Έργο Ηλεκτρικού Σιδηροδρόμου Υψηλής Ταχύτητας στην Αίγυπτο

Το Εμπορικό και Βιομηχανικό Επιμελητήριο Αθηνών (Ε.Β.Ε.Α.), μετά από σχετική πληροφόρηση της Πρεσβείας της Αιγύπτου στην Αθήνα, γνωρίζει στις επιχειρήσεις – μέλη του και σε κάθε ενδιαφερόμενο ότι το Υπουργείο Μεταφορών της Αιγύπτου **επανεξετάζει τη συμμετοχή του ιδιωτικού τομέα στην υλοποίηση των Γραμμών 2 και 3 του δικτύου ηλεκτρικού σιδηροδρόμου υψηλής ταχύτητας.**

Πιο συγκεκριμένα, το έργο του Ηλεκτρικού Σιδηροδρόμου Υψηλής Ταχύτητας (Electric Express Train- EET) αποτελεί ένα σημαντικό, φιλικό προς το περιβάλλον έργο μεταφορών. Η Μπλε Γραμμή του EET, μήκους 1.110 χλμ., θα παρέχει υπηρεσίες μετακίνησης επιβατών και μεταφοράς εμπορευμάτων μεταξύ του 6ης Οκτωβρίου (6th of October City) και του Αμπού Σιμπέλ, ενώ η Κόκκινη Γραμμή, μήκους 215 χλμ., θα παρέχει αντίστοιχες υπηρεσίες μεταξύ των πόλεων Κένα και Σαφάγκα, καθώς και τουριστικές υπηρεσίες που θα συνδέουν το Αμπού Σιμπέλ, το Ασουάν και το Λούξορ με τη Χουργκάντα.

Η συνοπτική έκθεση της μελέτης, η οποία εκπονήθηκε από το Υπουργείο Μεταφορών σε συνεργασία με κορυφαίες διεθνείς συμβουλευτικές εταιρείες του κλάδου των μεταφορών (βλ. συνημμένο), παρουσιάζει την οικονομική και χρηματοοικονομική αξιολόγηση του έργου, με στόχο την εκτίμηση της βιωσιμότητας των νέων γραμμών.

Στο πλαίσιο αυτό, απευθύνεται πρόσκληση συμμετοχής ενδιαφερόμενων επιχειρήσεων στο έργο του ηλεκτρικού σιδηροδρόμου υψηλής ταχύτητας, βάσει των μελετών βιωσιμότητας που έχουν εκπονηθεί για τον σκοπό αυτό. Επισυνάπτεται η συνοπτική έκθεση της μελέτης του έργου.

Τυχόν πρόσθετες πληροφορίες παρέχονται από την Πρεσβεία της Αιγύπτου στην Ελλάδα (τηλ. 2103600364, e-mail: commercial@egyptembassy.gr)

Feasibility Study Update

Feasibility Study of Electric Express Train

(EET)- Blue and Red Lines

May 2025

Objective of the Report

This report provides an updated financial and technical feasibility assessment for the Blue and Red Lines of the Express Electric Train project.
The primary objectives are to evaluate the financial viability of all lines under updated operations cost structures and recent exchange rate scenarios.
This report integrates the latest modeling results, operational updates, and risk analyses to serve as a robust basis for stakeholder review and final decision-making regarding the Blue and Red Lines's next phases.
This Scope of Work outlines the tasks required to perform a focused update of the Financial Appraisal section of the following:

- Feasibility Study of Electric Express Train (EET)- Blue Line (From October to Abou Simbel) and Red Line (From Qena to Safaga) dated 18th January 2024 (hereafter referred to as the "Original Study" in case of blue and red lines context.

Methodology

1. Project Timeline Adjustment and Operational Year Conventions

Revised Implementation Framework
Original Plan

- **Targeted Construction Completion**: 2030
- **Calendar-Year Alignment**: Initial projections used specific years (2030, 2031, etc.)

