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ENERGY, CLIMATE AND SUSTAINABLE DEVELOPMENT

PROMOTING LOW-CARBON TRANSPORT IN INDIA

POLICY SUMMARY

Infrastructure for Low-Carbon Transport in India:

A Case Study of the Delhi-Mumbai Dedicated Freight Corridor

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The Policy Summary is based on a case study of Delhi Mumbai Dedicated Freight Corridor (Pangotra, P., and P. R. Shukla. 2012. Infrastructure for Low-Carbon Transport in India: A Case study of the Delhi-Mumbai Dedicated Freight Corridor. UNEP Risø Centre, Roskilde), which is available online at http://www.unep.org/transport/lowcarbon/publications.asp. The findings, suggestions and conclusions presented in the case study and this policy summary are entirely those of the authors and should not be attributed in any manner to UNEP Risø Centre or United Nations Environment Programme, nor to the institutions of individual authors.

1. Executive Summary

The Delhi-Mumbai Dedicated Freight Corridor (DFC), known as the Western DFC, is one of the largest transport infrastructure projects being implemented in India. It is expected to revolutionize freight movement in the country and would thereby play a crucial role in sustaining national economic growth while inducing regional economic development. The DFC project also signifies a major transition in the freight transport sector as it would result in increasing the relative share of rail, which is a more energy efficient, environment friendly and less carbon-intensive mode of transport compared to the other available modes.

This case study of the Delhi-Mumbai DFC project provides long-term assessment of CO_2 emissions during the operations phase of the project. The assessment covers a 30-year time period from 2016–17 to 2046–47, under three future scenarios. There are two business-as-usual (BAU) scenarios based on continuation of current trends of freight movement, technologies and energy mix at the national level. The scenario BAU (With DFC), assumes that the Western DFC would become operational by 2016–17 as planned, while the scenario BAU (Without DFC), assumes continuation of freight movement on the existing mixed traffic network. The third scenario, LC (With DFC), is based on a low-carbon (LC) pathway at the national level, supported by a carbon tax, aimed at achieving the internationally agreed-upon global CO_2 stabilization target. As shown in Table 1, the Western DFC has the potential to bring about a large reduction in CO_2 emissions and thereby generate substantial potential revenues through carbon financing mechanisms.

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Table-1: Potential for CO_2 Emission Reduction from the Western DFC

Scenarios	Annual CO_2 emissions in 2016–17 (Million tons)	Annual CO_2 emissions in 2046–47 (Million tons)	Reduction in cumulative CO_2 emissions, 2016–2046 (Million tons)	Notional value of reduction in cumulative CO_2 emissions* (Billion Rs.)
BAU (Without DFC)	2.45	12.32	–	–
BAU (With DFC)	0.88	2.33	170.5	46.37
LC (With DFC)	0.76	0.28	204	55.48

**** Price of carbon is assumed to be €4 per ton (approximate prevailing price in 2012) and the currency conversion rate is taken as Rs. 68/€ (as of March 30, 2012).***

Box-1: Key Findings of the Study

1. Compared to the BAU (Without DFC) scenario, total cumulative CO_2 emissions over the 30-year time period (2016–17 to 2046–47) are expected to reduce from 222 million tons to 52 million tons under BAU (With DFC) and 18 million tons under the LC (With DFC) scenario. This further reinforces the enormous gains from the reduction in CO_2 emissions that are possible through the implementation of the DFC project.

2. Although in absolute terms the reduction among the two business-as-usual scenarios is larger, it is, in fact, the transition to the low-carbon scenario, LC (With DFC), that is more significant because it addresses the target of 2°C global average temperature rise until the year 2100, and has the possibility of generating substantial development co-benefits. Further, the difference between the two BAU scenarios may reduce if some of the efficiency improvements associated with the DFC can be realized in the BAU (Without DFC) scenario.

3. The step-wise decomposition analysis of CO_2 emissions shows that in 2046–47, nearly 87% of the difference in annual emissions between the two BAU scenarios can be explained by modal shift from rail (With DFC) to road (Without DFC). An additional 4% of the difference is due to the use of diesel traction for freight movement by rail in the scenario without DFC, instead of the 100% electric traction in the scenario with DFC. The remaining 9% of the difference is attributable to the higher energy efficiency of the DFC compared to the shared network due to various supply-side interventions.

