 263 members of community and governmental entities.
- 36 individual meetings were conducted in the 11 governorates with governmental stakeholders. In addition, 16 individual meetings were conducted with the LPG distributors.
- 1904 Households were consulted in various project areas.
- Dual meetings were conduct held with 20 persons in Marsa Matrouh city as households will be provided NG for the first time governorate-wide.
- A leaflet about the project was prepared and uploaded to the website. Thereafter, 1000 leaflet were printed and distributed during the site visits[14]:
  1- Brief description of the project
  2- Potential impacts of the project
  3- Total number of installations

Participants profile

In addition to the above mentioned, mini meetings and individual interviews were conducted in the 11 governorates. The community people on the district level were interviewed. As well as, the health centers' service providers, the LPG distributors, NGOs and Governmental entities. Participants were of a variety of age categories. Young people were motivated to attend the meetings held in their own premises. Females were strongly represented at 26.9% of the participants. Consultations with women took place in homes, LPG storerooms, and NGOs. Some consultation activities were conducted informally. A casual ambiance was adopted during consultations to encourage people to spell out their concerns freely.

[14] Details are presented in the SIA document (submitted to WB and EGAS in parallel to this report).

Photo 2: Woman interviewed in the NGO

Photo 3: Consultation on the street

Summary of discussions

The discussion addressed/documented the following:

1- Options of poorer customers to receive additional financial support
2- Physical and financial burdens of LPG cylinders and dilemmas during shortage
3- Corruption related to LPG distributors
4- Credible information due to the misconceptions related to NG safety
5- Feasibility of connecting NG to rural areas and remote ones
6- Importance to integrate community based organizations in awareness activities
7- Monitoring and maintenance of the grid
8- NG job opportunities for areas adjacent the project
9- Cooperation with the LGU throughout the life of the project

8.2.3 Final public consultations

Consultation activities were conducted in the 11 Governorates during the last 10 days of December 2013. Parallel teams implemented the consultation activities.

- Four consultants from EcoConServ (two environmental and two social)
- Eight representatives of EGAS, Town Gas and Egypt Gas
- Four representatives of EEAA accompanied the teams over the 11 governorates
- 2 administrative managers and numerous drivers

Table 8-2: 11 Consultation activities conducted during the final consultation phase

Governorate	Date	Venue
Aswan	21st of December 2013	Governorate Hall (Arous El Neil)
Menufia	21st of December 2013	Governorate Hall
Qena	23rd of December 2013	Girls Club Hall in Qena city
Giza	23rd of December 2013	Army Hotel Hall
Matrouh	25th of December 2013	Nile centre for Media
Sohag	25th of December 2013	Local Popular Council
Alexandria	26th of December 2013	Mercure Hotel
Daqahlia	29th of December 2013	Marshal Hotel
Gharbeia	29th of December 2013	Panorama Hotel
Qalubia	30th of December 2013	Egypt Public Library in Benha
Ismailia	30th of December 2013	Media Compound in El Sheikh Zaid

The list of invitees was developed by EEAA regional branches, environmental offices of the governorates, NGOs, governmental media centers, and various government employees, in cooperation with the Consultant. Invitees were informed of the date and location of the Public Consultation at least two weeks ahead. Participants were invited through:

Photo 4: One of the developed posters

1- Invitations sent by EGAS via mails, Faxes and e-mails.
2- Telephone communication by EGAS and the Consultant.
3- An advertisement was published in El Ahram El Mesay followed by a second advertisement published in Aswan Newspaper and El Esboua Newspaper.
4- Aswan Newspaper presented a news clip about the project prior to the event.
5- A simplified Fact-sheet/brochure in Arabic (500 copies) distributed:: i) Governorates that the project will be implemented in, ii) general description of the project, iii) Potential long and short term impacts of the project .

Hearings/consultations were held in adequately situated and equipped venues affiliated to NGOs, Media centers, Governorate, and hotels. In Sohag, Qena, and Aswan microbuses were rented to move people from the remote areas to the public consultation venues.

Egyptian Natural Gas Holding Company

الشركة المصرية القابضة للغازات الطبيعية
(إيجـــاس)

جلسات الاستماع ومناقشة عامة

لدراسة تقييم التأثيرات البيئية والاجتماعية
لمشروع توصيل الغاز الطبيعى فى ١١ محافظة

في إطار خطة الشركة المصرية القابضة للغازات الطبيعية خلال السنوات الثلاث القادمة والتى تعد جزءا متكاملا من استراتيجية الدولة في التوسع فى توصيل الغاز الطبيعى للوحدات السكنية لعدد ١,١ مليون عميل في محافظات الاسكندرية/ الجيزة/ مطروح/ القليوبية/ الدقهلية/ الغربية/ المنوفية/ سوهاج/ قنا/ اسوان/ الاسماعيلية). فإنه يسعد الشركة المصرية القابضة للغازات الطبيعية (إيجاس) بالتعاون مع شركة إكوكنسرف للحلول البيئية دعوة ممثلى المجتمع المدنى والجهات والأفراد المعنيين بموضوعات التنمية المستدامة والبيئة للمشاركة وإبداء الرأى بشأن المشروع وتأثيراته البيئية والاجتماعية المحتملة وذلك في تمام العاشرة صباحا طبقا للمواعيد التالية:

المحافظة	مكان الجلسة	التاريخ
أســـــوان	قاعة مؤتمرات عروس النيل	السبت ٢٠١٣/١٢/٢١
المنوفيـــة	ديوان عام محافظة المنوفية	السبت ٢٠١٣/١٢/٢١
قنـــــا	قاعة نادى الفنيات	الاثنين ٢٠١٣/١٢/٢٣
الجيـــزة	نادى القوات المسلحة - الزمالك	الاثنين ٢٠١٣/١٢/٢٣
مرسى مطروح	مركز النيل للاعلام	الأربعاء ٢٠١٣/١٢/٢٥
ســـوهاج	قاعة المجلس الشعبي المحلى بالمحافظة	الأربعاء ٢٠١٣/١٢/٢٥
الإسكندرية	فندق ماريكيور	الخميس ٢٠١٣/١٢/٢٦
الدقهـــلية	فندق مارشال	الأحد ٢٠١٣/١٢/٢٩
الغربيـــة	فندق بانوراما	الأحد ٢٠١٣/١٢/٢٩
القليوبيـــة	مكتبة مصر العامة	الاثنين ٢٠١٣/١٢/٣٠
الإسماعيلية	المجمع الإعلامي – الشيخ زايد	الاثنين ٢٠١٣/١٢/٣٠

وفى حالة الرغبة فى الحصول على نسخة من مسودة ملخص الدراسة المبدئية برجاء زيارة الموقع
الالكترونى للشركة المصرية القابضة للغازات الطبيعية www.egas.com.eg
أو الحضور لمقر الشركة ٨٥ طريق النصر مدينة نصر

وإننا لنتطلع لمشاركة سيادتكم في هذه الجلسة
للمزيد من المعلومات برجاء الاتصال بالمكتب الاستشارى – إكوكنسرف
فاكس: ٠٢- ٢٧٣٦٥٣٩٧ تليفون: ٠٢- ٢٧٣٦٤٨١٨/ ٢٧٣٥٩٠٧٨
بريد إلكترونى genena@ecoconserv.com

Photo 5: Advertisement published in El Ahram el Mesay related to the final 11 public consultations

Participants profile

971 participants attended the 11 final consultation events. Participants reflected different categories of stakeholders from the project targeted areas. Female participation was targeted throughout advertising and invitation process. The highest representation of women was

noted in Ismailia Governorate (60.8%) while the least representation of females were found in Matrouh. Taking the unique cultural traits of Matrouh into account, additional mini meetings were conducted with the females on the governmental employees and residents levels. Matrouh as invitations extended to heads of tribe and the NGOs working on the tribal levels.

