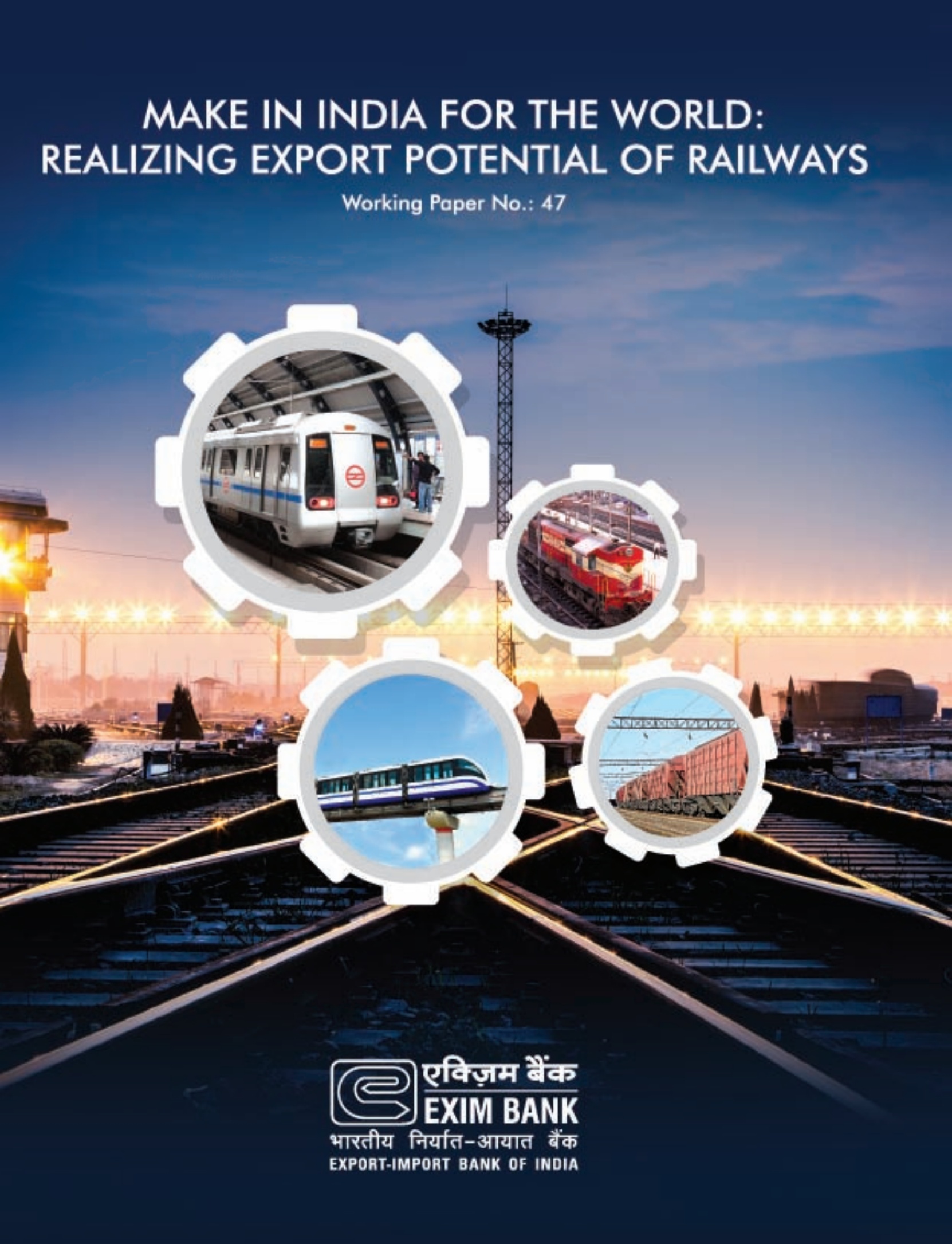
MAKE IN INDIA FOR THE WORLD: REALIZING EXPORT POTENTIAL OF RAILWAYS

Working Paper No.: 47



एक्ज़िम बैंक
EXIM BANK
भारतीय निर्यात-आयात बैंक
EXPORT-IMPORT BANK OF INDIA

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EXECUTIVE SUMMARY

Railways in India have been a tool for development, equity, and integration of all parts to the mainstream. It is also rightly referred to as 'the lifeline of the Indian economy' as it facilitates industrial and economic development by transporting materials such as coal, iron ore, fertilizers and foodgrains. Having touched the lives of people in both tiny villages and urban metropolises, it has assisted the evolution of social forces like urbanisation and inclusive development.

The railways also have significant forward and backward linkages. We would need iron and steel, engineers, mechanics etc. While railways develop, the backward linkages gets benefitted. For example, we would need iron and steel, engineers, mechanics etc. to create rail products. Therefore, iron and steel industries would develop and simultaneously services pertaining to engineering and mechanics would also develop with the growth of railways. On the other hand once developed there are significant forward linkages as well. Railways would help in transporting goods and raw materials from different industries. Therefore, almost all industries would benefit from it. Railways will also help in travelling and therefore it would develop services as well as tourism. According to Economic Survey 2015, the combined effect of the forward and backward linkages suggest a very large multiplier of around 5 or more of investments in railways, i.e. a Re. 1 increase in railways investment has the potential to increase economy-wide output by Rs. 5.

However, the railway transport sector somewhere over the years has been left behind when compared to road transport, and this is primarily because of the lack of investment into the rail sector. In 1951 the rail network in the country stood at 53,596 kms, and yet 63 years later, today, it has only grown by 22% to 65,436 kms. It may be noted that in 1951 India's rail network was 2.3 times that of China's, but as in 2012-13 China's is 1.6 times India's.

Data shows that China with 1.2%, Russia with 0.6% and UK with 0.4% is ahead of India in terms of railway expenditure spending as a percentage of GDP. While India stands fourth in the list with a share of 0.3%, and ahead of countries like France, Japan and Germany, these countries are developed and are known to have already technically sound and reputed rail transport systems in the world.

The current trend is unsustainable from resource cost to the economy. An integrated approach and an enabling policy framework are required to correct the existing distortion in favour of road. Indian Railways will have to be prepared to rise to this challenge. If India has to emerge as one of the largest economies of the world, railways have to have a crucial role. To be able to do so and attain the optimal share in the freight and passenger transport, Indian Railways would need to critically assess the business environment it faces and the internal capabilities it has. It also has to envision the future and align its resources towards attainment of those goals.

ALTERNATIVE SOURCES OF FUNDING RAILWAYS: AN OVERSEAS PERSPECTIVE

There are various financing mechanisms available like debt, equity, and other financial tools. Financing can be obtained from the private and public sectors. At the same time there are concessional debt products which are similar in structure to those issued by private banks (e.g., loans, loan guarantees, and lines of credit), but which typically have features that make them more attractive to borrowers (e.g., lower interest rates, longer-term loans, and flexible repayment terms). But besides the traditional modes of funding, railways in many counties have been able to successfully garner revenues through various innovative mechanisms. Some of them are through service/asset related revenue sharing; offering premium services; onboard and in-station retail concessions; commercial property development; and innovative public revenue funding, including public private partnerships.

FUNDING OF RAILWAYS IN SELECT COUNTRIES

Many countries in Europe and Asia have designed ambitious railway infrastructure programs while embracing effective policies, and investing significant funds in their rail and transit sectors. The rail network in the United States is predominantly owned and controlled by private freight railroads. In most international jurisdictions, the rail network (including track, stations, and yards) is primarily owned and controlled by government or quasigovernment agencies. Unlike the United States, in the international jurisdictions, freight companies compete amongst themselves to provide services, as do intercity passenger operators. USA's Federal Railroad Administration (FRA) supports passenger and freight railroading through a variety of competitive grant, dedicated grant, and loan programs to develop safety improvements, relieve congestion, and encourage the expansion and upgrade of passenger and freight rail infrastructure and services. FRA also provides training and technical assistance to guarantees and stakeholders.FRA manages all aspects of the grant lifecycle, including application, reporting, payments, monitoring, and closeout.

On the other hand in the EU, the European Investment Bank (EIB) has been a key institution funding the Railways in the EU region. Railways are one of the most energy efficient and least polluting transports and hence given by the mandate of EIB, it enjoys special focus. The EIB finances investment in incumbent operators' fleets, involving either the rehabilitation of existing or purchase of new rolling stock. The EIB also finances rail projects outside the EU, notably around the Mediterranean basin and in sub-Saharan Africa.

With one of the largest network in the World, Russia in 2008 devised the Strategy for Developing Rail Transport in the Russian Federation up to 2030 envisaging a significant expansion of Russia's rail network in two stages. Russia hopes to attract financing from Pension Funds, the National Health Fund, the Social Protection Fund, and oil exports for the infrastructure projects developed by Russian Railways. Another financing source that's being explored in Russia for infrastructure projects is grants through the Russian Direct Investment Fund (RDIF) in Russia and Vnesheconombank (VEB). The RDIF is expected to cover the necessary financing for the construction of high-speed transport facilities and VEB will ensure the financing of large projects, such as the construction of lines, rail stations and infrastructure, projects with a long amortization period At the same time

VEB is currently using pension funds to buy 50 bn Rubles worth of Russian Railways' infrastructure bonds to purchase new engines over 2014-2016. The bonds are being offered at the minimal yield to maturity, growth rate of CPI over the last 12 months plus 1% per annum (for a floating coupon rate) or the yield on sovereign bonds (OFZ) maturing before the bonds in question plus 1% per annum (for fixed rate).

China has over the last few decades have been consciously gearing up the railway sector. In 2004, the State Council (China's parliament) approved a new Railway Development Plan to 2020. Its goals were subsequently made more ambitious in 2007. In the wake of the 2009 global economic crisis, investments were accelerated further when rail, with a 17 % share, became the single largest component of the country's stimulus plan. Internationally, most attention has gone to China's audacious investment in HSR - high-speed railway. Typical high-speed trains traveling at 125–155 miles per hour are to share tracks with regular passenger and freight trains, while very high-speed trains traveling at 220 mph are to run on separate tracks. Although, China developed a domestically designed high-speed train in 2002 (dubbed the China Star), the country's leadership preferred bringing in the best technology available worldwide. To that end, Chinese companies CNR and CSR have been working since 2004 with international leaders Bombardier, Kawasaki, Siemens, and Alstom.

OPPORTUNITIES FOR INVESTMENT IN RAILWAY INFRASTRUCTURE IN AFRICA

Most railways in Sub-Saharan Africa are small, with the busier ones carrying no more than a million traffic units annually, a volume comparable to a moderately busy branch line on other railways. In some cases, the light traffic is due to lack of demand, in others, it is caused by shortages of rolling stock, particularly locomotives.

The anticipated spend on rail networks (incl. stations/terminals) by 2025 is expected to be around US$ 78 bn, with South Africa contributing US$ 32 bn, Ethiopia US$ 25 bn, and Ghana: US$ 86 bn. Market for railroads in Africa is expected to increase from US$ 37.4 bn in 2011 to US$ 46.2 bn in 2018 with primary demand being from South Africa, Egypt, and Nigeria. The market for railroad equipment in Africa is expected to increase from US$ 669.1 mn in 2011 to US$ 814.7 mn in 2018. Africa's imports of Railway, Tramway, Locomotives, Rolling Stock, and Equipment (at 2 digit HS code 86) from World has increased from US$ 1.1 bn in 2010 to US$ 1.4 bn in 2014 (with India's share being less than 2% of Africa's imports) in 2014.

According to IBRD, an average of US$ 100 mn is needed every year for track rehabilitation and renewal of the network north of South Africa, with a further US$ 80 mn a year needed for rolling-stock. The African Development Bank reports that high transport costs add up to 75% to the price of goods in Africa - bridging these gaps alone could add 2 percentage points to Africa's annual GDP growth rate.

Given the latent potential in Africa, GE is building locomotives for Mozambique and Angola in partnership with Transnet, SA, and is expecting to invest US$ 2 bn in rail infrastructure in countries like Nigeria and Angola. Grindrod Mauritius Rail, and Zambia's Northwest Rail Company are already in partnership to operate and maintain a new 590 km railway from the Zambian copper belt to the Angolan border, at a cost of about US$ 1 bn. Bombardier, too has been considering to make

South Africa as their manufacturing hub for rail projects on the continent.

OPPORTUNITIES FOR INVESTMENT IN RAIL INFRASTRUCTURE IN SOUTH-EAST ASIA

Asia is seeing rapid growth and urbanisation, and there is an increasing need to develop transport services. There are numerous railway projects in development or construction, representing billions of dollars in investment and spending. While the whole of Asia is gradually growing, the market for rail in South East Asia and South Asia is opening up, with many ambitious projects in the market and strong support for public private partnerships (PPPs) and private finance. It may be noted that in a populous region like this, the importance of mass public transport system cannot be ignored.

The scheduled investment in identified rail network projects in South East Asia is estimated to be around US$ 200 bn. There exist tremendous opportunities in South East Asia and South Asia corridors and those connecting it. Rail corridors connecting South East Asia stretches for 4579 kms, whereas the one connecting South Asia is more than 14,840 km.

The demand potential for railroads in South East Asia is estimated to be around US$ 53.2 bn in 2016 which is a 12% share of entire Asia (incl. China, India, Japan). South East Asia's imports of railway, tramway, locomotives, rolling stock, and equipment (HS-86) from World has increased from US$ 591 mn in 2010 to US$ 656 mn in 2014 (India's share is less than 1.5% of SE Asia's imports).

China sensing the huge opportunity has been investing heavily into the region. China has invested recently decided to devote 70% of the total costs to construct a 418 km railway line connecting China and Laos, which is part of a larger 3,000-kilometer regional railway that will run from Kunming through Laos and Thailand down to Malaysia and Singapore. At the same time RRC Zhuzhou Electric Locomotive Co, which is part of Chinese's largest train manufacturer China Railway Rolling Stock Corp, has also opened a US$ 131 million plant in Malaysia, which is managed by CRRC (Malaysia) Railway Vehicles Co and acts as the company's gateway to the rest of the ASEAN region - with main markets are Singapore, Indonesia, Thailand and Malaysia.

With Myanmar opening its doors to foreign investment, possibilities are emerging for many different types of rail infrastructure projects. Besides countries like Laos and Cambodia hardly has any available rail infrastructure, and hence the possibility of all these countries – Cambodia, Laos, and Myanmar has the possibility to leap ahead of the race and have high end rail set up. Vietnam as an emerging economy is also exhibiting interest in PPP projects to facilitate its growth.

MARKET IDENTIFICATION FOR EXPORT OF RAILWAY PRODUCTS TO AFRICA & SOUTH EAST ASIA

Exports of India's railway, tramway locomotives, rolling stock, equipment (HS – 2 digits - 86), has been abysmally low. Exports witnessed a sudden increase from US$ 56.8 mn in 2010 to US$ 134.5 mn in 2011, and thereafter it remained hovering around the same level. While exports in 2013 increased slightly to touch US$ 192.4 mn, it dropped again to touch US$ 140.3 mn in 2014. The key export markets at 2-digit HS Code- 86

were Bangladesh (27.7% share), Tanzania (12.8% share), USA (12.6% share), Australia (5.1% share), and South Korea (4.4% share).

At 2-digit HS Code-86 (Railway, Tramway Locomotives, Rolling Stock, Equipment) Africa's imports from world have exhibited an increase from US$ 1088 mn in 2010 to US$ 1481 mn in 2014, with its share in world imports increasing, albeit in small amount, from 4.2% to 4.6% during the same period. It has also been observed that the Africa's imports from World has been growing at an annualized average growth rate (AAGR) of 10.4% during 2010 and 2014, which was higher than world's import at an AAGR of 6.2%.

The share of the top 10 importers of railway, tramway locomotives, rolling stock, equipment (HS – 2 Digits - 86) in Africa has a share of 75% in its total imports and hence can be targeted as key markets for India's exports to Africa for these categories of products. The key importers as in 2014 being South Africa (21.1%), Ethiopia (10.8%), Morocco (8.1%), Mozambique (6.9%), and Algeria (5.8%). Other countries which are having a share more than 5% are Nigeria, Egypt, and Tunisia.

South East Asia's imports from world of products under 2 digit HS - code 86 (Railway, Tramway Locomotives, Rolling Stock, Equipment), exhibits a modest increase of 5% AAGR during the period 2010 to 2014. Imports in South East Asia have increased from US$ 591 mn in 2010 to US$ 657 mn in 2014.

Singapore which was having a share of 5.6% during 2010 has been showing a robust demand as its share increased to touch 36.6% in 2014. Indonesia too has shown gradual increase in imports over the last 5 years. Its imports have increased from US$ 85 mn in 2010 to US$ 176 mn as its share increased from, 14.4%. It is observed that Vietnam's imports albeit of a small amount of US$ 61 mn (as in 2014) has shown an AAGR of 51.8% while its share in imports in South East Asia touched 9.2%.

SELECT EXIM BANK SUPPORTED RAILWAY PROJECTS

Exim Bank provides competitive finance at various stages of the business cycle covering import of technology, export product development, export production, export marketing and export credit at pre-shipment and post-shipment stages, and investments overseas. It operates a wide range of financing and promotional programmes. Finance is provided in Indian Rupees and foreign currencies. The Bank finances exports of Indian machinery, manufactured goods, and consultancy and technology services on deferred payment terms. It also seeks to co-finance projects with global and regional development agencies to assist Indian exporters in their efforts to participate in such overseas projects.

Over the years Exim Bank has been involved in an array of projects involving supporting the Railways. These has been as diverse as facilitating design, procurement and construction of railways line overseas, to facilitating international joint venture projects in India, to helping Indian companies in securing contracts abroad. Select countries whwre Exim Bank have undertaken exposure in railway projects are in Ghana, Senegal, Sri Lanka, Mali, South Africa, and many others including in India.

