PREFACE

In response to a request from the Government of the Arab Republic of Egypt, the Government of Japan decided to conduct the “Public-Private Partnership (PPP) Program for Cairo Urban Toll Expressway Network Development” and entrusted it to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a Study Team headed by Dr. Hani Abdel-Halim of Katahira & Engineers International from April 2005 and March 2006. In addition, JICA set up an Advisory Committee headed by Professor Noboru Harata of the University of Tokyo to provide advise to the Study Team during the course of the Study.

The team held discussions with the officials concerned of the Ministry of Transport as well as other officials concerned, and conducted field surveys, data analysis and PPP financial plan. Upon returning to Japan, the team prepared this final report to summarize the results of the study.

I hope that this report will contribute to the development in the Arab Republic of Egypt, and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of the Arab Republic of Egypt for their close cooperation extended to the Study Team.

May 2006,

Kazuhisa MATSUOKA,
Vice President
Japan International Cooperation Agency

Mr. Kazuhisa MATSUOKA,
Vice President
Japan International Cooperation Agency

May 2006

Dear Sir,

Letter of Transmittal

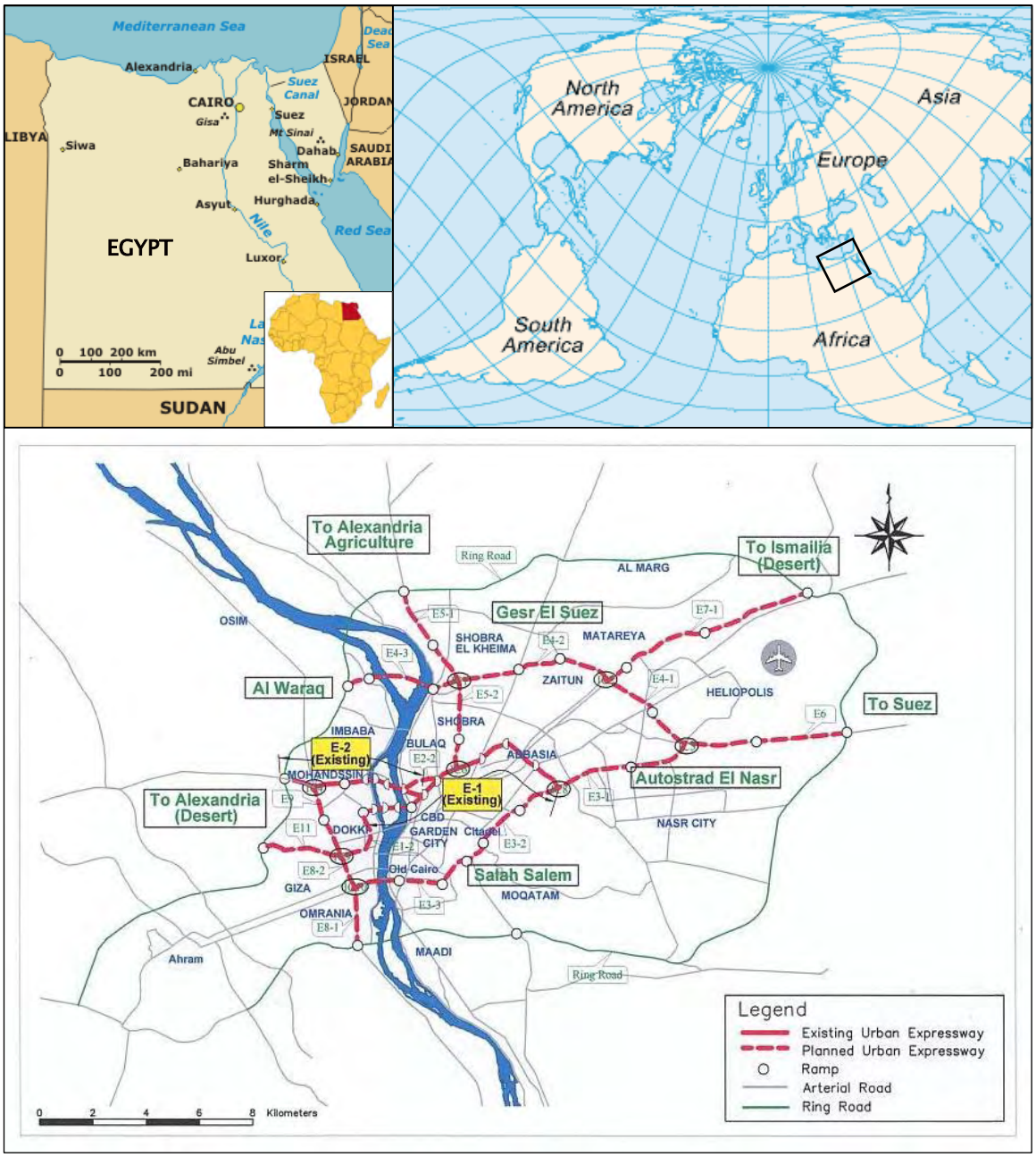
We are pleased to submit herewith the Final Report of the "Public-Private Partnership (PPP) Program for Cairo Urban Toll Expressway Network Development". The report compiles the results of the Study and includes the advices and suggestions of the authorities concerned of the Government of Japan and your agency as well as the comments made by the Ministry of Transport and other authorities concerned in the Arab Republic of Egypt.

The report analyses the present and future conditions and demand of transport in Greater Cairo Region. It presents the established overall plan for the sustainable development of the urban toll expressway network; including the required institutional setup, toll setting mechanism as well as maintenance and operation system. For the network development, a comprehensive program and strategy for the introduction of PPP scheme is formulated with required cash flow analysis and contractual arrangements.

We wish to take this opportunity to express our sincere gratitude to your agency and the Ministry of Foreign Affairs. We also wish to express our deep gratitude to the Ministry of Transport as well as other Governmental Agencies concerned in the Arab Republic of Egypt for the close cooperation and assistance extended to us during the Study. We hope this report will contribute to the development of the Arab Republic of Egypt.

Very truly yours,

Dr. Hani Abdel-Halim
Team Leader,
Public-Private Partnership (PPP) Program for
Cairo Urban Toll Expressway Network Development



Route	Location
E1-1	6th of October Elevated Road
E1-2	6th of October Extension
E2-1	15th of May Elevated Road
E2-2	15th of May Extension
E3-1	Autostrad El Nasr Street in Nasr City
E3-2	Autostrad from Nasr City to Citadel
E3-3	Salah Salem from Citadel to Giza Sq.
E4-1	Abu Bakr El-Sedeeq
E4-2	Ibn El hakam – El Matariyah

Route	Location
E4-3	Tereat Ismailia – Al Warraq
E5-1	Cairo-Alexandria Agriculture Road
E5-2	Ahmad Helmi Street
E6	Cairo-Suez Road
E7-1	Gesr El Suez (Ismailia Desert)
E8-1	Tereat El-Zumur South of King Faisal
E8-2	Tereat El-Zumur North of King Faisal
E9	Tereat El-Zumur in Bolaq el Dakroor
E11	From Tereat El-Zumur to Ring Road

CAIRO URBAN TOLL EXPRESSWAY NETWORK

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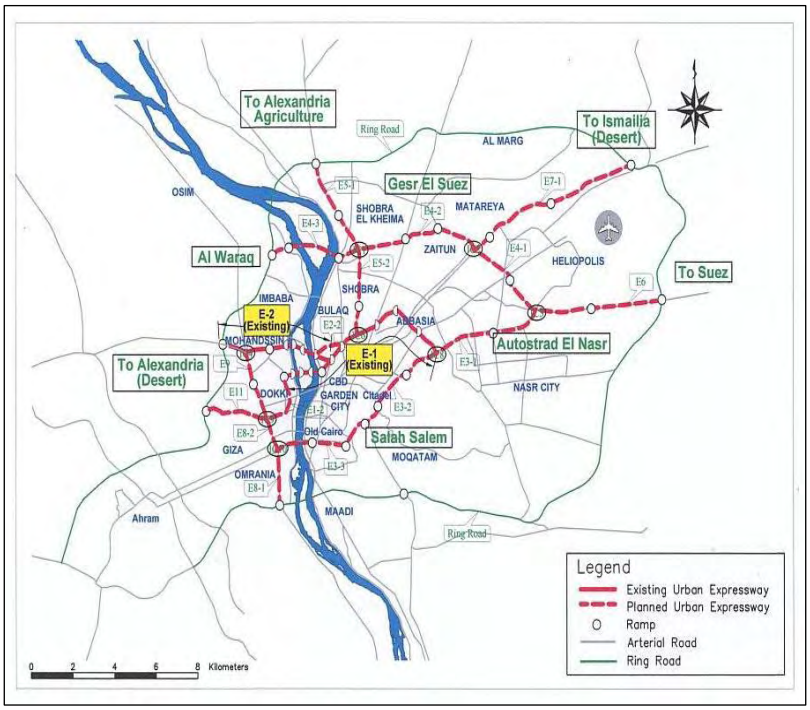
Exchange Rate:
LE 1.00 = US$ 0.1745
LE 1.00 = JPY 20.9
(As of January 2006)

ABSTRACT

Background

- Greater Cairo Region (GCR) is estimated to accommodate a population of 22 million in 2022 which puts growing pressure on all infrastructure systems, including the road network system.
- GCR requires unique solutions to promote the functional integration of the region, and to provide a base for market-oriented transport activity.
- JICA conducted the "Cairo Regional Area Transportation Study" (CREATS) and a transport Master Plan for GCR was formulated in 2002 as the outcome of CREATS. In this Master Plan, the development of an Urban Toll Expressway Network is proposed.
- To implement, operate and maintain the urban expressway network, huge financial resources are required. The financial gap is expected to be filled by the private sector that is also expected to be capable of improving the quality of transport services.
- The development of private sector involvement in the provision of public services can be achieved through ensuring private as well as public benefits through a PPP program that ensure the sustainable development of the expressway network.

Optimum Expressway Network



Study Objectives

- To review and update the traffic demand, routing and development phasing plan of the Cairo urban expressway network (hereinafter referred to as "Expressway") proposed in "CREATS Master Plan", November 2002
- To set up the toll road system for the sustainable development of the proposed Expressway
- To formulate a comprehensive program and strategy for the introduction of PPP program for the development of the Expressway
- To enhance the capacity of the new MOT agency that take the responsibility to promote and lead the PPP program and Expressway development, assuring that the Government of Egypt retains ownership in the implementation of the PPP program. The new agency will be suggested by the Study Team and approved by MOT.

Optimum Expressway Network

- Review and Modifications on the basic expressway network, in addition to all possible new links, are undertaken to improve its function as a network taking into consideration all possible corridors and links that were omitted from CREATS "Do Maximum" scenario, which are proposed to be implemented in later years after the target year of 2022.
- Optimum Network, with a length of 99.2 km (including 17.6 km of existing sections) is implemented to the target year 2022.

Toll Setting

- The existing Road Law stipulates the necessary fundamental matters but it needs supplement to be applied on toll expressway network.
- Several approached are considered to identify appropriate toll to be applied and applied toll collection system:

- Willingness-to-Pay interview survey
- Affordability based on the monthly average household income and transport expenditures.
- Cost of other transport modes
- International comparison
- Toll level that maximizes toll revenue
- Toll level and vehicle category.
- Flat toll and Distance-Dependent toll

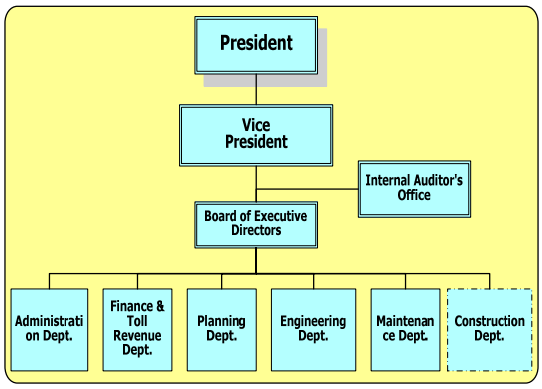
- A flat toll rate is applied for two categories of vehicles; light and heavy, based on the analysis of different approaches and other socioeconomic parameters in addition to the completed sections of the expressway network:

	Light	Heavy
2012 – 2015	LE 2	4
2016 – 2018	3	6
2019 – 2022	5	10

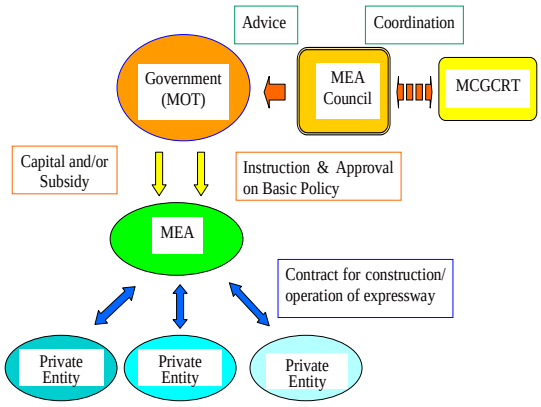
- The toll rate will be subjected to an adjustment mechanism that considers inflation rates, foreign exchange rates and the transport cost of other modes in addition to the total length of the expressway network under operation.
- With the increase in the length of the network in the future, the distance-dependent toll system can be applied through the use of advanced ETC systems in toll collection, which has enabled much shorter toll collection time.
- To achieve cross subsidy under flat toll system, it is recommended that the whole network be constructed and operated by a single entity, such as a *Metropolitan Expressway Authority (MEA)*, then transfer of profit surplus can be internally done.

Metropolitan Expressway Authority

- Cairo Expressway Network is a new and high level-of-service national infrastructure project which needs highly specialized professional expertise.
- MEA as a new organization with new ideas, energy and efficiency should be in charge.
- MEA should be established under the MOT to vigorously promote this national project.
- It is assumed that MEA is responsible for the implementation of the planned expressway network exclusively and solely
- Therefore, all the PPP projects will be supervised by MEA.
- MEA will be directly allowed to contract, maintain and operate any section of the planned expressways.



MEA Organization

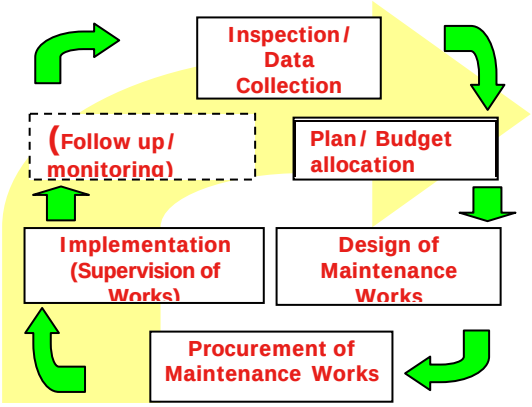


Institutional Setup

- MEA has to be developed in stages, starting with a "Secretariat Office" for initial functions that can be the core of future institutional development.
- Capacity development of MEA staff is an important issue that should be carefully planned for each of related fields.

Maintenance and Operation

- The "maintenance system" usually refers to a series of procedures which form a cycle.
- Recently, a new type of road maintenance contract called "performance Based Contract" (PBC) is being adopted.
- Standardization of work procedures is the key factor to improve and granite the quality and efficiency of work.
- Guidelines and manual are needed to be prepared and disseminated to achieve common measures and understanding.
- Upgrading the function of expressways is an important task to cope the increase in traffic volumes and vehicular weight,.



Cycle of Maintenance System

Project Cost

- Based on time scale, the cost is divided to Primary Cost (construction, land for ROW and information system) and Annual Cost (maintenance, management and toll collection).

Summary of Project Cost (without escalation)

Section		Primary Cost (m LE)	Annual Cost (m LE/year)
New Construction	E3	2,001	1.73
	E4	1,917	1.83
	E5	917	1.08
	E6	552	0.70
	E7	1,734	1.66
	E8	570	0.35
	E9	331	0.31
	E10	379	0.31
	E11	274	0.26
	IC	1,729	0.00
	Sub-Total	*10,404*	*8.23*
Exist	E1-2	356	2.42
	E2-2	99	1.12
	Sun-Total	*454*	*3.53*
M/O	Traffic Management	0	3.59
	Toll Collection	0	1.05
	Sub-Total	*0*	*4.64*
Total		10,858	16.41

Note: M/O: Maintenance and Operation, RR: Ring Road

Alternative Toll Network Scenarios

- Two main measures are considered to ease repayment of the project high construction cost; which are:
  - Users on existing E1 and E2 will be levied toll charge.
  - Users on existing Ring Road will be levied toll charge.
- Based on the combination of these two measures, four scenarios are established and assessed for the toll charge schemes.
- The most preferable, especially from economic and financial aspects is Scenario 4 in which toll is applied on existing E1 and E2, Ring Road and new construction expressways. This scenario is adopted for the developed PPP Program and cash flow analysis.

Evaluation of Expressway Network

- The target expressway network plan is evaluated based on the following factors:
  - Improvement of Traffic Efficiency
  - Improvement of System Efficiency
  - Financial and Economic Viability
  - Environmental Impacts
- Traffic Efficiency: By implementing the expressway network, the average travel speeds of the whole network will increase from 12.2 to 15.7 km/hr, and on the expressway network will increase from 15.3 to 25.2 km/hr in 2022.
- System Efficiency: VCR will decrease by about 15% in 2012 and 8% in 2022. It is also concluded that both PCU-km and PCU-hour will decrease on at-grade road network and on the expressways as well.
- Financial Viability: The annual revenue on expressways is about 1,924 million LE in year 2022. The annual Ring Road revenue is estimated at about 247,623 million LE by year 2022.
- Financial Sensitivity Analysis: is conducted under a worse-case scenario with a cost increases by 20% and revenue decreases a by 20%. FIRR is estimated as 11.2%.
- AAGR (Annual Average Growth Rates) of expressway users are estimated between 2012 and 2022 to be too high with about 22.3% in average.
- Economic Evaluation: is conducted using the benefits as savings in the vehicle operating cost, time cost. The project life period is assumed 30 years with a discount rate of 10%.
- Economic Sensitivity Analysis: is conducted under a worse-case scenario with a cost increases by 20% and Benefit decreases a by 20%. EIRR is about 24.9%.
- Air Quality: The air pollutants of HC, CO and NOx produced under cases of “with” and “without” the project are estimated. With project case provides recognizable improvements in air quality.

Expressway Network - Financial Indicators

Indicator	Value
Construction Cost (LE Million)	9,825
Revenue 2012 - 2045 (LE Million)	86,195
Revenue / Construction Cost	8.8
FIRR (%)	17.2

Expressway Network - Economic Indicators

Economic Indicator	Value
NPV (LE Million)	11,508
BCR	3.44
EIRR%	38.78

High Priority Expressways

- High priority expressways are identified based on the results developed of the prioritization multi-functional criteria.
- Results of economic evaluation and EIA recommended (E1+E2) and E3 as highest priority up to year 2013 among the lines of the optimum urban expressway network.

High Priority Expressways Up to 2013

Section	Location	Length (km)	Cost (mLE)
E1	6 Oct.	2.1	354
E2	15 May	1.2	98
E3	Autostrad	19.5	2,055
Total		22.8	2,507

High Priority Expressways - Economic Indicators

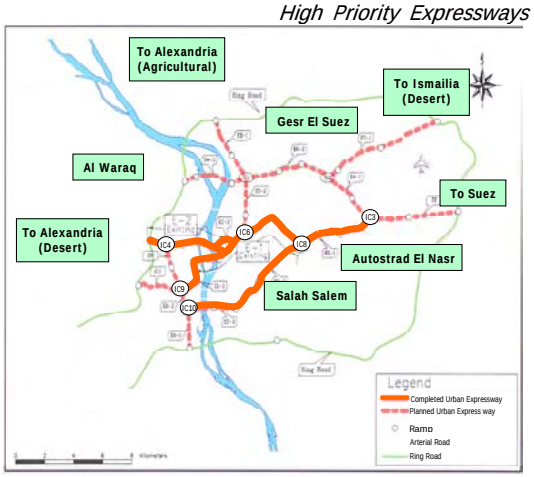
Expressway	NPV (m LE)	B/C	EIRR%
E1+E2	4,945	9.84	48.7
E3	3,331	2.85	20.4

Reduction in Daily Air Pollution (kg in Year 2022)

Expressway	Veh./day	Hc	CO	NOx
E1+E2	222,217	31.2	258.0	30.5
E3	149,172	23.1	190.6	22.5

- With the implementation of E1-2, E2-2 and E3-1 in 2011, toll will be applied on the whole length of expressways.
- Positive environmental impact, especially on the air quality is expected through the daily reduction in air pollution.
- The implementation Action Plan of selected high priority expressways is based on utilizing ODA finance for the design and construction in order to reduce financial burden of the Government and to put an attractive start for future participation of the private sector in finance.

