

Ex-Ante Evaluation (for Japanese ODA Loan)

1. Name of the Project

Country: India

Project: Dedicated Freight Corridor Project (Procurement of Electric Locomotives)

Loan Agreement: September 15, 2017

Loan Amount: 108,456 million yen

Borrower: The President of India

2. Background and Necessity of the Project

(1) Current State and Issues of the Railway Sector in India

Freight traffic in India has been increasing at an annual rate of 10 to 15 percent since 2000, stretching the existing freight rail to the limit of its carrying capacity. Under the Tenth Five-Year Plan (April 2002 - March 2007), the total amount carried by freight rail grew at a lower annual rate of nearly 8 percent. The freight rail traffic for 2007 stood at 475 billion ton-km. The share of freight rail in freight traffic has been on the decline as well. It decreased from 48 percent in the second half of the 1990s to about 30 percent in 2002. Under these circumstances, the development and upgrading of railways, which are capable of mass transit and are eco-friendlier than road transport, have become essential for the economic growth of India. A case in point is a set of railway sections known as the “Golden Quadrilateral (GQ),” which connects four major cities: the capital city of Delhi, the country’s leading center of consumption and production, —Mumbai, which plays the role as the gateway port, for the subcontinent in the west, Kolkata in the northeast, and Chennai in the southeast. The GQ accounts for about 65 percent of the nation’s freight traffic. Two corridors in the GQ--between Delhi and Mumbai, and Delhi and Kolkata--are home to a total population of some 740 million. According to the Government of India’s projections for freight traffic demand, the Western Corridor will see a surge in demand for container traffic carrying daily necessities and construction materials such as cement and iron ore between international ports along the western coast--most notably Jawaharlal Nehru Port in Maharashtra State--and inland consumption centers. The Eastern Corridor, on the other hand, will witness a jump in bulk freight traffic transporting coal, iron ore, cement, fertilizer, and grain. The current track capacity is only about 50 percent of the passenger and freight traffic demand projected for 2032 on average for all sections in the country. The track capacities of the eastern and western sections are nearing their limits, highlighting the need for an immediate response.

(2) Development Policies for the Railway Sector in India and the Priority of the Project

In its Twelfth Five-Year Plan (April 2012-March 2017), as well as the Eleventh Five-Year Plan, the Government of India refers to the need to expand lines for mass transportation along the trunk railways, introduce high-speed freight cars with an axle load of 25 tons, and improve access to port facilities among other needs. Special emphasis is placed on the need for early construction of two railway sections dedicated to freight traffic: between Delhi and Mumbai and between Ludhiana and Kolkata via Delhi, as well as the need to increase passenger and freight rolling stocks. The Dedicated Freight Corridor Project (Procurement of Electric Locomotives) (the “Project”), designed to introduce high-power, high-speed electric locomotives for the first section, is identified as an important project in the Twelfth Five-Year Plan.

(3) Japan and JICA’s Policy and Operations in the Railway Sector

Japan's Country Assistance Policy for India (March 2016) identifies enhancing connectivity as one of the priority areas of assistance. It states to the effect that, with a view to de-bottlenecking the infrastructure constraints to investment and growth, Japan will support the development of a transportation hub and network infrastructure, as well as electricity and other infrastructure to strengthen connectivity among major industrial cities and economic zones, and also among regions in the country. JICA Country Analysis Paper for India (March 2012) states that, in order to eliminate economic bottlenecks, assistance is necessary to support the development of trunk railways (which may include high-speed rail and freight transport), urban rail, roads, ports, and other infrastructure that will contribute to promoting regional economic development, streamlining logistics, and increasing investment by foreign capital, chiefly in areas where JICA's assistance will likely have a greater impact: special economic zones, economic corridors, and other industrial clusters located in India's six major metropolitan areas and along the Delhi-Mumbai Industrial Corridor. The Project is consistent with the policy and analysis above. It is worth adding that, by January 2017, Japan made a total of 32 ODA loan commitments in the railway sector in India, totaling 1,394.4 billion yen or 71.9 percent of the total commitments made for India. Five of the 32 commitments, totaling 334.3 billion yen, were made for Phase 1 and Phase 2 of the Dedicated Freight Corridor Project. The technical cooperation projects related to the Project include the Feasibility Study on the Development of High-Axle Load Multimodal Dedicated Freight Corridors with Computerized Control for the Delhi-Mumbai and Delhi-Howrah Rail Routes (2006-2007) and the Technical Cooperation Project on the Assistance in Proof Examination for Running Stability of Dedicated Freight Corridor Transportation (2008).

