

Ex-Ante Evaluation (for Japanese ODA Loan)

Middle East Division 1, Middle East and Europe Department

Japan International Cooperation Agency

1. Name of the Project

- (1) Country: Arab Republic of Egypt
 - (2) Project Site/Target Area: Target area: The southwestern part of the Greater Cairo Region (between 6th of October City [El-Ashghal Station] and the center of Cairo [El Fustat])
 - (3) Project: Greater Cairo Metro Line No. 4 Phase 1 Project (II)
- Loan Agreement: December 26, 2022

2. Background and Necessity of the Project

- (1) Current State and Issues of the Urban Transportation Sector Development and Priority of the Project in the Arab Republic of Egypt

The Greater Cairo Region has a population of approximately 19.29 million (as of 2017) and is in chronic traffic congestion due to population growth and increase in traffic volume resulting from increased number of vehicles. Further urbanization is expected to make traffic congestion more serious in the future. To cope with such concern, the Government of Egypt is trying to promote the decentralization of the population in existing urban areas by building satellite cities that function as industrial, residential, or other use areas. However, the impacts of traffic congestion caused by the expansion of the urban area has already started to extend to the inter-city traffic.

In the “Sixth Five-Year-Plan for Economic and Social Development” (July 2006 to June 2011), the Government of Egypt announced efficient measures with the use of multiple traffic modes for increasing demand in the transportation sector as one of the main policies, and the government decided to enhance its engagement in subways in the Cairo metropolitan area. In the “Cairo Vision 2050” which was prepared by the General Organization for Physical Planning, Ministry of Housing, Utilities and Urban Communities in 2007, development of 15 metros toward expansion of traffic modes in the Greater Cairo Region was proposed. Cairo Metro Line No.3 and No.4 are particularly positioned as projects with high priority for the expansion of transportation in the Greater Cairo Region. Moreover, in the “Sustainable Development Strategy 2030,” a long-term development strategy to 2030, which was announced in February 2016, traffic congestion caused by the poor public transport network has been identified as an issue in the transportation sector in achieving sustainable economic growth up to 2030. The construction of Cairo Metro Line No. 4 is therefore positioned as one of the mega projects for resolving such issues.

(2) Japan and JICA's Cooperation Policy and Operations in Relation to the Urban Transportation Sector

The Japanese government indicates "Promotion of Sustainable Economic Growth" as one of the priority areas under the "Country Assistance Policy for the Arab Republic of Egypt" (September 2020), and also indicates "Social/Economic Infrastructure Development," which supports the development of critical infrastructures including urban transportation, as one of the priority development issues. One of the priority areas in the "JICA Country Analysis Paper for the Arab Republic of Egypt (March 2016)" is "Realization of Inclusive and Continued Growth" and the "Transportation/Traffic Development Support Project" is identified as a cooperative Project that contributes to the improvement of the development issue "Social/Economic Infrastructure Development." Therefore, improving the mass transport function to reduce traffic congestion and to reduce the dependence on road traffic is consistent with these policies and analyses.

(3) Other Donors' Activity

Financial support for the construction of Cairo Metro Line No. 1 (The total length is 44 km. Phase 1 (29 km) was opened in 1987, followed by Phases 2 and 3. The entire line was opened in 2002.) was provided by Agence Française de Développement (hereinafter referred to as "AFD"), European Investment Bank (hereinafter referred to as "EIB") and European Bank for Reconstruction and Development (hereinafter referred to as "EBRD"), and technical assistance was provided by Fonds d'études et d'Aide au Secteur Privé in France.

The construction of Cairo Metro Line No. 2 (The total length is 21.6 km. Phase 1 (8 km) was opened in 1996, followed by Phases 2, 3 and 4. The entire line was opened in 2005.) was paid out of the budget of the Government of Egypt.

Financial support for the construction of Cairo Metro Line No. 3 (The total length is 41.2 km. Phase 1 (4.3 km) was opened in 2012, followed by Phase 2 (7.7 km) in 2014. Phases 3 (17.7 km) and 4 (11.5 km) are under construction and scheduled to be opened in 2024.) is provided by AFD, European Union (hereinafter referred to as "EU") and EIB, and technical assistance is provided by EU.

