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**Comprehensive
Development Plan for the
City of Luxor, Egypt –**

**Investment Project #4,
Investment Portfolio for
the Development of
Infrastructure serving
New Luxor and El Toad**

January 2000

Prepared for
The Ministry of Housing, Utilities
and Urban Communities //
Research and Studies
Organization, Egypt

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1. LIST OF ABBREVIATIONS

Currency

Currency Unit: Egyptian Pounds (LE)(As of December 1999)

LE 1.0 = 100 piasters

LE 1.0 = US\$ 0.29

US\$ 1.0 = LE 3.41

Weights and Measures

Metric system

Abbreviations and Acronym

CDCL	Comprehensive Development for the City of Luxor
CEA	Cost Effectiveness Analysis
DAG	Donor Assistance Group
EEAA	Egyptian Environmental Affairs Agency
EGSA	Egyptian General Survey Authority
EGSMA	Egyptian Geological Survey and Mining Authority
GDP	Gross Domestic Product
GNP	Gross National Product
GOE	Government of Egypt
GOPP	General Organization for Physical Planning (within the Ministry of Housing, Utilities and Urban Communities)
HCLC	Higher Council for Luxor City
IDSC	Information and Decision Support Center
IFC	International Finance Corporation
JICA	Japan International Cooperation Agency
MFA	Ministry of Foreign Affairs
MFIC	Ministry of International Cooperation
MHUUC	Ministry of Housing Utilities and Urban Communities
MHUUC/RSO	Ministry of Housing, Utilities and Urban Communities /Research and Studies Organization
MOC	Ministry of Culture
MOE	Ministry of Economy
MOF	Ministry of Finance
MOP	Ministry of Planning
MOT	Ministry of Tourism
MOTR	Ministry of Transportation
NOPWSD	National Organization for Potable Water and Sanitary Drainage
NGO	Nongovernmental Organization
PMU	Project Implementation and Management Unit
SCA	Supreme Council for Antiquities (within the Ministry of Culture)
TDA	Tourism Development Authority (within the Ministry of Tourism)
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
USAID	United States Agency for International Development
WG	Working Group

**Meeting the Infrastructure Needs of New Luxor and El Toad
Project Investment Portfolio**

**Ministry of Housing, Utilities and Urban Communities / Research and Studies Organization,
The Arab Republic of Egypt**

Fiscal Year

July 1- June 30

President

His Excellency Hosni Mubarak

Project Sponsor

The Honorable First Lady Mrs. Suzanne Mubarak

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Date

January, 2000

Principal Project Implementing Agency

Ministry of Housing Utilities and Urban Communities (MHUUC)

Higher Council for the City of Luxor (HCLC)

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2. EXECUTIVE SUMMARY

The proposed redevelopment for the City of Luxor includes three related projects south of the existing city: (1) the establishment of a new city, New Luxor, for a target population of 200,000, (2) the development of a resort community at El Toad, with a golf course and 4,500 hotel rooms, and (3) the construction of a new port for up to 200 cruise ships. This Investment Profile assesses the infrastructure needs associated with these three projects both individually and jointly, estimates the (additional) investments required to meet these needs, examines the opportunities for relying on private sector participation in infrastructure for such investments, and provides an estimate of the gaps to be filled through public investment. The infrastructure services needs include transportation, potable water and fire fighting systems, sewage collection and treatment, solid waste management, energy, and communications, but also social infrastructure, such as administration and education.

Serving as a supplement to the Structure Plan Report for the Comprehensive Development Plan for the City of Luxor prepared by Abt Associates Inc., the Investment Profile identifies the various infrastructure elements required in both the short and the long term, and presents a cost breakdown. It develops a conceptual infrastructure plan for the new city and the destination resort, which addresses all elements required to establish amenities and facilities over a period of approximately twenty years. It identifies each element of the required infrastructure, analyzes its role and development strategy, quantifies its magnitude and extent, and estimates its cost.

The Investment Profile is designed to establish a firmer base for detailed developmental planning, and to assess the magnitude of financial requirements that need to be met for the development of this world class heritage city.

The increasing number of tourists visiting Luxor has provided the impetus for accelerated growth in Luxor and its surrounding areas. Growth pressures in turn have resulted in encroachments on the tombs and monuments, thereby jeopardizing the cultural heritage and impairing their value as a tourist attraction.

To respond to these trends, the Ministry of Housing, Utilities and Urban Communities and the UNDP in 1997 sponsored Abt Associates Inc. for the study of a 20-year Comprehensive Development Plan for the City of Luxor (CDCL). The **Structure Plan, Heritage Plan** and **Investment Projects** produced in this project addressed ways to accommodate projected growth in population, tourism and agriculture, and outlined approaches to the preservation and enhancement of the antiquities to absorb the expected escalation in tourism without diminishing the cultural experience.

The objective of the project is to establish and carry out a work plan for environmentally sustainable tourism development that also benefits the local population. To reach this objective, the following core themes emerged from a study approach that stressed the active participation of all major stakeholders:

- (1) Preservation of cultural resources protects Egypt's heritage and promotes economic development.
- (2) Planned growth promotes sustainable economic development.
- (3) Meeting the contemporary needs of local residents is vital to the success of plans.

The project's execution documentation is arranged in six investment packages, each one a stand-alone document for investors and government officials. They are:

1. The Restoration of the Avenue of the Sphinxes
2. Development of the new community of New Luxor
3. Development of a destination resort at El Toad
4. Infrastructure services for New Luxor and El Toad
5. Development of high value agriculture primarily on reclaimed lands, and
6. Development of Luxor City Center as an Open Museum.

This investment package goes into detail concerning the physical infrastructure that will be needed for El Toad, the cruise ship port area, and the new city of New Luxor. Throughout the description the concept of private sector participation is stressed, calling for the private sector to invest in the roads, water, wastewater treatment, solid waste collection and disposal, among other utilities and services.

Descriptions of the various infrastructure investments are presented, as is a section on the legal situation in Egypt as to the ability of public agencies to contract with or give concessions to private entities willing to invest in infrastructure construction, either as permanent owners or temporary builders and operators willing to sell the assets to the government once constructed and operated for some time (BOT, etc.). A range of ownership and operations options is presented.

This investment package describes each investment as to type and scope, cost, ownership options, and populations served.

3. INTRODUCTION

3.1 Background

Luxor (Thebes for the ancient Greeks) is home to a treasure of world-renowned monuments. Tutankhamun's Tomb symbolizes Egypt's Pharaonic past as much as the Pyramids. Nefertari's Tomb, the tombs in the Valley of the Kings and in the Valley of the Queens, and the Tombs of the Nobles contain some of the most accomplished artwork in man's history. Together with the Colossi of Memnon, Karnak Temple (the most imposing Pharaonic temple in all of Egypt) and Luxor Temple, they represent some of the finest examples of mankind's early civilization and rank among its greatest cultural achievements.

This unique cultural heritage continues to attract visitors from all over the world in ever-growing numbers. Ironically, their dedication to viewing these treasures is becoming a threat. In the tombs, their very presence is becoming detrimental to the quality and preservation of the paintings. There and in the temples, their increasing number and the virtual lack of any effective crowd management means waiting and jostling, elements that detract from the cultural experience. At the same time, the virtual absence of

facilities for other tourist activities means very short stays in the area, lessening the benefits to the local economy, and less flexibility in scheduling visits to the cultural sites.

Even so, the increasing number of tourists visiting Luxor has also provided the impetus for accelerated growth in Luxor and its surrounding areas. Growth pressures in turn have resulted in encroachments on the tombs and monuments, thereby jeopardizing the cultural heritage and impairing their value as a tourist attraction.

To respond to these trends, the Ministry of Housing, Utilities and Urban Communities and the UNDP in 1997 sponsored Abt Associates Inc. for the study of a 20-year Comprehensive Development Plan for the City of Luxor (CDCL). The **Structure Plan, Heritage Plan and Investment Projects** produced in this project addressed ways to accommodate projected growth in population, tourism and agriculture, and outlined approaches to the preservation and enhancement of the antiquities to absorb the expected escalation in tourism without diminishing the cultural experience.

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- (1) Preservation of cultural resources protects Egypt's heritage and promotes economic development.
- (2) Planned growth promotes sustainable economic development.
- (3) Meeting the contemporary needs of local residents is vital to the success of plans.

These core themes in turn identified specific objectives for the Comprehensive Development Plan for the City of Luxor:

- Contribute to the preservation of the area's unique cultural heritage by alleviating pressures on the existing sites through the creation of additional tourist attractions;
- Prevent further urban sprawl and the deleterious effects of unplanned development on the cultural heritage and on the population's living conditions; and
- Create new economic opportunities for the citizens of the region.

The Comprehensive Development Plan incorporates the following elements designed to achieve these objectives:

- The creation of an open museum in Luxor proper, in large part linked to the excavation and restoration of the Avenue of the Sphinxes linking the major temples of Karnak and Luxor;
- The development of a tourism zone south of the City of Luxor in the El Toad plateau area, comprising hotels as well as a golf course and facilities for other tourist activities;
- The creation of a planned new community, New Luxor, south of the present city, for a target population of 200,000 residents by the year 2017; and

- Introduction of and support for the cultivation of higher-value crops in the agricultural zone surrounding the City of Luxor.

3.2 The Investment Projects

The Comprehensive Development Plan for the City of Luxor is being developed in a series of stages. The initial phase was designed to build consensus around a comprehensive conceptual framework. In the second phase, a Structure Plan translated the basic concepts into specific project elements. These elements are further refined and elaborated in a series of six investment projects, each focusing on one aspect of the overall project. This document is one in the series of six, examining in some detail the infrastructure needs associated with the development of the new community of New Luxor, the creation of the El Toad tourism zone, and the construction of the new cruise ship port. To put it in perspective, a brief review of the other investment projects is appropriate.

Investment Project 1: Restoration of the Avenue of the Sphinxes

During the Pharaonic period, the Avenue of the Sphinxes connected the Temples of Luxor and Karnak, a processional avenue lined on both sides by 1,200 statues of sphinxes. Both temples were substantially completed during the New Kingdom period, over 3,000 years ago. Successive rulers altered and added to the temples; Amenhotep III built the Temple of Luxor during the 18th Dynasty, adding gardens between the Temple of Luxor and the complex of temples at Karnak. The ram-headed sphinxes lining the avenue bore his likeness. The centuries since have buried this processional avenue and its statues under 2 meters of silt and sand, and urban development covered it with housing, asphalted streets, and other structures, obscuring its route and interrupting this dramatic connection.

Over the last 50 years, portions of the Avenue of the Sphinxes (also known as Kebash Avenue) have been excavated, revealing remnants of the sphinxes and the roadbed. Short segments near each temple have been fully excavated and are now integral parts of the antiquities settings. Test excavations at segments along the 2.4-kilometer length of the Avenue have verified its location and underlined its archaeological potential.

The investment project focuses on the renovation of the Avenue of the Sphinxes to improve the touristic experience, increase the vitality of the city center, and form the centerpiece of an Open Museum. The emphasis of the project at all times is on the accommodation of the living needs of the permanent population (mitigating the effects of congestion in a growing city center) with an active effort to increase job and entrepreneurial opportunities.

The restoration project comprises several major actions, several of which will require substantial outlays and demand intensive implementation oversight. These actions are:

- (1) Purchase of land where necessary to a width of 76 meters;
- (2) Relocation housing for the residents of over a hundred units on top of the Avenue of the Sphinxes;
- (3) Phased demolition of housing, commercial buildings, and government and religious buildings intruding on the Avenue of the Sphinxes;
- (4) Excavation to a depth of 2 meters: restoration of the sphinx statues and landscaping; provision of visitor amenities; and

(5) Modification of the adjacent street layout and street crossings of the Avenue of the Sphinxes.

In addition, the project will include measures to protect the setting. Administrative regulations and enforcement provisions will remove intrusions onto the Avenue of the Sphinxes, prevent future intrusions, and ensure that adjacent uses are compatible with the historic nature of the Avenue.

Investment Project 2: Development of a Destination Resort at El Toad

The Need

The creation of a tourism zone outside Luxor City is necessary to serve the future needs of the rapidly growing regional tourism industry. With tourism in Luxor projected to increase from 1 to 4 million visitors over the next 20 years, the area needs an estimated 6,600 new hotel rooms, in addition to the 2,280 rooms currently being planned.

Existing hotel development areas will not be able to serve future needs. Suitable areas in Luxor City itself are limited to small infill parcels along the Corniche or lands on the perimeter of the city that are reserved for agricultural use. Proposed hotel sites in outlying areas, such as New Thebes and Khuzam, would add to capacity, but the scale and location of these areas are not ideal for a major tourism zone. A large area with site amenities and strong regional access is needed as a major tourism zone for the Luxor region.

Such an area not only can provide ample sites to support new hotel construction but also can support tourist recreational services and amenities which contemporary tourists expect. The inclusion of diverse activities within this zone is essential to expanding the range of activities for tourists and to provide some alternatives to relieve pressures on the cultural heritage sites. The alternative is to allow the construction of very large hotels in a city center that would benefit economically in the short run, but would deteriorate as a pleasant tourism and cultural environment in only a few years of such intensified use.

Location

One site with favorable development potential is located in the El Toad area of the region. Encompassing two large, undeveloped plateaus approximately 9 kilometers south of Luxor City and 2 kilometers south of New Luxor, and also 2 kilometers south of the only Nile River Bridge in the region, El Toad offers a dramatic setting that can support significant tourism development. Northerly and westward views from the plateaus take in the Nile River Valley and distant Necropolis. In other directions, views take in the wadis and the agricultural and desert lands that frame the site. Local character is provided through the nearby villages, the infrequently visited and attractive El Toad Temple site, and the commoner tombs.

Existing regional links between El Toad and other East Bank activities include the inter-regional rail line and Cairo-Aswan Highway that run along the western edge of the site. Its proximity to the Luxor Bridge provides exceptional access to tourism attractions on the West Bank. The proposed cruise ship port immediately adjacent to the area will further enhance the value and attractiveness of El Toad.

The Vision

The El Toad Tourism Zone will include both tourism accommodations and attractions with regional appeal. Commercial and recreational attractions will make El Toad a major tourism destination, thereby promoting longer stays in the Luxor region, helping to relieve the visitor volumes at area monuments, and

Infrastructure Development for New Luxor and El Toad

increasing economic opportunities for local residents. Amenities will include a golf course, theater, museum, large-scale gardens, tennis, and equestrian facilities. Concentrating hotel development in a well-planned zone will also achieve economies of scale for provision of superior amenities, maintenance, events planning and security, as hotels can share promotional programs and facilities.

The Plan for the El Toad Tourism Zone has been developed to create a desirable area of both attractions and accommodations that serves regional tourists. Its key features include the following:

- El Toad is located outside agricultural and antiquities lands. Development on the plateau can be oriented to capture the dramatic views of the Nile River Valley and distant Necropolis.
- Development through the 2017 period should occur on the southern plateau, which can be strongly linked to the proposed Cruise Ship port. In the more distant future, assuming that monument capacity constraints are met, there will be the potential for future touristic zone development on the nearby plateau to the north.
- Approximately 18 hotels, with a total of 4,500 rooms, are planned for the twenty-year period. Accommodations will vary in quality and type, including three, four and five star hotels and villa complexes.
- The El Toad plan is coordinated with the new cruise ship port development in order to create an integrated tourism zone that promotes more joint cruise-hotel stays and improved connectivity.
- Attractions, such as an 18-hole golf course and botanical garden, are incorporated into El Toad in order to broaden the types of tourism experience possible in the Luxor Region.
- An inter-modal transportation facility is built at the intersection of the inter-regional highway and the El Toad entrance road; adjacent to the new cruise ship port. The facility becomes the primary transfer point between water and surface transportation in the area.
- A road between El Toad and New Luxor is eventually developed to provide a direct connection that bypasses local area settlements.
- Regular shuttle bus service is established to provide convenient access between the cruise ship port, destinations within El Toad, and regional destinations on the East and West Bank.
- A visitor center with a museum interpreting regional local life customs is built along the formal entrance boulevard to El Toad. The visitor center also serves as a staging point for shuttle bus service within the El Toad area and tour bus traffic to regional destinations.

Elements

A collection of 18 hotels and villas with approximately 4,500 rooms will locate in the El Toad Tourism Zone. Accommodations will vary in design and scale. Hotels will cluster at the entrance and along portions of the loop road. The highest quality hotels will likely locate in the northwest portion of El Toad with views to the Nile and Necropolis. The four hotels that will locate in the El Toad Center at the entrance to El Toad will be integrated with the surrounding shops, entertainment venues, and services to create an active environment that is distinct from the more secluded hotel developments along the golf course. Additional variety is offered through low-rise villa developments that locate along attractive narrow roads winding through the lushly landscaped golf course.

Infrastructure Development for New Luxor and El Toad

All hotels and villa developments will offer on-site recreation and service amenities that vary in number and quality between the three, four and five star developments. Shared resources within El Toad will include recreation, cultural and entertainment, public facilities, and transportation. Scattered among three areas within the tourism zone will be shops, restaurants, and cafes. Commercial uses will be integrated with associated cultural, entertainment and public service facilities.

Upon the completion of the cruise ship port, additional commercial businesses are expected to locate there and in the immediate vicinity. The cruise ship port will not only provide docking and associated facilities; it will be an entry point to the Luxor Region in general for multitudes of tourists. As such, there will be a great demand for shops, restaurants, cultural venues, and other attractions for new arrivals and for the hotel guests on the El Toad plateau who will often come down the hillside to take advantage of the attractions along and near the waterfront.

Cultural and Entertainment

The El Toad Center will include facilities to serve both hotel guests and visitors. A lively atmosphere will be created through clustering together facilities, such as a cinema, theater, nightclub and multi-purpose hall, with the commercial shops located in the Center which would complement the shopping opportunities in the cruise ship port area. The El Toad Center should also include a museum with exhibits on the Luxor region's history and local customs and traditions. This interpretive program could be integrated with visits to the commoner tombs area which is adjacent to the Center. A visitor center will offer regional information and serve as an entry point to the botanical garden and transfer point for bus tours of the nearby commoner tombs and El Toad Temple, which could be stand alone attractions or woven into the interpretive experience as described above.

Public Service Facilities

Also located in the El Toad Center will be public facilities, such as a post office and a police and fire station, that service the entire tourism zone and nearby cruise ship port. State of the art firefighting equipment will provide the maximum security for the hotels, residences, shops, and the cruise vessels, adding to the value of a vacation in Luxor.

Transportation Facilities

In order to create an efficient circulation system that provides connections within the tourism zone and regionally, an inter-modal facility will be sited near the intersection of the El Toad entrance road and the Cairo-Aswan Highway. Adequate parking and staging areas will be provided for the El Toad shuttle, regional coaches, and rental cars. Located adjacent to the new cruise ship port, the inter-modal facility will also become a good transfer point between water and surface transport. Easy transfer between buses and shuttles to water taxis, ferries, and cruise ships will be possible.

Connections and Circulation

Planned transportation improvements in the area will further strengthen El Toad's exceptional regional access. The airport is easily accessible via the Cairo-Aswan highway that runs along the edge of the El Toad, while cruise ship traffic will arrive at a large new port that is integrated into the development, thereby increasing the number of tourists combining hotel/cruise tours in the region. An inter-modal transportation facility that serves both El Toad and the cruise ship port is an opportunity to link the two areas and provide convenient transportation connections to tourists.

Access from El Toad to attractions in Luxor City and the West Bank will also be convenient. Travelers to Luxor City will use the Cairo-Aswan highway and the El Awameya Road connecting to the Corniche, while travelers to the West Bank Necropolis will be well served by the Luxor Bridge located just two kilometers from El Toad.

Within the El Toad Tourism Zone, circulation will be served through an attractively landscaped loop road that winds through the development. Shuttle service will be provided along the loop road to serve traffic going between the cruise ship port, hotels, and commercial nodes of activity throughout the El Toad Zone.

The entry sequence into El Toad would be along an attractively landscaped road running between the Cruise Ship Port, across the railroad tracks and up a steep grade to the El Toad Center. The Center's collection of shops and services includes an information center that also serves as a shuttle bus transfer point for reaching hotel and villa development areas and nearby attractions, such as the Commoner Tombs and El Toad Temple.

The formal entry road continues on to another commercial area and golf club, where it branches into a loop road that runs around the perimeter of the golf course to reach hotel development areas. Villa developments will be located on minor roads winding through the golf course.

Investment Project 3: Development of the New Community of New Luxor

The fast growing Luxor region is expected at least to double in population over the next twenty years. In order to reduce development pressures on the historic Luxor City area and protect the agricultural zone from encroachment, the Egyptian Government has advocated the development of new settlements outside the existing urbanized area to absorb the majority of new development over the next twenty years. One new town, New Thebes, has already been started 15 kilometers northeast of Luxor City. However, with the recent completion of a Luxor Bridge and the anticipated nearby expansion of a port for cruise ships south of Luxor City, informal, unplanned development will favor the southern part of the area. Such development is already claiming substantial agricultural lands to the south and east of Luxor City. If a new town is not planned for in the south of Luxor City, unplanned sprawl in that part of the region is likely to result in negative consequences for the future prosperity of the region. Timely action to stem this undesirable growth is essential: an attractive new town is needed to become the magnet for new development in the Luxor region

The Proposed Site

The proposed site for New Luxor, south of Luxor City, east of the Cairo-Aswan Highway and the agricultural belt, is accessible and visible from the Highway, and consists of three east-west oriented plateaus, separated by wadis. It is in close proximity to the regional wastewater treatment plant, readily accessible to the new Luxor Bridge and to the proposed El Toad tourism zone, which will be a major new source of jobs for the region. Intercity rail is nearby, parallel to the highway, and potential land reclamation efforts in the vicinity hold the promise of turning a portion of the desert land in the site vicinity into green, cultivated property.

The Vision

The new city is designed to be a pleasant place to live and work, setting a new standard for development in the Luxor region with its high-quality infrastructure, open spaces, and public facilities. With an

Infrastructure Development for New Luxor and El Toad

eventual population of approximately 200,000, New Luxor has the potential to emerge as the major commercial, governmental and residential location in the region. New Luxor's attractive urban environment for an economically diverse mix of residents will make it a magnet for new development, thereby relieving the growth pressures on Luxor City. New Luxor can become a model for the region to show how planning well in advance of development can help to create a high quality living environment.

The Plan for New Luxor has been developed to achieve a livable and attractive community which takes advantage of its regional setting, incorporating the following key features:

- (1) The community is located east of substantial agricultural lands, insuring an attractive greenway entry.
- (2) Major development is located on three elongated east-west plateaus, linked with major arterial streets.
- (3) The City axis and City Center, on the central plateau, are oriented to the Theban Necropolis, which is the most characteristic landmark in the region and highly visible from this location.
- (4) Many City parks and open spaces are located on the wadis between the plateaus, providing an effective use of land and supporting green spaces to city activities.
- (5) Each neighborhood is conceived as a relatively independent unit, with central services, minimal through traffic, and close proximity to District services centers.
- (6) Early connections with New Luxor can be achieved by upgrading existing roadways, while the long-range connection to Luxor City will be provided through a new arterial boulevard which will lead to the southerly growth area of the existing City.
- (7) The northwest corner of the City, in close proximity to agricultural lands and potential irrigation resources associated with secondary treatment of the new waste water plant, will be devoted to an agricultural village with nearby agro-processing industries, providing an initial employment base and investment rationale for the City's growth.

The Neighborhoods

The neighborhood will be the foundation of the structure of New Luxor. Some 25 neighborhoods will make up the city, each supporting a population of between 8,000 and 10,000. Although the form and character of each neighborhood will vary, a number of shared principles will guide development:

- (1) Neighborhoods are envisioned as building blocks that can be phased to accommodate gradual development. Each neighborhood will include housing clusters that are within a 500-meter radius of a neighborhood service center.
- (2) The neighborhoods are envisioned to include a variety of house types and sizes to meet the needs and preferences of a broad range of residents.
- (3) The economies of low-rise construction and the constraints of the desert environment influence dwelling design to be low in height and dense with respect to ground coverage, in order to provide shade and minimize irrigation. Single-family attached and detached houses on small lots are proposed for most New Luxor neighborhoods. Average lot sizes based on income and quality of construction is consistent with new town planning standards in Egypt. The average lot sizes are only

used to roughly estimate residential land area demands for New Luxor; further market study information will be necessary to guide the actual design of New Luxor's neighborhoods.

- (4) The relatively compact residential areas in New Luxor will allow for safe access by foot or bicycle to the pedestrian-oriented neighborhood greenways, and from there to the neighborhood service centers where travel can continue by foot, bicycle or bus to district service centers.

Open Spaces

A network of lush open spaces through New Luxor will give it the character of an urban oasis on the edge of the desert. At the city-scale, the plan takes advantage of the surrounding environmental features. Long linear wadis will become passive open spaces articulating the urban landscape of New Luxor, a desirable amenity for residents of the new city. These same wadis will also serve to collect storm drainage during the infrequent rains.

In that New Luxor will be a city of major proportions and population, the safeguarding and effective maintenance of open space will be necessary to make it a livable, innovatively – designed community. In addition to the passive open space created by the wadis, New Luxor will also contain landscaped boulevards and greenways, and a system of parks at several scales. These parks, provided at the neighborhood, district, and city level, will serve as centers for active recreation. Over 150 feddans are allocated to parks and open spaces in the city.

Connections and Circulation

A primary goal for any new city is to ensure that transportation corridors within the city and connecting to major points outside the city do not become congested as the city approaches its full buildout. A second goal is to ensure that flows of vehicular and pedestrian traffic within the city are consistent with adjoining densities and with commuting patterns. A third goal is to provide for safe and efficient management of pedestrians and non-motorized vehicles as they come into potential conflict with motor vehicles.

The new town will offer convenient access to the international airport, Luxor Bridge, and the inter-regional Cairo-Aswan Highway without an immediate need for major new inter-city roads. As the community grows, two important roads will be built: a direct connection to a new southern gateway rail station in Luxor City, and a north-south road along the edge of the agricultural belt to link New Luxor to the El Toad tourism zone to the south, and strengthening the connection to the airport, northeast of the new city.