Updated Approach

- **Operational Year Designation**:
  - **Y1**: First full year of operations (2030)
  - **Y2**: Second operational year
  - **Y***n**: Sequential year numbering for all subsequent periods

Rationale for Timeline Neutrality

1. **Risk Mitigation**
   - Addresses delays from supply chain disruptions, regulatory approvals, or force majeure events
   - Eliminates calendar dependency for cross-jurisdictional stakeholder alignment
2. **Financial Modeling Consistency**
   - Maintains original table headers with **2030 = Y1** as baseline reference
   - Enables like-for-like comparison between pre- and post-delay scenarios
3. **Implementation Benefits**
   - Simplifies replanning processes for phased deployments
   - Aligns with ISO 21500 project management standards for timeline-agnostic reporting

2. Key Appraisal Assumptions

Appraisal Period

- 31-year horizon (standard for long-term infrastructure projects)

Investor Structure

- Egyptian Government through the National Authority for Tunnels (NAT)

Taxation Framework

- Exemption from corporation tax and import duties for government-led projects

Economic Parameters

EGP/EUR Exchange	57.58

EGP/USD Exchange	50.8

Financial Costs

- EGP-denominated debt: 17.5% interest rate (reflects CBE's anti-inflation measures)
- EUR-denominated debt: LIBOR + 0.63% (per German Export Authority terms)

Local Inflation Rate

- 11% (projection for 2023) and remains in 2025.

Currency Depreciation Recalibration

Key Adjustment:

- 2023 assumption: 2.5% annual EGP devaluation
- 2025 revision: 1% stabilized rate

It is important to note that the assumed rate of foreign currency depreciation has been reduced from 2.5–3% at the end of 2023 to just 1% in 2025. This adjustment comes after the significant rise in exchange rates experienced last year, during which the Egyptian pound saw a sharp decline against foreign currencies. This major correction in the exchange rate has helped restore balance in the currency market. As a result, there is no longer a need to assume high rates of currency depreciation in the coming years. With inflationary pressures easing and liquidity improving, exchange rates are now expected to remain stable at current levels. This change in assumptions provides a more realistic reflection of the present economic conditions and enhances the accuracy of the project's financial model.

Executive Summary

The Electric Express Train (EET) is an Environmentally Friendly major transport project. The Electric Express Train (EET) Blue line, a route of **1110 Km** will provide passenger and freight services between October and Abou Simbel while the Red line, a route of **215 Km** will provide the same services between Qena and Safaga cities, in addition to the touristic services connecting Abou Simbel, Aswan and Luxor to Hurgada.

This report presents the financial and economic appraisal of the project to assess the feasibility of the new lines.

Project Details

The planned project services include express passengers' trains and regional passengers' trains in addition to freight trains.

Blue line: there are 37 stations on the Blue Line: two end stations (i.e., October Gardens and Abu Simbel) and 35 intermediate stations, including the interchangeable station with the Red Line (i.e., Qena station), where all of them serve the regional service, while 9 main stations serve the high-speed service.

Red Line: there are four stations on the Red Line: two end stations (i.e., Qena and Safaga stations) and two intermediate stations (i.e., Hurghada and Sahl Hasheesh) taking into consideration that Qena station is an interchangeable station with the Blue Line and the three stations are main stations, which serve the regional service and the high-speed service, while Sahl Hasheesh station is a secondary station dedicated for the regional service only.

The total number of stations for both lines are 39, not including the interchangeable station with the Green Line (October Gardens).

Both Lines will be maintained at four 4 different locations:

- Maintenance Services Qena Main Workshop, for both lines
- Service point in Aswan and Abou Simbel for the Blue line
- Service point in Safaga for the Red line

1. Capital Cost Update: Changes in Project Valuations from January 2024 to May 2025

This report provides a detailed analysis of capital cost changes for two project packages between January 2024 and May 2025. The primary factors influencing these changes are scope modifications to both packages and significant fluctuations in the EGP/USD exchange rate, which has moved from 31 EGP/USD to 50.8 EGP/USD during this period-representing a 63.9% depreciation of the Egyptian Pound.