(4) Other Donors' Activity

The World Bank has offered approximately 4,361 million US dollars in assistance for the Ludhiana-Mughal Sarai section (1,193 km) of the Eastern Dedicated Freight Corridor (EDFC). The Asian Development Bank (ADB) is providing institutional and other assistance to India's railway sector, especially for organizational reforms of Indian Railways. Earlier, the ADB extended 250 million US dollars in aid to Bangalore Metro and 176 million US dollars in aid to Jaipur Metro.

(5) Necessity of the Project

The Project is consistent with the development policies of the Government of India as well as Japan's and JICA's assistance policy and analysis. It will also help to achieve efficient freight transport with improved freight transport capacity through the introduction of high-power, high-speed electric locomotives following the Phase 1 and Phase 2 of the Dedicated Freight Corridor Project, designed to construct new dedicated freight lines. The Project is also expected to contribute to attaining Goal 9 of the SDGs. Therefore, JICA's support for the implementation of the Project is much needed.

3. Project Description

(1) Project Objectives

The objectives of the Project are to cope with the freight transport demand that is expected to grow rapidly and streamline logistics networks by introducing high-power, high-speed locomotives in the Delhi-Mumbai section as part of the program to construct new dedicated freight rail line for this particular section and

the Ludhiana-Delhi-Son Nagar section, thereby contributing to broader economic development in India.

(2) Project Site/Target Area

The states of Haryana, Uttar Pradesh, Rajasthan, Gujarat, and Maharashtra

(3) Project Component

1) 200 electric locomotives (9,000 ph; 6-axle) (international competitive bidding)

(4) Estimated Project Cost (Loan Amount)

203,657 million yen (loan amount: 108,456 million yen)

(5) Schedule

September 2017 - March 2027 (117 months in total)

The Project is considered completed when the facilities are put into service (scheduled for March 2025).

(6) Project Implementation Structure

1) Borrower: The President of India

2) Guarantor: none

3) Executing Agencies: Ministry of Railways (MoR), Dedicated Freight Corridor Corporation of India Limited (DFCCIL)

4) Operation and Maintenance System: Indian Railways will possess the electric locomotives, while DFCCIL will operate the electric locomotives as well as operate and maintain the tracks and the signal and communication system. It is planned that Indian Railways will maintain the electric locomotives and work to produce them on its own in the future. Therefore, the Project will also, by the contractors, transfer rolling stock manufacturing technologies to engineers at Indian Railways. In addition, DFCCIL plans to start hiring new engineers--including those on loan from Indian Railways--in 2019, as part of its efforts to further bolstering the operational structure for putting the whole line into service. The Ministry of Railways (MoR) of India has its own budget separate from the national budget, leaving no significant financial concerns for Indian Railways with regard to the procurement, possession, and maintenance of electric locomotives.

(7) Environmental and Social Consideration/Poverty Reduction/Social Development

1) Environmental and Social Consideration

(i) Category: A

(ii) Reason for Categorization

The Project falls under one of the sensitive sectors (railway) and has one or more sensitive characteristics under the Japan Bank for International Cooperation Guidelines for Confirmation of Environmental and Social Considerations, announced in April 2002 ("JBIC Guidelines").

(iii) Environmental Permit

An environmental impact assessment (EIA) report was completed in August 2009 for Phase 1 and in December 2012 for Phase 2, although such a report is not required for the Project under Indian law.

(iv) Anti-Pollution Measures

The anti-pollution measures taken by the contractors during the construction work include anti-dust measures, the proper storage of construction materials, and the use of low-noise equipment among other abatement measures in accordance with the environmental management plan. The noise mitigation measures after the railway section is put into service will include installing soundproof walls in built-up areas as needed.

(v) Natural Environment

The project area of Phase 1 is mainly farmland or unused land, and the route will detour any wildlife preserve. Thus, the adverse effects of Phase 1 are expected to be minimal. The adverse effects of Phase 2 are also expected to be minimal. Although a few portions of its project area are near national parks, the new line will be constructed along the existing line in those portions, which will keep its impact on the natural environment to a minimum.

(vi) Social Environment

The broader project as a whole involves the acquisition of 5,966 ha of land and the relocation of 3,515 households. DFCCIL compensates the affected residents at the repurchase price and provides support necessary for rebuilding their livelihoods in accordance with the MoR-approved resettlement plan, as well as the entitlement matrix that has been revised under the new land acquisition law. All the procedures for land acquisition and resettlement will be completed by December 2017.