The overall conclusion of the study is that large rail transport projects have high potential to reduce CO_2 emissions from the transport sector in India. Further, the perspective plans suggest that large transport investments have the potential to induce regional economic development provided complementary investments in economic and social infrastructure are made. Putting a monetary value on such co-benefits is not possible as the project is still in the planning stage.

Box-2: Major Policy Recommendations from this Study

1. Policymakers must recognise the potential for DFCs to generate large CO_2 reductions with significant co-benefits.

2. The creation of matching support infrastructures, such as freight terminals, special wagons, stack containers etc., would play a crucial role in the overall success of the project. Therefore, such infrastructures should be adequately provided and be part of a comprehensive plan.

3. The transport system of the DMIC region should be integrated with the DFC by providing appropriate infrastructures, such as Multi-Modal Logistics Parks and freight terminals at suitable locations.

4. Accelerated implementation of the remaining five DFCs would yield maximum economic returns in the long-run. The six corridors together would make the national freight transport system low-carbon, energy efficient and thereby more sustainable. Therefore, the remaining corridors should be taken up for implementation at the earliest time.

5. Policy decisions regarding location of power plants, cement plants and manufacturing centres would have important implications for development of freight transport infrastructure. To meet the rising demand for freight transport and make the system more efficient, use of pipelines for transport of oil product and natural gas should be expanded.

2. Background

India's economy has seen unprecedented growth during the last decade, averaging 7-8% per annum. While this growth has created a great deal of opportunity, it has also resulted in many challenges, especially for infrastructure required to sustain the rate of growth. Transport is viewed as one of the most important infrastructures for the national economy. In national transport systems, freight transport acts as the critical link between ports, markets and manufacturing centres.

There is increasing recognition among policymakers in India that transport infrastructure could become a serious bottleneck for future economic growth. This is particularly the case for freight transport, as high growth in freight traffic is expected to continue in the medium and long-term. The capacity of the existing rail network for freight transport is saturated on most of the trunk routes and the road network is also highly congested. It is apparent that economic growth at the current pace cannot be sustained without substantial addition to transport and logistics infrastructure.

Although rail is clearly the more energy efficient and environment friendly mode of transport compared to road, recent trends in freight movement show that the share of rail in total freight traffic has been steadily declining. Current policies of uneconomic pricing and cross-subsidy of passenger services by freight traffic are primarily responsible for inadequate investment in augmentation of the rail network capacity. Funding bottlenecks are the main reason for delays in completion of railway projects. Another major issue is the neglect of multi-modal integration, which has resulted in inefficient allocation of freight traffic between rail and road.

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In 2006, the Ministry of Railways adopted a long-term strategic plan to develop six high capacity, high speed dedicated freight corridors (DFC) along the "golden quadrilateral" that connects India's four largest cities, and its diagonals. The Dedicated Freight Corridor Corporation of India Limited (DFCCIL), a special purpose vehicle (SPV) company, was established to implement the DFC projects. The Delhi-Mumbai DFC, also known as the Western DFC, is one of the two corridors being constructed at present. The remaining four corridors would be taken up subsequently. The Government of Japan and the World Bank are providing financial and technical support for these projects.

The DFC project is one of the largest infrastructure projects ever implemented by the Indian Railways. Its main rationale is that the DFCs would enable the Indian Railways

to meet the growing demand for freight transport and induce modal shift of freight traffic from road to rail. The most important benefit of the DFC for the Indian Railways would be the higher operational efficiency in both freight and passenger services since the congestion on existing rail network would reduce significantly. In addition to efficiency improvements, the DFCs would contribute to substantial energy savings and significant reduction of greenhouse gas (GHG) emissions. These, in turn, could provide additional revenues to the Indian Railways through mechanisms such as carbon credits.

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Many countries around the world use rail infrastructure for "long haul operations", which is another term for freight corridors, specifically built for transportation of bulk freight goods by railways.