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Report No: 65538-EG

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF US\$585.4 MILLION

TO THE

ARAB REPUBLIC OF EGYPT

FOR A

HELWAN SOUTH POWER PROJECT

June 3, 2013

Energy and Environment Unit
Sustainable Development Department
Middle East and North Africa Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective April 30, 2013)

Currency Unit = Egyptian Pound (LE)
EGP 6.94 = US\$1

FISCAL YEAR
July 1 – June 30

ABBREVIATIONS AND ACRONYMS

AF	Additional Financing	GRM	Grievance Redress Mechanism
AFSED	Arab Fund for Social and Economic Development	HFO	Heavy Fuel Oil
ARAP	Abbreviated Resettlement Action Plan	HPP	Hydro Power Plant
BOO	Build-Own-Operate	HRSG	Heat Recovery Steam Generators
BOOT	Build-Own-Operate-Transfer	ICB	International Competitive Bidding
BTU	British Thermal Unit	IDA	International Development Association
CA	Contractual Agreement	IDB	Islamic Development Bank
CAS	Country Assistance Strategy	IFC	International Finance Corporation
CCGT	Combined-Cycle Gas Turbines	IFR	Interim Financial Report
CCGT	Combined Cycle Gas Turbine	IPF	Investment Project Financing
CCW	Closed Cooling Water	IPP	Independent Power Producer
CEPC	Cairo Electricity Production Company	ISN	Interim Strategy Note
CFL	Compact Florescent Light	ISO	International Organization for Standardization
CM	Concept Memorandum	JICA	Japanese International Corporation Agency
CNG	Compressed Natural Gas	KFAED	Kuwaiti Fund for Arab Economic Development
CPI	Cost Price Index	KM	Knowledge Management
CRC	Citizen Report Cards	Kwh	Kilowatt
CRCICA	Cairo Regional Center for International Commercial Arbitration	LNG	Liquefied Natural Gas
CSP	Concentrated Solar Power	LPG	Liquefied Petroleum Gas
CTF	Clean Technology Fund	MDB	Multilateral Development Bank
DA	Designated Account	MDTF	Multi-Donor Trust Fund
E&Y	Ernst & Young	MIGA	Multilateral Investment Guarantee Agency
EA	Environmental Assessment	MIS	Management Information Systems
EE	Energy Efficiency	MNA	Middle East and North Africa Region
EEA	Egyptian Electricity Authority	MoEE	Ministry of Electricity and Energy
EEAA	Egyptian Environmental Affairs Agency	MoF	Ministry of Finance
EEHC	Egyptian Electricity Holding Company	MSL	Mean Sea Level
EERA	Egypt Electricity Regulatory Agency	MW	Megawatt
EETC	Egypt Electricity Transmission Company	NCB	National Competitive Bidding
EEU	Energy Efficiency Unit	NGO	Non-Governmental Organization
EEUCPRA	Egyptian Electric Utility and Consumer Protection Regulatory Agency	NIB	National Investment Bank of Egypt
EGAS	The Egyptian Natural Gas Holding Company	NPV	Net Present Value
EGP	Egyptian Pounds	NREA	New and Renewable Energy Agency
EGPC	Egypt General Petroleum Corporation	OCC	Opportunity Cost of Capital
EIB	European Investment Bank	EIRR	Economic Internal Rate of Return

EMP	Environment Management Plan	OCC	Opportunity Cost of Capital
EMS	Environmental Management Staff	OFID	OPEC Fund for International Development
EMS	Environmental Management Staff	ORAF	Operational Risk Assessment Framework
EPS	Egyptian Power System Engineering Company	PCA	Procurement Capacity Assessments
ESIA	Environmental and Social Impact Assessment	PDO	Project Development Objective
ESMAP	Energy Sector Management Assistance Program	PFS	Project Financial Statement
ESPSP	Energy Sector Policy Support Program	PMU	Project Management Unit
EU	European Union	PPA	Power Purchase Agreement
FM	Financial Management	QRA	Quantitative Risk Assessment
FMS	Financial Management System	RAP	Resettlement Action Plan
FMU	Financial Management Unit	RE	Renewable Energy
FR	Financial Report	RPF	Resettlement Policy Framework
GASCO	Egyptian Natural Gas Company	RVP	Regional Vice President
GDP	Gross Domestic Product	SBD	Standard Bidding Document
GDP	Gross Domestic Product	SCADA	Supervisory Control and Data Acquisition
GEF	Global Environment Facility	SCAF	Supreme Council of the Armed Forces
GHG	Greenhouse Gas	SCE	Supreme Council for Energy
GoE	Government of Egypt	SMEs	Small and Medium Enterprises
		SOE	State Owned Enterprise
		TA	Technical Assistance
		UEEPC	Upper Egypt Electricity Production Company

Regional Vice President:	Inger Andersen
Country Director:	Hartwig Schafer
Sector Director:	Junaid Kamal Ahmad
Sector Manager:	Charles Joseph Cormier
Task Team Leader:	Waleed Saleh I. Alsuraih

ARAB REPUBLIC OF EGYPT
Helwan South Power Project

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PAD DATA SHEET
Egypt, Arab Republic of
EG - Helwan South Power Project (P117407)
PROJECT APPRAISAL DOCUMENT
MIDDLE EAST AND NORTH AFRICA
MNSEG

Report No.: PAD106

Basic Information			
Project ID P117407	Lending Instrument Investment Project Financing	EA Category A - Full Assessment	Team Leader Waleed Saleh I. Alsuraih
Project Implementation Start Date 27-Jun-2013		Project Implementation End Date 31-Dec-2018	
Expected Effectiveness Date 31-Dec-2013		Expected Closing Date 30-Jun-2019	
Joint IFC No			
Sector Manager Charles Joseph Cormier	Sector Director Junaid Kamal Ahmad	Country Director Hartwig Schafer	Regional Vice President Inger Andersen
Borrower: Arab Republic of Egypt			
Responsible Agency: Egyptian Electricity Holding Company			
Contact:	Eng. Mohamed Helmy Habib	Title:	Executive Director, Planning, Research, Power Projects
Telephone No.:	20-222616306	Email:	mhabib_eehc@yahoo.com
Responsible Agency: Egyptian Natural Gas Company (GASCO)			
Contact:	Eng. Ashraf Zaki	Title:	Chairman and Managing Director
Telephone No.:	20-2261711520	Email:	amzaki@gasco.com.eg
Project Financing Data(in USD Million)			
<input checked="" type="checkbox"/>	Loan	<input type="checkbox"/>	Grant
<input type="checkbox"/>	Credit	<input type="checkbox"/>	Guarantee
<input type="checkbox"/>		<input type="checkbox"/>	Other

Total Project Cost:	2404.40	Total Bank Financing:	585.40
Total Cofinancing:		Financing Gap:	0.00

Financing Source	Amount
Borrower	921.80
International Bank for Reconstruction and Development	585.40
Arab Fund for Economic and Social Development	193.50
Islamic Development Bank	449.90
KUWAIT Kuwait Fund for Arab Economic Development	213.80
OPEC Fund for International Development	40.00
Total	2404.40

Expected Disbursements (in USD Million)									
Fiscal Year	2014	2015	2016	2017	2018	2019	0000	0000	0000
Annual	53.00	105.00	157.00	154.00	116.40	0.00	0.00	0.00	0.00
Cumulative	53.00	158.00	315.00	469.00	585.40	585.40	0.00	0.00	0.00

Proposed Development Objective(s)

The project development objective is to increase power generation capacity in an efficient manner within the Borrower's territory.

Components	
Component Name	Cost (USD Millions)
The Helwan South Power Plant	2,168.90
Gas Pipelines	235.50

Institutional Data

Sector Board

Energy and Mining

Sectors / Climate Change				
Sector (Maximum 5 and total % must equal 100)				
Major Sector	Sector	%	Adaptation Co-benefits %	Mitigation Co-benefits %
Energy and mining	Thermal Power Generation	100		

Total	100		
<input checked="" type="checkbox"/> I certify that there is no Adaptation and Mitigation Climate Change Co-benefits information applicable to this project.			
Themes			
Theme (Maximum 5 and total % must equal 100)			
Major theme	Theme	%	
Financial and private sector development	Infrastructure services for private sector development	100	
Total	100		
Compliance			
Policy			
Does the project depart from the CAS in content or in other significant respects?		Yes []	No [X]
Does the project require any waivers of Bank policies?		Yes []	No [X]
Have these been approved by Bank management?		Yes []	No []
Is approval for any policy waiver sought from the Board?		Yes []	No [X]
Does the project meet the Regional criteria for readiness for implementation?		Yes [X]	No []
Safeguard Policies Triggered by the Project		Yes	No
Environmental Assessment OP/BP 4.01		X	
Natural Habitats OP/BP 4.04			X
Forests OP/BP 4.36			X
Pest Management OP 4.09			X
Physical Cultural Resources OP/BP 4.11			X
Indigenous Peoples OP/BP 4.10			X
Involuntary Resettlement OP/BP 4.12		X	
Safety of Dams OP/BP 4.37			X
Projects on International Waterways OP/BP 7.50		X	
Projects in Disputed Areas OP/BP 7.60			X
Legal Covenants			
Name	Recurrent	Due Date	Frequency
Implementation Arrangements	X		
Description of Covenant			
The Borrower shall ensure the adequate supply of fuel to Upper Egypt Electricity Production Company (UEEPC) for the operation of the power plant (Section I.A.5 of Schedule 2 to the Loan Agreement			

(LA)).			
Name	Recurrent	Due Date	Frequency
Institutional Arrangements	X		
Description of Covenant			
Egyptian Electricity Holding Company (EEHC)/UEEPC and Egyptian Natural Gas Company (GASCO) shall implement project activities in accordance with the Financial Management Manual, and shall maintain a Project Management Unit (Section I.B 1(a) and (b) of the Schedule to the EEHC Project Agreement (EEHC PA) and Section I.B (1) and (2) of the Schedule to the GASCO Project Agreement (GASCO PA).			
Name	Recurrent	Due Date	Frequency
Environmental and Social Safeguards	X		
Description of Covenant			
EEHC/UEEPC and GASCO shall implement the project in accordance with Environment and Social Impact Assessment (ESIA), ESI Management Plan (ESIMP), Site-specific EMPs, Resettlement Policy Framework (RPF), and Resettlement Action Plans (RAPs) (Section I.B 1(k) and (l) and Section I. E (1) of the Schedule to the EEHC PA; and Section I. E.(1) and (2) of the Schedule to the GASCO PA).			
Name	Recurrent	Due Date	Frequency
Environmental and Social Safeguards	X		
Description of Covenant			
EEHC/UEEPC and GASCO shall establish and make operational a grievance redressal mechanism prior to the commencement of project activities to address any issues that may arise in connection with the implementation of the RPF or RAPs (Section I.B 1(m) of the Schedule to the EEHC PA; and Section I. E.1(d) of the Schedule to the GASCO PA).			
Name	Recurrent	Due Date	Frequency
Environmental and Social Safeguards	X		
Description of Covenant			
In the event that land for the project is purchased by EEHC/UEEPC and GASCO from owners on a voluntary basis, EEHC/UEEPC and GASCO shall carry out adequate consultations, enter into contracts and address direct impacts, on people who may be adversely affected in accordance with the relevant RPF (Section I.E (3) of the Schedule to the EEHC PA; and Section I. E.(4) of the Schedule to the GASCO PA).			
Name	Recurrent	Due Date	Frequency
Environmental and Social Safeguards	X		
Description of Covenant			
EEHC/UEEPC shall ensure that the piece of land transferred to UEEPC by the Borrower for building the power plant shall be free from encumbrances and any adversely affected person shall be promptly rehabilitated and compensated in accordance with the principles set out in the RFP (Section I.E (5) of the Schedule to the EEHC PA).			
Name	Recurrent	Due Date	Frequency
Environmental and Social Safeguards	X		

Description of Covenant

EEHC/UEEPC and GASCO shall provide to the Bank for each semester a consolidated report on the status of compliance with the implementation of the respective ESIA, ESIMP, Site-specific EMPs RPF, and RAPs (Section I.E (4) of the Schedule to the EEHC PA; and Section I. E.(5) of the Schedule to the GASCO PA).

Conditions

Name	Type
Article V	Effectiveness

Description of Condition

The Implementation Agreements (the EEHC Subsidiary Agreement, the GASCO Subsidiary Agreement, and the UEEPC Agreement) have been entered into between the respective parties to each such Agreement.

Team Composition**Bank Staff**

Name	Title	Specialization	Unit
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John E. Besant-Jones	Consultant		London		
John Bowers	Gas Consultant				
Efstratios Tavoulaareas	Senior Operations Officer	5748-2068	Moscow		
Locations					
Country	First Administrative Division	Location	Planned	Actual	Comments
Egypt, Arab Republic of	Bani Suwayf	Muhafazat Bani Suwayf	X		

I. STRATEGIC CONTEXT

A. Country Context

1. **Egypt is undergoing a major political, economic, and social transition, which started in January 2011.** Socially inclusive economic development, job creation, poverty reduction, transparency, citizen participation, and governance have come to the forefront of the political and social debate. Experience in other countries suggests that such a transformation, fraught with significant risks and uncertainties, may unfold over a relatively long period and that external assistance during the transition – especially through investments in service delivery and economic infrastructure – can yield significant social and economic returns.

2. **The economic context of Egypt’s transition is proving to be a major challenge.** Following the Egyptian revolution, Egypt has been confronting low rates of economic growth – about two percent per annum in 2012, down from a high of seven percent in 2008. Unemployment rates are high – 13 percent nationally and youth unemployment increased to a record high of 41.4 percent for those between 20 and 24, and 25.3 percent for those between 25 and 29. Consistent with the low economic growth rates, public and private investments have fallen overall and in the power sector in particular. The growth in energy demand is slightly lower due to the economic downturn, but it is still significant at five percent per annum, in part driven by a growing population and a relatively low energy consumption baseline. As investments in energy generation have not kept up with sustained demand for electricity, load shedding and interruption in electricity supply are emerging as a critical service delivery issue for households, small- and medium-sized enterprises (SMEs), and industry overall – potentially feeding into citizen dissatisfaction on the one hand and further affecting economic growth on the other.

3. **Egypt’s fiscal and financial accounts are under stress.** The overall fiscal deficit reached 10.8 percent for FY12, a substantial increase compared to the 8.1 percent deficit in FY10. This increase is explained by lower than expected tax revenues due to weak growth, as well as higher spending on salaries, pensions, and fuel subsidies. Subsidies for fuel consumption have accounted for 18–20 percent of budget expenditures in recent years, amounting to 5–7 percent of Gross Domestic Product (GDP). As a result, public debt has increased to above 80 percent of GDP, mostly domestically held. On the external side, as capital flows reversed, the current account deficit also increased to US\$7.9 billion (3.1 percent of GDP) in FY12, reflecting (i) a trade deficit (which reached over twelve percent of GDP) due to much higher petroleum imports as well as (ii) a drop in tourism receipts. The balance of payments pressures were offset largely through sale of reserves, with some downward adjustment of the exchange rate. The Government of Egypt (GoE) has also received significant inflows from bilateral partners that have helped to address immediate liquidity needs. With that, external debt, which declined from a peak of 27.6 percent of GDP in FY06 to 13.1 percent in December 2011, experienced an uptick to 14.1 percent of GDP in December 2012. With reserves below three months of imports, the Government of Egypt is in active dialogue with the International Monetary Fund (IMF) regarding a Stand-By Agreement.

4. **At the same time, Egypt has started to take important steps to address some of the root causes of the fiscal imbalance.** Egypt has embarked on a program of targeted energy pricing and fuel subsidy reforms (see Table I) to achieve cost recovery and to replace untargeted subsidies with targeted social safety nets programs, which were considered “off limits” in the past. Overall, these reforms reduced subsidies by 0.7 percent of GDP and are ultimately expected to reduce them by 2.7 percent of GDP annually upon full implementation for the next five years. This is a significant first step toward achieving fiscal sustainability in the sector. It should be noted that this program was launched during the post-revolutionary period, which has been marked by greater political and economic instability and when reforms are typically difficult to implement. An overall 15 percent electricity tariff increase for households and commercial consumers was implemented in two steps in November 2012 and January 2013, together with a tariff increase of up to 50 percent for energy-intensive users, which was implemented in January and July 2012. These reforms in tariffs (mainly those targeting commercial and energy-intensive users) are expected to increase economic efficiency for the targeted sectors, improve the financial sustainability of the Egyptian Electricity Holding Company (EEHC), and send a price signal to save energy.

5. **The global financial crisis of 2008-09 and the revolution of 2011 slowed progress on sector reforms, but these have been pursued recently with renewed vigor.** The revolution in Egypt presents both an additional level of complexity and a wide spectrum of opportunities in an evolving democracy. Initially, the global financial crisis and the revolution slowed progress on the new Electricity Law, the financial position of the financial sector, and reforms of electricity tariffs and fuel subsidies. With the completion of parliamentary and presidential elections and the emergence of a new democratic government, the sector governance reforms are getting more traction. These reforms will affect the legal, institutional, and regulatory frameworks, transparency, and social accountability. Such reforms are consistent with the general public’s demand for improved governance, transparency, and accountability. The reforms are also a fundamental component of strengthening the investment environment in the sector for both public and private investments, which is a critical element of a sustainable, more efficient, and more reliable electricity sector.

6. **The increases in electricity tariffs have (i) helped move them closer to cost recovery levels (at 70 to 75 percent of financial tariff); (ii) allowed tariffs to be set above cost recovery for energy intensive users, commercial users, and public lighting; and (iii) provided much-needed budgetary savings.** At the same time, the impact on the poor and most vulnerable was mitigated by keeping the lifeline tariff price unchanged and securing a significant proportion of the budgetary savings from the subsidies reforms to strengthen the social safety nets. The reforms also introduced a new mechanism to compensate EEHC for the increased price of fuels (natural gas and heavy fuel oil used as inputs to generate electricity) that is not passed through to the end users’ electricity tariffs. The current move to remove a major source of quasi-fiscal deficit in the electricity sector is not only a crucial reform of transparency and public management, but also will improve the financial sustainability of EEHC. It should be noted that the electricity sector has much higher cost recovery than the fuel sector in Egypt. While the fuel sector cost recovery ranges from 20 percent for liquefied petroleum gas (LPG) to above 60 percent for natural gas, the cost

recovery for heavy fuel oil (HFO) and natural gas fuel supply for power generation increased to levels of 70 percent and 100 percent of cost recovery, respectively.

7. Within this context of political transition and economic adjustments, the Bank has a critical role to help support economic growth, employment generation, and service delivery in the short to medium term. The Bank's support to Egypt during this transition period includes programs such as the Emergency Labor Intensive Project and sector-based capital investments such as Helwan South Power Project. In addition, the Bank has proactively supported important reform initiatives in the energy sector, including governance, transparency and social safety nets.

8. In combination, these programs are aimed at enhancing public investment and confidence during this economic downturn and giving a boost to economic growth and service delivery in the short to medium term. Furthermore, as Egypt undertakes important policy and pricing reforms in the electricity sector, parallel investment in electricity supply and service delivery will help ensure the sustainability of the reform process, especially during a political transition to greater citizen accountability of the state. For the last three years, the country has experienced frequent electricity supply interruptions. More recently these occurred up to 14 times in a month, and some SMEs are reporting losses of on average 3.2 percent of annual sales. The Helwan South Power Project will add much needed generation capacity and will represent ten percent of the new generation to be added by 2018. With electricity connectivity at 99 percent, increased power will benefit almost the entire population including lagging regions like the Upper Egypt which has a high concentration of poverty. While supporting economic growth and employment in the medium term, starting the investment process will offer an important policy signal with political and economic impact today.

9. A special focus of the Bank's approach in the energy sector is to ensure improved governance for greater accountability, efficiency, and social inclusion. People in the streets are demanding a higher level of public scrutiny, transparency, and governance. The new post-revolution context in Egypt requires an even stronger focus on governance to strengthen regulatory certainty. The Helwan South Power Project is designed with complementary technical assistance (TA) and advisory services activities, in large part financed by the Transition Fund funded by the Deauville Partnership, to cover governance as a priority policy area. Other areas covered by these complementary activities include advancing energy pricing and subsidies reform, attracting private investment, and advancing energy efficiency and renewable energy (RE). Overall, the Bank is actively engaged in a policy dialogue with the Government of Egypt in its efforts to progressively adjust electricity tariffs and help the EEHC progress toward more solid financial ground. While questions remain as to whether the current reform process and in particular the price and subsidy adjustments can be sustained, especially in the current macroeconomic context, several factors suggest that this risk is manageable. First, capital investments like Helwan South will require some time to be implemented offering the Government the space to adjust the financial and fiscal setting of the electricity sector over a period of time. In particular, tariffs will not need to be adjusted at a fast pace thus increasing the probability that price increases can be politically sustained. Second, at a particularly critical time during the political transition, the Government has already undertaken important price adjustments in the

electricity sector, indicating its commitment to strengthen the financial viability of the industry in the medium to long term. Third, the Government has already started unfolding its safety net program for households affected by the reforms as well as adjustments in key economic sectors such as transport through the planned introduction of smart card systems. This increases the probability that pricing and subsidy reforms can be sustained. Finally, in case the Government decides to maintain a certain level of subsidy in the economy – a possible outcome – subsidies would likely be targeted to a few sectors. Given the direct impact on the poor and the economy, food and electricity subsidies would likely be prioritized.

B. Sectoral and Institutional Context

10. The power sector’s institutional structure includes a number of institutions and agencies. The Ministry of Electricity and Energy (MoEE) is the principal policy agency in the sector. The Supreme Council for Energy (SCE), established in 2006 as a Committee of the Prime Minister’s Cabinet and reporting to the President, deals with strategic issues in the sector, including major policy initiatives, investment programs, and energy pricing. The Egyptian Electric Utility and Consumer Protection Regulatory Agency (EEUCPRA) (also referred to as Egypt Electricity Regulatory Agency, or EERA)¹ issues licenses, establishes performance standards, and monitors performance of the licensees. However, EEUCPRA has no tariff-setting authority, which is the prerogative of the Cabinet of Ministers. EEHC is the country’s principal power utility. It is organized as a holding structure and reports to MoEE.²

11. Key sector entities. EEHC includes 16 subsidiaries: six electricity production companies, nine regional distribution companies, and one transmission-and-dispatch company (Egypt Electricity Transmission Company, or EETC). EETC also acts as a single buyer of electricity and operates the wholesale electricity market. The New and Renewable Energy Agency (NREA), also reporting to the MoEE, is in charge of renewable energy projects, excluding hydropower, which is the responsibility of the Hydropower Projects Authority. There are three major privately-owned independent power producers (IPPs) with a combined capacity of 2,048 Megawatt (MW). The IPPs have been operating in Egypt since 2002/2003 under a build-own-operate-transfer (BOOT) arrangement with 20-year power purchase agreements (PPAs) supported by Central Bank guarantees and prices denominated in US dollars.

12. Power sector reform has been evolving and a new era of power market governance is emerging. Starting in the early 1990s and continuing to the present, the Government embarked on economic reforms to improve the efficiency of state-owned enterprises (SOEs) as part of overall economic reforms, and started the process of commercializing power

¹ EEUCPRA was established by Presidential Decree No. 326 in 1997, as an agency to supervise, monitor, and regulate the relation between the electric utility parties. The agency was further reorganized in 2000 by Presidential Decree No. 339.

² EEHC was established in 2000 by Law No. 164, which converted the Egyptian Electricity Authority into a holding company. In 2001 the general assembly of EEHC agreed to unbundle the electricity business into separate generation, transmission, and distribution activities; and created separate subsidiaries for each segment.

supply.³ However, this process is incomplete, and additional reforms are still needed to address issues related to improving power sector and EEHC governance, introducing competition to the power market, strengthening regulations and the authority of the power sector regulatory agency, re-engaging the private sector, and establishing trading arrangements. These reforms are envisaged to be advanced through a new Electricity Law, which was approved by the Government. This law is expected to reorganize the power market to deliver modern energy services efficiently and economically. Initiatives to improve governance therefore must address both corporate governance and market governance. However, the new law is not yet effective because it must be presented for final approval when the new parliament is elected.

13. The Government regulates all energy prices and has used energy pricing as part of the social safety net for households and to incentivize industrial and agricultural development. However, cost recovery has been low, especially in the liquid fossil fuel subsector, discouraging private investments in the sector. In addition, most of the subsidies have benefitted disproportionately higher income households, while the fiscal burden of these pricing policies is considerable. Improving both the electricity supply and demand sides require comprehensive price and non-price measures, including improving the investment environment and the transparency of the energy industry, as well as redesigning energy subsidies to improve targeting while gradually aligning prices with economic costs.

Challenges in the Power Sector

14. Significant investments are needed in the power sector to ensure reliable electricity supply services. Egypt is a fully electrified country. More than 99 percent of households are connected to the electricity grid. Consequently, the power sector has a direct impact on practically every household, business, school, or hospital in the country; and thus sector performance and the capacity to supply reliable power are important to everyone. The power sector plays a vital role in underpinning Egypt's economic and social development; and for creating conditions for growth, job creation, provision of social services, and public safety. The brisk electricity demand growth is expected to continue for the foreseeable future. Investments in the supply side of the power sector will have to expand significantly to meet the demand, replace old and inefficient generation units, and create a sufficient reserve margin for higher system reliability and security.

15. Rapidly-growing demand is a key feature of the power sector in Egypt. This demand is driven by population growth, development of energy-intensive industries, and increasing use of electrical appliances, especially air-conditioners in the residential sector. The

³ Some of the main measures taken by the Government include: (a) in 1991, the electric distribution companies were transferred from the MOEE to the Holding Company for Construction and Electric Power Distribution, under the jurisdiction of the Ministry of Public Enterprises Sector, a new ministry created to prepare public sector companies for privatization; (b) In 1996 and 1997, the Government amended laws to permit and incentivize the private sector to develop and operate electric power generating plants under BOOT arrangements; (c) in 2000 the Government reorganized the EEA into an Egyptian joint stock (holding) company under the name, Egyptian Electricity Holding Company (EEHC); and (d) in 2001, further restructuring took place through the unbundling of generation, transmission, and distribution activities into 13 companies (five generation, one transmission, seven distribution).

residential and industrial sectors are by far the largest consumers of electricity, and together account for 70 to 75 percent of total electricity consumption. Peak electricity demand increased from 15,678 MW in 2005 to 21,330 MW in 2009, and higher to 24,400 MW in 2011, a 14 percent increase in just two years. The system reserve margin entered negative territory in 2009, and improved to zero percent in 2010. In response, the utility companies reverted to widespread load shedding to maintain reliability of supply. As a result, consumers experienced more frequent interruptions and lower quality of electricity supply services. Firms in Egypt must wait an average of 77.2 days to secure new access to electricity supply (approximately four times the time required in Latin America and East Asia and the Pacific). Viewed from an economic perspective, this long delay has become a significant barrier to doing business and to establishing enterprises in the country. Although the annual demand growth slowed to approximately five percent during the political crisis, EEHC forecasts demand growth to rebound to previous levels (6.4 percent) in the foreseeable future.

16. The poor reliability of electricity is having an impact on economic growth. According to World Bank Enterprise Survey data, firms in the Middle East and North Africa (MNA) Region experienced electricity supply interruptions an average of 14 times in a typical month, more than twice the rate in Eastern Europe and Central Asia. Managers in Egypt estimated losses due to electricity outages at an average 3.2 percent of annual sales, more than five times higher than in high income OECD countries. More important, such outages are tilted against SMEs, which are the engine of economic growth. For household consumers, frequent drops in voltage levels damage appliances and could shorten their lifetime. From a broader perspective, Investment and Climate Assessment (ICA) panel manufacturing data from 2004, 2006, and 2008 explored the characteristics of fast-growing manufacturing SMEs in Egypt, as defined by job growth. In this work, the “gazelle” firms were important for job creation.⁴ As a group, they registered 20 percent employment growth. Firms reporting fewer than 25 electricity supply interruptions per year were over three times more likely to be a gazelle than a firm reporting 25 or more interruptions. In the 2013 Doing Business Report (DBR), Egypt ranked 99th world-wide in terms of access to reliable power.

17. Government recognizes the importance of energy efficiency and pricing in curbing demand growth. The Government has been supporting non-price measures to improve supply side and end-use energy efficiency (EE). *On the demand side*, EEHC continues to implement a program of replacing incandescent light bulbs with compact fluorescent light (CFL) bulbs, improving efficiency of street and commercial lighting, and improving power factor compensation to reduce losses in transmission and distribution. EE standards for some domestic appliances have been developed and implemented. EE codes for new buildings have been prepared, although they remain voluntary for the residential sector. The Supreme Council of Energy has set up an interagency Energy Efficiency Coordination Council, including a small Secretariat Unit (Energy Efficiency Unit, or EEU), with the objective of streamlining energy efficiency activities nationally.⁵ These efforts, however, need to be

⁴ A “gazelle” firm is a high-growth company, 3 to 5 years old, which has increased its revenues by at least 20% annually for 4 or more years, starting from a revenue base of at least US\$1 million. www.google.com

⁵ The energy efficiency institutional framework for Egypt recently was reviewed to include specialized energy efficiency units to be created in each of the major consuming sectors. A central energy efficiency unit (CEEU) will be the main body to lead and coordinate the nation’s energy efficiency agenda. The CEEU will coordinate all EE activities of the various “energy-consuming” ministries/sectors, particularly the energy efficiency units at the line

intensified and scaled up. The World Bank recently completed an energy efficiency study to help develop policy recommendations for scaling up EE through institutional and regulatory reform, and identifying financing and implementation mechanisms and priority areas for investments. The Ministry of Finance (MoF) expressed its readiness to support EE programs as well, provided they have the potential to reduce the cost of energy.

18. A large amount of new power generation capacity (conventional and renewable energy) is needed in the coming years. The Government's strategy for electricity supply and demand includes measures on both sides. EEHC has increased investments in new power generation. The total nominal generation capacity of the system reached 28,860 MW at the end of 2011. By Fiscal year (FY) 2015, the generation mix is expected to continue to be dominated by gas-fired steam and combined cycle generation, but will show an important increase in wind generation (from two percent to seven percent).⁶ EEHC's annual generation investment plan by the year 2020 consists of 11,150 MW steam generation plants using natural gas, 11,500MW of Combined-Cycle Gas Turbines (CCGTs) capacity using Egyptian natural gas, 2,500 MW of Open-Cycle Gas Turbines (OCGTs) capacity, 6,475 MW of wind power capacity, 270 MW of solar power capacity, and 32 MW of small hydropower capacity.

19. Government support to supply-side energy efficiency has improved, although there is scope to do more. As part of the Government's efforts to increase the use of natural gas as a more energy efficient fuel, EEHC increased the share of CCGT technology from 19 percent in FY02 to 38% percent in FY11, with significant improvements in fuel conversion and reductions in greenhouse gas (GHG) emissions. A number of other supply-side measures have been implemented: rehabilitation of some old power plants and their conversion from petroleum fuel to gas firing; rehabilitation of transmission and distribution networks and installation of capacitor units at substations; and the use of supercritical technology for new steam power plants such as Helwan South. Transmission and distribution losses were reduced from 11.7 percent in FY05 to 10 percent in FY10, while self-consumption of power plants during the same period decreased from 4.5 percent to 3.6 percent.

20. The magnitude of investment requirements for new generation capacity has prompted the Government to turn to the private sector to help fund the investment program. Over the next 10 years, EEHC needs approximately 3,000 MW annually in power generation to meet its demand forecast, increasingly using private financing. The 2012–2017 investment plan calls for approximately 5,000 MW of thermal independent power plants built by the private sector through Build-Own-and-Operate (BOO) arrangements, to complement 6,900 MW to be constructed by EEHC. In early 2010, EEHC invited private investors to construct a 2,250-MW Dairut BOO with combined cycle gas turbine technology. The activities in pursuing this project slowed in 2011 due to the political events. However, the project was revived in December 2012, when the Government showed commitment toward attracting private sector investments to power generation projects by endorsing two

ministries. The CEEU was established as part of the Prime Minister's office, and a new technical assistance is being mobilized by the EU to support capacity building of the CEEU and implementation of its activities, including coordination with EE units in line ministries.

⁶ The FY2011 generation mix consists of 46% steam generation, 38% combined cycle gas turbine (CCGT), 10% hydro, 3% open-cycle gas turbine (OCGT), 2% wind, and 1% solar. In 2015 these percentages are expected to be 38%, 39%, 7%, 8%, 7%, and 1%, respectively.

guarantees with certain requirements. These guarantees are expected to be issued by the Central Bank of Egypt (CBE) with a value of US\$2.5 billion for the Dairut BOO and US\$660 million for the first 250 MW wind BOO project. The World Bank and International Finance Corporation (IFC) have been providing technical support for the development of these two projects.

21. An ambitious renewable energy program by the public and private sectors. Based on the current plans of the electricity sector, the share of renewable energy is envisaged to reach 20 percent by 2020, consisting mostly of wind and hydro, but with the important introduction of solar. Wind power will dominate RE development. The former is expected to increase from approximately 550 MW by end-2011 to over 6,000 MW of installed wind power capacity by 2020. EEHC's 2012–2017 expansion plan includes the development of approximately 2,750 MW in RE of which more than half to be developed by the private sector. Achieving this goal will depend on the stabilization of the political situation and enhanced private sector confidence in investing in Egypt. The World Bank and the Clean Technology Fund (CTF) are supporting a program through the Wind Power Development Project that is financing construction of a high voltage transmission line to link the wind farms in the Red Sea region to the national grid. A 250-MW privately funded wind power BOO is to be developed as part of the program, followed by additional private wind power plants. Furthermore, a 140-MW integrated CCGT-solar power plant at Kureimat (with a 20-MW concentrated solar thermal field), supported by a US\$50 million Global Environment Facility (GEF) grant administered by the World Bank, was completed recently and is in operation. Egypt is participating in the CTF-sponsored regional investment plan for MNA region to scale up concentrated solar power (CSP) technology with a 100 MW Kom Ombo CSP plant (near the town of Aswan), for which the Government requested IBRD financing as well.

Energy Pricing and Fuel Subsidies Reform

22. Launching a broad reform program to address low electricity tariffs and high fuel subsidies. The Government has been tackling the problem of low electricity and fuel prices since 2004. However, the process was paused in 2009, due first to the global financial crisis and then to the revolution of 2011. Spurred by urgent fiscal pressures, the Government recently launched a program aimed at further reforming electricity tariffs and fuel subsidies (see Table I).⁷ This program will be implemented in two phases, the first of which has been fully implemented. It is estimated that, after the two phases are fully operational, they will yield 0.7 percent of GDP in FY13 and 2.7 percent in FY14 (net after deducting compensating budgetary transfers to the electricity company).⁸

23. Resumption in electricity tariff increases. Adjustment of electricity tariffs resumed in January 2012 with a substantial increase for a group of energy intensive industries covering approximately 15 percent of electricity sales. Tariffs increased by up to 25 percent for the fertilizer, cement, petrochemical, and metal industries; and up to 50 percent for the glass,

⁷ See table I for a summary of the electricity tariffs in Part (i) and fuel subsidies reform program in Part (ii) with the implementation status as of May, 2013.

⁸ The net savings from the planned energy subsidies reforms are equal to the gross savings minus the compensation to EEHC for the natural gas and diesel price increases.

ceramic, and porcelain industries. The overall cost recovery for electricity is much higher than for the input fuel at 70 to 75 percent for electricity, with tariffs above cost recovery for energy intensive users, commercial users and public lighting. The proposed electricity tariff reforms for households have been fully implemented. In November 2012, a weighted average increase of just below eight percent for the household and commercial tariff was implemented. The first tariff block (up to 50 kilowatt-hour (kWh)) remained unchanged, while the price for the second block (50 kWh/mo–200 kWh/mo) increased by five percent. The highest block (over 1000 kWh) had a price increase of 19 percent. Another increase was implemented in January 2013 that entailed an identical increase (just below eight percent) for the household and commercial tariff, still keeping the first block unchanged. In total, tariffs for households and commercial users increased by a weighted average of 15 percent, an amount expected to bring them closer to cost recovery (from approximately 40 percent to approximately 50 percent). In the case of electricity, the direct effect of the simulated price changes already implemented is either neutral or slightly progressive, implying that the richest income quintiles will pay a higher burden than the lowest income quintiles.

24. Increase of natural gas price for electricity and a mechanism to compensate EEHC. Natural gas used for electricity generation witnessed a price increase of 76 percent from 25 piasters/cubic meter to 44 piasters/cubic meter. HFO prices increased by 130 percent from EGP 1,000/ton to Egyptian Pound (EGP) 2,300/ton. The new system also introduced a new mechanism to compensate EEHC for the increased price of fuels (including natural gas and heavy fuel oil), which is not passed through to the final end user electricity tariff. Such a reform makes the electricity subsidy explicit, transparent, and accounted for in the budget rather than leaving it as contingent liability. The current action to remove a major source of quasi-fiscal deficit in the electricity sector is not only a crucial reform in transparency and public management, but will also improve the financial sustainability of EEHC.

25. The implementation of the above pricing reforms is expected to ensure positive cash flow and a net profit for EEHC in most years, to enable the company to meet its current operating expenses and to allow for a gradual reduction in the levels of payables and past due obligations (arrears). However, there is a need to operationalize the mechanism of compensating EEHC for the increase in fuel prices. Although EEHC benefits from low fuel prices, the holding company is in a tight financial position since its costs are higher than the tariffs (even after the recent increase in electricity tariffs) for most consumer categories. Thus, the implementation of the mechanism to compensate EEHC for the increase in prices of fuels will be critical to mitigate any substantial increase in its operating costs. The cost rise is due primarily to the need to finance a large investment program, which EEHC does mainly through borrowing. Since EEHC also inherited significant debt from its predecessor organization (Egyptian Electricity Authority, or EEA), its balance sheet has become highly leveraged. The Government is helping by facilitating and guaranteeing EEHC investment loans from international financing institutions. The Government also is looking into options to restructure EEHC debts, especially the old debt inherited from EEA and owed to the state banks, to de-leverage EEHC's balance sheet, and to restore its creditworthiness. In practice, EEHC has accessed short-term loans and cash on hand, delayed repayment and prolonged its payables in meeting any periodic cash shortfall.

26. Generally, fuel prices in particular remain significantly below the cost of supply. The level of average cost recovery is low, ranging from approximately 20 percent for diesel and LPG to a percentage above 60 percent for natural gas.⁹ The difference has been financed by the Government through budget transfers to the energy companies. The largest share of subsidies (on average in excess of 40 percent) is for light diesel fuel, which is consumed predominantly by the transport sector (approximately two-thirds), followed by energy intensive industries. LPG will take approximately 20 percent of the subsidies, with the remaining subsidies shared by other fuels (gasoline, natural gas, HFO, and kerosene). Households account for the bulk of LPG subsidies. The electricity sector is the largest beneficiary of subsidies for natural gas, while the energy intensive industries are the main beneficiaries of subsidies for HFO. Gasoline is used mainly by the transport sector (86 percent) and households (14 percent). Overall, the largest beneficiaries of fuel subsidies are households, transport, and electricity sectors, each accounting for 20 to 21 percent of the fuel subsidies. The industrial and tourism sectors consume another 20 percent of the subsidies, with the remaining 20 percent benefitting other sectors.

27. Egypt has recently implemented a broad range of reforms of fuel prices. Key reforms include: (a) piloting a new distribution system for LPG cylinders, with the implementation of an increase in the price per 12.5 kilogram cylinder from EGP 2.5 to EGP 8, and an increase of EGP 5 to EGP 16 for 25 kilogram cylinder in April 2013; (b) an increase in the price of HFO from EGP 1,000/ton to EGP 2,300/ton; (c) an increase in the price of natural gas for households, keeping the first block (up to 30 cubic meters/month) unchanged and increasing the price of the second block by approximately 50 percent; and (d) the elimination of the subsidy for Octane 95 gasoline, by raising its price from EGP 2.75/liter to EGP 5.85/liter. The implementation of new gasoline and diesel prices will take place in a second phase of reforms through rationing schemes. The main impact of tariff reforms will come from the LPG reform. However, in reality, the impact on the poor will likely be limited since households already are paying prices considerably higher than the subsidized level due to shortages, the black market, and ineffective distribution systems.

28. The Government intends to set aside a share of savings from structural reforms for social purposes. Once established and operational, a new cash transfer program would absorb a part of these savings. In total, the poor would receive benefits of approximately 22 percent, a share that is in line with cash transfer and food subsidies benefits in other countries, such as Brazil, Colombia, Indonesia, and Mexico.