Overall, special attention was paid to involving young groups and females as they are most affected by the physical hardships of obtaining the LPG cylinders. The physically-challenged were represented in consultation activities through NGOs working with them.

- NGOs represented 14.9% of the participants among which 70.0% of them work on the solid waste management and street afforestation
- 42.0% of the participants represented governmental entities (Local Governmental Units, Road Authority, the Urban planning, etc.)
- Governmental environmental sector represented 15.8% of the total participants (EEAA regional branches, governorate EMU and local environmental units)
- 38.8% of the total participants held administrative jobs
- 26.5% specialists (Lawyers, professors, businessmen, chemists, etc.)
- 23.8% of the total participants were of top managerial positions (government) and heads of municipalities
- Technicians and specialists represented 6.8%
- 2.0% were students.

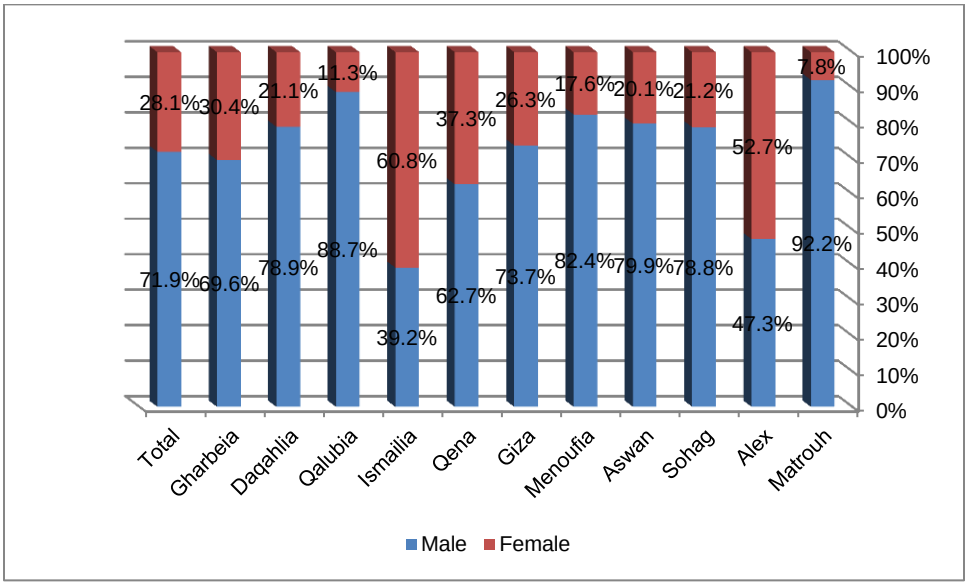


Figure 8-2: Distribution (%) of participants by Gender

Summary of discussions

All consultation events started with a summary of the project and the Natural Gas in Egypt. Using PowerPoint and multimedia, representatives of EGAS, Town Gas and Egypt Gas presented detailed information about all project activities.

Using PowerPoint and multimedia, EcoConServ experts presented the ESIAF to the community people. Simple wording was used whenever possible by the environmental and social expert in order to be comprehended by the members of community. The resettlement policy framework was presented as an important element of the final public consultation.

Photo 6: A tribe leader in Matrouh Gov.

Photo 7: Participants in Daqahlia Governorate

Photo 8: Posters in Sohag Governorate.

Photo 9: Consultation event in Sohag Governorate

During breaks, Media interviewed EGAS representatives, government officials, community members, and the consultants. The main issues raised during these interviews were as follow:

1- General information about the Natural Gas
2- Positive and negative impacts of the NG
3- The rules and regulations of EEAA
4- The role of stakeholders and community participation

Each session ended with an open discussion lasting for a couple of hours.

Table 8-3: Key comments and concerns raised during the Final Public Consultations

Subject	Questions and comments	Responses
Damaging underground utilities and infrastructure during digging	Will the implementing agencies avoid damaging the underground utilities/facilities and infrastructure?	All necessary procedures should be carried out to avoid damaging underground utilities/facilities and infrastructure. In case any facilities are damaged, they will be restored
Collaboration with governmental entities and information centers	Many governmental entities (Local Governmental Units, Information centers, Road Authority, Water resource, Mayors…etc.) are willing to cooperate with the project to facilitate work. Will this be possible?	It is crucial to collaborate with these entities in order to obtain information, maps and permissions
Role of community based organization and tribe leaders	It is recommended to cooperate with members of civil society in order to increase awareness	Civil Society members play a major role in carrying out awareness raising activities as well as securing the financial aid to poor people
Role of the Army	EGAS should consult and contribute with the army in the frontier governorates	Their approvals and permissions are key to implementing project activities
Reduction the installation cost	It is recommended to: 1. Take the LPG cylinder as an advance payment for the NG. Thereafter, the poor pay by installment 2. Cooperate with the Ministry of Social Solidarity to reduce the installation cost for poor 3. Mobilize the local community and the NGOs to provide support to poor	It is difficult to adopt these recommendations
People living with disabilities	At least 5% of jobs provided by EGAS should be filled by people with disabilities	This recommendation will be taken into consideration
Appropriate time for construction	Matrouh, Alexandria and Ismailia are touristic areas. Thus EGAS should avoid working there during summer time	This recommendation will be taken into consideration

Subject	Questions and comments	Responses
Restoration of streets	All attendees voiced their concern about damaging the streets without restoring them after the completion of installation activities due to the bad performance of the Local Governmental Unit (corruption)	Two alternatives of street rehabilitation were investigated: - Restoration will be fully undertaken by NG companies (Town Gas – Egypt Gas)or - NG companies will pay local governmental units to carry out restoration works
Some devices cannot be operated by the NG	We use a baking stove. This will not be operated by the NG. What should we do?	The baking stove can't be connected to the NG for safety purposes
Awareness activities	Awareness activities should cover the following: Contact person in the site (foreman) GRM personnel Hotline for damage and maintenance Website and SMS	This recommendation will be taken into consideration
Job opportunities	The jobs provided by this project should be made available to the local community	It is more economically viable to provide jobs to the local community
Remote areas and suburbs	NG should be installed to remote areas and the suburbs	They will be concerned in later stage
Capacity building	EGAS should raise the capacity of community members in order to enable them to work in the project	This will be investigated and implemented whenever possible
Paying by installment	Does the proposed system for paying by installment contain any interest?	The bank should have their interest rate
Criteria to select certain areas to install the NG	What are the criteria to select the project areas	There are numerous selection criteria based on economic aspects and technical consideration
Safety measures	What are the safety measures followed by the NG companies	We apply the maximum standards of safety (British standards)

Second Public Consultation Disclosure Activities

The importance of the project for the government and the community was reflected in remarkable media coverage. Media covered events and interviewed participants:

1- **Newspapers: El Youm 7, El Masry El Youm, El Watan**
2- **News websites: El Ahram, El Borsa website, El Shrouk, Aswat Mesria, El Mashad, Misr El Youm**
3- **Aswan governorate website, ONA news**

4- Tibah and Canal National TV channels

Photo 10: Sample of published news

http://www.akhbarelyom.com/news/newdetails/240546/1

Please see Annex 3 for a detailed report on the proceedings of the scoping and consultation events.

8.3 Closing note

The key message from the nationwide consultation events carried out for this project is that Public and government acceptance is simply overwhelming. Aside from limited concerns regarding arrangements for NG installment payments and street restoration, the main public and governmental requirement was the speedy implementation of the project and expansion to additional areas.