STRATEGIES TOWARDS STRENGTHENING THE RAILWAYS

Building Export Oriented Manufacturing Capabilities

While India has decades of experience in Railway manufacturing and services, India should increasingly look at technology transfer or joint collaboration with well renowned railways manufacturers like GE, Greenbrier, Trinity Industries and Westinghouse Air Brake Technologies (all based in the US), along with Alstom (France), Bombardier (Canada), China CNR Corporation and CSR Corporation (China), Nippon Sharyo (Japan), and Siemens (Germany). China's FDI policy of compulsory stiff local-content in railways which stipulates 70–90 % of the products manufactured in the country, is worth emulating. This also would facilitate India's 'Make in India' initiative promoting manufacturing, while harnessing from technology transfer. This will be a win-win situation for both the investor and for India. Indian Railways may consider even divesting stake to promote technology transfer either to foreign companies or Indian private sector. It may be noted that two new factories are being set up by GE and Alstom in Bihar which would add 200 locos to existing supply in a few years.

Assess Export Potential of Railway

Railways in India have significant opportunities in both Africa and South East Asia, including in select countries of South Asia. While foreign investors are already setting up base in Africa, the corridors linking South East Asia and South Asia. These opportunities needs to be tapped for both exports of railways products like rolling stocks, etc., as well as services where consultancy is required. Indian Railways has a huge infrastructure for manufacturing wagons, coaches, and engines, which needs to be also realigned with the potential available in overseas markets which are on the verge of developing railway infrastructure, and provides opportunities to export. A focus on strengthening indigenous capabilities will also increase local production and domestic manufacturing as well make India a hub for technology, equipment and services export globally. IRCON has been executing projects in countries like Malaysia, Sri Lanka, Algeria, Bangladesh and Nepal, while RITES has been providing diversified and comprehensive array of consultancy and engineering services in transport infrastructure sector under a single roof. Both IRCON and RITES also should aggressively pursue opportunities in these latent markets.

Manufacturing Set up of Railways under One Umbrella

RITES has been one of the key export arm of Indian Railways and has been exporting locomotives, coaches, wagons, DMU train sets and other related equipment to Bangladesh, Myanmar, Sri Lanka, Mozambique and other African countries. However to bring in uniformity and an equal footing, all the railways manufacturing set ups like Bharat Wagon and Engineering Company Limited (BWECL), Braithwaite and Company Limited, Burn Standard Company Limited, Diesel Locomotive Works, Chittaranjan Locomotive Works, etc. should all come under one unit having a common balance sheet. The strengths of each of these entities should in the process compliment eachother. This will also possibly help them to improve themselves, and even better position them to bid for projects in developing economies.

Funding from International Financial Institutions

Going forward both by virtue of its need and its plans, it is advisable for the Indian Railways to look at alternate mechanisms to finance themselves. For example, the Railways may like to explore the possibility of funding from international agencies like Korea Exim, which are eagerly looking at markets like India. The nature of the support may be tied/untied (with or without required underlying conditionalities like minimum Korean content / technology). Railways may also look at tapping other similar institutions which are upbeat on the opportunities in rail sector in the country.

Exiting from Cross Subsidization

The tariff policy of the Indian Railways has traditionally followed the principle of cross subsidization in order to offset the losses incurred in passenger and other coaching services through additional revenue from freight movement. It is felt that both passenger fares and freight rates have to be demand-cum-market driven and fixed differently for different segments. The pricing should be fixed so as to yield a net return that corresponds to the scarcity value of the capital in the economy. The time has, indeed, come to try out dynamic pricing for passenger travel in air-conditioned coaches. If airlines can have programmed systems for determining fares linked to travel date and realtime occupancy rates, the Indian Railways, too, could well adopt the same. The right to subsidised rail travel should be limited only to those travelling by non-AC coaches. Government may consider a time-frame of around five years for phasing out cross-subsidisation of passenger traffic by freight.

Diversifying its Freight Basket of Commodities

Indian Railways has an excessive reliance on transporting five bulk commodities for revenue generation and persistently losing traffic to roads. These include, coal (49% share), iron ore (12%), steel (4%), cement (10.4%) and fertilizers (4.2%) which accounts for almost 80 % of Indian Railways' overall freight traffic. It may also be noted that the market share of the Railways in freight transportation has dropped from about 90 % in the 1950s to 33 % currently. It therefore becomes immensely important that the Railways diversify its portfolio to include products such as sugar, milk, agricultural products, among others. This also entails Indian Railways to procure highcapacity wagons to increase loading capacity and better logistics facilities.

Monetising of Assets through Out-of-Box Thinking

Railways have been focussing on ticketing as a primary source of revenue generation. However, if railways has a significant multiplier effect on the economy, it should be possible to generate revenue by monetizing the economic value that Indian railways can generate. In fact, many railway systems globally, have a significant percentage of their revenues generated from non-ticketing sources. Indian Railways must increasingly appreciate the economic value that is trapped in its assets and its ability to create wealth by marrying tangible and non-tangible assets of the railways with capital, in a manner that can create wealth for it to transform the organization altogether. The existing assets of Indian Railways may be leveraged to raise resources, mostly on a contract basis. Some of the feasible opportunities

available for Indian Railways which could be utilized are on long term-lease or yearly contract basis, depending upon the assets.

Devising a Successful Marketing Policy for Rail Freight

Indian Railways has a tremendous potential in freight segment, but an appropriate framework for market segmentation is missing. A framework, which takes into account both origin and destination like should be analyzed. Like in any other transport business, an origin-destination based systems perspective could be used. The primary categorization of origins would be industry/ collection centre, mine and port. The primary categorization of destinations would be industry, port and distribution center. The loss in market from railway freight to road freight can only be addressed while taking into account the feasibility of last mile connectivity by creating better logistic and warehousing facilities. Incentive schemes could be explored aiming at promoting higher volumes of traffic particularly during the lean season, possible discount freight rates in empty flow directions and higher discounts for premier customers for bulk freight.

Capitalising on Green Bonds

The primary purpose of these bonds is to invest funds that support verifiable projects intended to achieve a specific climate or environmental purpose. Green bonds provide a means to unlock private capital for projects that support such purposes. Indian Railways can also look forward to tapping such bond markets and utilizing the proceeds for their energy efficiency projects.

It may be noted that transport continues to be the dominant theme in the US$ 597.7 bn ‘climate theme bonds’ universe, with US$ 418.8 bn bonds outstanding since January 1, 2005. Amongst the transport, rail accounted for 95% globally, largely from state backed entities. China Rail remains the largest issuer of any climate aligned bonds. European rail entities Eurofima (US$ 14.6bn), France’s SNCF (US$ 11.0bn) and UK’s Network Rail (US$ 44.1bn) are also significant issuers.

1. INDIA'S CURRENT RAIL INFRASTRUCTURE: AN OVERVIEW

Railways in India have been a tool for development, equity, and integration of all parts to the mainstream. Railways are considered critical not only from the standpoint of connecting remote regions and providing affordable transportation services (especially passenger services) but also from the perspective of defence movements (which cannot be passed on to the private sector), and meeting the transportation requirement in the wake of national emergencies and natural catastrophes.

It is also rightly referred to as 'the lifeline of the Indian economy' as it facilitates industrial and economic development by transporting materials such as coal, iron ore, fertilisers and foodgrains. Having touched the lives of people in both tiny villages and urban metropolises, it has assisted the evolution of social forces like urbanisation and inclusive development.

Railway infrastructure in India has spillover effects of linking markets, reducing a variety of costs, boost agglomeration economies, and improve the competitiveness of the economy, especially manufacturing which tends to be logistics-intensive. Infact, they have significant forward and backward linkages **(Annexure 1)**. We would need iron and steel, engineers, mechanics etc. While railways developed, the backward linkages gets benefitted. For example, we would need iron and steel, engineers, mechanics etc. to create rail products. Therefore, iron and steel industries would develop, services pertaining to engineering and mechanics would also develop with the growth of railways. On the other hand once developed there are significant forward linkages as well. Railways would help in transporting goods and raw materials from different industries. Therefore, almost all industries would benefit from it. Railways will also help in travelling and therefore it would develop services as well as tourism. According to Economic Survey 2015, the combined effect of the forward and backward linkages suggest a very large multiplier of around 5 or more of investments in railways, i.e. a Re.1 increase in railways investment has the potential to increase economy-wide output by Rs. 5. Investing in Railways could thus be good for "Make in India".

Given such strategic role played by railways in the transportation space, rail transportation has been one of the three areas reserved for public sector in successive industrial policies of the country (the others being atomic energy and defence).

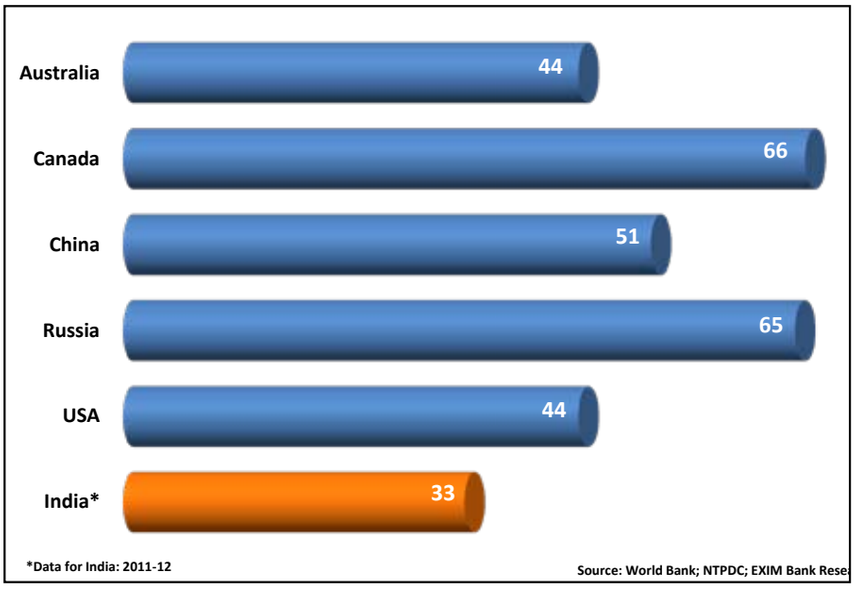
Modal Split: Rail vis-à-vis Road

However, the railway transport sector somewhere over the years has been left behind when compared to road transport, and this is primarily because of the lack of investment into the rail sector. In 1951 the rail network in the country stood at 53,596 kms, and yet 63 years later, today, it has only grown by 22% to 65,436 kms. It may be noted that in 1951 India's rail network was 2.3 times that of China's, but as in 2012-13 China's is 1.6 times India's[1].

There are a numbers of reasons for the growth of the road sector vis-à-vis the railways. These

[1]NTDPC research

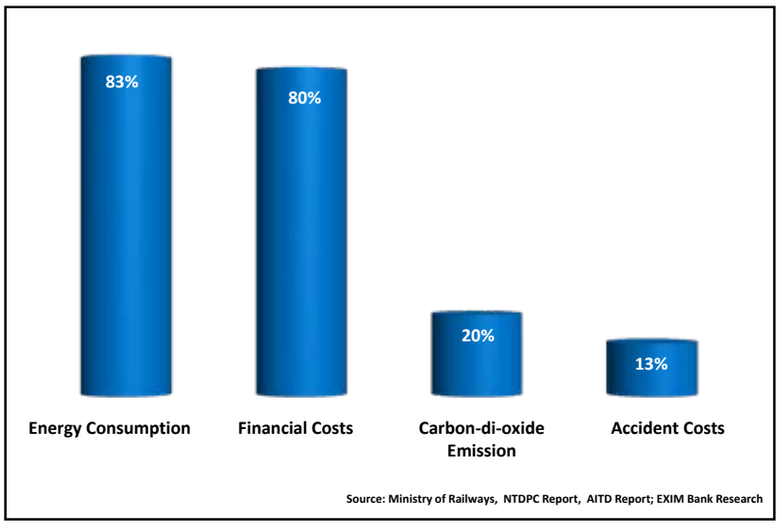
Exhibit 1: Model Share of Railways in Domestic Freight : 2012



include more dispersed industrial and business location patterns and increased need for just in time deliveries. Second, the road sector is composed of many small private operators in a highly competitive and dynamic environment. Structurally, railways are confronted with the changing pattern of industrial production and geography away from traditional industries and clusters towards a more dispersed pattern embodying high value and low volume manufactures. This coupled with complex technical, administrative working practices, service quality and inability to respond to the changing market conditions that have led to erosion in the market share of railways. A McKinsey's 2010 study had estimated that the modal share in freight traffic stands at 36% for the railways vis-à-vis 57% for roads. According to another Report of the National Transport Development Policy Committee this share is estimated to have declined further to 33% in 2011-12. It may be noted that USA has a 44 % share despite having extensive networks of coastal shipping links and elaborate inland waterways that carries significant freight.

Inspite of the growth of roadways, the railway transport system has its inherent advantages that needs to be harnessed. Across parameters like, energy consumption, financial costs, carbon-di-oxide emission, and accidental cost, railways remains ahead of road transport, with 83%, 80%, 20%, and 13% savings.

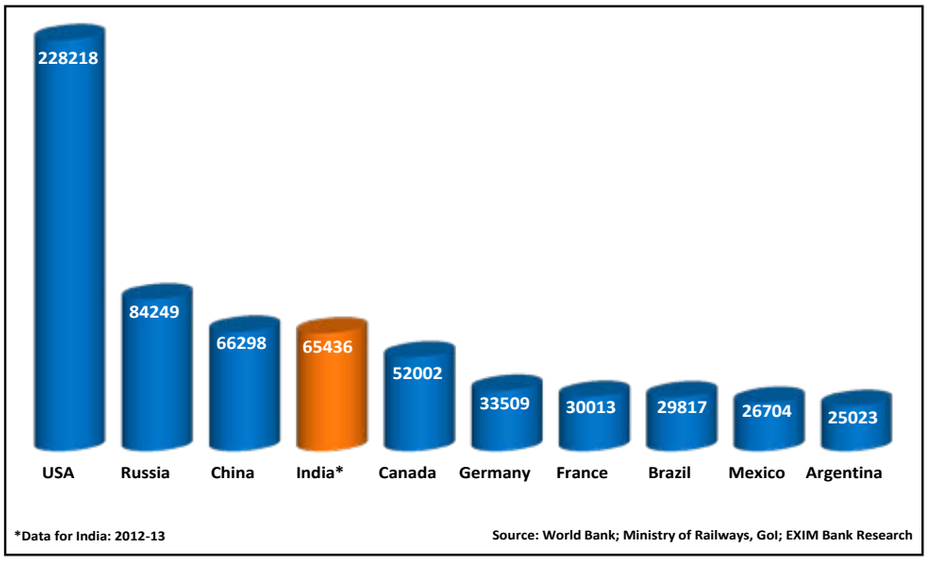
Exhibit 2: Rail as a Percentage of Road Costs: 2012



Rail Network

Indian Railways managed directly by the Ministry of Railways, Government of India, is the fourth largest railway network in the world under a

Exhibit 3: Top Rail Lines in the World (km): 2012



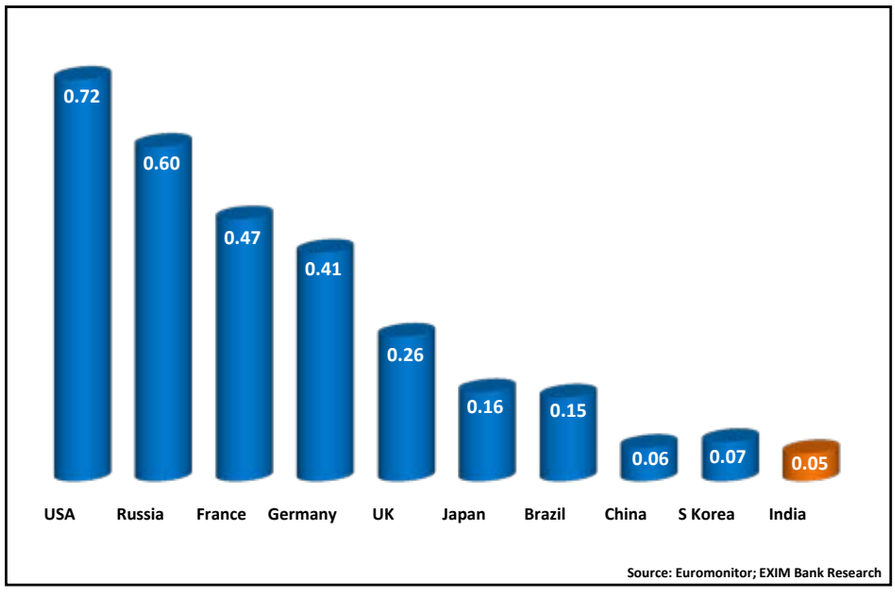
single management. With its current network of 65,436 route km and about 7,100 stations, Indian Railways has been playing a critical role in integrating markets, and connecting communities throughout the length and breadth of the country.

India's rail network per capital however, is found to be amongst the lowest in the world with 0.05 km as compared to 0.72 in USA and 0.15 in Brazil, and 0.06 in China. This aspect at the same time may be discounted given the fact that India is the world's second most populous country. Lower rail network per capital also does not reason for enhancing rail lines further, instead the current focus should be on ameliorating the roadway service.