High Priority Expressways



Implementation Action Plan for High Priority Expressways

Major Tasks	2005	2006	2007	2008	2009	2010	Agency In-Charge
Cairo PPP Study							JICA ST – ENIT
Route Prioritization							JICA ST
MEA Secretariat							MOT
Feasibility Study on HPE							MOT/ENIT/ODA
EIA on HPE							ENIT/MOE
MOT Approval							MOT
MEA Organization Setup							MOT
MOP / MOF Approval							MOP/MOF
Parliament Committee							MOT
Cabinet Approval							MOT
D/D Loan Preparation							MEA
D/D Loan Agreement							MEA
Consultant Selection							MEA
Detailed Design of HPE							ODA/MEA
Construction Loan							MEA
Tendering							MEA
Construction of HPE							MEA/ODA
F/S on Next Routes							MEA

HPE: High Priority Expressways
JICA ST: Study Team
D/D: Detailed Design
F/S: Feasibility Study
EIA: Environmental Impact Study
MEA: Metropolitan Expressway Authority
CG: Cairo Governorate
MOT: Ministry of Transport
MOP: Ministry of Planning
MOF: Ministry of Finance
MOE: Ministry of Environment
ENIT: Egypt National Institute of Transport
GOPP: General Organization for Physical Planning
ODA: Official Development Assistance

Public-Private Partnership (PPP)

- The term "public-private partnership" ("PPP") covers a range of different structures where the private sector delivers a public project or service.
- Under PPP approach, the public sector is ultimately accountable for service provisions, although the private sector designs, builds, operates and maintains infrastructure. PPP ensures provision of services to general public, but at lower cost and better quality by the use of private-sector management skills and finance capabilities.
- Risks are allocated to the party best able to manage, and therefore minimize the cost of risks. Allocation of risks and responsibilities between the public and private is clearly described in PPP contracts
- According to the international experience, excess risk transfer to the private sector and weak political commitment are main factors for failed PPPs. On the other hand, optimal risk allocation and strong political commitment are two key factors making good PPP projects.

Phased Approach

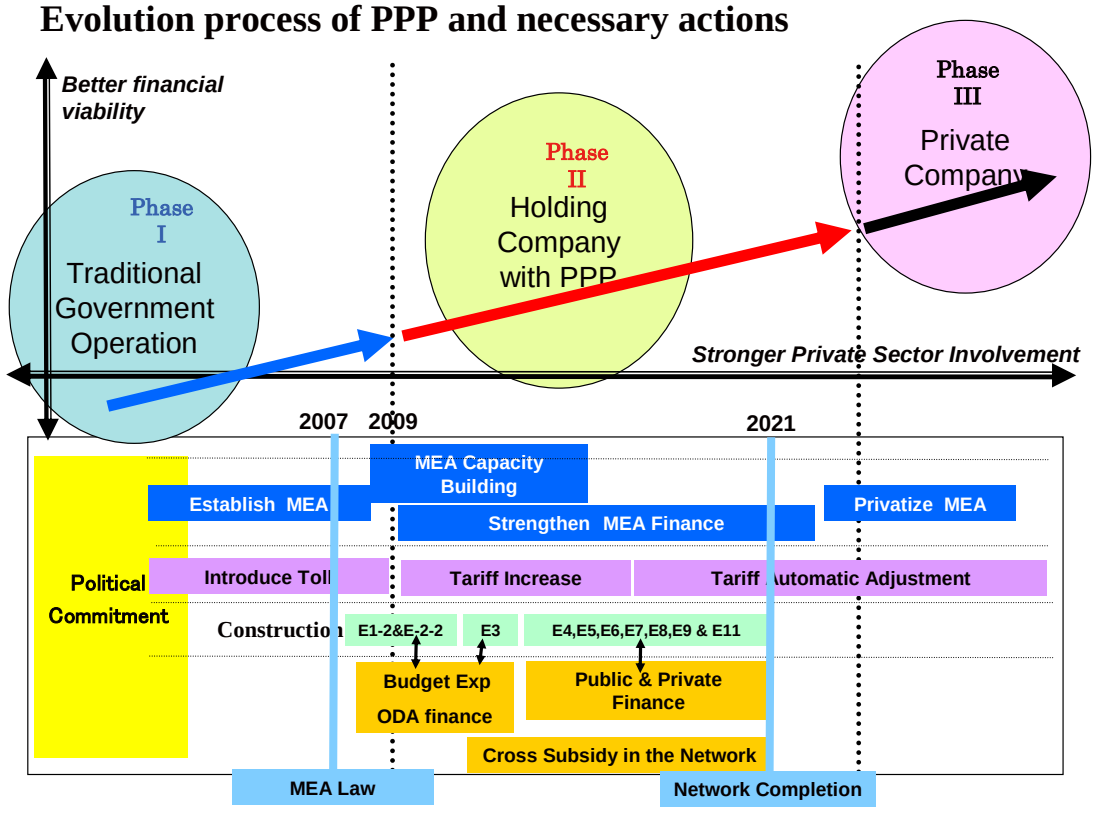
- In order to utilize private sector's expertise and financial capacity for the urban expressways network development, phased approach is proposed.

  - Phase I: Establishing implementation framework and building capacity
  - Phase II: Promoting PPP
  - Phase III (after completion of the network): privatizing MEA

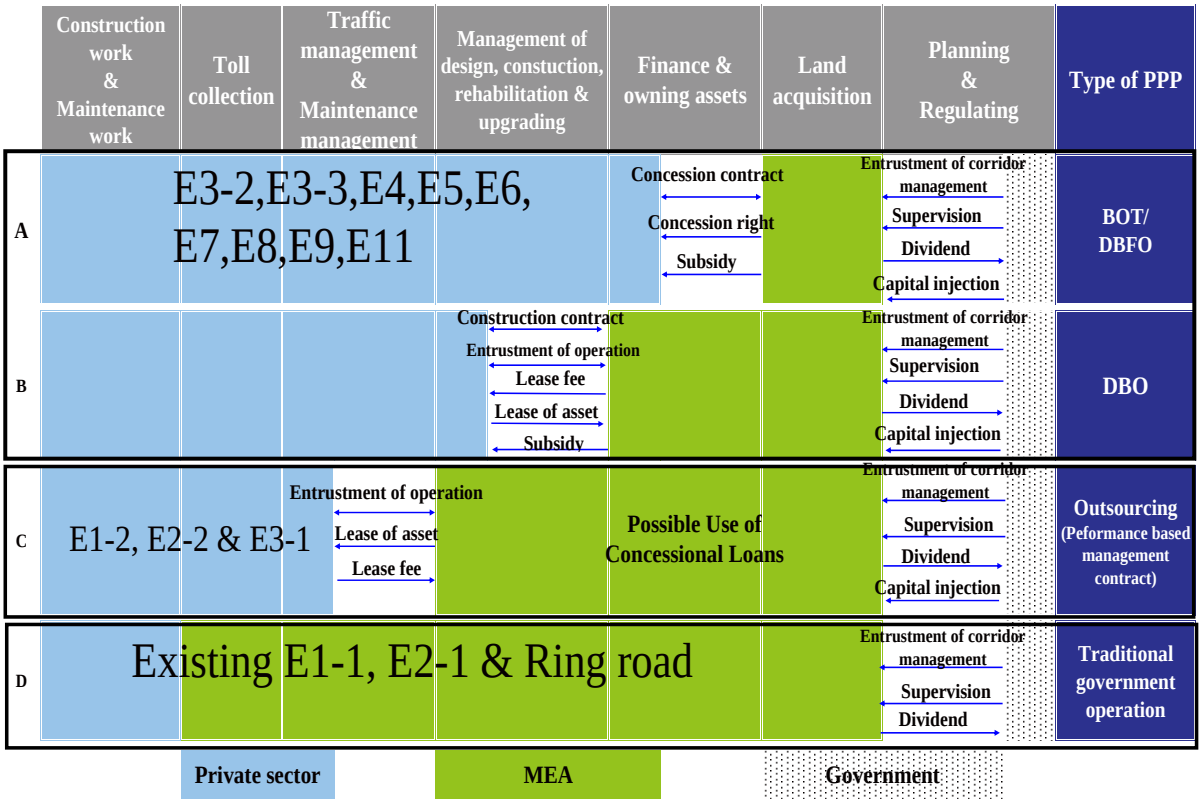
Implementation Plan

- *In the first phase,* the government will build and strengthen its basic function for project implementation, such as establishing a new organization which promotes the Expressway, introducing toll systems, and adopting necessary legislation.
- Construction of high priority routes will be started. It is desirable that utilizing concessional loans, such as ODA funds and state-owned bank loans, as well as Government capital subsidies in order to reduce financial costs and build a foundation of PPP scheme.

Evolution process of PPP and necessary actions



Comparison of possible PPP options for Cairo urban expressways



- Private participation will be promoted but limited to outsourcing of toll collection and operation and maintenance functions under performance based contracts.
- *In the second phase,* the private sector will finance a part of the Expressway network, covering its costs by tolls from users and, if necessary, government's payments for the service the private sector provides. Payments from the government will be paid based on the service level of the private sector.

Key Stimuli for Private Sector Participation

- Strong political commitment and continuous Government support for achieving self-sustainable network system and gaining confidence from the private sector.
- Establishment of an independent and financially sound executing entity which has power and function for network implementation.

Cashflow Analysis

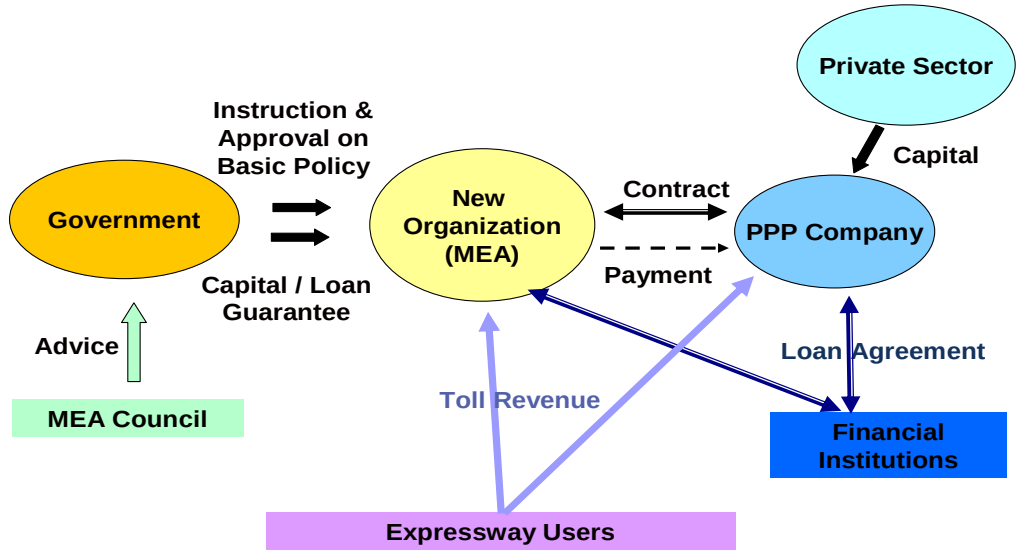
- Analysis of the cashflow shows that filling the financing gap in periods of construction of new Expressways, especially the period during 2014-18, is a challenge.
- Private sector financing will be required for the development of whole network.

Base case: 2011 Toll LE2
Revenue max case: 2011 Toll LE5

Cashflow Analysis Results

	Base case	Revenue max case
Stable positive net income	begin in 2024	begin in 2023
Total GOE equity (2009-2046)	592 millions of LE	2,378 millions of LE
Total GOE sub loan borrowing (2009-2046)	11,794 millions of LE	10,360 millions of LE
Completion of repayment of GOE sub debt	2031	2030
Total senior loan borrowing (2009-2046)	3,543 millions of LE	6,922 millions of LE
Completion of repayment of senior debt	2026	2027
Minimum DSCR for senior debt	54% (Year 2015)	18% (Year 2015)

Proposed Structure of Cairo PPP Expressway Network



- Setting an appropriate counterpart for PPP program in the public sector side to promote better coordination and dialogue between public sector and private sectors.
- Holistic approach to the network and effective and efficient use of toll revenues for future expansion and upgrading.
- In addition, capital and operating subsidies from the Government, including demand risk sharing with the Government, in order to lower financing requirements of the private sector down to the level affordable by toll revenues.
- On legislative issues, (i) appropriate and effective transfer of businesses from the public sector to the private sector; (ii) effective and efficient selection process of proposals from the private sector; (iii) appropriate risk allocation among the public sector and private participants.

Next Tasks

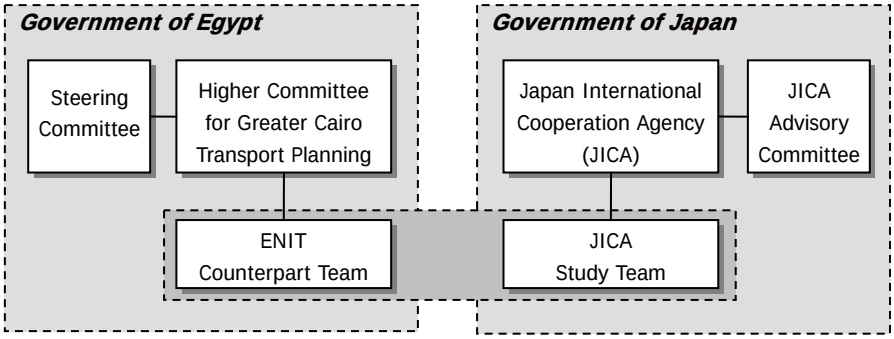
- The establishment of MEA Secertariate and starting in feasibility studies on high priority sections are important tasks to realize the Implementation Plan as scheduled.

Proposed risk sharing

◎: Main, △: Sub ○ Transferred to the private

Risk sharing	Current framework		Proposed PPP framework			
	GOE	Private	GOE	MEA	Private	Users
Political risk	◎		◎			
Legislative and regulatory risk	◎		◎	△		
Overall planning risk	◎		△	◎		
Force majeure	◎		◎	△		
Environmental risk	◎			◎	△	
Interest rate risk	◎			◎	△	
Devaluation and currency risk	◎		◎	△		
Inflation risk	◎			△	△	◎
Financing risk	◎		△	◎	△	
Design and construction risk	◎	△			◎	
Land acquisition risk	◎			◎		
Traffic demand and toll revenue risk	◎		△	◎	△	
Operational risk (MEA's responsibility)	◎			◎		
Operational risk (Private sector's responsibility)		◎			◎	

ORGANIZATION OF THE STUDY



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Mr. Kenshiro TANAKA	Assistant Resident Representative
Mr. Alfred ZOSER	Project Officer
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Ms. OGAWA Mariko (From September 1, 2005)	Deputy Team Leader / PPP Structure
Mr. IWATA Keiichiro (Up to August 31, 2005)	Deputy Team Leader / PPP Structure
Mr. SAKURAI Tatsuyuki	Deputy Team Leader / Toll Road Institution / Operational Plan

Dr. Ahmed Hamdy GHARIEB	Traffic Survey and Analysis
Mr. UENO Ryuichi	Demand Forecast
Mr. KOBAYASHI Kiyohito	Project Cost Analysis
Mr. KIMURA Toshio	Economic / Financial Analysis
Ms. NODA Yumiko	PPP Guidelines / Bidding Documents (1)
Mr. Alaa El SOUENI	PPP Guidelines / Bidding Documents (2)
Dr. Ahmed El-HAKIM	Toll Road Operation / Maintenance
Mr. ETO Munehiko	Financial Plan
Mr. BEKKI Tsuneo	Transport Policy
Mr. ISHIGURO Masakazu	Fund Arrangement

Higher Committee, Steering Committee and Stakeholders Meetings and Seminars

INTRODUCTION

INTRODUCTION

General

Greater Cairo Region (GCR) is estimated to accommodate a population of 22 million in 2022 which puts growing pressure on all infrastructure systems, including the road network system. At present, the urban transport situation, in general, is characterized by traffic congestions, constrained resources for public transport and deterioration of air quality. Congestion in GCR is caused by its excessive traffic demand and insufficient road capacity with inefficient traffic flow and ineffective traffic management. Results of previous studies show that everyday there are about half a million pcus (passenger-car units) entering and exiting the Study Area and one million pcus crossing the Nile River between the two Governorates of Cairo and Giza.

With new communities' development program towards the desert areas in the east and west, GCR requires unique solutions to promote the functional integration of the region, and the needs of inner city development. What the Greater Cairo Region needs is a transport development plan and projects that contribute to an efficient economic structure of the region, strengthen linkage with other parts of Egypt and provide a base for market-oriented transport activity.

JICA, Japan International Cooperation Agency, the official agency responsible for the implementation of the Technical Assistance Program of Japan, conducted the "Cairo Regional Area Transportation Study" (CREATS) starting in the year 2000, and a transport Master Plan for GCR was formulated in 2002 as the outcome of CREATS. In this Master Plan, the development of an Urban Toll Expressway Network was proposed.

To implement, operate and maintain the urban expressway network, huge financial resources are required. Conventionally, road projects have been financed out of the general revenues of the Government. As these sources will not be sufficient for the implementation of the urban expressway projects, new and stable sources of fund are required. This financial gap is expected to be filled by the private sector that is also expected to be capable of improving the quality of transport infrastructure services. The development of private sector involvement in the provision of public services can be achieved through ensuring private as well as public benefits. The benefits of private sector participation will be greater if the Government clarifies the responsibilities of involved governmental agencies and develops supporting polices on competition and regulation.

In response to the request of the Government of Egypt, the Government of Japan has decided to conduct the study on "Public-Private Partnership (PPP) Program for Cairo Urban Toll Expressway Network Development". Accordingly, JICA organized and dispatched a Study Team, from Katahira & Engineers International (KEI) and Price Water House Coopers (PwC), to Egypt to commence this one-year Study on April 2005. This Executive Summary is one volume of the Final Report, which is composed the two volumes of Main Report and Appendix. This summary provides mainly the outputs and results of each of the different major tasks of the Study.

Objectives of the Study

- To review and update the traffic demand, routing and development phasing plan of the Cairo urban expressway network (hereinafter referred to as "Expressway") proposed in the Master Plan of Urban Transport Projects in Greater Cairo Region (hereinafter referred to as "CREATS Master Plan") in November 2002;
- To set up the toll road system for the sustainable development of the proposed Expressway;
- To formulate a comprehensive program and strategy for the introduction of PPP program for the development of the Expressway;
- To enhance the capacity of the counterparts to promote and lead the PPP program and Expressway development, assuring that the Government of Egypt retains ownership in the implementation of the PPP program.

The Study Area

The Study covers the area studied in CREATS Master Plan including the whole length of the proposed Expressway.

PART I

URBAN TOLL EXPRESSWAY NETWORK DEVELOPMENT

1 The Need for Urban Toll Expressways

Necessity of Expressway Network

- With the rapid increase in traffic volumes and limited capacities of streets in urban areas without possibilities of widening the existing streets or the construction of new streets, the historical concept of providing elevated roads and expressways started to be the most realistic solution to solve traffic and transport problems.
- For decades, the traffic problem in Cairo Region has imposed itself as the cause of negative impact not only on the daily life of people and environment but on the socio-economic development on the country.
- CREATS Master Plan-2022 established an urban expressway network, in parallel with the development of all components in the transport sector with the objectives:
  - To reduce economic losses: by reducing Vehicle Operating Cost and time cost
  - To promote socioeconomic development: by improving the road transport sector as a basic infrastructure for inviting foreign and local investments.
  - To provide smoother and safe traffic flow: by reducing congestion
  - To reduce congestion: by providing expressway capacity of 2-3 times larger than ordinary road
  - To improve air quality: by decreasing traffic congestion, vehicle-hours and vehicle-kilometres as well as vehicular idling during stoppage at congestion.