In addition to documenting and analyzing the outcomes of the various consultation events, this framework study is meant to provide guidelines for consultation activities during the site-specific ESIAs to be prepared upon final project detailing in the each of the 11 governorates.

Site specific consultation efforts should include all concerned stakeholders – be they persons/households affected by the project activities, civil society organizations representing the interest of the community, or regulatory and governmental bodies who will play a role in facilitating or regulating the implementation of site-specific project activities.

Consultation activities are expected to differ according to the targeted governorate and stakeholder groups in relation to the foreseen impacts affecting them. The consultant will decide on the most appropriate consultation tool to reach out to the different stakeholders.

While WB safeguards and regulations state that a minimum of two large-scale, well-publicized public consultation sessions are a must for projects classified as category 'A' projects like the one at hand[15], additional consultation efforts (for example through focus group discussions, in-depth meetings, and interviews) are needed to reach the most vulnerable and difficult to reach community members. Additionally, in order to obtain larger scale and more quantifiable information, the consultant should assess conducting surveys in the different sites.

The following table suggests stakeholders to take into consideration while conducting site-specific consultation efforts in relation to the different foreseen impacts and project activities. It is worth mentioning that the scope of consultation should adopt community tailored venues, materials and consultation. Conducting consultation activities using Seminars and public hearing will be useful. However, conducting public meetings in the exact project areas in local councils, the mosques and churches, and the public gathering is of much more importance.

[15] Clause 14 of OP 4.01 states that: "For Category A projects, the borrower consults these groups at least twice: (a) shortly after environmental screening and before the terms of reference for the EA are finalized; and (b) once a draft EA report is prepared. In addition, the borrower consults with such groups throughout project implementation as necessary to address EA-related issues that affect them."

Table 8-4: Suggested stakeholders for site-specific consultations

#	ACTIVITY	IMPACT	STAKEHOLDER/S
1.	Construction of Pressure Reduction Stations (PRSs)	• Affecting the livelihoods of farmers as a result of using cultivated lands • Temporary or permanent Land Appropriation	• Agricultural Associations and land owners • Workers employed in agriculture • Private land owners • Relocation candidates
2.	Installation of Gas Transmission Connection (High Pressure Pipelines)		
3.	Installation of Gas Distribution Network	• Impact on businesses • Impacts on traffic	• Business & shop owners • Residents • Drivers (Microbus, Taxi, TucTuc…)
4.	Installation of Household Connections and modalities of payment particularly for poor	• Threat to Safety of users and houses (due to limited level of awareness and misconceptions) • Visual intrusion • Financial burden on consumers (of installments due to accumulation of fees /installments collection resulting in financial burden on consumers • Impact on the informal LPG distributors • Possibility of gas leakage • Concerned community members who do not meet the criteria for installing NG connections ('no gas areas')	• Civil society organizations and NGOs • Community leaders • Residents • LPG salespeople • Companies housing employees • Representatives from Community Health workers at the Ministry of Health (برنامج الرائدات الريفيات) • Ministry of Social Solidarity- community social workers • Local media • Community Service Centers
5.	Stakeholders relevant for all stages of implementation/ Project activities	• Miscellaneous	• EGAS • Supreme Council of Antiquities • Municipalities • Relevant utilities authorities (water/sanitation, electricity) • Governorate representatives • Potential local construction employees and young people
6.	Resettlement Action plans	• Potential impacts on the livelihood of farmers due to damaging their crops	• The project affected persons • EGAS and the subsidiary companies LDCs • Governmental entities (agriculture associations and directorate • NGOs

Annex 1: Contributors to the ESIA Framework

	Team Member	Role
1.	Dr. Tarek Genena	Senior ESIA expert and team leader
2.	Ms. Zainab Hafez	Senior SIA expert and project coordinator
3.	Dr Amr Sobhy	Senior EIA expert
4.	Eng. Fakhry AbdulKhalik	Senior Environmental inspection and legal expert
5.	Ms. Shaimaa Mostafa	SIA specialist
6.	Ms. Dalia Ashour	SIA specialist
7.	Eng. Maysra Shams	EIA specialist
8.	Eng. Nadine Suleiman	EIA specialist and multimedia expert
9.	Eng. Ahmed Kandil	Senior stakeholder engagement expert
10.	Mr. Ahmed Mostafa	Administrative coordinator
11.	Mr. Sameh Mahrous	Senior administrative coordinator

Acknowledgements

The EcoConServ consultant teams would like to express their deep gratitude to the scores of support staff, drivers, NGOs, collaborators and organizations who logistically supported the completion of this project under tight time limitations.

EcoConServ also acknowledges the invaluable knowledge and support provided by the technical, environmental, and social teams of EGAS, Egypt Gas, and Town Gas who accompanied the consultant teams all over the 11 governorates under demanding travel schedules.

Annex 2: Proposed procedures for chance finds

Cultural property include monuments, structures, works of art, or sites of significance points of view, and are defined as sites and structures having archaeological, historical, architectural, or religious significance, and natural sites with cultural values. This includes cemeteries, graveyards and graves.

Antiquities Law 117/1983: Article 24 states that everyone who finds by chance the part or parts of a fixed monument in its place must promptly inform the nearest administrative authority within forty-eight hours.

Prior to the construction phase, the approval shall be obtained from the antiquities department and surveying department

Chance Find Procedures

1. Stop the construction activities in the area of the chance find;
2. Delineate the discovered site or area;
3. Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be present until the responsible local authorities and Ministry take over;
4. Notify the site manager and HSE supervisor who in turn will notify the responsible local authorities and the Antiquities Authority immediately (within 24 hours or less);
5. Responsible local authorities and the Antiquities Authority would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures;
6. Decisions on how to handle the finding shall be taken by the responsible authorities from the Antiquities Authority;
7. Construction work could resume only after permission is given from the responsible local authorities and the Antiquities Authority concerning safeguard of the heritage.

These procedures must be referred to as standard provisions in construction contracts, where applicable. During project supervision, the site manager and HSE supervisor shall monitor the above regulations relating to the treatment of any chance find encountered are observed.

Relevant findings will be recorded in Monitoring Reports and Implementation Completion Reports (ICRs) submitted to the World Bank.

Annex 3: Public Consultations Report

The Public consultations report includes photos, attendance lists, and comments from the 3 scoping sessions and 11 public consultations. The report also includes advertisements and dissemination media used to publicize the consultations. Media articles and internet coverage of the events is also highlighted.

Due to its size, the PC annex is submitted as a separate document.

Annex 4: Proposed TORs for site-specific ESIAs

The proposed Terms of Reference for the 11 site-specific ESIAs are elaborations on the TORs provided by EGAS (and approved by the WB) for preparing the current ESIAF. The proposed TORs repeatedly refer to this ESIAF document as an important guideline for implementing the specific ESIA consultancies.

PROPOSED TERMS OF REFERENCE

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

FOR

NATURAL GAS CONNECTION PROJECT IN

(NAME OF GOVERNORATE) GOVERNORATE IN EGYPT

(MONTH) 2014

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

NATURAL GAS CONNECTIONS PROJECT IN (NAME OF GOVERNORATE) GOVERNORATE

CONTENTS

1. INTRODUCTION

In line with Egypt's energy diversification strategy, the Ministry of Petroleum is promoting the utilization of gas in all sectors with the implementation of major gas projects covering discovery, delivery and recovery searching for common interests among diverse participants and weaving these interests into a realistic broadly supported gas strategy.