3. Project Description

(1) Project Outline

- 1) Project Objective(s): The objective of the Project is to respond to increasing transportation demand and reduce serious traffic congestion by constructing a metro in the south-western part of the Greater Cairo Region (between 6th of October City [El-Ashghal Station] and the center of Cairo [El Fustat]), thereby contributing to economic development of the Arab Republic of Egypt.
- 2) Project Component(s): The Project will provide construction of Cairo Metro Line No. 4 Phase 1 extending approximately 18.8 km to the east from El Ashghal Station (start

point) to the center of Cairo (El Fustat), installation and maintenance of electric, mechanical, signal and communication equipment, and procurement of cars. The details are as follows.

- (a) Metro Construction (Western section: Between El-Ashghal Station and El-Mesaha Square Station, approximately 14 km [tunnel construction, construction of 12 metro station buildings, railroad construction, etc.])
 - (b) Metro Construction (Eastern section: Between El-Mesaha Square Station and El fstat [turning back point], approximately 5 km [tunnel construction, construction of four subway station buildings, railroad construction, turning-back equipment, etc.])
 - (c) Procurement of signal systems (Electric and mechanical equipment (including Supervisory Control And Data Acquisition [SCADA]), signal and communication equipment (including Operation Control Center [OCC]), railroad construction work (including third railroad), platform doors, automatic toll collection systems, construction of a rail yard and a car maintenance plant, etc.)
 - (d) Procurement of cars (184 cars: 8-car train × 23 trains)
 - (e) Consulting Service (Assistance in bidding, construction management (including safety management, assistance in test operation, etc.), social/environment-conscious support (assistance in preparing a resettlement plan, implementation management, support for monitoring, etc.), support relating to operations, maintenance/management systems and plans, etc.)
- (2) Total Project Cost: 500.035 billion yen (including the current debt of 41 billion yen)
- (3) Schedule (period for cooperation): March 2012 to February 2030 (215 months in total). The Project will be completed when the facilities are opened to serve the public (February 2028).
- (4) Project Implementation Structure
- 1) Borrower: Government of the Arab Republic of Egypt
 - 2) Guarantor: None
 - 3) Executing Agency: National Authority for Tunnels
 - 4) Operation and Maintenance Agency: Under consideration
- (5) Cooperation and Sharing of Roles with Other Donors
- 1) Japan's assistance activities
JICA provided “Greater Cairo Metro Line No. 4 Phase 1 Project” (ODA loan), which is the first time-sliced project of the entire project.
 - 2) Other donors' assistance activities:
Financial support for the construction of Cairo Metro Line No. 1 (The total length is 44 km. Phase 1 (29 km) was opened in 1987, followed by Phases 2 and 3. The entire line was opened in 2002.) was provided by AFD, EIB and EBRD, and technical assistance was provided by Fonds d'études et d'Aide au Secteur Privé in France.

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(6) Environmental and Social Consideration

① Category: A

② Reason for Categorization: The project falls under the category of the railway sector which is described in the JICA Guidelines for Environmental and Social Considerations (published in April 2010).

③ Environmental Approval and Authorization:

The environmental impact assessment (EIA) report regarding the project and the supplemental EIA report were approved respectively in July 2010 and November 2010 by the Egyptian Environmental Affairs Agency (EEAA). After that, the Scoped EIA report that covers the section (approximately 1.6 km to the east from El-Saleh Station to El Fustat) which had been extended with a change of the operation scope was prepared and then approved by the EEAA in October 2014.

④ Pollution Control Measures:

The project includes underground construction of all the railways and stations; therefore, it is assumed that the impact of noise and vibration when the facilities are used by the public will be limited. The possibility that the water drained from the car base station and stations contains contaminants that need special consideration is not assumed. Measures to deal with discharged water and waste as well as measures against noise, vibration, air pollution and traffic congestion will be taken based on the environmental management plan in the EIA report during construction.

⑤ Natural Environment:

Because the target area of the project does not include any lands such as a national park and is not even close to such lands, it is assumed that unwanted effects on the natural environment will be minimal.

⑥ Social Environment:

Because the target area of the project does not include any lands such as a national park and is not even close to such lands, it is assumed that unwanted effects on the natural environment will be minimal.

⑦ Others and Monitoring:

The construction contractor monitors a variety of factors including the air quality, noise, vibration, and groundwater level during construction under the supervision

of the NAT, and no problems have occurred so far. After the facilities are opened to the public, a contract operation/maintenance organization will monitor the air quality, noise, vibration, water quality, waste, etc. under the supervision of the NAT.