⁹ The economic cost for each fuel used in the power sector is natural gas: US\$3.00/million BTU; HFO: US\$14.30/million BTU; and LFO: US\$24.18/million BTU (source: EEHC Generation Planning Department). The cost of natural gas is much lower than the costs of the liquid fuels: 28% of the cost of HFO and 17% of the cost of LFO. These fuel costs show that the average cost of fuel used in a power plant varies substantially with the amount of HFO or LFO used in the plant.

Table I: Part (i) summary of the electricity tariffs reform with the implementation status, May 2013

Targeted Reforms	Description	Implementation Status
Tariff reforms for a group of Intensive Industries	<p>In January 2012, a substantial increase in electricity tariffs was implemented for a group of energy intensive industries*:</p> <ul style="list-style-type: none"> - 25% increase for fertilizer, cement, petrochemical, and metal industries - Up to 50% increase for glass, ceramic, and porcelain industries. <p>* This group generates 15% of total electricity sales.</p>	Fully implemented
Tariff reforms for Residential and Commercial consumers	<p>Two sets of reforms were implemented:</p> <ul style="list-style-type: none"> - In November 2012, an increase in the weighted average tariff of just below 8% for residential and commercial (with no change in Block-1 tariff for residential) - In January 2013, an additional increase of just below 8% (identical to previous increase) for the weighted average tariff for residential and commercial (with no change in Block-1 tariff for residential). 	

Table I: Part (ii) summary of fuel subsidies reform program with the implementation status, May 2013

Targeted Reforms	Description	Implementation Status
Natural Gas for Intensive Industries	<p>In January 2012, a substantial increase in natural gas pricing for a group of energy intensive industries:</p> <ul style="list-style-type: none"> - 33% increase for fertilizer, cement, petrochemical, and metal industries - Up to 43% increase for glass, ceramic, and porcelain industries. 	Fully implemented
	<p>In July 2012, an additional price increase of up to 50% for natural gas for large consumers, including cement and brick companies.</p>	Fully implemented
Fuel-for-Electricity	<p>In November 2012, adjustments in fuel-for-electricity prices were implemented (please see below the notes for other fuels):</p> <ul style="list-style-type: none"> - HFO prices increased by 130% - Natural gas prices increased by 76%. 	Fully implemented
Heavy fuel oil for Intensive Industries other than electricity	<p>In November 2012, tariff increase of 130% for HFO.</p> <p>In February 2013, an additional increase of up to 50% for large consumers of HFO was implemented, including cement and brick companies.</p>	Fully implemented
Natural gas for Household and Commercial users	<p>Consumption blocks were reduced from three to two:</p> <ul style="list-style-type: none"> - First block unchanged - 50% increase for the second block. 	Fully implemented

LPG for Households and Commercial users	In April 2013 , a price increase of LPG by 220% per cylinder was implemented in all governorates.	Fully implemented
Octane 95 Gasoline	- 113% increase to bring its price to full cost	Fully implemented
Diesel and Gasoline	The program will introduce gasoline and diesel rationing: <ul style="list-style-type: none"> - For gasoline, eligible car owners will be allowed a certain amount of gasoline per year - There is less clarity on plans for diesel, but the transport sector (trucks, public transportation, and minibuses), agriculture, irrigation, and fishing will continued to be subsidized. - MoF estimates that approximately 55% of gasoline and 60% of diesel consumption will remain subsidized. 	Expected July 2013

Rationale for Bank Involvement

29. **Since the mid-2000s, the World Bank has developed an active program in the power and gas sectors in Egypt.** During the last six years, the Bank has provided assistance both for project financing and for policy analysis. The Bank made a significant contribution to the knowledge of the security and reliability of electricity supply, energy pricing, development of renewable energy, energy planning, regional integration, and attracting private investment to the sector. Since 2006, the Bank has approved financing for six energy investment projects in renewable and conventional power generation, electricity transmission to support the development of wind power, and gas transmission and distribution.

30. **In the short term, support is needed for public investments in the sector, accompanied by adequate regulatory and energy pricing reforms, to stimulate private capital.** It is clear that, for the foreseeable future, EEHC will have to finance by itself a substantial part of its investment program (including through borrowing). Given the current financial position of the sector and the country, and the regulatory and policy risks, it will take a few years before the power sector is in a position to finance its large investment requirements for new power generation predominantly through private capital.¹⁰ Since the appraisal mission of this project in September 2012, the Bank had awaited credible first steps to be taken by the Government to reform electricity tariffs and fuel subsidies. These steps have now been taken as described above. The Bank's continued involvement in the sector, especially during the political transition, will be important to maintain the sector's ability to provide reliable and uninterrupted service to its customers that is needed to improve economic recovery and job creation. This will prevent rolling power cuts from becoming a source of social discontent in an already highly-charged atmosphere in the country.

31. **The Helwan South Power Project is part of a diversified Bank program to support the Government's efforts to develop electricity sector infrastructure, community projects, and advance policy reforms.** With respect to supporting communities, the Bank is

¹⁰ From 1998 to 2010, Moody's, for example, maintained Egypt's credit ratings for its long-term foreign-currency senior unsecured notes at Ba1. By early 2012, the rating had fallen to B2.

funding an Emergency Labor Intensive Investment Project (\$200 million), which is the first new project to be requested since the revolution to support the Government in tackling the issue of short-term unemployment. This community project is expected to generate 200,000 direct and 65,000 indirect job opportunities.

32. The Helwan South Power Project represents 10 percent of the new generation required to be added by 2018. This new capacity underpins the project’s significant contribution to improving the security of the electricity supply service delivery—one of the key factors for sustainable economic growth and country stability. In view of the fact that in recent years the available generation capacity did not keep pace with growing demand, the system reserve margin has not been stable. In fact, it entered negative territory in 2009, whereupon it reached approximately zero percent in 2010. In response, the utility companies reverted to widespread load shedding to maintain reliability of supply. As a result, consumers experienced more frequent interruptions and lower quality of electricity supply services. Firms in Egypt must wait an average of 77.2 days to secure new access to electricity supply (approximately four times the time required in Latin America and East Asia and the Pacific). Viewed from an economic perspective, this long delay has become a significant barrier to doing business and to establishing enterprises in the country.

33. Introducing new means to strengthen consumer feedback and accountability in service delivery. One of Helwan South’s key complementary advisory activities is the transparency and social accountability activity, implemented jointly by the Bank and EERA. This activity aims to help EERA and EEHC strengthen customer-utility interface and transparency and public information systems, to establish performance benchmarking, and to improve consumer feedback (“citizen report cards (CRCs)”). One of the components that is complementary to this project, the technical assistance on transparency and social accountability, is aimed at developing and designing consumer surveys (“citizen report cards”). These surveys would disaggregate the data by gender and regions to enable better targeting of coverage, quality gaps, and assessment. The CRCs would be conducted annually to inform the electricity regulator in Egypt of service delivery gaps, which information also would be disclosed publicly. Regarding enhancing the communication with several stakeholders as part of this project, it should be noted that the project will keep in place the availability of judicial recourse and traditional dispute resolution (where they exist). The project also will ensure the establishment of a grievance redress mechanism (GRM) that is transparent, accessible, affordable, unbiased, inclusive, and accountable.

34. The Bank financing of Helwan South project leverages co-financing from other sources and enhances confidence in the sector. In partnership with the Bank, the largest co-financier of this project, regional and international agencies are additional co-financiers (section II.C). Furthermore, Helwan South as public sector project is timely because it will offset the expected slowdown in private sector investments in the power sector resulting from the political crisis and the global financial crisis. Hence, given the lead time needed for construction of such a complex project, UEEPC has initiated the procurement on an “advance contracting basis” to help in meeting the construction with no further delays. In addition to the World Bank, a number of multilateral and bilateral financing institutions and aid agencies are involved in the power sector. They include the African Development Bank (AfDB), the Kuwait Fund for Arab Economic Development (KFAED), the Arab Fund for Social and

Economic Development (AFSED), the OPEC Fund for International Development (OFID), the European Investment Bank (EIB), the European Union (EU) the Global Environmental Facility (GEF), the Islamic Development Bank (IDB), the Japanese International Cooperation Agency (JICA), and several other agencies. Most of the funding provided by these agencies is allocated to investment projects, mainly for conventional and renewable electricity generation and high voltage transmission. Moreover, the agencies also finance TA activities. The EU is particularly active in this area (see Annex 2 and Annex 8 for more details)

C. Higher Level Objectives to Which the Project Contributes

35. The World Bank Group’s Interim Strategy Note (ISN) FY13-FY14 (Report # R2012-0126) for Egypt discussed by the Board of Executive Directors in June 2012 has three pillars: (a) improving economic management through control of the fiscal deficit and initiating reforms to enhance transparency in government operations; (b) job creation, through direct emergency lending and initiating steps to improve the environment for private sector-led growth and job creation; and (c) fostering inclusion, which involves ensuring broader access by disadvantaged segments of the population—women, youth, the poor—to services and enhancing citizen and community participation in the design, implementation, and monitoring of government operations. The design of Helwan South Power Project is guided by the principles in the ISN and provides critical input into all three pillars by supporting economic growth, job creation, improved sector governance, and citizen participation.

36. . The revolution highlighted the need to consult widely, particularly with citizens who have been politically, economically, and socially excluded in the past. In response, the Bank has engaged with new stakeholders, members of the new emerging political forces, members of parliament, and private entrepreneurs. The Bank has engaged in wide dissemination and transparency activities on the project and worked closely with all new political actors. The Bank also played a convening role by bringing a variety of experiences (particularly with energy subsidies) to the design of the project and making full use of the array of instruments for knowledge exchange. Dissemination of project reports will be expanded through blogs and effective social media in Arabic and English. In addition, the Bank has deepened its partnerships with several players to: (a) support this project through financing (such as by AFSED, IDB, KFAED, and OFID); and (b) improve sector sustainability through robust technical assistance and advisory services (such as the EU and the European Neighborhoods Policy, or ENP)¹¹. These efforts will be combined with innovative capacity-building initiatives, including training programs, implemented by the Bank and other partners.

37. The Helwan South Power project is consistent with the four areas emphasized in the MNA Regional Update presented to the Board of Executive Directors in February 2013:

¹¹ The assistance includes support to the GoE in implementing the Association Agreement (AA) with EU and the European Neighborhoods Policy (ENP) and as part of the Support to the EU-Egypt AA Program (SAAP). The broader objectives are (a) to help bring the electricity system in Egypt in line with European Commission (EC) rules and Directives on the competitive market in the production and retail supply of electricity; and (b) to facilitate the strategic desire of the EC to have an electricity and gas link between the western and eastern boundaries of the European Union via the countries of the southern Mediterranean.

acceleration of sustainable growth, job creation, governance strengthening, and economic and social inclusion. The project contributes to all four areas of the regional strategy in complementarity with TA and advisory services. The Helwan South power plant will be connected through transmission lines to Samalout and Assiut, thus helping to strengthen the reliability of the electricity supply to Upper Egypt, the area with the highest poverty rates in the country.

38. Helwan South will add a reliable and efficient new generation capacity that represents 10 percent of the new generation capacity required to be added by 2018. This new capacity underpins the project's significant contribution to improving the security of the electricity supply service delivery—one of the key factors for sustainable economic growth and country stability. In addition, this project will displace some older and less efficient generation. It will thereby enable EEHC to use this displaced capacity to increase the system reserve capacity and boost the system reserve margin by approximately 2.5 percent. Helwan South's large base generation units also will increase the system's inertial response (thus providing higher system security), which is required if EEHC is to keep the power system stable as more intermittent wind generation capacity is added. In addition, the design of the Helwan South Power Project will play a major role in boosting the use of cleaner fuel (natural gas) and in promoting efficient generation (cutting fuel consumption and reducing emissions) in the Upper Egypt Electricity Production Company (UEEPC) system. UEEPC currently uses HFO for approximately 45 percent of its total fuel consumption.

39. The Helwan South Power Project is expected to strike the right balance between short-term opportunities and long-term development needs. The plant will improve the quality and reliability of electricity services and contribute to more sustainable sources of economic growth in the country. This project will generate new employment directly through the use of skilled and unskilled labor on the site during construction (including local employment for both), and operation and maintenance of the plant during its lifetime. Indirectly, the project will use labor employed by contractors, suppliers, and service providers, as well as the economic activities enabled by the electricity generated by the plant during its lifetime. The project-related jobs created by private and public entities for Helwan South are estimated at 4,000, of which 75 percent will be created during construction. Since 40 to 45 percent of the steam technology power plants components are manufactured locally, Helwan South will further support local employment. The contribution of Helwan South to system reliability will play a major role in enhancing the continuity of electricity supply required to develop business. Furthermore, according to UEEPC, community development activities will be associated with this project to ensure that it benefits different social groups in neighboring communities.

II. PROJECT DEVELOPMENT OBJECTIVES

A. Project Development Objective

40. The project development objective (PDO) is to increase power generation capacity in an efficient manner within the Borrower's territory.

B. Project Beneficiaries

41. In Egypt, more than 99 percent of households are connected to the national integrated electricity grid. The additional generated electricity from Helwan South will be spread across grid-connected consumers in all sectors, including rural areas, as well as new and existing cities. Therefore, the benefits of the project will extend practically to the entire population, and support all economic activities. For existing consumers, additional generation from a reliable supply source would enable them to increase their consumption for better quality of life, business activity expansion, industry modernization, school buildings improvement, or installing healthcare equipment. For rural consumers, such source of electricity supply could alleviate poverty by increasing electrification of villages, illuminating roads to support economic and social activities, the development of education and health care (two of the critical sectors for Egypt), and meeting the basic needs for low-income families.

42. Access to energy has been shown to deliver a wide range of societal and economic benefits including increased economic productivity, improved health, education and human capital and enhanced labor market outcomes. While these welfare improvements are far-reaching, their impact is often greatest with regard to women and children. Electricity improves the quality of indoor air and lighting, and provides the ability to devote more time for children to study or read. Lighting improves personal security and enables businesses to keep longer trading hours. For women who are home-based, electrification frees up time that had often been spent on household chores and food preparation, allowing them to pursue more productive, income generating activities. Since women are often engaged in home production activities – where the effects of electrification are instant and significant – it follows that this “technology” effect may well translate into a greater effect on female employment. Whether at home or outside, reliable access to electricity creates opportunities and generates jobs – often in low-skill or the informal sector – in industries that favor female workers.

43. With a high level of access to electricity, as the case of Egypt, power outages are likely to equally affect equally all household members. There is no robust literature pointing at differential gender impact of power outages. The technical assistance complementary to the Helwan South Project on transparency and social accountability is expected to shed additional light on such issues, since the planned consumer surveys (“citizen report cards”) will disaggregate the data by gender and regions to enable better targeting of coverage, identification of service quality and performance gaps, and accountability assessment.

C. PDO Level Results Indicators

44. The project will add 1,950 MW to Egypt’s gross electricity generation capacity. After completion, the plant will supply approximately 13,450 million kWh of electricity annually to the high-voltage transmission grid, with not less than 40 percent thermal efficiency. The estimated number of beneficiaries (of which 49 percent are female) will also be an important indicator to measure the benefits to all grid-connected consumer sectors from Helwan South Power Project.

III. PROJECT DESCRIPTION

A. Project Components

45. The project includes two main components, which are described below: (a) power plant and (b) gas pipelines.¹²

46. **Component 1: The Helwan South Power Plant (Total: US\$ 2,168.9 million; IBRD: US\$503.8 million):** This component includes a 3x650-MW supercritical steam technology power plant, fired by natural gas as the primary fuel and by HFO as a backup. The plant comprises three identical units, each of 650 MW gross capacity. The plant will be cooled by a once-through cooling system using water from the Nile River. Each of the three units will include the standard set of equipment: a 650-MW steam generator, a steam turbine, a condenser, and an electricity generator; process and cooling water supply systems; an air and flue gas system; a fuel supply system; and a number of auxiliary systems (condensate treatment, hydrogen generation, compressed air, fire protection, emergency diesel generator, start-up power system, medium and low voltage system, direct current power system for control and relays, and uninterruptible power system). The plant also will include a distributed control system and a switchyard with step-up transformers. Engineering and project management services for the power plant, as well as the associated environmental and social impact mitigation plan, will be included in the project.

47. **Component 2: Gas pipelines (Total: US\$ 235.50 million; IBRD: US\$81.6 million):** This component includes two gas pipelines capable of supplying approximately 12.5 million cubic meters of gas per day. One pipeline, 36 inches in diameter and 93 kilometres (km) long, will connect the Helwan South power plant site, which is near the town of Atfeeh, to the existing gas pipeline network at the compressor station at Dahshour. The other pipeline, 32 inches in diameter and 65 km in length, will strengthen the gas transmission network by eliminating a bottleneck that otherwise would prevent normal gas supply to the Helwan South power plant. The pipeline will run from the Abu Hommos compressor station to the El Nubaria compressor station. Both pipelines will be designed for a maximum pressure of 32 bars. Pipeline inspection and cleaning facilities suitable for use with online inspection vehicles and appropriate Supervisory Control and Data Acquisition (SCADA) facilities will be included. The two gas pipelines will enable transmission of gas produced by Burullus, Rashid (Rosetta), and Western Desert gas fields to the Helwan South power plant. The associated environmental and social impact mitigation plan will also be included in the project.

48. **Safeguards consultations, documentation, and disclosure.** As part of project preparation, the reports of environmental and social impact assessments (ESIAs) and

¹² The transmission lines to interconnect Helwan South power plant to be constructed under a separate project implemented in parallel, also financed by an IBRD loan (Project Appraisal Document for Ain Sokhna Power Project, January 8, 2009, Report No. 46695-EG). The original design of Ain Sokhna project included a component for connecting the power plant to the 500-kV electricity transmission network. The Borrower has asked the Bank to restructure the Ain Sokhna project to redesign its transmission component to optimize the interconnection of both Ain Sokhna and Helwan South power plants with the transmission network, and to use the savings in the IBRD loan for the Ain Sokhna project—estimated at US\$180 million—to finance the redesigned interconnections.

Resettlement Policy Frameworks (RPFs) covering the power plant and the gas pipelines have been prepared and mitigation measures developed. Different levels of consultations were conducted and documented as part of preparing these ESIA and RPFs for both the power plant and gas pipelines. Public and direct consultations with project stakeholders, as required by the Bank, have been completed. All reports and consultations documents were disclosed prior to project appraisal. These documents were revised based on the appraisal mission outcomes and were re-disclosed in-country and in the Bank Infoshop in May 2013. Additional instruments, such as Environmental Management Plans (EMPs), Resettlement Action Plans (RAPs), and Grievance Redress Mechanism (GRM) will be developed, launched, and disclosed before construction. Preparation of the power plant dispute mechanism began in April 2013.

B. Complementary Activities: Technical Assistance and Advisory Services

49. **Helwan South is designed with complementary technical assistance and advisory services to be implemented in parallel with the Project.** These services cover a range of activities from upstream policy advice to transaction services that are designed to enhance the sustainability of the power sector and this project. Their overall aim is to address the priority areas in the sector: (a) advancing energy pricing and fuel subsidies reform as well as reforming social safety nets; (b) attracting private investment; (c) strengthening sector governance, transparency, and accountability; and (d) advancing energy efficiency and renewable energy. The TA and advisory services activities will be financed through grants from a number of donors, complemented by contributions from the Borrower and recipient agencies. Further details about the complementary activities are provided in Annex 2 and Annex 8.

C. Project Financing

50. The proposed operation is an Investment Project Financing (IPF). The Borrower has requested the loan to be a Variable Spread Loan denominated in US\$, with a 28.5-year maturity including a 7-year grace period.

51. Project Cost and Financing requirements for the investment components are presented in table II.

Table II: Project Costs and Financing

Project Components (Investments) (US\$ million)	Project Cost	Contingencies (%)	IBRD Financing (US\$ million)	Financing (%)
1. Power Plant Baseline Costs	1,742.2			
Power Plant Contingencies	245.61	14.1		
Customs	181.1			
Total Power Plant Costs	2,168.9		503.8	23.2
2. Gas Pipelines Baseline Costs	212			
Gas Pipelines Contingencies	23.5	11.1		
Total Gas Pipeline Costs	235.5		81.6	34.6
Total Investment Project Baseline Costs	1,954.2			
Total Contingencies	269.1			
Customs	181.1			
Total Project Costs and Financing Required	2,404.4		585.4	24.3

52. **Project Co-financing:** In addition to the IBRD loan (US\$503.8 million), the *Power Plant Component* includes loans from the OPEC Fund for International Development (OFID) (US\$40 million), Kuwait Fund for Arab Economic Development (KFAED) (US\$213.8 million), Islamic Development Bank (IDB) (US\$449.9 million), and Arab Fund for Social and Economic Development (Kuwait) (AFSED) (US\$193.5 million). The Upper Egypt Electricity Production Company (UEEPC) will contribute US\$767.9 million as counterpart funding. The *Gas Pipelines Component* will be financed by the IBRD loan (US\$81.6 million) and counterpart funds from the Egyptian Natural Gas Company (GASCO) (US\$153.9 million).

53. The Egyptian Electricity Holding Company has confirmed that local financing at the final stages of approval, and major co-financiers (KFAED, IDB, and AFSED) have confirmed their commitment to support the project. A summary of the financing plan and the co-financing status of each project component are shown in Table III.

Table III: Project Financing Plan and Status

Source of Financing	Amount (US\$ million)	Financing of Project Components	
		Power Plant Package	Gas Pipelines
Borrower (UEEPC for power plant and GASCO for gas pipelines)	921.8	All 17 packages (of which 5 are self-financing) and Engineering Services	7 packages (of which 4 are self-financing) and Engineering Services
International Bank for Reconstruction and Development (IBRD)	585.4	3 PACKAGES Steam Generator (boiler) Power Transformers Distributed Control System (DCS)	7 PACKAGES Gas Pipelines and Various Gas Pipeline Equipment
OPEC Fund for International Development (OFID)	40	1 PACKAGE Water and Waste Water Treatment	-
Arab Fund for Economic and Social Development (AFESD)	193.5	4 PACKAGES Heat Exchangers Critical Piping and Valves Electrical Equipment/I&C Installation Mechanical Equipment/Pipe Installation	-
Islamic Development Bank (IDB)	449.9	2 PACKAGES Steam Turbine Generator Switchyard	-
Kuwait Fund for Arab Economic Development (KFAED)	213.8	2 PACKAGES Civil Works Pumps and Drives	-
Total	2,404.40	17 Packages	14 Packages

Financing Complementary Activities: Technical Assistance and Advisory Services

54. Technical Assistance and Advisory Services relevant to the sustainability of the project, but financed and implemented separately from it (section III.B), will be funded and implemented by the Borrower and its agencies and various donors for a total of US\$10.2 million. The total will reach approximately US\$17.7 million subject to the approval of Egypt’s Energy/Social Sectors Reform Technical Assistance Project under the Deauville Transition Fund. EEHC will fund and implement advisory services for private investment in electricity generation (US\$3 million–US\$4 million). The MoF will finance its share of the cost for reforming energy subsidies and social safety nets, which is expected to be supplemented with US\$6.5 million from the Transition Fund implemented by the World Bank, from the Poverty and Social Impact Analysis (PSIA) Trust Fund (US\$72,000), and from the World Bank budget (US\$40,000). The World Bank Group will finance and implement TA to strengthen the policy and regulatory environment for scaling up renewable energy (RE) through private investment, in the amount of US\$700,000. EU will contribute

EUR4.9 million for strengthening the regulatory capacity and various other activities on energy policy, regulatory framework, energy sector financial transparency and performance, and development of RE and EE. ESMAP will contribute US\$120,000 in TA for strengthening transparency and social accountability.

D. Lessons Learned and Reflected in the Project Design

55. During periods of political transition when private investment declines, sustaining public investment is needed to maintain economic growth and create credible policy signaling. This has been seen in many fragile and conflict states in Africa, in the Latin American experience in 1980s and 1990s, and in Eastern Europe during the 1990s.

56. Ideally, power sector should operate on commercial principles to prevent facing any unsustainable financial situation and to meet future power demand efficiently and economically. Experience in other countries indicates that achieving full commercialization of the electricity sector is a long term process that involves a sequence of attainable steps for increasing incrementally the commercialization of power supply over time. This process would entail several energy policy interventions in a country such as Egypt given current conditions: (i) further electricity tariffs and fuel subsidy reforms; (ii) restoration of EEHC's borrowing capacity; (iii) reduction of EEHC's operating costs; (iv) scaling energy efficiency program both on supply and demand; (v) and improving the business environment (including governance and regulations) to attract market-based private investments in generation.

57. Energy provision is a key element for supporting sustained economic growth, and this will also hold for Egypt. A growing literature in academia and the policy arena underscores the strong impact that improved energy services infrastructure has on promoting economic growth, either by entering directly as input of the production function, or indirectly through improving total factor productivity and through encouraging private investment. Whereas important questions such as the causality and the specific channels through which energy and core infrastructure affect growth remain, the positive correlation between energy provision and growth is widely recognized and there is sound empirical evidence that the contribution of energy services to GDP exceeds the cost of provision of those services.

58. In this context, energy outages are identified as one of the most important hurdles to overcome for economic growth acceleration. Using a sample of 52 countries and addressing the issue of reverse causation, Canning and Bennathan (2000) finds rates of return to investment in electricity generating capacity of around 40%. For most countries, this rate was roughly the same as the return on non-infrastructure capital. Calderón and Servén (2003) find that the difference in infrastructure levels between Latin American countries and East Asian countries accounts for about one third of the gap in output per worker between these regions, even after factoring for causality. In a subsequent research using a sample of 100 countries over a 20 year period, Calderón and Servén (2004) reach robust results stressing the role that energy quantity and quality can have in accelerating economic growth. For Egypt, energy outages have the potential to contribute to the economic downturn, and to feed citizen's dissatisfaction. Results of surveys of SMEs across the world suggest that in addition to access to finance access to services and in particular energy services accounts for the growth and dynamism of SMEs. As discussed earlier, the emergence of dynamic SMEs -

the so called gazelles- require access to reliable power supply. Given the high level of connectivity, supplying power will be effective in supporting SMEs.

59. The World Bank Group is supporting countries' efforts to improve energy access and reliability of supply, as is the case for the Helwan South Power Project. Projects in the energy sector provide support for energy generation, transmission and distribution (T&D), increased energy access, renewable energy and energy efficiency and advice on energy policy reforms and regulations. The WBG engagement in the energy sector has reached almost US\$50 billion committed in the form of investments, policy advice, capacity building, and technical assistance. In FY12, the WBG financed US\$8.4 billion in energy sector projects, with represents an eight fold increase compared to financing levels of the previous decade.

60. Pricing and subsidy reform is best sustained by ensuring that service levels improve or at least do not deteriorate during the pricing reform process. This is supported by experiences across regions in both water and electricity reforms. The literature is ambiguous regarding whether the financing of generation capacity should be conditional on pricing reforms. Making one contingent on the other may lead to political resistance as has been the case in reform processes in countries in Africa and South Asia especially in the context of international financing. For this reason, we are pursuing both investment in infrastructure and price reform though parallel engagements.

61. The Bank's experience in a number of countries including Pakistan has demonstrated that adequate long-term investment in key energy infrastructure is important in countries facing financial and fiscal pressures. A decade ago, the Bank decided to move away from supporting public sector investments that were justified by the least cost plan due to sector financial imbalances. As private capital for large infrastructure also decreased, additional generation capacity to meet the growing energy demand was provided through a large quantity of smaller, but higher cost investments through the public and the private sector. A decade later, the higher average costs have further aggravated the financial deficit in the sector, making it progressively harder for the Government to take on the policy measures to bring the sector finances in balance. In Egypt, it is important to forestall the deteriorating pattern of growing electricity shortages and load shedding, which would make it politically harder to raise tariffs in the future and could lead to reductions in collection rates, undermining the actual financial impact of tariff increases.

62. Lessons learned from successful pricing reforms also point to important conditions for success including credibility of government commitment, strong communication and buy-in from targeted groups, and complementary energy efficiency programs. The credibility of the Government's commitment to compensate vulnerable groups and to use the funds freed from subsidy reform for more welfare enhancing activities is one key element of successful reforms. Policy tools to protect the poor include lifeline rates, which generally perform better than universal subsidies as well as cash transfers. In order to ensure public trust in the reform agenda, successful reforms entail a broad communication strategy including media and public campaigns in order to reach out to the poor and to those who will be most affected by the subsidy reform. Improving energy efficiency will also help to reduce the costs of removing subsidies both for energy suppliers and consumers.

63. Lessons learned from energy projects highlight the importance of a rigorous least cost and economic analysis. The least-cost justification for the Helwan South project is based on a two-part approach. First, a screening analysis shows the competitiveness of a supercritical dual-fired steam generating plant for serving the Egyptian base load and intermediate load. Second, a projection of EEHC's dispatch of its generating capacity – both existing and planned new capacity – shows whether the Helwan South units are needed at the time that they are scheduled to enter service. The economic analysis indicates that the proposed Helwan South units are needed from 2016/17 onwards for serving the system load. Steam-driven generating units, like the proposed Helwan South units, are suited to deal with changes in the system base load, although with a lower fuel efficiency than CCGTs. Moreover, steam-driven turbines are needed by the system operator to stabilize the power system when unexpected interruptions occur, such as a sudden change in load or a disruption to supply from a malfunctioning transmission line or substation transformer. Steam-driven turbines have the inertia required for this purpose, whereas gas turbines used in CCGTs provide little inertia to the power system.

64. Recent experience in the power sector also demonstrates that effective GRM as envisaged in the Helwan South project can assist in resolving any disputes that may arise from the construction and operation of infrastructure projects, and can contribute to transparency and accountability. GRM should be complemented with effective monitoring and mitigation measures to prevent and mitigate any potential adverse environmental and social impact. Bank experience in other countries shows that GRMs are more effective if they are implemented prior to project construction, which the case in Helwan South.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

65. The project will be implemented between June 27, 2013 and December 31, 2018.

66. The Power Plant Component of the project will be implemented by EEHC and UEEPC, the EEHC generation subsidiary operating in Upper Egypt, which will own and operate the plant. UEEPC has contracted an experienced engineering company, Power Generation Engineering and Services Company (PGESCO), to assist with engineering, procurement, construction, and project management. PGESCO has carried out similar assignments in a number of other large power generation projects in Egypt. UEEPC has established a Project Management Unit (PMU) for the Helwan South Power Project, and has appointed key staff (project manager, project engineers, procurement coordinator, as well as environmental and social safeguards coordinators for community communication/outreach specialists) at the project level. The PMU will be expanded as project implementation gets under way.

67. The Gas Pipeline Component will be implemented by GASCO, a subsidiary of EGAS, in charge of implementing investment projects in the gas transmission network and operating and maintaining the gas transmission networks. Although EGAS is the owner of

the gas transmission network assets, according to an agreement between EGAS and GASCO that defines their respective roles and responsibilities in such undertakings, GASCO can borrow funds to finance the construction of gas pipelines and to service such loans. GASCO has a strong technical capacity and follows design and construction and maintenance standards similar to those used by British Gas of the United Kingdom. During preparation, GASCO prepared the technical design and feasibility study report. A Project Management Unit (PMU) was established with a deputy general manager at GASCO has been appointed to manage and coordinate the implementation of the Gas Pipeline Component. Dedicated staff in different departments has been assigned responsibility for procurement, financial management, and technical and safeguard aspects. Each person in charge is supported by a group of staff in the various departments of GASCO with expertise in the respective areas. The PMU will be expanded as project implementation gets under way, particularly the recruitment of community communication/outreach specialists at the project level.

68. Lending arrangement and flow of funds. There will be a *Loan Agreement* between the Bank and the Arab Republic of Egypt, a *Project Agreement* between the Bank and EEHC for the Power Plant Component, and a *Project Agreement* between the Bank and GASCO for the Gas Pipelines Component. By virtue of a *Subsidiary Loan Agreement* between the GoE and EEHC and a *Subsidiary Loan Agreement* between the GoE and GASCO, the corresponding parts of the Bank loan will be on lent to the implementing agencies for their respective parts of the project. Similar to the other power projects financed by the Bank, Helwan South will have a Contractual Agreement between EEHC and UEEPC regarding project implementation. Co-financing with other financing partners will be on a “parallel financing” basis in terms of procurement. In other words, procurement packages will not be co-financed by different financing organizations (other than UEEPC co-financing all procurement packages) and interdependencies minimized. The experience with other Bank-financed projects implemented by EEHC, all of which are “procurement parallel-financed” by other donors, has been good in this regard.

69. An assessment of the procurement capacity of both implementing agencies—UEEPC and GASCO—was carried out by the Bank. The assessment reviewed the organizational structure for implementing the project, staffing, procurement systems, and past experience. Since all procurement actions for the Power Plant Component will be carried out by PGESCO, the procurement capacity assessment covered both PGESCO and UEEPC. PGESCO is familiar with Bank procurement procedures, as shown by its involvement under the other World-Bank-financed projects (El Tebbin, Ain Sokhna, and Giza North power projects). Procurement for Bank-financed packages for the power plant will be done through international competitive bidding (ICB) and subject to the Bank’s prior review. During supervision, the Bank will conduct due diligence at critical stages of the procurement process and during contract management.

70. The capacity assessment of GASCO concluded that it has adequate experience and capacity to carry out procurement activities related to the implementation of the Gas Pipelines Component of the Helwan South project. GASCO will only carry out procurement of goods through seven ICB packages, all subject to the Bank’s prior review. Installation of the pipeline will be financed from GASCO’s own sources and carried out by Petrojet, a subsidiary of EGAS.

71. **UEEPC established a Financial Management Unit (FMU) has been established as part of the PMU** to manage payments under the project and integrate project financial management and records with the financial departments in UEEPC. The FMU will have the overall responsibility for the project's financial recording, budgeting, reporting requirements, and handling the loan disbursement arrangements, including supporting documentation. The FMU will comprise an FMU manager, three accountants, and one project accountant who will be located at the project site and will ensure smooth coordination between the FMU and the rest of the PMU.

72. From a financial management perspective, GASCO has its financial management (FM) responsibilities and activities distributed among GASCO's different financial departments (accounting, financial controls, and payments, assets/inventory/costing, and commercial affairs) and various subsections within these departments. It was agreed to assign a special Financial Management Team from each department to act as the focal point for the Bank-financed project. The team was assigned on April 14, 2011 by an official internal memo from the vice-chairperson of the company and in charge of GASCO's financial and commercial affairs. Management of the Bank loan will follow GASCO's existing accounting and reporting cycles (Annex 3). Acceptable Oracle-based accounting software, already in place in GASCO, will be used for the recording and reporting purposes of the project. Payments under the IBRD loan are expected to be made primarily through reimbursement, special commitments, and direct payment methods as well as through advances to a designated account (DA).

73. **Environmental and Social Impact Assessments (ESIA) have been completed for both investment components (the power plant and gas pipelines) of the project.** The ESIA's include the Environmental and Social Impact Management Plans (ESIMP) to be implemented by the respective implementing agencies. Because some compensation for temporary land use and limited land acquisition of privately owned land may be needed, the Bank's policy on Involuntary Resettlement (OP 4.12) has been triggered. To ensure compliance with the policy, the implementing agencies—UEEPC and GASCO—prepared their respective Resettlement Policy Frameworks (RPFs). The exact extent and location of the impact will be known only closer to the construction time, once the detailed routing of cooling water pipelines (for the power plant, implemented by UEEPC) and gas pipelines (implemented by GASCO) has been determined with sufficient precision. The policy framework establishes resettlement objectives and principles, organizational arrangements, and funding mechanisms for any resettlement operation that may be necessary during the implementation of the various components of the project. When the extent of resettlement/land acquisition becomes known prior/during project implementation (after detailed design and process routing), site-specific Resettlement Action Plans (RAPs) will be prepared where needed.

74. EEHC has developed strong institutional capacity with respect to the Bank's safeguard policies, particularly as to how these are applied in power projects, and will provide close support to UEEPC as necessary to ensure that project activities comply with Bank safeguard policies. UEEPC will ensure the integration of environmental and social sustainability measures in the detailed design and construction of the power plant by including these requirements in bidding documents and through selecting qualified contractors.

75. GASCO has developed its corporate capacity for environmental management as part of its long-term involvement in the sector. The responsibility for environmental management falls to a senior officer designated as Assistant Chairman for Safety and Environment, who supervises a General Manager for Environmental Protection and five environmental specialists. The company also has an Environmental Policy, which focuses on continual improvement in the environmental, health, and safety aspects of all of its business activities. The company will follow its corporate policy, which requires regular environmental audits and inspections to ensure that an Environmental Management System is implemented according to set objectives and targets, as well as monthly and quarterly reporting on environmental performance. As part of the project, GASCO will be responsible for implementing and monitoring the Environmental and Social Management Plan, including the Resettlement Action Plan (as required) of the natural gas pipeline. GASCO's Environment Department is staffed by five qualified environmental specialists who are trained in environmental auditing, environmental impact assessments (EIAs) for industrial establishments, and environmental legislation. These specialists will be responsible for ensuring effective implementation, monitoring, reporting, and consultation during each step of project design, evaluation of tenders, implementation phasing, and construction of the project components.

76. **Technical assistance and advisory services activities**—which are not financed as part of this project—will be implemented by the agencies in charge of the respective activities and policy areas. EEHC will be in charge of *attracting private investment* in power generation. The Ministry of Finance will manage TA for *energy pricing and subsidies reform*, while the Ministry of Insurance and Social Assistance will manage social safety nets reform. Donors contributing their own, or administering, grant financing will implement these activities in close cooperation with the respective counterpart agencies.

B. Results Monitoring and Evaluation

77. Using their own systems, EEHC/UEEPC and GASCO will monitor progress of their respective components against the agreed performance indicators (in Annex 1). The implementing agencies will monitor overall project implementation and contractors' performance including implementation of mitigation instruments based on the project's ESIA and RPFs such as Environmental and Social Management Plans (ESMPs), RAPs, and GRMs. Data and statistics on actual project outputs and outcomes will be gathered, analyzed, and included in the quarterly progress reports to be submitted to the World Bank. TA activities will have their own monitoring and evaluation (M&E) mechanisms..

C. Sustainability

78. Sustainability of the project depends on the ability of EEHC/UEEPC and GASCO to implement and operate the project successfully and the sustained demand for project services by the market. The project implementing agencies have proven track records in implementing projects of this nature and scale. Nevertheless, there is a concern about EEHC's financial position, as well as about financial risks to GASCO arising from under pricing of fuel. Ultimately, however, as EEHC is fully state owned and provides such a vital service, the Government is implicitly underwriting its financial performance.

79. Starting in 2018 and onward, Helwan South full operation will contribute to meeting the growth of base load and in replacing over 700MW of old, inefficient generation steam units planned for retirement by 2020. Furthermore, Helwan South steam units will release some CCGT generation capacity that is better suited to changing its outputs quickly in response to the continuous changes in the system load (“load following”). Thus, Helwan South is likely to have a secure market for its output. This project’s sustainability is enhanced by the capability of its steam units’ technology to add fuel diversity to the system. As noted, in the event of disruption to the supply of natural gas to the plant, Helwan South can generate electricity from HFO as well.

80. The complementary advisory services and TA activities are expected to effectively strengthen the sustainability of the electricity and fuel sectors and hence, Helwan South power plant. Particularly valuable are the activities that support the Government in advancing energy pricing and fuel subsidies reform; and in strengthening sector governance, transparency, and accountability.

81. There has been a strong commitment to the project by both the project implementing agencies and the Government. Project preparation documents—the technical feasibility studies, ESIA’s, and the RPFs—have been completed.. The Government has been proactive in obtaining project financing from external agencies. Preparation of procurement documents for the power plant was initiated before project appraisal. Sustainability of the project should be strengthened by the TA accompanying the project.

V. KEY RISKS AND MITIGATION MEASURES

A. Risk Ratings Table and Summary

Table IV: Risk Ratings Summary

Stakeholder Risk	Low
Implementing Agency Risk	
- Capacity	Substantial
- Governance	Moderate
- Procurement and Financial Management	Moderate
Project Risk	
- Design	Low
- Social and Environmental	High
- Program and Donor	Low
- Delivery Monitoring and Sustainability	Moderate
- Interconnection to Transmission Grid	Low
- Demand Risk	Low
- Fuel (particularly gas as a primary fuel for Helwan) Supply Risk	Substantial
Overall Implementation Risk	Substantial

B. Overall Risks Rating Explanation

82. Project implementation risks from the technical and project management aspects are assessed to be Low. However, the overall implementation risk is rated substantial due mainly to macroeconomic and financial risks that are coupled with the unstable political and economic transition which may have an adverse impact on project implementation and sustainability.