Railway Traffic

Indian Railways is the topmost rail passenger carrier (in terms of passenger km) and the fourth largest rail freight carrier in the world. During 2014, Indian Railways while running more than 13,000 passenger trains carried more than 25 million passengers per day in 2014. In terms of the distance freight was carried over too, with 762 bn ton / km registered in 2014, India's railways were the fourth largest in the

Exhibit 4: Rail Network per Capita (in km): 2014



[2]Euromonitor

Exhibit 5: Top Rail Freight Traffic (in billion tonnes/km): 2014

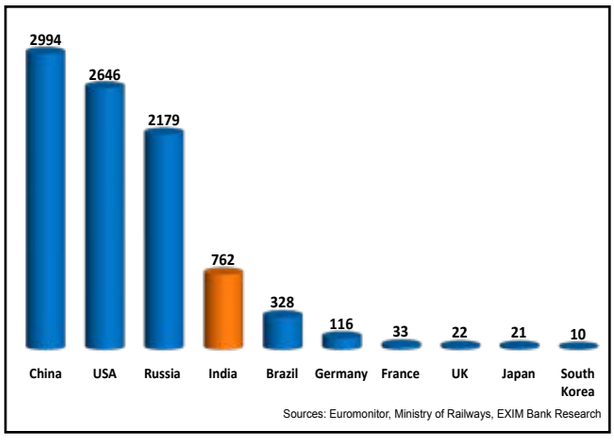
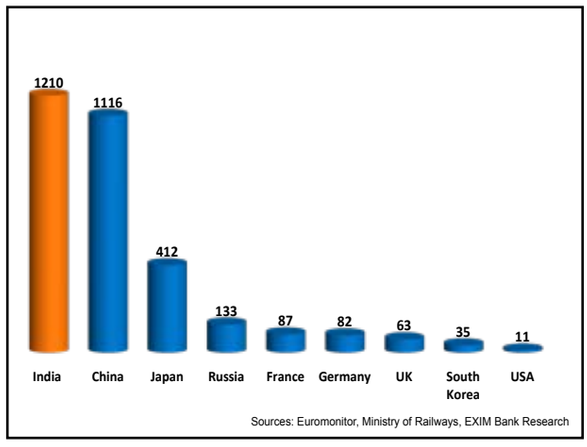


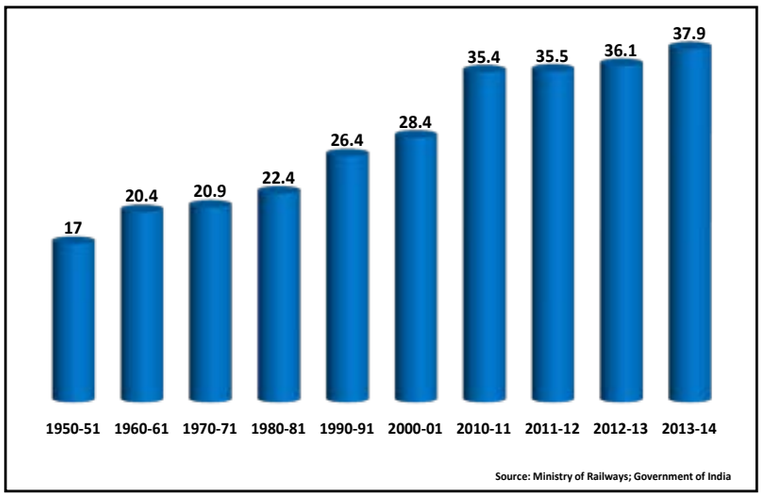
Exhibit 6: Top 10 Rail Passenger Traffic (in billion passengers/km): 2014



world. With 1.2 trillion km of passenger km for 2014, Indian railways actually score better than on the freight side, ranking first in the world[2].

Further, suburban traffic constitutes about 55% of the total originating passengers indicating the predominant role of Indian Railways in urban transport segment in the four metro cities of India. However, when viewed in terms of passenger kilometers, a measure of throughput, suburban transport makes up about 15% of the total.

Exhibit 7: Train Density (Train Kms. per Running Track Km.)



Traffic Density

Due to under-investment, there has been severe congestion on the network and has resulted in the inability of the system to accommodate more trains and increase the speed of trains. The biggest challenge that railways faces is the insufficient number of tracks and large number of trains, and on most occasions the trains cannot travel at its optimum speed because they do not get clearances on time. The high-speed trains like Rajdhani and Shatabdi are given preference over normal trains and thus most of the times when these trains are passing through a single track line, the normal trains have to wait for hours to get a clearance.

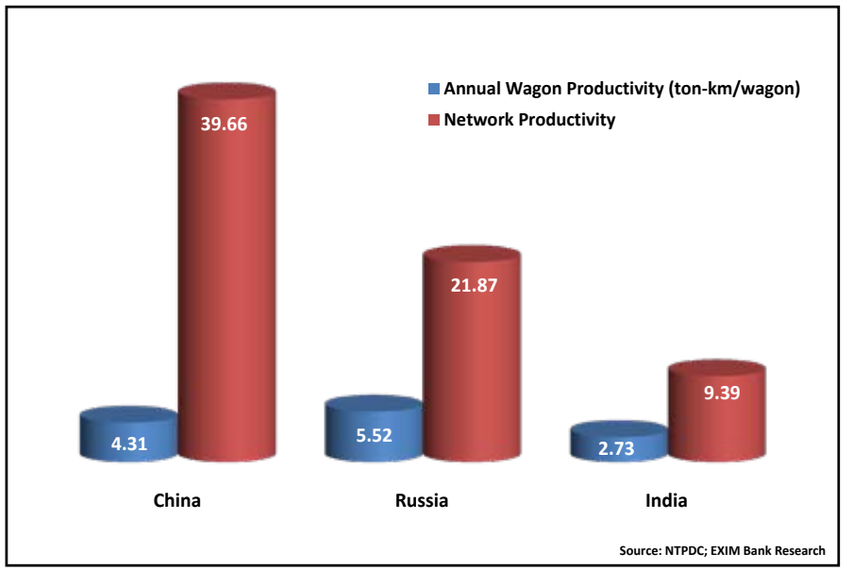
Traffic density is the volume of traffic moving between any two points on the railway system. It is expressed in terms of passenger kilometers or net tonne kilometer (NTKM) and train kilometers per running track kilometer or route kilometer. India's traffic density since independence has increased significantly. From 17 (train kilometers per running track kilometer) in 1950-51 it has increased to

[3]Ministry of Railways, Government of India

touch 37.9 (train kilometers per running track kilometer) in 2013-14.

It may be noted that although the traffic density on Indian Railways is quite high as per world standards, however the growth of the network is not commensurate with the growth of the traffic. In the last 64 years while the freight loading has grown by 1344% and passenger kilometers by 1642%, the route kilometers have grown by only 23% and doubling & multiple route length by only 289%[3]. This growth pattern has resulted in large scale congestion of the system, affecting the speed of movement, something that impacts passenger satisfaction.

Exhibit 8: Benchmarking Efficiency: India vis-a-vis China and Russia



It may be noted that the speed of the average freight train has remained virtually constant between 2000-01 and 2012-13 at around 24-25 km/hr. In contrast, in China, the maximum speed of freight trains was 80 km/h around 2008-09, and the maximum train speed that was around 80 - 100 km/hr in 1991 was raised in stages to 160 and 200 km/hr on the most popular passenger corridors by 2008 and is above 300 km/h at present[4].

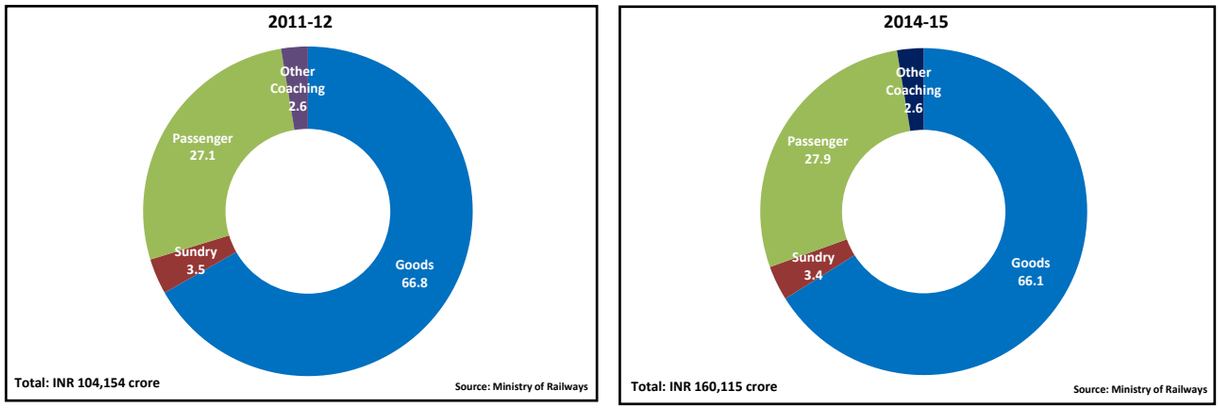
Given that the Chinese Railways also faces congestion and has embarked on huge capacity expansion, network productivity (as measured by NTKM (million) /network length) turns out to be much greater in China vis-à-vis both Russia and India. Wagon productivity (as measured by NTKM (million)/wagon holding) is the lowest in India among the three.

With passenger trains utilizing around 65% of the network capacity[5], the above situation imposes constraints on the running of heavy freight trains (that hampers the ability of the railways to carry bulk commodities from mines to power and steel plants) and high speed passenger trains as passenger traffic is generally accorded priority. Over these years, data indicates that the load carried and distance travelled by a wagon per day and the turnaround time has almost stagnated.

This congestion is facilitating the loss of share of railways to roads. The Committee for Mobilization of Resources led by Mr Bibek Debroy, highlighted that 60% of Indian Railways' lines were running above a capacity utilization of 80% (which Indian Railways defines as the optimum utilization). The situation on the High Density Network was observed to be worse. Even though it makes up only 18% of the total Indian Railways network, it carries 56% of the traffic, with 88% of the lines above the optimum utilization.

[4] World Bank, "Tracks from the Past, Transport for the Future: China's Railway Industry 1990-2008 and its Future Plans and Possibilities" China Country Office, Beijing, May 2009
[5]NTPDC

Exhibit 9: Share of Segmentwise Railway Earnings from Internal Resources



Railway Earnings

Segmentwise earnings of Indian Railways have increased from INR 104,154 crore in 2011-12 to INR 160,115 crore in 2014-15, an increase of 53.7%. The majority of earnings though continue to be through transportation of goods. As in 2014-15, earnings through goods stood at 66.1% followed by passenger earnings at 27.9%. Trends from goods earnings indicate that under tonnage, certain commodities like raw material for steel plants, pig iron and finished steel, iron ore & food grains are anticipated to load less than the preceding years. Average Freight Lead has grown nominally this year after registering negative growth in previous two years.

Railway Expenditure

Data shows that China with 1.2%, Russia with 0.6% and UK with 0.4% is ahead of India in terms of railway expenditure spending as a percentage of GDP. While India stands fourth in the list with a share of 0.3%, and ahead of countries like France, Japan and Germany, these countries are developed and are known to have already technically sound and reputed rail transport systems in the world.

India needs to enhance its spending on the railways as compared to roadways. Over the years as discussed earlier, railways has not received the kind of attention it should have ideally deserved. While advanced countries like UK and even developing countries like Russia has been balancing its spend between railways and roadways, in India's case its extremely skewed towards roadways. India's spending on railways as a percentage of rail and road spending stands at just 19%.

The expenditure on railways as a percentage of total transport expenditure has declined considerably.

Exhibit 10: Global Rail Spending as a Percentage of GDP: 2014

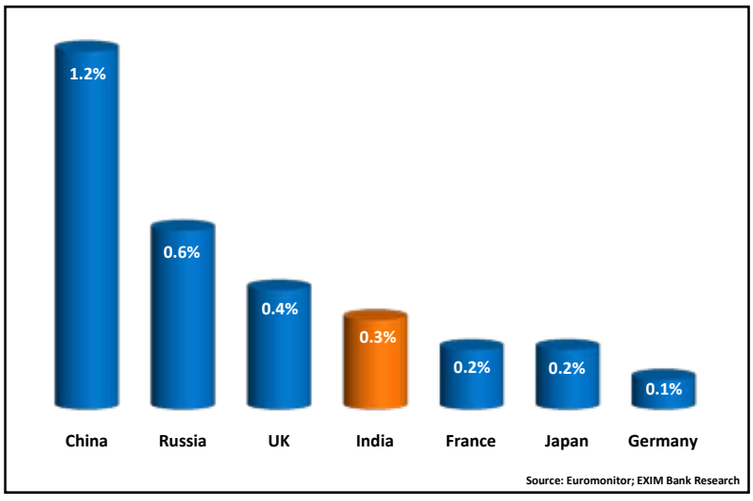
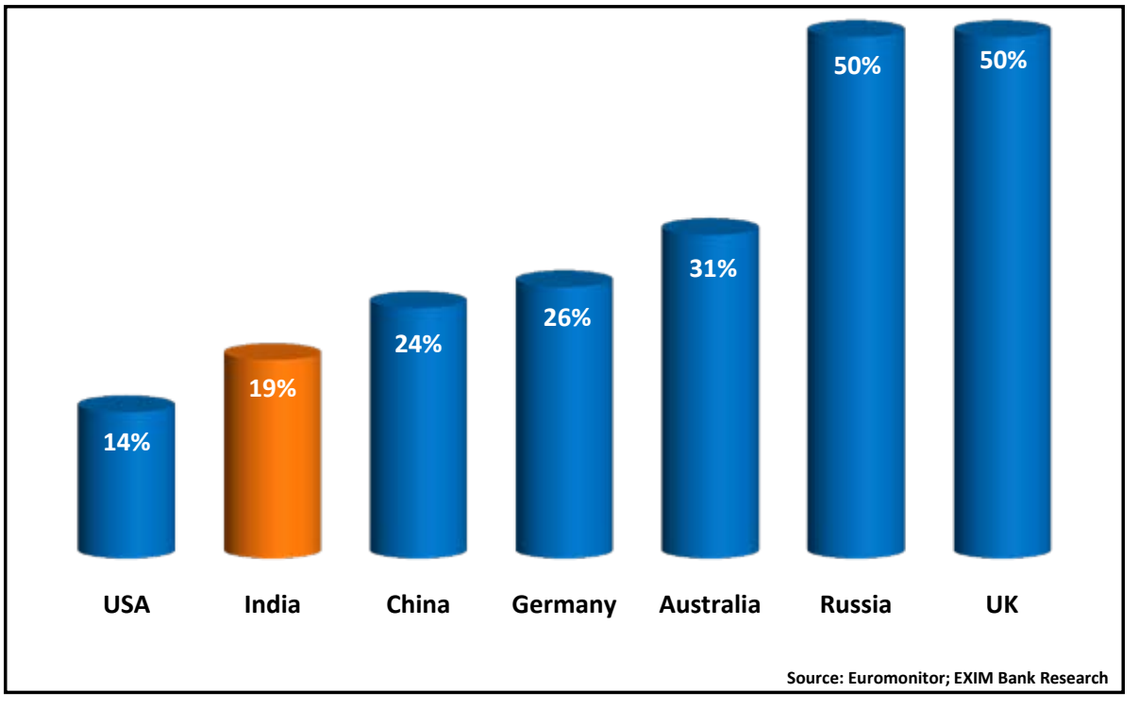
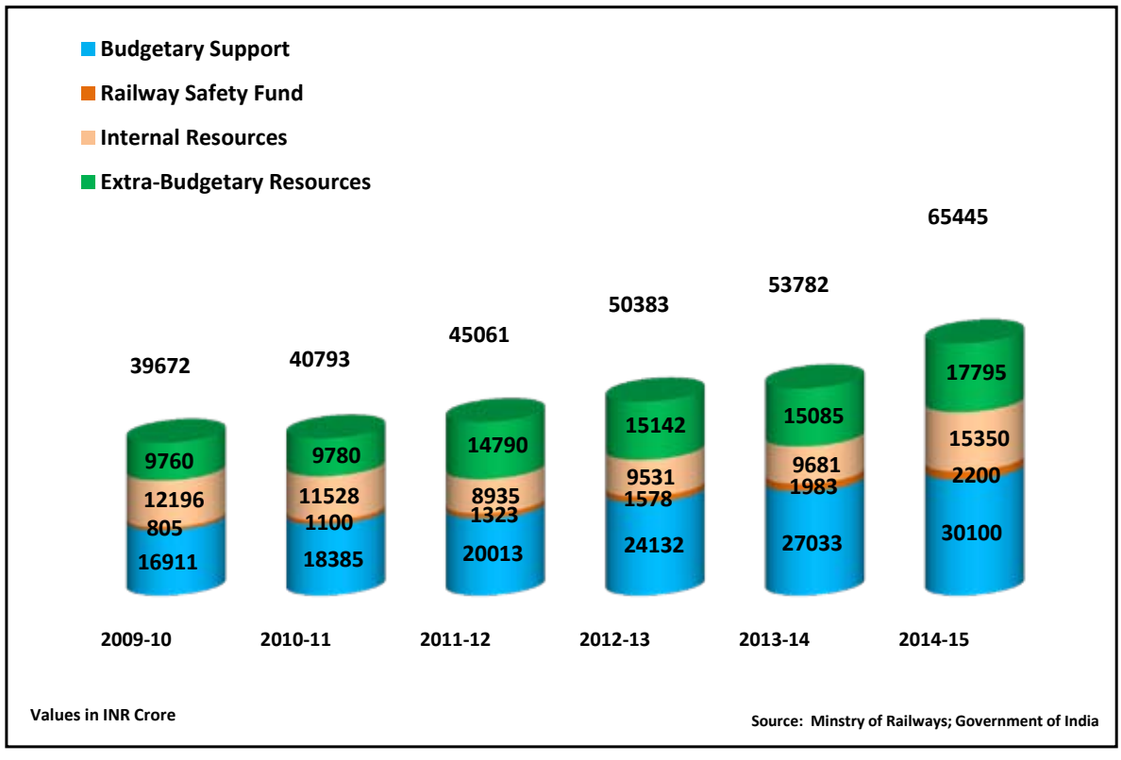


Exhibit 11: Spending on Railways as a Percentage of Rail and Road Spending: 2013



Source: Euromonitor; EXIM Bank Research

Exhibit 12: Source of Revenue for the Indian Railways



Values in INR Crore

Source: Minstry of Railways; Government of India

Railway expenditure as percentage of transport sector expenditure used to be 56% during the 7th Plan (1985-90), but has now reduced to 30% during the 11th Plan (2007-12). Indian Railways in last two decades has remained under-invested whereas the road sector has witnessed a surge in investments. The share of Indian Railways in overall GDP has been static at 1% and has, in fact, gone down to 0.9% in 2012-13.