Road-user Benefits

- Time value: Saving time as well as vehicles can be used in other purposes
- VOC value: Saving in the vehicle operating costs, including gasoline, tires, damage, etc., should be higher than the toll rate
- Comfort: Reduction in fatigue of drivers and passengers
- Efficient Public Transport: With less traffic on at- grade streets, buses move easily.
- The success of implementing this urban toll expressway network in Cairo is based on public acceptance, political commitment and Governmental support.

Necessity to apply Toll

- Although the basic principal is that a public road is free-of-charge to use, the urgency of, and the insufficiency in the fund for, road network development necessitate the governments to adopt toll road systems.
- Historically, public roads were not always free-of-charge as in the medieval ages, federal lords collected money from those who came into their territories.
- To construct elevated expressways in urban areas, huge investments are required.
- Collecting toll is justified by the beneficiary-pay principal for the new service provided by expressways as long as free alternatives of the at-grade street network exist.

Utilization of PPP

- Public-Private Partnership (PPP) is a useful tool for financing the urban toll expressway network project in order to reduce its life-cycle governmental burden, deliver better and less expensive services, contribute to private sector development and to support the national budget on the long-term.

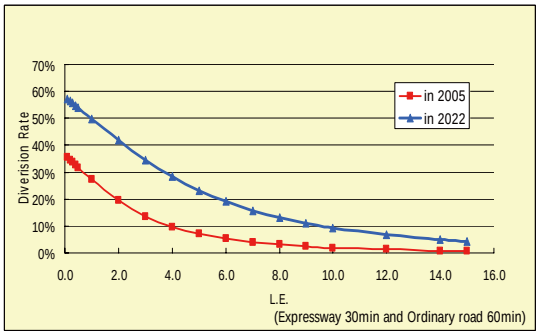
Old Concept of Elevated Roads [New York, 1904]

2 FUTURE TRANSPORT DEMAND

Traffic Surveys

- Traffic count and Willingness-to-Pay surveys are conducted in order:
  - To determine daily traffic volumes on the road network and the distribution of vehicle types in the traffic flow in order to update and supplement the OD tables of CREATS study.
  - To clarify individual potential to use the introduced urban toll expressway network and to identify indicators on the attitude of road users' willingness to pay a toll for the higher level-of-service provided by expressways.
- Traffic survey results show an annual average growth rate, from 2001 to 2005, of 3.5% in vehicular base and 3.7% in pcu base. OD matrices give the rate of 3.6%, which are similar to that of CREATS.
- Results of Willingness-to-Pay provide low rates, with 40% acceptance when travel time decreases by 50%. Results are used to develop Cairo Disaggregate Model for estimation of future diversion rates.

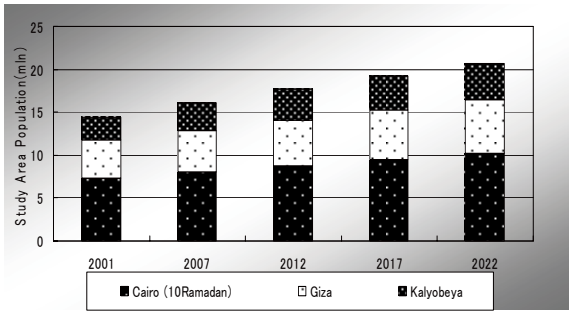
Present and Future Diversion



Socioeconomic Framework

- Population of the Study Area is expected to reach 20.7 millions in 2022.
- The applied medium economic growth scenario gives annual GDP growth rates between 4 and 5%.

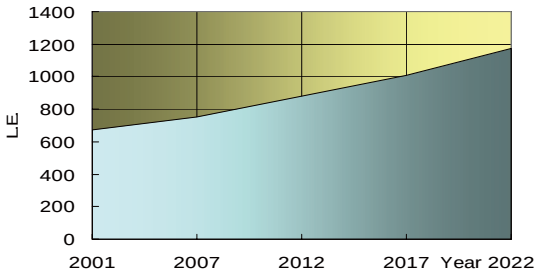
Forecasted Population



Employment – Medium Growth

Item	2001	2007	2012	2022
Population	14,392	16,098	17,649	20,721
Primary employed	155	159	163	172
Secondary employed	1,382	1,622	1,853	2,419
Tertiary employed	2,450	2,891	3,319	4,375
Total employed	3,987	4,673	5,336	6,966

Future Average Monthly Household Income



- The analysis results show that the future socioeconomic framework and OD matrices applied in CREATS Master Plan are still applicable to be applied in this Study since they fit with the present and future conditions.

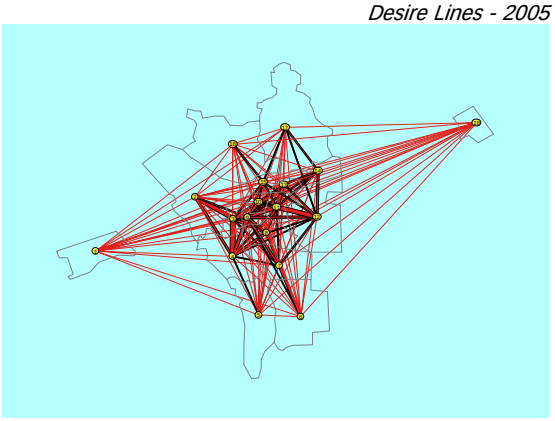
Future Demand Forecast

- The methodology of four-step model is applied to forecast the future demand.
  - Trip-end Model (Production / Attraction)
  - Trip Distribution Model
  - Modal Split Model
  - Traffic Assignment Model
- CREATS OD matrices on Person-trip and PCU base are converted to vehicular base by applying developed parameters for traffic composition and occupancy rates.
- The zoning system is composed of small (503 zones in 2005 and 525 in 2022), medium and large zones. Large zones with a total number of 18 are used for presentation purposes.
- Developed desire line charts in 2005 and 2022 show sudden increase of trips from 6th October city followed by 10th of Ramadan City. These high growth rates would put tremendous pressure on the road network in east-west directions and traffic crossing the Nile River.
- Cairo Governorate is expected to host about 6 million trips in 2012 and 8 million in 2022.
- Transition of trip-ends by vehicle category shows that the highest share belongs to passenger cars and to be followed by taxi.

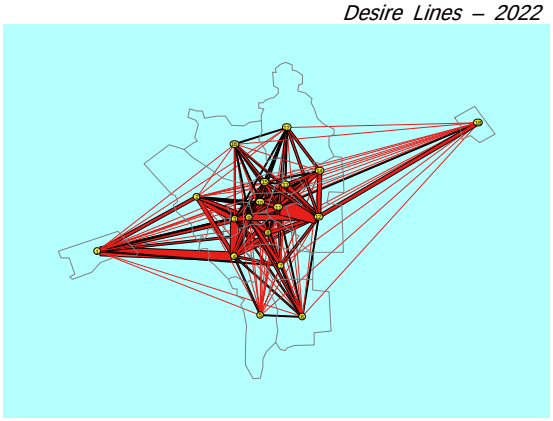
Indicators	2001	2005	2007	2012	2022
1.Population					
(1) Cairo*	7,364	7,785	8,005	8,688	10,359
(2) Giza	4,385	4,646	4,783	5,294	6,384
(3) Qalyobeyya	2,642	3,070	3,309	3,667	3,978
(4) Study Area	14,391	15,501	16,098	17,649	20,721
2.Employment at Work place					
(1) Cairo*	2,533	2,811	2,961	3,367	4,350
(2) Giza	1,027	1,149	1,215	1,401	1,882
(3) Qalyobeyya	427	472	496	568	734
(4) Study Area	3,987	4,431	4,672	5,336	6,966
3.Student at School place					
(1) Cairo*	2,669	2,652	2,643	2,681	2,815
(2) Giza	1,548	1,632	1,682	1,715	1,859
(3) Qalyobeyya	796	870	817	855	904
(4) Study Area	5,013	5,098	5,142	5,251	5,588
4.Average Household Income (LE/month)	672	726	754	879	1,176

Future Socioeconomic Framework

Desire Lines - 2005



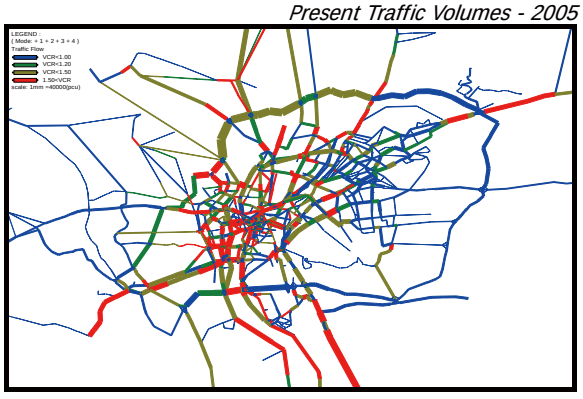
Desire Lines – 2022



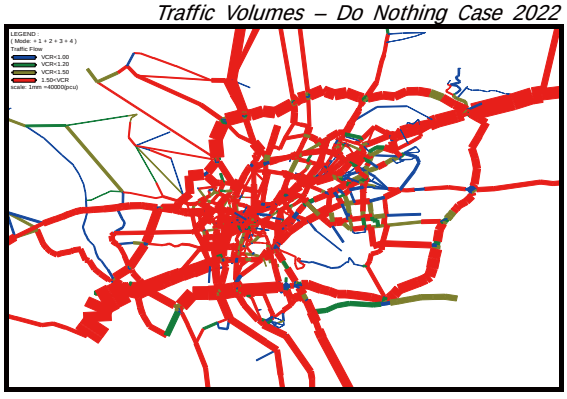
Assigned Traffic Volumes

- JICA STRADA (System for Traffic Demand Analysis) is used to assign the traffic volumes on the road network in two cases of "Without Project" and "With Project".
- Developed Cairo diversion model technique is applied to estimate the traffic volumes diverted from the at-grade streets to the new expressway network.
- By implementing the expressway network, the assignment results show an increase in speed by about 25% on the at-grade network and decrease of V/C from 1.53 to 1.46 in the target year 2022.
- Average V/C on the expressway network is estimated as 0.92 in 2022 for about 22 million pcu-km and 772,000 pcu-hr, with an average speed of 28.3 km/hr.

Present Traffic Volumes - 2005



Traffic Volumes – Do Nothing Case 2022



3 URBAN TOLL EXPRESSWAY NETWORK

Urban Expressway Plan

- The basic expressway network plan is generally proposed as a component in CREATS Master Plan Study. It is composed of seven corridors with a total length of 78.3 km. The estimated project cost in CREATS is about LE 9 billion.
- Review and modifications on the basic expressway network, in addition to all possible new links, are undertaken to improve its function as a network taking into consideration all possible corridors including links omitted from the "Do Maximum" scenario of CREATS. These links are proposed to be implemented in later years after the target year of 2022.

Optimum Expressway Network

- Field surveys and several cases of traffic assignment were applied on the proposed network, with a total length of 108.5 km.
- Links omitted in CREATS Plan are separately investigated in the cases of with and without these sections and it is proposed to implement these links in later years after the target year of 2022.
- The optimum network, with a length of 99.2 km (including 17.6 km of existing sections) is planned to be implemented until the target year 2022.

Components of the Optimum Network

Route	Length km	Location
E1-1	13.1	6th of October
E1-2	2.1	6th of October Extension
E2-1	4.5	15th of May
E2-2	1.2	15th of May Extension
E3-1	6.8	Autostrad El Nasr Street in Nasr City
E3-2	5.8	Autostrad from Nasr City to Citadel
E3-3	6.9	Salah Salem from Citadel to Giza Sq.
E4-1	4.7	Abu Bakr El-Sedeeq
E4-2	7.5	Ibn El hakam – El Matariyah
E4-3	5.3	Tereat Ismailia – Al Warraq
E5-1	5.7	Cairo-Alexandria Agriculture Road
E5-2	5.3	Ahmad Helmi Street
E6	7.5	Cairo-Suez Road
E7-1	11.0	Gesr El Suez (Ismailia Desert)
E8-1	3.0	Tereat El-Zumur South of King Faisal
E8-2	1.7	Tereat El-Zumur North of King Faisal
E9	4.0	Tereat El-Zumur in Bolaq el Dakroor
E11	3.1	From Tereat El-Zumur to Ring Road
Total	99.2	

Cross Sections and Viaduct Plans

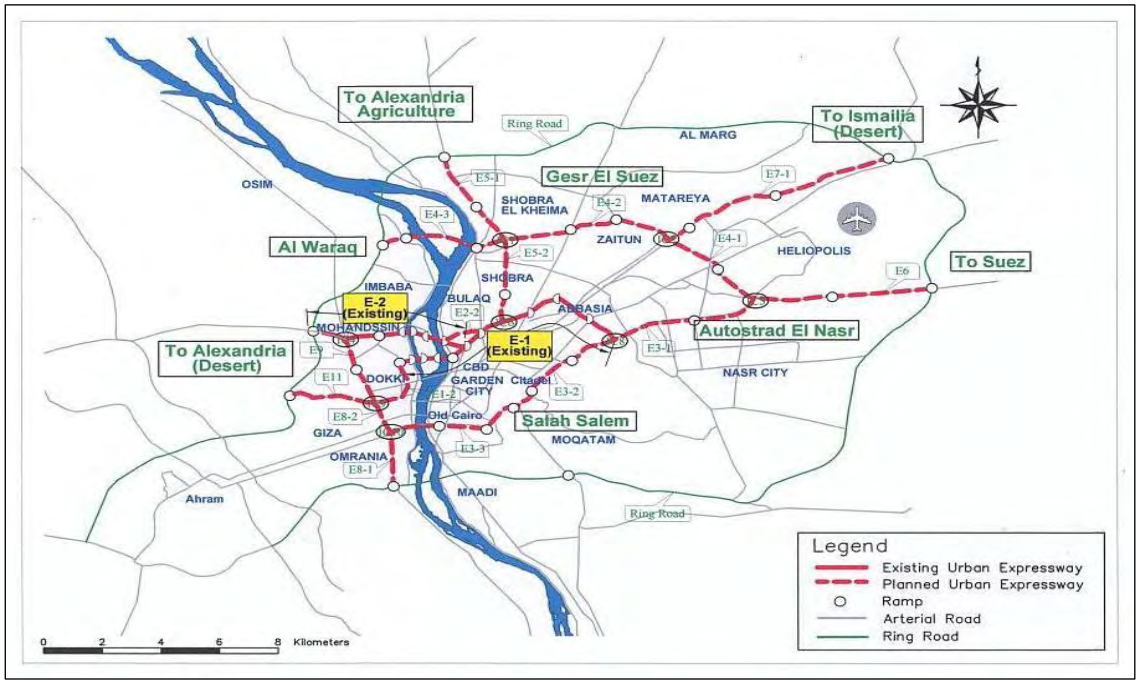
- Several types of cross sections are selected and their advantages and disadvantages are investigated which are:
  1- Standard Viaduct
  2- At-Grade
  3- Half-Underground (Semi-depressed)
  4- Separated Viaduct
  5- Gantry-Pier Viaduct
  6- Single-Pier Double-Deck
  7- Gantry-Pier Double-Deck

Standard Viaduct

Single-Pier Double-Deck Viaduct

- Basically, 4-lane structures are proposed in CREATS and in this Study. However, 6-lane cross-sections are required at some limited diverging locations where ADT is more than 50,000 PCU/direction in 2022.
- Alignment of the expressways is generally following those of existing wide streets.
- Preliminary topographic surveys were conducted under this Study to identify the type of cross section required for each expressway segment.
- In examining the horizontal alignments, design speed of the expressways is assumed 80 km/hr.
- It is considered appropriate that provision of exclusive bus lanes be excluded in the discussions on PPP schemes.

Optimum Greater Cairo Urban Toll Expressway Network



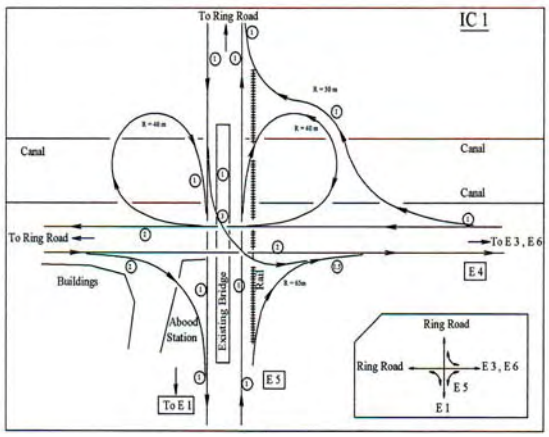
Interchanges

- A total of 9 interchanges are required to be constructed for the optimum expressway network.
- Some of these interchanges are located at places with various physical constraints.
- In planning the configuration of each of the interchanges, considerations are given basically to:
  - Conservation of existing fly-overs and bridges
  - Minimizing the acquisition of additional land
  - Omission of unnecessary on-ramps on existing elevated roads.

On-Ramps and Off-Ramps

- A total of 14 locations of entrances and exits are proposed on the newly constructed expressways that give an average interval of about 5.6 km.
- Longer intervals are desirable to secure smooth traffic flow; shorter interval is preferable from road-users to have more opportunities to enter/exit from the expressway. During future F/S studies on each expressway, more ramps should be considered.
- In Tokyo, as reference, the average interval of entrances and exits along the Metropolitan Expressways is 3.2 km.

Layout of Interchange No. 1

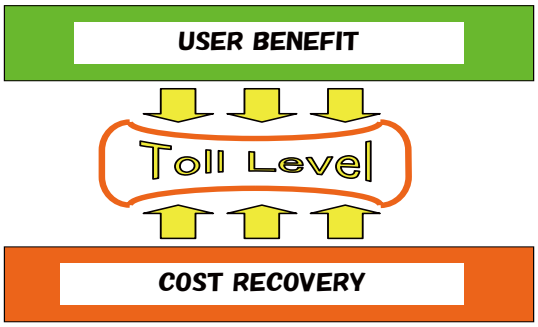


Tokyo Metropolitan Expressway

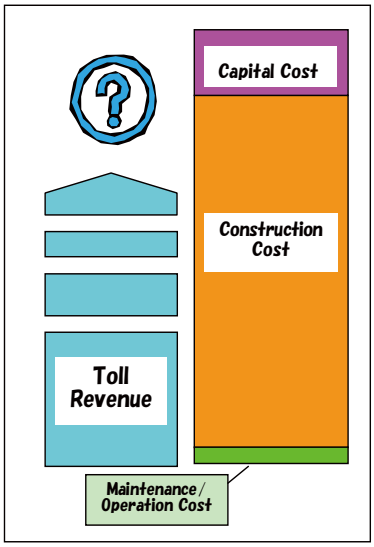
4 TOLL SETTING

Toll Level

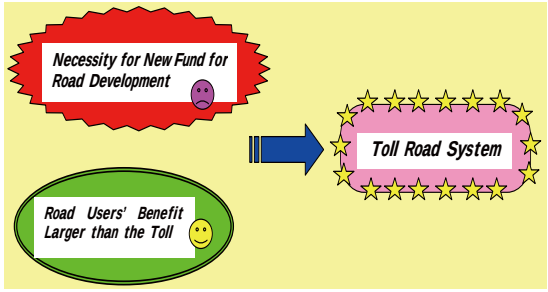
- The existing Road Law stipulates the necessary fundamental matters of toll road system, but it needs some revision and/or supplements to be applied on the planned urban toll expressway network.
- Toll rates are stipulated in the existing Road Law, however, these rates are too low. Higher rates are necessary for the PPP entities to recover the construction cost, including the interest.
- Most countries adopt the "Justifiable Toll Level Principle" in which the toll level should be equal or less than benefits enjoyed by road users. The second principle called "Cost Recovery Principal" indicates that the toll level should be set to cover the maintenance and operation cost and/or construction cost, is not widely adopted. These two principles define the upper and lower limits of toll level.
- The toll of the planned urban expressways is proposed to be around LE 5.0 per entry to be collected from the Year 2012.