The Government of Egypt recognizes the importance of the residential household natural gas connection program to improve the delivery of natural gas to the households with affordable prices, high safety measures and to replace the costly and troublesome LPG cylinders. In this regards, the Government of Egypt has an ambitious goal of providing access to 17 million households to the natural gas distribution networks in the coming few years.

EGAS, a state owned enterprise which works in the different activities of natural gas business is mandated to achieve the Government goals in connecting the residential households to the natural gas grid. EGAS aims to maximize household penetration of natural gas networks and has extensive plans for increasing the number of household connections by 800,000 annually during 2013/2014 and beyond.

This Gas Connection Project is an integral part of the Government's on-going program to connect households and other users to the natural gas network. The Project has identified (number of districts or project areas in the target governorate) Districts and villages in (name of target governorate) Governorate, with a target of connecting (number of customers identified by the property & appliance survey) customers (households).

LOCATIONS OF pressure reduction stations, buildings meeting connection criteria, exact paths of high-pressure pipelines, gas connections and distribution networks have been determined. This selection is mainly based on property and appliance (P&A) surveys which involve the following components:

- Obtaining the latest aerial maps of the project areas from the Egyptian Survey Authority
- Identifying Global Positioning System (GPS) coordinates of the sites
- Locating each road and building and inserting them on the corresponding map
- GPS team developing a land survey map to be used by the P&A survey team to generate a unique customer reference number (C.R.N) based on building, block, and sector
- Associating the final (C.R.N) with the customer name, address, appliances, and data.
- Creating an isometric drawing for each building, location of service, and riser routes. Drawings are reviewed by the surveyors and delivered to the *Installations department*
- Entering data into a central database and G.I.S system for review by a *design team*
- Finalizing pipe sizing, type, regulator capacity & locations, routing, and number of appliances to be converted by the Design team

An Environmental and Social Impact Assessment Framework for the natural gas connections in the 11 governorates of the project has been prepared at an earlier stage. In addition to assessing environmental and social impacts of the 11-governorate project using the level of detail available at the time, the framework study also sets a "roadmap" for key issues to be addressed in the various components of the 11 site-specific ESIAs upon finalization of project detailing. The ESIAF is to be utilized as a guiding document in preparation of this study.

This TOR outlines the scope of the Environmental and Social Impact Assessment (ESIA) and the Environmental and Social Management Plan (ESMP) to be prepared for the entire project components and activities in the specified governorate highlighted in further sections of this TOR. Also, it requires the preparation of the necessary documents and regulatory approvals required by the funding institution as well as the Egyptian Environmental Affairs Agency (EEAA) and other relevant national authorities.

2. DESCRIPTION OF THE PROJECT

2.1 Objectives

The purpose of this Project is to connect (number of households anticipated by the P&A survey) households in (number of districts identified by the P&A survey) Districts, in (target governorate) Governorates to the natural gas grid instead of using LPG cylinders. EGAS is utilizing a loan provided by the International Bank for Reconstruction and Development (IBRD)/The World Bank (WB)/Agence Française de Développement (AFD) to execute this project. The strategic objectives of the project are:

- Reducing the financial and physical burden from the citizens who are suffering to get the LPG cylinders with high cost and extensive efforts;

- Reducing the cost of subsidy paid to LPG cylinders and utilizing the savings in other development projects therefore giving a significant boost to the development process of the Egyptian economy;

- Significantly improve the safety measures in households by substituting the LPG cylinders with the safe and reliable natural gas connections;

- Improving the public health and environmental conditions through the utilization of natural gas as considered a relatively clean fuel.

A detailed description of the Project components, activities, geographical coverage, and execution arrangements are presented in Annex 1 of this TOR.

3. REQUIREMENTS FOR THE ESIA

Along the guidelines outlined in the ESIA Framework Study, the specific objectives of this assignment study are to:

- Establish and describe the baseline of existing environmental and social conditions in the Project area based on baseline components recommended in the baseline chapter of the ESIA Framework study, outcomes of the P&A survey, publicly available information, official secondary data and information source and supporting field surveys;
- Identify the potential environment and social impacts resulting from the Project during construction and operation;
- Assess the significance of impacts and propose mitigation measures that will eliminate or reduce the negative impacts to the public and the environment;
- Enhance the positive environmental and social impacts of the Project

- Provide the basis for consultation and communication with the regulatory authorities, funding institution(s), the public and other stakeholders, as appropriate.
- Develop an environmental and social impact assessment for the mitigation of the potentially negative impacts and for monitoring compliance with the relevant environmental laws and regulations.

The ESIA shall address the guidelines set out in the ESIAF and conform to the requirements of The World Bank Environmental and Social Safeguards Operational Policies and Procedures as well as the Egyptian laws and/or regulations on environmental reviews and impact assessment, and any other pertinent environmental requirements, as they relate to this project.

3.1 National requirements

According to the Egyptian Environment Affairs Agency (EEAA), natural gas connection to households and its associated infrastructure are classified as Category "C" which requires the preparation of a comprehensive environmental impact assessment (EIA). The EIA shall be submitted to the competent authority, EGAS and forwarded to EEAA for review and approval. Public hearing is required for all Category "C" projects.

3.2 The World Bank requirements

According to the World Bank Operational Policy OP 4.01 on Environmental Assessment, the project is classified as Category "A" which is equivalent to the EEAA Category "C" projects. This requires the preparation of comprehensive environmental and social impact assessment accompanied by a thorough consultative process.

During preparation of the ESIAF, situational analysis and discussions between WB experts, EGAS, and the E&S consultant have agreed that the following WB policies may also be triggered according to project components and their impact on physical, biological, and socioeconomic environment of the target governorate.

OP 4.11 – PHYSICAL CULTURAL RESOURCES

OP 4.12 – INVOLUNTARY RESETTLEMENT

(Further information on the Bank's safeguards policies can be obtained from the Bank's Safeguards website (http://www.worldbank.org/safeguards)

4. SCOPE OF WORK AND SPECIFIC TASKS

The Consultant is required to carry out the environmental and social impact assessment of the project, and prepare the ESIA Report, in accordance with the World Bank Operational policies and the EIA guidelines of the EEAA as indicated above. The consultants would be guided by the following scope and are expected to fulfill the following tasks, as a minimum, to achieve the objectives of the assessment:

4.1 Scoping

At the beginning of the assignment, scoping central consultation session should be arranged for thorough discussion with representatives of various competent authorities and stakeholders from the targeted Governorate. This scoping aims to explain the scope of the ESIA/RPF[1], the project description and the similarities and differences between the present project and other similar projects implemented in Egypt in particular the Greater Cairo natural gas connection which EGAS is currently implementing. The scoping central consultation session also aims at identifying, early on in the process, any environmental/social/safety aspects that may not have been included in the scope of work which the stakeholders raise. This process will provide a basis for reviewing the issues that should be considered in the ESIA. It is expected that the issues may include advance announcement of construction in the different areas, traffic, air and noise disturbances. The changes in the project in terms of the project environmental mitigation plan and how this plan will be implemented will be discussed.

The findings of the scoping and the recommendations/comments of stakeholders should be reflected in the study and elaborated in details in the Public Consultation Chapter.

This meeting will be arranged by EGAS/Town Gas/Egypt Gas in coordination with the concerned relevant national and local authorities.

Tools and stakeholders to be engaged:

Efforts should be made to maximize diversity of the groups of stakeholders engaged in the scoping of the study. Stakeholders on the District (Markaz) and Governorate levels should be engaged. Moreover, samples of stakeholders of the Markaz/Cities/Villages where the project will be implemented should be represented in the scoping discussions.