SUM UP

As we look at these trends, it is evident that the generation of internal resources is insufficient to take care of plan expenditure. Hence, other and alternate means of resources are required to be tapped for funding of bankable projects that can be executed in a short time-span.

Indian Railways has suffered from chronic and significant under-investment as a result of which the network expansion and modernization has not happened at the requisite pace leading to an erosion of the share in national freight and passenger traffic. There is a clear recognition of the fact that for making a contribution to the country's growth and serving as the lifeline of the nation, the organization needs to become operationally and financially sound.

Indian Railways is striving to enhance its market share and improve the quality of service so as to ensure that rail travel is an experience beyond other modes of travel. This can be achieved by eliminating capacity bottlenecks which constrain growth, improve productivity of assets and efficiency of operations and optimal employment of its resources including human capital.

Investments in safety have also suffered on account of low internal generation of resources. Although the safety record of Indian Railways compares well with other European countries, the fact remains that there is considerable room for improvement. Unmanned level crossings are a major area of concern apart from accidents that arise on other accounts.

The current trend is unsustainable from resource cost to the economy. Energy security would also become increasingly important in times to come, as also environmental and social considerations, making a positive shift towards rail transport an imperative. An integrated approach and an enabling policy framework are required to correct the existing distortion in favour of road. Indian Railways will have to be prepared to rise to this challenge.

If India has to emerge as one of the largest economies of the world, railways has to have a crucial role. To be able to do so and attain the optimal share in the freight and passenger transport, Indian Railway would need to critically assess the business environment it faces and the internal capabilities it has. It also has to envision the future and align its resources towards attainment of those goals.

This study amongst others envisages highlighting the various possible avenues to augment the revenue structure of the railways in India whilst referring to successful international cases. A brief section also highlights about select institutions overseas (including DFIs) which have been supporting the railway sector in various countries. An attempt has also been made towards emphasizing the huge railway infrastructure deficit in Africa, South Asia, and South-East Asia and the potential therein for railway manufacturers across its supply chain to cater to this latent market. This will also help India to manufacture domestically, while producing for the world as well. A section has been added which elucidates Export-Import Bank of India's contribution towards supporting the railways through its various programs. Lastly, a section has been added which dwells upon the possible role Indian Railways can undertake to explore its true potential.

2. ALTERNATIVE SOURCES OF FUNDING RAILWAYS: AN OVERSEAS PERSPECTIVE

There are various financing mechanisms available like debt, equity, and other financial tools. Financing can be obtained from the private and public sectors. Private finance providers (e.g., commercial banks and investors such as pension funds, hedge funds, and equity investors) provide loans, equity, and other forms of financing in order to generate a commercial return. The cost of capital (i.e., the rate of return that an investor seeks in exchange for financing) is generally commensurate with the level of risk of a project. The riskier the project, the higher is the cost of capital, and vice versa. When a project's revenues are not expected to cover the project costs, or when this revenue is uncertain, private finance providers will generally not invest in the project or service in question. In some instances, private finance may be attracted to a project because of innovative design and use of alternative financing products that minimize the risk or cost of the project to the private sector (e.g., where the public sector takes on risks which is not in the control of the private sector), such as government-backed loan guarantees or PPPs.

At the same time there are concessional debt products which are similar in structure to those issued by private banks (e.g., loans, loan guarantees, and lines of credit), but which typically have features that make them more attractive to borrowers (e.g., lower interest rates, longer-term loans, and flexible repayment terms).

When risks associated with an investment are perceived as high, a mechanism that can be used to attract private finance is a government backed loan guarantee. In such cases, the guarantor (e.g., federal, state, or local government) promises to assume the debt obligation of a borrower if the borrower defaults on the loan.

Exhibit 13: Possible Alternative Sources of Revenue for Railways

Source: Exim Bank Research

Providers of public finance (e.g., state infrastructure banks and government loan programs) also seek to invest in projects that are commercially viable, and these financing products typically have features that make them more attractive (e.g., lower interest rates, longer term loans, and flexible repayment terms). This is sometimes referred to as "concessional" financing. The focus of these public finance providers is typically on financing projects that have some form of public benefit, but that cannot obtain private finance (at a reasonable cost) given the perceived project risks and/or the long payback periods. Capitalizing public infrastructure banks or loan programs can be a major challenge, though this is a funding, rather than a financing issue.

POSSIBLE ALTERNATIVE MODES OF FUNDING

Discussed in this chapter are select cases of alternative modes of funding that may be considered for the Indian Railways.

1. PUBLIC PRIVATE PARTNERSHIP

There is a growing interest in using rail transit to solve urban transportation problems, particularly road congestion and air pollution. In developing urban rail projects, a range of major cities around the world have turned to public-private partnership (PPP) models, to leverage both public and private resources and expertise.

When the wave of privatization swept through the transport sector in the 1980s, there was deregulation and privatization in airlines, ports and airports; restructuring in intercity and commuter rail; and competitive tendering in bus services. The urban rail sector was left largely untouched. Prior to 1993, public sector ownership and operation of urban rail systems was widespread, with Japan being the only exception. The main obstacles for a private sector involvement in such rail projects are high cost and long payback periods; fare revenues that do not cover costs; the need for public subsidies; and the complexities of forming and sustaining coalitions and partnerships.

In the early 1990s, Argentina launched an ambitious plan to privatize its entire transport sector. It then became the only country outside Japan that had private urban commuter railways and the only country in the world that had granted a private concession to operate its subway. Since then, PPPs in urban rail have come to be adopted gradually all over the world.

Through PPPs, the advantages of the private sector - innovation, access to finance, knowledge of technologies, managerial efficiencies, and entrepreneurial spirit - are combined with the social responsibility, environmental awareness and local knowledge of the public sector in an effort to solve problems that are extremely important for the growth of a country. PPPs in railways have the potential to bring opportunities for investment, operating efficiency and modern and clean technology.

There are many forms of a partnership between public and private sectors depending on the political environment, the nature of the assets and the level of private sector participation. Infact, different models of PPP have gained popularity in different jurisdictions. PPPs have been successful in many sectors where service outputs can be described objectively and are capable of verification, and are suitable for both primary and social infrastructure although in emerging markets generally limited to primary infrastructure (power,

BOX 1: DISTINCTION BETWEEN PRIVATIZATION AND PPP

Grimsey and Lewis (2004) makes the following distinction between privatization and PPP: "within a PPP the public sector acquires and pays for services from the private sector on behalf of the community and retains ultimate responsibility for the delivery of the services, albeit that they are being provided by the private sector over an extended period of time (i.e. 25 years or longer). By contrast, when a government entity is privatized the private firm that takes over the business also assumes the responsibility for service delivery…A PPP is a formal business arrangement between the public and private sectors…regulation through contract and the lack of government disengagement define much that is distinctive about a PPP."

water and transportation). However, PPPs are not suitable where technology is likely to change rapidly over the life of the contract (so PPPs in the IT sector are generally not considered to having been successful).

When an urban rail system is developed by a PPP, a key factor in determining the success of the scheme is how risk is allocated between the parties. Achieving the right allocation of demand risk between the public and private sectors is critical. So is ensuring adequate physical infrastructure and integration with other modes of public transportation, both of which have a direct effect on demand.

In allocating demand (or passenger ridership) risk in urban rail PPPs, a critical consideration is whether the public or private sector will exercise control over such issues as fare setting, intermodal and ticketing integration, and licensing of competing services. The public authority typically has control over these factors. Alternatively, the authority may decide to allocate demand risk entirely to the private operator, with the fares paid by passengers being the private operator's main or sole source of income. But it is important that fares not only reflect customers' ability and willingness to pay, but also are aligned with policy goals (such as promoting a switch to public transportation, managing traffic congestion, or improving urban air quality). The use of PPPs on rail projects has been largely limited to greenfield projects, for which a revenue stream can be clearly linked to the investment.

Notwithstanding the problems that may arise, PPPs have played a transformational role in urban rail sector. There are no unique solutions or templates to follow with regard to choice of strategy. In arriving at a decision, policy makers will need to have a clear vision of the objectives and a deep understanding of the context to fully appreciate the advantages and limitations of PPPs. The transaction costs can be high and long term success is dependent on an array of factors spanning political, economic and institutional. For PPPs to be sustainable solutions, governments must remain central actors, the PPP strategies must be appropriately designed and regulated, and commuters must ultimately benefit.

Case Study 1: Vancouver's Canada Line

Vancouver's Canada Line comprises 19.2 km of track serving Vancouver, Richmond and

the Vancouver International Airport. It began operations in August 2009, a few months ahead of schedule and in time for the 2010 Winter Olympics. The line has been built with funding provided by both government agencies and a private partner. The project was put out for competitive bidding in 2003 and awarded in 2004 to the consortium InTransitBC. Under the DBFO[7] agreement, InTransitBC was contracted to design, build, partially finance, operate and maintain the Canada Line for a 35-year period. The total cost of the project has been estimated at C$1.9 billion, with InTransitBC's share estimated at C$657 million (2003 dollars) plus construction cost overruns. One of the public agencies contributing to the funding of the project is the Greater Vancouver Transportation Authority, TransLink. TransLink has agreed to guarantee 90% of projected ridership and to make up the shortfall in revenue if this is not achieved.

Case Study 2: High Speed Trains in UK

PPPs have been used mostly in the United Kingdom, including for High Speed 1 (formerly the Channel Tunnel Rail Link), which is the largest rail scheme in the United Kingdom and has been financed through a PPP. Concession agreement was signed between the Secretary of State for Transport and High Speed 1 Limited. The agreement regards the design, construction, financing, operation, repair and maintenance of the high-speed railway link from St. Pancras Station in London to the Channel Tunnel that connects with the international high-speed routes between London and Paris, and London and Brussels.

2. SERVICE OR ASSET-RELATED REVENUE FUNDING MECHANISMS

A major source of revenue for passenger railroads is ticket sale proceeds from passengers. Revenue collection is a function of ridership level and fare structure. Revenue maximization is open constrained by political acceptability (and in some other countries by regulation); even without this, it depends on railroads' ability to accurately predict elasticity of demand from passengers. Raise prices too high and passengers will use other modes; keep ticket prices low and operators may be missing an opportunity for higher revenues. Many transit operators have very simple fare structures, with a flat fare per trip, with discounts depending on status (e.g., seniors, students, and children), and sometimes with free transfer between routes. These simple fare structures usually do not maximize either use of public transport or revenues.

Hence exploring more complex fare structures can generate additional income through more market based pricing, while increasing ridership. Examples include 'zone' or distance based fares, higher peak fares, targeted discounts for off peak travel, daily 'capping' of total fares paid, and integrated prices (fares) with other modes.

Case Study 1: London Regional Rail Services

These are mostly operated by private companies under franchise agreements. They set a minimum service frequency on each route, at each time of the day. They also set the maximum fares, which are usually the fares charged to peak hour travelers and the weekly commuter fare. However, virtually

[7]Design, build, finance and operate (DBFO) in which a private firm designs, pays for, and is responsible for the day-to-day running of a project. In this route, a single organization is contracted to undertake all aspects of the project, including operating it for a period - typically, 25 or 30 years.

all London operators offer off peak tickets at 40% to 50% below the full regulated fare. They do this for commercial reasons - the lower fares attract more off peak travelers who might otherwise drive or not travel at all, and also divert some riders out of the crowded peaks, thereby reducing the need to buy new trains. Operators may also provide off peak service in excess, of the minimum requirements – for example routes which may have two trains each hour through the day before privatization, can often have three or four. About half of the London regional (commuter) services now operate with little or no subsidy, with fares covering all costs, including capital charges.

Case Study 2: Transport for London (TfL), UK

Transport for London (TfL), UK, is the local government body responsible for the planning, delivery, and daily operation of London's public transport system, including buses, light rail, some overground (commuter) rail, and the underground subway system. In 2003, TfL introduced the Oyster Smart Card system, which are used across all of the transport modes. This means riders can travel by bus, subway, and commuter rail all using the same Oyster Card. TfL estimates that this system increased revenues by 10%, 20%, 30% on buses, subways, and commuter rails, and also increased ridership by a similar amount. Oyster Card update was encouraged by dramatically raising fares for those who have not purchased using the Oyster Card (i.e., creating an incentive to purchase the Oyster Card).

3. PREMIUM SERVICES TO INCREASE SERVICE REVENUES

One means of raising ticket revenues is to charge higher fares for higher standards of service on public transport (e.g., First Class or express trains). Premium fares might generate higher revenues, but may also impose higher operating costs. The benefit will be greater if premium services attract passengers who would not otherwise use public transportation (e.g., attracting business travelers on the Amtrak[8] North East Corridor[9] who would otherwise drive or fly).

Case Study 1: UK Rail

Many UK rail operators, including commuter rail operators, offer First Class services. Commuters benefit from a higher standard of seating and a better chance of getting a seat, although there is no guarantee of a seat.

Case Study 2: The Dubai Metro

The Dubai Metro offers a 'Gold Class' with one car at the end of each train reserved for passengers paying a higher fare and benefitting from higher standards of seating, and (usually) less crowding. The Gold Class car has an onboard attendant who stands at the door and checks fares on boarding. A seat is not guaranteed, however, the Gold Class car is usually less crowded.

[8]National Railroad Passenger Corporation, known as Amtrak is a partially government-funded American passenger railroad service. It is operated and managed as a for-profit corporation, and provides medium- and long-distance intercity service in United States. Amtrak was founded in 1971 through the government-sponsored consolidation of most of the preexisting passenger rail companies in the United States.

[9]The Northeast Corridor (NEC) is an electrified railway line in the Northeast megalopolis of the United States. Owned primarily by Amtrak, it runs from Boston through New York City, Philadelphia, and Baltimore to Washington, D.C. Much of the line is built for speeds higher than the 79 mph (127 km/h)

4. ONBOARD AND IN-STATION RETAIL CONCESSIONS

Transport operators can raise additional non-ticket revenues from sales of other products and services both onboard trains and at stations. Examples include selling refreshments on board, selling access to Wi-Fi, and retail shopping opportunities among others.

Case Study 1: VIA Rail, Canada

VIA Rail, Canada's intercity passenger rail operator, offers a paid food and beverage service on most of its routes, with quality and price depending on the route and level of service. The company also now offers free Wi-Fi on its primary corridor service between Windsor and Québec City (passing through Toronto and Montreal), as well as the long-distance Montreal-Halifax service (in select coaches). While not a source of additional revenues, the addition of complimentary onboard Wi-Fi is an added attraction for travelers, particularly considering other options where free Wi-Fi is not available throughout the journey (driving, bus, rail travel), and so may generate revenue indirectly.

Case Study 2: Swiss Railway Company SBB

In November 2013, Swiss Railway Company SBB partnered with Starbucks Coffee to introduce a coffee and retail shop fully on board a train. The coffee shop is set up in a double-decker train car that has been made to look like a regular Starbucks shop, with a coffee-inspired color scheme, contemporary design elements and seating arrangements like that of a regular Starbucks. The shop seats a total of 50 people. The outside of the railcar is branded with Starbucks logos and graphics.

5. COMMERCIAL PROPERTY DEVELOPMENT

Extent of revenues depends on the size and type of the development. Commercial property development refers to the development of land or other property with the objective of obtaining some form of commercial revenues from the development. These commercial property development can go for joint development. Joint development is a form of commercial property development, which involves a partnership between a public entity and a private developer to develop certain assets. Revenues from joint development projects can be a good source of income for local authorities. The extent of revenues depends on the location, size and type of the development, as well as the negotiations/ structuring of lease revenue agreements between public and private parties. Transport operators may also 'brand' their product, facility or service with the name of a commercial enterprise in exchange for regular payments from the enterprise.

Case Study 1: Bethesda Metro Joint Development (BMJD)

The Washington Metropolitan Area Transit Authority (WMATA) has completed over 30 joint development projects since the 1970s, in part through their successful creation of a real estate development department that actively seeks out joint development opportunities.

One project example is the BMJD (Bethesda Metro Joint Development), a development located above the Bethesda Metrorail subway station in with office space, retail space, a 390 room hotel, and a five story parking garage. The BMJD is owned and operated by the private Meridian Group, which leases land and air rights from WMATA for a minimum annual rent of US$ 1.6 mn.

The partnership not only generates revenues for WMATA, but also provides WMATA with some opportunities to share construction and operating costs around the station. In this joint development case (though not in all cases), WMATA also shares in BMJD revenues when gross revenue exceeds US$ 31 mn.

Case Study 2: Dubai Metro

Dubai has shown the potential to sell "naming rights" to stations in the Dubai Metro. Several stations have been branded, usually with the name of an adjacent development (e.g., a large shopping mall). The Dubai Land Transport Authority (LTA) is understood to charge about US$ 2 mn per year, per station. Altogether, the LTA gets 30% or more of its revenue from naming rights and advertising. For example, the station at Bur Juman junction was going to be given a different name, until the owner of the adjacent shopping center, also called Bur Juman, decided for sponsorship.

Case Study 3: New York MTA

The New York MTA renamed Atlantic Avenue station in Brooklyn as "Atlantic Avenue Barclays Center." The MTA sold the naming rights to Forest City Ratner Companies, which is redeveloping the area, for US$ 200,000 per year. Forest City then sold the rights on, together with the naming rights for the basketball arena, for US$ 400 mn or about US$ 20 mn per year for 20 years.