1.1. Package 1 Valuation Analysis

January 2024 Baseline Assessment

In January 2024, Package 1 was valued at 175.7 billion EGP, equivalent to 5.67 billion USD based on the prevailing exchange rate of 31 EGP/USD. This established the initial financial framework for the project component.

May 2025 Updated Valuation

By May 2025, the value of Package 1 has been revised to 150.33 billion EGP, equivalent to 2.96 billion USD using the current exchange rate of 50.8 EGP/USD. This represents a 14.4% reduction in EGP terms (from 175.7 billion to 150.33 billion EGP), attributed to scope changes in the project specifications. More significantly, the USD equivalent value decreased by 47.8% (from 5.67 billion to 2.96 billion USD), demonstrating the compound effect of both scope reductions and currency depreciation.

Key Factors Affecting Package 1

The revised scope resulted in a 25.37 billion EGP reduction in local currency value. However, the more dramatic change in USD terms stems primarily from the substantial depreciation of the Egyptian Pound against the US Dollar during this period. This underscores how exchange rate

fluctuations can amplify or mitigate the financial impact of project scope modifications in international contexts.

1.2. Package 2 Valuation Analysis

January 2024 Baseline Assessment

Package 2 was initially valued at 9.55 billion USD in January 2024. As this package was denominated directly in USD, it was not subject to exchange rate effects at that time.

May 2025 Updated Valuation

The May 2025 valuation of Package 2 stands at 8.97 billion USD, reflecting a 6.1% decrease from the January 2024 figure. This reduction of 0.58 billion USD is attributed solely to scope changes, as confirmed in the project documentation. Unlike Package 1, these modifications affected the USD valuation directly since Package 2 is denominated in US Dollars.

1.3. Consolidated Project Valuation

Combined Financial Impact

As of May 2025, the total project value (Packages 1 and 2 combined) amounts to 11.93 billion USD, calculated using the current exchange rate of 50.8 EGP/USD. This represents a significant change from January 2024 combined total of 15.22 billion USD-a 21.6% overall reduction.

Comparative Analysis

The consolidated analysis reveals different patterns of change between the two packages:

- **Package 1**: Experienced a dual impact from scope reductions (-14.4% in local currency) and currency effects, resulting in a 47.8% decrease in USD equivalent value
- **Package 2**: Underwent a more modest 6.1% reduction attributed exclusively to scope changes

Table 1: EET Capital Costs (Updated 2025)

CAPITAL COSTS	COMPONENT		EGP	USD
PACKAGE 1	Civil Works (infrastructure, bridges, stations, access roads)			
LOT 1	General Authority of Road and Bridge for the alignment + Bridge and Access Road.			
LOT 2	Different contractors to make the construction of the stations by NAT			
	Subtotal		136,661,600,000	
	Contingency	10%	13,666,160,000	
	Total		**150,327,760,000**	
PACKAGE 2				
	Track Works, Civil Works, Power Supply and OCS, Overall Project Management & System Integration, Communications, Automatic Fare Collection, Operational Control Centre and Signaling			6,882,169,000
	15 years maintenance of package 2 works (Siemens+ Orascom + Arab Contractor)			2,085,338,037
				8,967,507,037
PACKAGE 1 TOTAL IN USD				**2,957,461,342**
PACKAGES 1& 2 TOTAL IN (BILLION USD)				**11.93**

Ongoing operating costs are an important component of both the financial and economic evaluation. Estimates have been made as to the scale of the cost of operations.

1. Maintenance of Lot 1 and 2 Infrastructure

The infrastructure constructed under Lot 1 and 2 of the EET project, which includes infrastructure such as the stations, bridges and access roads will require continued maintenance throughout the life of the scheme. For the purposes of the financial appraisal, a high-level estimate of ongoing infrastructure maintenance costs has been benchmarked against the overall cost of construction.An estimate of **5% of infrastructure cost as annual maintenance cost** has been adopted.