(vii) Other / Monitoring

During the construction work for the broader project, the executing agencies will, through the contractors, monitor the noise and vibration levels, soil, air and water quality, borrow pits, and vegetation, as well as the land acquisition and resettlement processes. After the facilities are put into service, the executing agencies themselves will monitor the noise and vibration levels, soil and water quality.

2) Promotion of Poverty Reduction

None in particular

3) Promotion of Social Development (e.g. Gender Perspective, Measure for Infectious Diseases Including HIV/AIDS, Participatory Development, Consideration for the Person with Disability, etc.)

The Dedicated Freight Corridor Project, which includes the Project, involves large-scale construction work that draws a huge number of construction workers in a country that is vulnerable to HIV/AIDS infection. As such workers will include many migrant workers who will live alone during the construction work, a high risk of HIV/AIDS infection will be likely. For this reason, the consultants will work with local NGOs to carry out occupational health and safety activities, including HIV prevention, for construction workers. It is worth adding that cooperation for such HIV prevention activities is provided for in the bidding documentation for contractors.

(8) Collaboration with Other Donors

None in particular

(9) Other Important Issues

The Special Terms for Economic Partnership (STEP) were applied to the preceding portions (Phases 1 and 2) of the Dedicated Freight Corridor Project, of which the Project is a part. In these portions, Japanese technology was used in the tracks, the signal and telecommunication system, and other components.

4. Targeted Outcomes

(1) Quantitative Effects

1) Performance Indicators (Operation and Effect Indicators)

Indicator	Baseline (Actual Value in 2007)	Target (2027) [Expected value 2 years after project completion]
1. Operation rate (%)	—	93
2. Train mileage (both directions) (1,000 km/day)		
Dadri - Rewari	24	148
Rewari - Vadodara	279	1,876
Vadodara - Mumbai Port	97	510
3. Number of trains (both directions) (/day)		
Dadri - Rewari	3	18
Rewari - Vadodara	259	1,741
Vadodara - Mumbai Port	41	218
4. Traffic (million ton-km/day)		
Dadri - Rewari	4	24
Rewari - Vadodara	381	2,342
Vadodara - Mumbai Port	55	281
5. Maximum speed (km/hour)	75	100
6. Transportation time (hour)		
Dadri - Rewari	5	2
Rewari - Vadodara	37	15
Vadodara - Mumbai Port	17	7

(The baseline figures for the Rewari-Vadodara section have been updated from those at the time of preparing the ex-ante evaluation sheet for Phase 1.)

2) Internal Rate of Return

Based on the conditions indicated below, the economic internal rate of return (EIRR) of the Dedicated Freight Corridor Project as a whole will be 20.00 percent, and its financial internal rate of return (FIRR) will be 4.31 percent.

[EIRR]

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

Benefit: Reductions in the marginal freight transport cost (compared with the existing lines and roads), transportation time, etc.

Project Life: 30 years

[FIRR]

Cost: Project cost, operation and maintenance expenses

Benefit: Revenue from freight charges

Project Life: 30 years

(2) Qualitative Effects

Satisfaction of the freight transport demand, streamlined logistics networks with shorter transportation time, and broader economic development associated with increases in the gross regional domestic product of the states where the section to be built under the broader project is located.

5. External Factors and Risk Control

- An appropriate employment plan is developed, and an appropriate plan for human resources development is formulated and implemented.
- Freight charges, which constitute a key revenue source of the Dedicated Freight Corridor Project as a whole, are set at appropriate levels compared with other modes of transportation, especially truck transport.

6. Lessons Learned from Past Projects

The ex-post and other evaluations of the Metro Manila Strategic Mass Rail Transit Development Project (I), (II), and (III) in the Republic of the Philippines indicate that when a public enterprise implements a Japanese ODA Loan project and takes charge of the operation and maintenance aspects as well, special attention should be paid to its financial sustainability and that comprehensive assistance is needed to support the enterprise in improving its finances and streamlining its management. Learning from these lessons and taking note of the World Bank's support for DFCCIL in formulating its business plan, the Dedicated Freight Corridor Project, of which the Project is a part, plans to conduct an incidental technical cooperation project and make suggestions on how to improve and strengthen both the organizational structures and the operation and maintenance plans to Indian Railways, DFCCIL, and the MoR.

7. Plan for Future Evaluation

(1) Indicators to be Used

- 1) Operation rate (%)
- 2) Train mileage (both directions) (1,000 km/day)
- 3) Number of trains (both directions) (/day)
- 4) Traffic (million ton-km/day)
- 5) Maximum speed (km/hour)
- 6) Transportation time (hour)

(2) Timing

2027 (two years after the section is put into full service)