6. PUBLIC REVENUE FUNDING MECHANISMS

Station parking charges can be set at different levels to reflect market demand and to encourage off peak transit use. Parking rates can be varied not just by duration of use, but by other factors to encourage public transit use and generate additional revenue. For instance, higher charges can be levied for spaces closer to the station or under cover, lower charges or even free parking can be offered for mid-day use, of say less than 4 hours, while encouraging off peak use, when trains are empty, and also reducing enforcement costs, as cars only need to be checked in the peaks, and higher rates for use by non-transit riders. At the same time land available at stations located near shopping areas can be developed for parking.

Case Study 1: Toronto Transit Commission

In Toronto, car parking charges at transit stations vary depending on local demand. All day rates are US$ 3 to US$ 5. At some stations, there are higher charges for parking at lots closer to the station, with lower charges for users arriving after 9 am.

Case Study 2: TfL

In London, parking at Underground (subway) stations (where it exists) is managed by a contract operator with pay by phone technology. Such technologies have a good potential to being developed countries where internet penetration is high.

3. FUNDING OF RAILWAYS IN SELECT COUNTRIES

Many countries in Europe and Asia have designed ambitious railway infrastructure programs while embracing effective policies, and invested significant funds in their rail and transit sectors. This chapter highlights some of the funding regimes for railways in select countries of the world.

UNITED STATES OF AMERICA

The rail network in the United States is predominantly owned and controlled by private freight railroads. In most international jurisdictions, the rail network (including track, stations, and yards) is primarily owned and controlled by government or quasi-government agencies. Unlike the United States, in the international jurisdictions, freight companies compete "above the rail"[10] to provide services, as do intercity passenger operators.

Public Funding from the Federal Railroad Administration (FRA)

USA's Federal Railroad Administration (FRA) supports passenger and freight railroading through a variety of competitive grant, dedicated grant, and loan programs to develop safety improvements, relieve congestion, and encourage the expansion and upgrade of passenger and freight rail infrastructure and services. FRA also provides training and technical assistance to guarantees and stakeholders. FRA manages all aspects of the grant lifecycle, including application, reporting, payments, monitoring, and closeout.

USA recently launched the 'Grow America Act 2015'. The Grow America Act supports predictable, dedicated investments that enhances safety and modernizes USA's rail infrastructure to meet the growing market demand, while promoting innovation and ensuring transparency and accountability. The Act envisages to invest US$ 29 billion over 6 years (till 2021) to improve rail safety and invest in a National High-Performance Rail System, as states and local communities need the certainty of sustained funding to make the transportation investments necessary to improve USA's infrastructure and support economic growth. The Act also builds on current investments to vastly improve the system in areas ranging from Positive Train Control (PTC)[11] implementation to enhancing flexibility in financing programs that will better enable the rehabilitation of aging infrastructure. Some of the salient features of the Grow America Act, 2015 in the railway sector are as follows:

[10]Competition among two or more operators on the same rail infrastructure

[11]Positive Train Control (PTC) is a set of highly advanced technologies designed to make freight rail transportation, already one of the safest U.S. industries, even safer by automatically stopping a train before certain types of accidents occur. In 2008, Congress passed an unfunded mandate requiring America's privately owned railroads to finance, develop, install and test this unproven technology across 60,000 miles of the nation's rail network by December 31, 2015.

Establishment of the New Amtrak Grants: Over many years, existing capital and operating programs have focused on maintaining the legacy rail system on an annual basis. The Grow America Act, 2015 will establish the Current Passenger Rail Service grant program to provide a longer-term view toward ensuring existing passenger rail assets and services are maintained in good working condition. The grants will be oriented around Amtrak's main business lines, including the Northeast Corridor, State Corridors, Long-Distance Routes, and National Assets.

Establishing Rail Service Improvement Program: Ridership on passenger rail is at an all-time high with a record 31.6 million passengers having travelled on Amtrak in 2014. The Government appreciates that as USA's population will grow by 100 million by the year 2050, getting to a destination safely and without delay will become all the more critical. The Grow America Act 2015 will be establishing the Rail Service Improvement Program, which will provide competitive grants to drive development of high-performing passenger rail networks. This will include funding for the implementation of Positive Train Control (PTC), the technology designed to stop trains to avert collisions, for commuter railroads, support for the mitigation of adverse impacts associated with rail operations in local communities, upgrades for short-line freight operations, and local and regional planning efforts.

Advances Safety Research: Building on previous successes in safety risk reduction and improved safety culture, the Grow America Act 2015 authorizes additional funding for research and development projects. The funds will also be used to increase the domestic content of new rail vehicles and allow their safety performance to be tested at FRA's facility. The funds will also expand research programs at universities, which will help address the urgent industry-wide need for qualified railroad professionals.

BOX 2: RAILROAD REHABILITATION AND IMPROVEMENT FINANCING (RRIF) PROGRAM

The Railroad Rehabilitation and Improvement Financing (RRIF) Program was established by the Transportation Equity Act for the 21st Century (TEA-21) and amended by the Safe Accountable, Flexible and Efficient Transportation Equity Act: a Legacy for Users (SAFETEA-LU) and by the Rail Safety Improvement Act of 2008. Under this program the Federal Railroad Administration (FRA) is authorized to provide direct loans and loan guarantees up to US$ 35 billion to finance development of railroad infrastructure. Up to US$ 7 billion is reserved for projects benefiting freight railroads other than Class I carriers. The funding may be used to acquire, improve, or rehabilitate rail-related intermodal (defined as "of or related to the connection between rail service and other modes of transportation") or rail equipment or facilities, including track, components of track, bridges, yards, buildings and shops; refinance outstanding debt incurred for the purposes previously listed; and, develop or establish new rail-related intermodal or railroad facilities. Direct loans can fund up to 100% of a railroad project with repayment periods of up to 35 years and interest rates equal to the cost of borrowing to the government. However, FRA prefers applicants to provide equity to the project. Eligible applicants include railroads, state and local governments, government-sponsored authorities and corporations, joint ventures that include at least one railroad and limited option freight shippers who intend to construct a new rail connection. FRA gives priority to projects that provide public benefits, including benefits to public safety, the environment, economic development, and rail or rail-related intermodal service.

EUROPEAN UNION

European Investment Bank (EIB) has been a key institution funding the Railways in the region. Railways are one of the most energy efficient and least polluting transports and hence given by the mandate of EIB, it enjoys special focus. Railway projects supported by the EIB include the rehabilitation, upgrading or electrification of existing lines, the construction of new lines, new signaling systems and intermodal terminals, as well as the financing of rolling stock for freight and conventional and high-speed passenger services. The EIB gives priority to railway projects as they contribute to the implementation of the European Union's transport policy and play an important role in EIB climate action lending.

The EIB has been supporting railways both inside and outside the EU. In the Union, the development of the trans-European transport network and the gradual implementation of the European Rail Traffic Management System (ERTMS) are fundamental. Climate and sustainability issues also play an important role. In 'new' Member States[12] (EU15), railway investment typically involves the rehabilitation and upgrading of existing rail infrastructure in order to achieve higher speeds. In the 'old' Member States[13] (EU13), the EIB often finances new high-speed networks, which encourage passengers to switch from air to rail, while freeing up capacity for regional and freight services in the conventional rail network. The objective is to improve rail services and attract passengers and freight from other modes particularly road and air. The EIB also finances rail projects outside the EU, notably around the Mediterranean basin and in sub-Saharan Africa.

New or rehabilitated lines need trains. The EIB finances investment in incumbent operators' fleets, involving either the rehabilitation of existing or purchase of new rolling stock. The Bank is also actively supporting the so-called new entrants, in the freight sector in particular. Given the higher environmental standards of new rolling stock, the renewal of existing fleets typically has positive effects in terms of energy efficiency and atmospheric emissions.

BOX 3: EIB FUNDS GOVERNMENT OF BANGLADESH'S RAILWAYS

Recently, The Government of Bangladesh has received a loan of €135m from the European Investment Bank (EIB) to improve the country's railway network. The loan will be used to fund the construction of a second track, upgrades to the existing track, and the installation of modern signaling equipment on the 72 km section between Laksam and Akhaura in eastern- central Bangladesh. The Akhaura-Laksam section is part of a major, sub-regional corridor of the Trans-Asia Railway network. By 2020, the government aims to upgrade the complete 321 km rail corridor between the capital city Dhaka and Chittagong, the second largest city and main seaport.

[12]Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom

[13]Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Malta, Poland, Romania, Slovenia, Slovak Republic

Table 1: Comparison of Select Railway Market Structures in the World

	Rail Infrastructure Ownership	Freight Operations	Passenger Rail Operations	Rolling Stock
USA	Majority of cross-country tracks privately owned by freight railroads. Amtrak owns some track in North-East Corridor. Public agencies own some commuter tracks.	Private Class I railroads operate 100% commercially without subsidy. Some smaller short line/regional railroads receive support from state and/or federal government	Public-sector companies that receive public support for operating and capital costs not covered by revenues. A few private operators (e.g., niche tourism services).	Owned outright, financed through a special rolling stock bond (equipment trust certificate) or acquired through leasing contracts of various lengths.
UK	Network Rail (a not-for dividend private company which has no shareholders and whose borrowing is mainly backed by a government guarantee) owns virtually all rail infrastructure and charges track access fees to both freight and passenger operating companies. Network Rail receives financing from the government for infrastructure costs not covered by track access revenues.	Private 'freight operating companies' compete on open-access commercial basis on track owned by Network Rail.	Mostly private "Train Operating Companies" (TOCs) that operate on a franchise basis, with contracts between 7 and 15 years. TOCs receive a subsidy or pay a premium to the government based on franchised lines and specified services and depending on the extent to which the above rail service generates a loss, or a profit. TOCs run on Network Rail track.	Typically leased from privately owned rolling stock ownership companies (ROSCOs)[14].
EU	Owned and managed by state-owned companies. Under EU rules, infrastructure must be managed by a company that is separate in its decision-making from any operators.	Public sector-owned companies in most cases, private companies in others.	For cross-border services, public or private, as long as there is potential competition for operations "above the rails." Some countries in EU have not yet opened competition for domestic services.	Owned by operating companies, which for the most part are state enterprises.
	Two types of systems: Common carriage network: states own infrastructure and provide open access to private operators. Private freight railroads: private companies own infrastructure. Some are required to provide open access. Other isolated lines are dedicated to commodities mines with no requirement for open access.	Private companies	Commuter rail operators are public-sector owned, except in Melbourne where services are franchised to a private operator. Intercity services in Queensland and New South Wales are operated by state-owned companies. Some long-distance services are operated by a private company, without subsidy.	Mostly owned outright by operators. Some use of leasing structures.
Japan	HSR lines constructed pre-privatization is owned by private Japan Railways (JR) Passenger Companies. New HSR lines (constructed post-privatization) are generally owned by the national government.	Private company (Japan Railways freight) pays to access tracks owned by Japan Railways (JR) Passenger Companies Passenger or other companies	Private: Japan Railways Passenger	Owned by private companies.

Source: From various web sources

[14]Rolling stock leasing companies (ROSCOs) own most of the coaches, locomotives and freight wagons that run on the rails, which they lease to train operating and freight operating companies, in accordance with the requirements for the services the latter wish to operate. ROSCOs have replaced many of the older trains that were being used at privatisation with modern vehicles. They are often responsible for the heavy maintenance and overhauling of the vehicles they lease to train operators.

JAPAN

Japan has been a pioneer in high-speed rail development and continues to be a global leader. Still, the country's declining population limits domestic demand for rail services. Thus, Japanese rolling stock manufacturers are looking increasingly to the burgeoning global market. Some 25,000 people are employed in the production of rail equipment, parts, and signal and safety equipment in Japan, with many times more employed in component parts supply chains.

JBIC supports overseas investment railways projects undertaken by Japanese firms by drawing on its knowledge and knowhow on host country economies and their investment projects. These projects amongst others includes, high-speed railway linking major cities, and railway in major cities. The political risk of the host countries is mitigated by leveraging JBIC's long-cultivated ties with their governments and its position as an official financing institution. JBIC supports overseas projects by drawing on the knowledge it has acquired on host country economies and investment projects. The investing firms can turn to JBIC for making assessment of environmental and social considerations pertaining to their investment projects. JBIC also undertakes equity participation in many of these cases. Equity participations are capital contributions to the companies which Japanese companies have equity stakes set up by Japanese companies to undertake overseas projects and funds where Japanese companies perform a significant role.

JBIC has also been providing guarantees for various rail projects. For example couple of years back, a ¥88.2bn-equivalent syndicated loan has been signed by a syndicate of 11 banks[15], and backed by a guarantee from the JBIC, in support of the development of an urban railway and subway project in the state in Sao Paulo in Brazil. The facility has been extended to the government of the state of Sao Paulo. The funds will be used to finance capital investment in the transport scheme, including the procurement of trains and associated signaling systems. The aim of the project is to improve the efficiency of freight transportation, and therefore boost the distribution of goods for locally operating Japanese affiliates.

JBIC has also been involved in co-financing railway projects even in developed countries. JBIC has signed a project finance loan agreement with the U.K. firm Agility Trains West Limited, a consortium led by Hitachi, Ltd., to fund the Intercity Express Programme (Great Western Main Line). This is one of the major projects of the British government, and is expected to make a significant contribution to the long-term and stable provision of railway services in the U.K.

RUSSIA

Russia in 2008 devised the Strategy for Developing Rail Transport in the Russian Federation up to 2030 envisaging a significant expansion of Russia's rail network in two stages. The first involves a period of modernization (2008-15) to ensure the necessary capacity on key routes, a fundamental renewal and upgrading of existing infrastructure and the beginning of planning and surveying work for expansion, as well as a start on the construction of some high-priority lines. The second stage from 2016 to 2030 involves large-scale expansion. This is expected to create the infrastructure needed to develop new areas of economic growth across

[15]SMBC, Mizuho Corporate Bank, the Bank of Tokyo-Mitsubishi UFJ, Depfa Bank (Tokyo branches), BNP Parivas, Calyon, Société Générale, BBVA, HSBC, Shinsei Bank and Sumitomo Trust and Banking Company

Russia's vast territory, achieving a world-class level of technology and improving the competitiveness of the country's rail system on the global market. The investment needed for this strategy to be put in place is estimated at a maximum of 13812.4 bn Roubles, with likely funding coming from the national budget (20%), regional budgets (5%) and private investors (35%), including Russian Railways (40%). Specific projects and specialized services will be fully funded by private investors.

Russian Railways current priorities are the reconstruction of existing main lines and their technical enhancement, along with the construction of new lines to remove infrastructural limitations to Russia's economic growth. A further priority is the construction of dedicated freight lines, which will be determined by how rapidly deposits of natural resources are tapped and the development of new industrial zones.

Apart from these financing sources, Russia hopes to attract financing from Pension Funds, the National Health Fund, the Social Protection Fund, and oil exports for the infrastructure projects developed by Russian Railways.

Another financing source that's being explored in Russia for infrastructure projects is grants through the Russian Direct Investment Fund[16] (RDIF) in Russia and Vnesheconombank (VEB). The RDIF is expected to cover the necessary financing for the construction of high-speed transport facilities and VEB will ensure the financing of large projects, such as the construction of lines, rail stations and infrastructure, projects with a long amortisation period

At the same time VEB is currently using pension funds to buy 50 bn Rubles worth of Russian Railways' infrastructure bonds to purchase new engines over 2014-2016. The bonds are being offered at the minimal yield to maturity, growth rate of CPI over the last 12 months plus 1% per annum (for a floating coupon rate) or the yield on sovereign bonds (OFZ) maturing before the bonds in question plus 1% per annum (for fixed rate).

CHINA

According to World Bank, China's intercity rail system carries a quarter of the world's traffic on just 6% of the world's track length1[7]. It is the largest conveyer of rail passengers and the second largest carrier of rail freight. During the past decade, Chinese rail traffic grew at an average annual rate of about 8%, putting growing strain on the network1[8]. Relative to population, the density of China's network is much lower than that of Japan, Europe, or even the United States. But the existing system is already used much more intensively than in those other countries. The Chinese government has been acutely aware of these problems and is investing unprecedented sums into the country's rail network.

[16]RDIF Management Company is a 100% subsidiary of Vnesheconombank (VEB), Russia's state development bank, and operates according to international best practices of investment governance. The Russian Direct Investment Fund (RDIF) is a US$ 10 billion fund established to make equity investments primarily in the Russian economy. In all of its investments, the fund is uniquely mandated to secure co-investment that as a minimum matches its commitment – thus acting as a catalyst for direct investment into Russia. RDIF has invested and committed for this purpose over RUB 720 billion, of which RDIF alone invested RUB 65 billion and over RUB 655 billion came from co-investors, partners and banks. RDIF also attracted over US$ 25 billion of foreign capital into the Russian economy through long-term strategic partnerships.

[17]World Bank, "Project Information Document (PID), Appraisal Stage, Report No. 43528

[18]John Scales and Paul Amos, 'Railways for Development. An Overview of China's Railway Development Program,' World Bank Transport Forum, April 2009

In 2004, the State Council (China's parliament) approved a new Railway Development Plan to 2020. Its goals were subsequently made more ambitious in 2007. In the wake of the 2009 global economic crisis, investments were accelerated further when rail, with a 17 % share, became the single largest component of the country's stimulus plan.[19] (in the United States, rail and transit account for just 2 % of stimulus funds.)

Internationally, most attention has gone to China's audacious investment in HSR - high-speed railway. Typical high-speed trains traveling at 125–155 miles per hour are to share tracks with regular passenger and freight trains, while very high-speed trains traveling at 220 mph are to run on separate tracks. Although, China developed a domestically designed high-speed train in 2002 (dubbed the China Star), the country's leadership preferred bringing in the best technology available worldwide. To that end, Chinese companies CNR and CSR have been working since 2004 with international leaders Bombardier, Kawasaki, Siemens, and Alstom.