In the city itself, reserving rights-of-way in advance of development will ensure a comprehensive and integrated **street network**. Both major and minor streets will be planned to provide for the adequate circulation of private vehicles, buses, and other transportation modes. Streets in New Luxor will be classified according to function and designed for each functional classification. Local streets, designed to provide access to each residence, will have very low traffic volume.

Higher volume neighborhood service streets will form loops and provide the principal routes for deliveries and service to neighborhood centers. Collector streets will run through district centers, intercept traffic from neighborhood streets, and feed into the arterial network which runs along the perimeter of each district center. The arterial streets, forming a continuous network connecting each district center to the city center as well as regional destinations, will provide for the rapid movement of high volumes of traffic over relatively long distances.

An east-west boulevard will be the major **point of entry** for traffic from the new road linking New Luxor to Luxor City. With a right-of-way to accommodate four lanes of traffic, shoulders, and a linear park, the boulevard will become an attractive entrance to the New Luxor City center. Buses will run the length of the city center boulevard and provide the major means of public movement within the center while inter-connecting the city center to other citywide public transportation routes.

The mall-boulevard will become a strong axis through the center of New Luxor, offering striking views of the West Bank Necropolis. Continuous pedestrian arcades along the boulevard will provide a shaded walking environment adjacent to the mall through the city center area. As an open space feature connecting a series of urban spaces in the city center, the central boulevard has the potential of becoming a promenade for New Luxor residents, similar to the role of the Corniche in Luxor City.

An exclusive system for pedestrians and cyclists will be provided through the local greenways that connect neighborhood centers. Pedestrian and bicycle traffic will also be accommodated along the collector system roads. Maximum care will be taken to assure separation of pedestrians and non-motorized vehicles from motorized vehicles wherever possible.

Animal drawn cart traffic will be minimized in New Luxor through establishing produce and livestock market areas in the northwestern portion of the city. Those facilities will intercept traffic from the surrounding agricultural lands because it will then not need to enter New Luxor.

Investment Project 4: Infrastructure Services for New Luxor and El Toad

This investment project, described in the present document, projects the needs of New Luxor, the El Toad tourism zone, and the new cruise ship port in terms of infrastructure (water, wastewater, transportation, energy, and telecommunications). It uses these demand forecasts as a basis for assessing the investment needs in infrastructure facilities, focusing on opportunities in these sectors for private sector participation.

Investment Project 5: Establishment of High-Value Agriculture

High-value crop production and agro-processing industries are key elements in the strategy to meet contemporary needs of Luxor residents. There is substantial poverty in Luxor, despite the appearance of wealth because of the tourism industry. The majority of Luxor residents depend on small agricultural plots (the average plot size is a modest 1.84 feddans) to sustain their families.

Those agricultural families have substantial needs to expand agricultural lands to support future generations and to increase household incomes to improve their standard of living. Reclamation of substantial lands in Luxor is essential for the growing population. Introduction of high-value agriculture and agro-processing will provide a means for farmers to improve their futures. The techniques and government programs for reclaiming lands for such purposes are well –used throughout Egypt, and may be of immense value in Luxor, which enjoys the prospect of a rapidly expanding tourism demand for high quality horticultural products, in addition to the increased consumption of fruits and vegetables by a growing full time population.

This project has as its main goal the reclamation and cultivation of up to 18,000 feddans of usable lands just outside the natural flood plain. Through a PMU management effort, there will be a coordinated program to grow and market certain crops which will serve the local market and possibly the export

market in the future. Those crops will be identified through an analysis of the crop potential of the area and the needs of hotels and food establishments.

The MALR and related agencies will design social programs to accompany the reclamation efforts, wherein recent college graduates, the landless, and small farmers in general will lease or purchase land for cultivation. There will also be large parcels set aside for entrepreneurs to carry on a moderate scale agribusiness, supplying processing plants with produce for export if the market is deemed to exist several years in the future.

The major investments will be in the reclamation and associated irrigation facilities, but there will also be a component which will strengthen the government agencies (including the Supreme Council of Luxor) involved in organizing the chain of farm production or managing the farm development process. This strengthening will include the enhancement of agricultural extension services and the creation of an advanced agricultural college, as well as preparing the local government agencies better to manage land policies and allocation, consistent with tourism development and the orderly economic growth of the region.

Investment Project 6: Development of Luxor City into an Open Museum and Heritage District

The Open Museum and Heritage District in Luxor will involve substantial redevelopment of Luxor City Center into an antiquities zone requiring protection of large areas of the old city from advancing modern development, which has encroached on, and surrounded, some of the most significant antiquities sites. Karnak Temple, Luxor Temple, the Temple of Mut, and the Avenue of the Sphinxes are surrounded and partly engulfed by the modern city.

As magnificent as these monuments are to experience, the setting around them detracts from their significance and enjoyment. Almost all tourists visiting Luxor experience these monuments. At the current level of tourism, these sites are already becoming overcrowded, and the projected volume of future tourists magnifies the prospects for gradual deterioration. With tourism projected to grow to four (4) million visitors annually by the year 2017, the monuments could be overwhelmed. The Open Museum will substantially expand restored areas and provide many additional non-invasive attractions to accommodate projected tourism growth. The Open Museum will also function as a vital relief valve for some of the deleterious pressures on the monuments that result from high levels of tourism.

The Open Museum and Heritage District is a comprehensive strategy to make one of the world's most significant cultural site into one of the most majestic and fascinating experiences for visitors and, at the same time, promote preservation of antiquities once restored.

The Open Museum and Heritage District has several key components, in addition to the restoration of the Avenue of the Sphinxes:

- Acquisition of properties around Karnak Temple and Temple of Mut to the Nile River;
- Relocation of some strategic government buildings to develop museums, replicas, parks, and other attractions;

- Development of a visitor center with centralized site ticketing, interpretative facilities, and centralized bus parking/tourist shuttle systems;
- Preservation and enhancement of the old section of Luxor City and traditional market areas;
- Traffic/pedestrian circulation system improvements, including vehicular-restricted and pedestrian-only zones; and
- Development of a medium-capacity convention center and performing arts/visual arts exhibition center.

The Open Museum is focusing on an area between the more contemporary city and the Nile River. It is a well-defined area that lends itself to a cohesive treatment. Development pressures are eroding the historic character of the area, and unless concerted action is undertaken to establish the Open Museum, the opportunity to create a truly appropriate setting for the treasured Pharaonic antiquities may be lost for future generations.

3.3 Organization of the Document

The organization of this document is straightforward. The first part describes the infrastructure services required by the three project elements – the new town of New Luxor, the El Toad tourism zone, and the proposed cruise ship port adjacent to the El-Toad Plateau¹. The second part briefly reviews the existing infrastructure in utilities and transportation, identifies the infrastructure investments required, and explores the extent that they could be undertaken by the private sector. An appendix provides information on the legal basis for private sector participation in the provision of infrastructure services in Egypt.

¹ The Ministry of Tourism (TDA) is in the process of planning for a new cruisehip port south of Luxor city and adjacent to the El-Toad Plateau.

4. INFRASTRUCTURE NEEDS: NEW LUXOR

4.1 Introduction

The fast growing region around the City of Luxor is expected at least to double in population over the next twenty years. In order to reduce development pressures on the historic Luxor City area and protect the surrounding agricultural zone from encroachment, the Egyptian Government is looking toward the development of new settlements outside the existing urbanized area to absorb the majority of new growth over the next twenty years.

One new town, New Thebes, has already been started 15 kilometers northeast of Luxor City, and is expected to absorb a portion of future development. However, the recent completion of a bridge to the West Bank (replacing a ferry) and the planned expansion nearby of a port for cruise ships south of Luxor City have begun to draw spontaneous development to the southern part of the region. Such informal development is already claiming substantial agricultural lands to the south and east of Luxor City. A new town in that area will be essential to forestall unplanned, informal growth and its negative consequences for the future prosperity of the region.

The Government of Egypt envisions a new community, New Luxor, to be built south of existing Luxor City, east of the Cairo-Aswan Highway – accessible and visible from the highway - and the agricultural belt along the Nile. With a projected final population of 200,000 residents, the proposed New Luxor has the potential to become the major commercial, governmental and residential location in the region.

The recommended site for New Luxor comprises three east-west oriented plateaus, separated by wadis. The site has good access to the new Luxor Bridge and is in close proximity to the regional sewage treatment site, which is planned for substantial upgrade. Intercity rail is nearby, parallel to the highway, and potential land reclamation efforts in the vicinity hold the promise of turning a portion of the desert land in the vicinity of the site into green, cultivated property.

New Luxor is designed to present an attractive urban environment for an economically diverse mix of residents, and is not intended to mirror the existing socioeconomic makeup of Luxor City. Its design features will make it a magnet for high quality new development, thereby relieving the growth pressures on Luxor City and creating one of the best new cities in the country. The plans for New Luxor incorporate the following key features:

- (1) The community will be located east of substantial agricultural lands, ensuring an attractive greenway entry.
- (2) Principal development will take place on three elongated east-west plateaus, linked by major arterial streets.
- (3) The city axis and city center, on the central plateau, will be oriented toward the Theban Necropolis, which is the most characteristic landmark in the region and highly visible from that location.
- (4) The wadis between the plateaus will be turned into city parks and attractive open spaces, providing an effective use of land and supporting green spaces.

- (5) Each neighborhood of New Luxor is conceived as a relatively independent community, with central services, minimal through traffic, and close proximity to district services centers.
- (6) Initially, outward transportation linkages for New Luxor will rely on upgrading existing roadways, while the long-range connection to Luxor City will be provided through a new arterial boulevard which will help structure the southerly growth area of the existing city.
- (7) The northwest corner of New Luxor, in close proximity to agricultural lands and potential irrigation resources associated with a new wastewater treatment plant, will be devoted to an agricultural community with nearby agro-processing industries, providing an initial employment base.

Plans for New Luxor also call for three hotels with a total of 700 rooms. The growth of the population in New Luxor is assumed to be largely driven by the development of tourism facilities at El Toad and New Luxor. Table 1 shows the planned build-up of the population for New Luxor.

TABLE 1: POPULATION BUILD-UP FOR NEW LUXOR

Year	2005	2010	2015	2020
Population	40,000	100,000	160,000	200,000

The infrastructure needs of New Luxor derive from the city’s service requirements. These requirements can be broadly separated into (1) “social” infrastructure service needs, such as neighborhood and district administrative services, education, health, etc., and (2) “physical” infrastructure service needs, such as potable water, wastewater collection and treatment, energy, transportation, and telecommunications. The assessment of these is carried out by applying generally agreed service standards for new communities elsewhere in Egypt to the projected population of New Luxor.

The *social* infrastructure needs are to be met directly as part of the development of the new community of New Luxor. Most of the *physical* infrastructure needs will be addressed in a broader regional context, together with those of the existing settlements, of the El Toad tourism zone, and of the cruise ship port. The notion of a “utilities compound” at the core of the delivery of infrastructure services to New Luxor, El Toad and the cruise ship port guides the response to these needs, as discussed in Chapter 7.

4.2 Social Infrastructure Needs

The social infrastructure needs derive from the planned social structure of New Luxor. The basis for the social organization will be the 25 neighborhoods with areas adequate to support a population between 8,000 and 10,000 each. The predominantly residential neighborhoods will occupy 2,043 feddans, or nearly 70 percent of New Luxor’s total surface area. A typical neighborhood is illustrated in the figures attached in the annex of this document, showing its general shape and pattern. Closely associated with neighborhood areas will be service centers for the residents at the neighborhood, district and city level. Collectively, the service centers will require nearly 450 feddans, or 14 percent of the total land area in New Luxor.

Neighborhood Centers

Each neighborhood will include housing clusters that are within a 500-meter radius from a neighborhood service center. Focused on facilities serving young children and the daily needs of families, neighborhood centers will be within convenient walking distance of every home. Serving approximately

8,000 residents, each neighborhood center will contain two primary schools, four nursery-kindergartens, a neighborhood place of worship, and numerous commercial shops. All of these uses will be served by parking as well as a centrally located park-courtyard which will serve as a center for neighborhood community life. Neighborhood centers are, typically, located along greenway linkages which connect each neighborhood to other sectors of the city.

District Centers

At the next scale of development are the district centers. Each district service center will serve three neighborhoods, or approximately 24,000 residents, and will be located within a maximum service radius of approximately 1,000 meters from every home in New Luxor. Located along busy arterial streets that offer public transportation access throughout the city, the eight planned districts will become major sources of activity for New Luxor residents.

Each district center will contain a mix of public and commercial uses with parking that are centered around a five-feddan park containing recreation facilities. Public facilities in the center are to include a large mosque and other places of worship, a cultural center, and a secondary school, along with services such as health clinics, post offices, and public safety offices. Commercial uses will include those kinds of retail shops and non-industrial trade workshops which do not require large support facilities and are compatible with related commercial, service, and related uses.

City Center

Centrally located with good transit access to all areas of New Luxor, the 85-feddan-city center is designed to become the major activity area in New Luxor with high-density commercial, recreation and public facility development. Public facilities in the center will include educational, governmental, cultural and health services.

In contrast to the neighborhood or district service centers, these public facilities will be major ones that attract residents from throughout New Luxor and, for many services, will support residents of the larger region. Key public facilities include two hospitals, a clinic, a mosque, church, and two large technical schools, one focused on the tourism industry and the other focusing on agriculture-related work. Commercial uses in the city center will also have a citywide draw and include hotels, large shops, and non-industrial trade workshops.

4.3 Potable water

Residential

According to a recent study conducted in conjunction with the improvement of water distribution, wastewater collection and treatment, the CDM study,² the projected per capita residential consumption for the Luxor area differed greatly between urban (Luxor) and rural (villages) residents, with urban consumption being much higher than rural, with an average of 131 l/day for both categories. The corresponding projection for 2025 was for an average of 137 l/day. In addition, the study also projected the per resident consumption for other key sectors, as shown in terms of m³/day, in Table #2. Once these other sources are included, total consumption per capita rises to an average of 185 l/day for 2015, and 194 l/day for 2025. Losses are estimated as 20 percent of total consumption.

² Camp Dresser & McKee International, *Final Environmental Assessment Report for Luxor. Water Distribution, Wastewater Collection & Conveyance, and Wastewater Treatment*. January 1997.

TABLE 2: TOTAL DAILY WATER CONSUMPTION, LUXOR REGION (M³/DAY)³

	Year 2015			Year 2025		
	City	Villages	Total	City	Villages	Total
Residential	26,432	10,135	36,567	36,623	13,164	49,787
Tourist	5,490	0	5,490	7,200	0	7,200
Commercial	3,192	608	3,800	4,382	790	5,172
Industrial	2,554	507	3,061	3,506	658	4,164
Institutional	2,235	709	2,944	3,068	922	3,990
Losses	7,981	2,392	10,373	10,956	3,107	14,063
Total	47,884	14,351	62,235	65,735	18,641	84,376

The residential consumption figures used in the water/wastewater study are significantly below the standard for capital cities of governorates established in the Egyptian Code of 170 liters per person per day for the base year of 1997 (plus an allowance of 20 l/person/day for losses). Using this standard and an annual increase of 1 l/day, we obtain the estimates for each of the four phases shown in Table 3. Combining the projected average residential potable water consumption rates for the end year of each period with the population projections shown in Table 1 yields the projected residential consumption of potable water shown in the second line in Table 3.

TABLE 3: PROJECTED RESIDENTIAL WATER CONSUMPTION RATES, 2000-2020

Phase	2000-2005	2005-2010	2010-2015	2015-2020
Average residential consumption rate (l/person/day)	178	183	188	193
Residential water consumption for end year (m ³ /d)	7,120	18,300	30,080	38,600

Source: Staff calculations; cf. text

Including the 20-percent allowance for losses, the total residential potable water consumption in New Luxor for the year 2020 would be roughly 46,300 m³/day.

Tourists

Most projections assume that tourists consume more water than city residents do. That assumption rests in part on behavior, but also the water demand of elements directly associated with tourism, such as swimming pools and green areas. It is therefore reasonable to assume that tourists on average consume 400 l/person/day. This consumption rate is likely to stay level over time, since the needs of tourists and of the sector are unlikely to be influenced by social or economic changes.

³ Source: Camp Dresser & McKee International (1997)

Current plans call for three hotels in New Luxor proper with a total capacity of 700 new hotel rooms. The two 4-star hotels are to be built in Phase 2 of the project (2005-2020), with the 3-star hotel in a subsequent phase. At an average occupancy rate of 65 percent, and 1.5 persons per room, the *average daily number* of tourists in New Luxor proper is as follows:

End of Phase 2 (year 2007) – two 4-star hotels	488
End of Phase 3 (year 2012) – add one 3-star hotel	683 (increase of 195)

If they consume 400 l/day each, as assumed, the total potable water demand from tourism in the new town of New Luxor would be 195 m³/d at the end of 2007, and 273 m³/d by the end of the third phase in 2012, corresponding to roughly 1 percent of the respective residential consumption.

Other sectors

The ratio between the consumption of potable water by tourists and residential consumption in these projections is significantly lower than that implied in the CDM study. The CDM projections imply the relationships among sectors in terms of per capita consumption of potable water as shown in Table 4; these ratios refer to the city of Luxor.

TABLE 4: SECTORAL WATER CONSUMPTION RATES⁴

Consuming Sector	Tourism	Commercial	Industrial	Institutional
Per capita consumption as percent of residential	20.0 %	12.0 %	9.6 %	8.5 %

The ratio for tourism in the CDM study obviously reflects the much higher tourism density in Luxor as compared to the plans for New Luxor. We therefore use the direct estimates. For the other sectors, we apply the CDM factors to obtain projections of total potable water needs for New Luxor, as shown in Table 5.

TABLE 5: PROJECTED TOTAL POTABLE WATER NEEDS, NEW LUXOR (IN M³/D)

Consuming Sector	2005	2010	2015	2020
Residential	7,120	18,300	30,080	38,600
Tourism	0	195	273	273
Commercial	860	2,200	3,600	4,630
Industrial	690	1,760	2,800	3,700
Institutional	605	1,555	2,556	3,255
Losses	1,855	4,763	7,825	10,040
Total (rounded)	11,130	28,570	46,950	60,225

⁴ Source: Camp Dresser & McKee International (1997)

Fire fighting

In accordance with the Egyptian Code, water requirements for fire fighting will be calculated at 40 l/second, corresponding to roughly 3,500 m³/d.

Irrigation

The poor soil conditions and the complete dependence upon irrigation to support plant life in New Luxor mean that planted open space must be continuously maintained. To conserve water under these circumstances, recycled water should be used to irrigate shelterbelts, back yards and open spaces in New Luxor. Although the wastewater effluent is suitable to irrigating shelterbelts on the city edge, it is not suitable for irrigating parks, and other actively used open spaces. Active open space should be irrigated by either the city's potable water supply, or the relatively clean wastewater from sinks and showers collected separately from the toilet waste.

Non-potable water from the wastewater treatment system will also provide site irrigation water. The non-potable water supply will be supplemented by potable water, because the total irrigation demand exceeds grey water production during all phases of development. Irrigation pumps will be operated by an automatic control system which will turn on the pumps at preset times. When the lagoon water level falls to an unusable level, the pumps will be shut down, check valves will shut, and a control valve will open, which will allow the potable water system to pressurize the irrigation piping network. Irrigation will continue to run under potable water system pressure until the lagoon is refilled to a usable level.

The potable water control valve will then close, and the irrigation pumps will be started, using lagoon water to irrigate. The connection of the potable water system to the irrigation system will contain dual backflow preventers to assure that no irrigation water can enter the potable water system. The potable water storage tank and water treatment system will be sized to accommodate site irrigation demand. All irrigation system piping will be PVC, and all materials, valves, and fittings will be in accordance with GOE, MHUUC requirements.

4.4 Wastewater

Generation

Using the conventions that the CDM study employed in deriving total wastewater flows from water consumption (which assume that 90 percent of water consumption reflow in the form of wastewater), we obtain the total wastewater loads as shown in table #6. Obviously, if the projections overstate industrial water needs, they also overstate the wastewater generated by industrial activities.

TABLE 6: PROJECTED TOTAL WASTEWATER FLOWS, NEW LUXOR (IN M³/D)

	2005	2010	2015	2020
Residential	6,408	16,470	27,070	34,740
Tourist	0	176	246	246
Commercial	774	1,980	3,240	4,167
Industrial	621	1,584	2,600	3,330
Institutional	544	1,400	2,300	2,930
Infiltration	835	2,161	3,545	4,540
Total (rounded)	9,200	23,800	39,000	50,000

Collection and Conveyance

All facilities for wastewater collection and transport are to be built as part of the development of New Luxor. The waste should be collected by gravity sewers and conveyed to the new treatment plant located just two kilometers northeast of New Luxor, unless further feasibility studies suggest the construction of another wastewater treatment plant in a new location (as opposed to further expansion of the existing plant). The collection system is likely to consist of a network of polyvinyl chloride pipe (PVC) or vitrified clay pipe (VCP) with manholes located at all changes in direction, all changes in slope, and on all straight runs at a maximum spacing of 90 meters. Sanitary sewage lift stations will be constructed at some locations to avoid extremely deep pipe runs. PVC force mains will carry pumped sewage to the wastewater treatment plant or to a point where gravity flow can be utilized.

Manholes and lift stations would be precast or cast-in-place concrete or brick structures, with cast-iron manhole frames and covers. Lift stations should contain a pair of parallel, alternating, submersible sewage pumps with automatic float switches and a separate, adjacent structure should contain shutoff and check valves. Design of sanitary sewage collection and pumping systems will be in accordance with Egyptian Governmental standards.

Treatment

The projections of total wastewater flows serve as the basis for delineating the required capacity of wastewater treatment facilities for the new city of New Luxor. The treatment requirements will conform to Egyptian Governmental standards, and will be essentially the same as the design parameters for the expansion of the existing treatment plant serving Luxor City and environs.

Effluent water quality will be such that it can be safely stored in lined storage lagoons at various locations on site and at El Toad without any danger of affecting public health. A pumping system will carry effluent water to the storage lagoons, where level controls will prevent overflowing and provide even distribution among the lagoons.

4.5 Solid Waste Collection and Disposal

Generation

Standard planning assumptions imply a daily generation of solid waste of 0.8 – 1.0 kg/resident/day. Tourists are assumed to produce between 1.5 and 2.0 kg/person/day. Using 1.0 kg/day for residents and 1.75 kg/day for tourists, we obtain estimates of total solid waste generated by weight by New Luxor as

shown in Table 7. A working assumption is a density of 1,600 kg/m³ of solid waste, which yields the volume estimates shown in Table 7.

TABLE 7: PROJECTED SOLID WASTE GENERATION, NEW LUXOR (BY WEIGHT AND VOLUME)

Year	2005	2010	2015	2020
Solid waste generated (in tons/day)	40	101	161	201
Solid waste generated (m ³ /day)	25	63	101	126

The guiding philosophy for the development of the new community of New Luxor will emphasize efforts to reduce the amount of solid waste generated by encouraging and facilitating source separation and recycling. Similarly, emphasis will be placed on opportunities for composting, the biological process to decompose organic waste and obtain a usable soil conditioner.

On-Site Storage

On site storage should occur at each building or facility, primarily by locating dumpsters at each location necessary to provide adequate storage between collections. Access control may be necessary in certain locations to help prevent potential problems such as insect and rodent infestation, fire hazards, foul odors, and unsightliness. In order to maximize on-site storage capacity, it may be feasible to install mechanized trash compactors at locations such as hotels commercial/industrial locations that will be the largest sources of solid waste.

Collection

Scheduled waste collection will occur at all dumpster locations by large top-loading vehicles equipped with hydraulic lifts. This will increase the speed and efficiency of the collection operation and will minimize manpower required for solid waste services. The top-loading vehicles require only a driver, whereas rear-loading vehicles typically require at least a two-man crew. Top loading vehicles are also less prone to spillage and odor problems than are other types of collection vehicles. In addition to solid waste created by public facilities, disposal of sludge from the wastewater treatment plant will be necessary.

4.6 Energy and Telecommunications

Electric Power

For electricity needs, an appropriate planning approach for new towns of the type of New Luxor use standard parameters regarding generating capacity needs per person or per room. These standard parameters include an estimate of 400-500 W per person for residential use, with a capacity utilization factor of 50 percent. For tourist facilities, different standards apply to different classes of hotels: 4 kW/room for 5-star hotels, 3 kW/room for 4-star hotels, and 2 kW/room for 3-star hotels and others, all with a capacity utilization factor of 75 percent. Finally, energy demands for handicraft operations are estimated at 1 kW/worker, with a capacity utilization factor of 70-80 percent. Applying these standard parameters to the population and related forecasts yields the generating capacity requirements shown in Table 8.

TABLE 8: PROJECTED ELECTRICITY GENERATING CAPACITY NEEDED, NEW LUXOR (IN MW)

Year	2005	2010	2015	2020
Generating capacity needed (rounded, in MW)	15	35	55	70

Other Energy: Fuels

Liquid Propane Gas

Liquid propane gas is expected to be used throughout the development, but primarily at the hotels. Uses for LP gas will include cooking, water heating, laundry dryers, and steam boilers. Distribution piping networks are not feasible with this gas, so that smaller steel storage tanks must be located at each point of use, and a tanker truck will make delivery to each individual storage tank. Use of LP gas for as many applications as possible will help to reduce electrical demands at the site.

Gasoline and Diesel Fuel

The primary needs for gasoline will be the requirements associated with automobiles and small trucks. The primary uses for diesel fuel will be for large trucks and for diesel powered electric generators.

Fuel Storage and Transportation

Bulk fuel storage tanks will be constructed at the docks for storage of LP gas, gasoline, and diesel fuel. This configuration considers that the majority of fuel supplies will arrive by tanker or barge. Facilities will exist at fuel storage areas for unloading and loading tanker trucks, thereby allowing shipment of fuels by truck to and from New Luxor (and El Toad). All fuel storage tanks and piping systems will be constructed according to International Petroleum Institute standards. All fuel storage areas will be constructed with secondary containment dikes, specialized foam type fire protection designed systems, and storm drainage routing systems which will contain an oil water separator, to prevent accidental discharge of hydrocarbons into the environment.