Upper & Lower Limits of Toll Level



Cost Recovery



Justification for Toll Road System

Willingness-to-Pay

- Results show that at the toll of LE 2.0, only 20% of the surveyed road users accept to divert to the new toll expressway. The ratio drops to 10% at LE 4.0.
- This is a very discouraging implication since LE 4.0 multiplied by traffic volume is far below construction cost.
- However, the road users seem to judge the service level based on exiting viaduct conditions. When the levels of service improve in future, it is expected that this ratio will be increased.

Affordability

- Estimation of road users' capacity or affordability to pay the toll road is objectively estimated from the level of average household income at present.
- The results show that the total monthly expenditure is about LE 1,000 and with a ratio of 7.62% to be spent on "Transport and Communication".
- The monthly expenditure is about LE 3,000 of the car-owner household in year 2000, of which 2% (about one third) can be spent on toll roads.
- The amount that can be spent by average car-owner household is estimated at LE 78.0 per month, i.e. a toll level of LE 2.0 per entry equivalent to 39 or about 20 times of round trips.

Cost of Other Transport Modes

- The proposed toll level of LE 5 is much higher than the fare level of other transport modes including the subway since it is subsidized by the government.
- In view of this situation, it may be justified that the government subsidize the planned urban expressway, as necessary, through a shadow toll, for example.

International Comparison

- Toll rate in other countries in case of urban toll roads show that it ranges between US$ 0.5 and US$ 1.5, regardless of the GDP/Capita.
- In case of interurban toll roads, the toll level increases as GDP per Capita increases. The toll rates per km of the interurban toll roads ranges between US₡ 2 and 3 per km for the GDP/Capita of US$ 1,000 to 5,000.

Toll Level that maximizes Toll Revenue

- Estimating the toll level that maximizes the total toll revenue is an important factor to assess the financial viability of the project.
- It is found that the maximum revenue is obtained at the toll rate of LE 4 to 5 for the year 2012 and LE 7 for the year 2022.

Toll Level and Vehicle Categories

- In Egypt the existing Road Law adopts 5 vehicle categories with different toll level on interurban toll roads. For urban toll expressways fewer numbers of categories are usually adopted.
- The ratio of the lowest toll (for passenger cars) and the highest (for heavy large trucks) is 1 to 5.
- The above stated toll ratios in Egypt are comparable to the international standard of 1:3 to 1:5 in many countries.

Flat Toll and Distance-Dependent Toll

- Distance-dependent toll rate or "Close (Toll) Systems", is mostly adopted for interurban toll roads.
- Flat toll rate or "Open (Toll) System" is usually used in urban toll road network.
- The rapid technological development of Electric Toll Collection (ETC) systems in recent years has enabled much shorter toll collection time. These technologies are advancing very rapidly. Thus, it is possible to introduce distance- dependent system for urban expressways if ETC is adopted for toll collection.
- The most suitable toll collection system needs to be determined in the detailed design stage or even later.

Toll Adjustment Mechanism

- Toll is collected for a long period, such as 30 years. It is highly possible that substantial inflation of the economy occurs during this long period. To cope with this inflation, the toll rate is adjusted (usually raised).
- Toll adjustment becomes necessary also when new sections are attached to the existing expressways.
- If foreign currency is invested to finance the expressway and is to be recovered by toll revenue, toll level has to be adjusted based on the exchange rate.

Cross Subsidy and Flat Toll System

- The unit construction costs per km of the expressway differ from one section/line to the other while the same flat toll rate is applied.
- Due to the fixed flat rate and changes in construction cost, some sections/lines are more profitable than others.
- There is a need to establish mechanism whereby the surplus of profit from high profitable sections/lines is used to subsidize less profitable sections/lines.
- If sections/lines operated by different entities, this mechanism is indispensable.
- If the whole network is constructed and operated by a single entity, such as MEA, the transfer of profit surplus can be internally done.
- This mechanism is called "Cross Subsidy", or "Toll Revenue Pooling System".

Tokyo: Early 1950s

Tokyo Metropolitan Expressway at Present

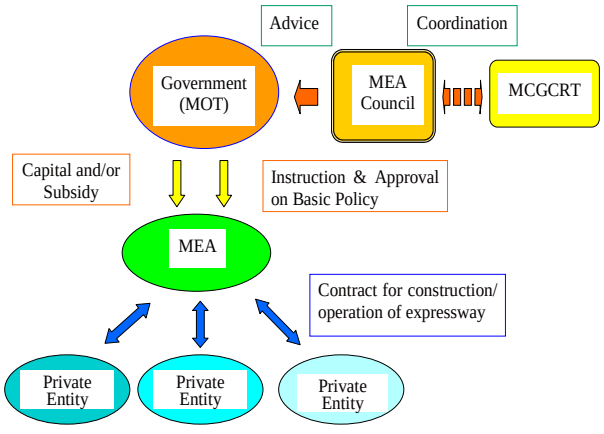
5 INSTITUTIONAL SETUP

CREATS Institutional Setup

- CREATS recommends the establishment of a "Ministerial Committee for Greater Cairo Region Transport (MCGCRT)" and "Cairo Metropolitan Transport Bureau (CMTB)".
- It is interpreted that the basic functions of MCGCRT and CMTB do not include direct planning or implementation of practical construction or operation of the transport facilities.
- CREATS recommends establishing a new organization, hypothetically named as the "Metropolitan Expressway Authority (MEA)" to develop and supervise the new urban toll expressway network in Greater Cairo.

Necessity of New Organization

- Cairo Expressway Network is a new and high level-of-service national infrastructure project which needs highly specialized professional expertise.
- The design, construction, maintenance, operation and control of the new transport infrastructure facility need to be based on new ideas not influenced by the precedent cases of old concepts.
- A new organization with new ideas, energy and efficiency should be in charge.
- The “Metropolitan Expressway Authority” (MEA) should be established under the Ministry of Transport to vigorously promote this national Project.
- This organization will assist the Government to plan PPP packages, evaluate proposals, negotiate with proponents and monitor the implementation and other tasks including management of the expressway.



Institutional Set-up

- Greater Cairo Urban Toll Expressway Network is shared among three Governorates; Cairo, Giza and Qalyobeya. No existing organization has such a jurisdiction.

Alternatives of Institutional Setup

- Several alternatives are considered under the Study; which are:
  - Establish a new organization such as MEA.
  - Establish a new division or section within the MOT.
  - Establish a new organization with main initiatives and supervised by the relevant governorates.
  - Establish a new organization as a joint venture enterprise with investment by the Government and private investors.
- Through comprehensive assessment of the "pros and cons" of these alternatives, the first alternative of establishing MEA is recommended under the supervision of the Minister of MOT as the most preferable organization.

Governing Mechanism of MEA

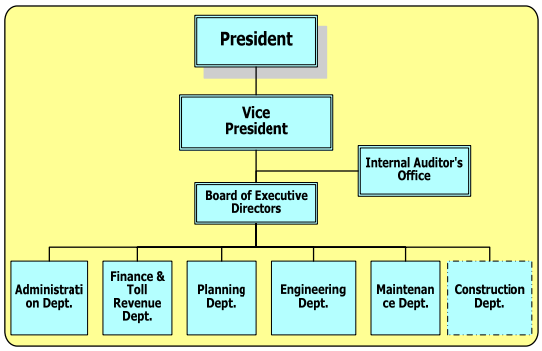
- It is assumed that MEA is responsible for the implementation of the planned expressway network exclusively and solely
- Therefore, all the PPP projects will be supervised by MEA.
- MEA will be allowed to directly construct, maintain and operate any section of the planned expressways.
- Other governing options include:
  - MEA is supervised by the Minister of Transport with advice by the MEA Council consisting of three governorates and representatives of all the concerned agencies: recommended
  - MEA is supervised by the Prim Minister or a minister specially appointed by the President: too strong political power.
  - The stakeholders participate in governing MEA as the members of the General Assembly and/or the the member of the Board as stipulated in the Public Business Sector Companies Law: weak political power.

Power and Function of MEA

- To borrow money needed for construction, maintenance and operation of the network
- To use toll revenue to maintain and operate the network
- To amortize loans of funds for construction of expressways
- To evaluate proposals of PPP schemes for any section or line of expressways
- To regulate traffic or stop the passage of vehicles in case of emergency.

Organizational Structure of MEA

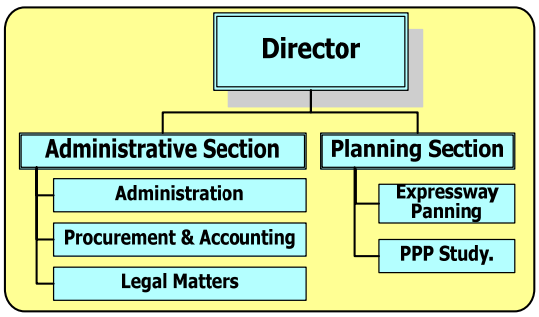
- The main framework of the final proposed organization of MEA consists mainly of six departments.



Proposed Final Organization of MEA

Staged Development of MEA

- MEA Organization cannot be established in its full-fledged form.
- MEA has to be developed in stages, starting with a Secretariat that can be the core of future institutional development.
- The Secretariat Office will prepare the organization plan, draft necessary revision of relevant legislation and coordinating and administrative works.



MEA First Establishment

- After establishing MEA, announcements of PPP projects will be prepared together with procurement of construction works.

Staff Size of MEA

- Toll collection, routine maintenance and road patrol are the jobs assumed to be out-sourced to private enterprises.
- All other works such as inspection and periodic maintenance are assumed to be contracted out to private contractors.
- The staff sizes of MEA's various departments will increase corresponding to various development stages of MEA.
- The staff sizes are estimated at 57 shortly after establishment, 114 at early stages and 163 at fully developed stage.

Institutional Capacity Development

- As soon as the new organization of MEA is established, it has to have sufficient capacity to operate the new urban toll expressways.
- The areas where the capacities unique to MEA are required are:
  - Toll setting and revision
  - Toll collection
  - Financial management of toll road
  - Evaluation and negotiation of PPP schemes and contracts
  - Traffic management including traffic information
- In addition, the general capacity for such tasks as planning, designing, construction management and maintenance of both ordinary highways and expressways is required.

Capacity Development of Staff

- Methods of training include: self-training, on-the-job training, off-the job training, group training and individual training.
- Major training subjects include: Traffic Control / Management, Expressway / Toll Road Maintenance, Transport Economics, Toll Road Financing and Evaluation and Negotiation of PPP Projects
- Major staff and trainee groups are Civil Highway Engineers, Toll Policy Experts, Toll Road Financing Expert and PPP Expert.
- Training of different groups of field crews is also an important issue that should be done by MEA personnel.

Standardization and Manuals

- Standardization of working procedures of MEA activities is necessary.
- Manuals/guidelines are needed by MEA.

6 OPERATION AND MAINTENANCE SYSTEM

Basic Concepts

- Higher levels of works are required for the toll expressways because of the high travel speed of the vehicles and road-users' expectation for the "return for the toll".
- With introduction of PPP, different maintenance and operation approaches are expected utilizing know-how of private sector.
- Toll Road Management consists of: Operation, Maintenance, Upgrading, as well as Planning, Construction Management, Financing and others.
- Operation covers the two major activities of Toll Collection and Traffic Management.
- Maintenance deals with the activities of Inspection, Road Cleaning, Repair and Rehabilitation. Maintenance is planned from the viewpoint of asset management.
- Another important task is the upgrading of the function of expressways, including widening and the strengthening of bridges and viaducts to cope with the increase in volumes, vehicular weight, changing from ordinary AC surface to permeable AC surface and installation of noise fences.
- Route numbering system is strongly recommended for making guide signs easy for drivers to understand.

Toll Collection Systems

- There are two types of toll systems which are usually adopted:
  - "Flat toll system" (or "open toll system")
  - "Distance-dependent toll system" (or "closed toll system").
- Where flat toll system is adopted, toll is collected (usually at the entrance) based on the visual vehicle classification by the toll collectors, or special devices. In manual collection, toll can be paid in forms of cash or coupon (with discounted rate for frequent users). A major disadvantage is the time required for toll collection.
- In the Electronic Toll Collection "ETC", collection of tolls is based on the automatic identification and classification of vehicles using electronic systems.
- The ETC system is an advanced system that can be adopted in the proposed urban expressway network, however, further studies are required during FS / DD studies to select the optimum one.

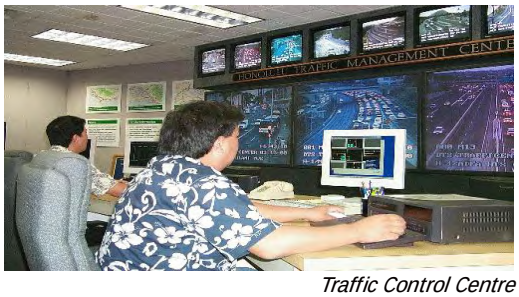
Toll Plaza

Traffic Management System

- Traffic Management System covers the following major aspects:
  - Traffic Information System (TIS),
  - Traffic Monitoring/Surveillance System,
  - Traffic Control/Regulation System,
  - Rescue and Assistance to Broken-Down Vehicles,
  - Clearance of Accident Site,
  - Ambulance Services, and
  - Other activities in relation to parties relevant to traffic management.

Car Mounted Sign

- Traffic Management here is distinguished from the "traffic control". "Traffic Control" is used to mean regulation or control of traffic by police officers (or law enforcer).



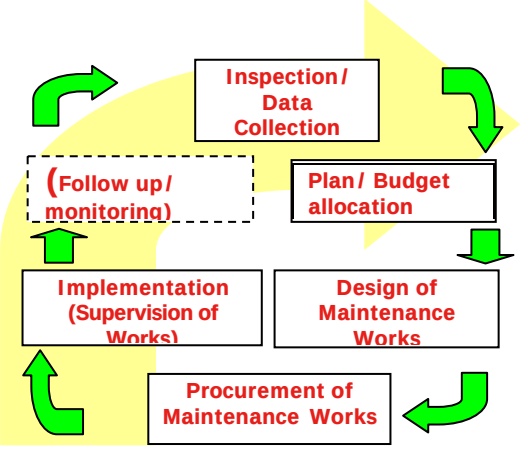
Traffic Control Centre

Standardization of Work Procedure

- Standardization of work procedures is the key factor to improve and guarantee the quality and efficiency of work.

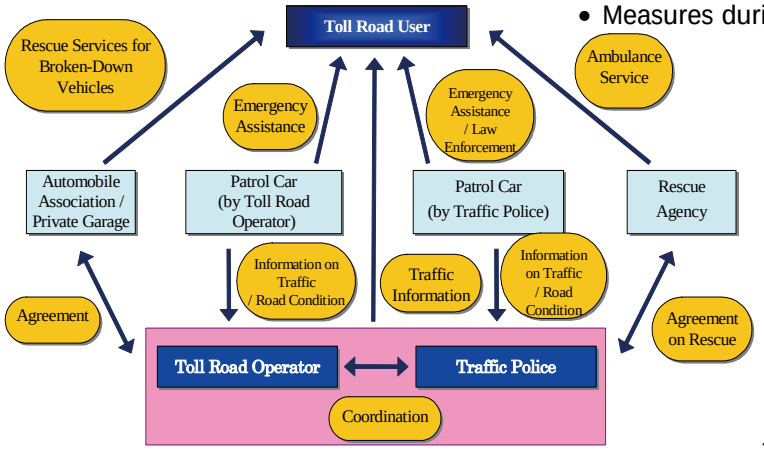
Maintenance System

- The "maintenance system" refers here to a series of procedures which form a cycle.



Cycle of Maintenance System

- Basically required maintenance works for the expressway network are similar to other roads, which are: routine, periodic and emergency maintenance.
- Recently, a new type of road maintenance contract called "Performance Based Contract" (PBC) is being widely adopted.
- An efficient and systematic maintenance work plan can be drawn-out based on the frequency of activities required.
- Traffic regulation for maintenance works needs to be carefully designed to avoid any hazardous situation and to minimize the traffic disturbance.
- Proper plans for management of road assets should be prepared based on an accurate periodically updated inventory surveys with relevant documentations.



Parties Relevant to Traffic Management

Level of Maintenance

- Securing a uniform level and manner of maintenance over the entire expressway network is very important for traffic safety.
- Setting this level between MEA and PPP entity should be clearly stipulated in the contract of concession.
- Required level of maintenance depends on the current practice and social background.

Potential Environmental Impact

- The potential environmental impacts from the expressway network may include:
  - Impact on historical and cultural sites
  - Impact on land use
  - Impact on aesthetics/modification of Scenery

Major Mitigation Measures

- Measures During Pre-Construction Phase:
  - Proper selection of alignment and sites of construction
  - Coordination with environment agencies
  - Preparation and execution of proper environmental management and monitoring plans
  - Preparation and execution of transport and traffic management plans.
- Measures during Construction Phase:
  - Proper environmental management and monitoring during all works.
  - Execution of transport and traffic management plans
  - Construction of safety precautions
  - Planting of trees, landscaping and re-establishing situation
  - Enforcement of laws and regulations.
- Measures during Operation Phase
  - Pollution control at bridges and underpasses.
  - Installation of sound barriers.
  - Noise and engine control
  - Proper operation and maintenance
  - Proper environmental management.
  - Safety precautions
  - Strict enforcement of environmental laws and regulations.

7 ECONOMIC AND FINANCIAL ANALYSIS

Cost Analysis and Estimation

- Cost is estimated based on the actual construction cost of similar structural items taking into consideration inflation rates.
- Primary Cost components are construction cost, land acquisition cost and traffic information system cost.
- Annual Cost components are: maintenance cost, traffic management cost and toll collection cost.

Summary of Project Cost

	Section	Primary Cost (m LE)	Annual Cost (m LE/year)
New Construction	E3	2,001	1.73
	E4	1,917	1.83
	E5	917	1.08
	E6	552	0.70
	E7	1,734	1.66
	E8	570	0.35
	E9	331	0.31
	E10	379	0.31
	E11	274	0.26
	IC	1,729	0.00
	Sub-Total	*10,404*	*8.23*
Exist	E1-2	356	2.42
	E2-2	99	1.12
	Sun-Total	*454*	*3.53*
M/O	Traffic Management	0	3.59
	Toll Collection	0	1.05
	Sub-Total	*0*	*4.64*
Total		10,858	16.41

Note: M/O: Maintenance and Operation, RR: Ring Road

Prioritization of Expressways

- Developed prioritization criteria are based on urban development, traffic efficiency (volumes - speed - congestion), economic and financial aspects, and physical and social environmental impacts.