1.1. Maintenance Costs – Rolling Stock and rail infrastructure (Siemens Contract)

The contract with Siemens includes provision of a 15-year maintenance package covering the rolling stock and rail infrastructure provided under Package 2.

The value of the maintenance component is 2.1 billion USD, representing 30% of the capital cost of Package 2 over the period.

The cost profile of actual maintenance requirements will not be constant over the 15 years, with required maintenance increasing over time.

The nature of the arrangement and payment profile with Siemens has not been established. Therefore, for the purpose of the financial appraisal, we take an increasing cost profile featuring a compound growth in maintenance costs of 5% per year, rising from an annual US$96.6m in opening year to US$191m in year 15.

2. *Operation Costs*

This revised operational cost assessment reflects current exchange rates (57.58 EUR/EGP), inflationary pressures, and optimized operational parameters. The restructured cost framework demonstrates improved fiscal efficiency despite Egypt's economic challenges.

Cost Component Breakdown (2025 Onwards)

Component	2024 Baseline (Converted)	2025 Updated	Change
Local (EGP)	0 EGP	4.0B EGP	New category
Foreign (EUR)	150M EUR	6.7M EUR	-95.5%
Total in EGP	4.975B EGP*	4.386B EGP	-11.8%

*2024 total calculated at Jan 2024 rate (33.17 EUR/EGP)

Scheme Revenues

Farebox and non-farebox revenues have been calculated, based on the traffic study projection of passenger and freight demand, and the inclusion of wider revenue generating potential from commercial rental at stations and parking charges.

The fare levels adopted for the revenue projection are the revenue maximizing tariff levels calculated within the traffic study. These are as follows:

1. **Medium fare** scenario (revenue maximizing) –
    - 0.95 LE/km regional,
    - 1.45 LE/km Express
2. Commercial rental

The rental value has been estimated by retail sector market reporting, with an annual rental value as follows[1]:

- **EGP 1800 per sq meter** for retail rental per annum

Each station will have an average of **1000 sq m of rentable commercial space**.

Stations will have an average of **66 car parking spaces** yielding EGP **30 per day per parking space, with an average occupancy rate of 75%**.

[1] https://enterprise.press/wp-content/uploads/2020/09/Egypt_Real_Estate_Report_-_Q3_.pdf

Financial appraisal results

1. Financial Appraisal First Option: Covering CAPEX, OPEX and Loan payments.

The following analysis presents a stress-test scenario where project revenues fully cover both capital expenditure (CAPEX) and operational expenditure (OPEX) over the project lifecycle.

Blue and Red-Lines	Jan 2024	2025
Exchange Rate Euro/EGP (2025)	33.17	↑57.58
Exchange Rate USD/EGP (2025)	31	↑50.83
Depreciation of EGP against EUR and USD (yearly)	2.5%	↓1%
FIRR	15.25%	↑16.88%
NPB EGPm	275,142	↑285,666
NPC EGPm	305,701	↓294,490
NPV EGPm	-30,559	↑-8,825

1.1. Analysis of Financial Appraisal Results for the first Option for Egypt's Blue and Red Lines Project (2023 vs. 2025)

1.1.1. Project Financial Performance

1. **FIRR (Financial Internal Rate of Return):**
   - 2024: 15.25%
   - 2025: ↑16.88%

The increase in FIRR is affected by many factors the currency devaluation and inflation in addition to the scope modifications, which has reduced the project's net present cost (NPC) from EGP 305,701 million to EGP 294,490 million. FIRR remains within the typical range for public infrastructure projects in Egypt.

Considering the current economic challenges, the project's financial model shows that all high-speed electric rail lines achieve a Financial Internal Rate of Return (FIRR) exceeding 14% based on the current exchange rate, which is considered an appropriate rate for approving such strategic government-funded projects.

Many countries with economic conditions similar to Egypt follow the same approach, setting high internal rate of return benchmarks for major infrastructure projects; for example, India applies a rate of around 12% for transport projects, while in some developing countries, rates range between 8% and 14% to account for risks and long payback periods.