Telephone

The estimated (land-based) telephone coverage for the new community of New Luxor depends on a number of factors, including projected economic activity patterns, the economic and social characteristics of the population, and the likely market penetration of alternative systems (mobile telephony). Based on standards for similar developments, an average of 130 telephone lines per 1,000 residents can be considered adequate for the first phase, growing at a rate of two additional lines per year, to reach 160 by the target year 2020. In addition, provisions must be made for other customers, including commercial and administrative activities, as well as for reserve capacity. In cases in which the ratio of tourists to the residential population is high (in the range of 25 percent), the factor for “other” telephone needs, including tourism, has been set at 50 percent. In the case of New Luxor, with a much lower ratio of tourists to resident population, that factor is likely to be lower. The projections therefore use 33.3 percent. Applying these standards to the projected population in New Luxor yields the requirements shown in

TABLE 9: PROJECTED REQUIREMENTS IN TOTAL TELEPHONE LINES, NEW LUXOR

	2005	2010	2015	2020
Residential density/1000	130	140	150	160
Population	40,000	100,000	160,000	200,000
Residential lines required	5,200	14,000	24,000	32,000
Other lines (33.3% of residential)	1,732	4,662	7,992	10,656
Total (rounded)	7,000	19,000	32,000	43,000

New Luxor thus will require provisions for at least 43,000 new telephone lines; about 5 to 10 percent of the total to be international lines. The required central office for the new community of New Luxor will therefore have to have a capacity of 43,000/4,300 (local/international) lines.

4.7 Transportation

Access and internal circulation

By reserving rights-of-way in advance of development, New Luxor can be planned to have a comprehensive and integrated street network as shown in relatively long distances. Both major and minor streets will be planned to provide for the adequate circulation of private vehicles, buses, and other transportation modes. Streets in New Luxor will be classified according to function and designed for each functional classification. Local streets, designed to provide access to each residence, will have very low traffic volume.

Higher volume neighborhood service streets will form loops and provide the principal routes for deliveries and service to neighborhood centers. Collector streets will run through district centers, intercept traffic from neighborhood streets and feed into the arterial network, which runs along the perimeter of each district center. The arterial streets, forming a continuous network connecting each district center to the city center as well as regional destinations, provide for the rapid movement of high volumes of traffic over relatively long distances.

An east-west boulevard will be the major point of entry for traffic from the New Luxor Highway connecting to Luxor City. With a right-of-way to accommodate four lanes of traffic, shoulders, and a linear park, the boulevard will become an attractive entrance to the New Luxor city center. Buses will run the length of the city center boulevard and provide the major means of public movement within the center while inter-connecting the city center to other citywide public transportation routes. The mall-boulevard will become a strong axis through the center of New Luxor, offering views to the West Bank Necropolis to which it is aligned. Continuous pedestrian arcades along the boulevard provide a shaded walking environment adjacent to the mall through the city center area. As an open space feature connecting a series of urban spaces in the city center, the central boulevard has the potential of becoming a promenade for New Luxor residents, similar to the role of the Corniche in Luxor City.

An exclusive system for pedestrians and cyclists is provided through the local greenways that connect neighborhood centers. Pedestrian and bicycle traffic is also accommodated along the collector system roads.

Animal drawn cart traffic is minimized in New Luxor through establishing produce and livestock market areas in the northwestern portion of the city that intercept traffic from the surrounding agricultural lands before would enter New Luxor.

Outside transportation linkages

Roads

The residents of New Luxor and its tourist visitors will require adequate road connections to Luxor City and points beyond in the north, Aswan in the south, and to the airport.

Airport

The residents of New Luxor will require adequate access to air travel and air cargo operations, for both domestic and international travel. Similarly, tourists will depend on adequate services for air travel from and to their points of origin.

Public Transportation

The residents of New Luxor will require public transportation to points outside the city itself. These service needs comprise both railroad and bus, requiring access to a railroad station as well as bus depot.

5. INFRASTRUCTURE NEEDS: THE EL TOAD DESTINATION RESORT

5.1 *Design Features*

Current projections imply a fourfold increase in the number of tourists visiting Luxor, from 1 million to 4 million, over the next twenty years. Accommodating this volume will require some 8,900 new hotel rooms, that is, 6,600 more than the 2,280 rooms currently being planned. The construction of new hotels, however, faces several constraints. Suitable areas in Luxor City are limited to small infill parcels along the Corniche or lands on the perimeter of the city that are reserved for agricultural use. Proposed hotel construction in outlying areas, such as New Thebes and Khuzam, will increase capacity, but the scale and location of these developments are not ideal. This situation calls for the creation of a tourism zone outside of Luxor City, yet linked to it.

The development of a new tourism complex with site amenities and strong regional access should not only provide ample sites to support new hotel construction, but should also support tourist recreational services and amenities that contemporary tourists expect. The inclusion of diverse activities within this zone can expand the range of activities for tourists, complementing the attractions of the monument areas and relieving some of the pressures. A greater diversity of activities is also essential to lengthening the average stay of visitors.

These considerations have led the Government to propose the development of a tourism zone south of Luxor City in the El Toad area, to include a golf course as well as facilities for other tourist activities. The zone would offer the capacity to construct new hotels with some 4,500 rooms.

The proposed site for the tourism zone is the **El Toad** (Great Mountain) area, a desert site approximately 9 kilometers south of Luxor City and 2 kilometers south of New Luxor. Encompassing two large, undeveloped plateaus, the El Toad site is located close to the infrequently visited and attractive El Toad Temple and a plateau that contains a significant number of commoner tombs. It is also just two

kilometers south of the only Nile River bridge in the region, offering exceptional access to tourism attractions on the West Bank, and virtually adjacent to the proposed cruise ship port. Major transportation links between El Toad and other East Bank activities include the rail line and the Cairo-Aswan Highway that run along the western edge of the site.

The El Toad tourism zone will include both tourism accommodations and attractions with regional appeal. Commercial and recreational attractions are designed to make El Toad a major tourism destination, thereby promoting longer stays in the Luxor region, helping to lighten the visitor load at area monuments, and increasing economic opportunities for local residents. Amenities will include a golf course, theater, museum, large-scale gardens, tennis, and equestrian facilities. Concentrating hotel development in a well-planned zone will also achieve economies of scale for provision of superior amenities, maintenance, events planning and security, enabling hotels to share promotional programs and facilities. Key features of the tourism zone include the following:

- El Toad is located outside agricultural and antiquities lands. Development on the plateau can be oriented to capture the dramatic views of the Nile River Valley and distant Necropolis.
- Plans call for development through 2020 to focus on the southern plateau, which can be directly linked to the proposed cruise ship port. Future tourism zone development can expand to the nearby plateau to the north.
- Approximately 18 hotels, with a total of 4,500 rooms, are planned for the twenty-year period. Accommodations will vary in quality and type, including three, four and five star hotels and villa complexes.
- The El Toad plan is coordinated with the new cruise ship port development in order to create an integrated tourism zone that promotes more joint cruise-hotel stays and improved connectivity.
- An 18-hole golf course and botanical garden, as well as other attractions, are incorporated into El Toad in order to broaden the types of tourism experience possible in the Luxor region.
- An inter-modal transportation facility to be built at the intersection of the interregional highway and the El Toad entrance road, adjacent to the new cruise ship port, will become the primary transfer point between water and surface transportation in the area.
- The eventual construction of a road between El Toad and New Luxor will provide a direct connection that bypasses local area settlements.
- Regular shuttle bus service will provide convenient access between the cruise ship port, destinations within El Toad, and regional destinations on the East and West Bank.
- A visitor center with museum, built along the formal entrance boulevard to El Toad, will interpret regional local life customs, and will also serve as a staging point for shuttle bus service within the El Toad area and tour bus traffic to regional destinations.

By 2020, the El Toad tourism zone will occupy a total land area of approximately 503 feddans, The hotels will occupy 171 feddan, the golf course 167, and other activity facilities, such as horse stables, pools, sports courts, mini-golf and playgrounds, 25 feddans. Commercial uses together with integrated cultural, entertainment and public service facilities will require 38

feddans. Finally, the visitor centers, administrative center, communications center and security services center together will require 1.8 feddans.

5.2 Projected Capacity and Activity Levels

The El Toad destination resort will develop its total tourist capacity gradually over the four phases of the project, with development slanted toward the higher-end (5 and 4-star) hotels in the early phases, followed by the 3-star hotels in later phases. This planned pattern reflects the intent to establish the resort immediately as an upscale development. The total number of hotel rooms to be constructed at El Toad, 4,500, is in addition to the 700 hotel rooms projected for New Luxor, for a total of 5,200 (or almost 80 percent of the 6,600 new hotel rooms needed in addition to the 2,280 already planned to accommodate the projected increase in the number of tourists). The number of hotel rooms has been translated into the average daily number of tourists by assuming an average occupancy rate of 65 percent and an average number of tourists per room of 1.5.⁵ Table 10 summarizes the results of these projections.

TABLE 10: PROJECTED CAPACITY AND ACTIVITY LEVELS FOR EL TOAD

	Phase I 2000-2005	Phase II 2005-2010	Phase III 2010-2015	Phase IV 2015-2020
5-star hotels	3	2	1	1
4-star hotels	1	0	2	1
3-star hotels	0	2	3	2
No. of rooms	1,150	1,000	1,400	950
Cumulative no. of rooms	1,150	2,150	3,550	4,500
Average daily no of tourists (rounded up)	1,200	2,100	3,500	4,400

5.3 Potable Water

The potable water needs for El Toad are simply the product of the projected number of tourists and the standard daily consumption rate used of 400 liters per tourist. The results of these projections are shown in Table 11. For the target year, 2020, El Toad would augment potable water consumption from New Luxor by about 3.5 percent, for a total of 62,300 m³/d.

TABLE 11: PROJECTED POTABLE WATER NEEDS, EL TOAD (IN M³/D)

	2005	2010	2015	2020
Consumption in m ³ /day	449	839	1,385	1,755
Losses	90	168	277	351
Total water consumption (rounded)	500	1,000	1,700	2,100

⁵ The two adjustment factors obviously just about cancel each other, so that the number of tourists is roughly equal to the number of rooms. In 1999, the average number of beds per room in 3-5-star hotels in Luxor was just under 2; the assumption of 1.5 tourists per occupied room therefore assumes an equal mix of single and double occupancy.

These projections are intended to cover irrigation needs. However, with the golf course as the centerpiece of the El Toad development, irrigation needs may be greater than for average tourism facilities. Even with an additional allowance, though, total water requirements from New Luxor and El Toad would not exceed 65,000 m³/d. These needs would of course be reduced by the extent to which effluent from the wastewater treatment operations can be used for irrigation.

5.4 Wastewater

Generation

As in the case of New Luxor, the wastewater generated by the El Toad tourism zone can be estimated by applying a reflow factor to the projected water consumption. Although the tourism facilities are to be constructed on a plateau high above the groundwater level, the projections include a provision for infiltration of 10 percent of the wastewater generated, as shown in Table 12.

TABLE 12: PROJECTED TOTAL WASTEWATER FLOWS, EL TOAD (IN M³/D)

	2005	2010	2015	2020
Wastewater generated	404	755	1,246	1,580
Infiltration	40	75	125	158
Total wastewater flows (rounded)	450	830	1,370	1,740

Collection and Conveyance

All facilities for wastewater collection and transport are to be built as part of the development of the infrastructure for the El Toad destination resort. As projected, the wastewater from the El Toad development will augment the flows from the new community of New Luxor by 3.5 percent. In other words, it will not have a significant impact on the required wastewater conveyance (between New Luxor and the treatment plant) and treatment capacity.

The appropriate standards for sanitary sewage collection and pumping systems for El Toad will be essentially the same as for New Luxor and will be in accordance with Egyptian Governmental standards.

Treatment

Treatment of sewage generated by the El Toad destination resort will be part of that for the new city of New Luxor, subject to the same standards.

5.5 Solid Waste Collection and Disposal

Generation

Using the planning standard of the midpoint between 1.5 and 2.0 kg of solid waste produced per tourist per day, or 1.75 kg, we obtain the estimates total solid waste by weight generated by the El Toad destination resort as shown in table 13. The projections by weight are converted into projections by volume using the conversion factor of 1,600 kg/m³.

TABLE 13: PROJECTED SOLID WASTE GENERATION, EL TOAD (BY WEIGHT AND VOLUME)

Year	2005	2010	2015	2020
Solid waste generated (in tons/day)	2	4	6	8
Solid waste generated (m ³ /day)	1	2	4	5

On-site storage

On-site storage should occur at each hotel, essentially in dumpsters to provide adequate storage between collections. In order to maximize on-site storage capacity, it may be appropriate to install mechanized trash compactors.

Collection

Scheduled waste collection will occur at all dumpster locations by large top-loading vehicles equipped with hydraulic lifts.

Sanitary Landfill

The collection vehicles will carry the solid waste generated by the El Toad destination resort to the sanitary landfill also used by the new city of New Luxor. The amount of solid waste projected for 2020 for El Toad adds about four percent to that generated by New Luxor, adding roughly two feddans to the required surface area for the sanitary landfill, well within its capacity.

5.6 Energy and Telecommunications

Electric Power

For estimating the infrastructure needs of El Toad in terms of electric generating capacity, generally accepted standard parameters provide guidance. For tourist facilities, different standards apply to different classes of hotels: four kW/room for 5-star hotels, three kW/room for 4-star hotels, and two kW/room for 3-star hotels and others, all with a capacity utilization factor of 75 percent. Energy demands for open spaces and street lighting are likely to be more significant for El Toad, with its dominant golf course and parks. For green areas and open spaces, an estimate of 0.5 W (or 0.0005 kW) per m² applies, while street lighting requires 1.5 W (0.0015 kW) per m² (with the surface area expressed as a percentage of the total area of the development). Applying these standard parameters to the forecast build-up of hotel rooms and the development of the green spaces yields the generating capacity requirements shown in Table 14.

TABLE 14: PROJECTED ELECTRICITY GENERATING CAPACITY NEEDED, EL TOAD (IN MW)

Year	2005	2010	2015	2020
Generating capacity needed (rounded, in MW)	4	6	9	12

The infrastructure needs in electricity for the EL Toad destination resort add significantly to those of the new community of New Luxor. For the target year, 2020, the generating capacity needs of El Toad add more than 17 percent to those of the new city. Total required capacity (without considering any needs associated with the new cruise ship port) is therefore in the range of 80-85 MW.

Other Energy: Fuels

Liquid Propane Gas

Liquid propane gas is expected to be used at the hotels and other facilities. Uses for LP gas will include cooking, water heating, laundry dryers, and steam boilers. Distribution piping networks are not feasible with this gas, so that smaller steel storage tanks must be located at each point of use, and a tanker truck will make delivery to each individual storage tank. Use of LP gas for as many applications as possible will help to reduce electrical demands at the site.

Gasoline and Diesel Fuel

The primary uses for diesel fuel will be for diesel powered electric generators, especially stand-by power supplies for the hotels. The primary needs for gasoline will be the requirements associated with automobiles and small trucks.

Telephone

The estimated (land-based) telephone coverage needs for the destination resort of El Toad is largely determined by the standards for 5 and 4-star hotels. Applying these standards to the projected number of rooms for each development phase yields the projected requirements shown in Table 15. In line with standards for international hotels, virtually all of those lines will need to be international lines.

TABLE 15: PROJECTED REQUIREMENTS IN TOTAL TELEPHONE LINES, EL TOAD

Year	2005	2010	2015	2020
Total lines required (equivalent)	1,400	2,600	4,300	5,400

Television

The provision of television will be the responsibility of the individual hotel operators, in the typical case through satellite access. Developers may also consider the installation of optical cables to provide fast Internet accesses for interactive entertainment or business uses.

5.7 Transportation

Roads

The needs of the El Toad destination resort with respect to roads concern internal circulation, and access to the monuments, Luxor City and New Luxor, as well as to the river port and the airport. Internal circulation, the responsibility of the developer, is in effect a ring road around the golf course, connecting the hotels, residential areas, and activity centers. The principal connector road to El Toad linking the complex to the El Toad road (connecting the El Toad Temple and New Luxor) and the Cairo-Aswan highway will become a formal entrance boulevard leading to a visitor center with museum. This visitor center will also serve as a staging point for shuttle bus service within the El Toad area and tour bus traffic to regional destinations. The El Toad road will need upgrading to meet the needs of the El Toad tourism zone and those of the residents of New Luxor working there.

Airport

The El Toad destination resort is likely to become a major “customer” for the Luxor airport, accounting for a significant portion of the tourists arriving by air. Improved tourist amenities for international

arrivals, as well as accommodations for corporate jets and a limited number of private small planes, will be needed several years out.

6. THE CRUISE SHIP PORT

6.1 Docks

The docks being considered by the Ministry of Tourism will include docking, unloading, and fueling facilities for commercial passenger ships, private pleasure boats, and cargo ships. The required facilities will include new piers, docks, warehouses, dry dock and maintenance buildings, and storage tanks for gasoline, diesel fuel, and liquid propane gas.

Storage facilities will be constructed to receive tourism-related materials and supplies. The new commercial docks and warehouses will be a critical element in the development of the area due to the heavy volume of cruise ships anticipated.

6.2 Wastewater

The principal infrastructure need associated with services provided to the cruise ships at the new port which is under study relate to wastewater collection, conveyance, and treatment. The needs of the cruise ships in this respect can be approximated by examining the current fleet, applying certain key parameters, and assuming that roughly half of the necessary services will be provided at the other terminal, Aswan. There is considerable seasonal fluctuation in the level of service needs, given the curtailment of cruise ship activities during the winter (low water levels), but the figures relevant to considering capacity needs can be estimated by looking at maximum activity.

Since ancillary uses of water are more limited for cruise ships as compared to hotels, it is probably more appropriate to apply residential water consumption rates to tourists traveling on these ships. Under these assumptions, and slightly higher occupancy and room utilization rates (70 percent, and 1.75 persons, respectively), we obtain the projected wastewater flows generated to be handled at the cruise ship port in Luxor, shown in Table 16. The infiltration factor (10 percent) has been added, since experience has shown that within several years the condition of the pipes may be such that there could be some infiltration during flood episodes.

TABLE 16: PROJECTED WASTEWATER FROM CRUISE SHIPS TO BE TREATED IN LUXOR

	2005	2010	2015	2020
Wastewater generated	669	720	772	823
Infiltration	67	72	77	82
Total wastewater flows (rounded)	740	790	850	910

For the target year, the wastewater collection, conveyance and treatment services for the cruise ships would therefore correspond to roughly half of the level generated by the El Toad development.

7. MEETING THE INFRASTRUCTURE NEEDS

7.1 Water

Treatment

Both potable water treatment and distribution and wastewater collection and treatment needs of the Luxor area are being addressed under the USAID-funded *Secondary Cities Project* (contractor: Camp Dresser McKee - CDM). The following discussion of available capacities draws specifically on the contractor's interim report (CDM, January 1997).

Luxor currently obtains its raw water from the River Nile. The water is processed at two adjacent plants. A new installation at the riverside facility that started operations in 1997 – replacing three older units - has a capacity of 200 lps (17,280 m³/d). A second, located just inland from the riverside facility, has a total capacity of 600 lps (51,840 m³/d) after the completion of the last phase of an expansion project completed in 1997. The combined capacity of the two water treatment plants is therefore 800 lps or 69,120 m³/d.

The CDM report projects a total water consumption for the “study area” (Luxor plus surrounding villages) of 62,200 m³/d for the year 2015 (for a total projected population of 257,300), and 84,400 m³/d for the year 2025 (population: 334,200). The combined capacity of the water treatment plants therefore would be sufficient to handle demands through 2017 for the population assumed in the study.

The combined potable water requirements associated with New Luxor and El Toad for the target year, 2017, are projected not to exceed 65,000 m³/d, roughly equivalent to the needs of the study area population projected in the CDM study.⁶ While the population of New Luxor is likely to involve some diversion from that of the CDM study area, it is reasonable to assume that most of it would in effect be the result of a *net* increase in the population of the area. Thus, only a small – if any - portion of the potable water needs of the new community of New Luxor and of the El Toad resort development could be covered by the existing water treatment plants.

The implication is that a new water treatment plant, or set of plants,⁷ with a (combined) capacity of approximately 800 lps (69,120 m³/d), along with the necessary pipes linking the plant to the distribution network in New Luxor, the El Toad tourism zone, and the cruise ship port, will need to be constructed.

The raw water for the new treatment plant would be taken from the Nile River or a canal carrying Nile River water. The high salinity content of underground water in the area⁸ and the costs associated with deep wells rule out this option. Possible process specifications for the (additional) potable water treatment plant are discussed in Annex 2.

⁶ The projections for New Luxor imply that a smaller population consumes about the same amount as the population in the CDM study; the difference is due to the different consumption standards used.

⁷ The subsequent discussion refers to a single plant or facility, although it is likely to involve more than one; in fact the most likely scenario would be a build-up to the final capacity through a series of tranches, each with a capacity of, say, 200 lps.

⁸ Previous tests in nearby areas for agricultural purposes have indicated the great depths of the groundwater aquifer and the high salinity content

Distribution

The potable water distribution system will consist of pumps, pressurization tanks, and a polyvinyl chloride (PVC) distribution system which will be routed to all service points in the new development.

Institutional options: Private sector participation

A national agency, the National Organization for Potable Water and Sanitary Drainage (NOPWSD) manages or oversees all activities related to the construction of and operation of water supply and wastewater collection and treatment facilities. The day to day operation is the responsibility of an agency at the level of the governorate, either as a separate Water Company, or as part of the local government structure. In the case of Luxor, water supply and wastewater collection and treatment are being managed by a division in the Higher Council of Luxor City (HCLC)⁹. These two entities will continue to play a key role, even if significant private sector participation can be achieved¹⁰. The recommended arrangements for building and operating the new water treatment plant is built and operated by a private investor, with a possible transfer at the end of the concession period under a BOT (build-operate-transfer) arrangement, with the HCLC continuing to manage the existing water treatment plants.

The legal basis for private sector participation in the water supply and wastewater collection and treatment is discussed in some detail in Annex 1, together with a brief compendium of the pertinent laws.

Clearly, the development of New Luxor and of the El Toad tourism zone offers an exceptional opportunity to bring in private capital to help meet the financial and management challenges of the Comprehensive Development of the City of Luxor. The necessary basis for a successful commercial operation (such as adequate metering, etc.) can be laid as part of the development of the new community. At the same time, the gradual expansion of the city and associated growth of the number of residents will make it possible to establish appropriate operating rules from the outset, rather than having to fight established habits that conflict with any commercial operation.

The main problem will be the tariff issue: for a private investor, tariffs need to be set to recover costs and an adequate return on the investment. While we have not studied the Luxor water supply operations in

⁹ Luxor is somewhat of an exception among the four governorates that are prime partners for the NOPSWD in not having a separate Water Company for managing water supply and wastewater operations.

¹⁰ Five possible arrangements for building and operating the new water treatment plant can be considered:

- (1) The new treatment plant is built by the NOPWSD and is operated by the office of the HCLC currently responsible for managing the water supply and wastewater operations;
- (2) The new treatment plant is built by the NOPWSD and operated under a concession by a private sector investor, with the HCLC continuing the operation of the existing facility;
- (3) The new treatment plant is built by the NOPWSD; both the new facility and the existing water treatment plants are operated under concession by a private investor;
- (4) The new treatment plant is built and operated by a private investor, with a possible transfer at the end of the concession period under a BOOT (build-own-operate-transfer) arrangement, with the HCLC continuing to manage the existing water treatment plants; and
- (5) The new treatment plant is built and operated by a private investor, with a possible transfer at the end of the concession period under a BOOT (build-own-operate-transfer) arrangement; the private investor also operates the existing water treatment plants under a concession.

detail, the region is likely to share the experiences of other governorates¹¹ regarding tariffs and revenues. Table 17 shows the tariffs for water. It reflects the implicit attempt at cross-subsidization, especially from the tourism sector. Even so, it is unlikely that revenues cover costs. As a rough estimate, the cost of water is probably in the .50 to .53 LE range. The revenue base is likely to be inadequate not only because of tariffs that are too low, but also because of difficulties in collecting tariffs.

TABLE 17: WATER TARIFFS IN THE LUXOR AREA, IN LE

Residential*			Government			Commercial		Hotels**		
< 30m ³	> 30m ³	Sewerage	Schools	Other	Sewerage	All	Sewerage	2 nd category	1 st category	Sewerage
.23	.30	35%**	.40	.50	60%**	.50	60%**	.50	.85	60% of water bill

* Threshold consumption is on a monthly basis, that is, corresponding to 1 m³/d.

** 1st category: 2, 3, 4 and 5-star hotels; 2nd category: 1-star and not classified.

This situation would make it difficult to introduce a “split” management of the water supply system in the Luxor area, with HCLC managing the current plants and distribution system and a private operator responsible for the new plant (options 2 and 4 above). It will not be feasible to charge different tariffs in the same area. Thus, either tariffs are raised in the HCLC-service area, or the private investor receives an explicit subsidy from the Government to cover the gap between the cost of water and the tariffs charged.¹² The tariff adjustment can be gradual. Given the investment needed and the other demands on the HCLC and the NOPWSD in the area, Option 5 above (BOOT for the new plant plus concession for the existing plants) offers a very attractive opportunity, provided a politically acceptable solution can be found to ensure adequate cost recovery.

In order to allow time to make changes to the regulatory and legal framework, a phased approach to a concession (such as in the case of Trinidad and Tobago) may be beneficial. In the case of Trinidad and Tobago, a precession, or enhanced management contract, was awarded for a period of three to five years, in which it will then be converted to a long-term concession. The rationale was to give the government time to develop a tariff regime, establish a relationship with the private operator, etc. In Egypt, the present tariff is too low to support a commercial operation; the GOE needs time to increase these rates. Furthermore, enforcement and monitoring mechanisms need to be put in place, to strengthen the regulatory framework and gain the confidence of investors.

Yet there is an adequate legal base for attracting private sector participation in the water supply to New Luxor and El Toad, and their development offers an exceptional opportunity to mobilize private capital and expertise for the provision of a critical infrastructure service.

¹¹ Abt Associates recently conducted a comprehensive assessment of prospects for private sector participation in water supply in the Beheira governorate. The experience of the Beheira Water Company regarding metering and collection is likely to be typical.