Priority Ranking

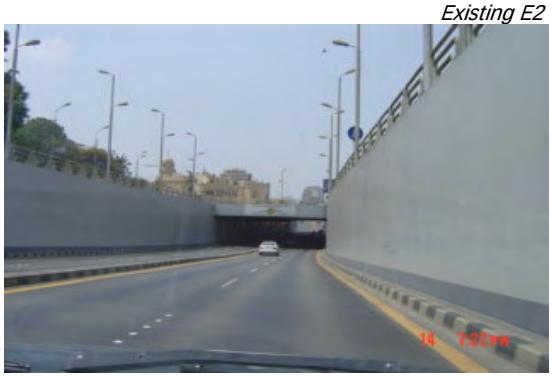
Priority Ranking	Route
Top Priority	E1 - E2
Second Priority	E3 - E4 - E5
Third Priority	E6 - E11
Fourth Priority	E7 - E8 - E9

Alternative Network Scenarios

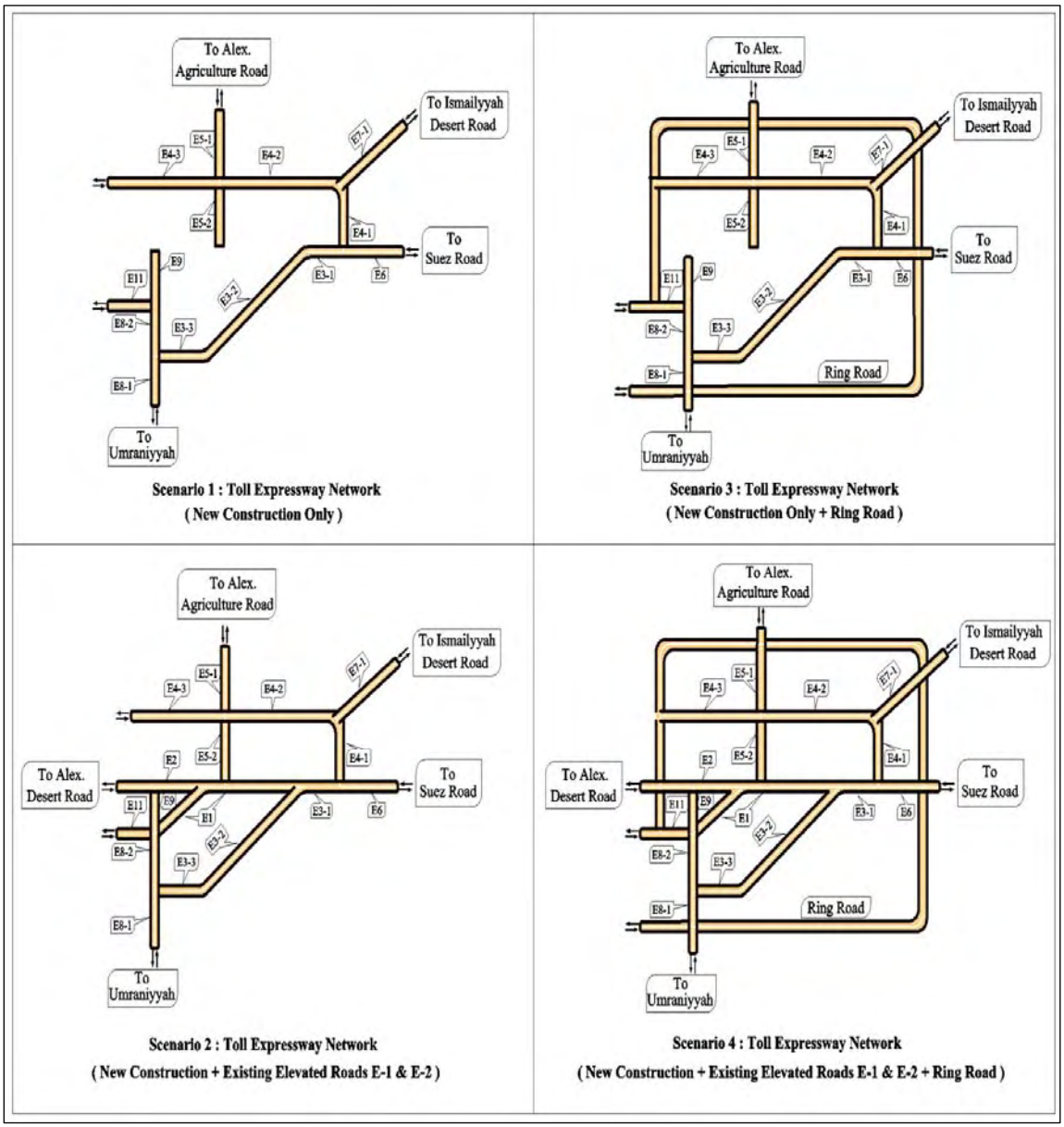
- To ease the repayment of the project high construction cost, two measures are considered.
  - Users on existing E1 and E2 will be levied toll charge.
  - Users on existing Ring Road will be levied toll charge.
- Four alternative scenarios are established for the expressway network that will be subject to toll collection.
  - New construction expressways
  - New Construction + existing E1 and E2
  - New construction + Ring Road (RR)
  - New construction + E1 and E2 + RR
- A comparative analysis is undertaken on the parameters of traffic conditions (speed and congestion), system efficiency for both expressway and at-grade networks (pcu-km, pcu-hr and travel cost), financial viability (FIRR and cost-revenue ratio), economic viability (EIRR, NPV and benefit-cost ratio) and environmental impact (air quality).
- Scenario 4 is the most preferable, especially from economic and financial aspects. This scenario is adopted for the developed PPP Program and cash flow analysis.

Existing E1

Existing E2



Cairo Ring Road (RR)



Scenario Evaluation - 2022

Scenario	Ex'ways veh/day ('000)	Network PCU-km ('000)	Network PCU-hr ('000)	NPV (LE m)	B/C	EIRR %	FIRR %	Reduction in CO (ton/day)	Ex'ways veh/day ('000)
1	337	147,727	11,536	4,940	2.33	26.67	6.3	6.9	337
2	444	147,635	11,593	4,329	2.08	24.14	7.7	7.1	444
3	912	147,291	11,242	7,356	2.97	36.28	16.3	7.8	912
4	1,713	147,122	11,157	7,846	2.96	38.78	17.2	8.2	1,713

Evaluation of Expressway Network

- The adopted expressway network plan (Scenario 4) is comprehensively evaluated based on the following factors:
  - Improvement of Traffic Efficiency
  - Improvement of System Efficiency
  - Financial Viability
  - Economic Viability
  - Environmental Impact
- Traffic Efficiency: The results show that by implementing the expressway network, the average travel speeds of the whole network will increase from 12.2 to 15.7 km/hr, and on the expressway network will increase from 15.3 to 25.2 km/hr in 2022.
- System Efficiency: VCR will decrease by

about 15% in 2012 and 8% in 2022. It is also concluded that both PCU-km and PCU-hour will decrease on at-grade road network and on the expressways as well.

- Financial Viability: The results indicate that the annual revenue on expressways is about 1,924 million LE in year 2022. The annual Ring Road revenue is estimated at about 247,623 million LE by year 2022.
- Financial Sensitivity Analysis: is conducted under a worse-case scenario with a cost increases by 20% and revenue decreases a by 20%. FIRR is estimated as 11.2%.
- Extended Schedule Sensitivity Analysis: Under this case, an extended construction period up to the year 2032 is considered. The results show that if the all expressway will be constructed by the year 2032 instead of 2022 as assumed, to add the revenue of 10 years more, indicators show higher financial viability with an estimated FIRR of about 27.8%.
- AAGR (Annual Average Growth Rates) of expressway users are estimated between 2012 and 2022 to be too high with about 22.3% in average.
- Economic Evaluation: is conducted using the benefits as savings in the vehicle operating cost, time cost. The project life period is assumed 30 years with a discount rate of 10%.
- Economic Sensitivity Analysis: is conducted under a worse-case scenario with a cost increases by 20% and Benefit decreases a by 20%. EIRR is about 24.9%.
- Air Quality: The air pollution components of HC, CO and NOx produced under both cases of "with" and "without" the project are estimated. With project case provides recognizable improvements in air quality.

Financial Indicators

Indicator	Value
Construction Cost (LE Million)	9,825
Revenue 2012 - 2045 (LE Million)	86,195
Revenue / Construction Cost	8.8
FIRR (%)	17.2

Sensitivity Analysis of Financial Parameters

Item			Revenue (R)		
			-20%	Base Case	+20%
Cost (C)	-20%	R/C	1.41	1.77	2.12
		FIRR %	17.2	21.4	26.0
	Base Case	R/C	1.13	1.41	1.7
		FIRR %	13.7	17.2	21.7
	+20%	R/C	0.94	1.18	1.41
		FIRR %	11.2	14.3	17.2

Note: 2005 Constant cost w/o escalation

Economic Indicators

Economic Indicator	Value
NPV (LE Million)	11,508
BCR	3.44
EIRR%	38.78

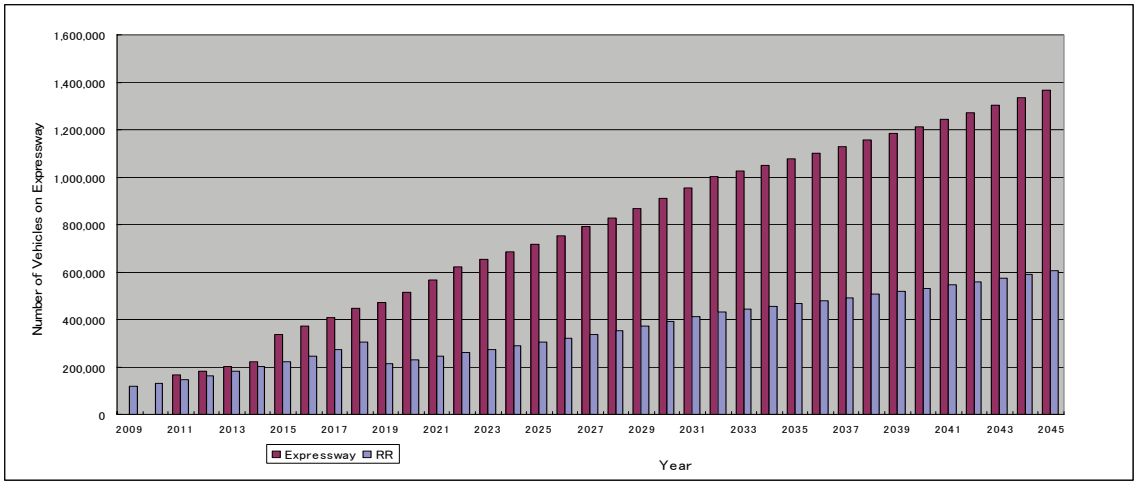
Sensitivity Analysis of Economic Indicators

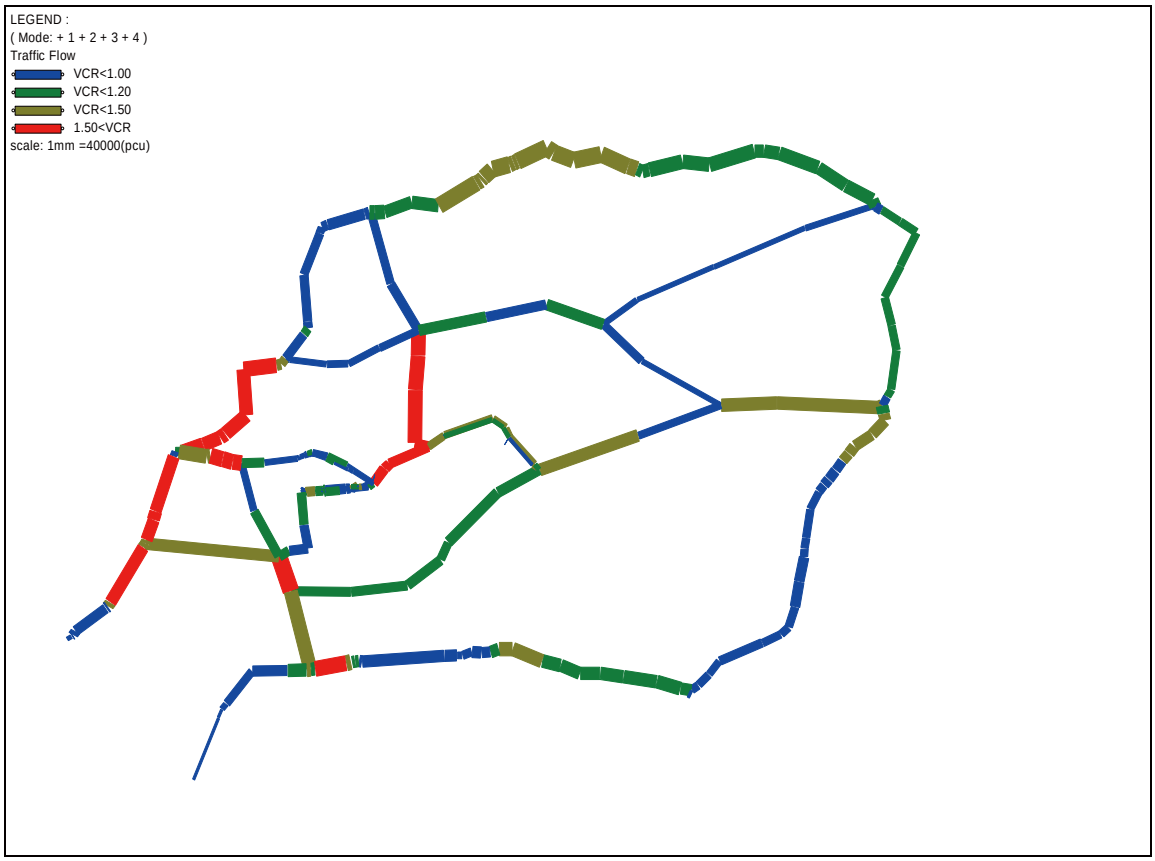
Indicator			Benefit (B)		
			-20%	Base Case	+20%
Cost (C)	-20%	NPV (mLE)	9,206	12,450	15,695
		B/C	3.44	4.30	5.16
		EIRR %	38.8	50.3	61.5
	Base Case	NPV (mLE)	8,264	11,508	14,752
		B/C	2.75	3.44	4.13
		EIRR %	30.4	38.8	47.7
	+20%	NPV (mLE)	7,321	10,565	13,809
		B/C	2.29	2.87	3.44
		EIRR %	24.9	31.6	38.8

Improvement in Air Pollution (Kg/day)

Year	Air Pollutants	Do Nothing	With Project	Difference
2012	HC	24,997	24,555	442
	CO	206,666	203,017	3,649
	NOx	24,406	23,975	431
2022	HC	38,356	37,369	987
	CO	317,115	308,956	8,159
	NOx	37,450	36,486	963

Forecast of Expressway Users





Assigned Traffic Volumes on Toll Expressway Network in 2022 – Scenario 4

Basic Annual Investment Schedule (million LE)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Route/Section														
E1–2		12.4	188.0	153.9										
E2–2		3.4	51.9	42.5										
E3–1		28.0	165.6	331.1	165.6									
E3–2			19.7	135.7	271.5	135.7								
E3–3			28.0	193.6	387.1	193.6								
E4–1					16.3	112.1	224.3	112.1						
E4–2					32.0	220.7	441.4	220.7						
E4–3						21.2	146.1	292.2	146.1					
E5–1							16.4	113.2	226.4	113.2				
E5–2								16.4	113.0	226.1	113.0			
E6								19.6	135.5	271.0	135.5			
E7–1										36.5	252.1	504.2	252.1	
E8–1											17.6	121.7	243.3	121.7
E8–2											29.0	13.5	27.1	13.5
E9											11.8	81.7	163.4	81.7
E11											9.8	67.9	135.7	67.9
Interchange														
IC1								11.4	157.5	157.5				
IC2										10.5	144.5	144.5		
IC3						6.8	93.9	93.9						
IC4												2.0	27.2	27.2
IC6									5.0	69.1	69.1			
IC8				5.6	77.3	77.3								
IC9												6.3	87.7	87.7
IC10												7.7	105.9	105.9

Implemenation Schedule	0	43.8	453.2	862.3	949.7	767.4	922.0	879.5	783.5	883.9	782.4	949.4	1,042.3	505.4

Design Construction

8 HIGH PRIORITY EXPRESSWAYS

- High priority expressways, which should be urgently constructed in the first stage of the implementation program, are identified based on the results of the prioritization multi-functional criteria developed under the Study.
- Results of the economic evaluation on the high priority expressways show high economic viability; especially for E1+E2 with low construction cost for extension purposes only, while E3 includes a relatively high cost due to the bridge over the Nile River.
- Positive environmental impact, especially on the air quality is expected through the daily reduction in air pollution.

Economic Parameters

Expressway	NPV (m LE)	B/C	EIRR %
E1 + E2	4,945	9.84	48.7
E3	3,331	2.85	20.4

Daily Reduction in Air Pollution (kg in Year 2022)

Expressway	Veh./day	HC	CO	NOx
E1 + E2	222,217	31.2	258.0	30.5
E3	149,172	23.1	190.6	22.5

- The location maps clarify three stages of project implementation for the years 2011, 2013 and 2016, in which E4 is included as the next expressway providing another east-west alternative that crosses the Nile.
- In order to timely implement the high priority expressways, and consequently other expressways for the sustainable development of the network, it is important to follow the established action plan for all the required tasks.
- Under this plan, the establishment of a secretariat for the Metropolitan Expressway Authority (MEA) is an important task.
- MEA secretariat will function as the core responsible to handle all other tasks toward the realization of the expressways.
- The action plan is based on utilizing ODA finance for the design and construction of selected high priority expressways in order to reduce governmental burden and to put an attractive start for private sector participation in financing following stages.
- With the implementation of E1-2, E2-2 and E3-1 in 2011, toll will be applied on the whole length of expressways.

Implementation Action Plan for High Priority Expressways

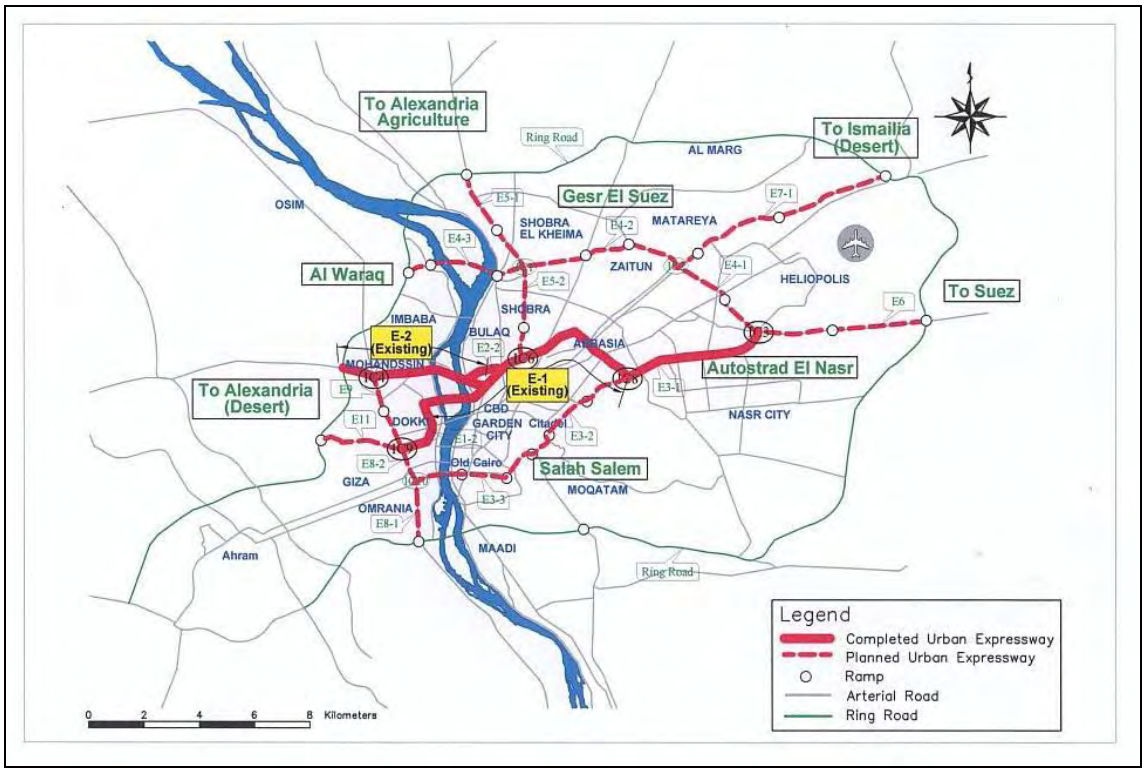
Major Tasks	2005	2006	2007	2008	2009	2010	Agency In-Charge
Cairo PPP Study							JICA ST – ENIT
Route Prioritization							JICA ST
MEA Secretariat							MOT
Feasibility Study on HPE							MOT/ENIT/ODA
EIA on HPE							ENIT/MOE
MOT Approval							MOT
MEA Organization Setup							MOT
MOP / MOF Approval							MOP/MOF
Parliament Committee							MOT
Cabinet Approval							MOT
D/D Loan Preparation							MEA
D/D Loan Agreement							MEA
Consultant Selection							MEA
Detailed Design of HPE							ODA/MEA
Construction Loan							MEA
Tendering							MEA
Construction of HPE							MEA/ODA
F/S on Next Routes							MEA

HPE: High Priority Expressways
JICA ST: Study Team
D/D: Detailed Design
F/S: Feasibility Study
EIA: Environmental Impact Study
MEA: Metropolitan Expressway Authority
CG: Cairo Governorate

MOT: Ministry of Transport
MOP: Ministry of Planning
MOF: Ministry of Finance
MOE: Ministry of Environment
ENIT: Egypt National Institute of Transport
GOPP: General Organization for Physical Planning
ODA: Official Development Assistance