Accordingly, adopting a 14% rate as a minimum is consistent with international best practices, reflects the project's strength and financial attractiveness, and justifies government investment in this vital sector. The financial analysis results confirm the project's ability to achieve returns exceeding this rate, with revenues efficiently covering operational and maintenance costs, which supports the project's feasibility and long-term sustainability. Thus, the high-speed electric rail project stands as a model for effective government investment that balances financial and developmental objectives and aligns with the standards of major global transport projects.

1.1.2. Key insights:

1. **Line-Specific Performance**

Positive Developments

- ↑ FIRR (exceeding 16% threshold)

- ↓ NPC (EGP 294.5B vs initial EGP 305.7B)

1.1.3. Operational Cost Analysis: Updated 2025 Projections

This revised operational cost assessment reflects current exchange rates (57.58 EUR/EGP), inflationary pressures, and optimized operational parameters. The restructured cost framework demonstrates improved fiscal efficiency despite Egypt's economic challenges.

Cost Component Breakdown (2025 Onwards)

Component	2024 Baseline (Converted)	2025 Updated	Change
Local (EGP)	0 EGP	↑4.0B EGP	New category
Foreign (EUR)	150M EUR	↓6.7M EUR	-95.5%
Total in EGP	4.975B EGP*	4.386B EGP	-11.8%

*2024 total calculated at Jan 2024 rate (33.17 EUR/EGP)

Key Efficiency Drivers

1. **Localization**
   - Shifted 91% of maintenance operations to EGP-denominated contracts (constant prices 2025)
     - 2024 EUR→EGP: 150M EUR × 33.17 = 4.975B EGP
     - 2025 Local Share: (4B EGP / 4.39B Total EGP) × 100 = 91%
2. **Currency Optimization**
   - Reduced EUR exposure of total OPEX

1.1.4. Net Present Value (NPV) Analysis: 2024 vs. 2025

The Net Present Value (NPV) of the project improved significantly from **EGP -30,559 million in 2024** to **EGP -8,825 million in 2025**. This shift represents a notable reduction in the project's expected net loss over its lifecycle.

Key Factors Behind the Improvement

- **Currency Movements:** The Egyptian Pound experienced substantial depreciation against major currencies during this period. For projects with foreign currency-linked revenues or cost components, this can increase the local currency value of revenues, helping offset rising costs and improving NPV.
- **Operational Efficiency:** The project implemented measures to streamline operations, such as localizing procurement and maintenance contracts, optimizing energy use, and adjusting freight tariffs. These steps reduced annual operating costs and contributed to a better financial outlook.
- **Cost Control and Scope Adjustments:** There was a focused effort to control capital and operational expenditure. Scope adjustments and renegotiated supplier contracts led to lower projected costs, directly supporting the improved NPV.
- **Revenue Enhancements:** Adjustments in pricing strategies, particularly for freight and service tariffs, increased projected cash inflows, further supporting the NPV improvement.

Interpretation

- **Still Negative, But Improved:** While the NPV remains negative, the substantial reduction indicates that the project is moving toward greater financial sustainability. The remaining gap is much smaller, suggesting that further operational improvements or favorable market conditions could potentially bring the project closer to breakeven.
- **Strategic Value:** In the context of large-scale infrastructure, a negative NPV is not uncommon, especially when broader economic, social, or environmental benefits are considered alongside direct financial returns. The improved NPV signals better fiscal management and a stronger case for the project's long-term value.

- **Resilience to Economic Shifts:** The project's financial model has demonstrated resilience in the face of inflation, currency volatility, and changing market conditions, reflecting prudent risk management and adaptability to Egypt's evolving economic environment.

In summary, the marked improvement in NPV from 2024 to 2025 reflects successful cost containment, operational optimization, and adaptive financial planning, strengthening the project's financial position despite ongoing macroeconomic challenges.