¹² Attempt to encourage the private operator to “enhance” cross-subsidization are likely to introduce reverse incentives, since the operator would be more inclined to favor service to those customers who pay tariffs that cover costs.

7.2 Wastewater Collection and Treatment

Collection

The situation for wastewater collection and treatment is similar to that for potable water. The network for wastewater collection and conveyance to the treatment plant will be part of the development of the new community of New Luxor and the El Toad tourism zone. The wastewater treatment requirements, however, need to be handled in a regional context.

The sanitary sewage collection-piping network constructed in Phase I will be expanded as development continues. Additional structures, piping, lift stations, and force mains will be constructed. The collection system will consist of a network of polyvinyl chloride pipe (PVC) or vitrified clay pipe (VCP) with manholes located at all changes in direction, all changes in slope, and on all straight runs at a maximum spacing of 90 meters.

Sanitary sewage lift stations will be constructed as required to avoid extremely deep runs of pipe. PVC force mains will carry pumped sewage to the utility compound or to a point where gravity flow can be utilized.

Manholes and lift stations will be precast or cast-in-place concrete or brick structures, with cast iron manhole frames and covers. Lift stations will contain a pair of parallel, alternating, submersible sewage pumps with automatic float switches and a separate, adjacent structure will contain shutoff and check valves. Design of sanitary sewage collection and pumping systems will be in accordance with United States building code criteria or Egyptian Governmental standards, whichever are more stringent.

Treatment

The CDM study, under USAID's *Secondary Cities Project*, projected total wastewater flows of 48,000 m³/d and 65,000 m³/d from the population of the study area for 2015 and 2025, respectively. After the planned expansion, the current wastewater treatment facility located toward the northeast corner of the new community of New Luxor will have a capacity of slightly over 48,000 m³/d. In other words, the capacity of the existing treatment plant will just be sufficient to handle the load projected by CDM through 2015. Handling requirements for the population of the CDM study area beyond that time period will require construction of additional facilities with a capacity of at least 20,000 m³/d to cope with the volume projected for the year 2025.

To the extent that the population of New Luxor can in fact be considered in addition to that projected by CDM on the basis of past trends, additional wastewater treatment facilities will be required with a capacity of approximately 52,000 m³/d for the year 2020 for New Luxor, the El Toad tourism zone, and the cruise ships serviced in Luxor. One of the locational advantages of the proposed site for New Luxor is its relative proximity to the existing wastewater treatment plant scheduled for expansion. Detailed feasibility studies will be required to determine whether the capacity of that plant can be expanded further to handle both the future needs of the general area and the additional needs of New Luxor, El Toad, and the cruise ship port. Alternative sites might include those in proximity to the proposed sanitary landfill.

As in the case of water supply, wastewater collection and treatment offer solid opportunities for private sector participation. The options are essentially the same as discussed above – all public, with NOPWSD and HCLC in charge of building and operating, respectively, the new treatment facility, or private sector involvement through concession or a BOOT arrangement or some combination thereof.

Reuse of Effluent Water

Various uses are possible for the non-potable effluent water generated in the wastewater treatment process. Overall, effluent water quality will be such that it can be safely stored in lined storage lagoons at various locations on site without any danger of affecting public health. A pumping system will carry effluent water to the storage lagoons, where level controls will prevent overflowing and provide even distribution among the lagoons.

The current wastewater treatment plant and its expansion include an effluent volume equalization pond; an effluent pump station; and a force main to lead from the effluent pump station to an agriculture effluent reuse area of about 1610 feddans that lies to the south east of the city in the desert.

The effluent can also be a source of fire protection water. The non-potable water distribution system and storage lagoons would provide the capacity required for adequate fire protection flow at all buildings and fire hydrants on the site. Storage and distribution systems for fire protection would be based on a requirement of 10,000 liters per minute for a period of two hours at a pressure of X ATM [65 pounds per square inch] at the hydrant farthest from the source. This criterion demands a storage capacity of 1,200 m³, and would control the sizing of the distribution piping network and the pumping system.

The distribution system would be fed by a pumping system capable of producing the high flows required for fire fighting. To be sure that the necessary storage capacity is constantly available, an automatic level control system would be installed at the fire water storage lagoon to shut down irrigation pumps when a minimum allowable water level is reached. All valves and hydrants for the fire protection system need to conform with the requirements of the GOE water standards for the fire protection system.

Irrigation

Non-potable water from the wastewater treatment system could also provide site irrigation water. The non-potable water supply would have to be supplemented by potable water, because the total irrigation demand is projected to exceed “grey” water production during all phases of development. The system of using potable water to complement the effluent irrigation water supply operates as follows: An automatic control system turns on the irrigation pumps at preset times, using the “grey” water from the effluent lagoons. When the effluent lagoon water level falls to an unusable level, the pumps are shut down, check valves are closed, and a control valve opens to allow the potable water system to pressurize the irrigation piping network. Irrigation continues to run under potable water system pressure until the effluent lagoon is refilled to a usable level. The potable water control valve then closes, and the irrigation pumps restart using lagoon water to irrigate. The connection of the potable water system to the irrigation system must contain dual backflow preventers to assure that no irrigation water can enter the potable water system. The potable water storage tanks and water treatment system need to be sized to accommodate site irrigation demand. All irrigation system piping would be PVC, and all materials, valves, and fittings must be in compliance with GOE, MHUUC standards.

7.3 Power

Generation

The initial demands of the new developments in terms of electricity can be met by tapping into the national grid from the step down transformer in El Toad. In the long term, though, alternative sources need to be developed to meet the needs of the new developments, estimated at roughly 85 MW.

One option is to extend a high voltage transmission line from the Aswan Dam Hydroelectric Facility to New Luxor. Alternatively, a suitably sized power generation plant could be constructed in the area. The feasibility of this option needs to be studied further, incorporating both the national-level power expansion program and specific opportunities in the area. New generation technologies could be considered for such a plant; for example, it could be linked to the sanitary landfill operation to use municipal waste as a fuel.

This new power plant could be constructed and operated by a private investor under a BOOT arrangement. In the case of the El Gouna development on the Red Sea, the developer built power plants with a total capacity of 18.8 MW as an integral part of the resort. Depending on the approach used in the El Toad resort development, such a provision could offer a useful transition solution. Such smaller power plants could then serve as peaking plants for high electrical demand periods and as a standby source to provide backup power for critical loads in the event of a power outage on the main utility source.

Distribution

Electricity will be distributed in multiple circuits of 15,000 volts nominal. The electrical distribution throughout the site will be by high voltage cables installed in an underground concrete encased ductbank and manhole network. Distribution equipment for switching and transformers will be low profile pad mounted type consistent with the resort aesthetic.

Transformers will be dead front types for safety and employ hook-stick operated separable cable connectors with plug-in bushings. Integral fusing will provide protection for transformers. A loop-feed switching arrangement will allow isolation of a faulted or open circuit segment and the re-energizing of all loads connected to the circuit.

7.4 Transportation

Roads

The Cairo-Aswan Highway, a two-lane asphalt road, provides the primary vehicular access to the new city of New Luxor and the resort area of El Toad. The highway is in relatively good condition, and is considered suitable for the normal highway traffic which would be associated with the planned resort development.

The El Toad Plateau is approximately 14 kilometers south of Luxor City. It is presently unused land adjacent to agricultural lands and the El Toad Village. The El Toad Plateau sits across the El Kalabeya Canal, east of the Cairo-Aswan highway, and is connected to the Highway by three small bridges. The paving from the bridges to the El Toad Plateau is mostly dirt road. Essentially no drainage structures exist along the El Toad Plateau Road, causing rainwater, sparse in frequency but heavy in intensity, to be forced to flow across the pavement in many areas. The dirt portion, actually a hard base limestone material, carries a limited amount of traffic transporting supplies to the village of El Toad. Most of this road will require upgrading and paving.

The Luxor International airport is connected to Luxor City by the airport road. The airport road also intersects with the Cairo-Aswan Highway about 18 kilometers north of the El-Toad Plateau. The airport road consists of an asphalt-paved surface, approximately 9 meters wide, and is in good condition. The Airport Road is considered suitable to handle the traffic generated by the new developments.

Some dirt trails exist throughout the New Luxor and the El Toad Plateau. These trails are small, rugged, and considered suitable only for all-terrain vehicular traffic. The access road and the internal road structure will be newly developed.

Public Transportation

Public transportation will rely on private operators.

Airport

The existing Luxor International Airport provides access to the area for visitors from all parts of the Middle East, Europe, and the Far East. It is located approximately 7 kilometers from the Cairo-Aswan Highway. The airport which serves as an origin/termination airport rather than a hub, and serves domestic and international flights. Air traffic arrives from Europe, Japan, and the Middle East countries, as well as from Cairo and other parts of Egypt. Facilities presently exist to service a wide range of aircraft including large and small commercial jets, private jets, turbo props, private single engine aircraft, and helicopters. Passenger traffic ranges from 5,000 to 7,000 passengers per day.

The two existing 3000-meter runways are adequate for all types of aircraft, including large passenger jets. No airport upgrading will be required as a result of this project outside of the existing activities aimed at increasing its capacity. New facilities can in the future be considered for other aspects of a commercial airport. New taxiways and apron space could be constructed, as well as landing and parking areas for commercial helicopters. Taxiways and aprons would consist of heavy-duty asphalt or non-reinforced concrete pavement.

7.5 Solid Waste

Private contractors will handle solid waste collection and transport to the sanitary landfill, and operations of the sanitary landfill.

7.6 Telecommunications

A series of microwave towers will be installed in New Luxor, which can be used for Phase I and long-term telecommunication system. These towers will be controlled by the Egyptian government, which also controls the current microwave system. Permission must be obtained from the government to use the microwave towers and to establish the microwave system required to create a telecommunications network in New Luxor. Arrangements must also be made with the controlling telecommunications authority to connect with the Egyptian civilian telecommunications system. This will make it possible to process local, long distance, and international telephone or data calls. The telecommunications authority must allow the installation of equipment which will provide communications channels to the private equipment, and provide radio equipment space, antenna space, and power for the private equipment. The authority should also assist in the installation of equipment and the interface.

Assuming that each microwave tower is within range for short haul microwave (less than 5 kilometers), service can extend from the closest tower to a small dish located on the roof of the Phase I hotels at New Luxor and El Toad, which will serve as a telecommunications center for the Phase I development.

The Egyptian private sector telephone companies must provide circuits and telephone trunk numbers to the microwave system at each node in New Luxor. It is estimated that at least 100 trunks and 100

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telephone numbers will be allocated to each node. These 100 trunks and numbers will feed a central PBX located in the main hotel. This central PBX will service all telecommunications facilities in the area, and will provide for intra nodal communications and access to the telephone network. This type of system will allow communications for all Phase I development at initial cost, and should be sufficient until permanent telephone utility backbone transmission facilities and switching centers can be established later in the development of the new city of New Luxor and the El Toad resort.

8. ANNEXES

Annex 1: Site Plan of New Luxor and El-Toad

(leave aside 5 pages for maps)

Infrastructure Development for New Luxor and El Toad

Infrastructure Development for New Luxor and El Toad

Annex 2 Legal background for private sector participation in water and wastewater services

Introduction

To attract private sector participation and to ensure the success of a privately operated water company, it is critical that a legal framework be in place that assures the private party that it will be able to operate in a stable and open environment, that its investment will be protected by a consistent set of fair laws, and that it will have enforceable legal rights and recourse in the event of a dispute arising from its activity. At the same time, the Government of Egypt and the consumers must have similar rights of transparency, accountability, and legal redress to assure that the natural monopoly granted the private investor is responsive to their needs and rights. The balancing of these two interests is best accomplished by a system which allows autonomy of operation to the investor while at the same time providing effective oversight of rates and services by an objective regulatory authority.

Overall Legal Frame work

NOPWASD, operating under the Ministry of Housing and Urban Development, is the concerned central body overseeing public water companies. The day to day operation of the water and wastewater services is the responsibility of a division of the HCLC, which in fact performs the functions that public water companies carry out in other governorates.

As part of the HCLC, it can enter into agreements with organizations and companies to assist it in realizing its objectives. It is therefore possible for HCLC to hire a private company to operate and manage its facilities. However, it is unclear whether the private company would have authority over the financial aspects of running the company.

In principle, HCLC has the right to decide on the rate collected from the customers for its services and to set the price for selling water on a sound economic basis. However, each of these is subject to direct control by the “authorized (competent) central body,” in effect removing true discretion from the local level. The rate is set according to the central body’s guidelines, the price is determined only after getting the consent of the central body, and the value of the consumed water is set by the tariff, which in turn is set by the central body. In actuality, the High Utility Committee, under the Ministry of Housing and Public Utility Planning, sets the formula, approves tariffs, and sets the prices throughout all of Egypt, including those for Luxor. In addition, all tariffs must be approved by the People’s Assembly and are generally uniform throughout the country.

The Governor of Luxor must approve proposals for new projects - in this case, building a new water treatment plant if necessary. He then submits them to NOPWASD, which in turn submits them to the Ministry of Planning. Similarly, the Governor is the first to approve the budget and then submits the request to the Ministry of Finance, through NOPWASD.

Legal Options for Private Sector Participation

Private sector participation in the operation of water and wastewater services in Luxor can be accomplished under Egyptian law in a number of different ways. These include:

- (a) Contracting with a private party to provide management and operation services;

- (b) In cases in which the services are operated by a public water company, converting the company to a true holding company and then privatizing it (this option does not apply in Luxor); or
- (c) Transferring control of the operation of the services to a private party through a BOOT/concession agreement.

The most effective means of attracting private participation appears to be through a BOOT/concession agreement. Considered in light of Egypt's new investment law (May 1997), it would be possible for a private party to operate the existing facilities under a long-term concession agreement, and then build new plants as needed either through a BOOT arrangement or simply outright in accordance with the new investment law. If new facilities were built under a BOOT arrangement, they would revert to the government at the end of the concession agreement; if they are built under the new investment law, the private party could establish an independent private water supply company which would sell purified drinking water to HCLC. The independent company would either remain private or be sold to the government after the end of the concession agreement.

Management Contract

The simplest means of reforming the company would be the engagement of a private company to operate and manage the production and/or distribution of water supply. The main problem with this is that the Governor could *not* authorize the private party to manage the financial aspects (rate setting, capital investments, etc.) related to operating the plant. This arrangement would therefore resolve only part of the problem. The Governor and the Ministry of Finance would still determine the budget, the company's monies would still be turned over to the government, and rates and tariffs would still be set by the central government and would not reflect the true cost of providing the services. Since the President appoints the Governor, he is unlikely to make significant changes without the approval of the President or the Council of Ministers. Thus, the problem of substantial centralized control and inadequate financing is not remedied by this solution.

This approach would also not address any issues of uncollected revenue and the loss of water through illegal connections and standpipes. These are currently under the enforcement of the Ministry of Justice and could not be delegated without that Ministry's approval. Special enforcement authority and mechanisms would need to be secured under any approach decided upon for private participation. Nor would these problems be addressed if only part of the operation (e.g., production but not distribution) were handled by a private company.

Offering a long-term Concession with Some Private Ownership

The most effective and acceptable means of engaging private sector participation appears to be through a long term concession contract covering all aspects of managing and operating the facilities, including financial matters. This would be appropriate for both the existing and new facilities, and would function similar to a BOOT agreement.

The private party would take control of the facilities, operate and maintain the facilities at its own expense but at agreed upon standards and rates, realize a profit from its operation, and then return the facilities - improved and more efficiently operating - back to the government at the end of the concession period. Tariff and service standards would be set in the concession agreement (initially based on the competitive

bid process for the contract) and amended with the approval of an independent regulatory body. If new water treatment facilities need to be built, this could be handled as part of the maintenance and improvement responsibilities of the concession agreement. At the end of the concession period, the newly built facilities would revert to the government with the remaining assets of the company. The original concession agreement would need to account for all of this in its terms and conditions.

The new investment law creates an alternative to this traditional concession agreement and is worth consideration. Under the new investment law, the concessionaire or another private party could build new water production facilities, if needed, that operated independently of the concession agreement. The proprietor of the new facility would own it outright and it would not revert to the government at the end of the concession period. The water produced by the new facility would be sold “into the grid” of the existing water pipe system (which may be operating under a concession agreement). If the new facility were owned by the concessionaire, it would in effect be selling the water back to itself. The advantage to the concessionaire is that it would not lose its investment at the end of the concession period because the new facility would not revert to the government; this feature may be attractive to potential bidders.¹³

If the facility were owned by an independent private party (instead of the concessionaire), it would create competition for the production of water or could serve to spread the risk among more than one investor. Since a regulatory framework will already be in place for the concession agreement, the new facility could be similarly regulated as to rates and service. The establishment of a new water facility would still fall under the existing law governing potable water (Law No. 27 for 1978), which requires a license from the Ministry of Housing, Utilities and Urban Communities. Therefore, the decision of whether the new facility is built by the concessionaire or by an independent private party would still be under the control of the central government. It may be more appropriate to delegate this authority to the regulatory body.

Legal Reform needed for a Concession Agreement with Some Private Ownership

Some of the laws will need to be revised in order to grant a long-term concession agreement with greater autonomy to the private party than is currently available. Other laws will influence the transition to private participation and are relevant to this discussion. The biggest challenge, however, is likely to be implementation and acceptance of the institutional reforms necessary to construct an independent regulatory body and to shift control from the concerned central authorities to the local regulators. The Government of Egypt has shown a willingness to decentralize control in its new investment law, which transfers power from the national Investment Authority to local governors, and this could be a good indication of its amenability to this proposal.

Laws Affecting Concession Agreements and Ownership

Concessions

¹³ The disadvantage is that BWC and the Government of Egypt will not receive the new assets upon termination of the concession agreement. However, it is recommended that the concession period be of significant duration to make it worth a private investor’s commitment of large capital funds. Even towards the end of his concession period, the private party would have the incentive to continue making the needed capital investments if he could recover his investments at the end.

The first obstacle is Law Number 129 of 1947 Concerning Public Utilities. This law provides that no public utility concession shall exceed 30 years. (Article 1) In the electricity and airport sectors, this law was amended to extend the maximum concession period to 99 years in order to allow sufficient time for an investor to make the necessary capital investments and realize a return on them. Since the groundwork has been laid by these two sectors already, this may not be an insurmountable obstacle. New legislation would be required to be passed by the People's Assembly, as was the case in the electricity and airport sectors.¹⁴ The Prime Minister could propose the legislation, but approval from the President would also be needed. At this point, the new legislation could be specific to Luxor, as opposed to the entire water supply sector, which is likely to make it more acceptable and make passage of it take place in a timely manner.

Other aspects of the existing concession law should be amended to change the limit on profits, which is currently 10 percent (Article 1) and to remove the ability of the grantor of the concession to unilaterally change prices or the organization of the utility company. (Articles 2, 3, 5 and 6) In addition, under the existing law the grantor still controls the technical, administrative and financial aspects of the utility and dictates development and progress. (Article 7) These should be changed to give the concessionaire more autonomy.¹⁵ Achievement goals should be part of the agreement and oversight responsibilities would lie with the regulatory board.

Under the current law, once a concession is granted, changes can be made by a presidential decree. (Law No. 61 of 1958, On the Granting the Concessions which are Connected with Investment of Natural Wealth Resources and Public Utilities, and the Amendment of Concession Agreements.) This decree authorizes the president to change both the concessionaire and the scope, duration and royalties of the concession contract by decree with the national People's Assembly's approval. Any other condition of a concession may be changed by the "concerned minister" issuing a decree.

The new legislation should remove the above restrictions. Responsibility for making necessary changes to the concession agreement should be delegated to the independent regulatory board, and security should be provided to the investor that his concession agreement will not be changed unilaterally and without a public hearing or other appropriate forum. The regulatory board would comprise a few (no more than 5) highly trained individuals with the expertise in the water industry necessary to make educated decisions regarding the private investor's request for increased tariffs or large capital improvements. The initial group of regulators could be from NOPWASD and/or HCLC and would receive intensive training as independent regulators. The actions of the regulatory body could still be consistent with national goals and interests set by a national water council or other appropriate body setting policy at a national level.

¹⁴ Generally, laws are first drafted by the Prime Minister or one of his ministries and then submitted to a special committee of the People's Assembly. The special committee will then study the proposed law and determine if it should be submitted to the People's Assembly for consideration. (Article 10 of the Constitution of the Arab Republic of Egypt of September 1971 and the Amendments May 22 1980.) If the Assembly passes the law, then the President will promulgate it, making it effective, and direct the appropriate ministry to issue executive statutes or regulations related to the law. (Article 144 of the Constitution)

¹⁵ Similar changes were made to the concession laws with respect to the electricity and airport sectors.

However, a local regulatory board is appropriate at this time since the production and distribution of water in Luxor is confined to a specific area (unlike the national electrical grid).

Ownership Rights

While a concession agreement and a BOOT agreement do not provide for true ownership of the property, since both require a transfer of the property back to the government at the end of the contract period, outright ownership of property - including public utility property and including ownership by foreigners - appears to be allowed under the new investment law mentioned earlier. This is a radical change in the Egyptian legal system.

The new investment law appears to decentralize authority over investments from the national “Investment Authority” to “Administrative Quarters”. (Law No. 8 of 1997 - Promulgating Law on Investment Guarantees and Incentives, signed by the President) The subsequent Prime Minister’s Executive Statutes designates the Governor as the “administrative quarter” of his respective area. (Article 22 of the Executive Statutes) Under these statutes, the Governor is able to sell state-owned land to companies desiring to establish a business in that governorate, after getting the approval of the competent minister, and he is required to provide all the licenses for the company that are needed to establish and operate the company’s business.

The new investment law specifically applies to water supply companies and would govern the establishment of a brand new water supply company in Luxor. However, it does not govern the transition of government property to private ownership and therefore would not apply to a concession agreement for the existing facilities.

Article 1 of the Law states that it applies to “the infrastructure comprising drinking water, drainage water, electricity, roads and communications.” All of these sectors except water have begun the process of private participation. Similarly, the Prime Minister’s statutes expressly state that the conditions and limitations of the law apply to the “establishment, operation, and management of water distillation and drinking water filtration stations, as well as their distribution networks and water pipelines.” (Article 1)

The guarantees provided by this law include guarantees against nationalization or confiscation (Article 9), against interference with pricing, products or profits (Article 10), and against cancellation of licenses unless infringed upon and then only by the Prime Minister after a hearing (Article 11). In addition, the law allows a company to own and possess the necessary land and buildings regardless of nationality or place of domicile of partners. (Article 12) This last guarantee is in stark contrast to a law as recent as 1996 (Law No. 230), which restricted ownership rights of non-Egyptians (including corporations) to two private dwellings, neither of which could exceed 4,000 square meters. (Article 1) (Presumably, under the old law, if a company was a joint venture with an Egyptian partner it could jointly own property.)

The new investment law would appear to enable the concessionaire to own outright any new water facility he builds as part of his concession agreement. Some caution in relying too strongly on this law may be appropriate, however, since it is unclear how far new authorities can be exercised.

Exclusive Water Rights, Enforcement and Access to Private Property

An important question with respect to the concession agreement will be whether the concessionaire has the exclusive right to supply water throughout the Luxor Governorate. While there are pros and cons to exclusive rights (i.e., the trade off between promoting some development of water production by private industry, the excess of which could be sold to HCLC at rates less than it would cost to build a new facility, or allowing the concessionaire a complete natural and regulated monopoly to ensure recovery of his investment), the existing law appears to give the controls necessary to restrict the activities of other public water suppliers in the area through the issuance of licenses. It does not, however, address the production of private sources of water supply and it would be a policy decision as to whether this should also be restricted. If restrictions are desired, an amendment or new law or regulation would seem to be required.

The relevant law is Law No. 27 for 1978, On Organization of Public Sources of Potable Water and Water for Human Use. Article 2 of the law prohibits the establishment of a) any public water source or b) the installation of any connections provided for the supply of water from any public source, without first obtaining the necessary license from the Minister of Housing, Utilities and Urban Communities. (Article 2) Public water source includes “any source of water to be established for obtaining drinking water or water for use by human beings and for distribution to a group of individuals . . .” (Article 1) Establishing a private source of water for anything other than drinking water - such as for a manufacturing process - would not be restricted by this law. If such restrictions were desired in order to give the concessionaire exclusive rights to all water, this would need to be amended. It is questionable how efficient such restrictions would be, however.

This law contains several other provisions which are relevant here. It provides a right of access to private property in order to make the required connections for public water supplies. This right specifically applies to both the government and private concessionaires. (Article 4) Licensing fees for installations and the terms, conditions and technical specifications are established by decree of the Ministry of Housing, Utilities and Urban Communities. (Article 5) This may need to be changed to allow the private party more autonomy as to these matters. The law also requires compliance with health laws, designates the Ministry of Justice as the enforcement authority and sets the criminal penalties for any violations. (Articles 6 through 11)

Participation of Employees

A final law which relates to employees is one which requires the election of workers to boards of public sector units, joint stock companies and private companies. (Law No. 73 of 1973) A similar requirement is found in Public Business Sector Law No. 203, which requires the board of directors to include a number of elected employees as members. However, the new investment law seems to repeal the requirement of employees on boards of public sector units, but still requires a showing of worker participation in management of the company. (Article 14) This would not appear to be an unduly burdensome requirement to a private operator.

Environmental compliance

One of the laws impacting a private party’s expansion of water production and services is Law No. 4 for the Year 1994, the Law for the Environment, and its related executive statutes. This law requires an environmental impact assessment to be conducted by the Environmental Affairs Agency before the issuance of any license required for conducting business or establishing a new facility. (Article 19 of the

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Law; Article 10 of the Executive Statutes) Thus, the concessionaire would be required to obtain an environmental impact assessment from the agency before it could expand its capacity through a new plant, and also possibly before it could lay new pipes. Further research in this area should be conducted.