China's approach offers valuable policy lessons for the India, in particularly the manner in which China has linked its domestic transportation goals to manufacturing policy, and its ability to strike tough deals with foreign suppliers, which has allowed it to join the ranks of leading rail producers.

The initial train sets were produced by the manufacturers in facilities in their home countries. But China has stiff local-content requirements that stipulate that 70–90 % of rail equipment be manufactured domestically. Technology-transfer agreements have permitted Chinese manufacturers to reproduce the vehicle designs in local factories[20].

[19]Yonah Freemark, "High-Speed Rail in China," TheTransport Politic.com, 12 January 2009; 17 percent share calculated from Nick Robins, Robert Clover, and Charanjit Singh, "A Climate for Recovery" (London: HSBC Global Research, 25 February 2009)

[20]Jamil Anderlini, "High-speed China Changes Rail Landscape," Financial Times, 16 March 2010

4. OPPORTUNITIES FOR INVESTMENT IN RAILWAY INFRASTRUCTURE IN AFRICA

Most railways in Sub-Saharan Africa are small, with the busier ones carrying no more than a million traffic units annually, a volume comparable to a moderately busy branch line on other railways. By comparison, the South African operator, Spoornet, carries a similar volume every three days. In some cases, the light traffic is due to lack of demand, in others, it is caused by shortages of rolling stock, particularly locomotives.

Inefficiencies and an inadequate railroad network contribute to high costs of doing business in the continent. Outdated infrastructure and limited maintenance have undermined the effectiveness of railways across Africa. The result has been a significant reduction in useable track. North Africa, particularly Egypt, boasts the oldest railway network in Africa, but it has had only a few upgrades since its inception. In West Africa, as evidenced by Senegal, the rail network is not upto the mark, because of administrative difficulties, locomotive breakdown, and lack of investment and maintenance. In Southern Africa, the Chinese-built Tanzania–Zambia railway has suffered from underinvestment for the past 30 years. With such hindrances, it is hardly surprising that intra-regional trade accounts for a mere 15.6% of Africa's trade with the rest of the world, as in 2014.

Railway Developments

Railway development has followed a similar pattern across Africa. First, isolated lines reached inland from ports to link with trading centers or mines, with branch lines then built over time. Many lines were state-owned from the start, but some were constructed as concessions or, in the case of some mineral developments, by a mining company as an integral part of its operations. Although grand master plans for integrated rail systems have been proposed, none has been fully implemented and, for the most part, the African rail system remains fragmented.

The only significant international networks are those centered in South Africa and stretching north to Malawi, the Democratic Republic of Congo (DRC), and Tanzania, the North African network in the Maghreb, and the East African network linking Kenya, Uganda and Tanzania. A few railways cross borders to link landlocked countries to ports, and others provide inland railheads from which goods can be on-forwarded by road. But there has historically been little trade between most African countries outside southern Africa.

Differences in rail gauges (which specify the spacing between the tracks in a railway) undermine the regional integration of rail networks. At the end of 2008 there were 51 railways operating in 36 countries in Africa. Most of these used either the "Cape gauge" (1.067 meters) or the meter gauge. The main network in southern and Central Africa uses the Cape gauge, which is also used in some Anglophone countries farther north. The meter gauge is used in most of francophone

Africa and much of East Africa. There are also a few, mostly disused, narrow-gauge lines (0.75 and 0.60 meters). The North African network is mostly standard gauge, as are a number of isolated mineral lines. When rail improvements are undertaken, the need for a uniform rail gauge among countries cannot be overemphasized. This complication highlights the need for a regional approach and addressing it effectively will enable trains to cross boundaries.

Current Status

The total network size for Africa as a whole is around 82,000 km, of which about 69,000 km are currently in use, with the remainder closed due to war damage, natural disasters, or general neglect and lack of funds. Almost all the networks are single track, except for sections of the Spoornet network in South Africa. Significant portions of the Southern and North Africa networks are electrified, as well as the mining region of the Democratic Republic of Congo and a short section of the Zimbabwe network (which is currently not in use).

According to AFDB, There are only six African countries with better railroad infrastructure than the global average. Three of them (Morocco, Tunisia and Egypt) are in North Africa, while the remaining three (Namibia, South Africa and Swaziland) are from Southern Africa. Most of the main Southern African cities are connected via railway lines, largely due to the interventions of the British Empire. The aim is to construct a line from the Cape to Cairo Railway to connect all its African colonies. Further north, Tanzania also has a fairly extensive railway system consisting of 3,681 km of railway lines. In reality though, the situation is bleak due to underinvestment, underutilization and losses for the railway operators. Kenya has 1,939 km of railway connecting most major towns. This is partially due to the Uganda Railway, which was built by the British to link Lake Victoria to Mombasa. Some of the original line has however fallen into disuse. It may be well summed that underinvestment and poor maintenance has left the railway in a poor state and utilization of the railway is limited.

Table 2: Africa's Network and Traffic Statistics : 2009

	Route-km (000) (operated)	Passenger-km (billion)	Net tonne-km (billion)	Density (million traffic units per route-km)
North Africa	13	45	13	4.7
West Africa	9	1	12	1.4
Central Africa	6	1	4	0.9
East Africa	9	1	5	0.6
Southern Africa	33	13	114	3.9
TOTAL	69	61	148	3.0

Source: AICD database

Traffic densities on Sub-Saharan railways are generally low. Specialized mineral lines in West Africa and Southern Africa, particularly the Spoornet coal and ore export lines carry more than half the railways' total freight (as measured by net tonne-km). Southern Africa also dominates general rail freight, handling more than 80% of the freight traffic on the non-mineral lines. Southern Africa and Egypt dominate the passenger business, with more than 85% of passenger-km. The traffic density of the Maghreb systems (Morocco, Algeria, and Tunisia) ranges between 2 million and 4 million (similar to many European systems), but only three Sub-Saharan African railways have traffic densities of more than a million, and many average less than 300,000. Sub-Saharan African railways are therefore generally lightly loaded by world standards, and most networks struggle to generate enough funds to maintain and renew their infrastructure as required.

African railways are used mainly for freight transportation and, to a lesser extent, for passenger transport. Financial analysis suggests that railways that carry less than 1 million net tonnes of freight annually do not generate sufficient revenue to finance the capital costs of the infrastructure[20]. Leaving aside South Africa and the North African railway networks, there are very few African countries that have the requisite volume of freight traffic. These include Cameroon, Gabon, Kenya, Namibia, and Tanzania. In general, the railways under concession, present higher traffic volumes than those that remain under state control.

MARKET POTENTIAL IN AFRICA

As Africa's economies look to develop, it will be critical to create solid transport networks that span regions and the entire continent. Improved rail linkages between economic centres, resource-intensive export zones, and the port and airport linkages to the global economy will spur greater cross-border trade.

Derelict and inefficient transportation infrastructure increases the costs of moving goods, reducing the competitiveness of businesses, and impacts intra-country and inter-country trade. In many African countries there is just insufficient capacity to export much of the resource wealth that lies inland.

The African Development Bank reports that high transport costs add up to 75% to the price of goods in Africa, with electricity deficit being chronic in almost half of the countries in the continent. It suggests that bridging these gaps alone could add 2 percentage points to Africa's annual GDP growth rate.

A gradual commitment from funding organisations and governments to develop transport infrastructure across sub-Saharan Africa and increasing attention now focuses on linking transport corridors to create a more effective integrated transport network. Over the next decade, spending on the various transport sub-sectors is expected to continue growing, driven by the need to access the natural resources of the region and achieve the goals of economic development.

[20]Handbook of Infrastructure Statistics

In South Africa, improving the rail network is one of the government's top priorities, with projects aimed at increasing freight rail volumes and container traffic market share. Ghana has extensive plans for rail modification and expansion, with new lines extending into the northern interior of the country and substantial improvements of existing lines in the coastal regions.

As of date, most investment in rail in the region has been driven by commercial and industrial-related rail projects. With increased urbanization and integration, it is anticipated that there will be an increased demand for passenger rail transport linkages.

Railroads

Africa is slowly gaining the imagination of railway developers in the world. The continent is having a tremendous potential on railroads in Africa. Railroads include all commonly understood products and services falling within a broad category of railways, irrespective of product packaging, formulation, size, or form. Considered essential to the economic infrastructure, railroad companies transport cargo or people, often over long distances.

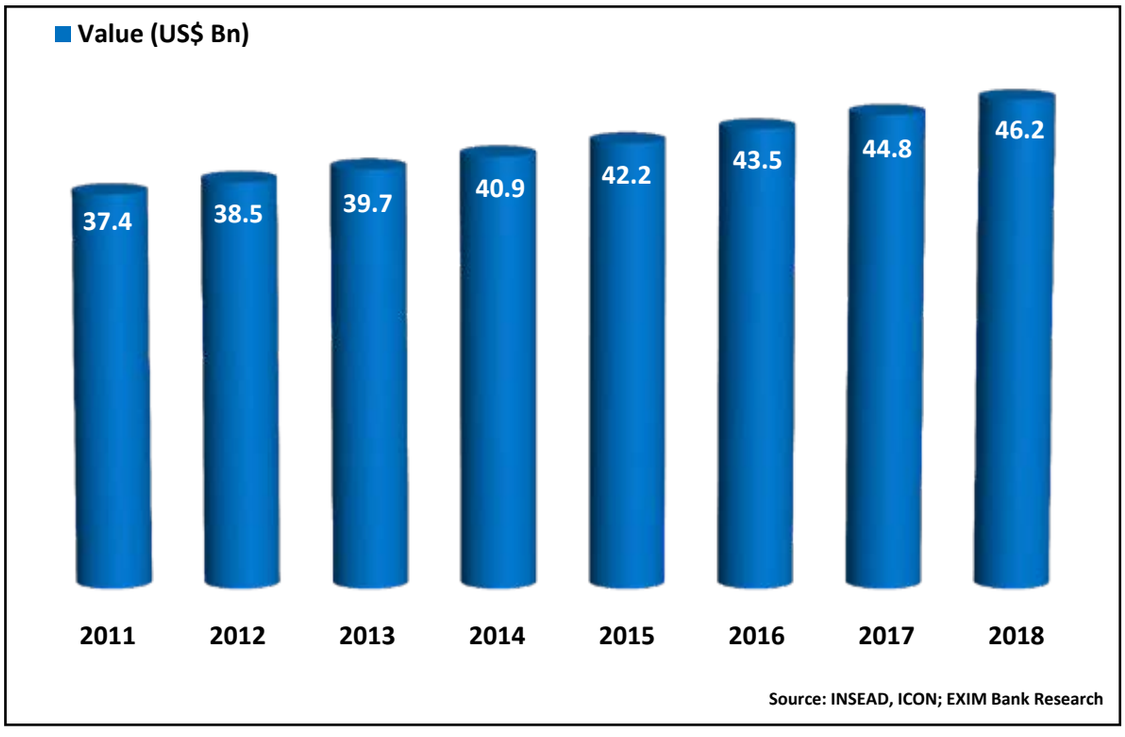
The railroad market in Africa is expected to increase from US$ 37.4 bn in 2011 to US$ 46.2 bn in 2018, while its share in world market is expected to hover around 4% during this period. The key markets where demand for roadrails exists as in 2013, are primarily South Africa and Egypt, both cumulatively capturing almost 33.7% share of the African market.

Table 3: Anticipated Spend on Transport Infrastructure across Sub-Saharan Africa

Mode of Transport	Estimated Total Spend by 2025 (US$ billion)	Anticipated annual spending growth rate	Countries with largest spend planned by 2025
Road Networks (including bridges and tunnels)	200	8.2%	Nigeria: US$ 104 billion
			South Africa: US$ 16 bn
			Mozambique: US$ 16 bn
			Ghana: US$ 1.6 bn
Rail Networks (including stations and terminals)	178	8.0%	South Africa: US$ 32 bn
			Ethiopia: US$ 25 bn
			Ghana: US$ 86 bn
Ports	25	7.8%	Nigeria: US$ 13 billion
			Kenya: US$ 8 bn
Airports	7	7.1%	South Africa: ~ US$ 2 bn
			Tanzania: ~ US$ 2 bn

Source: PwC

Exhibit 14: Market for Railroads in Africa : 2011-2018



Railroad Equipment

The "railroad equipment" industry includes those who are primarily engaged in building and rebuilding locomotives and locomotive parts and frames of any type or gauge as well as railroad, street, and rapid transit cars and car equipment for operation on rails for freight and passenger service.

Major companies include American Railcar Industries, Electro-Motive Diesel (EMD), GE, Greenbrier, Trinity Industries and Westinghouse Air Brake Technologies (all based in the US), along with ALSTOM (France), Bombardier (Canada), China CNR Corporation and CSR Corporation (China), NIPPON SHARYO (Japan), and Siemens (Germany). Worldwide, the railroad equipment manufacturing industry generates about US$100 billion in revenue.

The market for railroad equipment in Africa is expected to increase from US$ 669.1 million in 2011 to US$ 814.7 million in 2018, which is an increase of 21.7% over the 8 year period. At the same time, its share globally is expected to increase mareginally from 4.1% in 2011 to 4.2% in 2018.

Table 4: Countrywise Market Potential for Railroads in Africa as in 2013

Country	Latent Demand (US$ Million)	Share in Africa
South Africa	6942.3	17.5
Egypt	6449.0	16.2
Nigeria	5274.5	13.3
Algeria	3287.3	8.3
Morocco	2045.8	5.2
Angola	1449.4	3.7
Tunisia	1239.2	3.1
Ethiopia	1212.2	3.1
North Sudan	1086.0	2.7
Ghana	985.8	2.5
Kenya	901.6	2.3
Tanzania	813.2	2.0
Cameroon	593.9	1.5
Uganda	590.1	1.5
Libya	466.3	1.2
Cote d'Ivorie	439.9	1.1
Botswana	374.3	0.9
South Sudan	337.4	0.8
Equatorial Guinea	333.4	0.8
Congo	321.9	0.8
Senegal	313.7	0.8
Gabon	311.4	0.8
Mozambique	304.6	0.8
Burkina Faso	279.0	0.7
Zambia	278.4	0.7
Others	3066.7	7.7
Total	**39697.1**	**100.0**

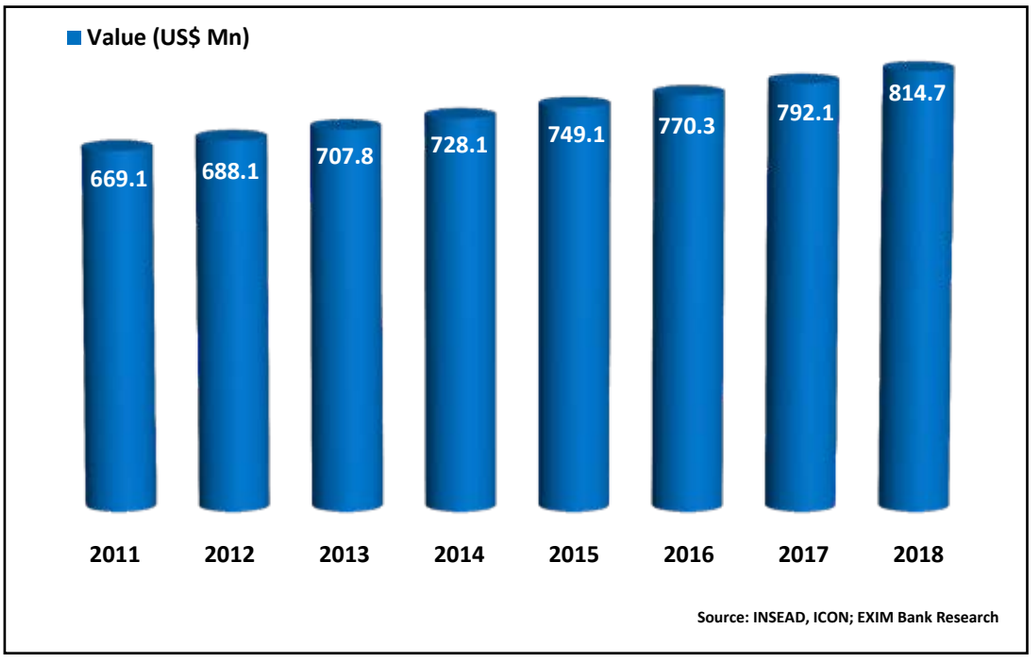
Source: INSEAD, ICON, Exim Bank Research

Table 5: Market Potential for Railroad Equipment in Africa: 2016

Country	Latent Demand (US$ Million)	Share in Africa
South Africa	128.7	16.7
Egypt	119.0	15.5
Nigeria	105.5	13.7
Algeria	61.8	8.0
Morocco	39.5	5.1
Angola	29.0	3.8
Ethiopia	26.2	3.4
Tunisia	23.5	3.1
Ghana	20.1	2.6
North Sudan	19.6	2.5
Tanzania	17.6	2.3
Kenya	17.5	2.3
Libya	15.6	2.0
Uganda	12.0	1.6
Cameroon	11.6	1.5
Cote d'Ivorie	9.7	1.3
Botswana	7.4	1.0
Gabon	6.6	0.9
Congo	6.5	0.8
Mozambique	6.2	0.8
Chad	6.1	0.8
Senegal	6.0	0.8
Burkina Faso	5.8	0.8
Zambia	5.6	0.7
Madagascar	4.7	0.6
Others	**58.1**	**7.5**
Total	**770.3**	**100.0**

Source: INSEAD, ICON, Exim Bank Research

Exhibit 15: Market for Railroad Equipment in Africa : 2011-2018



FOREIGN PARTICIPATION IN AFRICA'S RAIL INFRASTRUCTURE

Local and international rolling stock manufacturing and leasing companies are investing billions into African rail infrastructure to increase their presence in the continent and tap into its huge growth potential in railways. Some recent interests of foreign companies exhibiting interest in African rail infrastructure are as follows:-

- For General Electric, Africa has emerged as its most promising growth region, and it has set aside US$ 2 billion to be invested in a number of areas including rail infrastructure in countries like Nigeria and Angola, over the next three years. The company is building locomotives for Mozambique and Angola in partnership with Transnet, from its vast Koedoespoort factory, just outside Pretoria in South Africa.