High Priority Expressways (up to 2013)

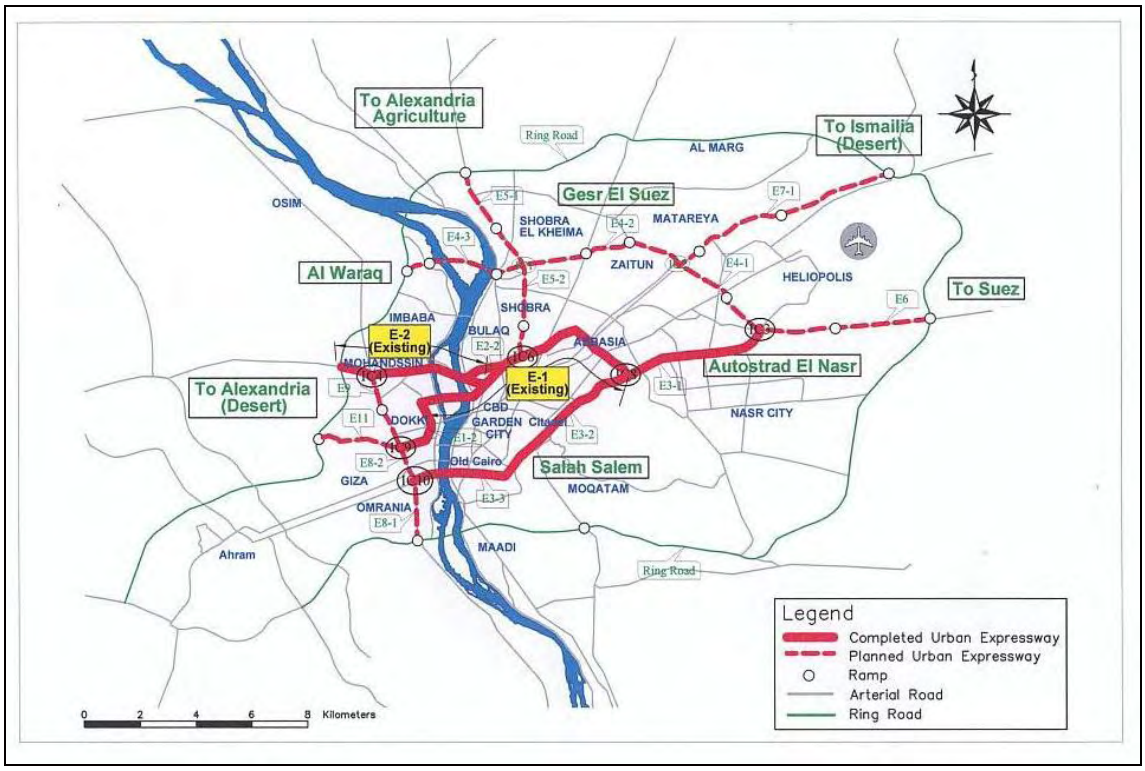
Section		Location	Length (km)	Cost (mLE)	Remarks
E1-2		6th October Extension	2.1	354	El-Tahrir Street
E2-2		15th May Extension	1.2	98	Boulaq 1-way section
	E3-1	Autostrad El Nasr – Nasr City	6.8	690	Underpass (1,400m)
E3	E3-2	Autostrad from Nasr City to Citadel	5.8	563	Elevated Viaduct
	E3-3	Salah Salem from Citadel to Giza	6.9	802	Nile River Bridge (600m)
Total			22.8	2,507	@ bJP￥50/mUS$440



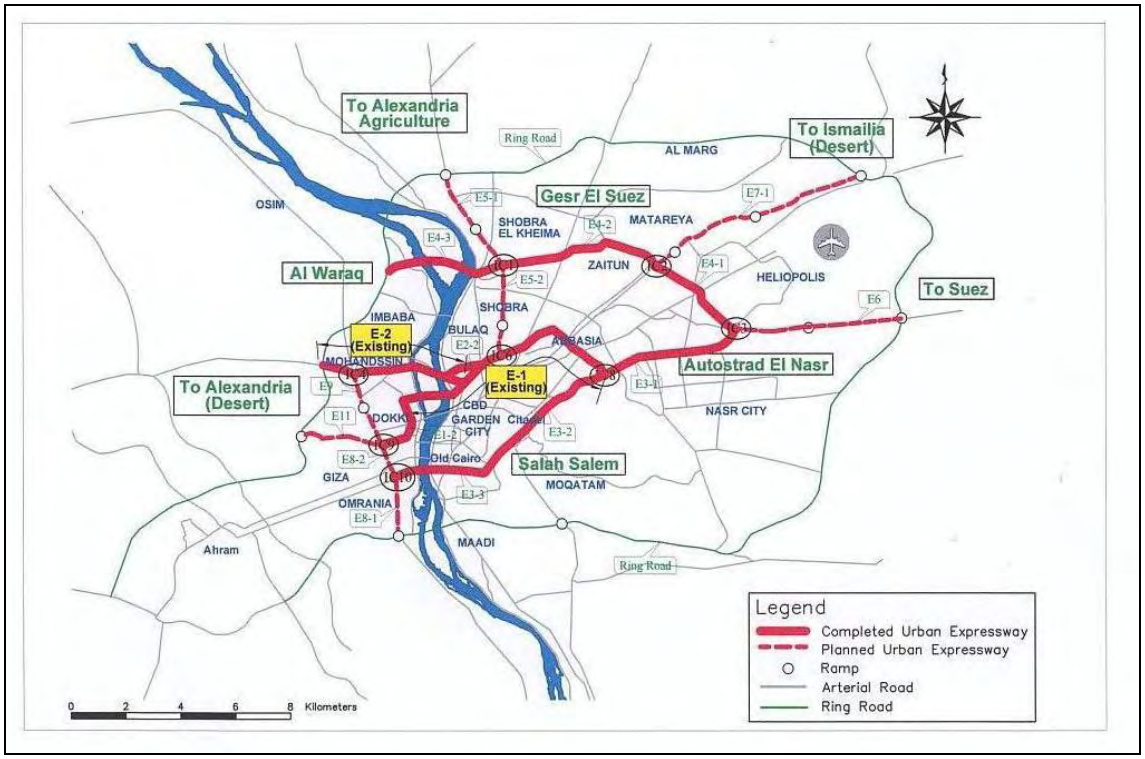
Year 2011
Expressways E1 + E2 + E3-1

Guiding Changeable Sign
Tokyo Metropolitan Expressway

Emergency Telephone Space
Tokyo Metropolitan Expressway



Year 2013
Expressways E1 + E2 + E3



Year 2016
Expressways E1 + E2 + E3 + E4

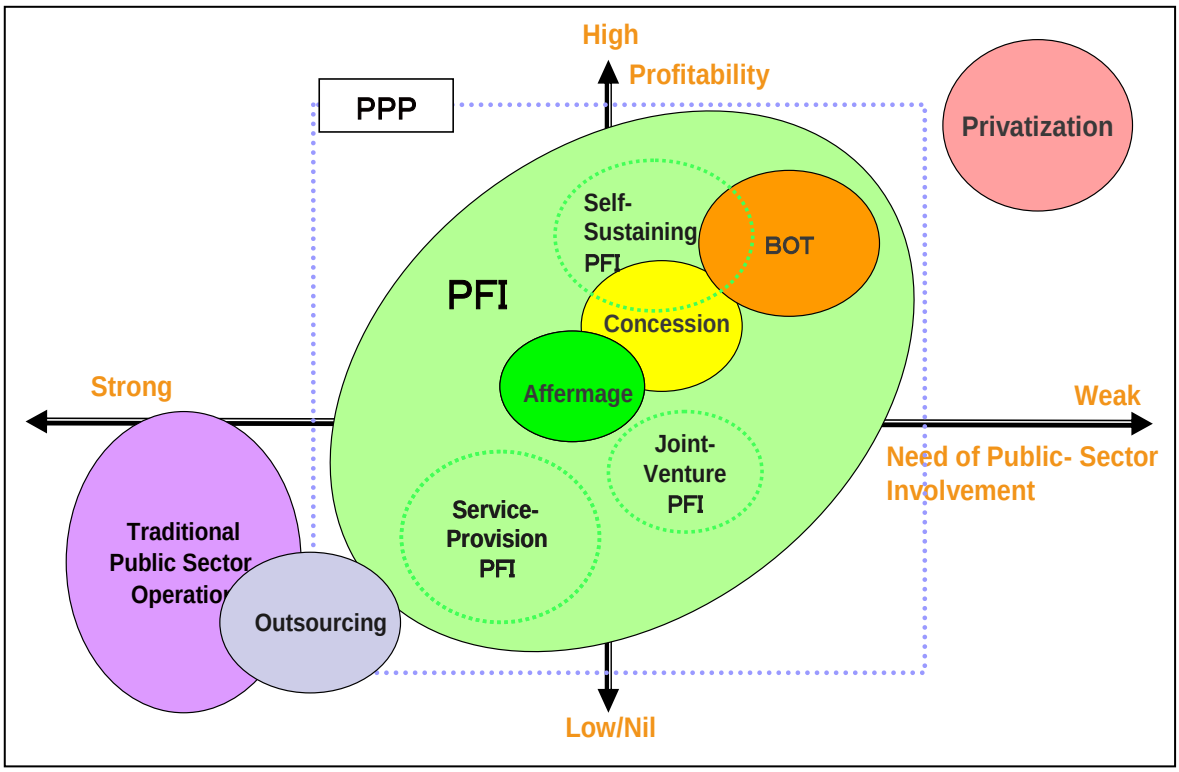
PART II

PPP STRATEGY
AND
FINANCIAL PLAN

9 PPP in Egypt and Other Countries

What are PPPs?

- The term "public-private partnership" ("PPP") has been in general use since the 1990s. However, there is no widely agreed, single definition or model of a PPP.
- The term "PPP" covers a range of different structures where the private sector delivers a public project or service. Concession-based transport and utilities projects have existed in EU member countries for many years, particularly in France, Italy and Spain, with revenues derived from payments by end-users, e.g. road tolls. The UK's Private Finance Initiative ("PFI") expanded this concept to a broader range of public infrastructure and combined it with the introduction of services being paid for by the public sector rather than the end-users.
- The use of PPPs has now spread to most EU country and depending on the country and the politics of the time, the term can cover a spectrum of models.
- These range from relatively short term management contracts (with little or no capital expenditure), through concession contracts (which may encompass the design and build of substantial range of services and the financing of the entire construction and operation), to joint ventures and partial privatizations where there is a sharing of ownership between the public and private sectors.
- Under traditional public sector approach, the public sector designs, builds, operates, and maintains infrastructure, and sets level of quantity and standards of service quality, while under privatization approach, the private sector conducts all of these aspects in place of the public sector. Under PPP approach, the public sector is ultimately accountable for service provisions, although the private sector designs, builds, operates and maintains infrastructure. PPP ensures provision of services to general public, but at lower cost and better quality by the use of private-sector management skills and finance capabilities



Conventional BOT vs. PPP

- Under conventional BOT, the public sector plays little role and 'leaves it solely to the private sector.' Risks are often imposed to the private sector as much as possible regardless of the capacity and capability.
- On the contrary, the prime PPP objective is to achieve Value for Money ("VFM"). In PPP, following a transparent and competitive process, whether to achieve higher quality services at lower cost compared with the traditional public procurement is strictly evaluated, verified and monitored, both quantitatively and qualitatively. If proved otherwise, PPP is dismissed.
- Risks are allocated to the party best able to manage, and therefore minimize the cost of risks. Full utilization of superior private management and expertise, not only the capability of raising finance, is highly encouraged in PPP. Allocation of risks and responsibilities between the public and private is clearly described in PPP contracts

Political Environment for PPP

- There exists considerable variety in development of PPP by countries and sectors.
- While growing interest in PPPs exists globally, experience of PPPs is limited. UK stands out as having the longest and most substantial experience of PPPs. Progress of countries appears to have more to do with the interest in PPPs and the political will to promote them shown by individual governments. The complexities of procurements and the needs to develop an institutional capability resulted in progress being slow initially.
- The slow progress has often related to deficiencies in legal and institutional frameworks in various countries and also to questions about whether value for money is being provided in the PPP. However, with many countries now initiating legislative changes and developing institutions to encourage PPP, a surge in these transactions elsewhere in the world may be expected.

DBFO Road Experience in UK

- UK has developed a sophisticated PPP structure in the road sector using DBFO (Design, Build, Finance, and Operate) scheme.
- Under the DBFO method of procuring road improvements and maintenance, The UK Highway Agency has achieved value-for-money savings averaging 20%.
- A special purpose company (DBFO Co) will be expected to assume the majority of the risks associated with the design, construction, maintenance, operation and financing of the Project.
- The government will establish whether the proposed levels of payment are justified by the benefits of the Project.
- The Highways Agency pays each DBFO Co an amount, which is based on the number and type of vehicles using the road, with adjustments made for lane closure and safety performance. These are known as shadow tolls as opposed to real tolls, as payment for usage is made by the Highways Agency rather than by the road user.
- By changing a unit payment to the private sector according to the level of traffic, the public sector can share demand risks with the private sector. The public secotr provides additional unit payments for the provision of services when traffic demand is low, and the private sector can mitigate the impact of demand decrease to some extent.

Factors for Success and Failure from International Experience

- Excess risk transfer to the private sector and weak political commitment are main factors for failed PPPs. On the other hand, optimal risk allocation and strong political commitment are two key factors making good PPP projects.

Lessons from BOT Projects in Egypt

- Four points were raised as lessons from past BOT projects in Egypt.
- Inappropirate allocation of risks between public and private sector. (power)
- High income tax rate and long procedures of apporval
- Uncertainty on toll revenues
- Lack of coordination among related ministries and authorities and changes on government policies

10 Approach for Private Sector Participation

Phased Approach

- The primary goal of GOE is to implement the whole network of urban expressways on time and efficiently utilizing private sector's expertise and capacity. In order to implement the expressway network achieving the above goal, JICA study team proposes an approach in three phases.

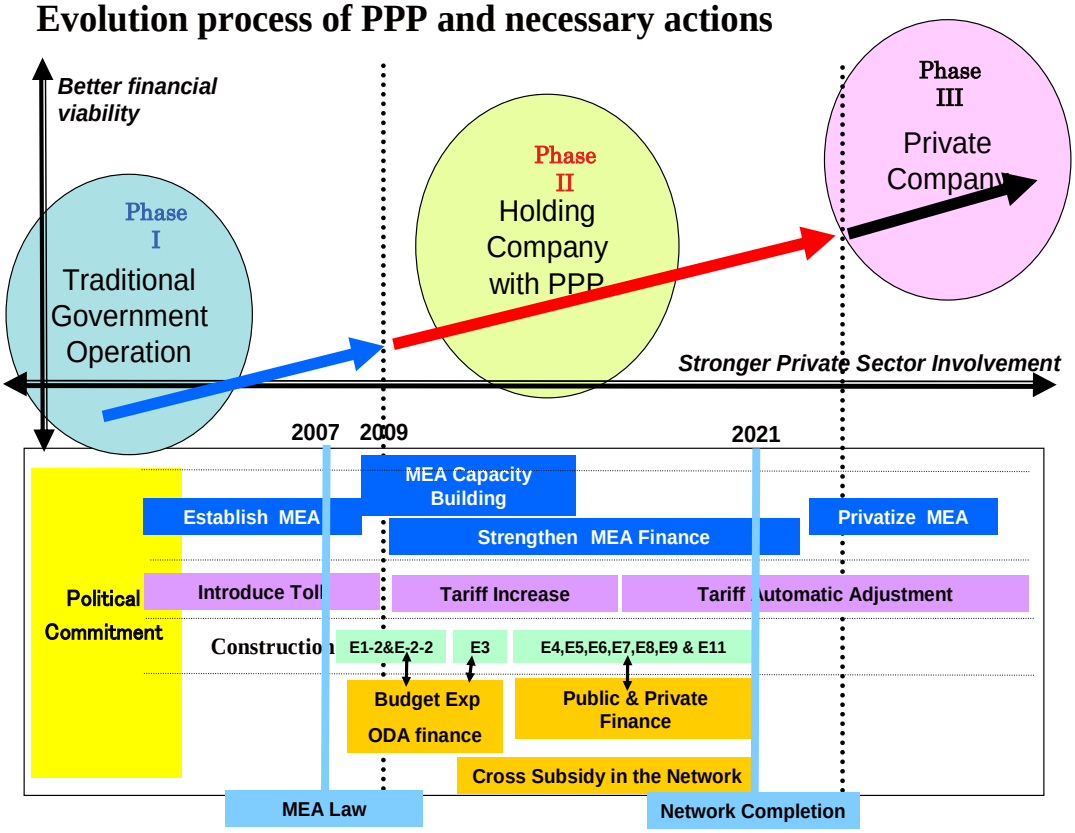
- Phase I: Establishing implementation framework and building capacity

- Phase II: Promoting PPP

- Phase III: Increasing private participation, such as privatizing MEA

- In the first phase, the government will build and strengthen its basic structure for project implementation, such as establishing a new organization which promotes Cairo Urban Expressway, introducing toll systems, and adopting necessary legislation. Private participation will be promoted but limited to outsourcing of toll collection and operation and maintenance functions under performance based contracts.
- In the second phase, the private sector participation will include from the design to operate under DBO scheme. Depending on project viability, it will finance a part of the Expressway network under DBFO scheme, covering its costs by tolls from users and, if necessary, government's payments for the services the private sector provides. Payments from the government will be paid based on the service level of the private sector.
- In the third phase, the Government will have an option to plan privatization of self-sustainable MEA.

Evolution process of PPP and necessary actions



Key Conditions for Private Sector Participation

- Strong political commitment and continuous Government support for achieving self-sustainable network system and gaining confidence from the private sector.
- Establishment of an independent and financially sound executing entity which has power and function for network implementation.
- Holistic approach and best utilization of toll revenues from the network for future expansion and upgrading.
- Setting an appropriate counterpart for PPP in the public sector side to promote better coordination and dialogue between the public sector and the private sector.

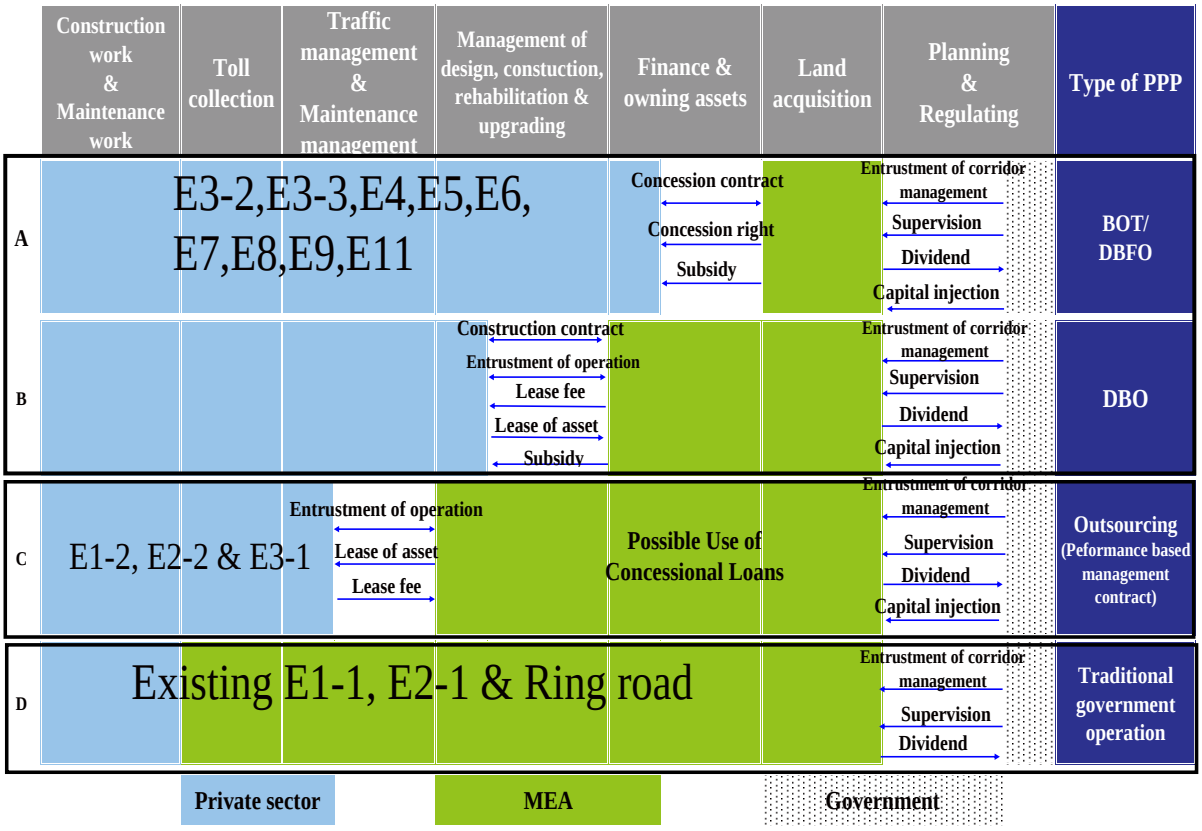
Expected Benefits with PPP

- Reduction in life cycle costs of the network by PPP compared to the traditional public sector work.
- Better and less expensive service delivery by maximising the use of private sector skills and allocating risks to the party best able to manage or absorb each particular risk.
- Contributing to private sector development by developing a new market for the private sector.
- Mitigating GOE's budget constraints and making the project affordable for GOE in the long term.