Law No. 4 does not regulate activity connected with the Nile River, which falls under Law No. 48 of 1982. Law No. 48 primarily deals with discharges into the Nile, including provisions such as the prohibition against re-using ditch water directly or adding it to potable water for any purpose for which it is not suitable. (Article 12)

Annex 3: Index of Laws Relating to Private Participation in Water Utilities

Laws Regarding Concessions

A. Concerning Public Utilities Concessions: Law Number 129 of 1947

Prohibits public utility concession in excess of 30 years. (Article 1)

Grantor of concession may reconsider prices based on concession contract. (Article 2)

Profit limited to 10% annually, after amortization. Profits in excess of 10% reserved for future when profits are greater than 10%. After 10% reserved, excess amounts used for capital improvements or lowering prices, as determined by Grantor. (Article 3)

Grantor may “always” change the organization of the utility and the prices, and then compensate the concessionaire. (Article 5)

Unforeseeable conditions affecting profits or finances of utility allow the grantor to change prices or organization to eliminate excess profits. (Article 6)

Grantor controls “establishment” and “progress” of the utility (including technical, administrative and financial matters). *Grantor can appoint reps within the utility’s departments who report back. (Article 7)

No attachments can be made against the utility (Article 8 bis) (from amendment by Law 538 in 1955)

B. On the Granting the Concessions which are Connected with Investment of Natural Wealth Resources and Public Utilities, and the Amendment of Concession Conditions: UAR Presidential Decree Number 61 of 1958

Presidential decree required to grant or change concession - Concessions shall be granted or amended as to the person, scope, duration, royalties by presidential decree, following National Assembly’s approval. (Article 1, from decree law 152 in 1950)

Minister may change any other conditions - “concerned minister” may issue a decree changing any other conditions.

The New Investment Law

**A. Promulgating Law on Investment Guarantees and Incentives (By the President):
Law Number 8 of 1997**

Fiscal privileges and exemptions, and other guarantees and incentives, of existing companies are not derogated by this law. (Article 2) Maintained until expiration date in legislation or other agreement.

“Administrative Quarter” to be established by presidential decree to implement the law and will replace the Investment Authority. (Article 3 of the Promulgation)

Supersedes 1989 Investment Law (Number 230), except part of Article 20. (Article 4)

Prime Minister to issue Executive Statutes within 3 months. (Article 5) (See Page 4 herein)

B. Law on Investment Incentives and Guarantees (by the People’s Assembly)

Law applies to all companies and installations established after the effective date, including those in “[t]he infrastructure comprising drinking water, drainage water, electricity, roads and communications.” (Article 1)

When there is a company involved in multi-purpose activities, the investment guarantees and incentives are only available to the portion of its business that is among the listed activities. (Article 2)

Law does not derogate better guarantees provided in other legislation. (Article 3)

Models and forms of incorporation documents to be issued by a decree of the Prime Minister. “A decree of the competent administrative quarter” [the Governor] issues the license to incorporate. (Article 4)

An administrative quarter [the Governor] shall allocate lands owned by the State or public juridical individuals and conclude contracts on behalf of the “concerned authorities.” Administrative quarter obtains licenses on behalf of companies from the Authorities. (Article 5)

Criminal actions regarding Article 9 of Law no. 38 of 1994 concerning the regulation of dealing in foreign currencies “shall be submitted after consulting the view of the competent administrative quarter.” (Article 6)

Settlement of disputes regarding implementation of this law is as agreed upon with the investor. Disputes among private parties involved are delegated to a number of different Egyptian and non-Egyptian forums. (Article 7)

Investment Guarantees

Companies will not be nationalized or confiscated (Article 8), or sequestered or their property seized. (Article 9)

No Administrative Quarter shall interfere with the pricing or products or profits. (Article 10).

Licenses cannot be revoked unless infringed upon, and then must be done by the Prime Minister and the party can challenge it. (Article 11)

Company may own and possess the necessary land and buildings regardless of nationality or place of domicile of partners. (Article 12)

Imports needed for operation, etc., can be imported without recording in the Register of Importers, and finished products can be exported without recording them. (Article 13)

Certain provisions of Law No. 159 of 1981, Law on Joint Stock, Partnership Limited by Shares and Limited Liability Companies, do not apply. (Article 14)

Workers' Representation on board of Public Sector Units may not be required, but should show mode of workers' participation. (Article 14)

Numerous tax incentives are provided to a new company, which may or may not apply to a concessionaire. Further clarification is needed here. (Articles 16, 20, 21, 23 and 24)

State-owned lands or lands owned by public juridical persons may be appropriated free of charge by a decree of the Cabinet upon recommendation of the Minister. (Article 28)

Lengthy section on public and private free zones to be run by the Administrative quarter. (Articles 29, 30) Does not apply to Beheira.

C. Executive Statutes of The Law No. 8 of 1997 (By the Prime Minister)

Conditions and Limitations - engaging in the "establishment, operation, and management of water distillation and drinking water filtration stations, as well as their distribution networks and water pipelines. (Article 1, Paragraph 10)

Activities prescribed in Article 2 of the Financial Lease Law No. 95 of 1995 come under this law. (Article 1, Paragraph 12)

Existing license requirements still apply under the new investment law. Further research needs to be conducted to determine if the concessionaire will need specific licenses. (Article 2)

"Investment and Free Zones Authority" shall verify Articles of Partnership and upon request shall verify Articles of Incorporations of joint stock company or limited partnership. (Article 5)

The Company's Incorporation License shall be issued by the Investment and Free Zone Authority once all the filing requirements have been met. (Article 8)

Participation of workers is through a Support Administrative Committee, to be formed by a Decision of the Company's Board of Directors, from representatives of the workers. (Article 14)

Appropriation of Land - "The Governor or his delegated assignee shall be the administrative quarter concerned with concluding the deeds for State-owned land or land owned by juridical persons, which are required for the companies and establishments, on behalf of the concerned authorities, after getting the competent Minister's approval on such appropriation..." The Governor shall get all the necessary licenses on behalf of the companies and establishments that are necessary for establishing, managing and operating them. (Article 22)

Laws Governing Public Business Sector Companies

A. Holding Companies

Forms of articles of agreement and articles of association for public sector business companies. (Prime Minister's Decree Number 1900 of 1991, relating to holding companies)

Establishing a company - An Egyptian Holding Joint Stock Company may be founded by virtue of Prime Minister's Decree. (Article 1)

Authority of Holding Company - it may establish affiliate and other joint stock holding companies, buy or sell shares of Joint Stock Holding Companies, form and manage the Company's securities portfolio including all financial items or assets, "carry out all dispositions, assignment and alienation acts that should assist in realizing all or part of the Company's purposes" (Article 3)

Effects of any disposition (i.e., payment from the sale of facilities) reverts to the company, exclusively (i.e., not to the treasury or Ministry of Finance). (Article 30)

B. Public Sector Workers; Promulgating the Law on Public Sector Workers: Law Number 48 of 1978

Wages - set by an attached schedule of wages. (Article 22)

Job classification and evaluation schedules - approved by the company's Board of Directors. (Article 22)

Transfer - "Without his approval, a worker may not be transferred to a similar position, or a position he fulfills the requirements of filling it, in another company within the same Sector, or another Sector, or a company affiliated to the Administrative machinery of the State, or the public Organizations and Authorities, providing as well the approval of both the unit he is transferred from and the one he is transferred to, is obtained." Transfers must be by the "Authority" having competence to endorse the appointment. (Article 52)

Board of Directors can order a transfer if the employee "does not fulfill his requirements" of any position in his group to another position in the same grade and maintain his seniority. (Article 53)

By Prime Minister decree, a worker may be transferred from one sector to another if he does not fulfill the requirements of any vacant position in his sector or if he is deemed to be redundant at the company where he is working. (Article 54) High Council Chairman may transfer a worker under the same conditions within the sectors supervised by the council.

C. Applicable Public Company Law; Public Business Sector Law. Some provisions of this law may apply to BWC. Further clarification is needed here. Law Number 203 of 1991

Laws Concerning Property Ownership

A. Ownership by Non-Egyptians; Organizing the Possession of Built Realities and Vacant Land by Non-Egyptians (superseded by new investment law): Law Number 230 of 1996

This law restricted the ownership rights of non-Egyptians, including natural persons and “any company - whatever it’s legal form - in which the majority of its capital is not owned by Egyptians.” (Article 1) He was restricted to two private dwellings, neither of which exceeded 4,000 square meters. This restriction was supposed to be “without derogation to his right of possessing the realities necessary for exercising his special activity as authorized thereby by the competent Egyptian Authorities.” (Article 2) This suggests that he can own the property related to his licensed activity. The new investment law permits outright ownership without restriction against foreigners and therefore appears to supersede this law.

B. Original Expropriation Law; Expropriation for Public Purposes (superseded by new investment law prohibiting expropriation): Law Number 577 of 1954, As Amended By Law Number 13 of 1962

Laws Specifically Addressing Water Utilities

A. Potable Water; On Organization of Public Sources of Potable Water and Water for Human Use (promulgated by the President): Law No. 27 For 1978

“Public Water Source” - “any source of water to be established for obtaining drinking water or water for use by ‘human beings’, and for distribution to a group of individuals whether in return for a countervalue, or for no return, or for purposes of foods and drinks industries for sale to the public.” (Article 1)

“Private source” is anything else.

Prohibition - makes it unlawful to establish any public water source or install any connections provided for the supply of water from any public water source except after obtaining a license from the department specified by the Ministry of Housing and Reconstruction. (Article 2)

Water must meet department of health standards or the responsible person must take steps to correct. (Article 3)

Whether a state or concessionaire, utility company may go onto private property to install pipes for public water supply. Enforceable by the Governor. (Article 4)

Ministry of Housing, Utilities and Urban Communities sets licensing fees for installation with a maximum of LE20, terms and specifications, conditions and technical specifications regarding the connections. Further research is needed to determine if the concessionaire would be bound by this rate. (Article 5)

Ministry of Justice is responsible for enforcing infractions of the law, civil and criminal penalties are set out in the subsequent articles. (Article 8)

B. Public Economic Authorities for Potable Water; Setting up a Public Economic Authority for Potable and wastewater in Some Governorates. [NOTE: This does not apply to Beheira but was the basis of the El Sharkia project involving private participation and is discussed in the legal analysis.]: Presidential Decree Number 281 of 1995

Public Economic Authorities (“PEA”) shall be set up in the governorate listed and shall be attached to the governor, with its own corporate personage, under the provisions of the Public Authorities Law. (Article 1)

The PEA is responsible for projects and works of potable and wastewater, including running, operating and maintaining the potable and wastewater networks. All physical properties belong to the PEA, including the right to exploit them. PEA is responsible for general and detailed projects and works; administration and operation and maintenance, expansion, support (materials and equipment); research studies in areas of engineering, economics and funding; designs, supervision of implementation, contracting; announcement of projects under tenders and biddings; contracting; participating in the preparation of standardization of criteria for potable water and drainage.

Board of Directors of PEA includes members from PEA, legal representative, other related agencies representatives, representative of the governor, representative of NOPWASD, two private experts. (Article 3)

Board of Directors - “supreme authority predominating its affairs and handling its operations” - subject to Public Authorities Law - and “undertake what is deemed necessary and suitable. . . to achieve the purpose for which [it was] established” including: propose general policy; propose projects; internal rules and regulations, organizational resolutions regarding financial and administrative affairs (without confinement to the governmental rules and systems); annual budget draft, final accounts, balance sheet, investment budget of PEA; training centers to increase productive efficiency; contract loans, accept grants, donations; follow up of periodical reports presented as to work progress and finances; propose rules and pricing tariff to achieve balance between revenue and costs in accord with local programs, which may be under strength of Cabinet Decree. (Article 4)

Chairman may represent PEA regarding third parties and in court (Article 6)

Meetings of Board every month and governor is Chairman if he participates. (Article 7)

Governor approves all Board resolutions before they become operative. (Article 8)

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Resources of PEA: revenues, appropriations from State Budget or Government Budget, loans, grants. All funds received are considered “public funds.” (Article 10)

Funds received remain in special account. (Article 12)

Employees of the entity are all transferred to PEA, with civil servant status, and all appropriations in the operation of the plant, etc., separated from other agencies (Article 13).

All assets transfer to PEA from the Governate. (Article 15) Administrative attachment law is available. (Article 16)

Every provision in conflict is superseded. (Article 17)

Laws Related to Passing New Legislation

A. September 1971 and May 22, 1980: The Constitution

1. Responsibilities for New Legislation/Regulation People’s Assembly

Every draft law shall be referred to one of the committees of the Assembly which will study it and submit a report concerning it. Draft laws presented to members of the People’s Committee shall not be referred to these committees unless they are first referred to a special committee which will study them and give an opinion on the suitability of their consideration by the Assembly and after the Assembly decides to consider them. (Article 10)

Every member of the People’s Assembly shall have the right to propose laws. (Article 109)

President

The President of the Republic shall have the right to promulgate laws or object to them. (Article 112)

The President shall have the right to propose laws. (Article 109)

The President of the Republic shall issue the necessary regulations for the implementation of the laws in the manner that would not modify, delay, or exempt them from execution. He shall have the right to vest others with the authority to issue them. The law may determine whoever issues the decision requisite for its implementation. (Article 144)

The President of the Republic shall issue control regulations. (Article 145)

In case it becomes necessary during the absence of the People’s Assembly, to take measures which cannot suffer delay, the President of the Republic shall issue decisions in this respect which have the force of law. But the laws must be submitted to the Assembly within 15 days after recess or no longer have the force of law. (Article 147)

The Government

Prime Minister and his Deputies, lower Ministers and their Deputies form the Cabinet. (Articles 153 and 155)

Prime Minister shall implement laws and decrees; issue administrative and executive decisions to implement laws; prepare draft laws and decrees; supervise implementation of laws. (Article 156)

2. Responsibilities for Policy and Planning The People's Assembly

Planning - The People's Assembly shall approve the general plan for economic and social development. The manner of the preparation and of its submission to the People's Assembly shall be determined by law. (Article 114)

After inauguration of Prime Minister, he shall submit a program of his Government to the People's Assembly, which is entitled to discuss such a program. (Article 133)

The President

Policy - The President of the Republic, in conjunction with the Cabinet, shall lay down the general policy of the state and shall supervise its implementation in the manner prescribed in the Constitution. (Article 138)

Authority over Ministers - The President shall appoint the Prime Minister, his deputies, the Ministers and their deputies and relieve them of their posts. (Article 141)

Attending Cabinet meetings and chairing them - The President shall have the right to convoke the Cabinet and to attend its meetings. He shall also preside over the meetings he attends and is entitled to demand reports from the Ministers. (Article 142)

The Government

Policy - The Cabinet shall lay down the general policy of the State in collaboration with the President; direct, co-ordinate and follow up the work of the ministries and their different administrations as well as public organization and institutions; prepare the draft of the State's overall plan. (Article 141)

Specific ministers' responsibilities - The Minister shall be the Supreme chief of his ministry. He shall undertake the laying down of the Ministry's policy within the limits of the State's General Policy and shall undertake its implementation. (Article 157)

3. Responsibilities for Budget/Finances

The People's Assembly

The draft general budget of the State shall be submitted to the Assembly at least two months before the beginning of the fiscal year. It shall not be considered in effect unless approved by the assembly. (Article 115)

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Each chapter of the draft budget shall be voted upon separately and shall be promulgated by law. The People's Assembly shall not make modifications in the draft budget except with the approval of the government.

The approval of the People's Assembly shall be considered necessary for the transfer of any funds from one title of the budget to another, as well as for any expenditure not included in it or in excess of its estimates. These shall be issued by law. (Article 116)

The law shall determine the provisions regulating the budgets and accounts of public organizations and institutions. (Article 117)

The final account of the State shall be submitted to the People's Assembly within a period not exceeding one year from the date of the expiration of the fiscal year. (Article 118)

Each title shall be voted on separately and issued by a law.

The annual report of the Central Agency for Accounting and its observations must be submitted to the People's Assembly. The Assembly has the right to demand from the CAA any data or other pertinent reports.

The President

No specific articles on budget/finance.

The Government

The Cabinet shall prepare the draft of the general budget of the State; contract and grant loans in accordance with the rules of the Constitution. (Article 156)

Local Administration

Egypt is divided into administrative units of "legal persons" - governorate, cities and villages. Other units may be established having "legal person" status. (Article 161)

Local People's Councils - administrative units gradually formed by direct election, half must be farmers and workers. Law prescribes how they are formed, their guarantees, and their role in preparing and implementing the development plan and in controlling various activities. (Article 162)

National Specialized Councils

Established by Presidential decree to assist in planning general policy. (Article 164)

B. Local Administration; Amending Certain Provisions of the Local Administration Law, Promulgated by Decree, Law Number 43 for 1979: Law Number 9 For 1989

“Special regulation for certain towns having special significance” can be promulgated after a presidential decree and cabinet approval on the basis of a proposal of the Minister concerned with local administration. [NOTE: doesn’t seem applicable here.]

C. The Law of Local Government; The structure of local government may be an important consideration in establishing an objective regulatory board: Law Number 50 of 1981.

Laws Concerning the Environment

A. The Nile River; Regarding Protection of the River Nile and Waterways from Pollution: Law Number 48 of 1982

Nothing exceptionally restrictive or especially applicable. Designates Ministry of Health as responsible for testing wastewater entering the Nile.

B. Related to the Above Law; The Executive Regulation of Law Number 48 of 1982 Regarding the Protection of the River Nile and Waterways from Pollution: Decree Number 8 of 1983

C. Related to the Above Law; Regarding the Amendment of Certain Provisions of the Ministerial Decree No. 8 for 1983: Decree Number 9 of 1988

D. Environmental Impact Assessments; Promulgating the Law concerning Environment: Law Number 4 of 1994

An environmental impact assessment would be required before building any new facilities and before any license to build was issued.

Laws Concerning Private Participation in other Infrastructure Sectors

A. Electricity: Law Number 100 of 1996 Amending Law No. 12 of 1976 Concerning The Establishment of The Egyptian Electricity Authority

Passed by the People’s Assembly but signed by the President.

Egyptian Electrical Authority has the power to buy and sell electricity. (Article 2)

Egyptian Electricity Authority has the power to effect all disposals and works that are liable to realize the purpose for which it was established. May contract directly with banks, persons, local and foreign organizations. (Article 7)

Concessions may be granted to local and foreign investors for establishment, management, operation, and maintenance of power generating stations, without being restricted by the earlier concession laws. Competition for the concession must be open, concession must not exceed 99 years, there must be a means of supervision and technical and financial follow-up.

Cabinet decree grants the concession upon proposal of the Ministry of Electricity and Energy, and sets its terms and conditions.

B. Airports: Law No. 3 of 1997 Awarding The Public Utility Concession For The Establishment And Exploitation of Airports and Landing Grounds

Awarding the Public Utility Concession

Concessions may be awarded to Egyptians and non-Egyptians, natural and juridical, for establishment, preparations, management, maintenance, servicing, exploitation of airport and landing grounds (the “build” and “operate” part of a BOOT) or the operation, management, maintenance, servicing, exploitation of existing airports and landing grounds (the “operate” part only), without regard to the restrictions of the earlier concession laws. (Article 1)

Competitive bidding for concession.

Time period is 99 years.

Concessionaire responsible for technical and financial supervision.

Concessionaire collects charges and fees in accordance with the rates in the concession document.

No attachment will levied against the property. (Article 3)

Concessionaire responsible for maintenance to keep property fit throughout the duration of concession. Everything returns to the State after the period of the concession. (Article 4)

Concession granted by decree of the Cabinet upon the approval of the concerned minister and returned by the “concessionaire to the State at the end of the concession period. (the “transfer” part) (Article 5)

C. Port Activity; Permitting the Private Sector to Exercise the Activity of Mechanical, Shipping and Unloading at Alexandria Harbor (recommended by the Ministry of Maritime Transport): Decree of The Ministry of Transport And Communications No. 30 of 1996

Egyptian Private Sector Companies may exercise the activity of mechanical shipping and unloading at Alexandria, and perform all works connected with this activity after obtaining a license from the Ministry of Maritime Transport - provided it is a joint stock company headquartered in Egypt. (Article 1)

Alexandria Port Authority has exclusive control over dealing with the companies and shall propose rates to the Ministry of Transport and Communications, who will set the rate by decree. Rate is then fixed for 5 years. (Requires the rate to be all inclusive, but does not say that it will be cost based.)

Annex 4: Illustrative process specifications: Potable water and wastewater treatment

Potable Water

The treatment process required for raw water taken either from the Nile River or pumped from Lake Nasser would be as follows: Raw water would be pumped to a flow equalization/settling tank. The exact capacity and required detention time would be determined pending the results of water quality tests. The water would then flow to a coagulation and flocculation tank, where an induced chemical reaction would take place in order to destabilize colloidal particles. Flocculation or slow mixing would be introduced to the water to promote the agglomeration of the destabilized particles. Pending the results of water quality tests, if the water needed to be softened, then lime would be fed into the coagulation and flocculation tank via a chemical injection system. From the coagulation and flocculation tank the water flows, via gravity, to two circular clarifiers where the settlement of the destabilized particles occur. The “clarified” water then passes over a perimeter weir into a filter surge tank. From the filter surge tank the water would be injected with a chlorine water solution. Following this initial disinfection application of chlorine, the mixture would pass through a bank of pressure sand filters to aid in the removal of color, tastes, odors, iron and manganese. The filter system would have automatic backwashing. The filtered water would then be injected with a second dose of the chlorine/water solution for final disinfection. The potable water would then be stored in appropriate storage tanks.

Water treatment, storage, and distribution systems will be designed and constructed according to standards and specifications of the American Water Works Association (AWWA). The treatment system will be designed to provide the maximum daily demand of Phase I development, including all irrigation and fire protection demands. New potable water storage tanks will be sized to provide three days’ water supply; this will allow uninterrupted service in case of disruptions in production due to maintenance or power problems. Water quality will meet or exceed United States Environmental Protection Agency and World Health Organization drinking water quality standards.

Wastewater

The operation of the wastewater treatment plant is described as follows: Raw sewage is pumped by the lift stations of the collection system through a bar screen and grit removal chamber and then into a flow equalization basin, where it is aerated and mixed. Flow equalization will provide mass loading surge protection from peak flow periods. From there, the wastewater is pumped into the aeration tank distribution box, where it is mixed with return activated sludge to provide the required biomass, and then equally distributed via gravity piping to two aeration tanks. The aeration tanks will provide a total of 24 hours aeration for the average daily flow. The aeration process will keep odor at from the aeration tanks, the aerated (biologically treated) waste stream overflows a weir into the clarifier distribution box, where it is equally distributed via gravity piping to two bridge supported primary type, circular clarifier and sludge collectors.

The settled (clarified) effluent goes into a filter surge tank, where it is then pumped through a pressure sand filtration system. The filter system will have automatic backwashing. The filtered effluent then goes to a disinfection tank, where it is mixed with a solution of sodium hypochlorite. The filtered effluent remains in the disinfection tank for 3.0 minutes. From the disinfection tank, the effluent (non-potable water) is then piped to several non-potable water storage lakes located around the site. The backwash

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flow from the filtration system is reintroduced into the treatment process at the flow equalization tank. The settled sludge from the clarifiers is piped via gravity and head to the excess solids holding tank or aerobic digester. The sludge will be aerated and stored for 10 to 15 days. The aerated sludge will then be pumped back into the treatment process at the aeration tank distribution box. The excess sludge will be wasted at the landfill. The treatment plant containment structures will be constructed of cast-in-place, reinforced concrete.

Annex 5: Infrastructure Cost

Improvement	Cost/Unit (LE)	# of units	Total cost (LE)	Comments
Potable Water				
Treatment plant for New Luxor	62,000 cu. m/day, at 69,000,000 LE	1.1 (69,120 cu. m./day)	76,000,000 LE	Secondary Cities project cannot be assumed to contribute to new growth outside the Luxor City center
Treatment plant for El Toad	62,000 cu. m/day @ a 69,000,000LE	1	69,000,000 LE	Can be partially offset by reuse of wastewater for irrigating the golf course
Piping system from treatment plants to New Luxor and El Toad	Cost per person, @300LE	200,000	60,000,000 LE	Can be done in increments to serve 20,000 people each, at 7,000,000LE each increment
Subtotal			205,000,000 LE	
Wastewater				
Treatment for New Luxor and El Toad	52,000 cu m/day total volume, 75,000,000 LE	1	75,000,000 LE	Additional facilities for New Luxor, El Toad , and the cruise ship port will have to be constructed by 2020, at 52,000 cu. m/day when additional facilities will be needed, at 20,000 cu. m./day. Flows in El Toad will not significantly affect total treated, at only 3 - 3.5% of all effluent treated
Wastewater Collection Network for New Luxor	City of 200,000, @ 45,000,000 LE	1	45,000,000 LE	Can be done in increments for city unit size of 20,000 population, @ 5,000,000LE
Wastewater Collection Network for El Toad	City of 20,000, @5,000,000 LE	1	\$5,000,000 LE	
Subtotal			125,000,000 LE	
Electricity				
Power Supply for New Luxor and El Toad	85 MW	1	230,000,000 LE	85 MW of new demand is forecast, to be met either by a new generation station or by a new line to High Aswan power plant can be phased in at

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Improvement	Cost/Unit (LE)	# of units	Total cost (LE)	Comments
				30,000,000LE per 10,000 MW El Toad's demand is approximately 12 MW of the total
Electrical network for new Luxor and El Toad	City of 200,000, @ 120,000,000 LE	1.1	131,000,000 LE	Can be done in increments of 20,000 person neighborhoods, @ 14,000,000 LE
Subtotal			361,000,000 LE	
Transportation				
Roads network for New Luxor	City of 200,000, @ 17,000,000 LE	1	17,000,000	Can be done in increments for neighborhoods of 20,000, with associated connecting roads, @ 17,000,000 LE each
Roads network for El Toad	City of 20,000, @ 2,100,000 LE	1	2,100,000 LE	Assumes that developers will pay for all but road connecting with other sites, with network approximately the same as for a small city of full time residents.
Upgrade 14 km of road to El Toad	890 LE /LM		12,460,000	Four lanes with parking and sidewalk
Subtotal			31,560,000 LE	
Telecommunications				
Telecommunications	Central exchange board and 50,000 total lines, 10% of which are international, @ 15,000,000 LE	5	75,000,000 LE	Private sector funding El Toad will have about 8-10% of the lines, virtually all of them international The eventual cost of upgrading the cellular phone equipment will be 6,000,000 LE
Subtotal			75,000,000 LE	
Total			797,560,000 LE	

Annex 6: Analysis of solid waste in New Luxor and El-Toad

On Site Storage

As the development grows, reliable waste storage systems must be implemented. Solid wastes are stored and transported through public living areas and have great potential for adversely affecting the quality of the environment. The environmental impact of a sound solid waste management system (collection and disposal) begins with on-site storage. Improperly stored waste may attract insects and rodents, present fire hazards, be visually unattractive, and produce odors and other unsightly conditions. On-site storage involves the use of proper containers to minimize these possible adverse effects. Various containers are available: galvanized steel cans, plastic cans' plastic and paper bags, steel bulk containers and mechanized trash compactors. The following chart shows a comparison of advantages and disadvantages of each. The frequency of waste collection should be maximized in order to reduce as many of the adverse effects of on-site storage as possible.