More importantly, organizers of the scoping events (whether group sessions or individual meetings) should ensure Project Affected Persons and organizations/assemblies which represent them or their interests are thoroughly represented and consulted.

As outlined in the ESIAF, installation and routing of key project components (steel HP pipelines, Polyethylene distribution pipelines, and Pressure Reduction Stations) may require land acquisition/purchase or pipeline intrusion/excavation/installation through privately-owned land or squatter areas.

[1] A separate ToR is provided for the Resettlement Policy Framework study

The scoping process for the preparation of the study should be adaptable to the cultural specificities and the current developments in the country. Where applicable, the scoping meetings should be properly and publicly advertised to ensure wide participation. In the meantime, other tools, apart from plenary scoping sessions, could be employed.

For more details about the scoping consultations, which is an integral part of both the ESIA and RPF studies, please refer to section 7 of the TORs.

4.2 Data Collection

Coinciding with the scoping for the environmental and social impact assessment, data will be gathered on the characteristics of each Governorate, district (Markaz) and town/village to be connected. Because of the extensive geographical extent of the project, the consultant is advised to utilize, to the extent possible, existing data and information. Special attention should be paid to data collection from areas approved for gas connections by the Property and Appliance survey which is carried out by EGAS/Town Gas/Egypt Gas. In addition, data must be collected from areas adjacent to the final routes of the high pressure steel pipelines and the final locations of the Pressure Reduction stations. Relevant data components are outlined in the ESIAF and later on these TORs.

For socioeconomic baseline data primary data collection should be utilized during the site-specific ESIAs. The proposed tools are: i) a structured questionnaire that should be applied with 500-1000 households within the vicinity of the project areas. Sample size should be based on scientific sampling approach. A random sample should be selected based on the total number of connections in each district and governorate. ii) the second tool to be adopted is the group discussion with the community people. iii) the third tool is an in-depth guideline to be applied with the governmental and non-governmental organizations. Such tools should cover the following indicators:

1- Household characteristics
2- Economic wellbeing and wealth index indicator
3- Type of fuel used for cooking and water heating
4- Perception of the community towards the project
5- The willingness and affordability to pay
6- The project affected persons and vulnerability
7- Compensation mechanism
8- Citizen engagement strategy

4.3 Analysis

Subsequent to gathering of data, the environmental and social issues will be assessed in terms of the environmental and social risks and benefits associated with the project. The consultant will provide an overview of the anticipated safeguards issues, both environmental and social, for the entire gas connections, distribution networks, Pressure Reduction Stations (PRS) and high pressure gas transmission lines.

The ESIA shall address the issue of alternatives by summarizing and referencing the alternatives in a manner consistent with national and international guidance. The analysis will include the

benefits and impacts expected from the project, and other technical and economical alternatives, including the "no action" alternative, and evaluate the environmental and social advantages and disadvantages of each alternative.

The consultant will also develop screening criteria for the areas to be connected through identification of potential impacts, including disturbance, by outlining, with EGAS, appropriate procedures which will include identification, recording, reporting, monitoring and auditing of implementation.

Specific focus of the study shall include, but not limited to, the following aspects:

- **Traffic disturbance:** Egyptian regulations require that the street has to be six meters or wider in order not to interfere with other utility infrastructure (e.g. electricity, water, telecom, etc). There may be temporary disruption of access by traffic to and from concerned streets. There may also be temporary increases in traffic due to delivery of materials and slow down of traffic in work areas.
    - identify potential traffic disturbance using appropriate procedures including recording, reporting, monitoring and auditing of implementation in high traffic areas.
    - Use criteria to formulate mitigation measures envisaged for traffic disturbances.
- **Air and noise disturbance:** There may be dust from topsoil removal, trench excavation and backfilling from the construction and from storage of excavated soil. There may also be noise from construction (e.g., vehicles and equipment, materials loading and offloading, pipe cutting and welding, pipe stringing, etc) which may cause nuisance where near to homes and businesses.
    - Identify sources for air and noise emissions;
    - Identify sensitive receptors to air and noise pollution
    - Develop mitigation measures for eliminating/reducing air and noise emissions from different sources and minimize impacts on sensitive receptors
- **Solid and hazardous wastes:** this may be generated due to the excavation of soils, pipe cutting, use of construction material, worker and engineer offices…etc. Types of wastes should be classified into hazardous and non-hazardous and avoid any littering to the surroundings. Also, solid wastes should be properly stored and disposed off.
    - Identify the types and quantity of wastes generated on site during construction
    - Prepare a management plan for hazardous and non-hazardous wastes to ensure proper handling, storage, possible reuse/recycle and final safe disposal
    - Maintain records for wastes generated and disposed off

- **Structural integrity of existing buildings:** There may be some impacts on existing buildings from construction activities. Egyptian regulations have specific criteria on the premises to be connected such as material of the premise for safety reasons.

    - Document local requirements and restrictions in terms of construction near and/on public buildings

    - Develop criteria for buildings to avoid

    - Document least intrusive methods

- **Cultural heritage:** Potential impacts on historic or cultural heritages sites, especially in Upper Egypt districts, must be assessed prior to final selection of households to be connected. Considering the rich historical background of some districts, procedures to deal with chance finds will be developed-(***World Bank's Safeguard Policies and Operational Procedures OP/BP 4.11 on Physical Cultural Resources will apply***).

- **Socioeconomic:** The project will likely have positive social impacts such as reduction in traffic from deliveries of fuels (e.g. LPG cylinders), reduced dust and emissions from fuel delivery vehicles, increased convenience, elimination of manual handling and disconnection/re-connection of LPG cylinders, reduced hazard due to physical characteristics of natural gas compared to LPG and safety.

The project may involve negative impacts as well, such as the impacts associated with temporary and permanent land use, affordability of poor household to gas connection, workers who are current working on production and transportation of LPG cylinders laid off.

The gender implications of the project, such as the differentiated impacts on men and women of time use, reduced health risks, increased convenience, etc.

The ESIA should examine the main positive and negative social impacts as mentioned above and include:

    - The principles, rules, guidelines and procedures to assess and mitigate the negative social impacts

    - The plans and measures to enhance the positive impacts.

- **Occupational Health & Safety measures during construction:** worker health safety issues may arise due to the different civil and mechanical works that will take place. Risks of injuries and other serious accidents may occur if health & safety measures are not followed and practiced.
    - Provide adequate induction training for all workers on site
    - Ensure that all health and safety measures are strictly followed by all personnel on site
    - Provide the construction site and the workers with necessary health and safety equipment

- Maintain records for accidents/incidents
- Analyze accidents/incidents and implement action plans to prevent/reduce accidents

5. ESIA REPORT

An Environmental and Social Impact Assessment report for the project will be developed in a manner complying with the World Bank, national legislations as well as other applicable international regulations The report should be concise and limited to significant environmental and social issues.

The ESIA should focus on the key environmental, social as well as health & safety issues and codes of practice to be adhered to during the construction and operation of the project. The level of analysis of individual issues in the ESIA should reflect the level of significance of the potential. The information in the ESIA should be accurate and presented clearly and concisely. The general and specific descriptions provided herein should not be interpreted as excluding from consideration any matters that are currently unforeseen, may arise during the Project design, execution or the community consultation process and associated documentation. The ESIA shall be conducted using international best practices, Egyptian requirements and the World Bank performance standards.

The report will, at minimum, cover the following topics:

- Project description;
- Regulatory review: legislations, standards and requirements relevant to the Project;
- Environmental and Social baseline review
- Identification and assessment of environmental and social impacts,
- Analysis of Alternatives and Mitigation Measures
- Environmental and Social Management Plan
- Consultation with the Public: process, disclosure and outcomes.