Proposed PPP

- Depending on the project economics under each phase, the possible PPP structure will vary as indicated below. The gradual increase of private sector participation is recommended.

Comparison of possible PPP options for Cairo urban expressways



11 Financing Plan

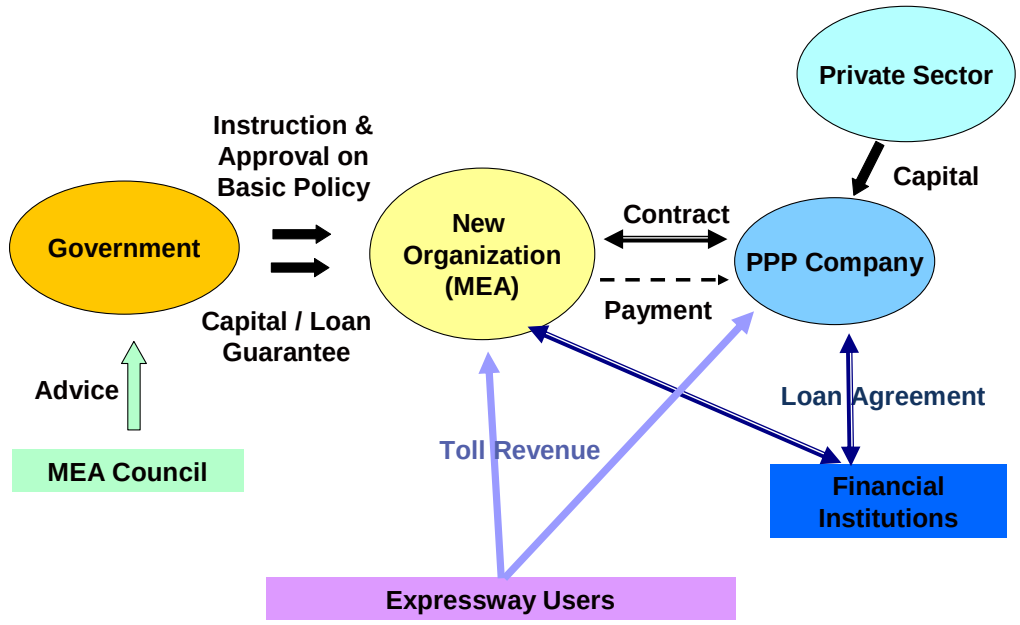
Overview of Financial Market in Egypt

- Since the early 90s, the Egyptian financial system with its three main sectors, the banking, equity market, and capital market, has been undergoing ambitious legislative reforms to enhance performance and encourage competition especially among the private sectors.
- Credit Market in Egypt - Credit markets are constituted of credit agreements between lender and borrower. Credit agreements are not normally traded, even on secondary market. There are three categories of credit agreement: loans, credit lines and project financing.
- Credit markets are major financing source in Egypt. As Egypt is also over banked, currently, the state owned banks control over 56% of banking assets and Egypt hat one of the lowest levels of private sector control share.
- Lending to large companies including future MEA and project financing for BOT projects are dominated by four state owned banks.
- Equity market in Egypt - Egyptian equity market is seen as under developed and shallow market depth compared to peers, with only a minority of liquid companies. In terms of market capitalization, Egypt has been losing ground relative to a number of Arab markets.
- Equity market cannot be promising fund raising channel for the proposed project in near future.
- Capital (bond) market in Egypt - Bond market suffers from low liquidity, pricing and lack of depth and bond market is immature and dominated by government bond issues. Treasury bills account for almost 95% of total volumes.
- When MEA establishes solid financial capacity and credit rating, bond could be an alternative financing instrument.

Government Budget for Transport Sector

- Total amount of investments during last five years are about 8.8 LE billion and its growth rate of the investments is about 9% per annum. The share of transportation investment has been slightly decreasing, partly because the Government has shifted investments for the transport sector to BOT projects.

Proposed Structure of Cairo PPP Expressway Network



Options for Financing the Urban Expressway Network

- Toll revenues will be a major funding source of the capital and operating costs of the network.
- However, even under the scenario of maximizing toll revenues, all costs will not be recovered by toll revenues only.
- The gap between toll revenues and required funds must be recovered by capital and operating subsidies from the Government, cross subsidy from other roads, and/or other business revenues.
- In order to lower financial costs, concessional loans such as ODA finances, loans from state owned banks, and government guarantee for MEA borrowing will be effective.

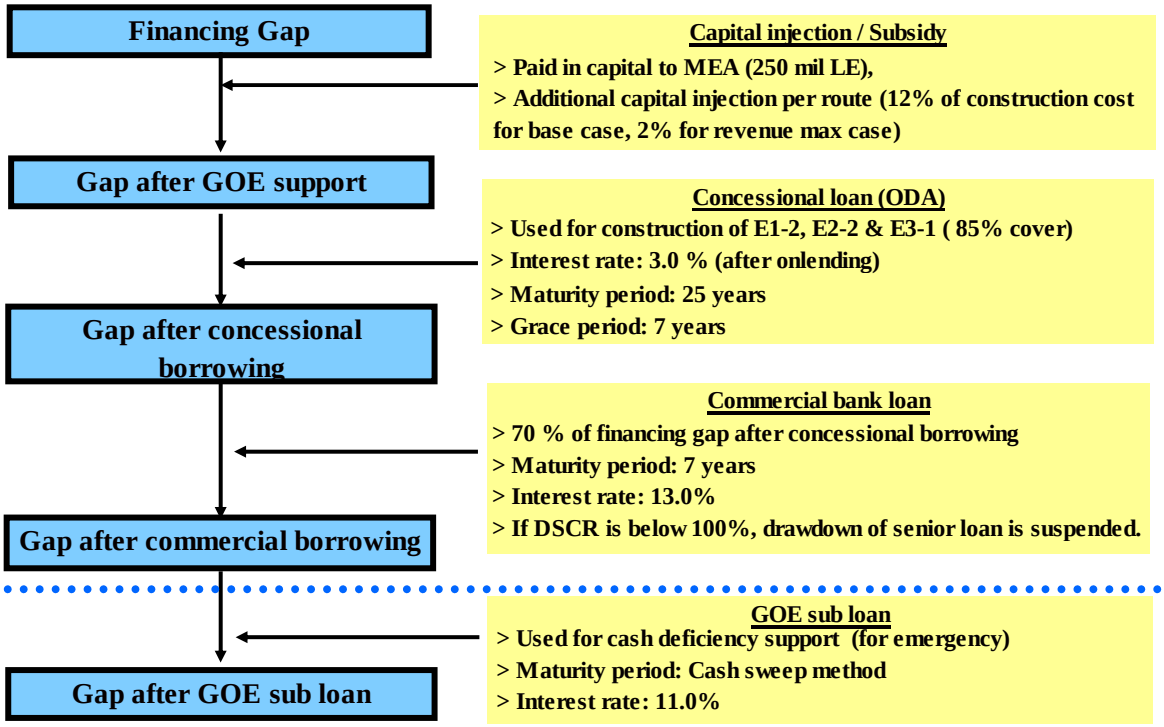
Financing Plan for Project

- The financing for the expressway project will be comprised of (a) senior debt from banks, (b) subordinated debt- capital, and (c) equity. Senior debt from banks has first call on the available cash flows and subordinated debt – capital has second call. Equity is fully at risk.
- Government equity injection will be necessary especially for the priority route.
- Concessional loans will be on-lent by the government or directly provided to MEA.
- Loans from state owned banks will be considered. Available amount, maturity, interest rates are depending on the project economics and credit enhancement structure.
- Loans from commercial banks will be available for short and medium term.

Financing Plan for PPP Company

- When the private sector provides finances for the network, PPP Company will be established with sponsor's equity. Commercial loans will be mobilized and toll revenues and/or payments from the public sector will secure repayments of loans.

Assumption on financing policy and conditions



12 Cash Flow Analysis

Assumptions

- Implementation Agency: MEA will be responsible for financing the expressway network in Cairo.
- Toll: Toll system will be introduced in 2009 for the Ring Road and in 2011 for the internal network, E1-2 and E2-2.
- Construction Period: Based on CREATS, year 2022 is set out as the target to complete construction of the network.
- Cross Subsidy: It is assumed that MEA uses cross subsidy including part of the revenue from the toll for the Ring Road.
- Concessional Borrowing: Concessional borrowing is utilized to construct first prioritized route, route E1-2, E2-2 & E3-1.
- Traffic Demand: In base case, traffic demand including the ring road will grow at 11.6 % per annum from 2011 to 2021, or 103millions per year in 2011 to 309millions per year in 2021. During 2021 to 2031, growth rate is assumed at 5.7%, or vehicles per year will reach 537 millions per year in 2031.
- Toll Structure: MEA will apply uniform toll system in the network with two categories (light vehicle and heavy vehicle). In base case, toll will be set at 2 LE per trip in 2009 and will be increased to 3 LE and 5 LE in 2016 and 2019, respectively, after the new route will be connected to the network.
- Toll Automatic Adjustment System: After the completion of construction in 2022, toll will be automatically adjusted to inflation index and to productivity gain.
- Investment Cost: Investment cost is estimated at LE17,081 million (or US$ 2,945 million), including annual inflation of 5% and annual land price increase of 2%. Mainlines are estimated at LE13,944 million and interchanges are estimated at LE2,916 million.

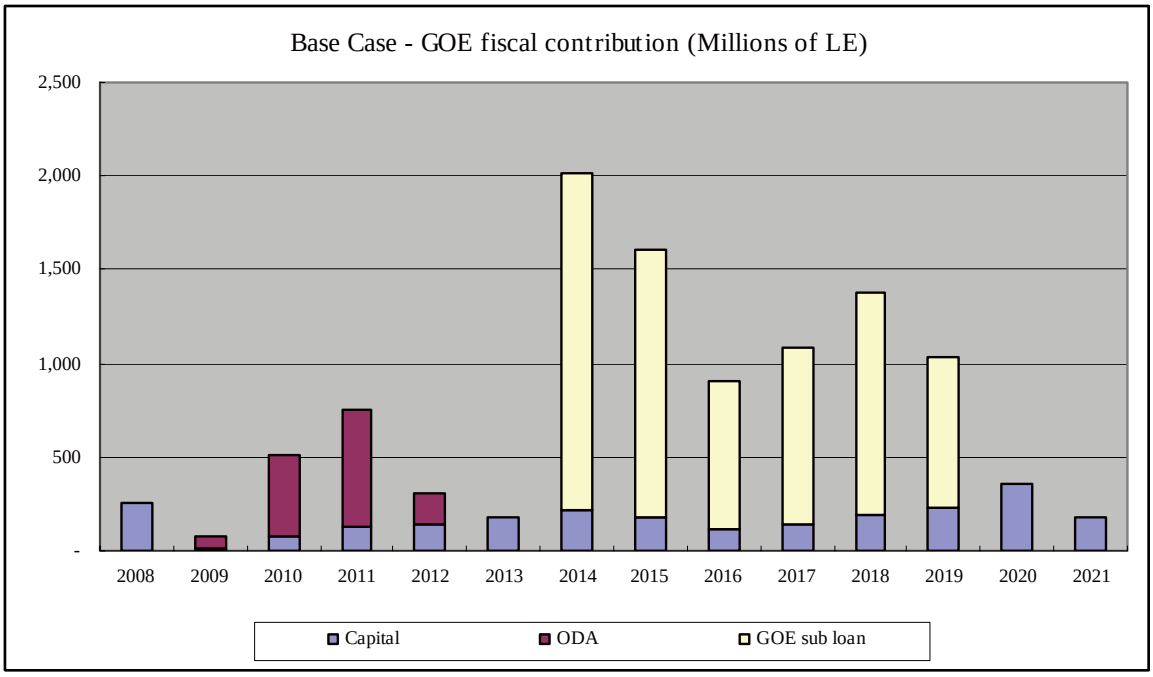
Scenarios

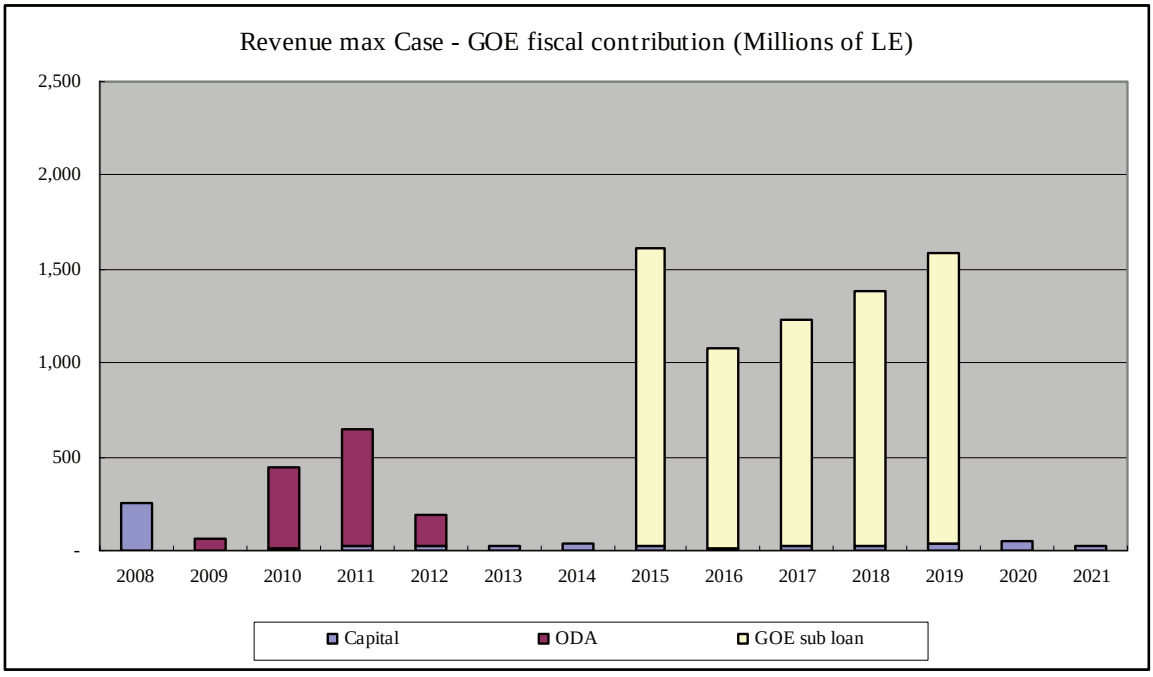
- Two scenarios, base case and revenue maximizing case, are set out for the analysis. In revenue maximize case, toll for light vehicle will be set out at 5 LE and increased up to 6 LE in 2013. Toll increase will be more frequent than the base case.
- Financial projection focus on (a) assessing appropriate burden sharing between expressway users and tax payers, and, (b) assessing financial sustainability of the whole network development.

Summary of the Analysis

- Filling the financing gap in periods of construction of new Expressways, especially the period during 2014-18, is a challenge.
- Substantial government support will be required especially for construction of priority route.

	Base case	Revenue max case
Stable positive net income	begin in 2024	begin in 2023
Total GOE equity (2009-2046)	592 millions of LE	2,378 millions of LE
Total GOE sub loan borrowing (2009-2046)	11,794 millions of LE	10,360 millions of LE
Completion of repayment of GOE sub debt	2031	2030
Total senior loan borrowing (2009-2046)	3,543 millions of LE	6,922 millions of LE
Completion of repayment of senior debt	2026	2027
Minimum DSCR for senior debt	54% (Year 2015)	18% (Year 2015)


Base Case - GOE fiscal contribution (Millions of LE)
2,500
2,000
1,500
1,000
500
-
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
Capital
ODA
GOE sub loan


Revenue max Case - GOE fiscal contribution (Millions of LE)
2,500
2,000
1,500
1,000
500
-
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
Capital
ODA
GOE sub loan

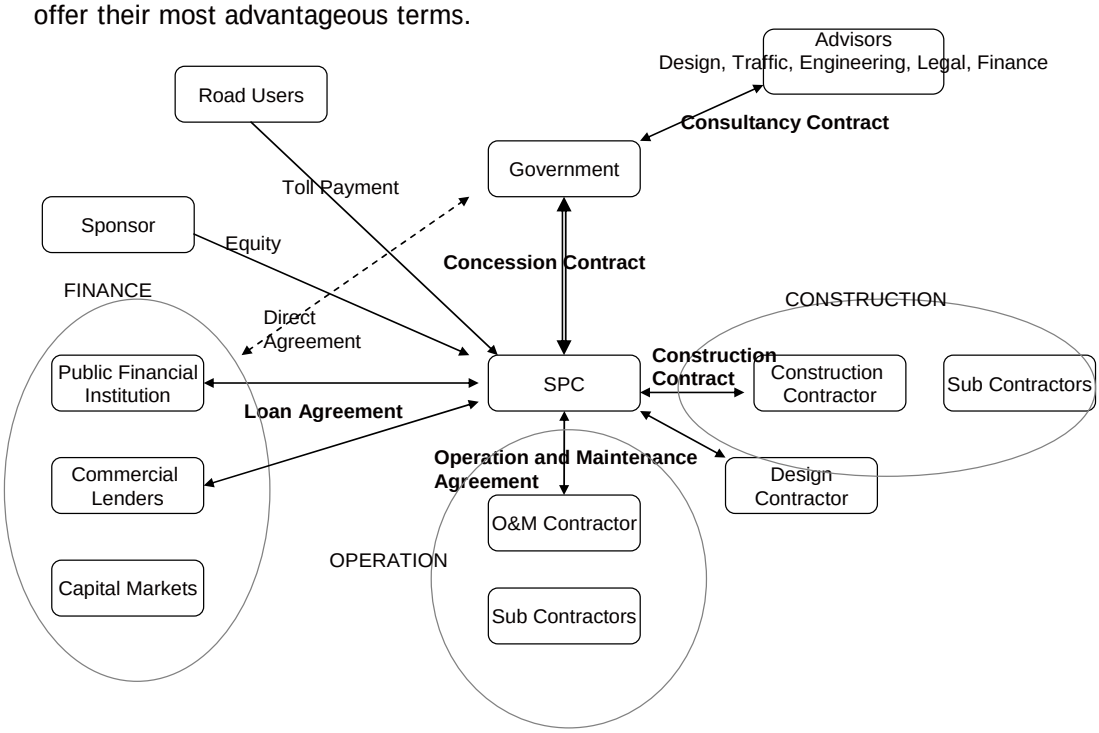
13 LEGISLATION AND PROCEDURES

Necessary Factors for Success of PPP

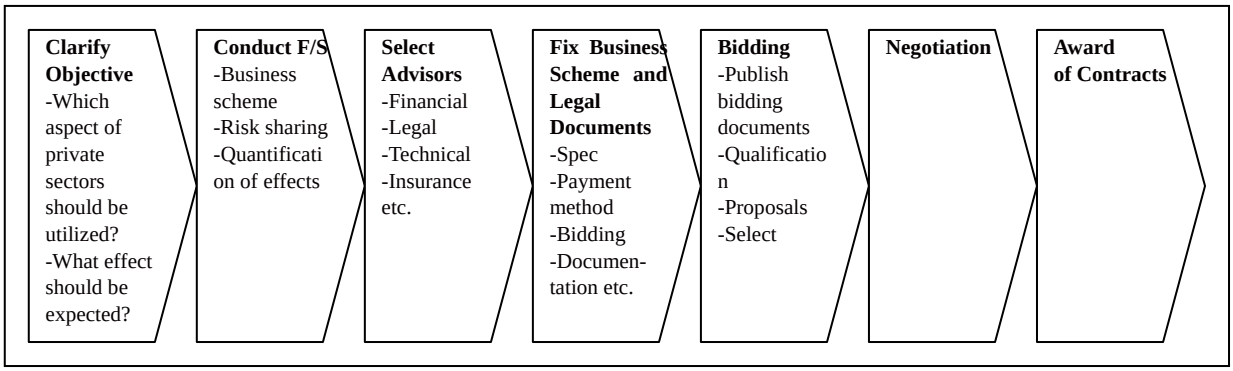
- On PPP structure, the private sector is in charge of design, construction, operation, maintenance, and management of public facilities. The public sector will have agreements with the private sector on service provisions and the private sector will allocate all the risks to consortium members who would best take these risks.
- Main factors for the success of PPP projects with regard to legislative issues can be summarized in three areas: (i) appropriate and effective transfer of businesses from the public sector to the private sector; (ii) effective and efficient selection process of proposals from the private sector; (iii) appropriate risk allocation among the public sector and private participants.