TABLE 18: ADVANTAGES AND DISADVANTAGES OF RESIDENTIAL WASTE STORAGE CONTAINERS

Alternative	Potential Advantages	Potential Disadvantages	Conditions which Favor Alternative
Paper or Plastic Bags	Lessens lift weight Reduces spillage and blowing litter Eliminates empty cans at curb Eliminates odors and necessity to dean dirty cans Limits vector attraction Increases speed and efficiency of collection Reduces contact of collector with waste	Curbside Collection Bags break when too fall Not suitable for bulky, heavy, or sharp objects	Curbside collection

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Alternative	Potential Advantages	Potential Disadvantages	Conditions which Favor Alternative
Metal or Plastic Cans [20-32 gal (75-120 L)]	Reasonable size for collector to lift Economical and reusable	Must be cleaned regularly when not used with liners Lids may be lost or fail to fit after use Cans may be left at curb for unreasonable periods	Backyard collection Animal population that open Bags
Bulk Containers for Mechanized Collection	More efficient than manual collection	Residents oppose storage of other people's waste on their property	Space for container
Drums [55 gal (208L)]	None	Lower collection efficiency Excessive weight can result in back injury and muscle strain Difficult to handle Lack of lids allows insects to breed in waste and odors to escape Rust holes at bottom of drum allow rodents to feed on waste	Unacceptable Alternative

Alternative	Potential Advantages	Potential Disadvantages	Conditions which Favor Alternative
Stationary Storage Bins	None	Inefficient-must be emptied manually Lack of proper cover leads to insect and rodent infestation Necessity for hand shoveling of wastes poses health hazard to collectors	Unacceptable Alternative

Waste Collection

Waste collection involves the selection of vehicles and their routing to 401 most efficiently collect the solid wastes generated. Solid waste collection is one of the most visible services provided to the inhabitants of an area. Solid waste collection can be accomplished through public, private, or mixed public-private service.

Public Collection: Public solid waste collection is conducted by municipalities which retain control of administration and/or operations of the system. Public systems are comprised of either minimal collection or contract collection. Under municipal collection, public employees using publicly owned equipment collect waste. Contract collection is a system in which waste is collected by a private firm under contract to a municipality. The Contractor owns the equipment, furnishes the employees, and manages operations.

Private Collection: Private solid waste collection is where collection services are not provided by a governmental agency. The collection fees of the private firms are paid directly by the customer. Private collection offers little public regulation of collection practices. The level of service is arranged between the customer and the collector.

The following chart lists some advantages and disadvantages of both public and private solid waste collection services:

TABLE 19: ADVANTAGES AND DISADVANTAGES OF PUBLIC AND PRIVATE WASTE COLLECTION SERVICES

Alternative	Potential Advantages	Potential Disadvantages	Conditions Which Favor Alternative
PUBLIC			
Municipal	Tax-free Non-profit Economies of scale Municipality has administrative control Can institute separate collection for recycling Can institute mandatory collection Management and policies continuous, resulting in experienced personnel and permitting long-range planning Records can be kept over a long time	Monopolistic Limited incentives to improve efficiency Financing and operations often influenced by political constraints Frequently financed from general tax fund and subject to 1-year budgeting process Solid waste management often low priority item in budget Labor pressures may result in inefficient labor practices and strikes or inflated labor costs Restrictive budget policies may affect equipment replacement and maintenance	Past history of unsatisfactory contractual operations for public services Public predisposition toward government operation of public services Quality of service provided more important criterion than economics
Contract	Competitive bidding for contract(s) helps keep prices down Municipality retains administrative control Can institute separate collection for recycling Can institute mandatory collection	Danger of collusion in bidding contractors Public agency must regulate contractors	Flexibility to make change in operations that would result in labor savings and other cost reductions Availability of qualified private contractors Public pre-disposed toward private sector involvement in public services Newly incorporated communities, or communities where population growth is outpacing ability of community to provide public services
COMBINATION OF PUBLIC AND PRIVATE			
Municipal system and	Competition helps	Could be	Municipality is

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Alternative	Potential Advantages	Potential Disadvantages	Conditions Which Favor Alternative
private firms under contract	keep prices down Alternative available if either sector cannot deliver service Municipality had administrative control can institute separate collection for recycling	administratively or jurisdictionally complex	expanding through annexation or merger with other jurisdictions Changing from separate garbage and trash collection to combined collection
PRIVATE ARRANGEMENTS			
Private collection	Competition may reduce costs Self-financing	No public administrative control Danger of collusion among haulers Cut throat competition can result in business failures and service interruptions Overlapping routes, waste of fuel Cannot institute city wide separate collection for recycling Difficult to enforce mandatory collection ordinances	Municipality not interested in refuse collection

The level of service is set by the frequency of routine collection and the type of service offered. Solid waste collection frequency and scheduling are principally matters of health, aesthetics and economics.

Residential collection service levels vary; however, once-weekly collection is the standard interval. The more frequently wastes are collected, the greater the collection costs. The majority of residential services are curbside collection. Curbside collection requires the resident to place waste containers at curbside or alleyside on the specific collection day.

Commercial collection service is a specialty service with the collection frequency based upon waste volumes and types. Putrescible type wastes should be collected more frequently than non-putrescible wastes. Large institutions such as hospitals, hotels and retail centers may require daily collection.

The collection equipment should be suited to the characteristics of the collection area. Service levels, crew size and route characteristics should be considered when selecting the collection and transportation vehicles. For residential service, the rear loading type collection vehicle is the most prevalent choice. The rear loading vehicles are suited to densely populated areas, where stops are frequent and waste volumes are high. The commercial collection vehicle most often utilized is the residential type rear-loading vehicle equipped to handle the larger bulk containers of commercial establishments.

Solid Waste Processing

The processing of solid wastes, due to the waste composition and character, requires considerable attention in applying the various unit processes. The recovery and reuse of solid wastes for energy recovery and production offer a direct economic benefit and lessen the demands on disposal requirements. The converting of solid waste into usable energy is a function of the waste's heating value (or energy content). Municipal solid waste can be burned without auxiliary fuel in their as received state. However, the processing and storing of wastes to minimize their moisture content and reduce their non-combustible content can greatly improve the waste's fuel quality.

The initial unit process that the solid waste will undergo will be shredding. Shredded solid wastes yield a number of advantages:

- a. Volume Reduction
- b. Reduced Vector Problems
- c. Reduced Fire Hazard
- d. Reduced Odor Potential
- e. Reduced Litter Problems

The next phase of solid waste processing involves the separation of waste materials. Some common separation methods include:

- a. Magnetic Ferrous Separation
- b. Air Classification
- c. Trammel Screening

There are several energy recovery technologies available for use with municipal solid wastes, they include the following-

- a. Waterwall Incineration
- b. Modular Incineration
- c. Refuse - Derived Fuels
- d. Pyrolysis
- e. Landfill Gas Recovery

Following separation, including by-product recovery and volume reduction, solid wastes are stabilized for final disposal. Disposal of solid wastes will be in the landfill west of New Luxor, which will be established in Phase I.

Sanitary Landfill

During Phase I, a landfill site will be established as discussed in Section IV. The landfill will be located above the alluvial plains to the northeast of New Luxor. A 170-feddan tract will be reserved for sanitary landfill purposes, and this area will be sufficient to contain the solid waste generated by long-term development on the El-Toad Plateau for a period of approximately 20 years.

Annex 7 Analysis of Fuel usage in New Luxor and El-Toad

Fuels put in use during Phase I include liquid propane gas, gasoline, diesel fuel, and aviation fuels (Jet A and AV-gas). Use of these fuels will be expanded as the development grows. As discussed previously, bulk fuel storage tanks will be constructed at the docks for storage of LP gas, gasoline, and diesel fuel during Phase I. Aviation fuels will be received at the docks and pumped to bulk fuel storage tanks at the airport. This configuration considers that the majority of fuel supplies will arrive by tanker or barge. Facilities will exist at fuel storage areas for unloading and loading tanker trucks. This will allow shipment of fuels by truck to New Luxor and from New Luxor to additional fuel storage tanks at each node in the El-Toad Plateau. All fuel storage tanks and piping systems will be designed and constructed according to American Petroleum Institute (API) standards. All fuel storage areas will be constructed with secondary containment dikes, specialized foam type fire protection systems, and storm drainage routing systems which will contain an oil water separator, to prevent accidental discharge of hydrocarbons into the environment. Storage and handling of fuels will be increased as required during long-term development.

Liquid Propane Gas

Liquid propane gas is expected to be used throughout the development. Uses for LP gas will include cooking, water heating, laundry dryers, and steam boilers. Long Term development will include residential uses as well. Distribution piping networks are not feasible -with this gas, so that smaller steel storage tanks must be located at each point of use, and delivery to each individual storage tank will be made by a tanker truck. Use of LP gas for as many applications as possible will help to reduce electrical demands at the site.

Gasoline

The bulk storage tank at the New Luxor docks will continue to provide gasoline for all locations on the El-Toad Plateau. The primary use for gasoline will be automobiles and small trucks. A fueling station will be located near the bulk storage tank, as well as at various retail locations throughout the city and the El-Toad Plateau. Fuel will be delivered by tanker truck to storage and dispensing facilities.

Diesel Fuel

The bulk storage tank at the New Luxor docks will serve as a dispensing and distribution point for the entire El-Toad Plateau. Tanker trucks will distribute diesel fuel to individual storage tanks and dispensing stations at each node and at retail locations throughout the El-Toad Plateau. The primary uses for diesel fuel will be for cars, large trucks, and diesel powered electric generators.

Natural Gas

Long term development fuel consumption levels may dictate that a cross-country natural gas pipeline be considered. This pipe line would probably extend from Aswan to the El-Toad Plateau along the new highway. A piping network would need to be looped around the El-Toad Plateau, and distribution piping installed along roadways at each node. If this is determined to be economically feasible, natural gas could replace liquid propane gas for many applications.

Advanced Technologies

To supplement the power generation plant described elsewhere in this report, the following list of candidate alternate energy/power systems which can cost effectively provide a significant portion of the projects energy/power requirements has been developed:

- Solar Power Tower (SPT)
- Wind Turbine System (WTS)
- Solar Concentrating Collector (SCC)
- Photovoltaic Building Facade (PVF)
- Photovoltaic Concentrator Electric Generator (PVC)
- Stirling Engine Electric Generator (SEE)
- Extensive Ground Source Solar/Thermal Heat System (EGS)
- Solar Non-Concentrating Collector (SNQ)
- Fuel Cell Electric (FC)

Each of these candidate-advanced technologies has its specific advantages, disadvantages, risks and rewards. Attached at the end of this section is a brief fact sheet on each of these advanced technologies which outlines the critical elements for selection for each candidate technology.

As a preliminary assessment of these advanced technologies, the following Advanced Technology Candidate Quantitative Evaluation Matrix has been developed.

Based on the preliminary climatological data which is available for the proposed site, preliminary load analysis and the evaluation factors listed in the matrix, there are several advanced technology candidates which warrant further consideration.

The Office of Energy and INFRASTRUCTURE of the United States Agency for International Development has developed the Energy Project Development Fund (FUND) to provide financial support for pre-feasibility and feasibility studies leading to the development and application of environmentally-sound energy technologies designed to solve energy problems of developing countries.

The FUND may share with eligible applicants up to 50 percent of the cost of pre-feasibility and feasibility studies.

To be eligible for award under this program, the applicant must be either:

1. A U.S. company with a controlling interest of not less than 51% held by U.S. citizens, such as energy and environmental equipment suppliers, engineering firms utilities and their subsidiaries, and private power developers.

2. A public agency or other public sector entity from a developing country (Egypt is on the approved aid-assisted country list) working with U.S. companies.

An award from this firm would defer up to 50% of the cost required to accomplish the pre-feasibility, feasibility and schematic design of the power generation and delivery system including advanced technologies that will be required for this project.

ADVANCED TECHNOLOGY CANDIDATES

QUANTITATIVE EVALUATION MATRIX

(Scale of 1 to 10. 10 is best.)

Advanced Technologies	Maturity	Available	Environmental	Cost	Impediments	Total	Rank
SPT	4	1	10	3	1	19	9
WTS	9	9	10	7	9	44	2
SCC	9	8	10	5	4	36	4
PVF	8	8	10	4	4	34	5
PVC	6	5	10	4	5	30	6
SEE	5	5	7	5	5	27	8
EGS	6	7	10	8	7	38	3
PC	5	7	5	5	6	28	7
SNC	8	9	10	10	8	45	1

SOLAR POWER TOWER

MATURITY	The first generation operated from 1982 to 1988. The second generation is under active development for 10 MW operation in early 1996 with 1000°F molten salts.
SUPPLY SOURCES	Several engineering and utility companies participating to supply 100 to 200 MW systems by 1999.
ENVIRONMENTAL COST PER UNIT	None during operation. Some hazards with handling molten salts. Estimated cost is \$2,000 per peak kW when completely Commercialized.
FUEL SOURCE	Direct solar (back up required). Extensive solar thermal storage required to carry through peak periods.
PROGRAM STATUS	Very developmental, but fully funded by U.S. DOE and 15 utility companies.
MAJOR IMPEDIMENT	Natural gas peaking generators cost and lack of environmental sensitivity.

**WIND TURBINE
SYSTEMS**

MATURITY	First generation extensively tested by U.S. DOE through 1981. Second generation larger rated units now under test by Pacific Gas & Electric.
SUPPLY SOURCES	U.S. Wind Power Company Sea West, Inc., Boeing, Westinghouse, General Electric and United Technologies.
ENVIRONMENTAL COST PER UNIT	Noise from rotors and visual pollution. \$2,000 to \$3,000/KW
FUEL SOURCE	Class seven wind speeds, (7 meters/second) (back up required).
PROGRAM STATUS	Third generation 7 MW, 400-foot rotor generators are under design and test.
MAJOR IMPEDIMENT	Consistent wind power source, land cost.

**SOLAR
CONCENTRATING
COLLECTOR**

MATURITY	Very mature. Extensively tested by U.S. DOE through Mid-1980's.
SUPPLY SOURCES	Numerous international sources for 3 meter trough Limited sources for concentrating dish.
ENVIRONMENTAL COST PER UNIT	None during operation. \$2,500 to \$3,000 per kW.
FUEL SOURCE	Global solar (back up required).
PROGRAM STATUS	No current federal support. High temperature thermal considered to have excessive operating deficiencies.
MAJOR IMPEDIMENT	Cost/benefit validation and operating hardware difficulties.

**PHOTOVOLTAIC
BUILDING FACADE
MATURITY**

PV cells fully mature. No facades in U.S. Under construction in Europe.

**SUPPLY SOURCES
ENVIRONMENTAL**

Multiple for PV cells. Several for facades.

COST PER UNIT

None during energy production.

FUEL SOURCE

\$5 per facade watt (\$50/ft)

Global solar (back up required).

PROGRAM STATUS

National Research Energy Laboratory planning program to stimulate commercialization. Many PV cell production facilities.

MAJOR IMPEDIMENT

Cost even with full maturity.

**PV CONCENTRATOR
ELECTRIC GENERATOR**

MATURITY

A commercial prototype and a demonstration is near at hand. System relatively mature.

SUPPLY SOURCES

At least two major industrial concerns are prepared for manufacture and deployment.

ENVIRONMENTAL

None during energy production.

COST PER UNIT

\$10 per kWh

FUEL SOURCE

Direct solar (back up required).

PROGRAM STATUS

The Electrical Power Research Institute, utilities and U.S. Department of Energy have had system under development for a number of years. Program moving into pre-commercial phase.

MAJOR IMPEDIMENT

Cost/benefit validation and commercial production.

**STERLING
ENGINE
ELECTRIC
GENERATOR**

MATURITY Under development for decades. Require demonstration.
No technology limitations.

SUPPLY SOURCES At least four designs. Three major commercializations.

ENVIRONMENTAL Low but hybrid operation would produce CO' and NOX.

COST PER UNIT \$1,500 per kW (\$.04/KWH)

FUEL SOURCE Direct solar and natural gas.

PROGRAM STATUS Sandia (DOE) conducting program to stimulate Commercialization. No current production facilities.

MAJOR IMPEDIMENT Final development and commercialization funding

**EXTENSIVE
GROUND SOURCE
SOLARM
THERMAL HEAT
SYSTEM
THERMAL
SUPPLY**

MATURITY Glazing material, ground heat pump/supply and ground thermal storage all very mature. Integration of above.
Requires analysis, prototype and demonstration.

SUPPLY SOURCE Numerous sources for all.

ENVIRONMENTAL None during operation.

COST PER UNIT Less than \$10 per square foot (produces 625 BTU per day).

FUEL SOURCE Global solar (back up required).

PROGRAM STATUS No current federal support. Ground storage well developed in Europe. Proposed as DOE and University of Massachusetts process heat system. Under test in Atlanta, Sandia and maybe National Research Energy Laboratory.

MAJOR IMPEDIMENT Funding to conduct program to validate integrated technology expectations.

**SOLAR NON-
CONCENTRATING
COLLECTORS
THERMAL SUPPLY
MATURITY**

Very mature. Active and integrated collector storage (ICS) systems fully commercialized. Active validation in U.S. completed in Florida. ICS testing in process.

**SUPPLY SOURCES
ENVIRONMENTAL
COST PER UNIT**

Numerous active and ICS suppliers in the U.S.
None during operation.

**FUEL SOURCE
PROGRAM STATUS**

\$20 per square foot (produces 625 BTU per day on annual basis).

Global solar (back up required).
ICS requires major commercial demonstration Application. Proposed as DOE and University of Massachusetts process heat. Competitive with electric thermal sources in U.S.

MAJOR IMPEDIMENT -

Natural gas lows prices and lack of environmental sensitivity.

**FUEL CELL ELECTRIC
AND
THERMALSOURCE
MATURITY**

Under research, development and pre-commercial demonstration for many years. No technology limits. Reasonably mature, but still evolving.

**SUPPLY SOURCE
ENVIRONMENTAL
COST PER UNIT
FUELSOURCE**

United Technology, Westinghouse and several others.

Medium with generation of CO₂ and NO_x.

\$1,500 to \$2,500 per kW.

Natural gas now, hydrogen later.

PROGRAM STATUS

Very active program in U.S. DOE, EPRI and GRI.
Several different material technologies in development.

MAJOR IMPEDIMENT

Technology selection and commercialization
Demonstration.

Annex 8 The National Plan for the Development of the South of Egypt, 2017¹⁶

South Of Egypt Strategy, 2017

The Government of Egypt's general strategy for the development of Egypt over the coming two decades calls for a “Comprehensive Development” approach; not only at the sector level but also at the regional level. This strategy has received specific focus in those regions that have received equitable development resources. This strategy attempts to transform these regions into “population attracting” ones and also to achieve a better and balanced population distribution outside the inhabited Valley.

Within the framework of this general strategy, several national projects have been planned and are currently underway. At the forefront of these are the National Project for the Development of Sinai, the National Project for the Development of the South of Egypt, the National Plan for Rural Development and others.

Objectives:

These National Projects share a number of objectives:

- To boost the private sector’s role in development and to create a favorable environment for private sector participation;
- Mobilizing Governorates’ resources for effective utilization at both the local and national levels;
- To achieve balanced development for various Governorates and resolve problems resulting from population and activities centralization;
- To achieve an equitable distribution of investments and services among Governorates; and
- To offer the chance for regional institutions for effective participation in development activities.

Strategic Directions:

The major strategic directions for Comprehensive Development are:

1. To raise the real growth rate of GDP to an average of 8% annually;
2. To create more than 12 million jobs;
3. To construct about 4 million housing units;
4. To provide potable water to each settlement, no matter how small it is and to provide sewerage facilities and treatment in all cities, districts and villages;
5. To achieve complete absorption (full enrollment?) in primary education, to eradicate illiteracy and to lower classroom density in all education levels to about 30 students per class;
6. To develop and upgrade universities, emphasis on scientific research and linkages to community and development needs.
7. To improve health indicators, emphasis on preventive health;
8. To disperse population outside the inhabited Valley to achieve balance and emphasizing rural development as one of the bases for national development;
9. To reclaim and cultivate around 2 million feddans;
10. To develop industries at a real growth rate between 10% and 14%;
11. To increase attention given to tourism and tourism infrastructure to reach an overall tourism flow of 15 million in 2012 and around 129 million touristic nights;
12. To increase generated electricity;
13. To upgrade and improve road networks, railroads and telecommunications; and
14. To gradually increase rural citizens’ participation in the development process.

¹⁶ Ministry of Planning, *Summary National Plan for the Development of the South of Egypt to the Year 2017*, February 18, 1996 (in Arabic).

Background

The South of Egypt encompasses two planning regions:

1. South Upper Egypt Region: including the Luxor City, Governorates of Sohag, Qena, Aswan, and the southern part of the Red Sea Governorate, and
2. Middle Upper Egypt Region (Assiyut Region): including the Governorates of Assiyut and El Wadi El Gedid (New Valley), in addition to the remainder of Red Sea Governorate.

The overall area of the South of Egypt is slightly more than half the total area of Egypt. However, the population of the area is no more than 10 million inhabitants, or 17% of total Egypt's population. Most of this population is concentrated in the Nile Valley whereas only less than 0.25 million reside in the Red Sea and El Wadi El Gedid Governorates.

The region encompasses one of the two major areas for out migration; that is, Assiyut, Sohag and Qena where population density is very high. The Red Sea is the only Governorate positively impacted by migration. With proposed developments, it is expected that the total population of the South of Egypt would reach approximately 16.2 million inhabitants by 2017.

Principals and Objectives

The principals and objectives of the National Project for the Development of South of Egypt are summarized as:

- Improvement locals' living standards and minimizing economic and social gaps between them and the rest of Egypt's population;
- Transforming promising zones of this region into attracting areas for activities and population;
- Exploring new horizons for agriculture, industry and tourism to participate in national development;
- Attracting the private sector to participate and support the development of the region;
- Contribution to the resolution of security problems within the framework of economic and social development;
- Improvement of comprehensive development management and local administration and supporting local administration.

Development Potentials

Economic Resources:

Tourism represents one of the most important activities in the South of Egypt region. There are two main types of tourism: cultural tourism in antiquity sites in Luxor and Aswan and resort and water sports tourism in Hurghada and along the Red Sea shores.

The South of Egypt encompasses some 1.3 million feddans of agriculture land, primarily in the governorates of Assiyut, Sohag, Qena and Aswan. Agriculture land, on the other hand, is minimal in the two desert governorates of El Wadi El Gedid and Red Sea. However, these two governorates hold the largest potential for land reclamation. El Wadi El Gedid governorate, alone, has some 365,000 feddans of land suitable for reclamation. The other four governorates, between them, hold some 951,000 feddans of land suitable for reclamation.

The South of Egypt also includes two major fishing grounds, namely Lake Nasser and the Red Sea shores.

The region is also rich in its mineral resources, particularly in the southern parts of the Eastern Desert: gold, copper, iron, phosphate, zinc, lead and others, in addition to quarries for marble, granite, white sands and gypsum. El Wadi El Gedid governorate has the richest deposits of phosphate in Abu Tartour.

Although processing industries do not constitute a major element of the region's economic structure, the region is not void of some important industries such as sugar in Qena and Aswan, aluminum in Nagaa Hammady (Qena), cement in Assiyut and fertilizers and chemicals in Aswan.

Human Resources:

Governorates of the South of Egypt region enjoy a pool of human resources that can aid in the establishment and operation of many productive projects, which will lead to considerable social and economic improvements in the region.

Tourism

Major Issues:

- Importance of diversifying the tourism product.
- Support/Expand Nile tourism.
- Upgrading and landscaping of antiquity sites and environmental preservation.
- Importance of integration and linkages between tourism areas in El Wadi El Gedid, Red Sea and the Western Desert.

Sector Objectives:

- Achieving effective utilization of tourism resources, with emphasis on existing infrastructure and public utilities.
- Directing tourism development away from congested, fast growing areas to alleviate environmental pressures on natural and cultural resources.
- Definition of tourism centers with promising potentials to accommodate tourism growth in the region.
- Achieving integration among tourism areas through linkages between circulation networks.
- Distribution of tourism products and their integration among different areas.

Planned Projects to 2017:

Tourism Accommodation:

Projected new accommodation for the South of Egypt is estimated at 228,000 new rooms, 88% of which in the Red Sea mainly for resort and recreational tourism and 11% in Aswan and Luxor for historic tourism. These new rooms are distributed as follows:

TABLE 20: PROJECTED NEW TOURISM ACCOMMODATION IN THE SOUTH OF EGYPT, 2017

<u>Governorate</u>	<u>No. of Rooms</u>	<u>%</u>
Assiyut	375	0.16
Sohag	724	0.32
Qena	800	0.35
Luxor	9,259	4.07
Aswan *	15,741	6.9
Red Sea	200,000	87.92
El Wadi El Gedid	575	0.27
Total	227,474	100.00

* Inclusive of cruise ships with new capacity of up to 5,000 rooms.

Luxor:

- Construction of a Nile docks complex.
- Establishment of a golf course and areas for recreational facilities.
- Construction of a Nile port south of the City.
- Streetscape and paving of city roads.
- Shading areas on the West Bank.