83. Reliable electricity supply is vital for Egypt's economic growth and security. Therefore, the Government is likely to provide budget support to the sector and to the project even under adverse fiscal conditions. The recent electricity tariffs and fuel subsidies reform along with the mechanism to compensate EEHC for the increase in fuel prices will have positive outcomes. However, to ensure financial sustainability in the electricity and fuel sectors, more clarity is needed about how that mechanism will be operationalized and for how long; and how the future increases in electricity tariff need to evolve for EEHC to achieve cost recovery. If these fundamental problems are not addressed in a timely manner and if no clear reform measures are established to support the electricity and fuel sectors to stay economically viable over the medium and long terms, the recently-implemented reforms and Government support are unlikely to be sustainable.

84. On social and environmental risks, mitigation instruments based on the project's ESIA's and RPFs such as Environmental Management Plans (EMPs) and Resettlement Action Plans (RAPs) will be developed and disclosed prior to project construction, and consultations will continue during implementation. In addition, a Grievance Redress Mechanism (GRM) for the power plant dispute mechanism was developed in April 2013 to cover both social and environmental complaints to meet the requirements of OP 4.12. However, the on-going instability and sporadic unrest in the country could pose risks during the implementation of these mitigation measures. A close coordination with project PMUs is ongoing to ensure that proper consultation is being comprehensively and timely conducted. Moreover, the PMU of each implementing agency will be strengthened by community communication/outreach specialists. Monitoring institutions and mechanisms will be established to ensure effective implementation, consultations, and disclosure of the mitigation measures.

85. The other main risks that could undermine the sustainability of the project are:

- a. Compromised financial position of EEHC and of the fuel sector, with potentially adverse impact on local financing of the project and its operations (especially fuel supply);
- b. Project implementation risks (implementing agencies' capacities, procurement, financial systems management, implementation delays, and cost overruns); and
- c. Project sustainability in the face of demand risk and fuel supply risk.

86. The key mitigation measures for these risks include:

- a) Sustainable energy pricing and fuel subsidies reforms: The Government targeted electricity tariffs and fuel subsidies through launching a two-phase reform

program (Section I.B, Table I). This program along with the mechanism to compensate EEHC for the increase in fuel prices has positive outcomes. As indicated earlier, the approach of operationalizing this mechanism will play a major role in the financial sustainability of the electricity and fuel sectors. EEHC's track record in ensuring local contribution to project financing has been very good. GASCO's financial position has been sound; the main risks relate to possible delays in payments from EGAS. Under reasonable business scenarios, EGAS should have a financially sustainable position. Its position should be further strengthened by the Government's commitment to reduce fuel subsidies.

b) EEHC has demonstrated the capacity to implement projects on time and within budget, and will provide assistance to UEEPC to the extent needed. UEEPC hired an engineering company (PGESCO) with experience in project management. GASCO has adequate corporate capacity and a proven track record in successfully implementing gas pipeline projects. Helwan South power plant employs the most efficient and well-proven supercritical steam technology, so its construction and operation should not pose unusual challenges. Similarly, the construction and the operation of the gas pipeline will follow well-established practices. The cost estimates for the project reflect the current level of prices and their expected movements during the project implementation period. Due diligence will be conducted by the Bank at critical stages of the procurement process and during contract management.

c) **For demand risk:** Over the past several years, Egypt has experienced difficulties in meeting electricity demand during the peak demand season. For instance, in 2010 the estimated unserved maximum demand was 600MW, or approximately 2.9 percent of peak load served. Electricity demand is likely to continue growing. New generation needs to be added even if energy demand growth is moderated by some slowdown during the political transition and by pricing and energy efficiency measures, which are expected to be progressively strengthened in the medium term. Although the annual demand growth slowed to approximately five percent during the political crisis, EEHC forecasts demand growth to be similar to previous levels (6.4 percent) in the foreseeable future. Helwan South will be one of the more efficient and reliable power plants. Thus, the demand for its output should be sustained, especially given the plant's contribution to the electricity supply of the relatively less developed Upper Egypt areas and to the stability of the system.

d) **For fuel risk:** the risk of inadequate supply of fuel (particularly gas, as a primary fuel for Helwan) is increasing due to persistent underpricing, which undermines the ability of fuel supply companies to finance—and attract private financing to—the exploration, production, refining, transportation, and distribution of fuels, both liquid and natural gas. The recent reforms in fuel prices and subsidies will improve the financial and operating sustainability of the fuel sector, but will not be enough over the medium to long term. Over the next few years, gas supply will be under particularly strong pressure until new gas fields under development become operational, and possibly even longer unless the exploration and development of production fields are accelerated. To increase domestic supply, Egypt is reducing gas

exports. This tactic may not necessarily eliminate the shortage, and could create its own problems. As part of EEHC's five-year plan (2012–2017) for power generation, Helwan South was presented and approved by the Supreme Council of Energy and the Council of Ministers. Such approval exemplifies the commitment by the Ministry of Petroleum (MoP) to meet the gas requirements for the power sector plan and this project. Helwan South's fuel demand has been included in the gas sector supply balance. The fact that the plant capability (as a steam technology) can operate on HFO also reduces the risk of fuel supply disruptions. To further mitigate the risk, the GoE is taking measures to address the possible natural gas shortages in the coming two to three years by: (i) resuming exploration in new gas fields that are expected to increase the domestic gas supply starting in 2016; and (ii) bridging the gap of gas supply shortage until 2016 by importing gas-tendering (bids for liquefied natural gas (LNG) supply already received).

VI. APPRAISAL SUMMARY

A. Economic and Financial Analyses

Economic Analysis

87. The economic justification of the Helwan South Power Project covers the three gas-fired steam-driven generation units, the interconnectors for the Helwan South power station to the national power and gas transmission networks, and associated works. It analyzes the role of the project in the long-term development of Egypt's power supply capacity for meeting its forecast power demand. The economic evaluation also derives the expected economic return to the Helwan South Power Project.

88. The Helwan South Power Project employs the most efficient steam turbine technology. A simple screening curve analysis¹³ indicates, unsurprisingly, that combined cycle gas turbine technology has the lowest levelized cost of electricity when a comparison is made in the absence of power system requirements. The technology choice for the Helwan South project is justified by the need to maintain a certain share of steam technology for power system stability considerations, derating of combined-cycle generation capacity due to temperature effects (especially critical during the peak summer seasons), simpler maintenance requirements, and superior contribution to the security of supply in terms of more affordable back-up fuel.

89. The economic return to the investment in power generation capacity under the Helwan South project is computed for a base case scenario that is formed from the expected values for the cost of natural gas used in the project plant, and the construction and operating cost for the project plant. The economic benefits for the project are derived from the willingness to pay by Egyptian electricity consumers for the forecast increase in electricity consumption.

¹³ The "screening curves" technique calculates the levelized costs of electricity for a particular type of power plants as a function of varying capacity factor of the plant. Capacity factor is a ratio of an assumed annual electricity generation vs. the maximum annual electricity generation possible (as if the plant were to operate continuously throughout the year at its maximum capacity).

At ten percent discount rate -- taken to be the Opportunity Cost of Capital (OCC) to Egypt -- and assumed short-term price elasticity of demand of -0.2¹⁴, the project Net Present Value (NPV) is estimated to be US\$5,270 million, and the economic rate of return to the project is 20.2 percent, which shows a positive economic return relative to the OCC. A range analysis for the short-term price elasticity of demand shows that if it varies between -0.25 and -0.15, the Net Present Value (NPV)/Economic Internal Rate of Return (EIRR) vary between US\$2,089 million/15.5 percent and US\$16,365 million/27.9 percent.

90. Because of considerable uncertainty about forecasting the main evaluation variables, the sensitivity of the NPV and EIRR is tested in scenarios with different values for these variables from the values used in the base case scenario. The analysis shows that with price-elasticity of demand at -0.2, the project economic return is: (a) 18.8 percent under 20 percent higher construction cost for the Helwan South project than the value used in the base evaluation case—equal to the OCC; (b) 17.2 percent under a 20 percent lower demand growth rate; (c) 17.2 percent under a 20 percent higher cost of natural gas used in the plant; and (d) 15 percent in a scenario that combines all three of these changes.

91. Since this analysis is based only on the cost of energy supplied, these results do not include the substantial other benefits of steam units which are hard to quantify but nevertheless important (load following; contribution to system stability, especially in a situation of sudden transmission or generation outages; fuel diversity; and temperature derating).

92. The principal project benefits, stemming from a more reliable electricity supply, accrue to all population (of which 49 percent is female) since they have access to electricity throughout the country.

Financial Analysis

93. This financial analysis evaluates the overall financial situation of EEHC group of companies, covering the whole spectrum of electricity generation, transmission and distribution businesses. This is followed by an assessment of EGAS¹⁵, the legal owner of the new natural gas pipelines for the Giza North and Helwan South power plants and the entity ultimately responsible for servicing the loans for these gas pipelines. The assessment concludes with a financial overview of GASCO, a subsidiary of EGAS (70-percent ownership) responsible for overseeing gas pipeline construction, operation and maintenance.

94. For EEHC, the main findings of the financial assessment are:

¹⁴ It is difficult to estimate short-term (within a year) price elasticity for Egypt's electricity demand with a sufficient degree of confidence, since the actual behavior of consumers has not been observed under cost-covering prices due to the traditional under pricing of electricity in Egypt. As EIRR and NPV values for the project are quite sensitive to the assumed short-term price elasticity of demand (-0.3 for the base case), additional analysis will be undertaken as part of project appraisal.

¹⁵ EGAS assessment is carried out on a nonconsolidated basis. EGAS does not prepare consolidated financial reports.

- (a) *EEHC remains in a precarious financial situation with a high level of outstanding liabilities relative to capital (9.7 times) and a large planned investment program (larger than existing fixed assets).* The Government's decision to further raise tariffs by approximately 15 percent (see Table I in Section I.B for details) in FY2013 provided much needed relief to commensurate rising operating costs. The authorities and EEHC are aware of the situation and have been working to restructure EEHC capital structure. A Supreme Energy Council Decree was issued in May 2011, authorizing in-principle the Ministry of Finance, the Ministry of Electricity and Energy, and EEHC to restructure the loan from the National Investment Bank of Egypt (NIB) and to settle accumulated financial obligations between EEHC and governmental agencies. The NIB is EEHC's largest creditor with outstanding loans of EGP21 billion by end FY2012. EEHC envisages its debt obligations to NIB to reduce by as much as one half of the current amount following the restructuring. Also in FY2012, EEHC owed over EGP40 billion to governmental agencies; on the other hand, governmental agencies owed EEHC approximately EGP11 billion.
- (b) *In FY2013 the Government announced measures to compensate EEHC for the increase in cost of fuel for power generation.* The Government announced that a portion of the cost of natural gas, mazout and light fuel oil for power generation will be subsidized directly from the state budget. These measures would keep EEHC's financial cost of fuels relatively stable until further notice, while the overall electricity tariffs could be gradually raised toward a cost recovery level in the next five to ten years.
- (c) *Increases in materials and services cost had outpaced revenue growth partly due to a shift toward Combined-Cycle Gas Turbine technology. Salaries and wages also outpaced revenue growth.* Approximately 6,600 MW of CCGT were added to the generation mix over FY2005–FY2011¹⁶. About this same period revenue grew on average 14 percent per year while materials and services cost grew by 22 percent, and salaries and wages grew by 20 percent—the only two cost categories growing faster than revenue. Other main cost categories—fuels, financing, depreciation charges—did not outpace revenue growth. EEHC has had to outsource certain operation and maintenance work for CCGT, contributing to such cost increases. As a result, materials and services cost reached a substantial 16 percent and salaries and wages reached 25 percent of revenue in FY2012, respectively.
- (d) *Importance of reforms for EEHC's financial sustainability: the prevailing financial situation and Government's compensation to EEHC for the increase in fuel for power generation would allow EEHC to carry out its investment program (over EGP100 billion of investments under the five-year investment*

¹⁶ Between FY2005–FY2011, CCGT capacity increased from 2,699 MW to 9,327 MW; stand-alone gas turbine capacity reduced from 1,537 MW to 1,376 MW; steam turbine capacity increased from 11,500 MW to 12,859 MW; and hydro power capacity remained at approximately 2,800 MW.

plan) and meet its financial obligations in the next five to ten years. Meanwhile, electricity tariffs could be gradually raised toward a cost recovery level, and fuel subsidies could be eventually lifted. This reflects new electricity tariffs for most customers, effective in FY2012–2013, and assumes no change to gas and fuel prices for EEHC until end of FY2017. Average electricity tariffs are assumed to increase at 7.5 percent per annum during FY2014–2018 (a continuation of the recent tariff increase by the Government) and three percent thereafter. The assessment underscores the need to de-leverage EEHC, the need for sustainable electricity tariffs, and the need for an adequate budget for governmental users to fully cover electricity expenses. These would allow EEHC to properly maintain existing assets, to carry out its investment program and to become a credible off-taker of electricity from future private independent power producers (IPPs).

95. For EGAS and GASCO's financial performances have been satisfactory. The following is a highlight for the financial performance.

- (a) EGAS is in a position to maintain its financial situation and to fully service its debt obligations over the ten-year assessment timeframe. However, the company may experience shorter-term cash shortfall should the margins from liquefied natural gas trading business fall below a certain threshold. To mitigate this risk, the authorities may consider allowing EGAS to make some profits from the natural gas transportation business—currently a cost-recovery business with no profit. In addition, EGAS's return on investment could help supplement its future revenue and cash flow.
- (b) GASCO is effectively an operating arm and a financing vehicle of EGAS and Egyptian General Petroleum Company (EGPC) for gas transportation and processing businesses. GASCO's financial situation is sound and not expected to hinder its ability to oversee the construction of the new gas pipelines for Giza North and Helwan South power plants. EGAS will be the owner of these pipelines and ultimately responsible for the repayment of loans for these new pipelines by passing through payments to creditors via GASCO. This pass-through or back-to-back arrangement has been in place since 2002.

Table V: Summary of EEHC Financial Results and Indicators

	Unit	2007/08	2008/09	2009/10	2010/11	2011/12
		actual	actual	actual	actual	actual
GWh sold	GWh	107,226	112,617	120,180	126,957	137,333
Average tariff	EGP / kWh	0.174	0.187	0.194	0.201	0.203
Natural gas used in EEHC plants	BCM	19.1	19.9	21.5	22.8	26.3
HFO used in EEHC plants	Ton million	4.6	5.2	5.6	5.2	4.6
Diesel used in EEHC plants	Ton million	0.1	0.1	0.2	0.1	0.1
Average natural gas prices	US\$/MMBtu	0.8	0.9	0.9	0.9	0.9
INCOME STATEMENT SUMMARY						
Electricity sales	EGP million	18,687	21,024	23,336	25,581	27,886
Total revenue	"	20,357	23,003	25,830	28,550	31,655
Fuel expenses	"	(4,287)	(4,939)	(5,524)	(5,498)	(6,081)
Purchased electricity expenses	"	(1,897)	(1,996)	(2,227)	(2,255)	(2,408)
EBITDA	"	7,224	8,081	8,582	9,000	8,301
Financing expenses	"	(3,166)	(4,000)	(3,925)	(4,225)	(4,603)
Depreciation	"	(2,477)	(2,665)	(3,043)	(3,743)	(4,249)
Net income	"	874	1,742	2,165	465	693
CASH FLOW STATEMENT SUMMARY						
Changes in working capital	"	7,064	2,529	5,748	5,991	2,409
Operating cash flow, net	"	6,701	7,249	8,339	7,565	5,384
Investing cash flow, net	"	(6,993)	(10,976)	(10,691)	(14,694)	(14,827)
Financing cash flow, net	"	1,961	4,325	2,135	5,702	8,533
Change in cash	"	1,669	599	(217)	(1,426)	(911)
Cash ending balance	"	4,182	4,781	4,564	3,138	2,227
BALANCE SHEET SUMMARY						
Total assets, of which	"	96,638	109,182	119,781	136,971	149,828
<i>Cash</i>	"	4,182	4,781	4,564	3,138	2,227
<i>Receivables</i>	"	17,225	18,793	18,079	18,678	21,250
<i>Fixed assets, net</i>	"	70,094	80,202	90,604	108,105	119,045
Total liabilities, of which	"	86,807	97,498	107,818	124,382	135,771
<i>Long-term debt, gross</i>	"	49,029	54,324	58,806	68,065	74,122
<i>Current portion of long-term debt, estim</i>	"	2,922	2,635	4,091	6,552	7,024
<i>Past due liabilities*</i>	"	28,244	32,654	36,918	41,497	41,991
Total equity	"	9,831	11,684	11,963	12,588	14,058
Financial ratios						
EBITDA margin	%	35%	35%	33%	32%	26%
Net margin	%	4%	8%	8%	2%	2%
Return on equity	%	9%	15%	18%	4%	5%
DSCR - EBITDA**	times	0.7	1.2	1.3	1.1	1.0
DSCR - net operating cash flow***	times	1.0	1.6	1.9	1.4	1.1
EBITDA interest coverage ratio	times	2.3	2.0	2.2	2.1	1.8
Self-financing ratio	%	52%	66%	53%	24%	9%
Current ratio	times	0.6	0.6	0.5	0.5	0.4
Cash on hand (# day of revenue)	days	75	76	64	40	26
Receivables day (# day of revenue)	days	309	298	255	239	245
Payables day (# day of external costs)	days	301	286	274	325	390
Liabilities-to-equity ratio	times	8.8	8.3	9.0	9.9	9.7
Long-term debt-to-equity ratio	times	5.0	4.6	4.9	5.4	5.3
Long-term debt / net operating cash flow	times	7.3	7.5	7.1	9.0	13.8
Net debt**** / EBITDA	times	10.2	10.3	10.8	12.0	14.0
Annual % change - GWh sold	%	8.5%	5.0%	6.7%	5.6%	8.2%
Annual % change - average tariff	%	7.8%	7.1%	4.0%	3.8%	0.8%
* Past due liabilities are largely obligations to the Ministry of Finance.						
These obligations are gradually being setoff against the cost of electricity supplied to governmental users.						
** EBITDA divided by previous year current portion of long-term debt and interest expenses for the year.						
*** Operating cash flow and interest expenses -- net of changes in working capital, divided by previous year current portion of long-term debt and interest expenses for the year.						
**** Sum of short- and long-term debt/obligations, subtract cash balance						

Source: EEHC

B. Technical

96. The Helwan South power plant consists of three identical supercritical steam turbine units, each with a rated gross capacity of 650 MW, operating on natural gas as the primary and HFO as the back-up fuel. The supercritical technology operates on higher temperature and pressure inside the steam generator, allowing for better efficiency in comparison with the subcritical technology (prevalent in Egypt's steam power plants) by three to five percentage points, with the consequent fuel savings and environmental benefits (five to ten percent savings in fuel consumption and carbon and other emissions). Although this is only the second power plant in Egypt with this technology¹⁷, the technology is well proven internationally, with decades of operational experience and represents low technology risk.

97. The technology choice was driven by the following considerations:

- (a) system security: the heavier steam turbines provide superior system support in terms of load following, especially in cases of sudden disturbances, in comparison with the lighter gas turbines, and a certain share of steam turbines in the system is therefore desirable;
- (b) energy security: steam turbines can use domestically supplied and less expensive HFO oil rather than the more expensive light fuel oil used by gas turbines;
- (c) higher contribution to the peak capacity: steam turbines are less sensitive to temperature-related derating than gas turbines, which is an important benefit since the highest outdoor temperatures coincide with peak demand season (summer); and
- (d) easier maintenance: there is a better developed local capacity for maintaining steam power plants, as maintenance of gas turbines is highly specialized and relies more on imported expertise and parts and is thus more costly and subject to scheduling problems in terms of availability of specialized crews, especially in cases of unplanned outages.

98. Gas pipelines to be built under the project do not pose particular technical challenges, as the pipelines will use the standard materials and well established construction techniques, including horizontal drilling.

C. Financial Management

99. The UEEPC has its financial management (FM) activities and responsibilities distributed among different departments within the UEEPC financial sector (accounting and budgeting, investment audit, cost accounting) and various subsections within these departments. Although the current arrangements may best serve the company's information needs, they are found to be inadequate for the project accounts to be compiled and consolidated as needed for the Helwan South project. To mitigate this issue, a Financial Management Unit (FMU)

¹⁷ Ain Sokhna power plant, financed by the World Bank (P100047), is the first power plant that employs supercritical steam technology.

was established in October 2011 that will have the overall responsibility for the project's FM activities including recording, budgeting, Bank reporting requirements, and handling the loan disbursement arrangements including supporting documentation. The unit is headed by a financial manager and includes three accountants, seconded from UEEPC for the duration of the project, for record keeping, finance and disbursements, and planning and reporting. A financial manual was prepared by the project FM team reviewed and found acceptable in November 2011. The Manual was updated in June, 2012. The UEEPC FM team has developed a financial accounting and reporting software that will be used for the project. UEEPC complied with the Bank's FM requirements.

100. The automated accounting system was developed in-house and built on SQL database architecture. The system is multicurrency input modes, includes basic security requirements and is capable of producing the quarterly Interim Financial Reports (IFRs) and annual Project Financial Statements (PFs) required under the umbrella of the project.

101. GASCO has its FM responsibilities and activities distributed between different departments (accounting, financial controls, and payments, assets/inventory/costing, and commercial affairs) and various sub-sections within those departments. It was agreed to assign a special Financial Management Team member from each department to act as the focal point for the Bank financed project. The team was constituted on April 14, 2011 by an official internal memo from the vice-chairman of the company and in charge of financial and commercial affairs of GASCO. Management of the Bank loan, from an FM perspective, will follow GASCO's existing accounting and reporting cycles described in detail in Annex 3. Acceptable accounting software is already in place, which will be used for the project's recording and reporting purposes. Payments under the IBRD loan are expected to be through Reimbursement, Special Commitments and Direct Payment methods as well as through a Designated Account (DA), as needed. GASCO complied with the Bank's FM requirements.

D. Procurement

102. Procurement Capacity Assessments (PCA) were carried out for the implementing agencies of both investment components, UEEPC/PGESCO (power plant) and GASCO (gas pipelines). Annex 3 provides additional information on the procurement capacity assessment, procurement implementation arrangements the risks identified and the recommended mitigation measures.

103. The Procurement risk for the project was assessed as "Moderate". This will be UEEPC's first experience in implementing a Bank project, and as such, risks for the power plant component, were identified as Moderate for UEEPC/PGESCO. The following risk mitigation measures were identified and have been put in place: (i) UEEPC/EEHC to carry out general oversight and quality assurance of procurement activities entrusted to PGESCO and (ii) UEEPC/EEHC to closely monitor and follow up on all procurement and contract management activities under the project in close coordination with PGESCO and the assigned World Bank procurement specialist for the project.

For the gas pipeline component, it was found that GASCO has some experience in procurement in international donor financed projects, although little experience with the

World Bank. However, considering that there is only one type of procurement for the Gas Pipeline Component namely, Procurement of Goods, that all major packages are subject to prior review, and the experience gained implementing the Additional Financing of the Giza North Project, the risk was considered to be moderate. The following risk mitigation measures were identified and have been put in place: (i) GASCO to appoint their most experienced staff in the Procurement Department and in sufficient numbers for this project; (ii) GASCO's General Procurement Manager and Foreign Procurement Department Manager to be fully involved in all the critical stages of the procurement process; and (iii) GASCO to closely monitor and follow up on all procurement activities under the project in close coordination with the assigned World Bank procurement specialist for the project.

104. The draft Procurement Plans for the project, prepared by the implementing agencies, were received by the Bank in June 2012 and found to be acceptable. These plans were finalized during negotiations and subsequently updated annually or as needed to reflect the latest project requirements.

E. Social (including safeguards)

105. Social impacts of the project are, on balance, expected to be positive. It has been confirmed by the Bank that support for the project among local stakeholders is strong, as the proposed project is expected to bring much needed local employment, as well as increased land prices. UEEPC will give priority to employing local workers both during construction and operation.

106. ***Operational Policy on Involuntary Land Acquisition and Resettlement (OP 4.12)***: The project triggered the Bank's social safeguard policy on Involuntary Resettlement (OP 4.12). All resettlement related activities will follow the World Bank safeguards policy on involuntary resettlement. The land acquisition needs for the project do not require relocation of houses and OP 4.12-related impacts are not major, as presented in more details below.

- i. ***Land Acquisition Impacts – The Power Plant***: The largest land requirement is for the power plant itself, approximately 90 fedan (1 fedan = 1.03 acres), or approximately 38 hectares, located on barren desert land, which was Government owned and transferred to UEEPC through a Presidential Decree No. 43 of February 14, 2010 for the purpose of building the power plant. The site extends to the main road and thus there is no need to construct access roads to reach the site. However, there is a strip of farm land—35 fedans, 1 quirat, and 9 sahm in size¹⁸ -- between the plant site and the Nile River, owned or used by 32 families¹⁹. UEEPC is in the process of acquiring this land on a “willing-buyer/willing-seller” basis. If for some

¹⁸ One fedan has 24 quirats; and 1 quirat has 24 sahms.

¹⁹ Twenty-nine plots, with a combined size of 29 fedans, 13 quirats, and 8 sahms are owned by the respective 29 families. Two plots—one 20 quirats in size, and the other 1 fedan and 17 quirats—traditionally have been used by 2 families. One plot of 2 fedans, 23 quirats, and 1 sahm in size was given to a family under the “agrarian reform.” To ensure compliance with OP 4.12, the Helwan Project Task Team has been working with UEEPC on the ongoing willing-buyer/willing-seller process for titleholders, as well as compensations and benefits for squatters and titleholders cultivating the Government land.

reason UEEPC is unable to acquire the land through “willing-buyer/willing-seller” transactions, it will resort (to the extent necessary) to the process of involuntary land acquisition and will prepare a RAP, consistent with the RPF which already has been prepared.

- ii. ***Land Acquisition Impacts – The Gas Pipelines.*** GASCO, which is the implementing agency for the two gas pipelines that are part of the project—the Dahshour-Atfeeh and the Abu Homos-Nubaria -- has prepared ESIA and RPF for the pipelines and will prepare corresponding RAPs and implement them prior to the start of construction. *Permanent land acquisition* for the pipelines includes eight plots of land for eight valve rooms for each pipeline (16 in total for both pipelines), which are spaced along the routes. Each valve room requires a plot of size of approximately 25 m x 45 m which GASCO hopes to acquire through willing buyer-willing seller transactions. There also is *temporary land acquisition* during construction. Compensation for temporary land acquisition, including the permanent restrictions (easement along the Right-of Way (ROW)), is negotiated and GASCO appears flexible in its approach to minimize the social impacts of the project. Compensation for the *temporary land acquisition* during construction and for the ROW will be made using the Egyptian crop compensation system administered by the Ministry of Agriculture which meets the basic requirements of OP 4.12. A RAP, consistent with the RPF, will be developed to cover all impacts associated with the gas pipeline, translated into Arabic and disclosed and compensations paid prior start of construction work.
- iii. ***Land Acquisition Impacts –The Electricity Transmission Lines.*** The transmission lines will be implemented under a different project by the Egyptian Electricity Transmission Company (EETC) and corresponding ESIA and RPFs have been prepared-satisfactory to the Bank²⁰ *Permanent land acquisition* will be limited only to the land needed for the towers (tower base). The largest tower requires a parcel of land 25mx25m in size for its base. EETC practice is not to buy the land but to enter into a long-term lease for tower bases. Each tower has four concrete foundations, with each foundation requiring a piece of land at most 4mx4m in size; the rest of the tower base can be used by the owners. A RAP will be prepared to cover all impacts (both permanent and temporary), translated and disclosed and compensations paid prior to the start of construction work.

F. Environment (including safeguards)

107. In accordance with the requirement of a Category A project, a comprehensive ESIA was carried out for the Helwan South power plant. The site belongs to UEEPC, which has been allocated to the UEEPC by a Presidential Decree No. 43 dated 14 February 2010 for the development of the Helwan South power plant. The overall proposed site area is approximately 378,000 m². The site is predominantly desert with some agricultural land adjacent to it and between the location of the plant and the Nile River. There are no human

²⁰ The safeguards documents for the transmission line - to be constructed under a separate project implemented in parallel with Helwan South, also financed by an IBRD loan- were disclosed on September 07, 2012 prior to the appraisal of Helwan South project. They were reviewed by the Bank during and after Helwan South appraisal and will be re-disclosed.

settlements within approximately two kilometers of the power plant site and no evidence of past industrial or commercial activity. The field surveys have indicated that there are no floral and faunal communities and/or species of conservation value (rare or threatened), including natural habitats or cultural properties within the project's area of influence.

108. The ESIA indicates availability of sufficient quantity of water from the Nile River for the proposed project, as well as the existing power projects upstream and downstream of the Helwan South power plant. The ESIA also indicates that water requirements is 82,861 m³/hr out of which cooling water for the Helwan South power plant will be abstracted from the Nile River at the rate of 23 m³/sec per unit, i.e. 82,800 m³/hr. From 82,800 m³/hr amount of cooling water, 57.96 m³/hr is consumed while the rest will be returned to the Nile River. This means that actual water consumption is approximately 0.07 percent of the abstracted water. The flow in Nile river varies between 60-250 million m³/day with average seasonal flow of water in the Nile River is as follows: Minimum flow (Winter time): 60 million m³/day at a Mean Seal Level (MSL) of 21.28m (6.63 percent of the Nile total). Dominant flow (Average time): 90 million m³/day at a MSL of 23.63m (4.42 percent of the Nile total). Maximum flow (Summer time): 250 million m³/day at a MSL of 24.36m (1.59 percent of the Nile total). The ESIA indicates that water requirements (for both service and cooling) at Helwan South are not expected to cause significant adverse environmental impacts or affect the capacity of other downstream users.²¹

109. During operation, exhaust gases will be emitted into the atmosphere from the boilers' stacks as a result of fuel combustion. The ESIA indicates that the emissions from the combustion of natural gas will include carbon dioxide (CO₂), water vapor, carbon monoxide (CO) and nitrogen oxides (NO_x), sulfur dioxide (SO₂) and particulates. These emissions will be within the emissions norms stipulated under the World Bank guidelines, as well as the Egyptian environmental regulations. Heated cooling water will be discharged into the Nile River via the cooling water discharge structure at a temperature within 3°C at the edge of mixing zone. Process waste water will be treated before being discharged. Any oil and residual solids will be removed before discharge and the pH of discharged water maintained at between six and nine. Chlorine will be added to the cooling water system to control bacterial and algal growth on various surfaces and in the cooling water intake. The cooling water discharge will contain residual quantities of chlorine at concentrations below the World Bank standard for free chlorine of 0.2 mg/l. Small volumes of solid wastes will be segregated, collected and disposed of by licensed waste disposal contractors. The power plant will incorporate a range of measures to eliminate or reduce operational releases within its design and layout, such as adoption of low NO_x burners in the boilers, oil interceptors fitted to the site drainage system and effluent treatment facilities to treat wastewater prior to discharge. As a result, the power plant will be designed to comply with the emission limits of the Arab Republic of Egypt and the World Bank.

110. Before selecting gas/oil-fired combined cycle technological option for Helwan South Plant, the ESIA analyzed various alternatives of fuel and technology. The ESIA also

²¹ As per the ESIA, there are no underground water wells used for irrigation or other purposes that would be adversely impacted during construction and operation of the plant. However, a screening study will be conducted before construction to ensure that any dewatering will not impact wells water or irrigation activity. The study area will be expanded to include the nearest cultivated land.

considered three alternative sites: Safaga, Sharm esh-Sheikh, and Helwan South. The Helwan South was selected as the best compromise, considering various economic and non-economic factors, including, among others, the scale and scope of environmental and social impacts and overall infrastructure requirements and cost.

111. Separate ESIA's for the two underground gas pipelines have been completed. The gas pipeline from the Dahshour compression station to the power plant site near Atfeeh will run generally parallel to the existing 36" Dahshour-El Kureimat pipeline and along an existing road. For a large section of the pipeline that is expected to run through desert land, the ESIA does not indicate evidence of any sensitive habitats; cultural properties, settlements or environmental receptors; or industrial or commercial activities that may potentially get adversely affected due to construction or operation of the gas pipeline. Construction of the gas pipeline will require 20 meter right-of-way during construction, which may result in temporary inconvenience for farmers and residents in such areas. The environmental and social impacts are expected to be limited to construction stage, and may include loss of top soil due to excavation, debris disposal, use and disposal of concrete and brick waste, use and disposal of lubricants and waste oil, dust and noise generation during construction, and potential damage to existing community/village roads due to transportation of heavy machinery. The pipeline will be buried below the ground level at a depth of 2-3 meters. After completion of works, the land will be fully restored to original condition, and farmers will be allowed to cultivate. There will be some restriction within the right of way with respect to any future construction of structures that may have potential to damage the pipeline. All river and water body crossing for the pipeline will use horizontal directional drilling technique to pass under the river bed, which is an internationally accepted standard practice to minimize environmental obstruction to water course. The farmers would be compensated in line with established practice in Egypt, prior to initiating any construction works for any temporary loss of agriculture, in case the losses are unavoidable. The exact alignment of the pipeline is not yet finalized but communities have been consulted. The ESIA for the gas pipeline indicated that most of the impacts will be construction related, which will be mitigated by implementing Environment and Social Management Plan (ESMP), including Environment, Health and Safety requirement in conformance with the World Bank/IFC guidelines.

112. The ESIA for the other pipeline which runs from Abu Hommos compressor station to El Nubaria was carried out following the World Bank guidelines. The chosen alignment based on an analysis of alternatives will cross a few roads, railways and canals, which will be done using horizontal directional drilling technique to pass under the river bed, which is an internationally accepted standard practice to minimize environmental obstruction to water course. As with the Dahshour-Atfeeh pipeline, the ESIA for Abu Hommos-El Nubaria pipeline does not indicate evidence of any sensitive habitats; cultural properties, settlements or environmental receptors; or industrial or commercial activities that may potentially get adversely affected due to construction or operation of the gas pipeline. Following a similar construction practice, the anticipated environmental and social impacts will be mitigated by implementing an Environment and Social Management Plan, including environment, health and safety requirement in conformance with the World Bank/IFC guidelines. The farmers would be compensated in line with established practice in Egypt, prior to initiating any construction works for any temporary loss of agriculture, in case the losses are unavoidable.

113. In order to ensure that the views and interests of all project stakeholders are taken into accounts, three stage phase public consultations were carried out for the power plant. The objectives of consultation and disclosure were to ensure that all stakeholders and interested parties, are fully informed of the proposed project, have the opportunity to voice their concerns and that any issues resulting from this process are addressed in the ESIA and incorporated into the design and implementation of the project. The first phase consultation focused on getting public inputs during the scoping and preparation of this ESIA Report, including the organization of a Public Scoping Meeting on 24 November 2010, in the Helwan Governorate. This was followed by continuous consultation during the preparation of ESIA and the RPF. The final stage consultation was organized on 16 March 2011, at the Kureimat Power Plant site, which was publicized through a press advertisement in Al-Ahram Newspaper (on 7 March 2011) describing the project and inviting interested parties to attend the public meeting and review the draft final ESIA Report. A Non-Technical Summary (in Arabic) was distributed along with an invitation letter prior to consultation meeting. The ESIA was revised incorporating comments and suggestion received during the consultation meeting.

114. For Abu Hommos Nubaria gas pipeline a public consultation meeting was held on May 25th, 2011 in the town of Damanhour, and for Dahshour-Atfeeh pipeline on April 9, 2011 in Maymoun village, Beni Suef. The meetings provided broad support to the pipelines and the power project, including mitigation measures as outlined in the ESIA report. Non-technical summaries of the ESIA reports were presented to a large group of stakeholders, and questions and comments were received at the meeting were incorporated to revise and disclose the ESIA reports.

G. Other Safeguards Policies

115. The project triggers the policy on Projects on International Waterways (OP 7.50). The Bank notified the Nile River riparian states of the Helwan South project on October 13, 2011 and requested that their comments, if any, be provided to the Bank by November 14, 2011. No comments were received from any of the riparian states during the notification period or since. Pursuant to the requirements of OP 7.50 and on the basis of the Bank team's assessment that the project activities will not cause appreciable harm to the other riparian states, the MNA Regional Vice President gave approval on February 3, 2012 to proceed with preparation of the project for Bank financing.

Annex 1: Results Framework and Monitoring

Egypt, Arab Republic of EG - Helwan South Power Project (P117407)

Results Framework

Project Development Objectives

PDO Statement

The project development objective (PDO) is to increase power generation capacity in an efficient manner within the Borrower's territory.

Project Development Objective Indicators

Indicator Name	Core	Unit of Measure	Baseline (2013)	Cumulative Target Values					Frequency	Data Source/ Methodology	Responsibility for Data Collection
				2014	2015	2016	2017	End Target			
Generation Capacity of Conventional Generation constructed under the project	<input checked="" type="checkbox"/>	Megawatt	0.00	0.00	0.00	0.00	1300.00	1950.00	Annually	EEHC/UEEP C Progress Report	UEEPC
Annual net electricity generation	<input type="checkbox"/>	Gigawatt-hour	0.00	0.00	0.00	0.00	6,723.00	13,447.00	Annually	EEHC/UEEP C Progress Reports	UEEPC

Minimum Thermal energy conversion efficiency	<input type="checkbox"/>	Percentage	0.00	0.00	0.00	0.00	40.00	40.00	Annually	EEHC/UEEP C Progress Reports	UEEPC
Direct Project Beneficiaries, of which female (%)	<input checked="" type="checkbox"/>	Number /Percentage	0.00	0.00	0.00	0.00	3,799,000 49%	7,391,000 49%	Annually	EEHC/UEEP C Progress Reports	UEEPC/EEHC

Intermediate Results Indicators

Indicator Name	Core	Unit of Measure	Baseline 2013	Cumulative Target Values					Frequency	Data Source/ Methodology	Responsibility for Data Collection
				2014	2015	2016	2017	End Target			
Procurement progress (Power Plant) (Bank financed packages)	<input type="checkbox"/>	Percentage	0.00	100.00	100.00	100.00	100.00	100.00	Semi-Annually	EEHC/UEEP C Progress Reports	UEEPC
Construction Progress (Power Plant)	<input type="checkbox"/>	Percentage	0.00	10.00	30.00	70.00	90.00	100.00	Semi-Annually	EEHC/UEEP C Progress Reports	UEEPC
Actual cost vs Cost Estimates (overruns if >100%)	<input type="checkbox"/>	Percentage	0	0	<=100	<=100	<=100	<=100	Semi-Annually	EEHC/UEEP C Progress Reports	UEEPC
EEHC's current ratio	<input type="checkbox"/>	Number	0.5	n/a	=>0.5	=>0.6	=>0.6	=>0.6	Annually	EEHC/UEEP C Progress Reports	EEHC
EEHC's DSCR	<input type="checkbox"/>	Number	1.1	n/a	=>1.1	=>1.1	=>1.1	=>1.1	Annually	EEHC/UEEP C Progress Reports	EEHC
Procurement Progress (Gas	<input type="checkbox"/>	Percentage	0.00	100.00	100.00	100.00	100.00	100.00	Semi-Annually	GASCO Progress	GASCO

Pipelines)										Report	
Construction Progress (Gas Pipelines)	<input type="checkbox"/>	Percentage	0.00	0.00	60.00	100.00	100.00	100.00	Semi-Annually	GASCO Progress Report	GASCO
EGAS's current ratio	<input type="checkbox"/>	Number	1.0	N/A	=>1.0	=>1.0	=>1.0	=>1.0	Annually	EGAS Progress Reports	EGAS
EGAS's DSCR	<input type="checkbox"/>	Number	1.3	n/a	=>1.2	=>1.2	=>1.2	=>1.2	Annually	EGAS Progress Reports	EGAS

Notes on indicators:

a. The indicator for the Gross Generation Capacity for this project represents the installed capacity at ISO conditions.

b. The calculation of beneficiaries' number assumes that the output of Helwan South will spread across grid-connected consumers in all sectors, existing and new, in cities and rural. The per capita consumption 1,549kWh/capita of the year 2012 is used as a baseline with a growth of 2.7% per year to estimate its value for the calculation of number of beneficiaries when the project is operational.

c. Debt service coverage ratio (DSCR) is defined in two ways (The targets in the table apply to both definitions):

(i) Dividing operating earnings before interest expenses, taxes, depreciation and amortization expenses (EBITDA) for a fiscal year with the sum of financing expenses for such fiscal year and the scheduled debt principal repayment for the same fiscal year.

(ii) Dividing the sum of net operating cash flow and financing expenses for a fiscal year with the sum of financing expenses for such fiscal year and the scheduled debt principal repayment for the same fiscal year.