The financial analysis for the **first option which "is to cover all EET costs"**, results show that over the 30-year appraisal horizon, the financial internal rate of return (FIRR) of the investment stands at **16.88% (previously 15.25% in Jan. 2024).**This is less than the investor hurdle rate of 17.5% 'whilst the FIRR might not hit the threshold for a private investor, the return remains strongly positive for a public investment project which has not only financial return, but also societal aspects benefit which is demonstrated in the Economic Study in this report.

2. Financial Appraisal – Second Option: Covering OPEX and Loan Payments

Blue and Red Lines Farebox Recovery Analysis

The financial sustainability of the Blue and Red Lines is evaluated using two key farebox recovery scenarios:

- **Case 1:** Coverage of Operational Expenditures (OPEX) and Maintenance Costs
- **Case 2:** Coverage of OPEX, Maintenance, and Finance Costs (Debt Service)

Quantitative Assessment

Based on projections for the Blue and Red Lines (see "Blue and Red Lines Farebox Recovery Tables (Y1–Y31)"):

- **Farebox Ratio (OPEX & Maintenance):**

The farebox ratio ranges from **1.34 to 2.47** over the analysis period, consistently demonstrating that fare revenues comfortably exceed operational and maintenance expenses.

- **Farebox Ratio (OPEX, Maintenance & Finance):**

Even when accounting for debt service, the farebox ratio remains robust, fluctuating between 0.93 and 1.99, with an average of 1.53 over the 31-year period. This consistently exceeds the break-even threshold of 1.0, highlighting the line's strong capacity to cover all major recurring costs-including financing-solely through fare revenues.

Financial Sustainability Analysis

These results highlight the Blue and Red Lines's impressive level of fiscal self-sufficiency, reflecting the government's commitment to responsible and sustainable infrastructure investment. The gradual improvement in both ratios over time points to increasing financial stability as ridership grows and operations mature.

Strategic Implications

- **Operational Efficiency:**

Consistently high ratios (above 1.3 for OPEX and maintenance) underscore effective planning and management, showcasing prudent use of public funds.

- **Fiscal Responsibility:**

The ability to maintain a farebox ratio above 1.0 even when including financing costs demonstrates a balanced approach to infrastructure development, ensuring long-term sustainability without over-reliance on subsidies.

- **Progressive Financial Strength:**

The positive trend in both ratios supports the government's strategic vision for a resilient, financially viable transportation network that delivers long-term value to the nation.

This analysis confirms the Blue and Red Lines's strong financial foundation and its alignment with Egypt's broader goals for sustainable, self-sufficient public infrastructure.

2.1. Blue and Red Lines Farebox Recovery Tables (Y1-Y31)

Blue and Red Lines (B&R_L) (Year of Operation	1	2	3	4	5
B&R_L Revenues Nominal (EGP m)	44,867	51,857	59,937	69,275	80,069
B&R_L Operating costs + maintenance excl. finance (Nominal)	19,202	21,974	25,155	28,806	32,999
Option 1: B&R_L GL Farebox ratio (OPEX& Maintenance)	**2.34**	**2.36**	**2.38**	**2.40**	**2.43**
B&R_L Costs - incl OPEX, maintenance & financing (Nominal)	25,276	28,108	64,137	68,178	72,765
Option 2: B&R_L Farebox ratio (OPEX& Maintenance incl finance)	**1.78**	**1.84**	**0.93**	**1.02**	**1.10**

Blue and Red Lines (B&R_L)	6	7	8	9	10	11
B&R_L Revenues Nominal (EGP m)	93,367	105,073	118,247	133,072	149,757	168,535
B&R_L Operating costs + maintenance excl. finance (Nominal)	37,817	43,354	49,720	57,043	65,470	75,171
Option 1: B&R_L Farebox ratio (OPEX& Maintenance)	**2.47**	**2.42**	**2.38**	**2.33**	**2.29**	**2.24**
B&R_L Costs - incl OPEX, maintenance & financing (Nominal)	77,981	83,919	90,691	98,424	107,265	117,384
Option 2: B&R_L Farebox ratio (OPEX& Maintenance incl finance)	**1.20**	**1.25**	**1.30**	**1.35**	**1.40**	**1.44**