- Grindrod Mauritius Rail, and Zambia's Northwest Rail Company are in partnership to operate and maintain a new 590 km railway from the Zambian copper belt to the Angolan border, at a cost of about US$ 1bn.

- Canadian aerospace and transportation company Bombardier, which successfully implemented the Gautrain Rapid Rail Link project in Gauteng, in South Africa, is considering to make the country key manufacturing hub for rail projects on the continent and other southern hemisphere regions. Bombardier has won part of an R50 billion Transnet contract to manufacture 1064 locomotives. Bombardier will build 240 of the locomotives for Transnet Freight Rail.

- Transnet Engineering, a South Africa based company is investing over R160 million in developing a prototype Trans-African

locomotive designed to suit the rugged conditions of Africa's railways and also suited for use in the narrow-gauge railway markets of Latin America. Transnet has six factories in South Africa where it has capacity to manufacture 4000 new wagons and refurbish 3000 wagons per year. Transnet Engineering also has capacity to build over 500 locomotives and refurbish 300. Transnet has identified 10 countries in Africa where it is pursuing opportunities. Existing Transnet customers include Rio Tinto for its Mozambique operations, Botswana Rail, Corredor de Desenvolvimento do Norte and Central East African Railways which operates in Mozambique and Malawi.

SUM UP

The investment in railway infrastructure required at any one time is a function of the age and condition of the existing assets. Lines that have been poorly maintained (as is the case with most Sub-Saharan African railways) generally require a substantial volume of backlog investment to return them to their original standard. Rail concessions adopted in many countries have helped to improve operational efficiency and reverse traffic decline by improving quality of service. But concessions have not been able to mobilize the volumes of investment needed to rehabilitate the networks. The basic reason for this is that the cash flows generated by the business are simply not high enough to finance the necessary investments in the absence of public subsidy. Modest cash flows are a reflection of the relatively low traffic volumes on Africa's rail networks, combined with intense intermodal competition from trucks that prevents railways from raising tariffs to full cost-recovery levels.

Some plans have emerged to improve the railway systems in East Africa in recent years. For instance, there is an East African Railway Master Plan, managed by countries in the East African Community (EAC) and Canada's CPCS Transcom Limited, that attempts to improve railway infrastructure and services in their goal to deepen trade links and economic opportunities among member countries. In August 2012, the AfDB provided US$ 500 million to the EAC towards this project. Meanwhile, in Ethiopia, the government aims to develop a 2,395 km railway network nationwide, out of which 1,808 km is planned to be completed by 2015. This forms part of the government's Five-Year Growth and Transformation Plan. It remains however to be seen, whether the government will have the financial strength to follow through with these plans. The government also plans to improve the Ethio-Djibouti Railway, which links landlocked Ethiopia to the Port of Djibouti. As opposed to other East African countries, Ethiopia does not allow foreign investors to invest in the transport sector.

According to IBRD (World Bank), an average of US$ 100 million is needed every year for track rehabilitation and renewal of the network north of South Africa, with a further US$ 80 million a year needed for rolling-stock. Allowing US$ 20 million for facilities, maintenance equipment, and so on brings the total to about US$ 200 million a year. In addition, there is a backlog investment of possibly up to US$ 3 billion, which could be spread over a 10-year period. The combined annual program would cost about US$ 500 million for 10 years, after which investment would decline to the steady-state level of US$ 200 million.

Given such a huge potential, developed and developing countries like India can look forward to tapping these nascent markets in Africa for garnering better revenues both by exporting products and rendering services to the region.

5. OPPORTUNITIES FOR INVESTMENT IN RAIL INFRASTRUCTURE IN SOUTH-EAST ASIA

The rail network throughout the ASEAN region is currently underdeveloped. Vietnam's rail network consists of seven lines, all of which are single track, and most of which are in need of upgradation. There are currently no railway lines between the neighbouring countries like, Vietnam and Cambodia or Laos, the latter of which have their own dilapidated railway networks. ASEAN Railway Network in a more efficient rail network will present significant advantages. Improved infrastructure in these countries would help to forge closer trade ties with neighbouring countries, which in turn will boost economic growth and help to alleviate poverty. The ASEAN community has targeted rail as a major investment sector and plans have been approved to invest in creating a more integrated network. Thailand suffers from a similar under-investment in its rail infrastructure. Although rail network investment will benefit the peninsular economies most, it will also have a positive impact on the wider ASEAN region (Indonesia and Philippines). The current scheduled investment in ASEAN rail networks currently totals US$ 200 billion.

Recognizing the lucrative market, both China and Japan are competing for high-speed rail in Southeast Asia. Serious negotiations have been underway in Thailand particularly. In May 2015, it was announced that Japan would help develop three high-speed rail networks in Thailand. The Thai government is also in talks with China to develop a joint rail project. China, which has more than half of the world's high-speed rail track, has proposed a network from Kumming in Southwest China to Singapore. The project, part of China's 'One Belt, One Road' Silk Road initiative has proposed three routes from Kumming to Bangkok: the Eastern route via Vietnam and Cambodia, the central route via Laos, and the Western route via Myanmar. The construction of a high-speed rail network has also been proposed between Kuala Lumpur and Singapore, which would make up the southern portion of the Kumming-Singapore rail network. The Kuala Lumpur-Singapore rail network is expected to be in operation by 2020, with both Japan and China expected to offer competing bids for construction.

Table 6: Rail Network Projects Breakdown of South-East Asia

Country	Number of Projects
Brunei	0
Cambodia	2
Indonesia	16
Laos	3
Malaysia	6
Myanmar	1
Philippines	4
Singapore	4
Thailand	13
Vietnam	10
Total Number	**59**
Total Value (US$ bn)	**200**

Source: BMI Research

South Asia - South-East Asia Rail Corridors

The situation for rail corridors is quite different from that of road corridors in the South Asia–Southeast Asia Rail Corridors. Firstly, there is currently no rail connectivity between South Asia and Southeast Asia. Secondly, there is also no connectivity within the Greater Mekong and only limited connectivity within South Asia. There are, however, plans to construct missing links within the Greater Mekong and South Asia and also to connect the two regions. It should be noted that providing full rail connectivity would be very costly and no reliable time schedule for implementation is available as yet.[21]

There are two types of missing rail links in South Asia, one that is remaining completion of the rail network in the SASEC region (South Asia Sub-regional Economic Cooperation) and second is the connection of SASEC with the GMS (Greater Mekong Subregion through Myanmar. Completing the rail network means first building short spur rail lines to connect both Nepal BCPs[22] (Bairahawa and Biratnagar) and Phuentsholing BCP in Bhutan to the Indian railway. Second, it means connecting the currently unconnected Manipur and Mizoram capitals in Northeast India. These connections are assumed to be implemented and therefore the four possible corridors have been described in **Table 7.**

The two first corridors start from Kolkata. The rail distance from Kolkata to Siliguri is 575 km. Therefore, Kolkata–Moreh by rail through the Chicken's Neck is 1,503 km, compared to 898 km if transiting through Bangladesh. Chittagong is well placed to serve Northeast Indian states and even part of Myanmar, as shown by corridor 4 (Chittagong Rail Corridor), with Chittagong – Myanmar being only 625 km. The rail corridors in South Asia are still a mix of meter and broad gauge rail tracks. However, Indian Railways is actively converting all the meter gauge tracks in the Northeast Frontier Railway (NFR) into broad gauge. Before connecting to Southeast Asia, Indian Railways' priorities are to provide rail access to all Indian state capitals, including Imphal in Manipur and Aizwal in Mizoram.

South-East Asia Rail Corridors

In the GMS, the national railways operate in a disjointed way. Railway integration has been, for a long time, a constant unfulfilled objective of ASEAN under the Singapore–Kunming Rail Line (SKRL). Any rail connection between South Asia and South-East Asia would require first that South-East Asian rail networks to be connected. There are many missing rail lines in the mountainous terrain of the region, and construction would be expensive and may raise environmental issues. Also, as freight traffic has been on a declining trend, any major new rail investment would be difficult to justify economically. For these reasons, only a few rail corridors could be envisaged to constitute a link between South Asia and South-East Asia through Myanmar. The only logical rail corridors would then be through first crossing Thailand to Myanmar at the Three Pagodas Pass and second through Yunnan Province in China. It should be recalled that one of the aims of the Indian "Look East" policy was to reach dynamic South-East Asian ports, namely Bangkok/Laem Chabang, Ho Chi Minh City, and Ha Noi (Hai Phong).

[21]ASEAN and the GMS are optimistically talking of 2017 for the completion of the Singapore–Kunming Rail Line (SKRL), which would have a direct impact on future South Asia–Southeast Asia rail connectivity

Table 7: Possible Rail Corridors Connecting to South-East Asia

Origin	Destination	Distance (Kms)	Railway
1. ASSAM–MANIPUR CORRIDOR			
Kolkata	Siliguri	575	West Bengal Railway
Siliguri (West Bengal, India)	Kolkajhar (Assam)	220	NFR (broad gauge)
Kolhajar	Dispur (Guwahati)	200	NFR (broad gauge)
Dispur	Lumding	180	NFR (broad gauge)
Lumding	Katigara (Silchar)	140	NFR (meter gauge)
Katigara	Jiripam (Imphal, Manipur)	70	NFR (meter gauge)
Jiripam	Moreh (BCP Myanmar)	118	New line
TOTAL		**1503**	
2. ASSAM–MIZORAM CORRIDOR			
Kolkata	Siliguri	575	West Bengal Railway
Siliguri (West Bengal, India)	Kolkajhar (Assam)	220	NFR (broad gauge)
Kolhajar	Dispur (Guwahati)	200	NFR (broad gauge)
Dispur	Lumding	180	NFR (broad gauge)
Lumding	Katigara (Silchar)	140	NFR (meter gauge)
Katigara	Kolashib (Mizoram)	90	NFR (meter gauge)
Kolashib	Darlon (BCP Myanmar)	148	New line
TOTAL		**1553**	
3. KOLKATA–DHAKA–MYANMAR CORRIDOR			
Kolkata	Darshana (BCP Bangladesh)	114	IR (broad gauge)
Darshana	Dhaka	245	BR (broad gauge)
Dhaka	Akhaura	124	BR (meter gauge)
Akhaura	Agartala (Tripura, India)	15	New line
Agartala	Manu	82	NFR meter gauge
Manu	Katigara (Assam)	130	NFR meter gauge
Katigara	Jiripam (Manipur)	70	NFR (meter gauge)
Jiripam	Moreh (BCP Myanmar)	118	New line
TOTAL		**898**	
4. CHITTAGONG RAIL CORRIDOR			
Chittagong	Akhaura	210	BR (meter gauge)
Akhaura	Agartala	15	BR (meter gauge)
Agartala	Manu	82	NFR (meter gauge)
Manu	Katigara (Assam)	130	NFR (meter gauge)
Katigara	Jiripam (Imphal, Manipur)	70	NFR (meter gauge)
Jiripam	Moreh (BCP Myanmar)	118	New line
TOTAL		**625**	

BCP = border crossing point, BR = Bangladesh Railway, IR = Indian Railways, NFR = Northeast Frontier Railway

Source: ADB

BOX 4: CHINESE BASED CRRC ZHUZHOU ELECTRIC LOCOMOTIVE EXPANDING IN ASEAN

CRRC Zhuzhou Electric Locomotive Co, which is part of Chinese's largest train manufacturer China Railway Rolling Stock Corp, has opened a US$ 131 million plant in Malaysia's Perak state, which is managed by CRRC (Malaysia) Railway Vehicles Co and acts as the company's gateway to the rest of the ASEAN region. The ASEAN plant will be involved in production, assembly, testing, maintenance and refurbishment, with an annual production capacity of 100 electric trains and LRVs. Since 2010 the company has supplied 38 electric trains to Kuala Lumpur, the country's capital.

During the past five years, CRRC ZELC has put together deals worth 8 billion yuan for rail equipment and service projects in Malaysia. Part of this involves supplying engines for the new 200-kilometer high-speed rail link between Kuala Lumpur and the northern city of Ipoh. High-speed engines will also be supplied for the 900 km rail link being planned between Johor Bahru on the southern tip of the country and Padang Besar on the border of Thailand. With a market share of 85 per cent, the company has become the largest rail equipment supplier in the country with close links to other members of the ASEAN.

CRRC ZELC has also invested and built two manufacturing and maintenance plants in Turkey and South Africa during the past two years. In 2014, it received eight major export orders worth a total value of 19 billion yuan. Still, foreign sales accounted for just 5 per cent of its annual operating revenue.

In the ASEAN region, CRRC ZELC's main markets are Singapore, Indonesia, Thailand and Malaysia, with rising demand for electric locomotives and mass transit trains for city and suburban lines. CRRC ZELC has already supplied 18 metro engineering maintenance trains to Singapore and they are now being used on the city-state's urban rail network.

CRRC ZELC is predicting that ASEAN countries will need 1,100 new carriages and refurbishment for another 700 during the next five years.

BOX 5: CHINA CONSTRUCTS RAIL LINE FROM LAOS TO CHINA

The long-awaited railway that would connect the landlocked Laos with China is poised to become a reality as an agreement was signed between authorities from the two countries. The China-Laos railway is the first overseas route that would connect Laos with the vast railway system in China, using Chinese technology, equipment and investment. The route starts from Mohan-Boten border area with China, which is a distance of 418 kilometers to Vientiane. Since as much as 60 percent of the route passes through bridges and tunnels, the speed would only be about 160 km per hour, and hence will not be as high as that in China.

China will be responsible for 70% of the investment while Laos will be responsible for the rest. It is part of a larger 3,000-kilometer regional railway that will run from Kunming through Laos and Thailand down to Malaysia and Singapore.

[22]Border Crossing Posts

The Asian Development Bank (ADB) has reviewed the alternatives under the SKRL and has proposed four alternatives.

- Alternative 1 (Cambodia–Vietnam corridor): This was the route considered and selected originally by ASEAN, requiring connection from Phnom Penh to Loc Ninth (Vietnam) and then to Ho Chi Minh City. The overall updated cost of constructing the two missing links is estimated at US$ 1.1 billion.

- Alternative 2 (Yunnan Province–Lao PDR corridor): This is the Chinese proposal to connect Yunnan Province to Vientiane. ADB had earlier in 2010 estimated the cost to be of US$ 5.3 billion, with the current figure quoted by the Lao PDR being US$ 7 billion

- Alternative 3 (Vientiane–Vung Ang [Vietnam] corridor): This would be along alignment of RN 8 in the Lao PDR with the estimated cost being US$ 2.3 billion.

- Alternative 4 (North Thailand-Lao PDR-Yunnan Province corridor): This would need extensive new rail construction with an estimated cost of US$ 6.3 billion.

From the South Asia–Southeast Asia connectivity perspective only, alternatives 1 and 3 have been assessed to be attractive by the ADB. A total of five possible rail corridors offering links with South Asia are outlined as in **Table 8**. To reach South Asia from Hai Phong, three corridors were reviewed: (i) through Vientiane, (ii) through Savannakhet, and (iii) through Yunnan Province. The Savannakhet option is the longest one and the Yunnan option is more than 1,100 km shorter than any route through the Lao PDR and Thailand.

Table 8: Possible Rail Corridors Connecting to South Asia

Origin	Destination	Distance (kms)	Railway
1. SAIGON PORT–INDIA CORRIDOR			
Ho Chi Minh City (Viet Nam)	Loc Ninh	129	New line
Loc Ninh (Viet Nam)	Phnom Penh (Cambodia)	254	New line
Phnom Penh	Poipet (BCP)	386	Cambodia North Line
Aranyaprathet (BCP)	Bangkok	260	
Bangkok	Nak Tok (Thailand)	208	
Nak Tok	BCP Myanmar (Three Pagodas Pass)	153	New line
BCP Myanmar	Thanbyuzayat	110	New line
Thanbyuzayat	Malawmyne	170	
Malawmyne	Bago	215	
Bago	Mandalay	615	
Mandalay	Kalay	539	
Kalay	Tamu	127	New line
TOTAL		**3,166**	

Origin	Destination	Distance (kms)	Railway
2. HA NOI/HAI PHONG–INDIA CORRIDOR (VIENTIANE)			
Hai Phong (Viet Nam)	Ha Noi	102	
Ha Noi	Vinh	319	
Vinh	BCP Lao PDR	70	New line
BCP Lao PDR	Vientiane	480	New line
Vientiane	Nong Khai	13	
Nong Khai	Bangkok	621	
Bangkok	Nak Tok (Thailand)	208	
Nak Tok	BCP Myanmar (Three Pagodas Pass)	153	New line
BCP Myanmar	Thanbyuzayat	110	New line
Thanbyuzayat	Mawlamyne	170	
Mawlamyne	Bago	215	
Bago	Mandalay	615	
Mandalay	Kalay	539	
Kalay	Tamu	127	New line
TOTAL		**3,742**	
3. HA NOI/HAI PHONG–INDIA (SAVANNAKHET)			
Hai Phong (Viet Nam)	Ha Noi	102	
Ha Noi	Dong Hoa	590	
Dong Hoa	Lao Bao (BCP Lao PDR)	80	New line
Lao Bao	Savannakhet	220	New line
Savannakhet	Mukdahan	15	New line
Mukdahan	Khon Khaen	320	New line
Khon Kaen	Bangkok	450	
Bangkok	Nak Tok (Thailand)	208	
Nam Tok	BCP Myanmar (Three Pagodas Pass)	153	New line
BCP Myanmar	Thanbyuzayat	110	New line
Thanbyuzayat	Mawlamyne	170	
Mawlamyne	Bago	215	
Bago	Mandalay	615	
Mandalay	Kalay	539	

Origin	Destination	Distance (kms)	Railway
Kalay	Tamu	127	New line
TOTAL		**3,914**	
4. HA NOI–INDIA (THROUGH YUNNAN PROVINCE) CORRIDOR			
Hai Phong	Ha Noi	102	
Ha Noi	Lao Cai (BCP Yunnan Province)	260	
Lao Cai	Kunming	480	
Kunming	Dali	359	
Dali	Ruili (BCP Myanmar)	350	Under construction
Muse (BCP)	Lashio	142	New line
Lashio	Mandalay	262	
Mandalay	Kalay	539	
Kalay	Tamu	127	New line
TOTAL		**2,621**	
5. SAIGON PORT–DAWEI PORT			
Ho Chi Minh (Viet Nam)	Loc Ninh	129	New line
Loc Ninh (Viet Nam)	Phnom Penh (Cambodia)	254	New line
Phnom Penh	Poipet (BCP)	386	Cambodia North Line
Aranyaprathet (BCP)	Bangkok	260	
Bangkok	Nak Tok (Thailand)	208	
Nam Tok	BCP Thailand–Myanmar	30	New line
BCP Myanmar	Dawei Port	130	
TOTAL		**1,397**	

BCP = Border Crossing Point, Lao PDR = Lao People's Democratic Republic

Note: There are two possible links between Thailand and Myanmar: one through the Three Pagodas Pass and a shorter route to Dawei Port

Source: ADB

BOX 6: ADB HAS CONSTRUCTED THE FIRST RAIL LINE IN AFGHANISTAN'S HISTORY

Afghanistan is the home to a spectacular rugged landscape. Unfortunately for the people of Afghanistan, who need goods from the outside world and markets to sell their products, the rough mountain passes in many parts of the country have not changed for centuries. The landlocked country has faced a critical shortage of roads. Aside from a lack of highways needed to move goods and people effectively inside the country, its few crossborder road links have been crowded with traffic.