A draft report will be issued for review and comment after which a final report will be issued.

The following sections indicate the main outputs expected from the analysis to be included in the report:

5.1 Introduction

This section will state the purpose of the terms of reference, identify the development project to be assessed and explain the executing arrangements for the environmental assessment. It may include background information which provides a brief description of the major components of the proposed project, a statement of the need for it and the objectives it is intended to meet, the implementing agency, a brief history of the project (including alternatives considered), its current status and timetable, and the identities of any associated projects. Summary of the general scope of the environmental assessment may be included.

5.2 Description of the Proposed Project

This section will provide a brief description of the relevant parts of the project, using maps (at appropriate scale) where necessary, and including the following information: areas to be connected, description of dwellings to be connected and their suitability, size of infrastructure involved, capacity, etc.; pre-construction activities; construction activities; schedule; staffing and support; facilities and services; operation and maintenance activities. Information included in this task will be provided by EGAS, Town Gas and Egypt Gas. This section should illustrate the land requirements by the various project components.

As outlined in the ESIA Framework report, the following components should be included in the Project description of the ESIA, as applicable:

- Existing high pressure lines (HP), Pressure Reduction Stations (PRSs), Connected zones within the project area, if any
- Results of the Property and Appliance Survey (areas meeting technical criteria, area excluded from connections, number of anticipated households to be connected, maps)
- Routes/alignments of new HP lines and related installations (such as electric protection against corrosion), if any
- Locations and specifications of Pressure Reduction Station(s), if any
- Land requirements and temporary intrusions on private land
- Number of households eligible for connections in the area
- Routes/alignments of the local interconnection networks
- Specifications and types of materials to be used for project components in the area
- Equipment and vehicles to be used during the construction phase
- Specifications and emissions of the equipment to be used in the area
- Assigned temporary storage areas for materials and equipment
- Description of the activities of the construction phase
- Work plan for excavations and restoration (re-pavement)
- Typical daily work schedules during the construction phase
- Local Socioeconomic considerations

5.3 Legislative and Regulatory Considerations

This section will describe the pertinent regulations and existing codes of practice and standards governing environmental quality, health and safety, protection of sensitive areas, protection of endangered species, siting, land use control, etc., at international, national, regional and local levels. This section should also present the safeguard policies of the Bank that will be triggered as part of the project.

The consultant should review and familiarize with the World Bank's ten safeguard polices and comment on the ones which are/should be triggered by this project. The consultant should identify the impacts and provide mitigating measures for each applicable safeguard policy[2]. During the preparation phase for this Project, three Operational Policies have been triggered: OP 4.01 on Environmental Assessment, which is triggered, OPs 4.11 for Physical Cultural Resources and 4.12 on Involuntary Resettlement.

The Legal framework chapter in the ESIAF is meant to shed light on the most relevant environmental and social legislations and regulations which the project should adhere to and take mitigation actions to comply with. These should be revisited and updated in this ESIA according to the detailed features of the Project.

5.4 Description of the Environment

This section will assemble and evaluate data on the relevant environmental characteristics of the project area. It will include information on any changes anticipated before the project commences.

- Physical environment: demography and degree of urbanization; land use permits and plans, plans for further development.

- Socio-economic baseline (include both present and projected where appropriate): community structure; employment; distribution of income, goods and services; recreation; public health; cultural prosperities. In addition to presenting Governorate-level information, this section should be focusing, to the extent possible, on the localities/districts (Markazes) where the project will be implemented. This section should be looking at the groups that could be negatively affected from the project (e.g. LPG cylinders sellers)

Review of impact on various vulnerable groups including the elder and others of special needs: Given the changes proposed by the project and in particular the elimination of the manual handling, collection and disconnection/re-connection of LPG cylinders, the project is likely to have important positive impacts on the disabled. The study should thus include a review of the expected project impacts on the disabled, and a discussion of how the installation of direct household connections will meet the needs of the disabled.

[2] Details on the triggering of the safeguard polices are available in World Bank's Guidebooks.

In addition to the abovementioned baseline data (and with special focus on the outputs of the P&A survey), the following table presents the baseline components of high relevance to the project and a non-exhaustive listing of suggestions on the best sources of relevant data.

Component	Proposed data sources	Governorates potentially sensitive to component
Traffic	- Studies/data by the technical departments of the Ministry of Interior - Local police and traffic authorities in the project area - Interviews with dwellers in the project areas - Studies and maps from the General Organization for Physical Planning (GOPP)	- All 11 governorates
Air quality	- Field measurements around equipment and machinery directly prior to commencement of project activities	- All 11 governorates
Noise	- Field measurements at source and at sensitive receptors directly prior to commencement of project activities	- All 11 governorates
Underground utility lines and piping	- Data collection and acquisition of updated documents from the central and regional offices of the Potable Water and Wastewater Authority; the Electricity Holding and Transmission Companies; the Ministry of Telecommunications - Field surveys and mapping in the presence of representatives of the above entities - Interviews with locals and residents of the project areas - Using non-destructive remote sensing technologies - Using limited/exploratory boreholes	- All 11 governorates
Weak structures	- Field surveys and mapping building-by-building - Consulting structural specialists in areas with clear signs of vulnerability - GOPP reports and maps related to conditions of structures	- All 11 governorates
Culturally-valuable sites and antiquities	- Coordination with the central and regional offices of the Supreme Council of Antiquities - Consultations with locals and project areas residents - Field surveys and mapping	- Aswan, Qena, Sohag, Giza, Ismailia, Matrouh, Alexandria

Component	Proposed data sources	Governorates potentially sensitive to component
Solid, liquid, and hazardous waste disposal sites	- Field investigation - Acquisition of maps and data from local government units and relevant offices - Data/maps from the Egyptian Environmental Affairs Agency (EEAA) - Data and maps from the GOPP - Interviews with locals and residents - Interviews with certified waste management companies and local service providers - Interviews with informal waste handlers / scavengers "النباشين" - Interviews with operators of the Nasreya and UNICO hazardous waste treatment facilities in Alexandria	- All 11 governorates
Geological and geotechnical history of the area	- Field surveys and geotechnical investigations - Interviews with locals and project area residents - Data collection and map acquisition from local government units - Geotechnical Due Diligence in areas close to water bodies or zone of high underground water tables	- Qena, Alexandria and Delta governorates
Government-owned land	- Field surveys and land mapping for placement of PRSs - Obtaining documents and maps from the Property of the Country "Amalak El Dawla" office in the local government or Markaz unit	- All 11 governorates
Protected Areas and sensitive ecological systems	- EEAA Protected Areas sector - Environmental profile of the governorate	- Probably none of the 11 governorates but due care should be given to possible upsets to ecological systems other than official Protected Areas during installation of the HP pipelines as they are usually located outside populated areas
Cultural, social, and political traits	- Field investigations - Interviews with locals and project area residents - Interviews with government officials and relevant stakeholders	- All 11 governorates

Component	Proposed data sources	Governorates potentially sensitive to component
Restoration and Repavement plans	- District local authorities - Data collection from the Directorate of Roads and Bridges	- All 11 governorates
Growth, future land use, and planned developments	- GOPP reports, data, and maps - Urban/physical planning offices of the Governorate	- All 11 governorates

It should be noted that some of the data above may simply be unavailable or incomplete despite having been implemented fully by a government and/or private entity. In such cases, the implementing company must generate the data using the necessary means (field investigations, measurements, stakeholder engagement, etc).

