



Technical Assistance Report

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Transaction Technical Assistance (TRTA)
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People's Republic of Bangladesh: Railway Rolling Stock Operations Improvement Project

(Financed by the Asian Clean Energy Fund under the Clean
Energy Financing Partnership Facility)

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Asian Development Bank

CURRENCY EQUIVALENTS

(as of 8 January 2018)

Currency unit	–	taka (Tk)
Tk1.00	=	\$0.0120
\$1.00	=	Tk82.9750

ABBREVIATIONS

ADB	–	Asian Development Bank
APU	–	auxiliary power unit
CO ₂	–	carbon dioxide
ERPIT	–	enterprise resource planning information technology
TA	–	technical assistance

NOTES

- (i) The fiscal year (FY) of the Government of Bangladesh and its agencies ends on 30 June. “FY” before a calendar year denotes the year in which the fiscal year ends, e.g., FY2018 ends on 30 June 2018.
- (ii) In this report, “\$” refers to United States dollars.

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I. THE PROPOSED PROJECT

1. Bangladesh's transport system consists of roads, railways, inland waterways, seaports for maritime shipping, and civil aviation facilities that cater to both domestic and international traffic. Historically, the railway enjoyed a monopoly as a carrier and transported most principal commodities, including cement, coal, fertilizer, raw jute, stone, food grain, and sugar cane. However, the railway began losing market share, declining from 30% in 1975 to a mere 4% in 2015 for both passenger and freight transports. Among the different modes of transport, by 2015 road transportation has become dominant, carrying over 70% of passenger and 60% of freight traffic. The drop in market share of the railway as a carrier is the result of the long-term inadequate investment in railway infrastructure, causing inconvenient and unreliable operations and uncomfortable experiences for passengers.

2. Efficient railway operations require an adequate number of effective rolling stock. Bangladesh Railway had 278 diesel locomotives, 1,249 coaching vehicles, and 8,677 freight wagons at the end of fiscal year 2016. However, majority of them are aged over 30 years and the old rolling stock is no longer reliable to operate due to frequent malfunctions.

3. The proposed Railway Rolling Stock Operations Improvement Project will finance the procurement of 40 diesel locomotives, 125 luggage vans for passenger and parcel trains, and 1,000 vans and wagons for freight trains for use in the major corridors of Bangladesh Railway's network. The proposed project will also finance the consulting services to prepare the detailed designs for four locomotive maintenance facilities to expedite the preparation of investment projects for urgently required maintenance facilities. The project will also provide institutional support to mainstream the use of the enterprise resource planning information technology (ERPIT) system developed under the Railway Sector Investment Program of the Asian Development Bank (ADB).¹ The proposed project will enhance the overall operational capacity of Bangladesh Railway, and contribute to the modal shift from roads to rail.

4. The project is aligned with the following impacts: (i) a balanced 3R (rail, river, and road)-based multimodal transport infrastructure system developed,² and (ii) greenhouse gas emission in the power, transport, and industry sectors reduced.³ The project will have the following outcome: operational and energy efficiency of Bangladesh Railway improved.⁴

5. ADB assistance in purchasing railway rolling stock will increase the operational capacity of Bangladesh Railway by expediting the replacement of old, inefficient rolling stock. The rolling stock to be procured under the proposed project will include 40 locomotives equipped with an auxiliary power unit (APU), which will be introduced for the first time into Bangladesh Railway. APU will significantly reduce the fuel consumption of locomotives during idling time. The effect of APU has been proven internationally and, in the case of the Indian Railways in India, a neighboring country of Bangladesh, APU consumed about 85% less diesel fuel than the main engine per hour. The fuel cost savings will contribute to the improvement of the financial performance of Bangladesh Railway and the reduction of greenhouse gas emissions.

¹ ADB. 2006. *Report and Recommendation of the President to the Board of Directors: Proposed Multitranchise Financing Facility and Technical Assistance Grant to the People's Republic of Bangladesh for the Railway Sector Investment Program*. Manila.