Annex 2: Detailed Project Description
EGYPT, ARAB REPUBLIC OF: Helwan South Power Project

I. Project Components

1. The project includes the following main components: (a) The Helwan Power Plant; and (b) Gas Pipelines, as described below.

Component 1: The Helwan Power Plant (Total: US\$ 2,168.9 million; IBRD:US\$503.8 million): This component includes a 3x650-MW supercritical steam technology power plant, fired by natural gas as the primary fuel and HFO as a backup. The plant comprises three identical units, each of 650 MW gross capacity. The plant will be cooled by once-through cooling system using water from the Nile River. Each of the three units will include the standard set of equipment: a 650-MW steam generator, a steam turbine, a condenser, and an electricity generator; process and cooling water supply systems; an air and flue gas system; a fuel supply system; and a number of auxiliary systems (condensate treatment; hydrogen generation; compressed air; fire protection; emergency diesel generator; start-up power system; medium and low voltage system; direct current power system for control and relays; and uninterruptible power system). The plant also will include a distributed control system and a switchyard with step-up transformers. Engineering and project management services for the power plant, as well as the associated environmental and social impact mitigation plan also will be included in the project.

2. **Component 2: Gas pipelines (Total: US\$235.5 million; IBRD:US\$81.6 million):** two gas pipelines capable of supplying approximately 12.5 million cubic meters of gas per day. One pipeline, 36-inch in diameter and with length of 93 kilometres (km), will connect the Helwan South power plant site, which is near the town of Atfeeh, to the existing gas pipeline network at the compressor station at Dahshour. The other pipeline, 32-inch in diameter 65 km in length, will strengthen the gas transmission network by eliminating a bottleneck that would otherwise prevent normal gas supply to the Helwan South power plant. The pipeline will run from Abu Hommos compressor station to El Nubaria compressor station. Both pipelines will be designed for a maximum pressure of 32 bars. Pipeline inspection and cleaning facilities suitable for use with on-line inspection vehicles and appropriate Supervisory Control and Data Acquisition (SCADA) facilities will be included. The two gas pipelines will enable transmission of gas produced by Burullus, Rashid (Rosetta), and Western Desert gas fields to the Helwan South power plant. The associated environmental and social impact mitigation plan will be included in the project.

II. Complementary Activities: Technical Assistance and Advisory Services

3. Complementary technical assistance and advisory services, to be implemented in parallel with and separately from the Helwan South project, cover a range of activities, from upstream policy advice to transaction services. Their overall aim is to address the priority issues in the sector: (a) advancing energy pricing and fuel subsidies reform as well as reforming social safety nets; (b) attracting private investment; (c) strengthening

sector governance, transparency, and accountability; and (d) advancing energy efficiency and renewable energy. The technical assistance and advisory services activities will be financed through grants from a number of donors, complemented by contributions from the Borrower and the recipient agencies. Technically, these activities are not part of the Helwan South project. However, they are described here because of their importance to enhancing the sustainability of the power sector generally, and so of the Helwan South project as well. The following is a description of such specific activities:

- (a) **Advancing energy pricing and fuel subsidies reform as well as reforming social safety nets system:** The Government is expected to continue the effort to reform energy prices and subsidies in a manner that would improve social protection, reduce fiscal burden, improve financial position of the energy sector, and facilitate energy efficiency and economic allocation of resources²². The Bank also is prepared to continue providing its support through technical assistance implemented by the Bank in cooperation with the Ministry of Finance and other relevant agencies. The work will be funded by a US\$72,000 grant from the Bank Multi-Donor Trust Fund for Poverty and Social Impact Analysis (PSIA) and the Bank budget in the amount of US\$40,000. The work provides a detailed analysis of the distributional impact and incidence of existing subsidies and their gradual reduction, as well as practical advice on the implementation, based on the international experience and Egypt's specific circumstances and a roadmap to consolidate the existing targeted cash programs. The Egyptian authorities applied for US\$6.5 million funding from the proposed World Bank managed Transition Fund, funded by the Deauville partnership, which is expected to be approved by May 2013 and implemented in 2013-2015. The main components include:
- **Power Sector Institutional Development and Financial Viability:** The technical assistance will focus on improving the financial viability and management of the electricity utilities in Egypt and their governance structure, developing effective strategies for the fuel pricing to the power generation, and strengthening the capacity of the Ministry of Electricity in particular in scaling up implementation of energy efficiency programs as part of the means, along with subsidies reform, for curbing growing electricity demand.
 - **Energy Pricing and Fuel Switching Reform Technical Assistance.** The technical assistance will support development and implementation of a comprehensive strategy for fuel subsidies reform in Egypt and implementation of measures to mitigate impact of fuel subsidies removal in the short-run and to provide protection to the poor and vulnerable in the long-run through social safety nets.

²² The Ministry of Finance of the outgoing Government initiated such an effort at the end of 2011. The result was to increase electricity tariffs for energy-intensive industries in January 2012 and substantially reduce the fuel subsidies budget for FY13. The Government continued the reforms of energy and subsidies in a broader approach to improve the financial sustainability of the electricity and fuel sectors.

- **Strengthening Social Safety Nets Technical Assistance.** The technical assistance will support implementation of measures to mitigate impact of fuel subsidies removal in the short-run and to provide protection to the poor and vulnerable in the long-run through social safety nets. Therefore this component supports reforming and strengthening social safety net systems in Egypt by improving targeting and consolidation of existing fragmented Social Safety Nets programs. The proposed activities include analysis of the distribution of family smart cards to assess card coverage and access, carry out baseline surveys and consolidation of household databases. The Ministry of State for Administrative Development (MSAD) will be the main counterpart.

(b) **Attracting private investment in conventional and renewable power generation technologies:** The 2012-2017 power sector investment plan envisages private financing for 5,500 MW in electricity generation, with a 2,250-MW Dairut BOO being the first project from the plan to be financed by the private sector. EEHC has contracted transaction advisors and is in the process of developing an approach for private financing of the Dairut plant that would include appropriate risk mitigation instruments reflective of the current political, economic, and sectoral environment. These activities are funded and implemented by EEHC and are estimated to cost approximately US\$3-4 million. The Bank will continue to provide strategic advice on strengthening the enabling environment for private investment in relation to the overall regulatory and policy environment and risk mitigation instruments, including those offered by the World Bank Group (MIGA guarantees, IFC financing, and IBRD Partial Risk Guarantees). In addition, the World Bank/IFC Investment Climate Unit will provide and implement technical assistance for strengthening policy and regulatory environment for *scaling up renewable energy through private investment*, building up on the effort to have the first 250-MW wind power plant financed by the private sector, supported by the IBRD- and CTF-financed Wind Power Development Project²³. The total funding for this subcomponent is expected to be in the amount of US\$700,000, including some donor funds administered by the Investment Climate Unit. The work should be completed by end of 2013. The counterpart agencies for these activities will be MoEE, EERA, NREA, and EETC.

(c) **Sector governance, transparency, and accountability:** The concept of sector governance and accountability covers a broad range of issues related to the legal, regulatory, and institutional framework for the sector; investment policies and trading arrangements; corporate governance; customer relationships, transparency and public accountability. All these elements are “works in progress” in Egypt. The sector has started to move away from the integrated public monopoly model with the unbundling of the industry, creation of a single-buyer wholesale market and more transparency in trading, establishment of the regulatory agency (EERA),

²³ Project Appraisal Document for a Wind Power Development Project, World Bank, May 19, 2010 (Report No: 54267-EG).

publication of EEHC annual reports, and adoption of competitive procurement practices. However, it is necessary to strengthen commercialization of the sector and its financial position; further empower the regulatory agency and strengthen its autonomy; improve tariff setting process and methodology; improve social protection that better target the needy; and increase transparency and public accountability. The following are specific activities that will be undertaken simultaneously with the Helwan South project (some of which have already been initiated):²⁴

- *Institutional capacity building of EERA*²⁵: The objective of this assistance, provided by the European Union (EUR 891,750), is to strengthen the capacity of EERA in developing and implementing primary and secondary legislation and regulations for the power sector. The scope includes: (A) organization, human resources and training of EERA; (B) advancement of electricity market reform (development of market rules, bilateral contracts templates, grid codes, guidelines for investment planning); (C) development of EERA public register (including web-based public information system); (D) public communications strategy; (E) development of electricity price and tariff regulation methodology and processes; and (F) twinning for capacity building.
- *Transparency and social accountability*: This activity, to be implemented jointly by the Bank and EERA, aims at helping EERA and EEHC to strengthen customer-utility interface; transparency and public information systems; establish performance benchmarking; and improve consumer feedback (“citizen report cards”). This activity is being financed by the Energy Sector Management Assistance Program (ESMAP) trust fund in the amount of US\$120,000 and is well in progress. A final inception report already has been shared with EERA and accepted by the Bank. A launch mission took place late 2012 where a set of meetings were held with the private and public stakeholders. The emphasis of this activity will be to collect information and assess in-depth issues that affect transparency and social accountability practices in order to implement targeted corrective measures.

As such, this activity will implement four set of actions to inform strengthening transparency and social accountability in the sector:

1. *Institutional Analysis*, an analysis of existing institutional and governance arrangements in the power sector in Egypt using a social accountability lens, with particular attention to the mandate of EERA.

²⁴ As described under section B (i), the Transition Fund also includes a main component on strengthening power sector governance.

²⁵ This assistance is provided in support to the GoE in implementing the Association Agreement (AA) with EU and the European Neighborhoods Policy (ENP) and as part of the Support to the EU-Egypt AA Program (SAAP). The broader objectives are (a) to help bring the electricity system in Egypt in line with European Commission (EC) rules and Directives on the competitive market in the production and retail supply of electricity; and (b) to facilitate the strategic desire of the EC to have an electricity and gas link between the western and eastern boundaries of the European Union via the countries of the southern Mediterranean.

2. *Performance Benchmarking*: operational and financial performance indicators used by the regulator to benchmark the quality and efficiency of the various segments of the sector will be reviewed; the company’s ability to report and the ability of the regulator to audit and monitor performance will be assessed; and an action plan to communicate performance indicators to the public developed.
3. *Customer Interface, Transparency, and Public Information Systems*: Review of content, the regulations, rules, procedures, and information technology (IT) tools used for communication between (i) distribution companies – customers, (ii) regulator – regulated companies, and (iii) regulator – public. Performance of the electricity service companies and the ability for consumers to monitor such performance will be assessed (ie. the regulator’s ability to gather consumer complaints, inputs, and feedback).
4. *Consumer Surveys (“Citizen Report Cards”)*: Survey development would be designed to disaggregate the data by gender and regions to allow better targeting of the coverage and quality gaps. The roll out of “citizen report cards” would be conducted in an annual basis covering different geographical areas, urban, and rural, and would both inform EERA about service delivery gaps and would be disclosed by EERA to the public.

(d) **Energy efficiency and renewable energy**: The World Bank has provided a TA on institutional organization for energy efficiency with financial support from ESMAP. The implementation of the recommendations is supported by EU under its *Energy Sector Policy Support Program (ESPSP)*²⁶. In addition, through the Deauville Transition Fund, the Bank will support the establishment of an energy efficiency unit at the MOEE to implement a National Energy Efficiency Action Plan (NEEAP) for the electricity sector. The ESPSP also is supporting RE projects—scaling up solar water heating, wind power generation, and concentrated solar power generation. The EE and RE activities of the ESPSP and the World Bank Group are complementary to strengthen policy and regulatory environment for scaling up RE through private investment. The counterpart agencies will be the EEU for energy efficiency; and EERA, MoEE, and NREA for renewable energy.

116. Technical assistance under the EU ESPSP operation covers a number of policy areas described above, with the objectives to improve the energy policy and regulatory framework and the energy sector financial transparency and performance; and promote development of renewable energy sources and energy efficiency. The ESPSP provides EUR 4 million for the following activities in pursuit of these objectives: (a) update of the Egypt Energy Strategy; (b) improving the gas sector regulation; (c) strengthening the national energy efficiency program and energy efficiency management in key energy consuming sectors and mitigation of greenhouse gas emissions; and (d) a collection of other activities to follow up on the implementation of the

²⁶ The Energy Sector Policy Support Program (ESPSP) provides EUR30 million of assistance, of which EUR26 million is for budget support, to be distributed over 2 years in 3 tranches according to the defined milestones related to the energy sector policy, macroeconomic conditions, and public finance management (PFM). EUR4 million is for TA in support of the ESPSP objectives.

ESPSP: improvement of the energy policy and regulatory framework, including adoption of a new Electricity Law; improvement of the energy sector financial transparency and performance - annual public disclosure of cost-of-service reports and of audited financial statements of state-owned enterprises; and promoting energy efficiency and renewable energy. Further details about the EU ESPSP are presented in Annex 8.

117. The advisory and technical assistance activities will be implemented simultaneously but separately from the Helwan South project, some by the project implementing agencies and some by donors financing the activities, in cooperation with the Borrower, as explained above. Although the outcome of these activities is not part of the result framework covered by the project's legal agreement, the impact of these technical assistance activities will be tracked.

Annex 3: Implementation Arrangements
EGYPT, ARAB REPUBLIC OF: Helwan South Power Project

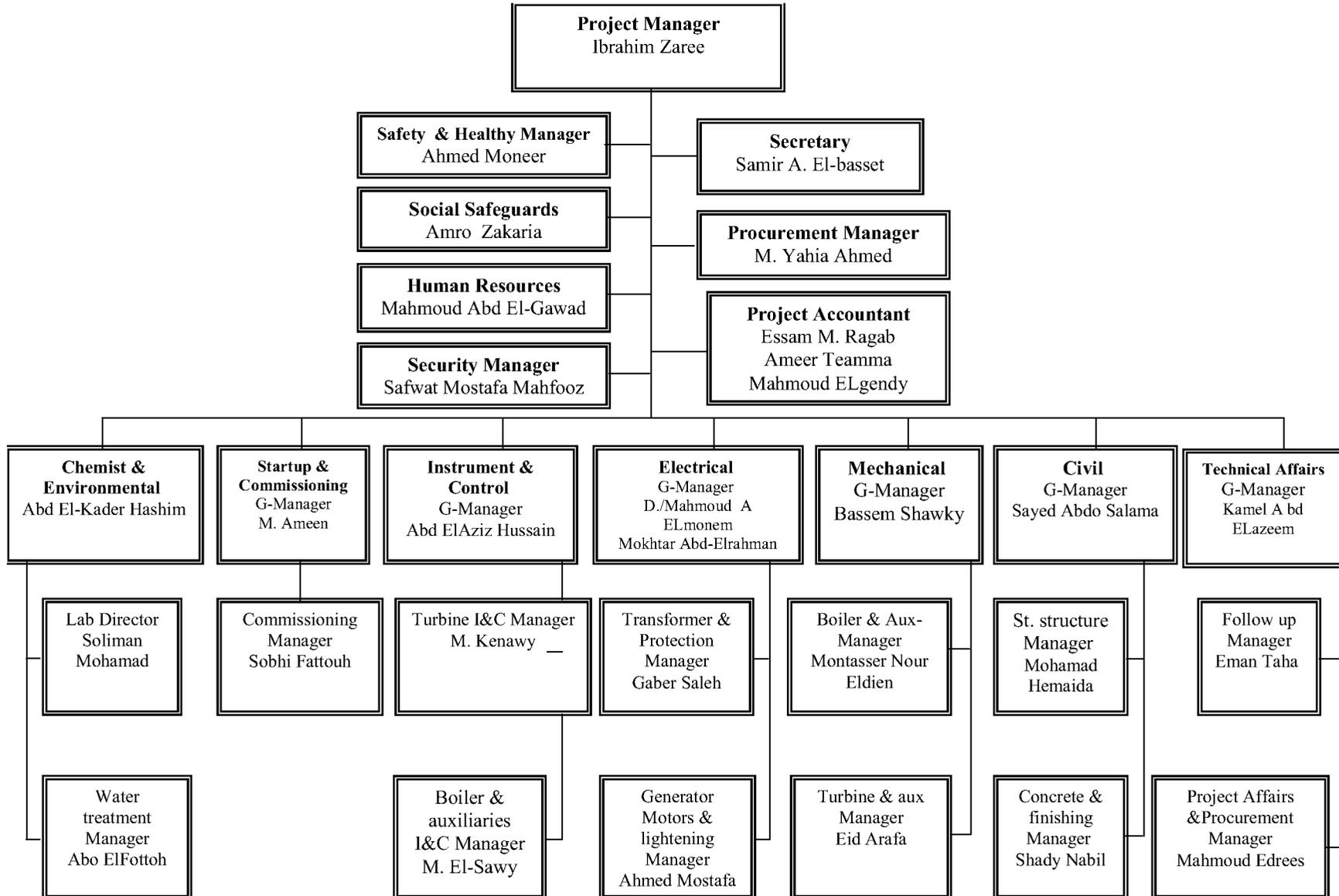
I. PROJECT INSTITUTIONAL AND IMPLEMENTATION ARRANGEMENTS

I. A. PROJECT ADMINISTRATION MECHANISMS

1. The project will be implemented between June 27 2013 and December 31, 2018. The closing Date for the IBRD loan will be June 30, 2019.

2. **The Power Plant component** of the project will be implemented by EEHC and UEEPC, one of its generation subsidiaries, which will own and operate the plant. EEHC will bear overall implementation responsibility for the Power Plant Component and will provide all necessary assistance to UEEPC if and as needed, while UEEPC will be directly implementing the project and be responsible for its day-to-day management. UEEPC has contracted an experienced engineering company, PGESCO, to assist with engineering, procurement, construction, and project management. PGESCO has performed similar assignment in a number of other large power generation projects in Egypt. UEEPC established a Project Management Unit (PMU) with key staff appointed (project manager, project engineers, procurement coordinator, and environmental and social safeguards coordinator). The PMU will be further expanded as the project implementation gets under way.

Figure 1: UEEPC's Project Management Unit (PMU)



3. **The Gas Pipeline Component** will be implemented by GASCO, a subsidiary of EGAS, in charge of implementing investment projects in the gas transmission network and operating and maintaining the gas transmission networks. Although EGAS is the owner of the gas transmission network assets, according to an Agreement between EGAS and GASCO which defines their respective roles and responsibilities in such undertakings, GASCO can borrow funds for financing the construction of gas pipelines and servicing such loans.. GASCO has a strong technical capacity and follows design and construction and maintenance standards similar to those used by the British Gas of the United Kingdom. During preparation, GASCO prepared the technical design and feasibility study report. A deputy general manager in GASCO has been appointed to manage and coordinate the implementation of the Gas Pipeline Component. Dedicated staff in different departments has been assigned responsibility for procurement, financial management, technical, and safeguard aspects. Each person in charge is supported by a group of staff in the various departments of GASCO with expertise in the respective areas.

Figure 2: GASCO's Project Management Unit (PMU) for Abo Homs-Elnubariya gas pipeline

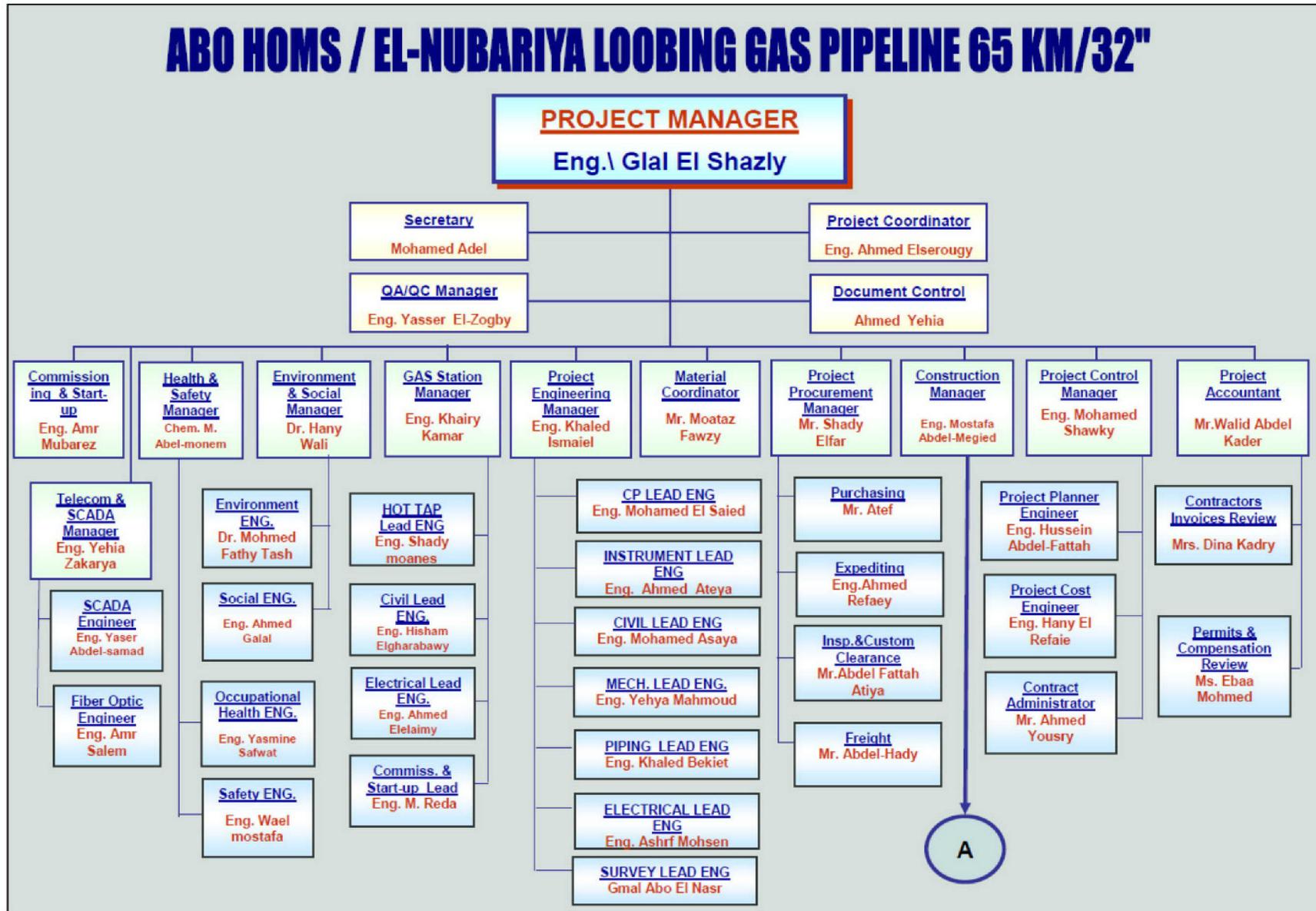
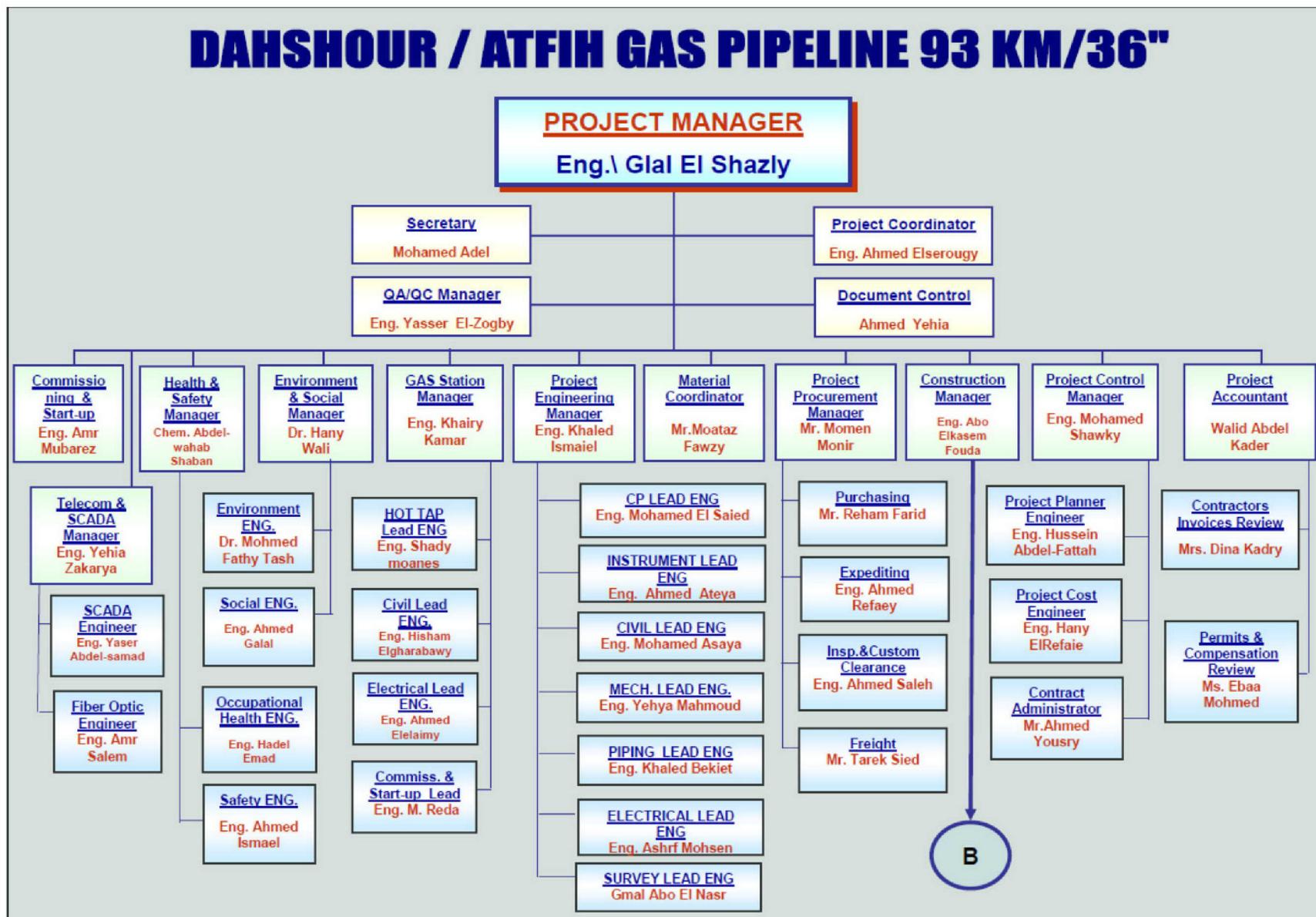


Figure 3: GASCO's Project Management Unit (PMU) for Dashour- Aftih gas pipeline



4. **Lending arrangement and flow of funds:** There will be a Loan Agreement between the Bank and the Arab Republic of Egypt, a Project Agreement between the Bank and EEHC for the Power Plant Component, and a Project Agreement between the Bank and GASCO for the Gas Pipelines Component. By virtue of a Subsidiary Loan Agreement between the GoE and EEHC and a Subsidiary Loan Agreement between the GoE and GASCO, the corresponding parts of the Bank loan will be on lent to the implementing agencies for their respective parts of the project. There will be a Contractual Agreement between EEHC and UEEPC regarding project implementation, similarly as for the other power projects financed by the Bank. For the gas pipelines, EGAS and GASCO will use their existing Agreement that defines their respective roles and responsibilities in financing, implementing projects and servicing the debts.

I. B. FINANCIAL MANAGEMENT, DISBURSEMENTS AND PROCUREMENT

I. B. a. FINANCIAL MANAGEMENT

1. UEEPC

(i) Executive Summary and Conclusion

1. An assessment of the financial management (FM) arrangements for the Project was undertaken in April 2011, to determine whether the current financial management arrangements are acceptable to the Bank. A detailed FM assessment was conducted for the UEEPC as the implementing entity for the project.

2. The UEEPC, from a financial management perspective, has its FM responsibilities and activities distributed between different departments within the UEEPC financial sector (accounting and budgeting, investment audit, cost accounting) and various sub-sections within these departments. Although the current arrangements may best serve the company's information needs, they do not provide for the proposed project accounts to be compiled and consolidated at any point or stage given the current structure. As a result, it was agreed to establish a special Financial Management Unit (FMU) that will have the overall responsibility for the project's FM activities including recording, budgeting, Bank reporting requirements, and handling the loan disbursement arrangements including supporting documentation. The FMU was established in October 2011, headed by a financial manager along with three accountants, seconded from UEEPC for the life of the project, for record keeping, finance and disbursements, and planning and reporting.

3. In November 2011, the project Financial Management team provided an acceptable draft Financial Management Manual to the Bank. The Manual was updated in June, 2012. The UEEPC FM team has developed a financial accounting and reporting software, acceptable to the World Bank that will be used for the project.

4. This is the first World Bank project to be implemented by UEEPC, the FM risk, which is currently assessed to be **Substantial**, will be Moderate, after applying the designed mitigating measures.

5. To mitigate the FM risks, the following mitigating measures have been agreed:
- (i) UEEPC will ring-fence the project implementation and funds.
 - (ii) The FM staff for this project has conducted several meetings with the Giza North project FM staff to benefit from their experience in managing the World Bank Project. Also, the Bank's FM team conducted training visits for the project's FM staff focused on the Bank's requirements and guidelines.
 - (iii) For the purpose of recording, the FMU will develop a chart of accounts that is based on project categories, components, activities and subcomponents. Also, a Financial Manual has been established to clarify the relations/responsibilities of the different layers of implementation.
 - (iv) Although the FMU will not include an Internal Audit function, UEEPC Investment Audit department conducts a 100 percent ex-ante audit of all expenditures.
 - (v) UEEPC has developed an acceptable automated accounting system which is capable of generating the quarterly Interim Financial Reports (IFRs) and annual financial statements required under the umbrella of the project. UEEPC will create a new unique code for this project. The financial management system will assist the project in recording and reporting its transactions in a timely and accurate manner. As part of the quarterly project IFRs, the FMU will prepare a forecast of the project's expected disbursements for the next six months for proper cash management.
 - (vi) UEEPC will contract with an independent external auditor based on TOR acceptable to the Bank, for the purpose of carrying out an external audit of the Project's Financial Statements and review of quarterly IFRs. The external audit will include reporting on compliance with the agreed FM system and internal control procedures.
- (ii) Accounting system**
6. The project will use cash basis of accounting and the outline of budget components for financial reporting. The books of accounts for the project will be maintained on double-entry bookkeeping principles. Commitments will be monitored and tracked to ensure that a full picture of the project is available.
7. It is agreed that Project Accounting (cash basis) will cover all sources of bank funded project transactions and all utilization of said funds. All project-related transactions will be recorded in books of accounts and supporting documents will be kept at FMU. Direct disbursements made by the Bank and payments from the DA, if any, will be included in the project accounting system. Funds received from different sources would be identified separately and reflected in project accounts, quarterly IFR and annual Financial Statements.
8. Project-related transactions and activities are distinguished at the data-capture stage. An identifiable Trial Balance for the project capturing all projects receipts, expenditures, and other payments under the project will be prepared. A Chart of Accounts for the project

will be developed. The Chart of Accounts shall conform to the classification of expenditures and sources of funds as indicated in the project documents. The Chart of Accounts allows data to be captured in a manner to facilitate financial reporting of project expenditures by: (i) project components; (ii) subcomponents, (iii) expenditure categories, (iv) disbursement categories, and (v) contracts.

(iii) Information System

9. The FMU will maintain its books of accounts using a computerized accounting system managed under its responsibility. It will prepare and disseminate financial management reports and ensure timely transmission of these documents. The automated accounting system will reflect the government contribution and other financing sources, if any, the balances related to the amounts disbursed, reflecting the transactions of the designated accounts and the remaining balance at the end of each period. The Financial Manager is in charge of the issuance of the annual project financial statements and the quarterly Financial Monitoring Reports (IFRs), as well as the submission of these documents on a timely basis to the IBRD and to the auditors.

(iv) Budgeting

10. The Project's Finance Officers at the FMU will prepare, on an annual basis, budgets and disbursement plans reflecting the project cash needs per quarter. The initial budget and disbursement plans will be developed based on the initial procurement plan, implementation schedules and estimated payments cycles, and revised thereafter. The budget will be used as a monitoring tool to analyze variances and manage cash. Updating the annual budget will be the responsibility of the FMU and such updates will be reflected in the quarterly forecast that will be part of the IFR reports.

(v) Flow of Funds/Flow of Documents

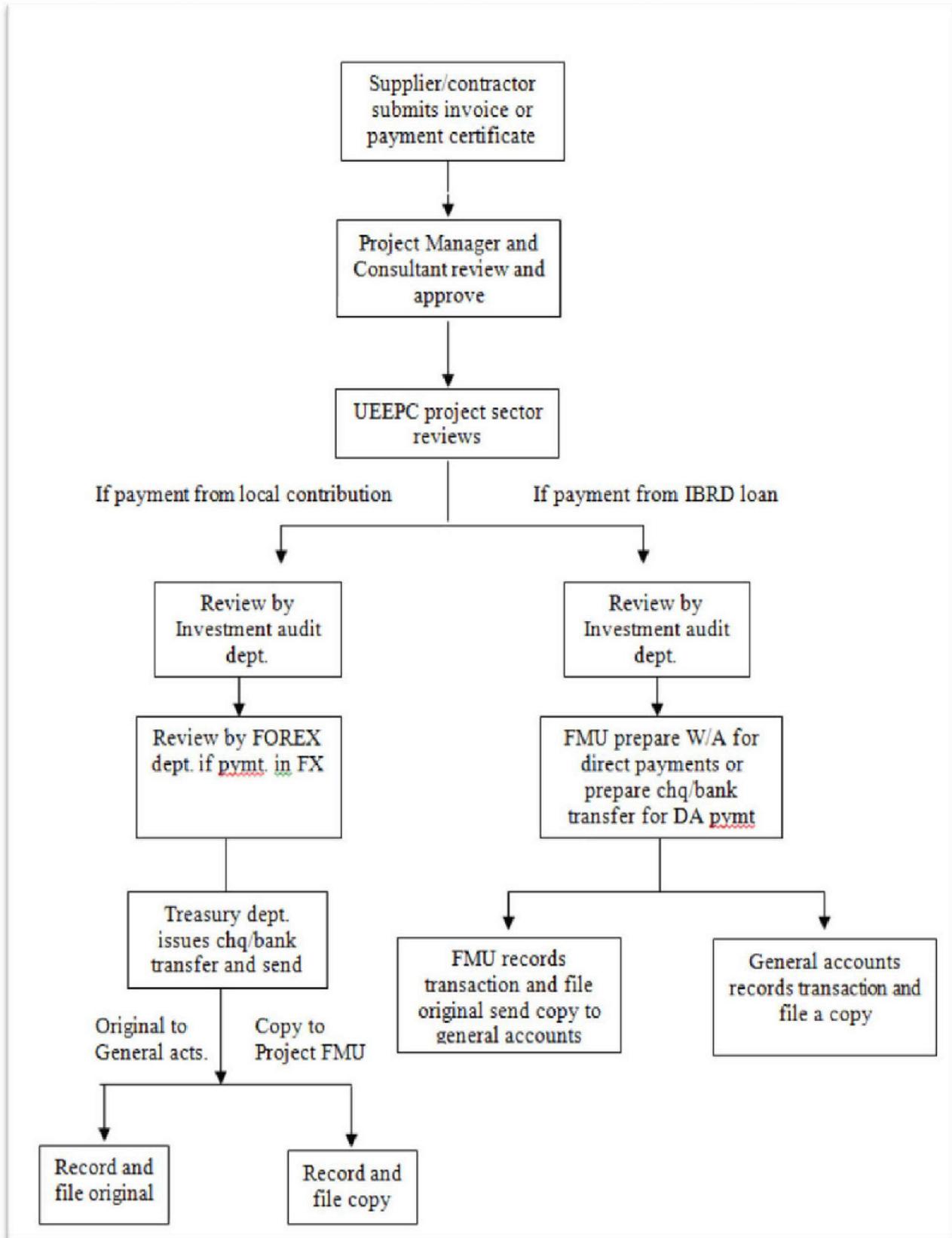
Between the Bank and the Project:

11. Payments under this project will follow the direct payment, reimbursement, and special commitments methods. In addition, the FMU will open, maintain and operate a Designated Account (DA) at a financial institution acceptable to the IBRD. The ceiling of the DA will be set to US\$ 5 million. Advances into, and payments from, the DA will be made in accordance with the provisions stated in the Disbursement Letter. Withdrawal applications will be prepared and sent by the FMU signed by authorized signatories. The names and corresponding specimen of signatures of authorized signatories will be submitted to IBRD.
12. UEEPC will maintain a current account for the local contribution to finance exclusively the project's costs including taxes and local expenditures. This account will be replenished at least at the beginning of each month based on the month's forecasted costs in order to ensure timely availability of funds.

Between the Project and its beneficiaries:

13. Since the project will be implemented by UEEPC, the regular accounting cycle of UEEPC will continue as it is. Meanwhile, the FMU will act as a focal point to maintain parallel records for all project related transactions, prepare withdrawal applications to be submitted to IBRD and produce project financial reports in accordance with IBRD requirements. A monthly reconciliation of project costs will take place between the FMU and UEEPC records.
14. After procurement procedures are concluded and contracts are signed, the original contracts are kept with UEEPC's Projects Sector. The original LCs documents are kept at the LCs department.
15. The contractor's payment certificate/supplier's invoice is first reviewed and approved UEEPC engineers and project manager in the site and then by the project consultant (PGESCO). The consultant submits the payment certificate/invoice to UEEPC's Projects Sector which reviews it for technical acceptance in accordance with the signed contract. The Projects Sector then forwards the package to the head of the financial sector where the package follows its cycle throughout different departments within the financial sector.
16. If the claim is to be paid from the local contribution as determined by the Procurement Plan, the package goes to the investment audit department for review (and then to FOREX department if it is in foreign currency), then to the treasury department to issue checks/bank transfers. The treasury department sends the original payment package to the bookkeeping department for recording and sends a copy to the FMU. The invoice/payment certificate copy would be stamped to indicate that the original is kept at UEEPC's filing system. The FMU records the transaction in the project accounting system and files a copy of the payment package at the FMU.
17. If the claim is to be paid from the IBRD loan as determined by the Procurement Plan, the package goes to the investment audit department then to the project FMU to prepare the payment documents (application for direct payment from IBRD or disbursement from the designated account). The transaction is then recorded in the project accounting system maintained at the FMU and the original payment package is filed with the FMU. The FMU forwards copy of the payment package to the bookkeeping department for recording with the invoice/payment certificate copy would be stamped to indicate that the original is kept at the FMU. At end month, FMU forwards the DA reconciliation to UEEPC treasury department.
18. The cycle will be slightly different in case of consultancy services where UEEPC planning and studies department will review the consultant report to assess its technical acceptance, and then the consultant's invoice will follow the same cycle of financial review and payment processing and reporting.

Figure 1: Cycle of Financial Review, Payment Processing, and Reporting



(vi) Internal Controls

19. An integral part of the internal control system is the development of a financial policies and procedures manual. This is crucial for ensuring transparency, providing clarity regarding financial aspects to the various stakeholders and finance staff, ensuring uniformity, and enforcing accountability. This manual will cover the following aspects: (i) expenditures that would be treated as project expenditures including their classification; (ii) expenditures, which would be eligible for reimbursement from IBRD loan; and (iii) project accounting policies. These policies include aspects such as efficient management and deployment of funds, internal control policies, etc.
20. The financial policies and procedures manual shall also outline: (a) job responsibilities within the financial department; (b) accounting principles and policies (e.g. evaluation of non US\$ expenses); (c) accounting system; (d) operational procedures (e.g. for withdrawal from Designated Account, replenishment, payments to contractors, etc); and (e) the accounting cycle and entries, the chart of accounts, and templates of forms to be used.

(vii) Reporting

21. The FMU will be responsible for issuing monthly automated financial reports (FR), quarterly Financial Monitoring Reports (IFRs) and annual Project Financial Statements (PFS):

Table 1: Financial Reporting

Report	Frequency	Due Date	By	Sent to	Language
FR	Monthly	2 weeks from end of month.	FMU	UEEPC	Arabic/English
FMR	Quarterly	3 weeks from end of quarter	FMU	Bank/UEEPC	English
PFS	Annual	3 months from end of FY.	FMU	Bank/UEEPC	Arabic/English

- (i) Monthly unaudited FR. The reports will be prepared, generated from the automated system, by the FMU on a monthly basis. They will not be sent to the Bank, however, as part of the Bank supervision, they will be reviewed and reconciled with the monthly withdrawal applications and quarterly IFRs sent to the Bank. The format of the reports should be quite simple, consisting of a trial balance listing all sources and uses of funds and bank reconciliation (s).
- (ii) Quarterly reviewed IFRs. The format and content of the Interim Financial Reports (IFRs), which will be produced within 45 days from each quarter closing date, will be agreed by negotiations and included in the financial management manual. IFRs include sources and uses of funds by category and component, financial commitment information, Designated Account (if used) reconciliation as well as six-month cash flow.