(7) Cross-Cutting Issues

- ① Climate Change: Because railway is an energy-efficient transportation means and has better greenhouse gas (GHG) reduction effect compared to other means of transportation, it is positioned as an important solution in the field of transportation. The project aims at enhancing the large public transportation function, meeting the increasing transportation demand, and alleviating traffic congestion through construction of subway, which will contribute to GHG emissions reduction as a solution for mitigation of climate change. The climate change mitigation effect (estimated GHG emissions reduction amount) by the project is approximately 75,886 ton per year in CO2 equivalent (2030).
- ② Consideration for Disabled People: In the project, stations (including elevators, slopes, blocks for guiding visually handicapped people, toilets for disabled people, vending machines for people in a wheelchair, etc.) with consideration for elderly people and handicapped people will be built based on the international standards.
- ③ Measures against COVID-19: The construction workers in the NAT operation site shall follow the directions regarding anti-COVID-19 measures, for example, compulsory vaccination against COVID-19, given by the Department of Health.

(8) Category of Gender: GI (S) gender informed (Significant)

<Description of activities and reason for classification>: The project deploys various efforts, such as operations of female-only train cars and setup of ladies' changing rooms for female employees, so that women can use the subway safely and comfortably. Therefore, the project is classified as a gender integrated project.

(9) Other Important Issues

The project is a STEP project, and therefore, Japanese technologies and products, such as escalators and elevators for civil engineering works, automated toll-collection systems and platform doors, will be used in the construction.

4. Targeted Outcomes

(1) Quantitative Effects

Indicator	Baseline	Target (2030) [2 years after project completion]
Passenger volume (thousand people per km/day)	—	3,228
Number of services (services/day)	—	396
Operation rate (%)	—	90.1
Train operation distance (km/day)	—	54,490

(2) Qualitative Effects

Reduction of traffic congestion in the urban area of Cairo, reduction of traffic pollution and air pollution through modal shift, improvement of convenience through ensuring of punctuality for transportation, economic development of the urban area of Cairo, and mitigation of climate change

(3) Internal Rate of Return

Based on the following assumption, the economic internal rate of return (EIRR) and the financial internal rate of return (FIRR) of the project shall be 8.6% and 2.4% respectively.

[EIRR]

Cost: Project cost (excluding tax), Cost for operation, maintenance and management

Benefit: Reduction of the cost for operating trains, reduction of the required time, reduction of the amount of NO_x, SO₂ and GHG emissions

Project life: 40 years

[FIRR]

Cost: Project cost, Cost for operation, maintenance and management

Benefit: Fare revenue

Project life: 40 years

5. External Factors and Risk Control

(1) Preconditions: None in particular.

(2) External Conditions: None in particular.

6. Lessons Learned from Past Projects

The ex-post evaluation report on the Delhi Mass Rapid Transport System Project (I) to (VI) in India (2015) emphasizes the importance of stimulation of latent demand through the improvement of convenience of connection to other transportation modes and housing development along the subway lines. In the phase of detailed design by technical assistance for ODA loans in the project, proposed basic concepts for developing four station vicinities which are assumed to be transport nodes at which safe and smooth transfer is required were examined. JICA then proposed a project needed to make the city desirable in the future to the NAT. Upon receiving JICA's proposal, the NAT is proceeding with development plans (examination of where taxi stands and bus stations should be, examination of where transfer gates to Cairo Metro Line No. 1 and No. 2 should be, etc.) for ensuring consistency with the transportation modes including monorail, bus and taxi and the regional development project at El Remaya Station, Maryoteya Station and Giza Square Station in cooperation with Giza Province and Cairo Province.

7. Evaluation Results

In the Greater Cairo Region, because of the population growth with advancement of urbanization, excessive dependence on road traffic by public transportation systems (busses, taxis, etc.), and rapid spread of automobiles, chronic traffic congestion is a serious problem now. The existing public transportation systems (busses, taxis and railways) have limited transportation capability and it is difficult to expand the network of roads substantially due to land shortage and dense population in the city. Therefore, improving the large public transportation function to alleviate traffic congestion and reducing the dependence on road traffic are one of the pillars of the Government of Egypt's economic and social development project. Moreover, the project should contribute to SDGs Goals 9 (Industry, Innovation and Infrastructure), 11 (Sustainable Cities and Communities) and 13 (Climate Action); therefore, we have a substantial need for implementation of the project.

8. Plan for Future Evaluation

(1) Indicators to be Used

As indicated in sections 4.

(2) Timing

2 years after project completion Ex-post evaluation

END

Attachment: Map of Greater Cairo Metro Line No. 4 Phase 1 Project

Whole of Egypt



End of the line: El Ashgar Station (No. 1 Station)

Center of the Greater Cairo Region