General Guiding Principles for a Constitutional and Legislative Framework (by UNCITRAL)

- Transparency. A transparent legal framework is characterized by clear and readily accessible rules and by efficient procedures for their application. Transparent laws and administrative procedures create predictability, enabling potential investors to estimate the costs and risks of their investment and thus to offer their most advantageous terms.
- Fairness. A fair legal framework takes into account the various interests of the Government, the public service providers and their customers and seeks to achieve an equitable balance between them. The private sector's business considerations, the users' right to adequate services, both in terms of quality and price, the Government's responsibility for ensuring the continuous provision of essential services and its role in promoting national infrastructure development are but a few of the interests that deserve appropriate recognition in the law
- Long-Term Sustainability. The long-term provision of public services, with increasing attention being paid to environmental sustainability will need to be assured. It is important to ensure that the public sector has the institutional capacity to undertake the various tasks entrusted to entities involved in infrastructure projects throughout their phases of implementation.



Illustrative PPP Process



Work and Risk Sharing in the Project Agreement

Proposed work sharing

◎: Main, △: Sub, Transferred to the private

Work sharing		Current framework		Proposed PPP framework		
		GOE	Private	GOE	MEA	Private
Planning & Regulating	Establishing institutional framework	◎		◎	△	
	Overall planning	◎		△	◎	
Owning assets, Financing & Land acquisition	Financing	◎		△ (Subsidy)	◎	△ (Borrowing)
	Negotiation and monitoring private sector	◎			◎	
	Land acquisition	◎		△	◎	
Design, Construction & Upgrading	Design approval & Construction management	◎			△ (early stage)	◎
	Design & construction work		◎			◎
	Upgrading & rehabilitation management	◎			◎	
	Upgrading & rehabilitation work		◎			◎
Traffic Management & Maintenance	Traffic management	◎		△	◎	△
	Maintenance work		◎			◎
	Clearance of traffic accident	◎				◎
	Maintenance management	◎			△ (early stage)	◎
Toll collection		◎			△ (early stage)	◎

Proposed risk sharing

◎: Main, △: Sub, Transferred to the private

Risk sharing	Current framework		Proposed PPP framework			
	GOE	Private	GOE	MEA	Private	Users
Political risk	◎		◎			
Legislative and regulatory risk	◎		◎	△		
Overall planning risk	◎		△	◎		
Force majeure	◎		◎	△		
Environmental risk	◎			◎	△	
Interest rate risk	◎			◎	△	
Devaluation and currency risk	◎		◎	△		
Inflation risk	◎			△	△	◎
Financing risk	◎		△	◎	△	
Design and construction risk	◎	△			◎	
Land acquisition risk	◎			◎		
Traffic demand and toll revenue risk	◎		△	◎	△	
Operational risk (MEA's responsibility)	◎			◎		
Operational risk (Private sector's responsibility)		◎			◎	

14 IMPLEMENTATION PLAN

		2006	2007	2008	2009	2010	2011	2012-16	2017-21
A	**Project preparation**								
	1 Feasibility study on E1- E3	■							
	2 Environment Impact Assessment on E1-E3	■							
	3 MOT approval on the network of expressways	■							
	4 MOP & MOF approval	■	■						
	5 Parliament transportation committee approval		■						
	6 Cabinet approval		■						
	7 Setting up a secretariat for MEA in MOT	■							
	8 Prepare and sign ODA loan agreement		■						
	9 Fesibility study on next routes			■					
B	**Legislation and regulation**								
	10 MOT drafts MEA (holding company) decree	■							
	11 MOT dratfs an amendment of Public Road Law	■							
	12 MOJ reviews them	■							
	13 Consultation with approval in the parliament		■						
	14 Prime Minister issues MEA decree and the amendment		■						
C	**Establishment of MEA**								
	15 Defining power and function of related entities		■						
	16 Set up corporate structure and management		■						
	17 Establish MEA corporate law		■						
	18 Appoint board members and personnels			■					
	19 Transfer asset to MEA			■					
	20 Establish MEA			■					
D	**Promotion of PPP**								
	21 Setting up PPP department in MEA			■					
	22 Defining bidding process & evaluation criteria				■				
	23 Defining PPP contractual arrangement				■	■			
	24 Privatization of existing toll collection works by MEA						■		
	25 Promotion of PPP							■	■
E	**Capacity development of MEA**								
	26 Strengthen corporate structure and procedure			■	■	■	■		
	27 Specify service levels			■	■	■	■		
	28 Improve financial capacity			■	■	■	■		
	29 Strengthe business function			■	■	■	■		
	30 Traffic information collection and supply				■	■	■		
F	**Introduction of toll system**								
	31 Initial work on tariff levels and tariff adjustment rule	■	■						
	32 Consultation with three governorates			■					
	33 Public awareness campaign		■	■					
	34 Agreeemnet with municipal counsels				■				
	35 Tariff introduction 2LE				■				
	36 First increase in tariff 3LE							■	
	37 Third increase in tariff 5LE								■
	38 Introduce atutomatic toll adjustment								■
	39 Introduce toll sysytem in the ring road				■				
G	**Design & Construction**								
	40 Expressways(81.6km)				■	■	■	■	■
	41 7 Interchanges						■	■	■

CONCLUSIONS
AND
RECOMMENDATIONS

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Justification of Cairo Urban Toll Expressway Network:

- Cairo Urban Toll Expressway Network is formulated under the comprehensive Urban Transport Master Plan of "CREATS", and reviewed under this "Cairo PPP" Study as a component of the systematic approach to cope with present and future transport and traffic issues and problems in Greater Cairo Region.

- The development of Cairo Urban Toll Expressway Network has the objectives:
  - To reduce traffic congestion in Greater Cairo Region
  - To provide alternative high level-of-service facility of expressways to roads users
  - To increase traffic efficiency on the at-grade street network
  - To contribute to the provision of preferable social and urban environment.
  - To contribute to the national, regional and urban socioeconomic development
  - To promote planed urban development and new communities

- The urgent need to implement the Urban Toll Expressway Network is recognized through the existing traffic problematic situations with huge losses in the transport cost and deterioration in urban environment. For the maximum efficiency of the Urban Transport Master Plan (CREATS), a total length of about 80 kilometres of elevated expressways should be constructed by the target year of 2022.

- With the current traffic and transport problems in Greater Cairo, more road network capacity is basically required. However, it is extremely difficult to widen the existing streets and in the same time it is almost impossible to construct new major streets in the highly dense areas in Cairo. The option of constructing elevated expressways is a viable option taking into consideration that there is no need for acquiring land for the Right of Way or for the resettlement of people.

- The evaluation results of the expressway plan show high traffic efficiency parameters, such as the increase in average travel speed of all vehicles on the at-grade network by about 25% and on the elevated expressways by about 80%. However, the decrease in the average volume/capacity ratio is expected to come down from 1.95 to 0.92 on the elevated expressways and only from 1.45 to 1.38 on the at-grade network.

- The Plan is justified to be economically feasible with the following economic indicators (based on an annual discounted rate of 10% and constant 2005 prices):

EIRR:	38.8%
NPV:	11,508 L.E. million
B/C:	3.44

- In addition to the direct and indirect benefits of the Expressway Network, such as promoting urban and national socioeconomic development and improving living standards, the Expressway Network is also financially viable with 17.2% of FIRR (based on constant 2005 prices) and a revenue/cost ratio of 1.41.

- The Cairo Urban Toll Expressway Network can be implemented by applying normal construction methods and techniques for most of the network sections. There are 2 newly planned bridges on the River Nile that may require advanced techniques in order to match the scenic view and landscape.

- Still, however, a detailed economic, environmental and technical feasibility study on the high priority expressways is required to be carried out as early as possible as shown in the implementation schedule of the network.

Urban Toll Expressway Network Development:

- For the sustainable development of the expressway network, a multi-functional

prioritization criterion is established, in line with the objectives of the expressway network, to provide optimum efficiency for each implementation stage.

- The implementation program of the Expressway projects provides a timeframe on an annual basis up to CREATS target year of 2022. In addition, more expressways are proposed for later years that can be introduced based on the updating process of network function and requirements as far as financial resources are secured.

- When comparing the different scenarios of applying toll on expressway sections, it is concluded that applying toll on the newly constructed expressways together with the existing elevated roads of 6th of October (E1) and 15th of May (E2) as well as the Ring Road is the most optimum scenario. It gives the highest economic and financial viability and also provides a part of the PPP financing program toward the development of the whole expressway network.

- For the successful implementation of the Urban Toll Expressway Network, a new autonomous organization, called "Metropolitan Expressway Authority (MEA)", with new ideas and energy is required to be established as an irreplaceable prerequisite. It will function as the Core Task Force for the promotion of the project and for managing both public and private sector activities through the implementation and operation and maintenance of the expressway network.

- A flat toll rate is applied for two categories of vehicles; light and heavy, based on the analysis of different socioeconomic parameters and the completed sections of the expressway network, however, more social and political aspects should be considered under future feasibility and updating studies.

	Light	Heavy
2012 – 2015	LE 2	4
2016 – 2018	3	6
2019 – 2022	5	10

- The toll rate will be subjected to an adjustment mechanism that considers inflation rates, foreign exchange rates and the transport cost of other modes in addition to the total length of the expressway network under operation.

High Priority Expressways:

- Results of the Study show that early implementation of High Priority Expressways is urgently required. More detailed feasibility studies on several issues, including technical, financial, institutional, social and environmental aspects, should start as early as possible to cope with present traffic situations and to transit from planning stage to implantation stage.

- High priority expressways include the extensions of existing elevated roads of 6th of October (E1) and 15th of May (E2) in addition to E3 that runs from Nasr City to Giza along the Autostrade and Salah Salem roads.

- The total cost required for the 22.8 km length of the High Priority Expressways is about LE Billion 2.5 (excluding price escalation), including one bridge over the River Nile (beside the existing Giza Bridge). Benefits by implementing these roads prove high economic and environmental viability, with the following economic indicators (based on a discounted rate of 10% and constant 2005 prices):

E1+E2:

EIRR:	48.7%
NPV:	4,945 L.E. million
B/C:	9.84

E3:

EIRR:	20.4%
NPV:	3,331 L.E. million
B/C:	2.85

- Values of the annual reduction in air pollutants by implementing the High Priority Expressways (E1+E2+E3) is estimated for the year 2022 as:

HC:	19.82 Ton
CO:	163.74 Ton
NOx:	19.35 Ton

- The above findings and indicators should be verified during the feasibility study on the high priority toll expressways, which is to include the design and other aspects for technical, economic and financial viability. In addition, it may include a detailed study on environmental impact assessment that is required to provide mitigating measures for any negative social or physical impact that may occur.

PPP Program:

- As a prior, the PPP program for the implementation of Cairo Urban Expressway Network should be launched by the Government as the political commitment in order to establish MEA and other steps required to proceed in the implementation process.

- PPP involves contracts between the public and private sectors for infrastructure development and management where risks are shared between the parties. Risks are allocated to the party which is best able to manage, and therefore minimize, the cost of risks. The term PPP covers a range of different structures which can be used to deliver a project or a service from relatively short term management contracts through concession contracts to joint ventures and partial privatizations.

- Under PPP approach, the public sector is ultimately accountable for service provisions, although the private sector designs, builds, operates and maintains infrastructure. PPP ensures provision of services by using private-sector management skills and finance capabilities at lower cost and better quality.

- While growing interest in PPPs exists globally, experience of PPPs is limited. UK stands out as having the longest and most substantial experience of PPPs. Progress of countries appears to have more to do with the interest in PPPs and the political will to promote them shown by individual governments. The complexities of procurements and the needs to develop an institutional capability resulted in progress being slow initially.

- The slow progress has often related to deficiencies in legal and institutional frameworks in various countries and also to questions about whether value for money is being provided in the PPP. However, with many countries now initiating legislative changes and developing institutions to encourage PPP, a surge in these transactions anywhere in the world may be expected.

- For Cairo Urban Toll Expressway Network, the proposed phased approach is:

  Phase I: establishing implementation framework and building capacity
  Phase II: implementing network development with promoting PPP
  Phase III: increasing private participation, such as privatizing MEA

- In the first phase (2006-2008), the government will build and strengthen its basic structure for project implementation, such as establishing a new organization which promotes Cairo Urban Expressway, introducing toll systems with inflation adjustment rule, and adopting necessary legislation. Private participation will be promoted but limited to outsourcing of toll collection and operation and maintenance functions under performance based contracts.

- In the second phase (2009-20022), the private sector will finance a part of the Expressway network, covering its costs by tolls from users through cross subsidy mechanism and, if necessary, payments from the government for the services private sector provides. Payments from the government will be paid based on the service level of the private sector.

- In the third phase, which may be considered in later years after completing the urban toll expressway network in 2022, the private sector participation may be increased through the privatization of MEA.

- Government funding will be required, but due to the relatively large size of the project, it is not realistic for the government to cover all capital and

operation costs of the Expressway network. At the same time, although toll revenue is expected to be substantial resources for future construction and operation of the network, it will be difficult to collect enough toll revenues to cover all costs for the initial construction of the network.

- It is proposed to utilize concessional loans, such as ODA (Official Development Assistance) funds and national bank loans, to lower financial burden for an organization owns the network. In addition, private sector participation will require capital subsidy from the government and demand risk sharing with the government in order to lower financing requirements of the private sector down to the level affordable by toll revenues.

- Analysis of the cashflow of the "Base Case" of toll setting shows high funds requirement in periods of construction of new expressways, especially the period during 2014-18, which requires private sector participation for network financing for the sustainable development.

- Main factors for the success of PPP projects with regard to legislative issues can be summarized in three areas: (i) appropriate and effective transfer of businesses from the public sector to the private sector; (ii) effective and efficient selection process of proposals from the private sector; (iii) appropriate risk allocation among the public sector and private participants.

RECOMMENDATIONS

Political Commitment:

- The Master Plan authorization is vital for systematic implementation of the planned expressways as scheduled, so that all efforts can be integrated toward the same targets at the optimum timing.

- The institutional set-up toward the establishment of an autonomous MEA is a very important issue because building the institutional framework obviously needs huge coordination, negotiation, consultation and documentation with timely decision making. The MEA secretariat should be led by a high ranking official who has sufficient power delegated from Minister of Transport with experts of different related fields on full-time basis as a core for future MEA. This Secretariat should be provided with appropriate initial budget that allows it to efficiently handle all the required activities and to join all future studies.

- Projects in the expressway network should be included in the Five Year Development Plan to secure required funds and to assure the sustainable development of the network based on the established schedule for the smooth implementation and maximum efficiency.

Establishment of MEA:

- The implementation, operation and maintenance of the urban toll expressway network include a large number of road and structure projects which require large investments and implementation capability. An effective organization for systematical implementation of the network is the vital key for the successful realization and sustainable development of the expressway network.

- Capacity development of MEA is required during different implementation and operation stages on the network. Training of MEA staff on urban expressway issues should be provided on regular basis in such fields of assets management, design management, maintenance management, traffic management and information, toll setting and toll collection systems, PPP structuring schemes, PPP negotiation and contracting, transport economy, financing and accounting.

Early Implementation of High Priority Expressways:

- For the sustainable development of the expressway network, it is important to maintain the momentum of this Study and continue in required steps and studies toward the implementation of high priority

expressways as scheduled.

- To implement projects as scheduled, feasibility studies and other social and environmental studies should be conducted few years before the project schedule in order to secure required financial resources and to avoid delay.

Toll Rate Setting

- Two cases of toll rate are considered in the cash-flow analysis; Base Case with low toll rates concluded based on Willingness-to-Pay survey and other social factors such as affordability and house-hold income and Revenue Maximize Case which resulting in higher toll rates. It is recommended to carry out social studies and public awareness campaigns before introducing the toll rate to be applied.

- The flat rate is recommended to be applied at the beginning of toll collection with the limited length of the expressway network under operation. With the increase in the length of the network in the future, the distance-dependent toll system can be applied through the use of advanced ETC systems in toll collection.

- A toll adjustment mechanism based on the actual rates of inflation and foreign exchange is required in order to promote PPP programs and encourage the participation of the private sector. Governmental subsidy, in terms of shadow toll for example, may be required when taking the social dimension into consideration.

PPP Promotion:

- It is desirable that utilizing concessional loans, such as ODA funds and national bank loans, for high priority expressways in the first stage in order to reduce financial costs of network development and build a foundation of PPP scheme.

- It is recommended to introduce toll systems for E1, E2 and the Ring Road to lower financial burden of the government and to increase the efficiency of the network.

- In addition, initial capital subsidy from the government and/or demand risk sharing with the government will be recommended in order to lower financing requirements of the private sector down to the level affordable by toll revenues.

- According to expected project economics of selected routes for PPP, details of transfer of businesses from the public sector to the private sector and risk allocation among the public sector and the private participants need to be developed and defined in the project agreement. Excess risk transfer to the private sector and weak political commitment are main factors for failed PPPs. On the other hand, optimal risk allocation and strong political commitment are two key factors making good PPP projects.

- Several legislative initiatives are underway in Egypt including drafting a new PPP Law and reviewing BOT procedure at GARBLT. In this regard full coordination among different agencies in charge is recommended.

- With regard to PPP procedure, it is recommended to assure competitive procedure enables optimal conditions for economy, transparency and efficiency. At the same time, it is desirable to take into account characteristics of the PPP approach which involves a long-term contract, requires the private sector a wide range of responsibilities, and encourages the private sector's free ideas for better services at lower costs.

Environmental Considerations:

- The planning process of the expressway network aim to minimize any negative impact on both natural and social environmental conditions, and coordination with the environmental agencies is important to be done throughout the different stages of project implementation.

- When implementing road projects in areas where land acquisition is required, acquisition and resettlement schemes

should be prepared in early stages with the allocation of required fund.

Coordination with other related Agencies:

- Implementation of the expressway projects should be carried out as scheduled and in complete coordination with other infrastructure and socio-economic development plans and major projects to provide optimum integration and maximum benefits.
- Good understanding and supporting by policy makers and budgeting agencies, such as the Ministry of Planning and Ministry of Finance, are indispensable for successful implementation of the expressway network. MOT and MEA should exert full effort to obtain understanding of those policy-makers and other related agencies.
- A Feasibility Study on high priority expressways is an important task that should be carried out as scheduled in the implementation plan of this study. The Feasibility Study will include the design and other aspects for technical, economic and financial viability. In addition, it may include a detailed environmental impact assessment study that is required to provide mitigating measures for any negative social or physical impact that may occur.

Double-deck Section, Tokyo Metropolitan Expressway

Shopping Centre Under Tokyo Metropolitan Expressway