- (iii) Annually audited PFS. The PFS should be ready 3 months from the end of fiscal year to enable the submission of the audit report within 6 months after the closing date of the fiscal year. The PFS would have to include: (i) a statement of sources and uses of funds indicating funds received from various sources, project expenditures, assets and liabilities; (ii) schedules classifying project expenditures by components, sub-components, and category; (iii) a DA (if used) reconciliation statement; and (iv) detailed statement of withdrawals made on the basis of SOEs.

(viii) Attestation Arrangements

22. The project and UEEPC will be subject to three types of attestation engagements as follows:

- (i) Annual Audit: Annual audits for the project will be conducted by independent private auditors acceptable to the Bank and procured by the UEEPC no later than 90 days after loan effectiveness (dated covenant). The audit would be performed for the project as a whole (i.e., all components and sources of funds). The audit report, accompanied by a management letter, will cover the project’s financial statements, reconciliation and use of the DA, use of direct payments, use of reimbursements, use of special commitments, and withdrawal based on SOEs. The report should be submitted by UEEPC to the Bank no later than six months following the closing of the fiscal year subject of the audit (*fiscal year July 1 to June 30*). The external audit report should be in accordance with the Bank auditing requirements/TOR and conducted according to International Standards on Auditing (ISA).
- (ii) Quarterly Reviews: The same auditor will also be involved in conducting quarterly reviews of the project's IFRs within 45 days from the end of each calendar quarter. Withdrawals from the loan - whether in the form of SOEs or direct payments - that are included in IFRs will be part of the scope of these quarterly reviews.

Table 2: Auditor Reports

Report	Due Date	Responsibility	Sent to:	Language	Scope
IFR	45 days from end of quarter	External Auditor	Bank/UEEPC	Arabic/English	Review
PFS	6 months from end of FY	External Auditor	Bank/UEEPC	Arabic/English	Audit

2. GASCO

23. GASCO uses an ORCALE-based accounting and reporting system to account for its financial transactions. The system links between the different units of the Financial and Commercial Affairs sector. The Chart of Accounts coding on the system is based on the task, category, type and class. To insert or remove a new code from the chart of accounts a request must be made by the Projects’ Accounts unit to the General Accounts sector,

which is the only authorized sector for carrying out any changes to GASCO's chart of accounts. The Chart of Accounts allows data to be captured in a manner to facilitate financial reporting of project expenditures by: (i) project components; (ii) subcomponents; (iii) expenditure categories; (iv) disbursement categories; and (v) contracts. A daily backup of the accounting data is maintained and each user has a unique password to allow an audit trail of entries.

24. The Bank project will have separate coding on the system for recording and reporting purposes. The system is capable of generating reports from the accounting data inputs. The Bank reporting requirements include interim financial reports on a quarterly basis as well as annual financial statements. These project reports should cover the project as a whole and not be limited to the loan portion of the project. Sample financial reporting formats were agreed with GASCO during appraisal.
25. The project will use cash basis of accounting and the outline of budget components for financial reporting. The accounts for the project will be maintained on double-entry bookkeeping principles.
26. Commitments in GASCO are monitored by the Budgeting Department for each contract, Material Requisition and Purchase Order issued. This facilitates the budgeting and forecasting process and also prevents over commitment of funds.
27. It was agreed that Project Accounting will cover all sources of Bank funded project transactions and all utilization of said funds. All project-related transactions will be recorded on GASCO Accounting system and supporting documents will be kept at the Accounting Department using GASCO normal Archiving procedures. Direct disbursements made by the Bank will be included in the project accounting system. Funds received from different sources would be identified separately and reflected in project accounts, quarterly Interim Financial Report (IFR) and annual Financial Statements.
28. **Budgeting and Internal Controls.** All transactions in GASCO are subject to different levels of reviews and authorization as follows:
 - (i) **Budget preparation**
 29. Before the beginning of a new fiscal year the Projects Management Sector prepares a detailed description of the projects that will be executed during the coming year. This detailed description is forwarded to and discussed with the Budget Unit under the Financial Sector. The Budget Unit together with Banking and Treasury determine the sources of financing for the budgeted activities. The budget is then presented to the Board of GASCO for approval. The Budget Unit assigns a budget code for each budgeted activity.
 - (ii) **Material Requisitions**
 30. The requesting department/unit prepares a Material Requisition which is forwarded to the Inventory Unit to check if the requested item is available in the warehouse. If the item is

available, it is disbursed directly from the warehouse to the requesting unit and such transaction is recorded in the item card and the warehouse manual record for outgoing items. These transactions are evidenced by the signatory of the manger of the requesting unit, the review of the Budget unit as evidence of budgeting for such item and the warehouseman signature. Every two weeks, copies of the warehouse manual records are transmitted to the Inventory Unit at GASCO Head Quarter to record all inventory transactions on the inventory computerized system. Inventory is subject to regular quarterly counts, sudden checks and annual physical count with the participation of the external auditor i.e. E&Y. If the requested item is not available in the inventory the Material Requisition is forwarded to the Procurement Department after being reviewed and approved by the Budget Unit which also gives the budgeted amount for the item being purchased. The item is technically inspected when received and matched to the Purchase Order issued then added to the inventory balance. The invoice received is submitted to the Budget unit to review and give the budget code before forwarding to Project Costing Department and then Treasury for payment.

31. The Budget coding is manual and not captured by the Oracle system. However, monthly reviews and matches between the budget codes and the actual charges on the system are performed by the Budget Unit. In addition, GASCO is working on upgrading its Oracle system to overcome this issue.
32. Although GASCO had developed its Financial Regulations that sets out the general guidelines for the company, no Financial Procedure Manual was developed and applied to summarize the financial procedures in place. During project preparation, GASCO has developed such a manual which is now found to be satisfactory to the Bank.

(iii) Payment Cycle

33. Invoices and/or payment certificates are reviewed by the Projects Costing Department of GASCO. Such review is evidenced by a stamp or a letter from the Projects Department before forwarding to the General Accounting Department for recording on the system. The Accounting Department reviews and ensures the proper coding. The documents are then forwarded to the Payment Sector which checks evidence of the previous units' reviews. The Payment Sector computes and applies the necessary deductions on the invoice/payment certificates. The Banking Sector receives the documents and prepares the check/bank transfers which have to bear two authorized signatories. Documents are forwarded to the General Accounting Department for scanning and archiving.

(iv) Internal Audit

34. GASCO's Internal Audit (IA) Department reports directly to the chairman of the company. The IA department work is based on a 5-year annual plan approved by GASCO's chairman and such plan is re-visited annually. It includes approximately 40 employees all with accounting degrees and background. GASCO has its developed financial regulations and the IA department reviews the internal control procedures and ensures that the company's financial regulations are being adhered to. The Internal Audit

department issues interim reports, including responses from different departments on findings noted, in addition to a comprehensive annual report.

35. **Flow of Funds.** It is expected that the reimbursement, direct payment and special commitment methods will be used for the majority of project’s expenditures. In addition, GASCO will open, maintain and operate a DA at a bank acceptable to the IBRD. The ceiling of the DA will be set to US\$ 500,000.
36. **Financial Reporting.** GASCO will be responsible for issuing monthly automated financial reports (FR), quarterly IFRs and annual Project Financial Statements (PFS) as follows:

Table 3: Financial Reporting

Report	Frequency	Due Date	By	Sent to
FR	Monthly	2 weeks from end of month.	GASCO	Bank
IFRs	Quarterly	3 weeks from end of quarter	GASCO	Bank
PFS	Annual	3 months from end of FY.	GASCO	Bank

- (i) Monthly unaudited FR. The reports will be prepared, generated from the Oracle system, by the financial management team on a monthly basis. They will not be sent to the Bank; however, as part of the Bank supervision, they will be reviewed and reconciled with the monthly withdrawal applications and quarterly IFRs sent to the Bank. The format of the reports was shared with GASCO during the assessment.
- (ii) Quarterly reviewed IFRs. The format and content of the IFRs, which will be produced within 45 days after each quarter closing date was agreed with GASCO FM team during the assessment. IFRs include sources and uses of funds by category and component, financial commitment information, Designated Account, if needed, reconciliation as well as six-month cash flow, and variance analysis between actual and forecasted figures of the quarter that go beyond 15%.
- (iii) Annually audited PFS. The PFS should be ready within three months after the end of fiscal year to enable the submission of the audit report within six months after the closing date of the fiscal year. The PFS would have to include: (i) a statement of sources and uses of funds indicating funds received from various sources, project expenditures, assets and liabilities; (ii) schedules classifying project expenditures by components, sub-components, and category; (iii) a DA reconciliation statement, if any; and (iv) a detailed statement of withdrawals made on the basis of State Of Expenditures (SOEs).

37. **Attestation Arrangements:** Annual audits for the project will be conducted by an independent private auditor acceptable to the Bank, appointed no later than 90 days after effectiveness. The audit would be performed for the project as a whole (i.e., all components and sources of funds). The audit report, accompanied by a management letter, will cover the project's financial statements, reconciliation and use of the DA, use of direct payments, and withdrawal based on SOEs. The report should be submitted to the Bank no later than six months following the closing of the fiscal year subject of the audit (fiscal year July 1 to June 30). The external audit report should be in accordance with the Bank auditing requirements/TOR and conducted according to International Standards on Auditing (ISA).
38. **Disclosure of financial statements:** The project's financial statements will be publicly disclosed. The contents of the financial statements will be mutually agreed between the Bank and the implementing agencies before they are disclosed.
39. The FM risk, which is currently assessed to be **Substantial**, will be Moderate, after applying the designed mitigating measures this is primarily due to the limited previous experience of GASCO in managing World Bank Projects.
40. At the project level, the FM risk is considered *substantial* before mitigating measures due to the limited previous experience of UEEPC in managing World Bank Projects.
41. To mitigate the FM risks, the following mitigating measures have been agreed:
- (i) The project will be executed by GASCO FM staff GASCO who are well qualified and organized.
 - (ii) For the purpose of recording, the FMU will develop a chart of accounts that is based on project categories, components, activities and subcomponents. Project accounting will cover all sources of project funds and all utilization of said funds. Also, all project-related transactions would be recorded in the automated books of accounts and supporting documents will be kept at the FMU (audit trail).
 - (iii) Funds received from different sources would be identified separately and reflected in the project accounts, quarterly IFR, and annual Financial Statements.
 - (iv) The GASCO FMU has a written financial and accounting policies and procedures Manual which covers: (i) treatment of expenditures, including their classification; (ii) efficient management of funds; (iii) Internal controls and controls over bank accounts and inventory; and (iv) authorization, approval and documentation cycles. The manual was reviewed by the Bank's FM team and found acceptable.
 - (v) GASCO utilizes acceptable automated accounting system which is ORACLE based. The ORACLE Management Information System (MIS) of GASCO will enable the project recording and reporting its transactions in a timely and accurate manner. As part

of the quarterly project IFRs, the FMU will prepare a forecast of the project's expected disbursements for the next six months for proper cash management.

- (vi) GASCO will contract with an independent external auditor based on TOR acceptable to the Bank, for the purpose of carrying out an external audit of the Project's Financial Statements and review of quarterly IFRs. Also, will include reporting on compliance of the agreed FM system and internal control procedures.

3. SUPERVISION PLAN

42. A Bank-accredited Financial Management Specialist (FMS) will assist in the supervision process. At least two supervision missions for the project will be carried out annually in addition to follow up visits as deemed necessary. The IFRs for the Project will be reviewed on a regular basis by the Project FMS and the results or issues will be followed up during the supervision missions. Financial audit reports and management letters will be reviewed and issues identified will be followed up by the FMS. Also, during the Bank's supervision missions, the Project's financial management and disbursement arrangements (including a review of a sample of SOEs and movements on the Designated Account) will be reviewed to ensure compliance with the Bank's requirements and to develop the financial management rating to the Implementation Status and Results Report (ISR).

I. B. b. DISBURSEMENT

43. Disbursement under this loan will be made according to the transaction-based disbursement procedures that include withdrawal applications for advances, for direct payment, reimbursement and requests for the issuance of special commitments. Withdrawal applications will be prepared by EEHC/UEEPC and GASCO, for their respective project parts, and signed by authorized signatories. Upon project effectiveness, EEHC/UEEPC and GASCO may submit applications to withdraw the initial advances to their respective designated accounts up to the ceiling amounts (US\$ 5 million for EEHC/UEEPC and US\$ 500,000 for GASCO). Subsequent withdrawal applications (WA) will be supported with records or statement of expenditures for amounts below the thresholds specified in the disbursement letter. Each WA will be signed by two authorized representatives. The name and corresponding specimen of signature of authorized signatories will be submitted to IBRD through the form of Authorized Signatory Letter provided in the Disbursement Letter.
44. **Electronic delivery of Applications (eDisbursements).** The Borrower may deliver Applications electronically to the Bank through the Bank's Client Connection, web-based portal²⁷. The option to deliver Applications to the Bank by electronic means may be effected if: (a) the Borrower has designated in writing, pursuant to the terms of subparagraph (i) of Section II of the Disbursement Letter, its officials who are authorized

²⁷ Accessible at <https://clientconnection.worldbank.org>

to sign and deliver Applications and to receive secure identification credentials (“SIDC”) from the Bank for the purpose of delivering such Applications by electronic means; and (b) all such officials designated by the Borrower have registered as users of Client Connection.

45. **Allocation of loan proceeds:** The loan proceeds have been allocated to two categories as shown in the table below. Funds allocated to Category (1) will be withdrawn by EEHC, through its subsidiary UEEPC, to finance expenditures under Part A (power plant), and funds allocated to Category (2) will be withdrawn by GASCO to finance expenditures under Part B (gas pipelines).

Table 4: Allocation of Loan Proceeds

Category	Amount of Loan Allocated (US\$ million)	% of Expenditures to be Financed
(1) Goods for Part A of the Project	503.8	100% of foreign expenditures
(2) Goods Under Part B of the Project	81.6	100% of foreign expenditures
(3) Interest Rate Cap or Interest Rate Collar premium	0.0	Amount due pursuant to Section 2.07 (c) of the Loan Agreement
Total IBRD Loan Amount	585.4	

46. The Borrower will ensure there is a mechanism in place to ensure payments will not be made to debarred or temporarily suspended firms.

I. B. c. PROCUREMENT

(i) General

47. Procurement for the proposed project would be carried out in accordance with the World Bank’s "Guidelines: Procurement under IBRD Loans and IDA Credits" dated January 2011 and the provisions stipulated in the Legal Agreement. For each contract to be financed by the Loan, the different procurement methods, the need for pre-qualification, estimated costs, prior review requirements, and time frame agreed between the Borrower and the Bank are in the Procurement Plan. The Procurement Plan will be updated at least annually or as required to reflect the actual project implementation needs and improvements in institutional capacity.

48. **Procurement Packages:** The agreed procurement packages are as follows:

- **Power Component:** The Bank will finance three packages under a single responsibility Plant Design, Supply and Installation contract, namely: i) The Steam Generator (boiler); ii) The Power Transformers; and iii) The Distributed Control System (DCS). Procurement will be done using the Bank’s Standard Bidding Documents (SBD) for ICB. The SBDs will include the agreed modifications to accommodate the simultaneous receipt but sequential opening

of the technical and commercial envelopes under two Envelope Bidding procedures.

- **Gas Component:** The Bank will finance seven packages. Only procurement of goods will be carried out for the gas pipeline. The seven procurement packages are subject to Bank's prior review. Procurement will be done using the Bank's Standard Bidding Documents (SBD) for Goods. Procurement will follow the Bank's traditional one envelope bidding procedures.

49. **Advanced Procurement:** Procurement of all packages is expected to begin before the loan becomes effective under the "advanced procurement" arrangement in order to speed-up project implementation.

(ii) Assessment of the agency's capacity to implement procurement

50. There will be two implementing agencies, namely UEEPC for the Power Component and GASCO for the Gas Component. An assessment of the capacity of the Implementing Agencies to implement procurement actions for the project was carried out by the Bank. The assessment reviewed the organizational structure for implementing the project, the staffing, the procurement systems, and the past experience.

51. **UEEPC/PGESCO:** UEEPC is closely supervised by EEHC having the same procedures and guidelines established by EEHC. As is usual in the Power Sector in Egypt, the Power Plant investments are implemented having a consulting firm acting as Project Management Coordinator with the role of: (i) designing the installations; (ii) defining the number of packages for procurement under supply and install (single responsibility) contracts for the different parts of the plant; (iii) carrying out all procurement actions (with UEEPC signing the contracts); (iv) integrating and coordinating the different contractors working in the project site; and (v) overall project management on behalf of UEEPC. PGESCO has been hired by UEEPC as Project Management Coordinator for this project, financed by UEEPC's own resources. PGESCO has already performed this role in several power plants in Egypt. The Bank has had experience working with PGESCO in the El Tebbin, Ain Sokhna and Giza North Power Projects, all adequately implemented. Considering that all procurement actions for the project will be carried out by the Project Management Coordinator (PGESCO), the Capacity Assessment covered both UEEPC and PGESCO. UEEPC's Project Implementation Unit will have one staff in charge of coordination, follow-up and reporting to the Bank on procurement actions, and all procurement actions will be carried out by PGESCO, with some oversight from UEEPC. PGESCO has a procurement unit with twenty qualified Procurement Specialists with knowledge of international procurement and well acquainted with Bank procurement, of which some will work full time for this project.

52. **GASCO:** A procurement capacity assessment of GASCO was carried out for the Additional Financing (AF) of the Giza North project. Therefore, there was no need to carry out a new procurement capacity assessment because the procurement implementation arrangements remain the same as those under the Giza North AF. It has been concluded that GASCO has adequate experience and capacity to carry out

procurement activities related to the implementation of the gas component under the proposed project. Under the advance procurement for the GIZA North AF, GASCO has become familiar with Bank procurement procedures. GASCO also has extensive experience in this type of procurement including dealing with other Multilateral Development Banks (MDBs) such as EIB. GASCO has a procurement department with qualified Procurement Specialists with knowledge of international procurement who are well-acquainted with Bank procurement, some of whom will work full time for the South Helwan Power Project.

53. **Risks and Mitigation Measures.** The overall procurement risk for the project is assessed as “**Moderate**”. Moderate risks were identified in the Power Component, as this is the first project to be implemented by UEEPC. In the Gas Component, due to GASCO’s limited experience in World Bank procurement procedures, even if only one type of procurement is involved, namely, Procurement of Goods, all major packages are subject to prior review. The following measures were agreed and will be in place to mitigate the remaining risks:

- UEEPC/EEHC is to carry out general oversight and quality assurance of procurement activities entrusted to PGESCO
- UEEPC/EEHC is to closely monitor and follow up on all procurement and contract management activities under the project in close coordination with PGESCO and the assigned World Bank procurement specialist for the project.
- GASCO is to appoint their most experienced procurement staff in sufficient numbers, particularly those that gained experience with World Bank procurement procedures in the implementation of the Giza North project.
- GASCO’s General Procurement Manager and Foreign Procurement Department Manager is to be fully involved in all the critical stages of the procurement process.
- GASCO will closely monitor and follow up on all procurement activities under the project in close coordination with the assigned World Bank procurement specialist for the project.

54. **Procurement Plan:** The Borrower has developed a procurement plan for project implementation which provides the procurement methods. This plan will be available in the project file and on the Bank’s external website. The procurement plan will be updated annually or as required to reflect the actual project implementation needs and improvements in institutional capacity.

55. **Frequency of Procurement Supervision:** In addition to the prior review supervision to be carried out from the Bank field office, the capacity assessment of the Implementing Agency has recommended two supervision missions during the first year of project implementation and one mission annually to follow up on implementation issues, involving visiting the field to carry out an-on-site review of procurement actions.

Details of the Procurement Arrangements Involving International Competition

Procurement Strategy

56. The Bank discussed with UEEPC and GASCO the procurement strategy to be followed in view of the lessons learned from previous projects. Three issues were discussed:

- **The two envelope system.** - It has been agreed that the Borrower will use the one envelope system for procurement of goods under the Gas Component while for the Power Component the Borrower will continue to use the two envelope system as approved by the Bank for the El Tebbin, Ain Sokhna, Wind Power and Giza North projects with successful results in terms of competition and prices. The Borrower has substantial experience in tendering for these types of projects with the two envelope system which has proven to be efficient, economic and transparent.
- **Prequalification vs. post qualification.** - The advantages and disadvantages of prequalification vs. post-qualification were discussed with the Borrower. These included the risk that the high costs of preparing detailed bids could discourage competition, the assurance to the employer that invitations to bid are extended only to those who have adequate capabilities and resources thus simplifying the bid evaluation process, and the risk of unnecessary delays with prequalification. However, the Borrower's position is to follow post qualification procedures as approved by the Bank for the El Tebbin, Ain Sokhna, and Giza North projects.

57. **The use of fixed prices versus adjustable prices** – Although in the previous projects financed by the Bank, EEHC required bidders to offer fixed prices, it is well known that this practice results in bidders including a premium in their prices to have an insurance against price increases during the execution of their contracts. For those reasons, the Bank has advised against the use of fixed prices. However, neither the Borrower nor the contractors have had issues with the fixed price payment terms under the previous projects. EEHC argues that the use of adjustable prices creates additional burdens to the owner of the plant, such as: (a) the need to find additional funding for price increases; (b) the need for contract amendments to adjust the final contract price; and (c) the need (in the case of public entities like EEHC) to have additional budget authorizations for contract price increases. In addition, the use of price adjustment contracts, although resulting in lower initial contract prices, are not a guarantee of lower final contract value (since the owner assumes the price increase risks). For all those considerations, despite Bank arguments in favor of the use of price adjustments, it is EEHC's decision to continue using fixed price contracts. The task team considers that the terms of payment proposed by the Borrower hedge the risk of having a fixed price reasonably well.

58. **The use of Cairo Regional Center for International Commercial Arbitration (CRCICA) for Settlement of Disputes.** In the past the Bank allowed the use of the CRCICA for Settlement of Disputes through arbitration and an assessment of the CRCICA has been carried out. Paragraph 2.43 of the World Bank's Procurement Guidelines requires that Borrowers use international commercial arbitration in a neutral

venue in contracts for the procurement of goods, works, and non-consulting services unless the Bank has specifically agreed to waive this requirement for justified reasons such as equivalent national regulations and arbitration procedures, or the contract has been awarded to a bidder from the Borrower's country. The second part of the provision provides the basis for justifying such a waiver, namely "equivalent national regulations and arbitration procedures". The procedures of CRCICA's Arbitration Rules, based on those of UNCITRAL and administered by an institution set up under an international agreement, are more than merely equivalent to international commercial arbitration procedures. In addition, Egypt's Arbitration Law is based on the UNCITRAL Model Law. It meets some of the highest international standards for national regulations in this field. As a result of the positive outcome of the assessment of the CRCICA, the Bank agreed to waive the requirement for international commercial arbitration in a neutral venue as set forth in paragraph 2.43 of the 2011 Procurement Guidelines for a pilot period of 3 years.

59. **Two envelope system:** Under the Power Component, the following special provisions for procurement will apply:

- a. Bidding shall be open to all potential and qualified bidders and not exclusively to manufacturers. However, a bid from a non-manufacturer would require a commitment letter from the manufacturer.
- b. In addition to clear technical specifications, the bidding documents shall include detailed and clear technical evaluation criteria.
- c. During the technical evaluation, no meeting with the bidders shall take place; clarifications with bidders shall take place in writing only and can neither result in modifications of the bids (i.e., withdrawal of deviations) nor in changes to the bid price.
- d. The bidding documents shall include a list of deviations which are considered as major. The list may not be comprehensive but in any event, bids with major deviations will be considered substantially non-responsive and will be eliminated. Minor deviations and omissions may be accepted and may be quantified in monetary terms only for the purpose of evaluation and as per the detailed method spelled out in the bidding documents. This will neither affect the bid price nor the contract price.
- e. For contracts where technical deviations may, with due justification, bring additional competition to the bidding process, the bidding documents may allow bids to include a list of deviations from terms and conditions or technical specifications, and, in such event, the bidders shall provide additional price of withdrawal of deviations (pricing of the withdrawal of the deviations would be part of the commercial bids). Minor deviations or omissions will be quantified for evaluation purposes only, by using the quotation given by the bidder or, if not quoted, the deviation may be quantified for evaluation purposes based on pricing information available to the owner according to the specifications in the bidding documents in other similar and recent bidding.
- f. If bidders are allowed to offer deviations, and in accordance with Bank guidelines, when the owner awards the contract to the successful bidder, the owner may

request the bidder to withdraw any of the deviations listed in the winning bid, at the price shown by the bidder for the deviation in attachments to the bid.

- g. The bid validity period shall be sufficiently long (180 days) to cover the entire evaluation process to avoid having to request bid validity period extensions given that prices are fixed.
- h. After opening the technical envelopes, the commercial envelopes shall be kept unopened and in a safe place.
- i. The review process of the technical evaluation shall be as follows: (i) preparation of the Technical Evaluation report and recommendations by the Borrower, to be sent to the Bank; (ii) review by the Bank and, if needed, clarifications to be sought by the Bank from the Borrower; and (iii) Borrower to then receive no-objection from the Bank. Borrower will then inform the bidders of the outcome of the technical evaluation. For those bidders rejected due to being substantially non-responsive, the Borrower shall provide clear reasons for the rejection to these bidders who request the basis for rejection.
- j. Prior to the opening of the commercial envelopes for bidders deemed responsive, adequate time (a minimum of 5 business days) has to be provided to allow opportunity for bidders deemed non-responsive to complain, if they wish. The agreed bidding documents will establish clearly this period of five business days for bidders to complain. Any complaint letter or communications and responses provided by the Borrower need to be sent to the Bank for information. The Bank, in consultation with the Borrower, will examine these complaints. If additional data is required to complete this process, they will be obtained from the Borrower.
- k. When clarification is required from the bidder, the Bank will ask the Borrower to obtain it and comment or incorporate it, as appropriate, in a revised version of the Technical Bid Evaluation report. The Bank's review will not be completed until any complaint submitted is fully examined and considered.
- l. Commercial bids of substantially responsive technical bids shall be opened in public and bid prices read out. Bids of non-responsive bidders should be kept until contract signing.
- m. When the full evaluation is completed, the Bid Evaluation Report and contract award recommendation are prepared by the Borrower and sent to the Bank for review.
- n. The Bank shall, if it determines that the intended award would be inconsistent with the Loan Agreement and/or the Procurement Plan, promptly inform the Borrower and state the reasons for such determination. Otherwise, the Bank shall provide its no objection to the recommendation for contract award. The Borrower shall award the contract only after receiving the "no objection" from the Bank.
- o. If, after publication of the results of evaluation, the Borrower receives protests or complaints from bidders, a copy of the complaint and a copy of the Borrower's response shall be sent to the Bank for information.

- p. If, as result of analysis of a protest, the Borrower changes its contract award recommendation, the reasons for such decision and a revised evaluation report shall be submitted to the Bank for no objection. The Borrower shall provide a republication of the contract award in the format of paragraph 2.60 of these Guidelines.
- q. The terms and conditions of a contract shall not, without the Bank’s prior approval, materially differ from those on which bids were asked or prequalification of Contractors, if any, was invited.

Table 5: Helwan South Procurement Plan

1	2	3	4	5	6	7	8
Ref. No.	Contract (Description)	Financing Agency(ies)/ Procurement Method	P-Q	Domestic Preference (yes/no)	Review by Bank (Prior / Post)	Estimated Bid-Opening Date	Estimated Price in Million US\$
Power Plant Component							
CP – 102	CIVIL WORK	NBF* (KFAED+UE EPC)	N.A.	N.A	N.A	8/2013	338.3
CP - 103	ENVIRONMENTAL MONITORING	NBF*(UEEPC)	N.A.	N.A	N.A	9/2014	0.7
CP - 104	SWITCHYARD	NBF*(IDB/UEEPC)	N.A.	N.A	N.A	8/2013	26.8
CP – 105	STEAM GENERATOR (BOILER)	WB/UEEPC	N.A.	No	Prior	6/2013	496.7
CP – 106	STEAM TURBINE GENERATOR AND CONDENSER	NBF*(IDB+UEEPC)	N.A.	N.A	N.A	5/2013	413.8
CP – 107	YARD TANKS	NBF*(UEEPC)	N.A.	N.A	N.A	7/2013	10.8
CP - 108	WRAP-UP INSURANCE	NBF*(UEEPC)	N.A.	N.A	N.A	6/2013	18.0
PO – 109	PUMPS AND DRIVES	NBF* (KFAED/UE EPC)	N.A.	N.A	N.A	9/2013	60.3
PO-110	FEED WATER HEATERS	NBF* (AFSED+UE EPC)	N.A.	N.A	N.A	11/2013	22.8
CP – 111	WATER AND WASTEWATER TREATMENT	NBF* (OFID/SDF/UEEPC)	N.A.	N.A	N.A	1/2014	41.5
PO – 112	CRITICAL PIPING AND VALVES	NBF* (AFSED+UE EPC)	N.A.	N.A	N.A	8/2014	50.3

PO – 113	POWER TRANSFORMERS	WB/UEEPC	N.A.	No	Prior	1/2014	40.8
PO – 114	DISTRIBUTED CONTROL SYSTEM (DCS)	WB/UEEPC	N.A.	No	Prior	6/2014	8.3
CP – 117	ELEC. EQUIP./INSTRUMENT. INSTALL.	NBF* (AFSED+UEEPC)	N.A.	N.A	N.A	3/2014	36.0
CP – 118	MECH. EQUIP./PIPE INSTALL.	NBF* (AFSED+UEEPC)	N.A.	N.A	N.A	2/2014	102.8
PO – 122	MEDIUM AND LOW VOLTAGE SWITCHGEAR	NBF* (UEEPC)	N.A.	N.A	N.A	1/2014	6.7
CP-123	Site Services	NBF* (UEEPC)	N.A.	N.A	N.A	8/2013	10.8
	Engineering Services	NBF* (UEEPC)	N.A.	N.A	N.A	8/2011	56.9
Gas pipeline Component							
1	Line Pipes	World Bank/ICB	No	TBD	Prior	12/2013	79.2
2	Valves and other accessories	World Bank/ICB	No	TBD	Prior	04/2014	3.3
3	Fittings, Pig Traps, Other	World Bank/ICB	No	TBD	Prior	01/2014	1.85
4	Metering Station	World Bank/ICB	No	TBD	Prior	07/2014	5.8
5	SCADA system, cathodic protection, etc	World Bank/ICB	No	TBD	Prior	07/2014	1.1
6	3 rd party inspection	World Bank/ICB	No	TBD	Prior	07/2014	0.1
7	3 rd party inspection	World Bank/ICB	No	TBD	Prior	09/2014	0.3

NBF* -- Non World Bank-Financed

I. C. ENVIRONMENTAL AND SOCIAL (INCLUDING SAFEGUARDS)

(i) The Site

60. The proposed 3x650 MW Helwan South power plant will be located at selected site along the right (eastern) bank of the Nile River, approximately 10km south of the village of Kureimat in the Dayr El-Maymoun area (approximately 100 km south of Cairo). The site is within an existing piece of land allocated to the Upper Egypt Electricity Production

Company (UEEPC) by a Presidential Decree No. 43 on 14 February 2010 for the development of the power plant. The overall proposed site covers approximately 378,000 m² (or 90 fedans), - a trapezoid-shape sandy area of uncultivated, unproductive land, 450 meters wide and on average 840 meters long. On the north side of the site at a distance of approximately 7.5 km is the Kureimat Power Complex (2x600 MWe+ 2x750 MWe). The site is surrounded by a wide-extended desert land on both the southern and the eastern sides. On the eastern side and across the power plant site is a two-lane road running parallel to the Nile river, with the distance from the west side of the site to the Nile ranging from 150 to 300 meters. On the western side of the site, between the site and the Nile River, is an agricultural strip of land where the power plant's cooling water intake and discharge structures will be located. The site is located approximately 2 km from the nearest settlement. The nearest town of importance is Es-saff, Markaz Es-saff, approximately 38 km along the road in the north direction. Towns of importance in the wider vicinity of the power plant site are Atfieh, Giza, Helwan, Imbaba, 15th of May, Beni-Suweif and El-Wasta.

61. The power plant will consist of three supercritical thermal steam units, anticipated to start commissioning by end of 2017 and full operation in 2018. The power plant will utilize natural gas as its primary fuel, and also have the capability to operate using mazout (heavy fuel oil). The power plant will incorporate a direct (once through) cooling system using water abstracted from the River Nile. The abstracted water also will be used, following pre-treatment demineralization, to provide process water make-up in the boiler system. Potable water supplies will be drawn from the same water supply system of the power plant. The main demand for water is due to the direct cooling system. After use, almost all of the water will be returned to the River Nile at a slightly elevated temperature but within the World Bank stipulated guidelines.
62. A 93-kilometer, 36-inch diameter gas pipeline will be constructed between the power plant site and a gas substation at Dahshour. The pipeline will operate at the pressure of 70 bars. The design capacity of the pipeline is 12.5 million cubic meters per day, of which 10.5 million cubic meters per day will be used by the power plant. Most of the route of the pipeline is running through a desert land.
63. Another 65-kilometer, 32-inch diameter gas pipeline will be constructed between Abu Hommos compressor station and El Nubaria, to strengthen the gas transmission network by eliminating a bottleneck that would otherwise prevent normal gas supply to the Helwan South power plant. The pipeline will operate also at the pressure of 70 bars and have a design capacity of 12.5 million cubic meters per day. Most of the route of the pipeline is running through agricultural land.
64. Transmission lines to connect the Helwan South power plant with the 500-kV national transmission grid will be constructed under a separate transmission project. Under a preliminary plan, the power plant will be connected by two 500-kV overhead transmission lines: one 100-km long running north to a new 500/220-kV, Zahraa El-Maadi GIS substation; and the other 300-km long running south to Assuit substation, of which only 150-km will need to be constructed, as the other 150-km will be using the existing

transmission line from Samalout to Assuit. The transmission project will include some other components not directly related to the Helwan South power plant.

(ii) Social Safeguards

65. Permanent land acquisition is not significant, as the power plant site is located in a desert area owned by the implementing agency, and most of the associated infrastructure also will be located in desert areas. Land acquisition for associated infrastructure (electricity, gas, and water connections, access roads, etc.) will be limited and most of the areas affected are Government-owned desert land.
66. The Bank Task Team has carried out a number of site visits and in-depth meetings with community members and other stakeholders. The land acquisition needs for this project do not require relocation of anyone (no houses to be relocated). The impacts are relatively limited. The largest land requirement is approximately 90 fedan (1 fedan = 1.03 acres) for the power plant itself. There is no need for permanent land acquisition for the gas pipeline that supplies the power plant with fuel (except for 16 small plots for valve rooms, 8 plots for each pipeline) or for the electric transmission line carrying the electricity generated by the plant to the national electric grid (except for long-term lease of land needed for transmission towers, 25mx25m at most per tower). UEEPC is in the process of acquiring additional 35 fedans, 1 quirat, and 9 sahm in size of agricultural land between the power plant site and the Nile River on a willing seller-willing buyer basis. The project triggers the Bank's OP 4.12 on *Involuntary Resettlement and Land Acquisition* and the implementing agencies (EEHC/UEEPC and GASCO) have prepared two Resettlement Policy Frameworks (RPFs), covering their respective project components. RAPs will be prepared for the gas pipeline and for the transmission lines, as well as for the power plant if needed (i.e., if some or all of the transactions cannot be successfully concluded on the willing seller-willing buyer basis). The following sections describe each of these components of land acquisition.
67. **The power plant site.** This 90-fedan plot (approximately 38 hectares) is desert land, completely barren with no economic use at all. This was Government owned desert land, so there was no land acquisition, but a Presidential Decree No. 43 was issued on February 14, 2010, giving the land to the Upper Egypt Electricity Production Company (UEEPC) to build the power plant. There is no need for an access road as the site for the power plant extends to the main road ROW. The power plant site is large enough and no additional land is needed for material storage and other uses during construction. Worker's camps will not be required as almost all workers during construction will be recruited locally. The site has at least a 20 meter buffer from a nearby cemetery. The nearest village, El Hagara, is a settlement (smaller than a village, up to a few hundred residents), and approximately 2 km south of the power plant site that is off the same main north-south road paralleling the Nile. There is a major grain silo to the north of the project site, but it is hundreds of meters away from the site.
68. **The agricultural land between the power plant site and the Nile River.** Approximately 35 fedans, 1 quirat, and 9 sahm in size of agricultural lands owned or used by 32 families is in the process of being acquired on a "willing buyer-willing seller" basis for the power

plant to access the Nile for water intake and discharge including for: i) water pipes for the intake of water (underground); ii) the intake structure at the river bank; iii) water pipes for water discharge back to the river (underground); and (iv) the discharge structure at the river bank.

69. The Bank social safeguards specialists met with five such landowners/farmers on the edge of their land. The meeting was facilitated by the UEEPC's resident engineer at Helwan South and the community liaison officer (CLO) who is an engineer and a community leader, and has worked for UEEPC for 15 years.
70. Interviews with the farmers confirmed that unemployment is a major concern therefore power was viewed as a good source of potential employment, especially for sons and this has influenced their decision to sell the land. UEEPC agreed to offer one permanent job for each 4 quirat (24 quirat = 1 fedan) of land sold to UEEPC. Therefore by selling the entire 35 fedans, 1 quirat, and 9 sahm, UEEPC has committed to providing approximately 210 permanent jobs to these 32 families. Jobs are given to people between the ages 18-35. The job offers will be part of the legal written agreements for land acquisition. The 210 family members will be matched to the jobs based on their skills and training. UEEPC plans to recruit an approximately 1000-person workforce needed permanently for power plant operation from the local area. These employees will first be employed at the three existing power plants 7 km away, to be trained and at their jobs before transferring to the proposed power plant. The landowners are very happy with this "win-win" arrangement.
71. The landowners (farmers) also seem satisfied with the process being followed to determine the price they will receive for the land which involved five rounds of negotiations. The five farmers said there was unanimous agreement among the 32 landowners to sell the land conditional on the jobs offered. The nature of the agreements reached with farmers on the employment offers was confirmed by UEEPC, and it will be a legal agreement. UEEPC stated that they needed skilled workers and would welcome this labor from nearby villages as it would eliminate the need for worker housing, minimize transport distances and costs, etc.
72. **The gas pipeline.** The Egyptian Natural Gas Company (GASCO) is responsible for the gas pipelines and has prepared the ESIA's and RPFs for Helwan South Power Project. The gas pipelines will have RAPs, consistent with the RPFs. The gas pipeline has two main types of land acquisition requirements: (1) permanent land acquisition of small (25m by 45m) plots for valve rooms which control pressure, filter the gas, and serve other critical functions for the gas pipelines; and (2) temporary land acquisition during construction of the gas pipeline (20m wide) as well as permanent easements for the ROW (6m on each side of the pipeline in rural areas) which allow necessary access for repair and maintenance of the gas pipelines. The number of affected landowners will not be known until final design of the gas pipelines.
73. **Permanent land acquisition for the gas pipelines.** GASCO needs eight valve rooms for Dahshour-Atfeeh gas pipeline fueling Helwan South and another eight valve rooms for the Abu Homos-Nubaria gas pipeline (which links the gas collection site to GASCO's gas pipeline system). GASCO expects that the willing seller-willing buyer approach will be

used to acquire this land. GASCO's previous experience with similar gas pipelines, and that GASCO has some flexibility in the exact locations of the valve rooms, it believes it can acquire the necessary small plots with little problem.