5.5 Analysis of Alternatives to the Proposed Project

This section will describe alternatives that were examined in the course of developing the proposed project and identify other alternatives which would achieve the same objectives. The concept of alternatives extends to siting, design, technology selection, construction techniques and phasing, and operating and maintenance procedures. It will compare alternatives in terms of potential environmental and social impacts and suitability under local conditions.

On the alternatives part, in other words, the analysis should include an analysis of reasonable alternatives to meet the ultimate objectives of the project. Such alternatives should include e.g, alternative ways of meeting the demand for energy (e.g. alternative fuels or electricity), alternative design and alternative implementation arrangements.

5.6 Analysis of Impacts

This section will distinguish between significant positive and negative impacts, direct and indirect impacts, and immediate and long-term impacts. It will identify impacts which are unavoidable or irreversible. Wherever possible, it will describe impacts quantitatively.

The analysis of impacts should be studied during the different project phases (e.g. construction and operation). Attention should be given to the environmental, social, health & safety impacts of the project during operation for example risks of gas leakage from pipelines and noise generated from PRS operation. For this and all other significant impacts, appropriate mitigation measures should be developed as part of the ESMP.

In examining the social impacts of the project, the analysis should be sensitive to communities' diversities. Impacts are affecting various groups differently and this should be reflected in the

analysis. Special attention should be given to the vulnerable groups including poor households and those who could be negatively affected from the project.

The safety risks associated with the operation of PRSs should be assessed for the workers and the public at large using Quantitative Risk Assessment (QRA) modeling and the results have been compared with international risk acceptance criteria "As Low As Reasonably Practical – ALARP".

The QRA should be performed for a typical PRS with odorant. The following risks should analyzed:

- **Flammable gases dispersion (Gas Clouds) ;**
- **Flash fires; and**
- **Jet fires.**

Factors to be considered in preparing the QRA:

- Type and access to PRS area
- Wind and meteorological data
- Gas release rate and leak size based on various hole sizes
- Jet fire (flame length) based on multiple pressure ratings
- Gas dispersion distances and flammability range of the released gas cloud
- Heat radiation from flash fires
- Hazards of possible types of fires
- Extent and characteristics of damage distances

Risks should assessed for the industrial workers and general public representing the two types of risk namely the "Individual Risk" and "Social Risk" within the PRS.

Safety precautions should be detailed for design, operation and maintenance of PRS facilities.

5.7 Environmental and Social Management Plan

This section provides details on the management initiatives and on the measures to be implemented during both the construction and operational phases of the project. The purpose of the ESMP is to: (i) outline the procedures for the environmental and safety assessment of the connectivity process and the codes of practices to be applied; (ii) ensure an appropriate level of consultation and disclosure takes place; and (iii) to ensure systems and resources are in place for the successful monitoring of the management program.

Special attention will be given to the implementation and monitoring of the activities related to Involuntary Resettlement Policy in accordance with the requirements of the World Bank OP 4.12. Outcomes from the RPF study should be cross referenced in the ESMP.

A grievance redress mechanism (GRM) should be designed and made operational prior to the construction activities. The study should be proposing tools for this purpose. The mechanism should be simple, accessible and responsive to local complaints. EGAS should be securing

human resources at both Head Quarters and local level to allow for efficient functioning GRM system. The mechanism will be used for handling any environmental, social or resettlement project related concerns.

The ESMP will have three main components:

(i) Environmental guidelines and procedures

These guidelines and procedures will be used for the application of the proposed mitigation measures during the construction and operation phases in the various districts and areas of implementation.

- World Bank guidelines present the key aspects of the mitigation plan.

(ii) Monitoring program:

This section will prepare a detailed plan to monitor the implementation of mitigating measures and continuously monitor the impacts of the project during construction and operation. Costs of the monitoring facilities and mitigation measures will be estimated.

- Monitoring should aim toward achieving the optimal operation performance as consistently as possible. This will require adhering to safety measures and minimizing impact during construction.

(iii) Institutional arrangements

This section will review the authority and capability of institutions at local, regional, and national levels and recommend steps to strengthen or expand them so that the management and monitoring plans in the environmental assessment can be implemented. The costs and sources of funds for the proposed measures and any training requirements for capacity building in the field of environmental and social safeguards should be specified.

- Institutional responsibilities for environmental and social management of the gas connections project.

- Responsibilities for occupational health and safety during construction and operation

5.8 Inter-Agency Coordination and Public/NGO Participation:

This section will describe the process that will result in coordinating the environmental assessment with other government agencies, consulting, obtaining the views of local NGO's and affected groups, and keeping records of meetings and other activities, communications, and comments and their disposition. The process of consultation will follow the requirements of the World Bank OP/BP 4.01, as described in Section 6 of this TOR.

6. CONSULTATION AND DISCLOSURE

The project is category A project according to the Bank environmental screening. As stipulated in OP/BP 4.01 on Environmental Assessment, Category A projects, the borrower consult with project-affected groups and local nongovernmental organizations (NGOs) about the project's

environmental aspects and takes their views into account. This should be done at least twice: (a) shortly after; and (b) once a draft ESIA report is prepared. In addition, the borrower consults with such groups throughout project implementation as necessary to address ESIA-related issues that affect them.

It is also essential that proper and newspaper announcement for the consultation session(s) should take place at least one week in advance of the event. Relevant materials that will be used during the consultation session (s) should be made available to all participants in Arabic ahead of the meeting.

Site specific consultation efforts should include all concerned stakeholders – be they persons/households affected by the project activities, civil society organizations representing the interest of the community, or regulatory and governmental bodies who will play a role in facilitating or regulating the implementation of project activities.

Consultation activities are expected to differ according to the targeted governorate and stakeholder groups in relation to the foreseen impacts affecting them. The consultant will decide on the most appropriate consultation tool to reach out to the different stakeholders.

While WB safeguards and regulations state that a minimum of two large-scale, well-publicized public consultation sessions are a must for projects classified as category 'A' projects like the one at hand[3], additional consultation efforts (for example through focus group discussions, in-depth meetings, and interviews) are needed to reach the most vulnerable and difficult to reach community members. Additionally, in order to obtain larger scale and more quantifiable information, the consultant may wish to resort to conducting surveys in the different sites.

It is recommended to classify the stakeholders under the following groups (to be revised during preparation of the site-specific ESIAs):

- Direct beneficiaries, Project Affected Persons (PAPs)
- Local Governmental entities
- Other governmental entities
- Media
- NGOs working on environmental and social related aspects
- Universities and Educational institutes
- Other
- Community people
- Natural Gas companies

[3] Clause 14 of OP 4.01 states that: "For all Category A and B projects proposed for IBRD or IDA financing, during the EA process, the borrower consults project-affected groups and local nongovernmental organizations (NGOs) about the project's environmental aspects and takes their views into account. The borrower initiates such consultations as early as possible. For Category A projects, the borrower consults these groups at least twice: (a) shortly after environmental screening and before the terms of reference for the EA are finalized; and (b) once a draft EA report is prepared. In addition, the borrower consults with such groups throughout project implementation as necessary to address EA-related issues that affect them."

The following table suggests stakeholders to take into consideration while conducting site-specific consultation efforts in relation to the different foreseen impacts and project activities.