Aswan Governorate:

- Construction of a repair and maintenance center for Nile ships.
- Improvement and upgrading of roads leading to antiquity sites in the cities of Aswan, Kom Ombo, Esna and Edfu.
- Construction of a new dock in Aswan and repair of existing ones.
- Streetscape of roads leading to hotels.
- Construction of a bridge over the Nile.
- Construction of Kalabsha bridge and Kalabsha Institute.

Red Sea Governorate:

- Development of Sahl Hashish area.
- Development of Ras Benias area.
- Development of Marsa Alam area.
- Development of Abu Soma area.
- Development of Wadi El Gemal area.

Assiyut Governorate:

- Construction of a cruise ships port and development of docking area.
- Upgrading and landscaping of antiquity areas around Mir area.
- Completion of the Assiyut Wadi road.
- Construction of a bridge on Nagaa Hammady El Sharkeyia.
- Grading and paving of the governorate's roads.
- Construction of a fence for the touristic project in El Haggameyia.

Sohag Governorate:

- Paving of Akhmim area roads.
- Expansion of El Baliana dockings and completion of the Corniche.
- Completion of Akhmim cafeteria.

Qena Governorate:

- Establishment of a control, communication and rescue center.
- Construction of a cruise ships port.
- Corniche Qena bridge.
- Construction of gates at Qena entrance.
- Construction of gates at Esna city entrance.
- Completion of El Kallabeyia Canal Corniche.
- Development of Dandara Temple area.

El Wadi El Gedid Governorate:

- Establishment of an advanced center for desert safari in El Dakhla and El Kharga, in addition to recreational and facilities areas.
- Establishment of an emergency and accidents medical center.

Urban Fabric and Development

The National Plan for the South of Egypt aims to put in place new bases for the urban fabric an structure so that the Nile would become a major source of water but the only attracting factor influencing the urban structure. The objective being to re-distribute population in a way that preserves the Valley and allows use of desert and coastal stretches that have not received their fair share of development.

Spatial Distribution of Population:

The population of the South of Egypt resides in a total of 867 settlements, a third of which (303 settlements) are of more that 10,000 inhabitants each – as of January 1994 – accommodating nearly 70% of the total population. The remaining settlements (564) accommodate about 30% of the region's population. These two facts put together indicate the concentration and imbalanced distribution of population. Further, nearly 86% of the population are concentrated in the three governorates of Assiyut, Sohag and Qena. Luxor, El Wadi El Gedid and Red Sea accommodate only 4% of the population and the remainder 10% resides in Aswan.

The continuation of this pattern will lead to either of two possibilities, or both:

- The South of Egypt will continue to be a rebelling region for population leading to more pressures on the northern regions, or
- More agricultural lands will be encroached upon for urban development and land holdings will be further fragmented.

Projected Urban Structure, 2017:

While redirecting population growth outside the narrow Valley remains a driving objective, the establishment of new communities in desert areas requires substantial investments. Therefore, the projected urban structure have been based on a number of assumptions:

- Population growth rates will remain low.
- Preservation of existing agricultural lands and the antiquities.
- Preservation and safeguarding the environment.
- Integration between the South of Egypt and the rest of the country's regions.
- Gradual change in the urban structure and concentrated growth at the edges of the Valley.

The main bases for the proposed urban structure are:

- Creation of two corridors parallel to the Valley at the edge between agriculture and desert serving as a starting point for attracting growth through environmentally sound plans.
- Creation of west-east corridors in the Eastern Desert linking the Valley to the Red Sea and start development of new communities along these corridors.
- Development of large cities at the edges of desert; that applies for Assiyut and Qena.
- Preservation of the touristic character of both Luxor and Aswan by absorbing growth in New Aswan and New Luxor cities and enforcement of laws and regulations that safeguards the protected zones in these two areas.
- Emphasis on the development of Al Owinat – Kom Ombo – Bernis corridor to become an international circulation route, and encourage urbanization along it through the development of new communities.
- Urbanizing El Wadi El Gedid and development of most existing settlements and creation of large urban centers in six main cities: El Farafra, Abu Tartour, Moult, Shark Al Owinat, Paris and El Kharga.
- Development of the Red Sea coast in an environmentally sound approach. Safaga and Bernis are to absorb 40% of population. New communities are to be established away from the coast to accommodate industrial and commercial growth to safeguard the shores.

The projected spatial distribution of population would be as follows:

- Settlements of less than 10,000 inhabitants, in 530 villages all of which in the Nile Valley governorates.
- Settlements of 10,000 to 100,000 inhabitants, mainly urban ones, totaling 289 towns.
- Settlements of more than 100,000 inhabitants. These are eight (8) main cities in the Valley governorates including Assiyut and Qena (more than 400,000 inhabitants), Sohag and Aswan (250,000 to 400,000 inhabitants) and Luxor, Guerga, Tahta and Akhmim (100,000 to 250,000 inhabitants). This group of settlements will accommodate nearly 12% of the total region's population, or 10% of the expected growth.
- Existing settlements to be developed: including 62 towns and villages, 23 of which in the Valley and the remainder in El Wadi El Gedid and Red Sea. This group will accommodate 2.1 million inhabitants (13.3% of total population, or 21.4 of the expected growth).
- New agricultural settlements: this group is linked to land reclamation and expected to accommodate 1.35 million inhabitants, primarily in El Wadi El Gedid and Aswan representing 8% of the region's population, or 20.7 of expected growth.
- New towns: including 27 new town totaling 2.15 million inhabitants and ranging from 25,000 to 250,000 person/town. This group includes some of the towns that are currently being developed: El Safa in Assiyut, New Sohag/Akhmim, New Luxor and New Aswan. These towns will accommodate 13% of the region's population, or 32 of expected growth.

To accommodate the expected population growth, and to substitute for loss in existing urban stock, nearly 1.69 million new housing units will have to be constructed.

Agriculture

Major Issues:

1. Imbalance between cultivated land and population, especially in the governorates of Assiyut, Sohag, Qena and Aswan.
2. Small agriculture land holdings depriving the sector from large-scale economics.
3. Low productivity per feddan.
4. Decreasing agricultural lands due to all sorts of encroachment.
5. Inefficiency of transportation and storage facilities leading to an increasing loss of crops.
6. Imbalance between livestock and poultry production and population.
7. Minimal fishery production compared to the fast fishing ground available in the region.
8. Minimal available investment resources.

Sector Objectives:

- Horizontal expansion in agriculture with the reclamation of nearly 1,25 million feddans.
- Increase economic revenue of available agricultural resources, which will be reflected in an increase of production and individual's share of income.
- Increase agricultural production through development and upgrading of current production systems.
- Increase both self-sufficiency ratio of strategic crops and, export of other crops.
- Increase the added value of agricultural production through industrial and agricultural integration, especially in newly reclaimed lands.
- Creation of more job opportunities.
- Increase the inhabited area of the region/nation through relocation in newly reclaimed lands.
- Building the capacity of the private sector through the establishment of large companies to allow for optimum utilization of agricultural resources.

Planned Projects to 2017:

Vertical Development Projects:

These projects aim to increase the productivity of existing agricultural lands:

- Inventory and classification of lands: in light of recent changes to soil characteristics.
- Soil Improvement.
- Generalization of covered drainage systems.
- Improvement of irrigation system.
- Completion of substitution and renewal of the High Dam and Aswan Dam infrastructure/facilities.
- Support research in the field of high-value crops.
- Veterinary Care projects.
- Agricultural marketing.
- High-productivity seeds production.

Horizontal Development Projects:

In light of current and foreseeable ground and water resources, some 600,000 feddans can be reclaimed, using primarily Nile water and partially underground water, in the Nile Valley and adjacent desert lands and in some areas of the Red Sea governorate. 350,000 feddans can also be reclaimed on underground water East of Owinat and the oases of Kharga, Dakhla and Farafra. Additionally, about 300,000 feddans can be reclaimed south of the El Wadi El Gedid (Paris) on Nile water, through a new canal to be dug.

Livestock Development Projects:

Fodder resources in newly reclaimed lands is estimated at 16 million tons (green fodder) which is enough for nearly 1 million units. In light of these resources, the private sector can be encouraged to invest in these projects in newly reclaimed lands.

Development of Fishing Resources:

This projects aim to increase fish production from around 45,000 to 70,000 tons. The program includes:

- Construction and development of fishing ports on the Red Sea, improvement of the current fishing fleet and intensive cultivation of natural and man-made lagoons.
- Establishment and development of incubators for Lake Nasser supply, three incubators in Garf Hussein, Amada and El Alaqui areas and construction of fishing ports inclusive of ice factories, refrigerators and services that facilitate handling.
- Fish incubation/cultivation in cages in lagoons and small bays along the Nile and canals is an important means to increase fish production.

Potable Water and Sewerage

Potable water

The overall capacity of water plants in the region is 960,000m³/day whereas current needs are estimated at a total of 1,340,000m³/day – assuming an average consumption rate per individual of 115 liter/day and 190 liter/day for rural and urban residents, respectively.

Water plants are located in Assiyut, Sohag, Qena and Aswan. There are no plants in either the Red Sea or El Wadi El Gedid governorates; the former depends on pipelines from Suez and El Korimat.

The National Project for the Development of the South of Egypt aims at raising the average consumption rate to 200 liter/day and 240 liter/day per individual in rural and urban areas, respectively.

Sewerage

The National Project for the Development of the South of Egypt aims at raising the average rate of sewerage to approximately 192 liter/individual/day, or nearly 2.9 million m³/day.

Social Services

Strategic Objectives

- Provision of basic facilities to correspond to expected population growth so as to raise the standard of facilities in the region.
- Meeting the expected needs of settlements in promising areas of the region.
- Achieving an acceptable level of balance in the distribution of facilities and services between rural and urban areas and between populated and remote areas.
- Raising the standard of quality and improve operation.

Planned Projects, 2017

Educational Facilities

1. Increase the carrying capacity of primary and secondary schools by increasing number of schools and classes, which will lead to:
 - meeting expected needs,
 - lowering class density to 30 students/class,
2. Increase number of teachers and upgrade general and technical education curriculum.
3. Emphasis on women's education and eradication of illiteracy.
4. Achieving an acceptable balance in distribution of educational facilities between different areas of the region.
5. Application of new approaches in education that are more suitable to the region's characteristics and needs.
6. Expansion in one or two primary schools in rural and remote areas.

7. Move towards community colleges, rather than new universities, as being more suitable to the local community's needs.
8. Upgrading of technical and technological institutes in Aswan and transform them into a technological university.

In light of these, the demand for educational facilities to the year 2017 is estimated as:

- Establishment of nearly 55,300 primary classes (general and Azhar education), 32,500 prep. Classes and 26,400 secondary classes (general, technical and Azhar).
- Establishment of 20 community colleges in areas not served by university colleges or higher institutes (2 in Assiyut and Sohag, 4 in Qena, Aswan and El Wadi El Gedid, 3 in Red Sea and 1 in Luxor City).
- Upgrading technical institutes in Aswan and transforming them into a technological university.
- Completion of the South of the Valley University (5 colleges, one of which for Agriculture and one for tourism and antiquities in Qena).
- Rehabilitation of Assiyut University.

Scientific and Technological Research

- Establishment of regional research branches for the Ophthalmic Research Institute.
- Completion of the National Institute for Marine Science and Fishery in the Red Sea.
- Establishment of Magnetic Observatory and Regional Earthquake Center in Aswan and a main center in El Wadi El Gedid.

Health Facilities

The main objectives for the development of this sector are summed as:

- Emphasis on eradication of health illiteracy, especially in rural and desert areas.
- Provision of health facilities in remote areas and reliance on mobile health units.
- Emphasis on the importance of recording births and deaths, especially in infancy.
- Support of targeted health programs, such as combating malaria, diarrhea and vaccination campaigns.
- Quality and quantity upgrading supporting medical services such as nursing and tests.
- Expansion of the social health insurance umbrella to cover the entire population.
- Achieving an acceptable balance in distribution of medical and treatment facilities between urban and rural areas and between the region's governorates.
- Encouraging the private sector to build hospitals, clinics and medical centers.
- Support the privatization of an acceptable percentage of hospital beds for nominal fees.

The total number of beds needed by 2017 is estimated at 46,000 beds.

Religious Facilities

The strategy aims to the expansion in provision of these facilities to relatively deprived and new development areas, in addition to making available the human resources required for these facilities.

Culture, Information and Youth and Sports Facilities

The development objectives for these sectors are as follows:

- Increase the number of establishments, especially in higher-density governorates.
- Emphasis on cultural centers and convoys and mobile libraries to serve desert and rural areas, in addition to emphasis on information (media) centers and convoys and the establishment of a sufficient number in each governorate.
- Expansion in establishing youth and sports facilities, especially in Assiyut and Sohag.
- Making available the human resources required and training these resources.

Social Care Facilities

- Family and Childhood projects to reinforce the role of the family and its educational effectiveness.
- Emphasis on productive families projects and vocational training, bringing to the front the role of local associations in organizing local efforts.
- Support the role of social and rural units in providing social care facilities in rural and deprived desert areas.

Vocational Training Facilities

Expansion in vocational training facilities to meet the needs of development projects.

Electricity and Energy

Sector Plan, 2017:

This plan aims to extend the National Grid to remote areas of Red Sea and El Wadi El Gedid governorates, at a total of 4,400km in length of lines. 3,200km of these will be high-voltage power lines and the majority of these will be in El Wadi El Gedid (1,670km) and the Red Sea (770km). The plan also aims to raise the capacity of existing power plants by 750 Mega Watt.

TABLE 21: PROJECTED INCREASE IN ELECTRICITY GENERATION, SOUTH OF EGYPT, 2017

<u>Governorate</u>	Power Plant	Nominal Capacity (Mega watt)	Notes
Assiyut	El Walideyia Thermal	300	Third expansion
	Assiyut Barrage Hydroelectric	40	New
Qena	Nagaa Hammady Hydroelectric	60	New
	Nagaa Hammady Thermal	270	New
Aswan	Diesel Plants (Abu Simbel)	20	Expansion
Red Sea	Diesel Plans	60	New
Total		750	

Following are projects for transformer stations and lines:

- 20 new transformer stations of 500, 2020 and 132 KVolt with a total capacity of 3,825 Mega Volt Ampere.
- 38 new transformer stations of 66 and 33 KVolt with a total capacity of 2,425 Mega Volt Ampere.
- Power lines of:

- 500, 220 and 132 KVolt at a total length of 3.192km.
- 66 and 33 KVolt at a total length of 979km.

Studies are currently underway to investigate the potential of unconventional and renewable energy sources such as solar energy, wind and the biomass.

Transportation, Communication and Storage

Sector Objectives:

- Improve the effectiveness of transportation axis in the Valley with utmost preservation of agricultural lands through the following means:
 - Minimizing intersections between roads and between roads and railroads in as far as feasible.
 - Improve the effectiveness of Cairo – Aswan railroad, once doubled, by improving communications and signals and increasing the speed limit.
 - Improve the effectiveness of the Nile navigational channel by dredging, construction of Nile ports and cruise ship ports together with maintenance and repair facilities for cruise ships.
- Creation of a new corridor parallel to the Valley in the form of a new western desert road to absorb expected growth in traffic volumes and to encourage urban development, with linkages to the Valley.
- Creation and improvement of perpendicular axis to the Valley as a means of population redistribution:
 - Safaga – Qena – El Wadi El Gedid as the prime corridor
 - Bernis – Aswan – west coast of Lake Nasser – Abu Simbel – Shark Al Owinat
- Emphasis on Qena area as the intersection point between the Valley and the new prime corridor.

Planned Projects, 2017:

- Construction of new roads at a total length of 2,945km, most important of which is the extension of Cairo – Assiyut west desert road to Aswan.
- Maintenance and rehabilitation of 2,760km of existing roads.
- Cancellation of 30 intersections between roads and between roads and railroads.
- Construction and maintenance of 1,200km of internal roads in governorates.
- Completion of three bridges across the Nile: Assiyut, Luxor and Aswan.
- Construction of four new bridges across the Nile at Quos, Guerga, Tama and Kom Ombo.
- Construction and improvement of about 90 passenger station in the governorates.
- Completion of doubling the railroad to Aswan.
- Re-routing of the railroad in Luxor City.
- Upgrading of Safaga and Bernis ports and small fishing ports.
- Construction and improvement of five cruise ship ports on the Nile.
- Upgrading and development of international airports in Hurghada, Luxor, Aswan and El Wadi El Gedid, and construction and improvement of domestic airports in Assiyut, Farafra, Al Dakhla, Al Owinat, Abu Simbel and Shalateen.
- Upgrading of telephone switch boards in cities and villages, and microwave lines.
- Construction and upgrading of post offices, radio and TV broadcasting stations and meteorological stations.
- Construction of a grain cell in Qena with a capacity of 100,000 tons.

Industry and Mining

Major Issues:

Statistics of late 1993 indicate that total number of employees in industry and mining in governorates of the South of Egypt reached some 82,000, representing about 1.6% of the region's total population. This percentage rises to 2% in Qena and Aswan and declines to only 0.8% in El Wadi El Gedid whereas the national average is 3.9% (7%, 7.4% and 8.3% in Cairo, Alexandria and Damietta, respectively).

It is, therefore, clear that governorates of the South of Egypt require substantial support to increase their share of industrial and mining activities, especially with their wealth of resources.

Sector Objectives

- Increase growth rates, in general, in the South of Egypt and create more job opportunities.
- Effective use of available resources in each governorate.
- Improve the economic structure in favor of industry and mining and broaden the private sector participation in the development of this sector.
- Minimize out-migration trends from these governorates and, moreover, to transform them into attracting centers.
- Raising the technology level and, accompanying that, education, training and scientific research standards.

Planned Projects to 2017

Projects Based on Agriculture Resources:

- Expansion in sugar industry through expansion in cultivating and processing of sugar beets in addition to rehabilitation and renewal of existing factories.
- Establishment of paper mills and factories based on sugar-cane fibers (creating some 3,000 jobs).
- Better utilization of palm trees resources especially in El Wadi El Gedid.
- Crop drying factories, especially for onion in Assiyut, Sohag and Qena through small units near farms.
- An integrated complex for food oils, hydrated fats and fodder from sunflower seeds (investment cost LE 2 billion).
- Factories for cotton fabrics, garments and textiles in cotton-producing governorates.
- Fish processing and packaging and fodder factories especially in Lake Nasser area, and fishing boats and gear manufacturing.
- Other food processing factories: dairies, juices, jam in addition to traditional and non-traditional fodder.
- Wood and leather products.
- Packaging material.

Projects Based on Mineral Resources:

- Completion of Abu Tartour Phosphate complex.
- Production of bi-ammonium phosphate near Safaga port, with a capacity of 250,000 tons per year and a cost of LE 516 million
- Application of the Chinese experience studies in Qena – establishment of small cement factories, each with one production line, or two at most, with a capacity of 44,000 tons annually to fulfill the needs of remote areas.
- Introduction of the “small mine” concept.
- Building material industries.
- Industries that are based on deposited material.
- Electricity insulator industries

In addition to projects that will be established in the designated 11 “Industrial Zone” projects throughout the South of Egypt.

Petroleum and Natural Gas

Major Issues:

The major issue in this sector is the lack of infrastructure in most areas of current agreements and those under negotiations as they are remote, uninhabited areas and, consequently, the substantial expenditures required for provision of infrastructure.

Sector Objectives:

- Production of petroleum and natural gas at rates suitable for both local and export demands without over-use of reservoirs to maintain national reserves.
- Setting up and implementation of a clear policy for distribution of petroleum products without bottlenecks.

Planned Projects to 2017:

In the Field of Petroleum Agreements:

- Negotiate and sign more agreements with international companies and the Egyptian private sector to work at new areas at the borders of these governorates.

In the Field of Exploration:

- Concentrated efforts and work, especially in areas of current agreements and those under negotiations.

In the Field of Refineries and Processing:

- Continue work on rehabilitation, upgrading and expansion of the Assiyut refinery.

In the Field of Distribution and Transport:

- Installation of pipelines to cover the rest, or most, of the region’s governorates for various uses (domestic and industrial) and, construction of more car services stations and propane-gas filling and distribution centers; in addition to infrastructure projects that go with these projects.
- Studies have also proven the importance of installing a 24 inch pipeline, connected to the national network near El Saff, heading south to Aswan with a total length of about 860km and a capacity of 240q.ft./day in an estimated investment cost of LE 825 million. This project will serve existing and future industrial units along the route in addition to development efforts in Upper Egypt.
- Installation of a diesel pipeline from Assiyut to Aswan to serve new industrial zones and power plants, in addition to a propane-gas line in Upper Egypt to serve residential settlements.

Commercial and Banking Services

Planned Commercial Services, 2017

- Adding about 620 wholesale establishments, creating some 2,480 jobs at an investment cost of nearly LE 62 million.
- Adding about 38,220 retail outlets, creating some 51,162 jobs at a cost of nearly LE 764 million.

Banking Facilities

Major Issues

- Low density of banking facilities in the region’s governorates.
- Concentration of banking units in the four State-owned banks.

Infrastructure Development for New Luxor and El Toad

- Low rate of effectiveness in banking units.
- Low saving capacity (average saving/individual is nearly 0.2 of the national average).
- Low role of banking units in credit.

Planned Projects, 2017

Adding about 116 banking units, with 7,630 jobs at an estimated investment cost of LE 174 million.

Employment and Population

- The total number of job opportunities projected for the South of Egypt to the year 2017 is estimated at 2.8 million jobs, about 68% of which in agriculture, industry and tourism.
- The corresponding population to these jobs is estimated at 6,3 million, which mean an increase in the region's population from 9.9 million in 1994 to about 16.4 million in 2017.

TABLE 22: PROJECTED JOB OPPORTUNITIES

	Assiyut	Sohag	Qena	Luxor	Aswan	Red Sea	El Wadi El Gedid	Total
Agriculture	27	21	48	3	180	3	140	422
Industry, Mining, Petroleum	254	2242	321	21	240	66	56	1,200
Tourism	3	3	9.2	6.1	39.8	30.6	208.3	300
Sub-total	284	266	378.2	30.1	459.8	99.6	404.3	1,922
Social & Public Facilities	34	36.4	55	11	29.6	29.6	35.4	231
Other Facilities	104	103	128	16	187	79	52	669
Total	422	405.4	561.2	57.1	676.4	208.2	491.7	2,822

TABLE 23: ANALYTIC INDICATORS

Total new jobs	2,822
Estimated unemployment	227
Net new jobs	2,595
Corresponding population	6,264
Current population (1994)	9,980
Natural increase	13,246
In migrants	2,998
Total Population, 2017	16,244

Investments

TABLE 24: INVESTMENTS OF THE NATIONAL PROJECT

Sector	Investment Cost	
	LE Billion	%
Tourism	52.9	17.3
Agriculture	23.9	7.8
Industry and Petroleum	82.7	27.1
Urban Development & Housing	94.2	30.9
Electricity and Energy	7.3	2.4
Transportation & Communications	18.5	6.1
Potable Water and Sewerage	9.0	3.0
Commercial and Banking	1.9	0.6
Social	14.5	4.8
Total	304.9	100

Annex 9 GOE Privatization Policy¹⁷

At the turn of this decade, Egypt chose to liberalize its economy and enable its private sector to take the lead in generating growth and employment. Major strides have been taken to revamp conditions for market entry, operations and exit of businesses, by rebuilding and consolidating the infrastructure and dismantling bureaucratic barriers and streamlining procedures to make the Egyptian economy an open and internationally integrated market.

The GOE is currently targeting to achieve an annual growth rate of 6-7% by the end of the century. GDP grew at some 5% between 1996 and 1998 – up from an average of 3.5% over the previous three years – giving a clear signal of the success of the GOE’s reform policies.

On the fiscal side, the budget deficit has been reduced significantly to 0.9% of GDP in 1996/97, down from 20% prior to the reform program, with a substantive revenue effort and significant expenditure restructuring and reduction achieved through downsizing the Government’s activities and implementing lasting structural improvements. Tax administration has greatly improved, and the economy is currently moving from a general sales tax towards applying a full value added tax.

TABLE 25: SELECTED ECONOMIC INDICATORS¹⁸

	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	Estimated 1997/98
Real GDP Growth Rate	1.9	2.5	3.9	4.7	4.3	5.0	5.0
Inflation (average)	21.1	11.1	9.0	9.3	7.3	6.2	3.8
Unemployment	9.2	10.0	9.8	9.6	9.2	8.8	N/A.
Fiscal Deficit (% GDP)	6.4	3.5	2.1	1.2	1.0	0.9	0.9
Current Account Balance (% GDP)	9.5	10.4	0.4	2.1	1.4	0.5	1.9
Foreign Debt (% GDP)	79.7	69.2	58.0	58.7	44.8	36.8	35.2
Foreign Debt (% export)	236.0	202.0	225.0	222.0	223.5	171.0	133.9
Debt Service Ratio	14.9	15.5	13.6	13.4	10.5	9.4	8.9

¹⁷ Ministry of Economy, 1998, *Investment in Egypt, I – New Business Environment for a Great Country*, Ministry of Economy, Research Information Sector, 1998, *The International Competitiveness of Egypt in Perspective*, First Report 1998, prepared by Development Economic Policy Reform Analysis Project (DEPRA, a USAID-funded project); International Business & Technical Consultants, Inc., 1999, *Quarterly Review for the Period 1 January to 31 March 1999*, USAID Privatization Project.

¹⁸ Ministry of Economy, 1998, *Investment In Egypt: I – New Business Environment for a Great Country*, p. 9.

Infrastructure Development for New Luxor and El Toad

	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	Estimated 1997/98
Reserves/Imports (months)	12.9	14.4	19.2	18.6	16.5	16.2	16.5

Free Financial Markets

In January 1991 all controls on foreign exchange were dismantled. Today, the Egyptian Pound is floating and the exchange system is free of restrictions. Coupled with this are improved potential and efficiency standards of the domestic financial sector.

Moreover, all controls on interest rates were lifted in 1991, as were restrictions of banks' fees and commissions. Foreign banks are currently allowed to operate in domestic currency and can even be 100% foreign owned. Rules discriminating against private banks have also been totally abolished.