74. **Temporary land acquisition for the gas pipelines.** GASCO officials described and have documented a highly participatory five-stage consultation process with farmers for land acquisition. The compensation for temporary land acquisition, including the permanent restrictions (easement along the ROW), is negotiated and GASCO appears flexible in its approach to minimize impacts of the project. Because the crop compensation system is prevalent throughout Egypt, there is little disagreement over the compensation amounts, which are adjusted up until the land is temporarily acquired. The latter includes the land for the trench for the gas pipeline, adjacent land for excavators and other equipment laying the gas pipes, and permanent restrictions on the right of way (ROW) of the gas pipeline as established by Egyptian law. This includes restrictions on buildings and other structures in the ROW, and prohibition of certain crops with deep roots in the ROW. The Egyptian crop compensation system is used for temporary land acquisition in a variety of projects including gas pipelines, electricity transmission lines, subsurface drainage systems, etc. (Ministerial Decree no. 358 issued by the Minister of Water Resources and Irrigation, July 31, 2008, and updated periodically). A RAP will be prepared to cover impacts associated with the temporary land acquisition for the gas pipeline and also for the permanent land impacts associated with the valve rooms (if the willing-buyer, willing-seller approach does not transpire for the valve room impacts) translated into Arabic, disclosed and implemented prior to start of construction work.
75. **The electricity transmission line.** The transmission lines will be implemented under a different project by EETC, and corresponding ESIA and RPF documents have been prepared satisfactory to the Bank; and disclosed prior to the appraisal of Helwan South project. These documents reviewed by the Bank during and after Helwan South appraisal and they will be re-disclosed after addressing the Bank review. The same crop compensation system administered by the Ministry of Agriculture that is used for gas pipelines also will be used for compensation of land required for the electricity transmission towers. The temporary land needs are limited only to the foundations for the towers (25mx25m for the largest towers). The compensation payment contains two elements: (1) the crop compensation for crops that are removed during construction; and (2) the permanent easements on the ROW. The easement restrictions include prohibiting structures and other fixed assets within the ROW (set by Egyptian law and based on the voltage of the lines but approximately 25 meters wide for high voltage lines). Farmers are allowed to farm under the lines. Compensation rates have increased significantly since the revolution of January 2011. The number of affected landowners will not be known until final design of the transmission line. A RAP covering these impacts will be prepared according to OP 4.12 translated into Arabic, disclosed and implemented prior to start of construction work.
76. **Disclosure:** All safeguards documents prepared including the RPFs, ESIA etc. have been publicly disclosed to all stakeholders prior appraisal. These documents were revised based on the appraisal mission outcomes. The ESIA and RPF for the gas pipelines were re-disclosed in country on May 23, 2013 and at the World Bank Infoshop on May 24, 2013.

The ESIA and RPF for the power plant were re-disclosed in country on May 23, 2013. The ESIA for the power plant was re-disclosed at the World Bank Infoshop on May 29, 2012 and the RPF was re-disclosed on May 28, 2013. The RAPs that will be prepared later will be translated into Arabic and disclosed in a manner to ensure its accessibility to all stakeholders particularly the affected persons/communities. Along with all the information in the RAP, efforts will be made to disseminate information about the grievance mechanism that will be available to stakeholders and also timings of construction and other construction-related information.

77. **Grievance Redress Mechanism (GRM):** Land acquisition and resettlement processes may in some cases result in disputes and grievances. With the exception of crop compensation (to be discussed below), the absence of a first-tier grievance mechanism in Egyptian law means that access to grievance redress is limited for local stakeholders. Court cases are time consuming and beyond the reach of many stakeholders. Establishing local level mechanisms to solve disputes where project- affected persons feel that they are given a fair hearing is therefore essential. The RPFs focus on the need to approach grievances both proactively and retroactively. A transparent disclosure of project information and the criteria for eligibility for assistance will be widely disseminated and available/accessible to affected persons: increased transparency is likely to result in a reduced number of grievances.
78. While keeping in place availability of judicial recourse and traditional dispute resolution (where they exist) the Project will ensure the establishment of a grievance system that is transparent, accessible, accountable, affordable, unbiased and inclusive. There will be a two-tier system. As a first tier, the PMU will establish a register of land acquisition and resettlement related grievances. A focal person will be nominated to maintain the register of complaints and respond to complainants about the status of the complaints. He/she will refer the complaint to the relevant officer for resolution (whether construction related, or related to compensation or environment etc.) and inform the complainant of the results. The methods to access this register (where, when, how) will be widely disseminated within the concerned community as part of the broader RAP consultation as well as through public awareness mechanism and outreach activities. Communities also will be informed about the types of complaints that will be eligible for resolution (e.g. impacts related to project interventions).
79. For unresolved complaints a Grievance Mediation Committee consisting of knowledgeable persons with experience in the subject area will be constituted at the local level in an effort to settle disputes amicably. Such a committee will consist of the Head of the District, a legal adviser, local representative from the elected council, CBO/NGO representative as well as local leaders as appropriate. The procedures to be followed by the Committee with timelines will be clearly delineated in the RAP. All mediation committee meetings will be carefully recorded and documented. It is important that these committees are set up as soon as the Project becomes effective in order to ensure that cases going to Court will include only those disputes that cannot be resolved at the local/project level. All complaints and the status of their resolution will be monitored and documented in the Project's progress report as well as in the Aide Memoires of the supervision missions.

80. For crop compensation (resulting from the sub-surface gas pipeline), a well-established project-level procedure (in addition to the court) exists. First-tier grievance redress mechanisms include the Crop Compensation Committee and the Grievance Committee and the functions of these are discussed in the RPF. Eligibility and compensation rates for the different crops are well known to the farmers and this information is widely available.
81. **Monitoring and reporting:** This will follow procedures that have been well established through several previous and ongoing Bank-funded power projects in Egypt. Safeguard monitoring including monitoring of the implementation of the social mitigation measures will be an integral part of overall project reporting. UEEPC and GASCO will closely monitor project progress against agreed performance indicators. Data on actual project outputs and outcomes will be gathered, analyzed and included in quarterly progress reports to be submitted to the World Bank.

(iii) Environmental safeguards

82. The Borrower also carried out an ESIA of the project and of the various related works that have to be undertaken as part of the project preparation studies. The UEEPC ESIA and the GASCO ESIA each concluded that no large-scale, significant or irreversible environmental or social impacts can be expected from the project as planned, and they propose mitigation measures, a monitoring program, and an institutional development/strengthening program. These are contained in the ESIMP integral to each ESIA, which will be adequate to mitigate the risks that the project does pose. The key environmental aspects of the project, including impacts and the proposed mitigation measures as detailed in the ESIA, are summarized below.

The Power Plant Site

83. The power plant site is located immediately above a river floodplain and just upstream and downstream of Helwan South Island, away from the cultivated area. Small oases occur approximately one km south of the site, and immediately to the north of the site. There are no significant habitats within the project's area of influence. In addition, the field surveys have indicated that non-of the floral and faunal communities and/or species are of conservation value (rare or threatened). Meanwhile, no natural protectorates exist near the vicinity of the proposed site. No industry, other than the existing Kureimat power complex, is present near the site. Thus, the air in the background atmosphere is of appropriate quality. No archaeological resources are known in this zone. The ESIA indicate that the local archaeological authorities have surveyed the whole area around the site, which confirms that there are no historical resources within the area. Two water sources are available near the site, i.e. the Nile river and the underplaying aquifer. The quality of both surface water and groundwater in the Helwan South reach of the Nile is generally good.

Environmental impacts and mitigation measures

84. During operation, exhaust gases will be emitted into the atmosphere, normally from the boilers' stack as a result of fuel combustion. Emissions from the combustion of natural gas are carbon dioxide (CO₂), water vapor, carbon monoxide (CO) and nitrogen oxides (NO_x). Sulfur dioxide (SO₂) and particulates, which are typically associated with coal and oil combustion, will only be produced in trace quantities during natural gas firing. However, in emergencies when heavy fuel oil (mazout) is used instead of gas, SO₂ and particulates will be key emissions from the power plant.
85. Heated cooling water will be discharged into the River Nile via the cooling water discharge structure at a temperature of no more than 9.6°C at the point of discharge. Process waste water will be treated and discharged into the discharge system, which includes two pathways, - one to the circulating water discharge system (CWDS) and the other to the plantation irrigation network. Any oil and residual solids will be removed before discharge and the pH of discharged water maintained at between six and nine. Chlorine will be added to the cooling water system to control bacterial and algal growth on various surfaces and in the cooling water intake. The cooling water discharge will contain residual quantities of chlorine at concentrations below the World Bank standard for free chlorine of 0.2 mg/l. Small volumes of solid wastes will be segregated, collected and disposed of by licensed waste disposal contractors. The power plant incorporates a range of measures to eliminate or reduce operational releases within its design and layout, such as low NO_x burners in the boilers, oil interceptors fitted to the site drainage system and effluent treatment facilities to treat wastewater prior to discharge. As a result, the power plant is designed to meet high environmental standards and comply with the emission limits of the Arab Republic of Egypt and the World Bank.
86. Before selecting gas/oil-fired combined cycle technological option for Helwan South Plant, the ESIA analyzed various alternatives of fuel. Before finalizing the current location, the ESIA also considered three alternative site namely Safaga, Sharm Esh-Sheikh and Helwan South. Considering various economic and non-economic factors, the current site was selected, particularly due to land availability with minimal environment and social impact, no additional infrastructure requirements, no need for a worker's colony during construction, and anticipated desirable development of the area.

Air Emissions and quality

87. Construction activities will result in locally high levels of dust. This may affect nearest receptors or sensitive environments which lie in the immediate boundaries of the power plant. Existing concentrations of airborne dust are already high in this rural area. Potential impacts from dust emissions on site will be significantly reduced by careful management and the implementation of mitigation measures to reduce dust generation.
88. The power plant will burn natural gas as its primary fuel. As a result, the principle pollutant during normal operation will be NO_x. The ESIA indicates that the emissions from the plant will meet Egyptian and World Bank Guidelines. The dispersion modeling indicates that the highest concentrations for each of the averaging periods under consideration (hourly, daily, and annual) are found to the north-north-west, south and south- south-west of the site, respectively. The maximum hourly average value is 367.3

$\mu\text{g}/\text{m}^3$, the maximum 24-Hours average is $126.7 \mu\text{g}/\text{m}^3$ and the maximum annual average is $37.3\mu\text{g}/\text{m}^3$. Combined effects from the proposed Helwan South Power Project and the surrounding sources for nitrogen oxides (NOx) have been obtained using the background NOx measurements recorded for the Helwan South area. The maximum total combined 24-hour impact level ($138.79\mu\text{g}/\text{m}^3$, including the background level), while the maximum 24-hour impact level of the Helwan South Power Project is $126.7 \mu\text{g}/\text{m}^3$ (excluding the background level). The maximum combined 1-hour impact level, including the highest value during 2008, is $397.52 \mu\text{g}/\text{m}^3$.

Water use, discharge and quality

89. Cooling water and process water for power plant operation will be drawn from the Nile River via an intake structure. The quantity of the cooling water that will be returned back to the Nile River is about $69 \text{ m}^3/\text{sec}$. Process water that will be abstracted from the Nile River is about 0.07 percent of this quantity. Potable water will be supplied to the power plant via the power plant water supply system. Cooling water will be returned to the Nile River via a discharge structure whilst waste process water will be disposed of after treatment. The treated waste water will be used for plantation irrigation network and Circulating Water Discharge System (CWDS). Sanitary waste water will be disposed of after treatment via plantation irrigation network and the residual sludge will be transported by trucks to the sewer treatment plant of El-Saff town. No ground water or other surface water will be used during power plant construction and operation. The Contractors will be responsible for relevant water/toilet facilities during construction and the need to provide appropriate services will be specified in their contracts. The key potential impacts of the power plant on the aquatic environment will therefore be impacts to the aquatic flora and fauna during power plant construction and operation. No commercial fishing occurs in the vicinity of the project, but there is very limited fishing activity near El-Kureimat power complex site, approximately 7.5 km downstream the South Helwan project site.
90. The returned cooling water will be released at a temperature of no more than 3°C at the edge of mixing zone, which lies approximately within 100 m from the point of discharge, in conformance with the Egyptian and the World Bank Standards. In addition, the area affected by the highest temperature increases - and therefore where aquatic ecology is likely to be most affected- is localized and the aquatic habitats in this area have been found to already be relatively impoverished.

Noise Impacts

91. The construction of the Helwan South power plant is expected to generate a maximum noise level of 55 dB(A) during the day at the fence of the power plant and 50 dB(A) at night. These worst-case construction noise levels are within both Egyptian and World Bank guidelines, and for most of the construction periods, the noise levels will be lower than these values. No vibration impacts are expected beyond 100 m of the site. Construction traffic on local roads also will generate additional noise, however noise levels on local roads predicted for peak construction activity (during 2012-2013) is expected to be only 0.3dB(A) above ambient levels. The potential noise emissions from the Helwan South plant during operation have been modeled to provide noise contours in

the area around the site. The predicted operational noise levels at the site boundary and at all receptors are below the Egyptian and World Bank guidelines during daytime and nighttime.

Solid and Hazardous Waste Management

92. The management of wastes during construction and operation of the power plant will include mitigation measures to collect and store waste on-site, record all consignments of solid or contaminated waste for disposal and periodically audit waste contractors and disposal sites to ensure that disposal is undertaken in a safe and environmentally acceptable manner. During construction and operation, all wastes including debris waste, general waste, packaging waste, commercial wastes, raw-water pre-treatment sludge, tank sludge and interceptor sludge will be disposed of by licensed waste contractors.

Occupational Health and Safety

93. With the provision of a high standard of health and safety management on site, construction and operation of the power plant in accordance with good industry practice, the occupational health and safety risks associated with construction and operation of the power plant will be minimized and are not significant.

Associated Infrastructure

94. Transmission lines which will evacuate power generated by the Helwan South power plant will be constructed under a separate project, which is under preparation, including the ESIA which was prepared and found satisfactory to the Bank; and disclosed prior to the appraisal of Helwan South project.
95. A new gas pipeline route has been identified from Dahshour to Atfeeh within the gas network in collaboration with GASCO, which will supply gas to the proposed power plant. A separate ESIA, including a Resettlement Policy Framework for the proposed underground Gas Pipeline, has been completed. The gas pipeline starts from the Dahshour compression station and extends parallel to the existing 36" Dahshour-El Kureimat pipeline and parallel to an existing road. For a large section of the proposed pipeline that is expected to run through desert land, the EA does not indicate presence of any evidence of sensitive habitats; cultural properties, settlements or environmental receptors; or industrial or commercial activities that may potentially be adversely affected due to construction or operation of the gas pipeline. Construction of the gas pipeline will require a 20-meter right-of-way during construction, which may result in temporary inconvenience for farmers and residents in such areas. The environmental and social impacts are expected to be limited to construction stage, and may include loss of top soil due to excavation, debris disposal, use and disposal of concrete and brick waste, use and disposal of lubricants and waste oil, dust and noise generation during construction, and potential damage to existing community/village roads due to transportation of heavy machinery. The pipeline will be buried below the ground level at a depth of 2-3 meters. After completion of works, the land will be fully restored to original condition and farmers will be allowed to cultivate. There will be some restriction within the right of way with respect to any future

construction of structures that may have potential to damage the pipeline. All river and water body crossing for the pipeline will use Horizontal Directional Drilling (HDD) technique to pass under the river bed, which is an internationally-accepted standard practice to minimize environmental obstruction to water course. The farmers would be compensated in line with established practice in Egypt, prior to initiating any construction works for any temporary loss of agriculture, in case the losses are unavoidable. The exact alignment of the pipeline is not yet finalized but communities have been consulted. The ESIA for the gas pipeline indicated that most of the impacts will be construction-related, which will be mitigated by implementing Environment and Social Management Plan (ESMP), including Environment, Health and Safety requirements in conformance with the World Bank/IFC guidelines.

96. The ESIA for the other pipeline which runs from Abu Hommos compressor station to El Nubaria was carried following the World Bank guidelines. The chosen alignment based on an analysis of alternatives indicate that the pipeline will cross few roads, railways and canals, which will be done using horizontal directional drilling technique to pass under the river bed, which is an internationally accepted standard practice to minimize environmental obstruction to water course. As with the Dahshour-El Koreimat pipeline, the ESIA for Abu Hommos-El Nubera pipeline does not indicate evidence of any sensitive habitats; cultural properties, settlements or environmental receptors; or industrial or commercial activities that may potentially be adversely affected due to construction or operation of the gas pipeline. Following a similar construction practice, the anticipated environmental and social impacts will be mitigated by implementing an Environment and Social Management Plan, including Environment, Health and Safety requirements in conformance with the World Bank/IFC guidelines. Prior to initiating any construction works, farmers would be compensated for any temporary loss of agriculture in case the losses are unavoidable, in line with established practice in Egypt .

Monitoring

97. Stack emissions will be monitored continuously during plant operation at a representative point in the stack. Operational monitoring of stack emissions shall comprise monitoring the levels of: Oxides of Nitrogen; Sulfur Dioxide; Carbon Monoxide; and Total Suspended Particles and PM₁₀. The automatic monitoring system used will be linked in the controlling room to an alarm system to warn when emission limits for each pollutant are being approached. Concentrations will be recorded as hourly rolling averages and reports on stack emissions monitoring will compare recorded emissions against predicted levels and Egyptian and World Bank guidelines. Reports will be submitted to the EEAA, the World Bank and any other concerned authority on an annual basis. Monitoring of impacts of the power plant on the aquatic environment will include monitoring of the quality of the discharge water, Nile River bank line and benthic sediments, ambient water quality and the impact on aquatic flora and fauna. Monitoring data will be analyzed and reviewed at regular intervals and compared with Egyptian and World Bank guidelines.

Public consultation and disclosure

98. **Consultations:** Stakeholders consultations have been an integral part of the preparation of the safeguards documents. This has been a two- way mechanism of sharing information with stakeholders about the project and obtaining feedback to improve the design and obtain consensus/ownership and also toward the preparation of the safeguards documents (ESIA/RPF/ etc.). In order to ensure that the views and interests of all project stakeholders are taken into account, a three-phased public consultation was carried out. The objectives of consultation and disclosure were to ensure that all stakeholders and interested parties are fully informed of the proposed project, have the opportunity to voice their concerns and that issues resulting from this process are addressed in the ESIA and incorporated into the design and implementation of the project. The first phase consultation focused on getting public inputs during the scoping and preparation of this ESIA-Report, including the organization of a Public Scoping Meeting on 24 November 2010, in the Helwan Governorate. A second stage consultation was on 16 March 2011, in the Kureimat Power Plant site, which was publicized through a press advertisement in Al-Ahram Newspaper (on 7 March 2011) describing the project and inviting interested parties to attend the public meeting and review the Draft Final ESIA Report. A Non-Technical Summary (in Arabic) was distributed along with an invitation letter prior to consultation meeting. Most suggestions/comments were related to employment opportunities, concerns regarding local area development and compliance with the local emission requirements, and fair compensation for the loss of land. The ESIA was revised incorporating comments and suggestions received during the consultation meeting. For Abu Hommos Nubaria gas pipeline a public consultation meeting was held on Wednesday, May 25th, 2011 in the town of Damanhour, and for Dahshour Atfeeh pipeline on Saturday, April 9, 2011 in Maymoun village, Beni Suef. The meetings provided broad support to the pipelines and the power project, including mitigation measures as outlined in the ESIA report. Non-technical summaries of the ESIA reports were presented to a large group of stakeholders, and questions and comments were received at the meeting were incorporated to revise and disclose the ESIA reports.
99. Consultations are also a major aspect of the compensation process, e.g., the crop compensation process under the Egyptian law follows a five-stage consultation process. In addition, the consultation process will be strengthened by holding meaningful consultations during preparation of the RAPs for the different project components. The grievance mechanism will strengthen participation of stakeholders through a consultative process of decision making.

Institutional Safeguards Capacity

100. EEHC has developed strong institutional capacity with respect to Bank's safeguard policies and particularly how these are applied in power projects as they have implemented a number of Bank-funded category A and B projects. Although UEEPC capacity will need to be strengthened, EEHC has confirmed to the Bank that it will provide support as necessary to ensure that project activities comply with Bank safeguard policies.

101. Through recruitment of suitably qualified and experienced contractors, UEEPC will ensure integration of environmental and social sustainability measures into the detailed design and construction of the power plant. During construction, the Project Management Unit will have qualified Environmental Management Staff to coordinate implementation of the Environment and Social Management Plan. An Assistant Plant Manager will supervise and lead the Environmental Department (ED) and the Environmental Management Staff (EMS). The Assistant Plant Manager in collaboration with the consultant Site Manager will ensure that all contracts with contractors and sub-contractors stipulate all construction management measures, operational design criteria and environment, health and safety standards which must be implemented at the project site . Implementation and supervision of these measures will be ensured by PMU/EMS and the Assistant Plant Manager. The site management will be supported by UEEPC Project Manager, who will have direct responsibility for full compliance with the Environment and social mitigation measures including Environment, Health and Safety requirements on site during construction and operation. During operation, direct responsibility for environmental compliance and the implementation of the mitigation, management and monitoring measures will continue to be with the plant Environmental Staff under direct supervision of site-based Assistant Plant Manager. This position, will report directly to the Chairman of UEEPC/General Manager of Helwan Power Plant (UEEPC/ HPP).The Assistant Plant Manager will maintain an environmental register to regularly record evidence of environmental performance with respect to Egyptian and World Bank guidelines. The Project Company also will ensure that all staff employed at the plant will be trained in: general operation of the power plant; specific job roles and procedures; occupational health and safety; and contingency plans and emergency procedure. In addition to this environmental training for all staff employed at the plant, special environmental training will be given to the staff employed for the EMU.
102. UEEPC/HPP will establish and integrate policies and procedures on occupational health and safety into the operation of the power plant which meet the requirements of Egyptian and World Bank guidelines. As part of the preparation of emergency procedures and the plans for accident response arrangements, contingency plans and emergency procedures are being developed to cover events due to operational failures, natural causes and acts of third parties. The plans and procedures will cover, as a minimum: fire; explosion; leaks and spills of hazardous materials; injuries and illnesses; risk from natural disasters (wind, sandstorm, earthquake); and third-party risks (potential impacts of an accident occurring at another industrial facility which may impact upon the power plant).

I. D. MONITORING & EVALUATION

103. EEHC and GASCO will closely monitor project progress against the agreed performance indicators listed in Annex 1. Data on actual project outputs and outcomes will be gathered, analyzed and included in semi-annual progress reports to be submitted to the World Bank. EEHC and GASCO also will monitor the day-to-day procurement

progress and project implementation of the physical components including monitoring the implementation aspects of their respective ESIA and RPF. The relevant implementing agencies for TA activities (see section IV.A) will monitor progress of their respective activities.

II. ROLE OF PARTNERS

104. *Co-financing*: In addition to the IBRD loan (US\$503.8 million), the *Power Plant Component* includes loans from OPEC Fund for International Development (OFID) (US\$40 million); Kuwaiti Fund for Arab Economic Development (KFAED) (US\$213.8 million); Islamic Development Bank (IDB) (US\$449.9 million); and Arab Fund for Social and Economic Development (Kuwait) (AFSED) (US\$193.5 million); The Upper Egypt Electricity Production Company (UEEPC) will contribute US\$767.9 million as counterpart funding. The *Gas Pipelines Component* will be financed by the IBRD loan (US\$81.6 million) and counterpart funds from the Egyptian Natural Gas Company (GASCO) (US\$153.9 million).
105. There will be no jointly-financed procurement packages between the World Bank and other financiers, except for UEEPC (power plant) and GASCO (gas pipelines) counterpart funds.
106. For technical assistance and advisory services activities, please the details in Annex 2 and Annex 8.

Annex 4: Operational Risk Assessment Framework (ORAF)

Egypt, Arab Rep: EG - Helwan South Power Project (P117407)

Stage: Implementation

Risks

Project Stakeholder Risks

Stakeholder Risk	Rating	Low				
Risk Description: Government ownership and commitment to the project may be compromised due to competing Government priorities during the challenging country transition.	Risk Management:					
	Strong ownership demonstrated by outgoing and new Governments during project preparation based on the importance of this project for the sector and country at large.					
	Resp: Client	Status: In Progress	Stage: Implementation	Recurrent:	Due Date: 31-Dec-2018	Frequency:

Implementing Agency (IA) Risks (including Fiduciary Risks)

Capacity	Rating	Substantial				
Risk Description: Risk of compromised financial position of EEHC and GASCO could adversely impact implementation of the project and its sustainability, as well as EEHC's ability to service the loan (repay it to the government). GASCO's financial position depends mainly on EGAS' financial position, which has been sound. Risk of insufficient resources at UEEPC and GASCO: Due to the high level of complexity of	Risk Management:					
	Risk of compromised financial position of EEHC: Previous Governments have demonstrated readiness to assist through budget support and other means—including tariff increase -- to ensure orderly implementation of investment projects and operation of the power system. The outgoing Government started adjusting electricity prices again, with an increase in prices for energy intensive industries between approximately 15 and 50 percent in January 2012. The Government continued the efforts of addressing the low electricity tariffs for different consumer segments. A 15 percent increase on average electricity tariff was implemented in FY13. As part of the energy pricing reforms, a mechanism was introduced to compensate EEHC for the increase in fuel prices. However, to ensure financial suitability in the electricity and fuel sectors, more clarity is needed about how that mechanism will be operationalized and for how long; and how the future increases in electricity tariff will evolve for EEHC to achieve cost recovery.					
	Risk of GASCO's financial position. Risks will be closely monitored during implementation and necessary					

<p>this project and involvement of two implementing agencies (UEEPC and GASCO), there is a need for competent staff with adequate skills and sufficient resources to implement the project</p>	<p>measures to ensure sufficient mitigation measures are considered.</p> <p>As part of the parallel technical assistance and advisory services, the Bank, in coordination with other donors, will continue dialogue with the GoE on energy pricing and subsidies with a view of strengthening financial sustainability of the sector. The Transition Fund activities and EU could effectively assist the government in managing this risk.</p>					
	Resp: Client	Status: In Progress	Stage: Implementation	Recurrent :	Due Date: 31-Dec-2018	Frequency :
	<p>Risk Management:</p> <p>Risk of insufficient resources at UEEPC: EEHC, which has successfully prepared and implemented three large Bank-financed projects in recent years, will provide assistance through its corporate channels to UEEPC if needed. UEEPC hired a qualified engineering firm that is familiar with Bank projects to help with project design, procurement, construction supervision, testing, and commissioning, and has in place appropriate financial management system. UEEPC established a Project Management Unit (PMU) with key staff appointed (project manager, human resources, project engineers (electrical, mechanical, civil, and chemical), accountants, health and safety, procurement coordinator, and environmental and social safeguards coordinator). The PMU will be further expanded as the project implementation gets under way.</p> <p>Risk of insufficient resources at GASCO: GASCO has successfully constructed large number of gas pipelines, some with financing of international financial institutions, and has adequate corporate capacity for project design and implementation, including in procurement and financial management. GASCO's financial position is solid but it is exposed to any disturbances in payments from EGAS and EGPC. A deputy general manager in GASCO has been appointed to manage and coordinate the implementation of the Gas Pipeline Component. Dedicated staff in different departments have been assigned responsibilities for procurement, financial management, technical and safeguard aspects. Each person in charge is supported by a group of staff in the various departments of GASCO with expertise in the respective areas</p>					
	Resp: Client	Status: In Progress	Stage: Implementation	Recurrent:	Due Date: 31-Dec-2018	Frequency:
Governance	Rating	Moderate				
<p>Risk Description:</p> <p>Risk of accountability and oversight weaknesses: due to the size and complexity of this project, issues could arise around</p>	<p>Risk Management:</p> <p>All Bank-financed packages will be procured through ICB and be prior-reviewed by the Bank. The FM assessment made during project preparation (and follow up during appraisal) indicated that project implementing agencies (UEEPC and GASCO) developed internal control systems in place. Project accounts will be audited by independent</p>					

implementing agencies (UEEPC and GASCO) responsibilities and functions affecting oversight and accountability.	auditors, agreeable to the Bank. Additional risk mitigation measures were put in place. Both UEEPC and GASCO have established PMUs with clearly defined responsibilities for each area related to project implementation.					
	The experience with the existing Bank-financed projects implemented by EEHC and its subsidiaries has been very encouraging in this regard. However, given the importance of this risk for project implementation, it will be closely monitored during implementation and further mitigation measures will be developed, if necessary.					
	Resp: Client	Status: In Progress	Stage: Implementation	Recurrent:	Due Date: 31-Dec-2018	Frequency:
	Assessment of fiduciary risks (procurement, financial management) has been made during project preparation and an action plan for mitigations developed. Adequate procurement and financial management systems have been put in place to ensure proper management and transparent use of project funds. The Bank will monitor the risk closely based on the detailed FM and procurement mitigation measures (described in Annex 3, Section I.B.) already agreed with the implementing agencies (UEEPC and GASCO).					
Resp: Client	Status: In Progress	Stage: Implementation	Recurrent:	Due Date: 31-Dec-2018	Frequency:	

Project Risks

Design	Rating	Low				
<p>Risk Description:</p> <p>The risk of project design being suboptimal.</p> <p>The project requires coordination between two different agencies (UEEPC and GASCO). This could pose the risk that the timing for completing the interfaces between the power plant and gas pipelines is not aligned due to</p>	Risk Management:					
	The project uses well established technology. An experienced engineering firm has been hired to help with design, procurement, contracting, and construction management. Qualification requirements for equipment suppliers will be designed so as to minimize the technology and design risks.					
	Resp: Client	Status: In Progress	Stage: Both	Recurrent:	Due Date: 31-Dec-2018	Frequency:
Risk Management:						
Project management risk: The share of over 83% of power plants connected to the national gas network demonstrates a well-established experience between the gas sector and power generation companies. UEEPC hired a qualified engineering firm to help with project design, procurement, construction, and management. EEHC will redeploy staff as needed to ensure that UEEPC has adequate capacity to deliver the project to the extent necessary. GASCO has adequate corporate capacity to implement the project. The overall implementation plan and specific procurement plans have been carefully sequenced to ensure that all components are completed at the optimal time. Project						

<p>insufficient coordination or delay in procurement.</p>	<p>financing includes contingencies to cover possible cost overruns. Given the importance of this risk for project implementation, it will be closely monitored in coordination with the project PMUs and EEHC during implementation and further mitigation measures will be developed, if necessary.</p>					
	Resp: Client	Status: In Progress	Stage: Both	Recurrent:	Due Date: 31-Dec-2018	Frequency :
<p>Social and Environmental</p>	Rating	High				
<p>Risk Description: The construction of the power plant involves risk of possible social and environmental impacts that are defined in the ESIMPs of each component.</p>	<p>Risk Management: Environmental and social impact assessment reports covering the power plant and the gas pipelines have been prepared and mitigation measures developed as part of project preparation. Public and direct consultations with project stakeholders, as required by the Bank, have been completed. Additional instruments, such as Environmental Management Plans (EMPs), Resettlement Action Plans (RAPs) and Grievance Redress Mechanism (GRM) will be developed along with their associated consultations, launched, and disclosed prior to project construction. In fact, the preparation of the Power Plant dispute mechanism started in April 2013. However, the ongoing instability in the country could pose risks during the implementation of these mitigation measures. A close coordination with project PMUs will be pursued to ensure proper consultation is being comprehensively and timely conducted. Monitoring institutions and mechanisms will be established to ensure the implementation of the agreed mitigation measures.</p>					
	Resp: Client	Status: In Progress	Stage Implementation :	Recurrent:	Due Date: 31-Dec-2018	Frequency :
<p>Program and Donor</p>	Rating	Low				
<p>Risk Description: There is a risk associated with the interdependencies between project components that are financed by partners and local financing sources. Co-financing will be done on a parallel financing basis for procurement, i.e., procurement packages will not be co-financed by different financing agencies, which will simplify implementation. The experience with</p>	<p>Risk Management: The Bank, EU and participating ministries are closely coordinating donor-funded advisory services and technical assistance activities.</p>					

other Bank-financed projects implemented by EEHC, which are all co-financed by other donors, has been good in this regard.	Resp: Client	Status: In Progress	Stage: Both	Recurrent:	Due Date: 31-Dec-2018	Frequency:
Delivery Monitoring and Sustainability	Rating	Moderate				
Risk Description: Monitoring risk: If project implementation is not closely monitored, there is a risk that the process would not be efficient and would not achieve expected results. EEHC/UEEPC and EGAS/GASCO have developed adequate systems to monitor implementation of the project and evaluate its impact.	Risk Management: Monitoring risk: Due to the importance of this risk, the Bank task team will provide implementation support focused on monitoring progress.					
Sustainability risk: The design of the plant makes it competitive in terms of demand and dispatch in the context of growing electricity demand. The plant can operate both on natural gas and heavy fuel oil, which further strengthens its sustainability.	Resp: Client	Status: In Progress	Stage: Implementation	Recurrent:	Due Date: 31-Dec-2018	Frequency:
	Risk Management: Helwan South is likely to have a secure market for its output because of its role in replacing generation capacity of old inefficient generation steam units, and its contribution to meeting the growth of base load. The recent reforms of energy pricing and fuel subsidies established the necessary first steps to improve the sustainability of both the electricity and fuel sectors. The Government has also demonstrated readiness to assist through budget support and other means to ensure orderly implementation of investment projects and operation of the power system.					
	Resp: Client	Status: In Progress	Stage: Implementation	Recurrent:	Due Date: 31-Dec-2018	Frequency:
Other (Optional)	Rating	Low				
Risk Description: Interconnection Risk The risk of the interconnection to the transmission grid not materializing.	Risk Management: Interconnection Risk Management Background studies—technical, as well as environmental and social impact assessment -- for interconnecting transmission lines have been completed. The Borrower has requested to use the savings under the Ain Sokhna project to finance the lines, which will connect the Ain Sokhna and Helwan South power plants to the transmission grid. A Project Paper to restructure Ain Sokhna project accordingly is expected to be prepared in Q4 of FY13 and the Bank approval sought in FY14.					

Demand Risk: Economic decline and improved energy efficiency, especially if energy prices are reformed (as they should be), could lead to a lower electricity demand growth than assumed, making this power plant unnecessary with the proposed schedule of construction and completion.	Resp: Both	Status: In Progress	Stage: Both	Recurrent:	Due 31-Dec-2018 Date:	Frequency:
	Risk Management: Demand Risk Management Demand growth rates assumed (6.4 percent) are lower than what they have been in recent past (7.9 percent during 2003-2009 period). The electricity generation reserve margins are tight and the expected economic recovery, following political stabilization, is likely to lead to an increase in electricity demand growth. The plant remains economic under even more conservative load growth assumptions.					
	Resp: Both	Status: In Progress	Stage: Implementation	Recurrent:	Due 31-Dec-2018 Date:	Frequency:
Other (Optional)	Rating	Substantial				
Risk Description: Fuel (particularly gas as a primary fuel for Helwan) supply risk: The recent shortages in domestic gas supply had negative impacts on the electricity sector operations. If no further measures are taken by the Government to address the fuel pricing and subsidies, fuel exploration, production, refining, transportation, and distribution of fuels, both liquid and natural gas are likely to be undermined.	Risk Management: Fuel supply risk: Helwan South was presented and approved as part of EEHC's five-year plan 2012-2017 for power generation by the Supreme Council of Energy and the Council of Ministers. Such approval exemplifies the commitment by the Ministry of Petroleum (MoP) to meet the gas requirements for the power sector plan and this project. Hence, natural gas requirement for the plant is included in GASCO supply-demand balance. Moreover, MoP is taking measures to address the envisaged natural gas shortages in the coming 2 to 3 years by (1) resuming the exploration in new gas fields that are expected to increase the domestic gas supply starting from 2016; and, (2) bridge the gap of gas supply shortage until 2016 by importing gas- tendering.					
	Resp: Client	Status: In Progress	Stage: Implementation	Recurrent:	Due 31-Dec-2018 Date:	Frequency:
Implementation Risk Rating: Substantial Risk Description: Project implementation risks from the technical and project management aspects are judged to be low. However, the overall implementation risk is rated substantial due to mainly the macroeconomic and financial risks that are coupled with unstable political and economic transition which may have an adverse impact on project implementation and sustainability. Reliable electricity supply is vital for						

economic growth, security of the country, and the government is likely to provide budget support to the sector and to the project even under adverse fiscal conditions. The recent electricity tariffs and fuel subsidies reform along with the mechanism to compensate EEHC for the increase in fuel prices would have positive outcomes. However, to ensure financial sustainability in the electricity and fuel sectors, more clarity is needed about how that mechanism will be operationalized and for how long; and how the future increases in electricity tariff will evolve for EEHC to achieve cost recovery. Hence, if the fundamental problems are not addressed timely and no clear reform measures are established to support the electricity and fuel sectors to be economically viable over the medium- and long-term, the recently implemented reforms and government support are unlikely to be sustainable.

Annex 5: Implementation Support Plan
EGYPT, ARAB REPUBLIC OF: Helwan South Power Project

Strategy and Approach for Implementation Support

1. The project activities financed by the Helwan South will start in 2013 and will be completed in 2018. The loan is scheduled to close on June 30, 2019.

2. The strategy for implementation support (IS) has been developed based on the nature of the project and its risk profile. It aims at making implementation support to the Client flexible and effective, and will focus on implementation of the risk mitigation measures defined in the ORAF.

- **Risks related to the sector policies, including fuel supply, pricing, and subsidies:** The Bank will support the Borrower in addressing these important issues through its engagement in related analytical work and policy discussions. The Bank budget provides resources for policy work, complementing grant financing that has been obtained (Additional grants may also be sought). The main counterpart agencies for this work include Ministry of Finance, Ministry of Electricity and Energy, Ministry of Petroleum, and Egypt Electricity Regulatory Agency
- **Compromised financial position of the implementing agencies:** In addition to the activities related to the energy pricing and subsidies at the level of Government agencies, the Bank will work with the project implementing agencies to assist in developing strategies to implement investment projects (including through private sector investment) and strengthen their financial performance.
- **Project Management:** The Bank task team will monitor the capacities of the project management teams of the implementing agencies throughout project implementation to ensure that they are adequate to implement the project. The Bank will provide additional training where needed in relation to the Bank fiduciary and reporting requirements, as well as in the areas of environmental and social safeguards management. The Bank team will maintain regular contact with key officials of EEHC, UEEPC, GASCO, and EGAS, and with their project management teams to ensure timely identification of any potential problems and their resolution.
- **Procurement:** Implementation support will include: (i) reviewing of the Procurement Plan and providing suggestions; (ii) reviewing procurement documents and providing timely feedback; and (iii) monitoring procurement progress against the agreed Procurement Plan. More intensive support will be provided during the first 12-18 months to ensure the timely procurement and contracting of the big packages.

- **Financial Management:** Supervision of project financial management will be performed on a risk-based approach. Supervision will review the project's financial management system, including but not limited to, accounting, reporting and internal controls. The Bank team will assist the UEEPC and GASCO in improving financial management and reporting. Financial management supervision will be conducted by financial management specialists.
- **Environmental Impact Management:** The Bank will provide support through the regular review of the semi-annual environmental monitoring and evaluation reports and will follow up any issues with the UEEPC and GASCO and their consultants. Given the moderate risk rating, environmental site visit will be carried out once or twice a year.
- **Social Impact Management:** The Bank will provide support through regular review of the quarterly project progress report on social aspects and the implementation of the resettlement action plan as required. Intensive support will be provided during project preparation stage and early construction stage, to ensure that any social impact issues are appropriately addressed, including preparation and implementation of RAP(s), if any are needed.
- **Anti-corruption:** The project is essentially about procuring contracts through International Competitive Bidding (ICB). The Government has its own anti-corruption plan of action. Bank support will leverage the anti-corruption plan of the government and also will reinforce the preventive measures by reviewing main contracts and ensuring adherence to both government and Bank procurement guidelines. The Bank's Anti-Corruption Guidelines apply to this Project, as with all Bank Projects.
- **Implementation Progress:** The Bank will closely monitor the overall progress of project implementation by reviewing the semi-annual progress report, the execution of the Procurement Plan, the actual disbursement of the loan. The Bank will provide support by regularly visiting the project, helping to identify arising issues which impede project progress and discussing and agreeing on actions to resolve critical issues.

Implementation Support Plan

3. The Bank team members for procurement, financial management, and safeguards will be based in the Egypt country office to ensure closer support to the client. Formal supervision and field visits will be carried out semi-annually. Detailed inputs from the Bank team are outlined below:

- **Technical inputs:** Inputs of technical specialists will be required to review bid documents and associated technical specifications to ensure that adequate technical standards are observed and that they enable a fair competition. Technical

specialists also will be needed to review bid evaluation reports and monitor implementation of the project during construction and commissioning.

- **Fiduciary requirements and inputs:** The Bank team will help UEEPC and GASCO to identify capacity building needs to strengthen its financial management capacity and to improve procurement management efficiency. Training will be provided by the Bank's financial management specialist and procurement before the commencement of, and during, project implementation to the extent needed. Both the financial management and the procurement specialist will be based in the country office to provide timely support. Formal supervision of financial management will be carried out semi-annually, while procurement supervision will be carried out as required by the client and project implementation timeline.
- **Safeguards:** Inputs from an environment specialist and a social specialist will be required, though the project's social and environmental impacts are limited. Training on environment project monitoring and reporting will be provided if needed. On the social side, supervision will focus on the implementation of the agreed RFPs and preparation of RAPs, if needed. Field visits will be based on the project needs and are expected to be more frequent during the first 18-24 month of project implementation (semi-annually), and less so after that (annually).
- **Financial review of EEHC and EGAS/GASCO financial performance:** Input will be required from a financial specialist for regular review of EEHC and EGAS/GASCO financial status to monitor its financial capability. This exercise will be combined with the supervision of other WB financed projects implemented by EEHC and EGAS/GASCO through semi-annual reviews.
- **Sector policies:** The Bank will provide, through its staff and consultants as needed, experts that will engage in policy support, complementing the activities of other donors, as described in Section III.B in the main text.