Blue and Red Lines (B&R_L)	12	13	14	15	16
B&R_L Revenues Nominal (EGP m)	189,667	213,450	240,216	270,339	307,287
B&R_L Operating costs + maintenance excl. finance (Nominal)	86,343	99,215	114,052	131,159	150,894
Option 1: B&R_L Farebox ratio (OPEX& Maintenance)	**2.20**	**2.15**	**2.11**	**2.06**	**2.04**
B&R_L Costs - incl OPEX, maintenance & financing (Nominal)	128,978	142,276	157,543	163,268	183,323
Option 2: B&R_L Farebox ratio (OPEX& Maintenance incl finance)	**1.47**	**1.50**	**1.52**	**1.66**	**1.68**

Blue and Red Lines (B&R_L)	17	18	19	20	21
B&R_L Revenues Nominal (EGP m)	345,340	388,106	436,171	490,190	550,902
B&R_L Operating costs + maintenance excl. finance (Nominal)	173,669	199,962	230,330	265,419	305,979
Option 1: B&R_L Farebox ratio (OPEX& Maintenance)	**1.99**	**1.94**	**1.89**	**1.85**	**1.80**
B&R_L Costs - incl OPEX, maintenance & financing (Nominal)	173,669	199,962	230,330	265,419	305,979
Option 2: B&R_L Farebox ratio (OPEX& Maintenance incl finance)	**1.99**	**1.94**	**1.89**	**1.85**	**1.80**

Blue and Red Lines (B&R_L)	22	23	24	25	26
B&R_L Revenues Nominal (EGP m)	619,135	695,823	782,012	878,882	996,936
B&R_L Operating costs + maintenance excl. finance (Nominal)	352,883	407,144	469,941	542,647	626,859
Option 1: B&R_L Farebox ratio (OPEX& Maintenance)	**1.75**	**1.71**	**1.66**	**1.62**	**1.59**
B&R_L Costs - incl OPEX, maintenance & financing (Nominal)	352,883	407,144	469,941	542,647	626,859
Option 2: B&R_L Farebox ratio (OPEX& Maintenance incl finance)	**1.75**	**1.71**	**1.66**	**1.62**	**1.59**

Blue and Red Lines (B&R_L)	27	28	29	30	31
B&R_L Revenues Nominal (EGP m)	1,118,451	1,254,784	1,407,741	1,579,352	1,735,710
B&R_L Operating costs + maintenance excl. finance (Nominal)	724,434	837,539	968,695	1,120,841	1,297,403
Option 1: B&R_L Farebox ratio (OPEX& Maintenance)	**1.54**	**1.50**	**1.45**	**1.41**	**1.34**
B&R_L Costs - incl OPEX, maintenance & financing (Nominal)	724,434	837,539	968,695	1,120,841	1,297,403
Option 1: B&R_L Farebox ratio (OPEX& Maintenance)	**1.54**	**1.50**	**1.45**	**1.41**	**1.34**

Economic Appraisal

The economic appraisal, also known as a cost-benefit analysis, considers the value of the scheme from a wider societal perspective. The scheme brings benefits to both travelers and to the wider economy.

The economic appraisal assumptions are as follows:

Appraisal period – 60 years
Discount rate – 3.5%
Base year – 2025 (all economic evaluation pricing in 2025 constant prices)
Shadow price factor – 0.95%

The main scheme benefits are generated from the following User benefits:

- User travel time savings
- Vehicle Operating Cost savings
- Freight Vehicle Operating Cost savings
- Accident Reduction benefits
- Congestion Reduction benefits
- Infrastructure Reduction of Maintenance Investments
- Local Air Quality Improvements
- Noise Reduction benefits
- GHG Emission Reduction benefits

The following parameters have been used as the basis of the emission reduction calculations (values expressed in grams of CO2 per passenger km):