#	ACTIVITY	IMPACT	STAKEHOLDER/S
1.	Construction of Pressure Reduction Stations (PRSs)	• Affecting the livelihoods of farmers as a result of using cultivated lands • Temporary or permanent Land Appropriation	• Agricultural land owners • Workers employed in agriculture • Land owners • Relocation candidates
2.	Installation of Gas Transmission Connection (High Pressure Pipelines)		
3.	Installation of Gas Distribution Network	• Impact on businesses • Impacts on traffic	• Business & shop owners • Residents • Drivers (Microbus, Taxi, TucTuc…)
4.	Installation of Household Connections	• Threat to Safety of users and houses (due to limited level of awareness and misconceptions) • Visual intrusion • Financial burden on consumers (of installments due to accumulation of fees /installments collection resulting in financial burden on consumers • Impact on the informal LPG distributors • Possibility of gas leakage • Concerned community members who do not meet the criteria for installing NG connections ('no gas areas')	• Civil society organizations and NGOs • Community leaders • Residents • LPG salespeople • Companies housing employees • Representatives from Community Health workers at the Ministry of Health (برنامج الرائدات الريفيات) • Ministry of Social Solidarity-community social workers • Local media
5.	Stakeholders relevant for all stages of implementation/ Project activities	• Miscellaneous	• EGAS • Supreme Council of Antiquities • Municipalities • Relevant infrastructure services authorities (water/sanitation, electricity) • Governorate representatives • Potential local construction employees and young people

6.1 Consultation[4]

The following presents the consultation activities expected to be delivered as part of the process of preparing the ESIA.[5]

A-1) Scoping phase (first public consultation)

Activity	One central scoping consultation session for the project to be held in the capital city of the governorate or a city equi-distant from project areas in the governorate. EGAS should be arranging this event on the central level due to the wide geographic scope of the project and the fact that the project is considered as a national project.
Timing	Once the ESIA assignment is launched
Objectives	Present the ESIA ToR and get the views of relevant stakeholders on the scope and the plan of the consultant
Participants	Balanced representative from range of stakeholders of governmental and non-governmental agencies from the central level and the targeted governorates
Venue	A conference hall (details should be determined by EGAS and the Consultant)
Requirements for advertisements	Advertisement to be published as "Public invitation" in one of the national newspaper announcing the date and venue of the event. The announcement should take place at least one week in advance of the event. In the meantime, EGAS should be directing invitation to relevant stakeholders as needed.
Materials for distribution	Relevant materials should be made available to all participants, in Arabic, ahead of the meeting.

A-2) The preparation phase

Activity (ies)	As per the ToRs of the Consultant, different consultation, including interviews, surveys and focus group discussions, should be carried out on the Governorate and Markaz level by the Consultant as stipulated in the ToR.
Timing	During the preparation of the ESIA
Objectives	Strengthen the level of local stakeholders' participation in planning for the project by allowing a space for discussing the details of the project, the potential environmental and social impacts of the project during the construction and operation and get stakeholders views on the type of appropriate mitigation measures.
Participants	• Governmental organizations on the Governorate and Markaz level • Local NGOs • Local communities and affected persons (if known)

[4] Consultation activities for the preparation of the ESIA could be combined with the consultations of the RPF

[5] This process is also required during the preparation of the RPF study.

	• Other relevant stakeholders
Venue	The selection of the venue of the conducting these activities is flexible and left to the Consultant and EGAS. The selected place should be of neutral nature to allow stakeholders to participate freely. Meetings and groups' discussions could be conducted in wide range of local venues, including but not limited to, Community Development Associations (CDAs), local hall or youth centers.
Requirements for advertisements	Not needed

A-3) Presenting the draft ESIA (second public consultation)

Activity (ies)	All project areas should be included and covered to ensure the draft findings of the studies are consulted upon on the Governorate level. The Consultant is encouraged to propose innovative, time and cost efficient approach to plan for and implement highly engaging consultation without jeopardizing the quality and outcomes of the activities.
Timing	Once the Draft ESIA is ready
Objectives	Present the draft ESIA findings and get the feedbacks and views of stakeholders and integrate them in the final studies.
Participants	All the requirements of the WB and EEAA in terms of the representation of stakeholders to participate in the event should be considered. Main categories to be present in the events are: • Governmental organizations on the Governorate and Markaz level • Local communities and affected persons (if known) • Local NGOs • Media • Private sector • Academia, consultants and research centers • Other relevant stakeholders
Venue	Conference hall(s) in neutral place to be determined by the Consultant in consultation with EGAS on case by case basis.
Requirements for advertisements	Advertisement (s) to be published as "Public invitation" The advertisement (s) should be made on local newspaper or widely prevailing national newspapers announcing the date and venue of the event. The announcement should take place at least one week in advance of the event. In the meantime, EGAS should be directing invitation to relevant stakeholders as needed.
Materials for distribution	Relevant materials should be made available to all participants, in Arabic, ahead of the meeting.

Documentation requirement for the consultation activities

For all the activities explained above, EGAS needs to ensure sufficient documentation to be used to support the produced safeguards documents at each of the stages. This includes, but is not limited to, photographs, videos, meetings transcripts, newspapers announcements registration sheets, etc.

6.2 Disclosure

After the ESIA is consulted upon, concerns and comments from the consultations are addressed, the ESIA obtain the approval of the Bank. After the Bank approval, the following documents should be disclosed in country and in the Bank infoshop:

- ESIA (Full version – English Language)
- ESIA (Full version – Arabic Language)
- ESIA (Executive Summary – English Language)
- ESIA (Executive Summary – Arabic Language)

7. QUALIFICATIONS AND EXPERIENCE OF THE ESIA TEAM

The assignment will be carried out by a specialized consulting firm. The team of selected experts should, at least, cover the following areas of expertise and knowledge:

- Environmental Assessment
- Solid waste / hazardous waste management
- Archaeological, Historic and Cultural Heritage.
- Occupational Health, Environment and Safety issues
- Socio-economic development.
- Traffic assessment

8. FACILITIES TO BE PROVIDED BY CLIENT

The consultant shall be provided with project document, studies already conducted for the project including RPF and participatory strategy. The client may also facilitate meeting with stakeholders for the consultant to give legitimacy and support from the key stakeholders.

9. ACTIVITIES, AND TIME SCHEDULE

	Week	1	2	3	4	5	6	7	8	9	10
	Activity										
1	Scoping and first round of consultation(s)	C									
2	Baseline environmental and social surveys										
3	Draft ESIA preparation and submission					D					
4	Client review										
5	Second round of consultation(s)						C	C	C		
6	Draft Final ESIA submission								DF		
7	Client review										
8	Final ESIA production and disclosure										F

C: Consultation D: Draft report

DF: Draft Final report **F**: Final report

10. DELIVERABLES

The ESIA report shall be delivered according to the following Table:

	Revision	Language	Due Date (from contract awarding)	Number of Copies

				Hard	Digital
1	Draft	English	5 Weeks	2	2
2	Draft Final	English	8 Weeks	5	2
3	Draft Final	Arabic	8 Weeks	5	2
4	Final	English	10 Weeks	5	2
5	Final	Arabic	10 Weeks	5	2
6	Final (Executive Summary	English	10 Weeks	5	2
7	Final (Executive Summary)	Arabic	10 Weeks	5	2

Notes:

- The Draft Final ESIA should include a concise Executive Summary and should have all annexes and bibliography and the dissemination/disclosure plan.
- Only Final versions of hard copies shall be submitted in Color format if needed
- Digital copy of all pictures taken during the preparation of this report will be submitted separately in an organized manner with appropriate tagging

11. ANNEX: BRIEF DESCRIPTION OF THE PROJECT

11.1 Project Execution and Geographical Scope
11.2 Design Works
11.3 Procurement and Stores
11.4 Construction
11.5 Project Components
(a) Pressure Reduction Stations (70/7 Bar PRS)
(b) Distribution networks, external & internal installation and conversion medium & low pressure networks
11.6 Time Schedule