4. The main focus of implementation support is summarized below:

Table 1: Areas of Implementation Support

Time	Focus	Skills Needed
First twelve months	Monitor and assist in procurement of the main contracts, as appropriate	Procurement Technical
	Monitor performance of land acquisition and resettlement activities if any	Social
	Sector policies	Power Sector Policy
12-48 months	Monitor project implementation (including construction progress)	Technical Procurement
	Monitor financial management and disbursement	Financial
	Monitor performance of environmental and social impact management plan	Environmental/Social
	Sector policies	Energy sector strategy specialists Financial analyst
	Sector Policies	Energy sector strategy specialists Financial analyst Power Sector Policy

Table 2: Skills Mix Required

Skills Needed	Number of Staff Weeks per Year	Number of Trips per Year	Comments
Procurement	8		Field based
Financial management	3		Field based
Technical	6	2	
Environment	2	1	Field and HQ based
Social	3	2	Field and HQ based
Financial analyst	3	1	
Sector Specialists	2	2	
Others	5	2	

Annex 6: Financial Analysis

EGYPT, ARAB REPUBLIC OF: Helwan South Power Project

A. Main Financial Risks Facing EEHC

1. **High debt leverage impacting debt service ability and posing foreign exchange risk.** EEHC's leverage has increased substantially in the past eight years, as liabilities-to-equity ratio rose to 9.7 times in FY2012 from 6.6 in FY2002. A substantial delay in NIB debt restructuring, a lack of recapitalization or a prolonged tariff freeze would keep leverage level high, which may affect debt repayment in the next ten years. In addition, in FY2012 EGP 28.3 billion out of EGP 67.1 billion non-current long-term loans were denominated in foreign currencies; the depreciation²⁸ of the Egyptian pound has increased the book value of foreign currency loans.
2. **Potentially higher cost of fuels in power generation and higher cost of wind and solar power.** (i) Natural gas and HFO are primary fuels used in power generation in Egypt. The Government announced in FY2013 that it would compensate EEHC for the increase in fuel prices, which according to EEHC would keep the unit cost of fuels unchanged (from FY2012) until further notice. In the future the cost of fuels to EEHC may thus change subject to Government future decisions; (ii) Egypt is developing a commercial wind power program and solar power projects. The per-unit financial cost of wind and solar power could initially be substantially higher than that of conventional power for EEHC, depending on the level of concessional funding available.
3. **Large investment plan.** EEHC is concluding the sixth generation investment plan with a 2,500 MW fast track program. It also is planning a large investment program for 2012–2017 plan for new generation projects, including the 2,250 MW Giza North and the 1,950 MW Helwan South projects. This could amount to over EGP 100 billion of new investment, exceeding existing fixed assets of EGP 96 billion. In addition, the opportunity to resume the planned IPP program is experiencing a delay and has become more challenging to execute as a result of Egypt difficult economic and political situation.

B. Main Financial Risks Facing EGAS

4. **EGAS is the main owner of Egypt's domestic natural gas pipeline network and a key entity responsible for liquefied natural gas trading business.** EGAS was established in 2001 in accordance with the provisions of the Public Enterprise Sector Law No. 203 (1991) and has progressed into a trader of Liquefied Natural Gas (LNG) and the main owner of the natural gas transmission and distribution (T&D) network in Egypt. In recent years EGAS has generated financial profits and cash resource from the LNG trading business. The natural gas transportation activity has been carried out on a cost recovery basis with no profit component. Effectively, the LNG trading business has been cross-subsidizing the natural gas T&D network business.

²⁸ The Egyptian pound has depreciated by approximately 19 percent from early July 2010 to mid-March 2013— from EGP 5.7 to EGP 6.79 per US\$.

5. **Revenue and cash flow pressure stemmed from lower LNG trading margin.** EGAS' margin on LNG sales could be negatively affected by multiple factors such as (i) the cost of LNG charged by EGPC to EGAS; (ii) changes in contracted LNG prices, including EGAS' share; (iii) changes in spot LNG prices; (iv) quantity of LNG belonging to Egypt and correspondingly to EGAS; (v) foreign exchange rate movement.

6. **Large investment planned for the next five years.** EGAS' current budget for FY2012–FY2016 includes a relatively large investment plan of LE 2–4 billion per year²⁹, totaling approximately LE 15 billion, compared to approximately LE 16 billion of fixed assets and investment by end FY2011.

7. **Financial ability to cross-subsidize natural gas transportation business.** A significant decline in LNG trading margin would impact EGAS' ability to cross-subsidize its natural gas transportation business. This may force EGAS to delay its investment program or to become more leveraged in order to supplement any cash shortfall.

8. **Large outstanding gas bills (arrears).** EGAS has acted as a facilitator in collecting natural gas bills from gas users on behalf of the gas owner EGPC. Legacy gas bill receivables and payables were transferred from EGPC to EGAS upon its establishment, and these outstanding amounts have continued to increase. Nevertheless, in terms of cash flow this pass-through arrangement has limited impact on EGAS.

9. EGAS financial risks are mitigated by the following factors:

- a. The company has a relatively low financial debt relative to its capital as reflected in a long-term debt/obligation-to-equity ratio of 1 by end FY2011.
- b. In the future the authorities could allow EGAS to generate some return on investment from the natural gas transportation business to supplement the LNG trading margin.
- c. EGAS' investment in subsidiaries and affiliated companies may generate incremental revenue and cash flow for EGAS following their construction/initial operation phase.
- d. Construction of Egypt's two LNG facilities was completed in the 2000s. Both facilities now have substantial operational experience, higher ability to manage operating costs, and may have a declining level of fixed cost amortization associated with capital expenditures during construction. These could help maintain or improve LNG trading margins for EGAS.
- e. Collectively, EGAS should be in a position to maintain a sound financial status and carry out its natural gas mandate for Egypt on a sustainable basis. However, certain variables -- such as the level of gas transmission margin -- are not directly under the control of EGAS and will require policy and regulatory supports.

²⁹ EGAS's budgeted investments include those carried out by GASCO (Source: EGAS).

C. Main Financial Risks Facing GASCO

10. Any substantial delay in cash transfers from EGAS and EGPC to GASCO could incur cash flow constraints for GASCO, especially pass-through transfers to cover expenditures related to EGAS and EGPC's assets. Effectively, GASCO could be required to use its own cash resources in servicing loans related to EGAS and EGPC's assets.

Table 1: Summary of EGAS Recent Financial Results and Indicators

	2008	2009	2010	2011
Balance Sheet Summary-Million LE	<i>Actual</i>	<i>Actual</i>	<i>Actual</i>	<i>Actual</i>
Assets				
Cash	1,325	1,112	728	539
Other current assets, net	18,085	23,659	26,533	32,877
Fixed assets, net	1,857	4,831	6,879	9,754
Investments	1,228	1,404	6,056	6,909
Total assets	23,521	32,280	41,057	50,796
Liabilities & Equities				
Current portion of long-term debt	2	1,195	440	686
Due to GASCO	2,772	3,218	3,906	4,498
Other current liabilities, net	15,140	20,928	23,137	30,817
Long-term liabilities, net	2,592	2,997	4,618	4,756
Total liabilities	20,506	28,338	32,101	40,757
Retained earnings & reserves	2,473	3,400	4,116	4,525
Total Equity	3,015	3,942	8,956	10,039
Income Statement Summary-Million LE				
Revenue				
Sales	5,131	6,719	4,651	6,156
Investment income	24	50	40	222
Expenses				
Operating expenses	(3,648)	(4,833)	(3,252)	(3,794)
Financing expenses	(170)	(212)	(244)	(369)
Depreciation/amortization	(73)	(250)	(332)	(800)
Taxes	(320)	(280)	(374)	(420)
Net Income	1,040	1,115	831	755

	2008	2009	2010	2011
Cash Flow Summary-Million LE	<i>Actual</i>	<i>Actual</i>	<i>Actual</i>	<i>Actual</i>
Changes in working capital	311	461	(96)	(1,823)
Operating cashflow - net	1,759	1,871	1,067	(77)
Investment cashflow - net, of which	(1,139)	(3,336)	(2,728)	(194)
<i>Capital expenditures</i>	(806)	(3,225)	(2,381)	(206)
Financing cashflow - net, of which	85	1,252	1,277	172
<i>Repayment</i>				(451)
<i>Disbursement</i>				623
Net change in cash	705	(213)	(384)	(98)
Beginning cash balance	620	1,325	1,112	728
Ending cash balance	1,325	1,112	728	539
Financial Ratios				
Profitability				
EBITDA margin	29%	29%	31%	42%
Net margin	20%	17%	18%	12%
RoE	34%	28%	9%	8%
EBITDA - Debt service coverage	n/a	no payment	1.0	3.2
Cashflow				
Debt service coverage	n/a	no payment	1.3	0.4
Debt service coverage, including GASCO	n/a	n/a	n/a	n/a
Interest coverage	11.3	9.8	5.4	0.8
Self finance	158%	55%	11%	-118%
Liquidity and leverage				
Current ratio	1.1	1.0	1.0	0.9
Receivables day	1284	1284	2071	1946
Payables day	1668	1854	3193	4259
Long-term debt to equity	0.9	0.8	0.6	0.5
Long-term debt+due to GASCO to equity	1.8	1.6	1.0	1.0
Cash on hand (days of revenue)	94	60	57	32
Physical Units				
LNG quantity (bcm piped gas, estimated)	3.9	3.9	3.9	3.9
Piped natural gas quantity (bcm)*	47.8	52.0	53.5	53.5
*2011 value is an estimate				

Table 2: Summary of GASCO Recent Financial Results and Indicators

Balance Sheet-Million LE	2008	2009	2010
	<i>Actual</i>	<i>Actual</i>	<i>Actual</i>
Assets			
Cash	2,134	2,085	1,261
Current assets, net	1,348	890	821
Long-term assets, net	3,156	3,535	4,237
Due from EGAS and EGPC, net	3,748	5,214	6,850
Total assets	10,387	11,724	13,169
Liabilities & Equities			
Current portion of long term debt	146	197	320
Current liabilities, net	2,163	2,275	2,505
Long-term liabilities, net	2,097	2,676	3,085
Total liabilities	4,261	4,952	5,590
Retained earnings	1,558	1,277	1,440
Capital & reserves	4,568	5,495	6,140
Total equity	6,126	6,773	7,580
Income Statement-Million LE			
	<i>Actual</i>	<i>Actual</i>	<i>Actual</i>
Revenue			
Sales	2,701	2,156	2,698
Cost of sales	(1,031)	(1,180)	(1,197)
Other (Inv&non required Prov.)	1,204	830	660
Expenses			
Operating expenses	(182)	(198)	(305)
Financing expenses	21	(14)	(28)
Depreciation	(110)	(108)	(66)
Other	(1,045)	(237)	(294)
Net Income	1,558	1,249	1,468

Cash Flow Summary-Million LE	2008	2009	2010
	<i>Actual</i>	<i>Actual</i>	<i>Actual</i>
Changes in working capital	(1,428)	(639)	(1,516)
Operating cashflow - net	1,050	503	67
Investment cashflow - net, of which	(947)	(553)	(775)
<i>Capital expenditures</i>	(546)	(591)	(712)
Financing cashflow - net, of which	561	(0)	(116)
<i>Change in long term loans</i>	1,128	631	531
Net change in cash	664	(49)	(824)
Beginning cash balance	1,471	2,134	2,085
Ending cash balance	2,134	2,085	1,261
Key Financial Ratios			
	<i>Actual</i>	<i>Actual</i>	<i>Actual</i>
Profitability			
EBITDA margin	89%	80%	80%
Net margin	93%	128%	98%
RoE	25%	18%	19%
Cashflow			
Debt service coverage, cash flow	3.0	2.8	0.5
Debt service coverage, EBITDA	4.1	3.9	4.8
Self finance	77%	65%	-17%
Liquidity and leverage			
Current ratio	2.1	2.0	1.8
Receivables day	10	23	20
Payables day	28	31	29
Long-term debt to equity	0.3	0.4	0.4
Cash on hand (days of revenue)	288	353	171
Physical Units			
Domestic gas consumption (bcm)	40.8	42.5	45.1

C. Future Financial Performance of EEHC (Consolidated basis)

11. Projections to assess EEHC's future financial position and performance have been carried out for the period 2012/13–2021/22. Further details are recorded in the project files.

12. In the base scenario, projections for future financial performance are based on the following key assumptions:

- a. Gas and fuel prices to EEHC remain at FY2012 levels until end of FY2016/17 (reflects government's compensation to EEHC for fuel prices increase). Afterward gas and heavy fuel/diesel prices are increased to 44 piasters per cubic meter and EGP 2,300 per metric ton, respectively, which are new prices announced by the government during FY2013.
- b. Annual increases in the average tariff of 7.5 percent in FY2013/14 until FY2017/18 and 3 percent thereafter.
- c. Final sold electricity increases on average 6.4 percent per annum.
- d. No restructuring or conversion of debt from the National Investment Bank into equity.
- e. Solar power projects of 270 MW are assumed to gradually come online starting in FY2013. In addition, a 2,250 MW thermal BOO and 1,200 MW wind BOOs are assumed to gradually come online starting in FY2018.
- f. Collection performance of new account receivables of 95 percent on average.

13. The projections yield the following key results:

- a. The implementation of the above ensures positive cash flow and a net profit for EEHC in most years, enables the company to meet its current operating expenses and allows for a gradual reduction in the levels of payables and past due obligations (arrears).
- b. Government's provision of fuel subsidies (assumed until end of FY2017) could be lifted if gradual tariff increases are implemented (assumed 7.5 percent per year until FY2018 and 3 percent thereafter). These measures would gradually lead EEHC toward a full cost recovery tariff.
- c. The projections indicate that the company may experience cash shortfall and cannot fully service all long-term debt obligations in some years from internally-generated cash, with debt service coverage ratio of lower than 1. However, in practice EEHC has accessed short-term loan and cash on hand, delayed repayment and prolonged its payables in meeting a periodic cash shortfall.
- d. The projections also indicate that the company could substantially fund new capital expenditures from internal cash flow, suggested by the self-financing ratios³⁰ of above 20 percent in multiple years (note that capital spending for the outer years could be higher than current estimates).

³⁰ Self-financing ratio is estimated based on net operating cash flow after subtracting estimated long-term debt repayment.

14. Introduction of energy conservation measures and a pilot on time-of-use tariffs, measures which are currently under implementation, would further enhance EEHC's financial performance, reducing the overall annual increases in demand, which in turn would defer additional investment needs. In addition, potential settlements with the government of public arrears in the payment of energy charges and past due obligations could accelerate the reduction in the level of accounts receivables and payables, further strengthening EEHC's balance sheet.

15. The financial performance targets, revised and set for the Giza North Power Project partially financed by the World Bank (approved in June 2010), are: (i) achieving a current ratio higher than or equal to 1 by FY2020; and (ii) maintaining a debt service coverage ratio higher than or equivalent to 1.2. The projections indicate that meeting these targets is feasible.

16. **Sensitivity of financial results.** EEHC's financial results are highly sensitive to the average selling tariffs.

- a. **A scenario of no increase in the average selling tariff** would incur EEHC financial losses in every year. That also means lower ability to service debt obligations, with debt service coverage ratio falling below 1 in all years. Without recapitalization, EEHC's debt level would substantially increase and its EGP 14 billion of equity reduced to zero. Neither the current ratio nor the debt service coverage ratio targets will be met by the end of the projections.
- b. **A restructuring of the NIB loans would reduce leverage and increase debt service cushion.** An (assumed) 50 percent reduction in the NIB debt would reduce long-term debt-to-equity ratios from 9.7 times in FY2012 to approximately five times. This would increase the debt service coverage ratios to over 1.2 in most years.

Table 3: Base-case EEHC Financial Projection Results for FY 2012/13 to FY 2021/22

	Unit	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
		actual	projection									
GWh sold	GWh	137,333	146,123	155,475	165,425	176,012	187,277	199,263	212,016	225,585	240,022	255,383
Average tariff	EGP / kWh	0.203	0.218	0.235	0.252	0.271	0.292	0.313	0.323	0.332	0.342	0.353
Natural gas used in EEHC plants	BCM	26.3	32.2	34.3	34.6	37.8	40.2	43.4	46.6	49.5	52.6	56.0
HFO used in EEHC plants	Ton million	4.6	0.6	0.5	0.7	0.7	0.8	0.9	0.8	0.8	0.9	0.9
Diesel used in EEHC plants	Ton million	0.1	0.1	0.2	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2
Average natural gas prices	US\$/MMBtu	0.9	0.9	0.9	0.9	0.9	0.9	2.0	2.0	2.0	2.0	2.0
Average HFO prices	EGP / ton	221.0	221.0	221.0	221.0	221.0	221.0	2,300.0	2,300.0	2,300.0	2,300.0	2,300.0
Average LFO prices	EGP / ton	655.5	655.5	655.5	655.5	655.5	655.5	2,300.0	2,300.0	2,300.0	2,300.0	2,300.0
INCOME STATEMENT SUMMARY												
Electricity sales	EGP million	27,886	31,896	36,483	41,729	47,730	54,593	62,444	68,433	74,998	82,191	90,075
Total revenue	"	31,655	35,665	40,251	45,497	51,498	58,362	66,212	72,202	78,766	85,960	93,843
Fuel expenses	"	(6,081)	(6,264)	(6,667)	(6,744)	(7,367)	(7,828)	(21,455)	(22,651)	(24,042)	(25,580)	(27,217)
Purchased electricity expenses	"	(2,408)	(2,302)	(2,323)	(2,549)	(2,692)	(3,033)	(8,468)	(10,702)	(11,276)	(11,918)	(16,149)
EBITDA	"	8,301	11,491	14,043	17,297	20,776	25,095	12,036	12,738	15,472	18,451	18,246
Financing expenses	"	(4,603)	(5,773)	(6,410)	(6,803)	(6,787)	(6,563)	(6,290)	(6,132)	(5,965)	(5,657)	(5,266)
Depreciation	"	(4,249)	(4,918)	(5,505)	(6,075)	(6,604)	(7,002)	(7,375)	(7,618)	(7,713)	(7,808)	(7,903)
Net income	"	693	2,044	3,372	5,664	8,629	12,774	(385)	232	3,038	6,230	6,320
CASH FLOW STATEMENT SUMMARY												
Changes in working capital	"	2,409	(5,964)	(12,073)	(2,230)	(1,691)	(1,391)	5,151	(3,286)	(2,383)	(2,464)	(1,842)
Operating cash flow, net	"	5,384	998	(3,195)	9,508	13,542	18,385	12,141	4,564	8,368	11,574	12,382
Investing cash flow, net	"	(14,827)	(19,574)	(18,981)	(17,625)	(13,281)	(12,438)	(8,101)	(3,165)	(3,165)	(3,165)	(3,165)
Financing cash flow, net	"	8,533	19,280	22,553	8,548	233	(5,382)	(3,395)	(907)	(4,664)	(7,817)	(8,569)
Change in cash	"	(911)	704	377	431	493	564	645	492	540	591	648
Cash ending balance	"	2,227	2,931	3,308	3,740	4,233	4,797	5,442	5,934	6,474	7,065	7,713
BALANCE SHEET SUMMARY												
Total assets, of which	"	149,828	168,274	181,946	193,326	199,350	203,502	202,151	195,813	193,162	190,597	188,136
<i>Cash</i>	"	2,227	2,931	3,308	3,740	4,233	4,797	5,442	5,934	6,474	7,065	7,713
<i>Receivables</i>	"	21,250	23,942	23,712	23,063	21,873	19,991	17,238	14,841	16,190	17,669	19,289
<i>Fixed assets, net</i>	"	119,045	133,701	147,176	158,726	165,403	170,840	171,566	167,113	162,565	157,922	153,184
Total liabilities, of which	"	135,771	152,173	162,473	168,189	165,584	156,962	155,996	149,427	143,738	134,943	126,161
<i>Long-term debt, gross</i>	"	74,122	93,402	115,955	124,503	124,736	119,354	115,958	115,052	110,388	102,571	94,002
<i>Current portion of long-term debt, estin</i>	"	7,024	7,567	7,839	5,619	10,060	9,328	7,791	7,613	7,296	7,014	6,492
<i>Past due liabilities*</i>	"	41,991	41,991	30,691	29,191	27,691	26,191	24,691	23,191	21,691	20,191	18,691
Total equity	"	14,058	16,101	19,473	25,137	33,766	46,540	46,155	46,387	49,424	55,654	61,975

Table 3 (Continued from the previous page)

	Unit	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
Financial ratios												
EBITDA margin	%	26%	32%	35%	38%	40%	43%	18%	18%	20%	21%	19%
Net margin	%	2%	6%	8%	12%	17%	22%	-1%	0%	4%	7%	7%
Return on equity	%	5%	13%	17%	23%	26%	27%	-1%	0%	6%	11%	10%
DSCR - EBITDA**	times	1.0	0.9	1.0	1.2	1.7	1.5	0.8	0.9	1.1	1.4	1.5
DSCR - net operating cash flow***	times	1.1	0.5	0.2	1.1	1.6	1.5	1.2	0.8	1.1	1.3	1.4
EBITDA interest coverage ratio	times	1.8	2.0	2.2	2.5	3.1	3.8	1.9	2.1	2.6	3.3	3.5
Current ratio	times	0.4	0.5	0.6	0.7	0.7	0.7	0.6	0.7	0.8	0.8	0.9
Cash on hand (# day of revenue)	days	26	30	30	30	30	30	30	30	30	30	30
Receivables day (# day of revenue)	days	245	245	215	185	155	125	95	75	75	75	75
Payables day (# day of external costs)	days	390	345	300	255	210	165	120	75	75	75	75
Liabilities-to-equity ratio	times	9.7	9.5	8.3	6.7	4.9	3.4	3.4	3.2	2.9	2.4	2.0
Long-term debt-to-equity ratio	times	5.3	5.8	6.0	5.0	3.7	2.6	2.5	2.5	2.2	1.8	1.5
Long-term debt / net operating cash flow	times	13.8	93.6	(36.3)	13.1	9.2	6.5	9.6	25.2	13.2	8.9	7.6
Net debt**** / EBITDA	times	14.0	11.7	10.3	8.8	7.2	5.7	11.4	10.5	8.2	6.4	5.9
Annual % change - GWh sold	%	8.2%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%
Annual % change - average tariff	%	0.8%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%	3.0%	3.0%	3.0%	3.0%
* Past due liabilities are largely obligations to the Ministry of Finance.												
These obligations are gradually being setoff against the cost of electricity supplied to governmental users.												
** EBITDA divided by previous year current portion of long-term debt and interest expenses for the year.												
*** Operating cash flow and interest expenses -- net of changes in working capital,												
divided by previous year current portion of long-term debt and interest expenses for the year.												
**** Sum of short- and long-term debt/obligations, subtract cash balance												

D. Future Financial Performance of EGAS

1. **Projections to assess EGAS' future financial position and performance** have been carried out for the period FY2012–FY2020. Further details are recorded in the project files.
2. In the base scenario, projections are based on the following key assumptions:
 - a. **LNG business.** The quantity of EGAS' share of LNG is fixed at approximately 3.9 billion cubic meter (bcm) of piped natural gas equivalent per year. This corresponds to a 50:50 quantity split between EGAS and EGPC of Egypt's share of processed LNG. EGAS' LNG trading margin ranges between US\$2.25–3.25 per MMBtu.
 - b. **Gas transportation business.** The quantity of natural gas handled by EGAS in Egypt is assumed to remain constant at 53.5 bcm as in 2010. The projection has maintained a cost-recovery basis for this business based on the prevailing arrangement.
 - c. **Investment income.** The projection assumes an eight percent return on investment in subsidiaries and associated companies beginning in FY2016. The eight percent is less than Egypt long-maturity Treasury bond interest rates at present.
 - d. **New investments and debt financing.** EGAS' current budget for investments and new gas pipeline costs for Giza North and Helwan South power plants are applied: EGP 2–4 billion per year, totaling approximately EGP 12 billion by FY2016. New debt financing is used to supplement internally generated cash; each year's ending cash balance is fixed at 30 days of revenue.
 - e. **EGAS financing terms.** Existing loans are estimated to be fully repaid in the next eleven years. New loans are assumed to have a 3-year grace period and to be repaid over ten years on average. A blended interest rate of seven percent is assumed for new loans, reflecting prime commercial lending rates in Egypt and lending rates of development financial institutions.
 - f. **Gas bill receivables** (EGP 32.8b) and payables (EGP 35.1b) are capped at the outstanding amounts of end FY2011.
 - g. **Due to GASCO.** Outstanding due of EGP 4.5 billion is assumed to be repaid over the next 10 years. Due related to the Giza North and Helwan South gas pipelines is assumed to be repaid over 10–20 years, based on the terms of Egypt commercial banks and of the World Bank.
3. The projections yield the following key results:
 - a. **Profitability.** Net profit margins are projected to decline from twelve percent in FY11 to below ten percent over the projections period. The rising depreciation charges related to large investment are the main driver of the projected decline in profitability;

- b. **Cash flow and debt service**
 - i. **Net operating cash flows** are projected to average EGP 1.8 billion per year. Therefore, new loans are needed to help finance the LE 2–4 billion per year investment plan;
 - ii. **Cash needed for debt repayment** is projected to step-up in the next ten years toward a level of EGP 1.1 billion per year;
 - iii. **Debt service coverage ratios (DSCR)** -- cash flow basis -- are projected to decline to a low of 1.0. This low ratio is due to the projected repayment of loans and payment to GASCO related to EGAS' projects implemented in recent years that are becoming due. EGAS may need to resort to additional debt financing to bridge any short-term cash shortfall;
 - iv. The percentages of self-financed investment are projected to average at 22 percent up to FY2016.
 - c. **Leverage.** The ratio of long-term debt plus due to GASCO-to- equity is projected to average approximately 1.2 up to FY2016. The risk of over-leverage is not high despite the large investment program due to the on-going projected profitability.
4. **Sensitivity of financial results.** EGAS' financial results are sensitive to the LNG trading margin, the margin on gas transportation business and the return on investment in subsidiaries and affiliated companies.
- a. **Adverse scenario.** EGAS would incur financial losses immediately should the LNG trading margins drop below US\$2.0 per MMBtu (compared to US\$2.25–3.25 per MMBtu in the base case). Under this situation EGAS would be unable to fully service its debt obligation from operating cash flow.
 - b. **EGAS is allowed to make a profit from gas transportation business and higher return on investment.** Should EGAS be allowed to make a 15 percent margin on its gas transportation business, instead of zero margin, its net profit margin would remain above 5 percent in most years, and the debt service coverage ratio would exceed 1.0. This scenario thus provides a higher cushion against financial stresses.

Table 4: EGAS: Base-case Financial Projection Results for FY 2011/12 to FY 2019/2020

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Balance Sheet Summary-Million LE	<i>Actual</i>	<i>Projected</i>								
Assets										
Cash	539	506	575	575	575	575	570	566	571	565
Other current assets, net	32,877	32,877	32,877	32,877	32,877	32,877	32,877	32,877	32,877	32,877
Fixed assets, net	9,754	12,543	13,051	13,645	14,336	15,133	14,978	14,749	14,445	14,066
Investments	6,909	7,046	7,197	7,363	7,546	7,747	7,747	7,747	7,747	7,747
Total assets	50,796	53,689	54,417	55,177	56,051	57,048	56,889	56,656	56,358	55,973
Liabilities & Equities										
Current portion of long-term debt	686	454	454	924	1,024	1,124	1,122	1,122	1,126	1,133
Due to GASCO	4,498	4,048	4,324	4,599	4,875	4,296	3,718	3,095	2,473	1,850
Other current liabilities, net	30,817	31,267	30,992	30,716	30,441	31,019	31,597	32,220	32,843	33,466
Long-term liabilities, net	4,756	7,452	7,588	7,408	7,854	8,295	7,823	7,371	6,955	6,562
Total liabilities	40,757	43,433	43,569	43,859	44,405	44,945	44,472	44,020	43,608	43,222
Retained earnings & reserves	4,525	4,741	5,333	5,804	6,131	6,588	6,903	7,121	7,235	7,236
Total Equity	10,039	10,255	10,848	11,318	11,645	12,103	12,418	12,636	12,750	12,751
Income Statement Summary-Million LE										
Revenue										
Sales	6,156	6,151	6,993	6,993	6,993	6,993	6,993	6,993	6,993	6,993
Investment income	222	222	222	222	222	612	620	620	620	620
Expenses										
Operating expenses	(3,794)	(4,427)	(4,494)	(4,567)	(4,646)	(4,731)	(4,823)	(4,923)	(5,030)	(5,146)
Financing expenses	(369)	(606)	(688)	(689)	(705)	(729)	(718)	(672)	(628)	(586)
Depreciation/amortization	(800)	(1,055)	(1,247)	(1,335)	(1,431)	(1,537)	(1,654)	(1,729)	(1,804)	(1,879)
Taxes	(420)	(72)	(197)	(157)	(109)	(152)	(105)	(73)	(38)	(0)
Net Income	755	216	592	471	327	457	315	218	114	1

Table 4 (Continued from the previous page)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Cash Flow Summary-Million LE	<i>Actual</i>	<i>Projected</i>								
Changes in working capital	(1,823)	0	0	(0)	0	(0)	0	0	0	(0)
Operating cashflow - net	(77)	1,271	1,840	1,805	1,758	1,995	1,969	1,947	1,918	1,880
Investment cashflow - net, of which	(194)	(3,981)	(1,906)	(2,095)	(2,305)	(2,535)	(1,500)	(1,500)	(1,500)	(1,500)
<i>Capital expenditures</i>	(206)	(3,844)	(1,755)	(1,929)	(2,122)	(2,334)	(1,500)	(1,500)	(1,500)	(1,500)
Financing cashflow - net, of which	172	2,676	136	290	547	540	(474)	(452)	(412)	(386)
<i>Repayment</i>	(451)	(686)	(454)	(454)	(924)	(1,024)	(1,124)	(1,122)	(1,122)	(1,126)
<i>Disbursement</i>	623	3,362	590	744	1,471	1,564	650	670	710	740
Net change in cash	(98)	(34)	69	0	(0)	(0)	(5)	(5)	6	(6)
Beginning cash balance	728	539	506	575	575	575	575	570	566	571
Ending cash balance	539	506	575	575	575	575	570	566	571	565
Financial Ratios										
Profitability										
EBITDA margin	42%	32%	39%	38%	37%	41%	40%	38%	37%	35%
Net margin	12%	4%	8%	7%	5%	7%	5%	3%	2%	0%
RoE	8%	2%	5%	4%	3%	4%	3%	2%	1%	0%
Cashflow										
Debt service coverage	0.4	1.5	2.2	2.2	1.5	1.6	1.5	1.5	1.5	1.4
Debt service coverage, including GASCO	n/a	1.1	1.6	1.5	1.1	1.1	1.0	1.0	1.0	1.0
Interest coverage	0.8	3.1	3.7	3.6	3.5	3.7	3.7	3.9	4.1	4.2
Self finance	-118%	3%	48%	39%	11%	9%	8%	5%	4%	2%
Liquidity and leverage										
Current ratio	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Receivables day	1946	1947	1713	1713	1713	1713	1713	1713	1713	1713
Payables day	4259	3582	3582	3582	3582	3582	3582	3582	3582	3582
Long-term debt to equity	0.5	0.8	0.7	0.7	0.8	0.8	0.7	0.7	0.6	0.6
Long-term debt+due to GASCO to equity	1.0	1.2	1.1	1.1	1.2	1.1	1.0	0.9	0.8	0.7
Cash on hand (days of revenue)	32	30	30	30	30	30	30	30	30	30
Physical Units										
LNG quantity (bcm piped gas, estimated)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9
Piped natural gas quantity (bcm)*	53.5	53.5	53.5	53.5	53.5	53.5	53.5	53.5	53.5	53.5
*2011 value is an estimate										

Annex 7: Economic Analysis

EGYPT, ARAB REPUBLIC OF: Helwan South Power Project

1. This section presents the economic analysis for the Helwan South project. The project comprises three supercritical gas-fired steam power generation units in a new power station with a rated capacity of 3x650MW (under ISO conditions) that are to be fully commissioned in 2018. The analysis determines whether this project forms part of the economically least-cost power development program for meeting the forecast power demand for Egypt. The analysis also shows whether the expected economic return to the project is positive, and whether this conclusion is robust to uncertainty about the projected values of the main evaluation variables.

Projected medium term supply/demand balance

2. The economic analysis of the Helwan South project uses the Egyptian Electricity Holding Company (EEHC)'s forecast for Egyptian electricity demand. This forecast is based on predictions of economic growth by major economic sector. Energy consumption to 2016/17 is forecast to increase at an average annual rate of 6.4% and peak load on the power system at 6.1%.³¹ The forecasts for demand in terms of both consumption and generation are given in Table 1.

Table 1: EEHC's Forecast of Egyptian Power Demand

Year	Energy Consumption GWh	Generated Energy GWh	Peak Load MW
2009/10*	119,216	138,022	22,750
2010/11	127,186	147,431	24,251
2011/12	135,236	157,009	25,808
2012/13	143,999	167,093	27,426
2013/14	153,221	177,507	29,093
2014/15	162,926	188,643	30,830
2015/16	173,142	200,586	32,641
2016/17	184,027	212,921	34,526
Av.growth	6.40%	6.39%	6.14%

*Actual electricity consumption supplied by EEHC Forecasts for subsequent years are projected on EEHC's forecast average growth rates for 2009/10 to 2016/17

Source: Egyptian Electricity Holding Company

Least cost justification

3. The least-cost justification for the Helwan South project is based on a two-part approach. First, a screening analysis shows the competitiveness of supercritical dual-fired steam generating plant for serving the Egyptian base load and intermediate load. Second, a

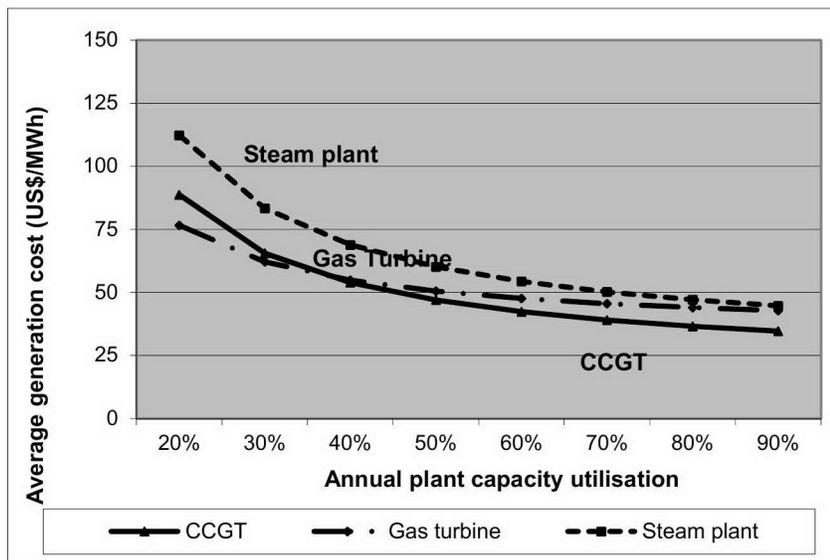
³¹ EEHC's financial and planning year runs from July to June.

projection of EEHC’s dispatch of its generating capacity – both existing and planned new capacity – shows whether the Helwan South units are needed at the time that they are scheduled to enter service.

4. **Screening analysis.** Screening analysis compares the average cost of generated power over a range of plant capacity utilization rates produced from various generation options that are defined in terms of generation technology, plant capacity and type of fuel consumed. High capacity utilization rates - typically above 60 percent - represent base loads on the power system, medium utilization rates to intermediate loads, and low utilization rates – typically below 25 percent - to peak loads. In a country with Egypt’s large reserves and production of natural gas, the economics of power plants favor gas-fired CCGTs and steam units for base loads and to a lesser extent for intermediate loads, and gas-fired open cycle gas turbines for peak loads.

5. Figure 1 compares the relationship between the average cost and annual capacity utilization for the gas-fired power generation options available to Egypt. The relationship is presented for a combined cycle plant of 750MW that corresponds to the Giza North project, a 250MW gas turbine that forms the GT components of a 750MW CCGT, and a 650MW supercritical steam plant which is based on the proposed Helwan South plant. All three options use Egyptian natural gas. The economic cost of using this natural gas is estimated to be approximately \$3/MMBTU.³² Table 4 presents the detailed assumptions used for this analysis.

Figure 1: Comparison of Average Generation Cost by Capacity Utilization for Egyptian Power Generation Options



Source: World Bank staff (Table 5 of this section)

³² This value is based on estimates of the economic cost to Egypt of consuming its natural gas that appear in the report, "Egypt: Economic Costs of Natural Gas - Final Report, February 2007, Economic Consulting Associates.

6. The curves in Figure 1 show that the CCGT option is least cost above approximately 35 percent annual capacity utilization of the plant, and that the open cycle gas turbine is least cost below this utilization level. This level reflects the low cost of natural gas in Egypt. The gas-fired steam plant is not least cost at any level of capacity utilization.

7. **Projected role of Helwan South plant in system dispatch.** The economic analysis of the proposed Helwan South plant is completed by showing that it is needed from 2016/17 onwards for serving the system load. For this purpose, an analysis is performed of how EEHC's generation capacity will be dispatched under the forecast demand on EEHC's system with the Helwan South plant in place. It is based on an analysis of how EEHC has dispatched and currently dispatches its generation capacity.³³

8. **EEHC's dispatch in FY10.** From information contained in EEHC's annual reports and the load duration curves, EEHC evidently uses its gas-fired steam plant and some of its gas-fired CCGTs to serve the base load on its system, gas-fired CCGTs and hydropower to serve the intermediate load, and gas turbines using liquid fuels, wind turbines and hydropower to serve the peak load.³⁴

- The base load amounted to 11,603MW, which was approximately 51 percent of the total system load. The steam plants were the major generation type for base load requirements, and EEHC had sufficient capacity of this type to fully serve the base load. However, EEHC continued its reliance on its efficient CCGTs to serve the base load requirements. In 2009/10 an estimated share of 37 percent of its CCGTs' available generation capacity was utilized to replace the inefficient operation of old steam plant units for base load requirements (Figure 3).
- The intermediate load amounted to 7,734MW, which was approximately 34 percent of the total system load. This load was served mainly by CCGTs, of which EEHC operated 7,178MW.³⁵ However, due to the higher efficiency and lower operational costs of these plants relative to the steam plants, most of the CCGTs were operated at a load factor above 70 percent, which implies that EEHC used its CCGTs for serving both base and intermediate loads on EEHC's system. Thus, EEHC used approximately 65 percent of available hydropower (approximately 1,680MW) that adds to the capacity of CCGTs for meeting intermediate load requirements.
- The peak load amounted to 3,413MW, which was approximately 15% of the total system load. This load was served mainly by liquid fuelled open cycle gas turbines, 35

³³ This analysis draws on information given in EEHC's Annual Reports, ongoing advisory activities to EEHC planning department, and discussions with respective departments at the National Control Center

³⁴ The available generation capacity in FY 2010 was 22,754MW (of 25,122MW installed capacity) against 22,750MW peak load. The reserve margin exited from the negative territory in FY09 but settled at 0% which signals a critical situation for system operation.

³⁵ The installed generation of CCGTs and gas turbines (GTs) is de-rated by 8% during peak load due to high ambient temperatures. Thus, EEHC relies on hydropower to overcome the shortage in generation capacity to meet intermediate and peak load requirements.

percent of hydropower capacity, and 20 percent of installed wind capacity. In 2010/11, the available capacity of hydropower amounted to 840MW, gas turbines 775MW, and wind power 109MW. It is very likely that EEHC operated some of its CCGTs in open cycle mode to overcome the shortage of its generation capacity for meeting the peak load.