Capital Market

The GOE undertook several reform measures aiming primarily at reviving the stock market, a move that led to its resurgence as a strong vehicle for financing and investment. As a result, Egypt's Stock Exchange remained stable at a time when most emerging markets struggled with the repercussions of the Southeast Asia crisis. The GOE has implemented several regulatory reforms to streamline the capital market. These included raising capital adequacy requirement for new brokerage firms, abolishing capital gain tax levied on securities and strengthening rules of corporate disclosure. In order to be at par with international practice, the government published corporate guidelines on International Accounting Standards (IAS), and required joint stock companies to prepare future accounts on the basis of these Standards.

Enterprise Restructuring and Privatization

The Public Enterprise Law No. 203 of 1991 governs the restructuring of 314 public sector enterprises, and removed all government control over public sector companies, restructuring them as affiliates under 16 financially autonomous holding companies. To expose them to free market conditions and facilitate their privatization, the GOE abolished credit guarantees from the national budget and investment financing.

The privatization program in Egypt consists of two basic parts: the first, and largest, involves divestment of public sector holdings in production and manufacturing companies. The second part of the privatization program is the encouragement of private sector investments in sectors historically controlled and operated by the public sector, including power, roads, airports, maritime ports and oil and gas transmission.

Over the past 6 years, the GOE has provided an increasingly conducive privatization environment through the removal of trade barriers, the relaxation of industrial investment licensing procedures, the reform of trade and financial markets, as well as the legal, taxation and regulatory frameworks.

The privatization program in Egypt can be divided into two phases. During the first phase, between 1993/94 and January 1996, 3 companies were sold outright to the private sector (anchor investor sales)

and 16 were partially divested (proportions ranging from 5% to 20%) through the stock market. In 1996, the program was more aggressively promoted. The second phase has seen impressive acceleration in the pace of privatization, with 65 companies sold, as well as broadening the scope of companies sold and the modalities employed.

The scope of Egypt's privatization plan increased the share of private sector economic activity through the continued downsizing of the civil service by 2% a year, ongoing divestiture of the banking sector as well as scheduled privatization of the public sector banks and insurance companies.

The companies that have been privatized were diversified over a number of sectors including agriculture, real estate and construction, food and beverage, milling, pharmaceutical, cement, chemical and fertilizers, engineering, retail and textiles.

One important outgrowth of the original privatization of Law 203 Affiliated Companies and joint venture banks (JVBs) has been the change in the mind set of both Egyptian decision-makers and the general public. Decision-makers now actively examine new alternate ways of privatizing government-owned enterprises formally called "strategic" and thus off limits to privatization initiatives. These new privatization efforts go substantially beyond the original scope of the privatization program, and appear to be on the threshold of offering Egyptians much greater access to public services. Moreover, the quality and efficiency of the services are being substantially improved.

TABLE 26: MAJOR ACHIEVEMENTS IN PRIVATIZATION¹⁹

	1994	1995	1996	1997	Q1/1998	1999	2000
Total Number of Companies	10	11	32	46	14	97	40
Sales to Anchor Investor	2	1	3	2	1	9	13
Sale of Majority Stake through Stock	0	0	20	13	3	36	12
Sale of Majority Stake*	1	1	7	1	0	10	6
Sale of Tranches	3	3	0	6	4		0
Sale of ESAs	4	6	0	5	0	15	3
Sales of Assets**	0	0	2	19	6	27	6
Proceeds (LE million)	925	1,003	3,691	3,241	428	9,288	1,500
Number of Employees	22,849	38,726	82,503	81,793	31,482	257,353	90,000
Asset Value (LE million)	4,030	3,218	11,800	8,026	3,773	30,847	8,000

* To avoid duplication, companies sold more than one tranche counted only once in total number of companies

** Most of these companies are under the process of liquidation

¹⁹ Ministry of Economy, 1998, *Investment In Egypt: I – New Business Environment for a Great Country*, p. 18.

One of the many examples of the increasingly private-sector-oriented approach of the GOE, in an area formally monopolized by the government, is airports. Currently, there are at least six regional airports being built or developed using new Build, Own, Operate and Transfer (BOOT) contracts that the GOE has offered to the private sector. As is the case with telecommunications, maritime ports and power, airport privatization is occurring in an area that was until recently considered strategic.

The following are four contracted airport projects being reviewed by the State Council:

1. Alamein Airport, managed by El Alamein (Kato Investment);
2. Marsa Alam Airport, managed by EMAC;
3. Ras Sidr Airport, managed by Delta Gulf; and,
4. Dahab Airport, managed by NESCO Egypt.

In addition, two BOOT projects were offered during the Third Quarter of 1998 on the following airports:

5. Northern Oasis in the Western Desert and,
6. El Farafra in the Western Desert.

Legislative Reforms

In order to facilitate investment in Egypt and to provide more incentives and guarantees for the private sector, the GOE over the past few years has undertaken major steps in reforming its legal, taxation and regulatory frameworks. In addition to Law No. 203 of 1991, following is a list and brief description of some of these reforms:

1. Investment Law No. 8 of 1997

This Law provides various incentives and guarantees for foreign and national investors undertaking activities in Egypt, in accordance with its provisions. The Law guarantees against expropriation and nationalization of companies established under its provisions. Companies and their assets can not be attached, seized or expropriated by way of an administrative order. Companies enjoy a five-year period of tax holiday starting from the first fiscal year following the commencement of production or the company's activities.

2. Foreign Exchange Law No. 38 of 1994

This Law regulates foreign exchange operations in Egypt. Virtually all banks licensed to operate in Egypt, and new banks to be established, are authorized to deal in foreign currency. The Law permits the establishment of authorized foreign exchange dealers to buy and sell foreign currency for their own account and on behalf of third parties. Natural and legal persons are free to maintain foreign currency in any amount. Foreign currency accounts may be held with any approved bank in Egypt. The funds kept in foreign currency accounts may be used in Egypt or remitted overseas. Foreign currency generated from tourism or exports no longer needs to be repatriated into Egypt, and may be maintained abroad at the owner's discretion.

3. Banking Laws

Law No. 163 of 1975 has been amended by Law No. 37 of 1992, Law No. 101 of 1993 and Law No. 97 of 1996 regulating the activities of the banking system. Under this set of Laws, the Minister of Economy in consultation with the Central Bank of Egypt (CBE) can now impose capital adequacy standards for each bank in relation to its assets and liabilities in accordance with the Basle Rules. The CBE retains significant powers to undertake remedial measures when the provisions of the Laws are violated. Branches of foreign banks can now, at the approval of the Minister and the CBE, deal in local currency without the need to form an Egyptian joint stock company. Foreigners can now own more than 49%

equity shares in a bank, but no one is permitted to own more than 10% of the shares without the approval of the CBE. Finally, Law No. 205 of 1990 – the Bank Secrecy Law – governs the obligation of Egyptian banks to keep information relating to their customers bank accounts secret.

4. Capital Market Law No. 95 of 1992

This Law covers, in general, joint stock companies that offer their shares to the public as well as companies that deal in securities.²⁰

²⁰ References:

Ministry of Economy, 1998, *Investment in Egypt, I – New Business Environment for a Great Country*.

Ministry of Economy, 1998, *Investment in Egypt, III - The Laws of Business*.

Ministry of Economy, Research Information Sector, 1998, *The International Competitiveness of Egypt in Perspective*, First Report 1998, prepared by Development Economic Policy Reform Analysis Project (DEPRA, a USAID-funded project).

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Annex 10: Profile of Egypt

Egypt's economic fortunes have fluctuated sharply during the past two decades, but its economic future now holds real promise. A decade of rapid growth ended in 1986 when a decline in oil prices caused a regional economic slowdown. Egypt's retreat at this time to inward-looking policies, combined with heavy borrowing, resulted in severe macroeconomic imbalances. Between 1986 and 1992, per capita income grew by only 10 percent.

The macroeconomic stabilization efforts that Egypt undertook in the early 1990s have been a success, and longer-term structural reforms are underway. Real Gross Domestic Product (GDP) growth accelerated from 1.9 to 5 percent from 1991–92 to 1995–96. GDP per capita has risen to \$1,040, categorizing Egypt as a middle-income country. During the same period, inflation fell from 21.1 percent to 7.2 percent. The fiscal balance, foreign reserves, and external debt have also improved. With these positive trends now well established, Egypt appears to be on the brink of a significant period of growth.

Challenges to the Economy

Unemployment looms as a crucial challenge. Solving the employment problem through growth is critical not only for the economy, but also for social stability. Current estimates place unemployment at between 9 to 13 percent, and the labor force is growing at around 3 percent annually.

Egypt's Growth Strategy

Egypt is progressing with privatization, with reducing tariff and other trade barriers, and with streamlining legal aspects of investment and commercial activities. It is promoting the Egyptian stock market, creating a more equitable and transparent tax system, and structuring a financial system that is more responsive to medium- and long-term credit needs. All of these actions will facilitate the transition to a market economy and reduce policy impediments to economic development.

Egypt is moving to improve its domestic savings rate in several ways, the most important being privatization. Above all, the expected gains in savings will come from improved productivity and efficiency. Other reforms to increase savings include establishing a more efficient pension system, and further developing capital markets.

The government has begun to identify major areas of legislative reform; eliminate obsolete laws; and deal with commercial law, investment, leasing, acquisition of property by foreigners, and tax petitions.

The upcoming free trade agreements that Egypt is negotiating with the European Union (EU) and, more recently, the United States, will bring about major opportunities. With these agreements, Egypt will gain access to the world's two largest markets and investors will view Egypt as a manufacturing base for exports to these markets. The agreements will also accelerate the improvement of trade and investment procedures in line with best international practices.

Egypt already offers major advantages to investors. With a population of 60 million and a per capita income of more than \$1,000, Egypt represents a large market in its own right. It also has very good relations with other countries in the Middle East and North Africa, thus offering advantages in exporting to the region. And the wage rate of the Egyptian labor force of about \$3 per day is highly competitive for capable, productive workers.

TABLE 27: PROFILE OF EGYPT

	Egypt	M. East and North Africa	Lower- Middle Income
POVERTY and SOCIAL			
1997			
Population, mid-year (<i>millions</i>)	60.3	283	2,285
GNP per capita (<i>Atlas method, US\$</i>)	1,180	2,060	1,230
GNP (<i>Atlas method, US\$ billions</i>)	71.2	583	2,818
Average annual growth,			
1991-97			
Population (%)	2.0	2.3	1.2
Labor force (%)	2.8	3.2	1.3
Most recent estimate			
(latest year available, 1991-97)			
Urban population (<i>% of total population</i>)	45	57	42
Life expectancy at birth (<i>years</i>)	66	67	69
Infant mortality (<i>per 1,000 live births</i>)	51	48	36
Child malnutrition (<i>% of children under 5</i>)	9	..	..
Access to safe water (<i>% of population</i>)	64	71	84
Illiteracy (<i>% of population age 15+</i>)	49	39	19
Gross primary enrollment (<i>% of school-age population</i>)	100	97	111

KEY ECONOMIC RATIOS and LONG-TERM TRENDS

Environment

Forests	0 thousands of sq. km
Deforestation	0.0 % change (1990-1995)
Water use	94.5 % of total resources
CO2 emissions	1.7 metric tons per capita
Energy use per capita	638 kg of oil equivalent per capita
Electricity use per capita	924 kWh per capita

Labor force:

total:	17.4 million (1996 est.)
by occupation:	
agriculture	40%,
services, including government	38%,
Industry	22% (1990 est.)

Unemployment rate: 9.4% (1997 est.)

Table 27: Profile of Egypt (cont'd)

	Egypt	M. East and North Africa	Lower- Middle Income	
Budget:				
Revenues:	\$19.2 billion			
Expenditures:	\$19.8 billion,			
Including capital expenditures of \$4 billion (FY96/97 est.)				
Industries:	textiles, food processing, tourism, chemicals, petroleum, construction, cement, and metals			
Industrial production growth rate:	.5% (1996 est.)			
Electricity—capacity:	13.04 million kW (1995)			
Electricity—production:	48.5 billion kWh (1995)			
Electricity—consumption per capita: 778 kWh (1995)				
Agriculture—products:	cotton, rice, corn, wheat, beans, fruits, vegetables; cattle, water buffalo, sheep, goats; annual fish catch about 140,000 metric tons			
Exports :				
Total value:	\$5.1 billion (f.o.b., FY96/97 est.)			
Commodities:	crude oil and petroleum products, cotton yarn, raw cotton, textiles, metal products, chemicals			
Partners:	EU, US, Japan			
Imports:				
Total value:	\$15.5 billion (c.i.f., FY96/97 est.)			
Commodities:	machinery and equipment, foods, fertilizers, wood products, durable consumer goods, capital goods			
Partners:	US, EU, Japan			
Debt—external:	\$30.5 billion (1996/97 est.)			
Economic aid:				
Recipient:	ODA, \$1.713 billion (1993)			
Currency:	1 Egyptian pound (£E) = 100 piasters			
Exchange rates:	Egyptian pounds (£E) per US\$1—3.4			
Fiscal year:	1 July—30 June			
	1976	1986	1996	1997
GDP (<i>US\$ billions</i>)	13.4	35.9	67.6	75.5
Gross domestic investment/GDP	28.4	23.7	16.6	17.7
Exports of goods and services/GDP	22.3	15.7	20.2	20.2

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Gross domestic savings/GDP	16.7	13.8	10.8	13.0
Gross national savings/GDP	15.8	18.8
Current account balance/GDP	-10.2	-9.4	1.6	0.6
Interest payments/GDP	0.5	2.4	1.5	1.0
Total debt/GDP	47.6	84.8	46.3	39.7
Total debt service/exports	6.4	8.4	11.5	8.9
Present value of debt/GDP	..	..	30.9	..
Present value of debt/exports	..	..	105.0	..

Table 27: Profile of Egypt (cont'd)

	Egypt	M. East and North Africa	Lower- Middle Income	
<i>(average annual growth)</i>				
	1976-86	1987-97	1996	1997
GDP	7.1	4.0	5.0	5.5
GNP per capita	3.7	2.3	3.6	3.1
Exports of goods and services	2.7	5.9	1.6	2.4

STRUCTURE of the ECONOMY
(% of GDP)

	1976	1986	1996	1997
Agriculture	28.3	20.8	17.3	17.7
Industry	26.2	26.8	31.6	31.8
Manufacturing	16.1	13.3	24.3	25.2
Services	45.5	52.4	51.1	50.5
Private consumption	58.5	69.6	78.8	76.8
General government consumption	24.8	16.5	10.4	10.2
Imports of goods and services	34.0	25.6	26.0	24.9

Average annual growth

	1976-86	1987-97	1996	1997
Agriculture	3.0	2.8	3.1	3.4
Industry	8.4	4.5	4.9	4.6
Manufacturing	..	4.9	6.9	8.3
Services	9.7	3.8	5.6	6.4
Private consumption	6.2	4.7	3.6	3.9
General government consumption	5.0	0.5	2.4	4.8
Gross domestic investment	6.9	-0.4	9.7	10.4
Imports of goods and services	3.2	2.4	1.6	1.9
Gross national product	6.4	4.4	5.5	6.1

PRICES and GOVERNMENT FINANCE

Domestic prices
(% change)

	1976	1986	1996	1997
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Consumer prices	8.3	4.6
Implicit GDP deflator	12.5	12.8	9.0	6.2
<i>Government finance</i>				
<i>(% of GDP, includes current grants)</i>				
Current revenue	..	21.3	25.1	23.7
Current budget balance	..	-14.2	2.5	2.9
Overall surplus/deficit	..	-23.1	-1.3	-0.9

Table 27: Profile of Egypt (cont'd)

	Egypt	M. East and North Africa	Lower- Middle Income
TRADE			
<i>(US\$ millions)</i>			
	1976	1986	1996
	1997		
Total exports (fob)	..	..	4,608
Cotton	..	..	110
Other Agriculture	..	..	230
Manufactures	..	..	1,314
Total imports (cif)	..	..	14,107
Food	..	..	2,955
Fuel and energy	..	..	..
Capital goods	..	..	4,100
Export price index (1995=100)	..	..	127
Import price index (1995=100)	..	..	145
Terms of trade (1995=100)	..	..	87
Trade and finance			
trade as share of PPP GDP	18.5 %		
trade growth less GDP growth	-0.6 average % (1987-1997)		
high-technology exports	7 % of manufactured exports		
net barter terms of trade	103 (1995=100)		
present value of debt	21,265 \$ millions		
total debt service	1,928 \$ millions		
short term debt	2,991 \$ millions		
aid per capita	32 \$		
BALANCE of PAYMENTS			
<i>(US\$ millions)</i>			
	1976	1986	1996
	1997		
Exports of goods and services	3,319	6,494	15,245
Imports of goods and services	5,182	11,825	17,541
Resource balance	-1,863	-5,331	-2,296
Net income	-342	-1,021	539
Net current transfers	842	2,995	2,842
Current account balance	-1,363	-3,357	1,085
Financing items (net)	1,049	3,533	-515
Changes in net reserves	314	-176	-570
Memo:			
Reserves including gold (US\$ millions)	..	1,780	17,867
Conversion rate (DEC, local/US\$)	0.5	1.1	3.4

Table 27: Profile of Egypt (cont'd)

	Egypt	M. East and North Africa	Lower- Middle Income
EXTERNAL DEBT and RESOURCE FLOWS			
<i>(US\$ millions)</i>			
	1976	1986	1996
Total debt outstanding and disbursed	6,357	30,415	31,299
IBRD	50	1,228	1,075
IDA	126	827	1,090
Total debt service	267	837	2,283
IBRD	3	243	272
IDA	1	12	23
Composition of net resource flows			
Official grants	910	0	1,324
Official creditors	841	1,712	-17 19
Private creditors	122	534	-376
Foreign direct investment	61	0	636
Portfolio equity	0	0	0
World Bank program			
Commitments	197	617	172
Disbursements	78	369	108
Principal repayments	0	114	192
Net flows	78	256	-84
Interest payments	4	141	102
Net transfers	74	115	-186

Note: 1997 data are preliminary estimates.

Geography

Area:

Total	1,001,450 sq. km
Land	995,450 sq. km
Water	6,000 sq. km

Land boundaries

Total border countries	2,689 km
	Gaza Strip 11 km, Israel 255 km, Libya 1,150 km, Sudan 1,273 km

Maritime claims

contiguous zone	24 NM
continental shelf	200-m depth or to the depth of exploitation
exclusive economic zone	200 NM
territorial sea	12 NM

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<u>Climate</u>	desert; hot, dry summers with moderate winters
<u>Terrain</u>	vast desert plateau interrupted by Nile valley and delta
<u>Elevation extremes</u>	
lowest point	Qattara Depression -133 m
highest point	Mount Catherine 2,629 m
<u>Natural resources</u>	petroleum, natural gas, iron ore, phosphates, manganese, limestone, gypsum, talc, asbestos, lead, zinc
<u>Land use</u>	
arable land	2%
permanent crops	0%
permanent pastures	0%
forests and woodland	0%
Other	98% (1993 est.)
<u>Irrigated land</u>	32,460 sq. km (1993 est.)
<u>Environment— current issues</u>	agricultural land being lost to urbanization and windblown sands; increasing soil salinization below Aswan High Dam; desertification; oil pollution threatening coral reefs, beaches, and marine habitats; other water pollution from agricultural pesticides, raw sewage, and industrial effluents; very limited natural fresh water resources away from the Nile which is the only perennial water source; rapid growth in population overstraining natural resources
<u>Environment— party to</u>	Biodiversity, Climate Change, Desertification, Endangered Species, Environmental Modification, Hazardous Wastes, Law of the Sea, Marine Dumping, Nuclear Test Ban, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94, Wetlands, Whaling signed, but not ratified..
<u>Geography—note</u>	Controls Sinai Peninsula, only land bridge between Africa and remainder of Eastern Hemisphere; controls Suez Canal, shortest sea link between Indian Ocean and Mediterranean Sea; size, and juxtaposition to Israel, establish its major role in Middle Eastern geopolitics
Government	
Government type	Republic
National capital	Cairo
Administrative divisions	26 governorates (muhafazat, singular—muhafazah); Ad Daqahliyah, Al Bahr al Ahmar, Al Buhayrah, Al Fayyum, Al Gharbiyah, Al Iskandariyah, Al Isma'iliyah, Al Jizah, Al

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	Minufiyah, Al Minya, Al Qahirah, Al Qalyubiyah, Al Wadi al Jadid, Ash Sharqiyah, As Suways, Aswan, Asyut, Bani Suwayf, Bur Sa'id, Dumyat, Janub Sina', Kafr ash Shaykh, Matruh, Qina, Shamal Sina', Suhaj
Independence	28 February 1922 (from UK)
National holiday	Anniversary of the Revolution, 23 July (1952)
Constitution	11 September 1971
Legal system	Based on English common law, Islamic law, and Napoleonic codes; judicial review by Supreme Court and Council of State (oversees validity of administrative decisions); accepts compulsory ICJ jurisdiction, with reservations
Suffrage	18 years of age; universal and compulsory
Executive branch	
Chief of state	President Mohammed Hosni MUBARAK (since 14 October 1981)
Head of government	Prime Minister Kamal Ahmed El-GANZOURI (since 4 January 1996)
Cabinet	Cabinet appointed by the president
Elections	President nominated by the People's Assembly for a six-year term, the nomination must then be validated by a national, popular referendum; national referendum last held 4 October 1993 (next to be held NA October 1999); prime minister appointed by the president
Election results	National referendum validated President Mubarak's nomination by the People's Assembly to a third term
Legislative branch	Bicameral system consists of the People's Assembly or Majlis al-Sha'b (454 seats; 444 elected by popular vote, 10 appointed by the president; members serve five-year terms) and the Advisory Council or Majlis al-Shura—which functions only in a consultative role (264 seats; 176 elected by popular vote, 88 appointed by the president; members serve NA-year terms)
Elections	People's Assembly—last held 29 November 1995 (next to be held NA 2000); Advisory Council—last held 7 June 1995 (next to be held NA)
Election results	People's Assembly—percent of vote by party—NDP 72%, independents 25%, opposition 3%; seats by party—NDP 317, independents 114, NWP 6, NPUG 5, Nasserist Arab Democratic Party 1, Liberals 1; Advisory Council—percent of vote by party—NDP 99%, independents 1%; seats by party—NA
Judicial branch	Supreme Constitutional Court
Political parties and leaders	National Democratic Party (NDP), President Mohammed Hosni MUBARAK, leader, is the dominant party;

	Legal opposition parties Khalid MUHI AL-DIN; Socialist Liberal Party, Mustafa Kamal MURAD; Democratic Unionist Party, Mohammed 'Abd-al-Mun'im TURK; Umma Party, Ahmad al-SABAHI; Misr al-Fatah Party (Young Egypt Party), leader NA; Nasserist Arab Democratic Party, Dia' al-din DAWUD; Democratic Peoples' Party, Anwar AFIFI; The Greens Party, Kamal KIRAH; Social Justice Party, Muhammad 'ABDAL-'AL
International organizations	ABEDA, ACC, ACCT (associate), AfDB, AFESD, AG (observer), AL, AMF, BSEC (observer), CAEU, CCC, EBRD, ECA, ESCWA, FAO, G-15, G-19, G-24, G-77, IAEA, IBRD, ICAO, ICC, ICRM, IDA, IDB, IFAD, IFC, IFRCs, IHO, ILO, IMF, IMO, Inmarsat, Intelsat, Interpol, IOC, IOM, ISO, ITU, MINURSO, MONUA, NAM, OAPEC, OAS (observer), OAU, OIC, OSCE (partner), PCA, UN, UNCTAD, UNESCO, UNIDO, UNITAR, UNMIBH, UNMOP, UNOMIG, UNOMIL, UNPREDEP, UNRWA, UPU, WFTU, WHO, WIPO, WMO, WToO, WtrO
Communications	
Telephones	2.2 million (1993)
Telephone system	Large system by Third World standards but inadequate for present requirements and undergoing extensive upgrading
Domestic	principal centers at Alexandria, Cairo, Al Mansurah, Ismailia, Suez, and Tanta are connected by coaxial cable and microwave radio relay
International	satellite earth stations—2 Intelsat (Atlantic Ocean and Indian Ocean), 1 Arabsat, and 1 Inmarsat; 5 coaxial submarine cables; tropospheric scatter to Sudan; microwave radio relay to Israel; participant in Medarabtel
Radio broadcast stations	AM 39, FM 6, short-wave 0
Radios	NA
Television broadcast stations	41
Televisions	5 million (1993 est.)
Transportation	
Railways	
Total	4,751 km
Standard gauge	4,751 km 1,435-m gauge (42 km electrified; 951 km double track)
Highways	
Total	64,000 km
Paved	49,984 km
Unpaved	14,016 km (1996 est.)
Waterways	3,500 km (including the Nile, Lake Nasser, Alexandria-Cairo)

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	Waterway, and numerous smaller canals in the delta); Suez Canal, 193.5 km long (including approaches), used by oceangoing vessels drawing up to 16.1 m of water
Pipelines	Crude oil 1,171 km; petroleum products 596 km; natural gas 460 km
Ports and harbors	Alexandria, Al Ghardaqaq, Aswan, Asyut, Bur Safajah, Damietta, Marsa Matruh, Port Said, and Suez
Merchant marine Total	161 ships (1,000 GRT or over) totaling 1,225,989 GRT/1,899,818 DWT
Ships by type	Bulk 24, cargo 60, liquefied gas tanker 1, oil tanker 15, passenger 42, refrigerated cargo 1, roll-on/roll-off cargo 15, short-sea passenger 3 (1997 Est.)
Airports	89 (1997 est.)
Airports— with paved runways	
Total	70
Over 3,047 m	11
2,438 to 3,047 m	39
1,524 to 2,437 m	15
914 to 1,523 m	2
Under 914 m	3 (1997 est.)
Airports—with unpaved runways	
Total	19
2,438 to 3,047 m	2
1,524 to 2,437 m	2
914 to 1,523 m	6
Under 914 m	9 (1997 est.)
Heliports	2 (1997 est.)
Military	
Military branches	Army, Navy, Air Force, and Air Defense Command
Military age	20 years of age
Military manpower— availability	
Males age 15-49	17,350,925 (1998 est.)
Military manpower—fit for military service	
Males	11,247,896 (1998 est.)
Military manpower— reaching military age annually	
Males	683,868 (1998 est.)

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Military expenditures—
percent of GDP

8.2% (FY95/96)

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