² Government of Bangladesh, Planning Commission. 2015. *Seventh Five-Year Plan FY2016-FY2020*. Dhaka.

³ Ministry of Environment and Forests, Government of People's Republic of Bangladesh. 2015. *Intended Nationally Determined Contribution (INDC)*. Dhaka.

⁴ The design and monitoring framework is in Appendix 1.

II. THE TECHNICAL ASSISTANCE

A. Justification

6. Bangladesh Railway will procure 40 locomotives equipped with APU for the first time into its operations. APU will allow the shutdown of the main engine during idling time, reducing fuel consumption and greenhouse gas emissions. APU operation is automatic in principle and there are no concerns over the applicability to Bangladesh Railway. However, the realization of the full potential of APU can only be achieved with appropriate operations by the locomotive drivers. For instance, a pilot test by Indian Railways, the neighboring country of Bangladesh, showed that only 43% of potential APU operation hours are utilized due to inadequate operations by locomotive drivers. Due to lack of confidence in APU, locomotive drivers tend to switch off APU for fear of unexpected failures during the locomotive operations. Since this is the first introduction to Bangladesh, it is reasonable to expect that the utilization rate of potential APU operation hours will be less than in the case of Indian Railways. Support for realizing the full potential of APU will be the key to maximizing the effects of the proposed loan project.

7. The technical assistance (TA) will provide training to locomotive drivers in accordance with the supplier's operation manuals of APU-equipped locomotives. It will also support Bangladesh Railway to establish the training program with the preparations of training materials based on which Bangladesh Railway will be able to train its locomotive drivers after the proposed project; keeping pace with the increase in APU-equipped locomotives in the future. In addition, as a policy direction for improving the overall energy-efficient operations of Bangladesh Railway, the TA will recommend potential solutions to improve the overall energy efficiency of rolling stock operations.

8. Considering the TA's objective to support mainstreaming the use of a new technology in Bangladesh Railway, the ADB-administered TA will be a better tool than a loan consulting service under the proposed loan project.

C. Cost and Financing

10. The TA is estimated to cost \$500,000, of which \$500,000 will be financed on a grant basis by the Asian

14. **Consulting services.** The TA requires inputs from international experts in the areas of railway energy efficiency and diesel locomotive engineering, and from a national expert for railway staff training. An international firm will be engaged in accordance with ADB's Guidelines on the Use of Consultants (March 2013, as amended from time to time).⁶ The quality- and cost-based selection method with a quality: cost ratio of 90:10 and biodata technical proposals will be used for this recruitment. Output-based contracts with reimbursable items based on actual expenses will be used. The consultants will procure the goods required to achieve the outputs of the TA. These goods will be turned over to the executing agency at the end of the TA.

⁶ Terms of Reference for Consultants (accessible from the list of linked documents in Appendix 2).

COST ESTIMATES AND FINANCING PLAN
(\$'000)

Item	Amount
A. Asia Clean Energy Fund^a under the Clean Energy Financing Partnership Facility	
1. Consultants	
a. Remuneration and per diem	
i. International consultants	373.00
ii. National consultants	45.00
b. Out-of-pocket expenditures	
i. International and local travel	27.00
ii. Equipment (PC and PC peripherals)	5.0
iii. Training, seminars, and conferences	10.0
iv. Reports and communications	5.0
v. Miscellaneous administration and support costs	10.0
2. Contingencies	25.0
Total	500.0

PC = personal computers.

Note: The technical assistance is estimated to cost \$500,000, of which contributions from the Asian Clean Energy Fund under the Clean Energy Financing Partnership Facility are presented in the table above. The government will provide counterpart support in the form of counterpart staff, office space, and other in-kind contributions.

^a Established by the Government of Japan and administered by the Asian Development Bank.

Source: Asian Development Bank estimates.

LIST OF LINKED DOCUMENTS

<http://www.adb.org/Documents/LinkedDocs/?id=50312-003-TARreport>

1. Terms of Reference for Consultants