9. **EEHC's generation to 2019/2020.** EEHC has to manage its generating units economically to handle the continual changes in system peak and intermediate loads on its system. Steam driven generating units, like the proposed Helwan South units, are suited to deal with changes in the system base load, although with a lower fuel efficiency than CCGTs. Moreover, steam-driven turbines are needed by the system operator to stabilize the power system when unexpected interruptions occur, such as a sudden change in load or a disruption to supply from a malfunctioning transmission line or substation transformer. Steam-driven turbines have the inertia required for this purpose, whereas gas turbines used in CCGTs provide little inertia to the power system. Hence in its generation investment plan, EEHC allocates new generation capacity to steam plants as well as to CCGTs, even though the cost of energy produced from steam-driven turbines is higher than the cost of energy produced from CCGTs (Figure 1)³⁶. With respect to peak load, EEHC has started to implement a Fast Track Generation Program which will add 1,500MW in 2011 (completed) and 1,000 MW in 2012 (under construction) of Open-Cycle Gas Turbines (OCGTs) technology. The program is being executed to meet rapid peak demand growth which has exceeded the generation capacity additions in recent years. The additional peaking generation by OCGTs represents 8 percent of EEHC generation investment plan.

10. According to EEHC's latest available generation investment plan, the proposed Helwan South project is shown in Table 2 as part of the Steam Plant capacity to be added in 2017 and 2018 (fiscal years).³⁷ The plan up to the year 2020 consists of 11,150MW steam generation plant using Egyptian natural gas, 11,500MW of CCGTs capacity using Egyptian

³⁶ It should be noted that EEHC is trying to balance optimally gas technology and steam technology so as to maintain system safety, reliability, and economic performance. OCGTs used alone or in combination with CCGTs have some investment and operating cost advantage, but adversely impact system stability (lower mechanical inertia), expensive back up fuel (light diesel), higher maintenance costs, and cannot operate at full capacity during hot summer days (this leads to 4 -11% decrease in the net energy produced). More importantly, EEHC plans to operate Helwan South when the gas pressure in the pipelines feeding the power plant is lower than to 22 bar or at full load with Heavy Fuel Oil (HFO) in case natural gas is not available. CCGTs are forced out of service at that level of gas pressure and not suitable for HFO as reliability and maintenance issues and associated costs make them impractical choice. Helwan South will remain to be more efficient than the existing steam plants, although its merit order in the dispatch will decline gradually as the existing plants retire. This will be happening over a 15-20 year period, during which the capital cost of the plant will be depreciated. EEHC confirmed that 40% - 45% of steam power plants components are manufactured locally, in comparison to only 30% for CCGT, which demonstrates the importance of steam technology in supporting local employment.

³⁷ EEHC's long-term generation plan to 2024/2025 is summarized in the report, "Egyptian Electricity Holding Company: Study for the Development of the Egyptian Power Transmission Network Master Plan, 2008-2030. Final Report," August 2009, by consultants CESI/Tractebel Engineering Suez. The team has developed the generation investment until 2020 based on the revisions of the long-term generation plan along with the investment plan in the feasibility study of the Giza North project with EEHC. The team also considered the Fast-Track Program, which will add 1,500MW (500MW at Damietta and 1,000 MW at EL Shabab) in 2011 and 1,000 MW in 2012.

natural gas, 2,500MW of OCGTs capacity, 6,475MW of wind power capacity, 270MW of solar power capacity, and 32MW of small hydropower capacity.

Table 2: EEHC’s Annual Generation Investment Plan to 2020, in MW

Technology	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
SP	-	-	1,400	650	1,300	650	650	1,300	2,600	1,300	650	650	11,150
CC	1250	1,000	1,000	-	500	3,250	2,000	500	500	-	750	750	11,500
GT	-	-	1,500	1,000	-	-	-	-	-	-	-	-	2,500
Solar	-	-	140	-	-	130	-	-	-	-	-	-	270
Wind	-	120	85	320	600	1,000	600	750	750	750	750	750	6,475
Hydro	-	-	-	-	-	-	32	-	-	-	-	-	32
Nuclear	-	-	-	-	-	-	-	-	-	1,000	-	-	1,000
Total annual additions	1,250	1,120	4,125	1,970	2,400	5,030	3,282	2,550	3,850	3,050	2,150	2,150	32,927

Note: SP = steam plant; CCGT = combined cycle gas turbines; GT = gas turbines.

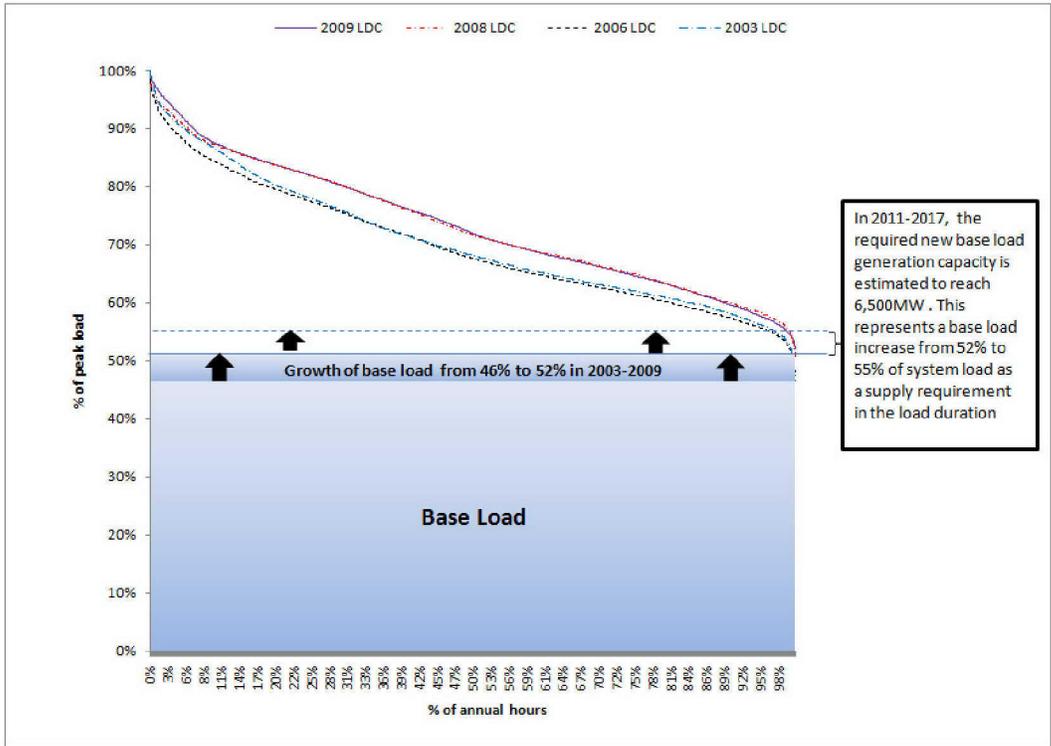
Source: World Bank staff, based on the investment plan revisions with EEHC.

11. **Helwan South’s role in meeting demand:** The base load on EEHC’s power system grew at an average of 7.9 percent annually in 2003-2009, which increased its proportion of total system load from 46 percent to 52 percent, respectively (Figure 2). The total equivalent increase in base load generation capacity was approximately 4,000MW in that period. The base load is projected to increase to 55 percent of total system load by 2017. In 2011-2020, the required increase in base load generation capacity is estimated at 10,000MW, of which 6,500MW is required by 2017. Starting from 2018 onwards, Helwan South will contribute to meeting the growth of base load and in replacing over 700MW of old generation steam units planned for retirement by 2020.³⁸ Generation capacity for meeting the base load on EEHC’s system includes all of the installed capacity of the steam units and in 2008/09 a contribution of 40 percent of installed CCGT capacity. The new steam generation investments, including Helwan South, will gradually reduce the contribution to meeting base load provided from CCGTs to 15% of total installed CCGT capacity in 2019/20.³⁹

³⁸ As per EEHC’s 2009/10 annual report, the seventh 5-year plan (2012–2017) is anticipated to add 7,150MW of steam generation by the power plants of El Suez, South Helwan , Kena, Safaga, and El Aiat.

³⁹ Generation capacity used to meet the peak load on EEHC’s system includes all the OCGT capacity, 35% of installed hydro capacity, and 20% of installed wind power capacity. Generation capacity used to meet the intermediate load consists largely of CCGT units, which accounted for 60% of installed CCGT capacity in 2008/09 and which gradually will increase to 85% in 2019/20, and a proportion of 65% of installed hydro capacity, which remains constant.

Figure 2: Development of Base Load Supply Requirements in 2003-2009 (actual) and 2011-2017 (projected)



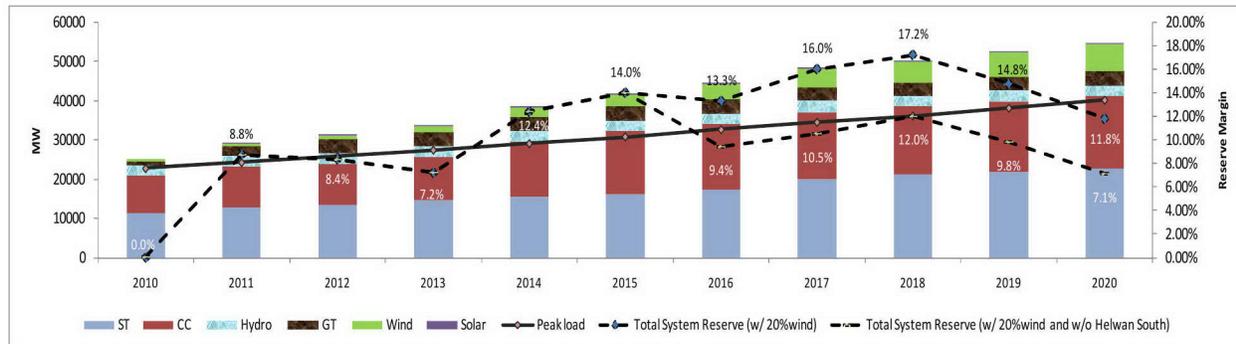
12. The role of Helwan South in system stability: the generation mix is projected to evolve from 46% of steam generation, 38% CCGT, 10% hydro, 3% GT, and 2% wind and solar in 2011; to 38%, 39%, 7%, 8%, 7% and 1% in 2015, respectively. In 2017 and 2018, the commissioning of three units (1,950MW) of the proposed Helwan South project will displace some older and less efficient generation units from base load operation and thereby enable EEHC to use this displaced capacity for increasing system reserve capacity and thus for boosting the system reserve margin by 2.5%.⁴⁰ Figure 3 shows how Helwan South will help to avoid a negative system reserve margin in the years 2017 to 2020 and to reduce the possibility of a negative reserve margin thereafter. This will significantly improve the level of system reliability (adequacy of supply and system security). Helwan South’s large base generation units also will increase the system inertial response that EEHC needs to keep the power system stable as more wind generation capacity is added to the system.⁴¹ Furthermore, Helwan South steam units will release some CCGT generation capacity that is better suited to changing their outputs quickly in response to the continuous changes in the system load (“load following”). Finally, the steam units of Helwan South will add fuel diversity to the system due

⁴⁰ Due to the already delay incurred in the advance procurement of the Turbine and Boiler packages of Helwan South, the plant will be start commissioning in 2017 and will be fully operational in of 2018.

⁴¹ The higher the inertia of a power system, the lower the changes in system frequency when system imbalances between generation supply and demand of the power occur due to fluctuations in power supply from wind power generators.

to ability to generate electricity from diesel fuel as well as from natural gas in the event of disruption to the supply of natural gas to the plant.

Figure 3: Existing and Projected Generation Mix by Technology, Peak Demand, System Reserve Margin in 2010-2020



13. Project economic return: This section derives the economic return to the investment in power generation capacity under the Helwan South project, based on a benefit/cost analysis. The economic costs and benefits are the power system costs and benefits attributable to the Helwan South project. They are aggregated into a stream of net annual benefits that extends over the economic life of this investment, which is taken to be 30 years. All economic costs and benefits are expressed in constant 2010 price terms and exclude local direct duties and taxes on capital and operating costs.

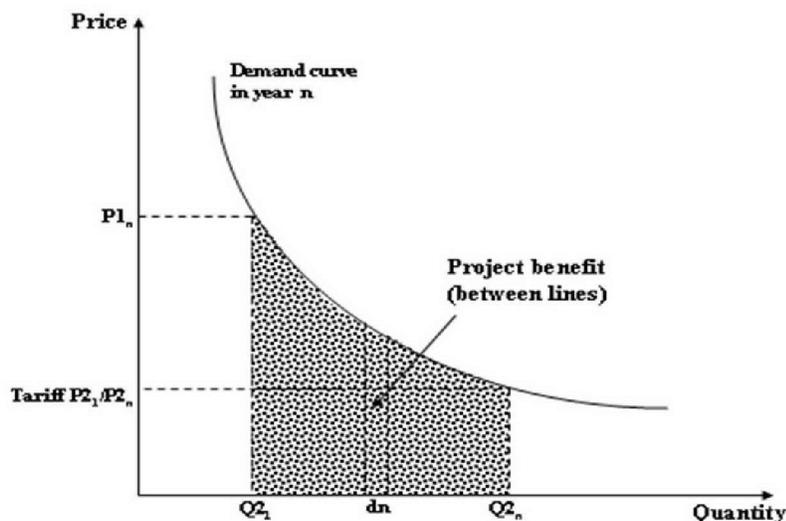
14. The economic return to the project is computed from the stream of annual net economic benefits in terms of two parameters: (i) net present value (NPV) calculated at the estimated opportunity cost of capital (OCC) to Egypt – which is taken to be 10 percent; and (ii) the economic internal rate of return (EIRR). The criteria for a positive economic return are that the value of the NPV should exceed zero and the value of the EIRR should exceed the OCC.

15. This return is computed for a base case scenario that is formed from the expected values for the main evaluation parameters, including the cost of natural gas used in the project plant, the construction cost for the project plant and for the interconnections between the plant and the national electricity and gas transmission systems, and the future growth rate of Egyptian power demand. Because of the considerable degree of uncertainty about the values of these variables, the sensitivity of the NPV and EIRR is tested in scenarios with different values for these variables from the values used in the base case scenario.

16. Project economic benefits. The economic benefits for the project are derived in terms of the willingness to pay (WTP) by Egyptian electricity consumers for the forecast increase in electricity consumption from the time that the Helwan South project starts to generate

electricity. This value is illustrated in Figure 4 by the area under the power system price-demand curve for a given amount of consumption at a particular electricity tariff.⁴²

Figure 4: Project Economic Benefit is based on Value of Electricity Consumption



17. By using the average value of the benefit from consuming electricity, this approach recognizes that the electricity that reaches consumers is a mixture of electricity that is supplied from a large number of generating sources whose outputs are dispatched as an integrated system. This means that a specific generation source of supply cannot be allocated to a particular portion of the demand curve and hence cannot be directly linked to a particular segment of WTP for electricity.

18. The observable values for evaluating the economic benefit are the projected increase in total consumption of energy based on the power demand forecast, the amount of this energy that is provided from the project, and the average regulated retail tariff. The base case for the economic evaluation uses the average tariff for the year 2009/2010, which is equivalent to approximately US\$0.035/kWh.⁴³ Additional information about power demand, however, is needed to calculate the area under the price-demand curve. For this purpose, a demand function was selected with a semi-log relationship between demand and price⁴⁴ with a price

⁴² For each year of the project’s economic life, the value of electricity consumed from the Helwan South plant is computed from the value of the total increase in electricity consumption in that year from the time that the Helwan South plant is fully commissioned multiplied by the ratio of the energy consumed from this plant to the total increase in electricity consumption.

⁴³ This level is very low compared to electricity tariffs in the Mediterranean region See chapter 4 of “Tapping a Hidden resource: Energy Efficiency in the Middle East and North Africa,” World Bank Report No. 48329-MNA, February 2009.

⁴⁴ A semi-log form for a demand curve such as is used for this project economic evaluation (table 6) is chosen because it provides a sensible compromise between 2 critical properties. One is its curvilinear shape, which differs sufficiently from a purely linear relationship to provide a credible model of the variation in consumers’ willingness to pay for electricity consumption with changes in the price of electricity within consumers’ overall budget constraints. The other property is that this form is not overly sensitive to the selected value of price

elasticity of demand equal to -0.2 for the level of demand at the prevailing electricity tariff. This value for the elasticity is based on a regression analysis of the 25-year record from FY1986 to FY2011 of EEHC's average tariff yield⁴⁵ and electricity sales and Egyptian GDP (as a proxy for growth in consumer income). Table 7 shows the computed values for the project economic benefits.

19. **Project economic costs.** Under the approach outlined above, the economic costs for the Helwan South project are the direct costs for the power plant plus associated costs for connecting the plant site to the national gas supply network and the national electricity transmission network. The economic costs also include indirect costs for the project, namely the cost of supplying natural gas through the Egyptian gas network to the Helwan South plant, the cost of transmitting and delivering electricity from the Helwan South plant, providing consumer related services, and incurring technical losses of energy in the power network. Table 7 shows the computed values for the project economic costs.

20. **Project economic returns.** Based on the approach and assumptions described above, Table 7 shows the computation of the economic return to the Helwan South project in the base case. Table 6 summarizes the detailed assumptions used for this computation. The project NPV is estimated to be US\$5,270 million, and the economic rate of return to the project is 20.2 percent, which substantially exceeds the criteria for a positive economic return.

21. Table 3 shows the results of sensitivity analysis of the project economic return under alternative scenarios to the base case scenario. The project economic return falls to 17.2 percent under 20 percent lower demand growth (case C), to 18.8 percent under 20 percent higher construction cost for the Helwan South plant (case D), and to 17.2 percent under 20 percent higher cost of natural gas used in the plant (case E) than the values used for these variables in the base evaluation case. The project economic return falls to 14.5 percent in a scenario that combines all three of the changes in cases C, D and E (case F). These returns are well above the hurdle rate of return.

Table 3: Sensitivity of the Economic Return to the Helwan South Project

Eval.	Opportunity	Average	Demand	Demand	Construct.	Nat.Gas	NPV	EIRR
Case	Cost Capital	Retail Tariff	Elasticity	Growth	Cost Incr.	Cost	@10%	
	(%)	(US\$/kWh con.)		(%/year)	(%)	(\$/MMBtu)	(US\$million)	(%)
Base	10.0%	\$0.035	-0.2	6.42%	0%	3.13	5,270	20.2%
A	10.0%	\$0.035	-0.15	6.42%	0%	3.13	16,365	27.9%
B	10.0%	\$0.035	-0.25	6.42%	0%	3.13	2,089	15.5%
C	10.0%	\$0.035	-0.2	5.13%	0%	3.13	3,179	17.2%
D	10.0%	\$0.035	-0.2	6.42%	20%	3.13	4,958	18.8%
E	10.0%	\$0.035	-0.2	6.42%	0%	3.76	4,431	17.2%
F	10.0%	\$0.035	-0.2	5.13%	20%	3.76	2,474	15.0%

Source: World Bank staff

demand of elasticity. The latter is a key parameter whose value must be imputed from little available empirical information about consumers' consumption response to price changes and therefore is subject to substantial uncertainty.

⁴⁵ EEHC's average tariff yield in EGP per kWh billed is computed from the ratio (Total Sales Value of Electricity in EGP million divided by Total Sales Quantity of Electricity in GWh).

22. The project economic return is sensitive to the value of the price elasticity of Egyptian demand for electricity. A value of -0.2 is used for the elasticity in the base case scenario and in sensitivity cases C, D, E and F. If a lower elasticity of -0.15 were the case, the project economic return would increase substantially, with the EIRR rising to 27.9% (case A). Likewise, if a higher elasticity of -0.25 were the case, the project economic return would decrease substantially to 15.5% (case B), which is still well above the hurdle rate of return.

**Table 4: Comparison of Power Generation Options for Egypt
Computation of Fixed Costs and Variable Costs**

Generation technology	CCGT	Gas turbine	Steam plant
Generation fuel	Natural gas	Natural gas	Natural gas
Plant rated installed capacity (MW)	750	250	650
Operating life (years)	25	20	30
Construction cost - overnight (US\$/kW)	800	500	1076
Construction period (years)	3	2	4
Factor for construction schedule	1.202	1.144	1.308
Capital recovery factor @10%/yr	0.110068	0.117460	0.106079
Annualised constr. cost (US\$/kW/yr)	105.8	67.2	149.3
Fixed O&M cost (US\$/kW/year)	16.0	9.0	3.0
Variable O&M cost (US\$/MWh)	0.20	3.00	0.40
Generation efficiency (%)	54%	34%	41%
Generation heat rate (btu/kWh)	6,319	10,035	8,322
Fuel cost (US\$/mmBtu inputted)	3	3	3
Fuel cost/kWh generated (US\$/kWh)	0.019	0.030	0.025
Summary of cost parameters:			
Total fixed cost (US\$/kW/yr)	121.82	76.19	152.28
Total variable cost (US\$/MWh gener.)	19.16	33.11	25.37

Source: World Bank staff estimates based on various studies.

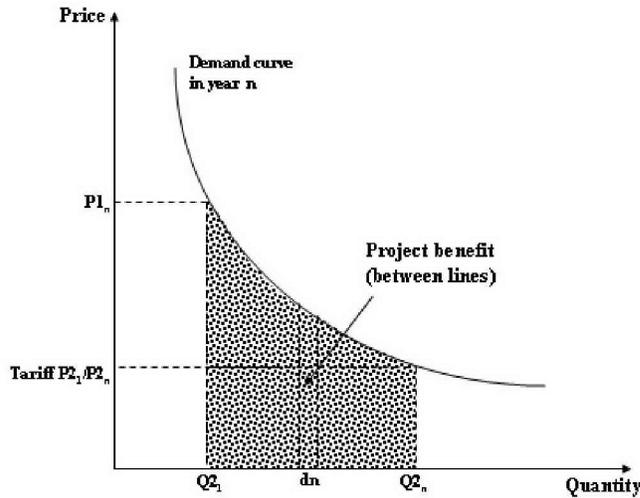
Note: Generation options that use liquid fuels such as diesel oil and heavy fuel oil, are too costly to be competitive with the gas-fired options and so are not included in this comparison.

Table 5: Comparison of Average Generation Cost by Capacity Utilization for Egyptian Power Generation Options (US\$/MWh)

Gener. technol.	CCGT	Gas turbine	Steam plant	
Annual plant capacity utilisation	10%	158.2	120.1	199.2
	20%	88.7	76.6	112.3
	30%	65.5	62.1	83.3
	40%	53.9	54.8	68.8
	50%	47.0	50.5	60.1
	60%	42.3	47.6	54.3
	70%	39.0	45.5	50.2
	80%	36.5	44.0	47.1
	90%	34.6	42.8	44.7

Source: World Bank staff

Table 6: Values for the variables used in the economic evaluation of the Helwan South Project – Base Case



Demand function $Q_n = a_n + b_n \cdot \log P_n$ in year n of Helwan S. project operation

where subscript or superscript n denotes year n of Helwan S. project operation

a_n is a constant $= (1 - \epsilon_n \cdot \log P_{2_n}) \cdot Q_{2_n}$ b_n is a constant $= Q_{2_n} \cdot \epsilon_n$

P_{2_n} = Average marginal tariff faced by electricity consumers -assumed unchanged in real terms from year 1 onwards to the end of the project evaluation period (30 years)

Q_{2_n} = System consumption of electricity at price P_{2_n}

ϵ_n = price elasticity of demand on the Egyptian power system at point (P_{2_n}, Q_{2_n})

d_n = System consumption supplied from the Helwan S. project

P_{2_1} = Regulated average retail tariff in year 1 of Helwan S. project operation

Q_{2_1} = System consumption at price P_{2_1} in year 1 of Helwan S. project operation

P_{1_n} = consumers' marginal willingness to pay for quantity Q_{2_1} [$P_{1_n} = \exp((Q_n - a_n)/b_n)$]

$Q_{2_n} = Q_{2_1} \cdot (1 + r)^n$ where r is the forecast annual rate of growth of system demand

The project economic benefit in year n (X_n):

$$X_n = B_n \cdot \text{MIN}[d_n, Q_{2_n} - Q_{2_1}] / (Q_{2_n} - Q_{2_1})$$

= portion of total economic benefit B_n attributable to the project

$$B_n = b_n \cdot [\exp((Q_{2_n} - a_n)/b_n) - \exp((Q_{2_1} - a_n)/b_n)]$$

= total economic benefit from increase in consumption in year n over year 1

Source: World Bank staff

Table 6, cont.

Values for the evaluation variables:				Note
System consumption in base year for power demand forecast (FY09/10)				119,216 GWh cons. a
System consumption in first year of project operation (FY15/16) (Q2₁)				173,142 GWh cons. b
System demand grows to first year of project operation (FY15/16) at r				6.42% /year c
Regulated average retail tariff (P2n)				\$0.035 /kWh cons. d
Price elasticity ε for total system power demand				-0.2 e
Opportunity cost of capital to Egypt (OCC)				10% f
System demand met from 3x650MW Helwan S.plant (dn)				11,626 GWh cons. g
except for year 1				5,813 GWh cons. h
except for year 2				11,626 GWh cons. h
Project operating life (n)				30 years i
Project construction cost for steam units + electric & gas interconnectors				\$2,523.1 million j
Disbursements of project construction cost:				k
FY12 =	8.65%	FY13 =	17.30%	FY14 = 24.89%
FY15 =	26.36%	FY16 =	21.95%	FY17 = 0.86%
Cost of natural gas consumed by steam units at Helwan S.				\$3.13 /MMBtu l
Heat rate of gas-fired steam units for power generation				8,450 BTU/kWh/gen. m
Cost of natural gas to produce 1 GWh by steam unit				\$26,449 n
Cost of natural gas to produce 1 kWh by steam unit				\$0.0264 n
Plant non-fuel fixed O&M cost				\$3.0 kW/year o
Plant non-fuel variable O&M cost				\$0.40 MWh o
Incremental transmission cost of energy sales from Helwan S.				\$0.006 /kWh gen. p
Incremental distribution cost of energy sales from Helwan S.				\$0.010 /kWh cons. p
Consumers' marginal willingness to pay for quantity Q2 ₁ :				P ₁ = \$0.047 /kWh cons.
Values of demand function constants in year 1:				a ₁ = 57,132 b ₁ = -34,676

Source: World Bank staff

Notes to Table 6

a	For EEHC year 2009/10 (Source: "AF Giza North Power Plant feasibility Study. Third Unit" March 2011. Chapter 5. Table 2.1)
b	For EEHC year 2015/16 (Source: "AF Giza North Power Plant feasibility Study. Third Unit" March 2011. Chapter 5. Table 2.1)
c	Computed from the base year consumption forecast and forecast growth rate of consumption to the first year of project operation
d	Estimated 2009/2010 average retail electricity tariff for all consumer categories
e	Based on regression analysis of 25-year record of EEHC's average tariff and electricity sales
f	World Bank standard rate
g	Based on annual gross generation at 82% average annual capacity factor for the three 650MW steam units and 17% station consumption plus technical losses in T&D networks.
h	Based on the expected commissioning schedule for the steam units in Helwan S. power station.
i	Based on operating life until investment to extend the life of the plant will be required - the plant's operating role in the power system cannot be projected beyond then with reasonable confidence.
	No salvage value is attributed to the plant after operating for 30 years, because extending the plant working life may not yield a positive economic return under the conditions prevailing at that time.
j	Sources: EEHC "Helwan South 3*650MW Feasibility Study March 2011" including 10% physical contingency and excluding customs duties for the power plant; EETC for power transmission interconnections; GASCO for the gas transmission interconnections. Local costs components are converted at US\$1 = LE 6.
k	Based on the disbursement schedules for power plant construction provided from the sources for the construction cost estimates.

l	Based on the estimated economic costs of natural gas given in the report "Egypt: Economic Costs of Natural Gas - Final Report" of February 2007 by Economic Consulting Associates: Adopted the average of two estimates in the report: (i) based on LRMC production plus depletion premium - \$2.38/MMBtu; (ii) opportunity cost based on netback value from LNG exports - \$3.77/MMBtu. Add US\$0.05/MMBtu for pipeline transport to the plant site.
m	Source: "Helwan South 3*650MW Feasibility Study March 2011" Chapter 9
n	Cost of natural gas times the heat rate of the steam units
o	Source: EEHC Generation Planning Department
p	Based on appraisal estimate.
	No economic cost is charged for (i) atmospheric emissions from the Helwan S. plant because the steam units will be fitted with low NOx burners; (ii) water used in the Helwan S. plant, because the water will be recycled from natural sources; (iii) for the land occupied by the Helwan S. plant,

Source: World Bank staff

Table 7: Economic Return to the Helwan South Project – Base Case

FY	Year	Annual Electricity Generated	Annual Electricity Consumption	Total Economic Benefit	Develop.& Construct. Cost	Cost of Fuel consumed	Non-fuel O&M Cost	Annual T&D O&M Cost	Total Economic cost	Net Econ. Benefit	
		(GWh)	(GWh)	(US\$million)	(US\$million)	(US\$million)	(US\$million)	(US\$million)	(US\$million)	(US\$million)	
2010/11	-6								0.0	0.0	
2011/12	-5				200.6				200.6	-200.6	
2012/13	-4				401.0				401.0	-401.0	
2013/14	-2				587.2				587.2	-587.2	
2014/15	-1				626.8				626.8	-626.8	
2015/16	1	6,682	5,813	237.5	515.7	176.7	6.6	98.2	797.2	-559.8	
2016/17	2	13,363	11,626	552.9	21.6	353.4	11.2	196.4	582.7	-29.8	
2017/18	3	13,363	11,626	641.7		353.4	11.2	196.4	561.1	80.6	
2018/19	4	13,363	11,626	741.9		353.4	11.2	196.4	561.1	180.9	
2019/20	5	13,363	11,626	854.1		353.4	11.2	196.4	561.1	293.1	
2020/21	6	13,363	11,626	978.8		353.4	11.2	196.4	561.1	417.7	
2021/22	7	13,363	11,626	1,116.1		353.4	11.2	196.4	561.1	555.0	
2022/23	8	13,363	11,626	1,266.2		353.4	11.2	196.4	561.1	705.2	
2023/24	9	13,363	11,626	1,429.1		353.4	11.2	196.4	561.1	868.0	
2024/25	10	13,363	11,626	1,604.5		353.4	11.2	196.4	561.1	1,043.4	
2025/26	11	13,363	11,626	1,792.0		353.4	11.2	196.4	561.1	1,230.9	
2026/27	12	13,363	11,626	1,991.2		353.4	11.2	196.4	561.1	1,430.1	
2027/28	13	13,363	11,626	2,201.2		353.4	11.2	196.4	561.1	1,640.2	
2028/29	14	13,363	11,626	2,421.5		353.4	11.2	196.4	561.1	1,860.4	
2029/30	15	13,363	11,626	2,651.0		353.4	11.2	196.4	561.1	2,089.9	
2030/31	16	13,363	11,626	2,888.7		353.4	11.2	196.4	561.1	2,327.7	
2031/32	17	13,363	11,626	3,133.8		353.4	11.2	196.4	561.1	2,572.7	
2032/33	18	13,363	11,626	3,384.9		353.4	11.2	196.4	561.1	2,823.8	
2033/34	19	13,363	11,626	3,641.1		353.4	11.2	196.4	561.1	3,080.0	
2034/35	20	13,363	11,626	3,901.2		353.4	11.2	196.4	561.1	3,340.1	
2035/36	21	13,363	11,626	4,164.1		353.4	11.2	196.4	561.1	3,603.0	
2036/37	22	13,363	11,626	4,428.7		353.4	11.2	196.4	561.1	3,867.7	
2037/38	23	13,363	11,626	4,694.0		353.4	11.2	196.4	561.1	4,133.0	
2038/39	24	13,363	11,626	4,959.1		353.4	11.2	196.4	561.1	4,398.0	
2039/40	25	13,363	11,626	5,222.8		353.4	11.2	196.4	561.1	4,661.8	
2040/41	26	13,363	11,626	5,484.5		353.4	11.2	196.4	561.1	4,923.4	
2041/42	27	13,363	11,626	5,743.2		353.4	11.2	196.4	561.1	5,182.1	
2042/43	28	13,363	11,626	5,998.3		353.4	11.2	196.4	561.1	5,437.2	
2043/44	29	13,363	11,626	6,249.0		353.4	11.2	196.4	561.1	5,687.9	
2044/45	30	13,363	11,626	6,494.9		353.4	11.2	196.4	561.1	5,933.8	
								NPV @	10.0%	5,270	
								EIRR	20.2%		
								Levelised economic cost @	10.0%	\$0.046	/kWh consumed

Source: World Bank staff

Source: World Bank staff

Annex 8: European Union Technical Assistance and Partnership Results Framework
EGYPT, ARAB REPUBLIC OF: Helwan South Power Project

1. To improve energy security and sustainable development in Egypt, the EU has embarked on a series of partnerships with Egypt to strengthen reform mechanisms in the energy sector. Two such programs include the 1) The Energy Sector Policy Support Program (SPSP), with a sub component on a Technical Assistance (TA) to Improve Fiscal Transparency and 2) the Support to the EU-Egypt Association Agreement Program (SAAP).

A. Technical Assistance to support implementation of Energy Sector Policy Support Program (SPSP)

2. The overall objective of the proposed Energy SPSP is to assist Egypt in putting in place and implementing its program of energy reforms and fostering implementation of its strategic energy partnership with the EU with the purpose of improved energy security and sustainable development. The specific objectives of the proposed Energy SPSP are to: (i) improve the energy policy and regulatory framework; (ii) improve the energy sector financial transparency and performance; (iii) promote development of renewable energy sources; and (iv) promote energy efficiency.

3. The scope of the Energy SPSP will include an inception phase and an implementation phase. During the inception phase all objectives set for the project with the country partners will be reviewed and a project plan in line with international project management standards and/or project management good practices will be developed. The implementation phase will comprise of four components: 1) revisit and update of the Egypt Energy Strategy and contribute in the preparation of the Medium term action plan, 2) contribute to consolidating the gas sector regulation, 2) support in strengthening national energy efficiency program and energy efficiency management in key energy consuming sectors and 3) other supports to facilitate implementation of the Energy SPSP.

4. A subcomponent of the energy SPSP is the *Technical Assistance to Improve the Fiscal Transparency*. This subcomponent will include an inception phase which will produce a detailed implementation plan to achieve the expected results. This TA also will include two components: 1) improve management and transparency of contingent liabilities; and 2) improve transparency and oversight of SOEs.

Implementation

5. The Energy SPSP including the TA *Technical Assistance to Improve the Fiscal Transparency* will be implemented in 36 months during the period 12/2011 – 14/2013

6. The Ministry of International Corporation will be the coordinating ministry for the Energy SPSP and its subcomponent. A Steering Committee (SC) will be established to monitor the SPSP implementation. Its members will include the SPSP stakeholders: MOIC (Chair); MoF; the Ministry of Petroleum and Mineral Resources; the Ministry of Electricity and Energy;

EgyptERA; the Secretariat of the Supreme Energy Council (i.e. the ‘Energy Efficiency Unit’); NREA; EEHC; EETC; the Egyptian General Petroleum Corporation; and the Egyptian Natural Gas Holding Company. The Delegation of the European Union will be represented in the SC as observer only.

B. Support to the EU-Egypt AA Program (SAAP)

7. The SAAP supports a TA component with the overall objective of strengthening the institutional capacity of EGYPTERA on implementing the regulatory framework necessary to create the bases for transparency and nondiscriminatory market operation and assist in the development and implementation of international best practices of regulations in the energy sector consistent with development of an internal electricity market.

8. The scope of services will focus on supporting the EECpra to become fully operational and capable of carrying out its mandate locally as well as regionally. This component will address ways of strengthening EGYPTERA’s capacity in policy design and implementation, and harmonizing energy legislation with the Acquis Communautaire, in pricing and incentive regulation, in setting and monitoring of quality of supply standards, and in preparation of market rules and technical codes required to implement electricity market reform.

9. The main beneficiary is the EGYPTERA. The Transmission System Operator (TSO) also is a key stakeholder, envisaged to be involved in the implementation of activities.

10. The expected main activities relate to EGYPTERA’s organization, HR and Training, implementation of market reforms, organization of a public register, communications development, price and tariff regulation and twinning preparation to support the EGYPTERA during the preparatory phase of a market liberalization process.

ARAB REPUBLIC OF EGYPT HELWAN SOUTH POWER PROJECT

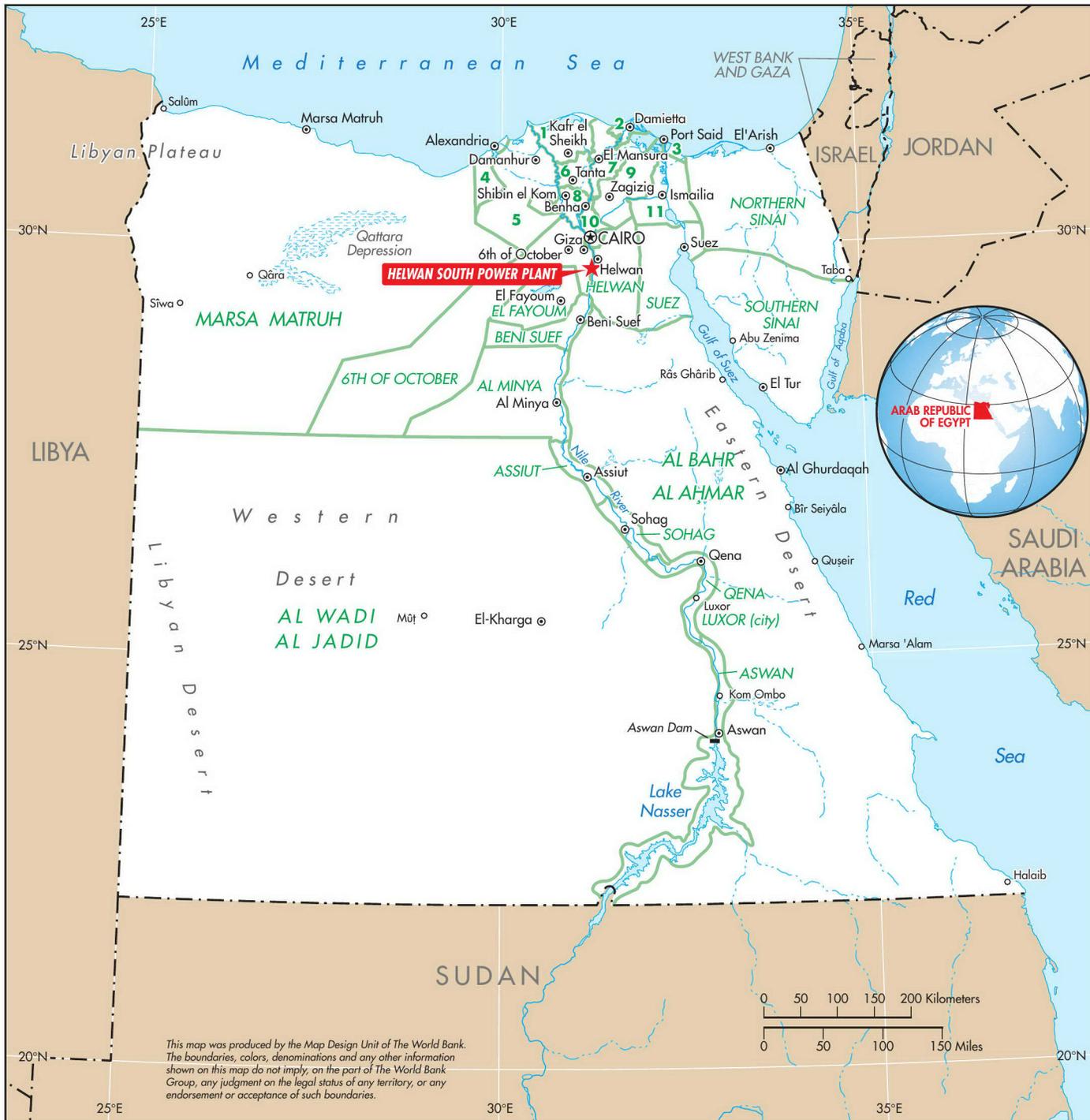
★ GIZA NORTH POWER PLANT

- SELECTED CITIES AND TOWNS
- ⊙ GOVERNORATE CAPITALS
- ⊕ NATIONAL CAPITAL
-  RIVERS

-  GOVERNORATE BOUNDARIES
-  INTERNATIONAL BOUNDARIES

GOVERNORATES IN NILE DELTA:

- | | |
|------------------|--------------|
| 1 KAFR EL SHEIKH | 7 DAGAHLIYA |
| 2 DAMIETTA | 8 MENOUIYAH |
| 3 PORT SAID | 9 SHARGIYAH |
| 4 ALEXANDRIA | 10 QALIUBIYA |
| 5 BEHEIRA | 11 ISMAILIA |
| 6 GHARBIYA | |



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