Mode	Emissions per **Passenger Kilometers (PKM)** (gCO2eq/Pkm)
Private car	91
Road based public transport (Shared Taxi/ Bus	46.99
Regional Train	91[2]
Air	101
Truck	150 g / Ton-Km
High speed electric rail * Rail has 1/5th of emissions per ton/km compared with trucks	30 g /passenger km (P-km)

[2] https://travelandclimate.org/transport-calculations

Carbon emissions savings have been monetized by taking the World Bank Carbon Market price of USD60 for 2020.
In addition to the benefits of passenger modal shift from road to rail, there is significant emission mitigation potential from the move of freight from road to rail.
Freight vehicles represent a major contributor to transport emissions, due to the vehicle weight and their high level of vehicle activity (km travelled).
Transporting goods by rail is estimated to generate only 20% of the emissions per ton-km by comparison with travel by lorry.
With truck emissions estimated to be 150g of CO2/ton-km, by comparison, movement of freight by rail would amount to just 30g of CO2/km.

A World Bank study[3] estimated that congestion in Cairo was costing the Egyptian economy almost 4% of Egypt's total GDP.This sits much higher than other similar economies, highlighting the significant social impact that delays bring to Egyptians each day.The high-speed rail will promote modal shift from road to rail, taking vehicles from a highly congested network which will bring benefits not only to rail users, but also to those who continue to travel by road.
Decongestion benefits have been estimated for the blue and red line.These assume a modest level of congestion on the adjacent highway corridor. Decongestion values are taken from the UK transport appraisal guidance (Webtag Tag-book) adjusted to Egyptian values using relative values of time for each country.

Reducing the number of vehicles using the highway bring about other societal benefits also.Fewer vehicles on the roads reduces the impact on the highway infrastructure, particularly through a reduction in the larger vehicles such as buses and shared transport vehicles.Reduced axle loading will reduce the scale of maintenance required on the highways.

Further benefits from reduced vehicle kms are derived from reduction in local air pollution (primarily NOx and PM) and noise pollution.These benefits have also been monetized, taking Egyptian values derived from relative costings adjusted from UK evidence.

Economic Appraisal Results

The results of the economic appraisal are summarized with standard metrics in the table below. The overall result of the assessment demonstrates that based on the present assumptions regarding time savings and other social benefits, the societal cost of the scheme outweighs the societal benefits.

EIRR	9%
NPB EGPm (Benefits)	1,179,891
NPC EGPm (Costs)	592,583
NPV EGPm	587,308
BCR	1.99

[3] https://www.worldbank.org/en/country/egypt/publication/cairo-traffic-congestion-study-executive-note

Glossary

BCR -	Benefit to Cost Ratio – a measure of economic value for a project
CAPEX –	capital Costs]
CAPM	Capital Asset Pricing Model
CTF -	Clean Technology Fund
CO2 -	Carbon Dioxide Emissions
EET	Electric Express Train
EGP	Egyptian Pounds
EIRR	Economic Rate of Return
EUR	Euro
Eurobor -	Euro Interbank Offered Rate.The average interest rates at which a large panel of European banks borrow funds from one another.
FIRR –	Financial Internal Rate of Return
Forex	Foreign Exchange
GCF	Green Climate Fund
GHG –	Greenhouse Gas Emissions
Hrs	Hours
IFI	International Financial Institution
km	Kilometers
LE	Egyptian Pounds
LIBOR -	London Inter-Bank Offered Rate
NAT	National Authority for Roads and Tunnels
INDCs	Intended Nationally Determined Contribution
NPB	Net Present Benefits
NPC –	Net Present Costs
NPV	Net Present Value
OPEX	Operating Costs
p.a.	per annum
SC0 –	the baseline or ‘Do nothing’ scenario without EET or HSR lines
SDGs	Sustainable Development Goals
SNCF –	Société nationale des chemins de fer – French railway company
USD	United State Dollars
VOC	Vehicle Operating Costs