ADB has constructed the first rail line in Afghanistan's history with a US$ 165 million grant which runs 75 kilometers from the city of Mazar-e-Sharif to Hairatan, a town on the country's northern border with Uzbekistan. The project constructed new stations between Hairatan and Mazar-e-Sharif and installed modern signal and telecommunications systems for safe and efficient operation. For Afghanistan, the country's first railroad has resulted in a steady supply of lifesaving goods and a vital link to Uzbekistan. Having an efficient, safe, and reliable railway transport network operating in northern Afghanistan has resulted in people getting jobs in areas where opportunities were very limited. Employment in the project area has shown an overall growth of over 10% per year since 2010. About 1,200 people are currently employed in logistics and unloading operations, while more jobs are expected to emerge in logistics services at railroad stations. By 2012, freight transported by train had reached about 6,500 tons per day, and the volume of vehicle traffic on the old, overburdened road had decreased. The freight travel time from Hairatan to Mazar-e-Sharif had been cut from 2 hours by road to 1 hour by rail, while carbon dioxide emissions from heavy vehicles had dropped from 2.3 million tons to 1.7 million tons per year.

The future railway system is expected to be developed by 2025 while covering 4,425 kilometers, will link the country's major population centers. It is also expected to help make the country a strategic north–south trade corridor between Central and South Asia and, through further links, to the sea.

Source: ADB

Market Potential in Asia

Railroads

The railroad market in Asia is expected to increase from US$ 369.7 bn in 2011 to US$ 469.3 bn in 2018, while its share in world market is expected to increase from 34.1% to 36.9% during the same period. The chunk of the market in Asia is in China which dominates 44.3% share. India and Japan cumulatively constitutes 31%, while the rest of around 24% is contributed by rest of Asia.

Railroad Equipment

The market for railroad equipment in Asia is expected to increase from US$ 5659.5 million in 2011 to US$ 7179.8 million in 2018, which is an increase of 26.8% over the analyzed period. Its share globally is also expected to increase from 34.1% in 2011 to 37% in 2018, which is a significant jump.

Exhibit 16: Market for Railroads in Asia: 2011-2018

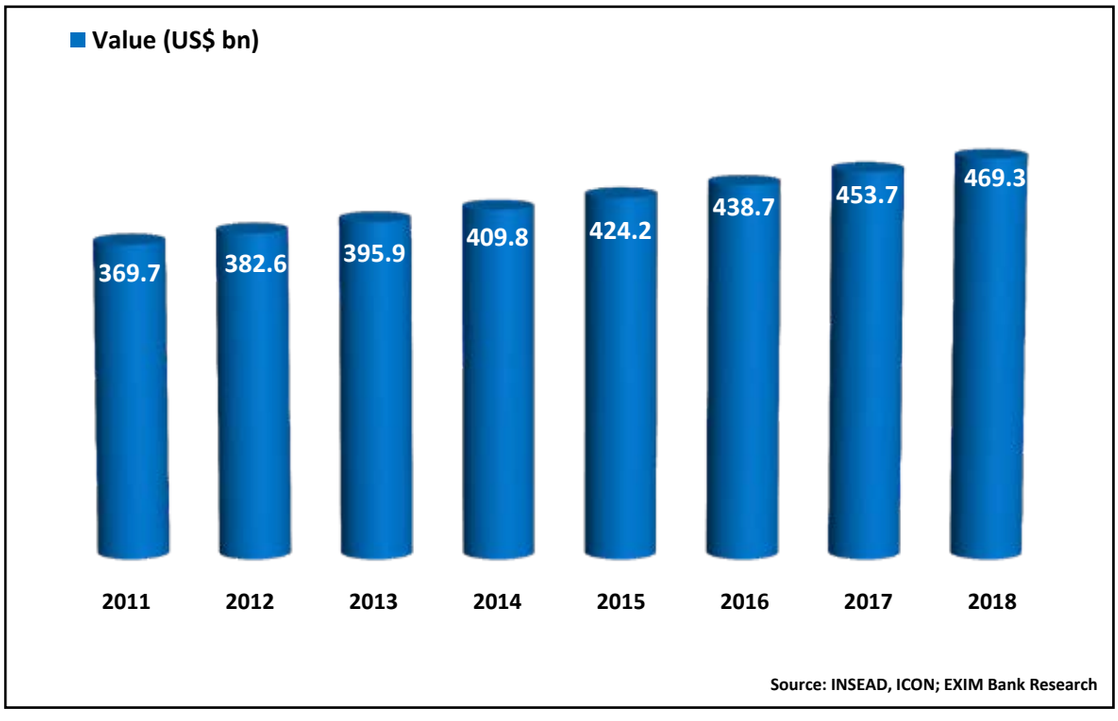


Table 9: Countrywise Market Potential for Railroads in Asia: 2016

Countries	Value (US$ Mn)	Share in Asia
China	194436	44.3
India	70888	16.2
Japan	66785	15.2
South Korea	23621	5.4
Indonesia	18443	4.2
Taiwan	13096	3.0
Thailand	9546	2.2
Malaysia	7513	1.5
Philippines	6568	1.2
Hong Kong	5408	1.2
Vietnam	5151	1.1
Singapore	4837	1.1
Bangladesh	4670	0.4
Sri Lanka	1939	0.4

Countries	Value (US$ Mn)	Share in Asia
Burma	1606	0.2
Macau	765	0.1
Nepal	598	0.1
Cambodia	573	0.1
North Korea	562	0.1
Timor - Leste	369	0.1
Brunei	313	0.1
Laos	302	0.1
Papua New Guinea	286	0.1
Mongolia	252	0.0
Bhutan	75	0.0
Others	77	0.0
Total	**438692**	**100.0**

Source: INSEAD, ICON, Exim Bank Research

Exhibit 17: Market for Railroad Equipment in Asia: 2011-2018

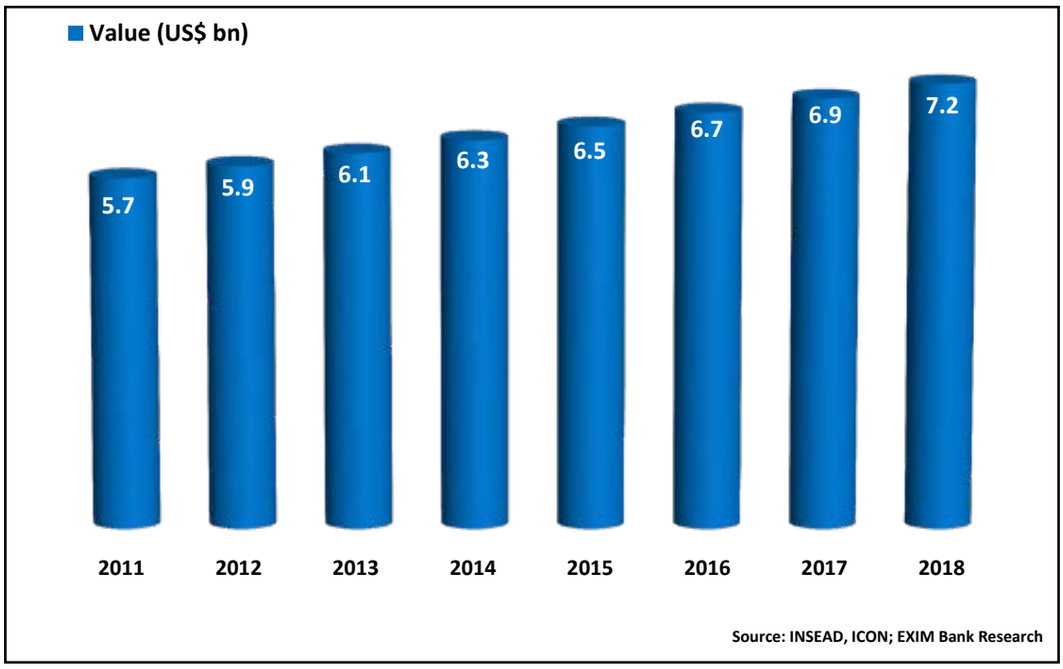


Table 10: Countrywise Market Potential for Railroad Equipment in Asia: 2016

Country	Value (US$ Mn)	Share in Asia
China	2974.9	44.3
India	1084.6	16.2
Japan	1021.8	15.2
South Korea	361.4	5.4
Indonesia	282.2	4.2
Taiwan	200.4	3.0
Thailand	146.1	2.2
Malaysia	115.0	1.7
Philippines	100.5	1.5
Hong Kong	82.8	1.2
Vietnam	78.8	1.2
Singapore	74.0	1.1
Bangladesh	71.5	1.1
Sri Lanka	29.7	0.4
Burma	24.6	0.4
Macau	11.7	0.2
Nepal	9.2	0.1
Cambodia	8.8	0.1
North Korea	8.6	0.1
Timor - Leste	5.7	0.1
Brunei	4.8	0.1
Laos	4.6	0.1
Papua New Guinea	4.4	0.1
Mongolia	3.9	0.1
Bhutan	1.2	0.0
Others	1.2	0.0
Total	**6711.8**	**100.0**

SUM UP

Asia is seeing rapid growth and urbanisation, and there is an increasing need to develop transport services. Railway is a viable option to meet the demand for urban commuting as well as long distance travel. There are numerous railway projects in development or construction, representing billions of dollars in investment and spending.

While the whole of Asia is gradually growing, the market for rail in South East Asia and South Asia is opening up, with many ambitious projects in the market and strong support for public private partnerships (PPPs) and private finance. It may be noted that in a populous region like this, the importance of mass public transport system cannot be ignored.

The most common projects in the region both in terms of PPPs and normal procurement are freight railways and commuter rail systems such as light rail and high-speed lines. The most expensive projects are in Indonesia: the Jakarta to Bandung airport rail link (US$ 6.1 billion) and the Bukit Asam Transpacific Railway connecting various coal mines to Lampung port (US$4.8 billion) to name two. High-speed rail links are also planned between Thailand and China through Laos, and Malaysia and Singapore.

With Myanmar opening its doors to foreign investment, possibilities are emerging for many different types of infrastructure projects, including rail. Besides countries like Laos and Cambodia hardly has any available rail infrastructure, and hence the possibility of all these countries – Cambodia, Laos, and Myanmar has the possibility to leap ahead of the race and have high end rail set up. Vietnam as an emerging economy is also exhibiting interest in PPP projects to facilitate its growth.

6. MARKET IDENTIFICATION FOR EXPORT OF RAILWAY PRODUCTS TO AFRICA & SOUTH EAST ASIA

India's Exports of Railway, Tramway Locomotives, Rolling Stock, Equipment

Exports of India's railway, tramway locomotives, rolling stock, equipment (HS – 2 digits - 86), has been abysmally low. Exports witnessed a sudden increase from US$ 56.8 mn in 2010 to US$ 134.5 mn in 2011, and thereafter it remained hovering around the same level. While exports in 2013 increased slightly to touch US$ 192.4 mn, it dropped again to touch US$ 140.3 mn in 2014. The key export markets at 2-digit HS Code - 86 were Bangladesh (27.7% share), Tanzania (12.8% share), USA (12.6% share), Australia (5.1% share), and South Korea (4.4% share).

However, on analyzing exports at 4-digit HS Code it is found that products like parts of railway or tramway locomotives or rolling-stock (HS Code 8607) constituted 44% of the total exports; followed by 25% share of railway or tramway goods vans & wagons, not self-propelled (HS Code 8606); and rail locomotives rail locomotives, nes, locomotive tenders, which are primarily rail locomotives, diesel-electric (HS 8602) and having a 18% share, in total exports under various categories of railways.

Table 11: Exports of Railway, Tramway Locomotives, Rolling Stock, Equipment (HS – 2 Digits - 86)

Product Name	2010	2011	2012	2013	2014
World	**56.8**	**134.5**	**130.6**	**192.4**	**140.3**
Bangladesh	0.0	1.3	0.7	72.4	38.9
Tanzania	0.1	0.8	0.1	0.4	18.0
USA	6.6	10.8	14.5	17.9	17.9
Australia	0.2	0.7	1.0	3.3	7.2
South Korea	3.4	1.1	0.2	0.4	6.3

Source: Data derived from Trade Map, ITC; EXIM Bank Research

Exhibit 18 : Share of Key Export Items related to Railway, Tramway, Locomotives, Rolling Stock, and Equipment

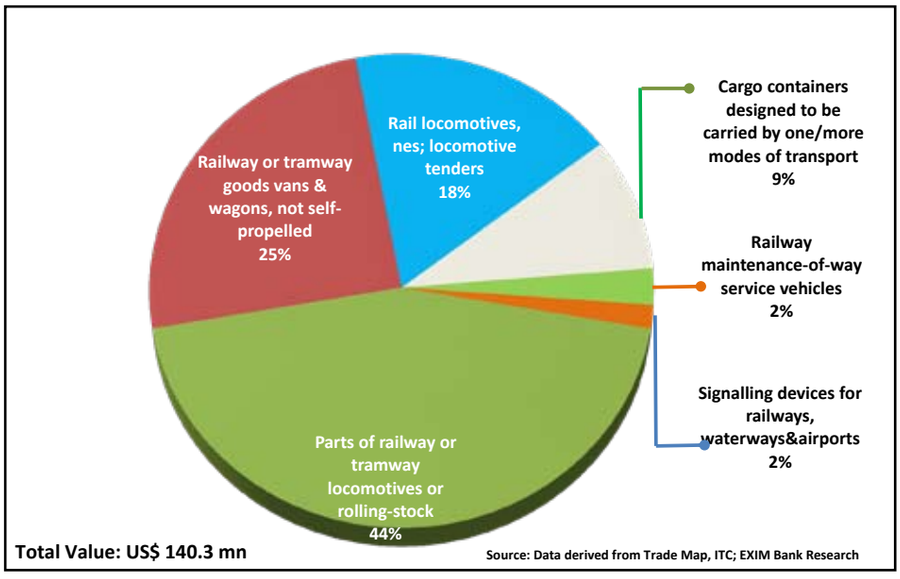


Table 12: India's Exports of Railway, Tramway Locomotives, Rolling Stock, Equipment (HS – 4 Digits - 86)
(Values are in US$ mn)

HS Code	Product Name	2010	2011	2012	2013	2014
8607	**Parts of railway or tramway locomotives or rolling-stock**					
	World	33.8	39.8	58.3	53.1	62.4
	United States of America	5.8	10.4	13.1	17.4	17.7
	Australia	0.2	0.7	0.8	2.7	7.2
	Korea, Republic of	3.4	1.1	0.2	0.4	6.3
	Germany	2.7	4.3	3.7	3.5	4.6
	Brazil	0.0	0.0	0.3	1.5	4.1
8606	**Railway or tramway goods vans & wagons, not self-propelled**					
	World	0.1	0.0	18.1	28.9	34.7
	Tanzania, United Republic of	0.0	0.0	0.0	0.0	17.4
	Bangladesh	0.0	0.0	0.0	12.9	13.0
	Cameroon	0.0	0.0	0.0	0.0	2.0
	Mozambique	0.0	0.0	0.0	4.6	2.0
	Malaysia	0.0	0.0	0.0	0.0	0.2
8602	**Rail locomotives, nes; locomotive tenders**					
	World	8.7	35.4	30.6	72.6	24.6
	Bangladesh	0.0	0.0	0.0	54.6	24.5
	Mozambique	0.8	0.4	1.4	0.1	0.1
	Sri Lanka	1.6	27.9	28.2	16.2	0.1
	Japan	0.0	0.0	0.0	0.0	0.0
	Myanmar	0.0	1.0	1.0	1.6	0.0

HS Code	Product Name	2010	2011	2012	2013	2014
8609	**Cargo containers designed to be carried by one/more modes of transport**					
	World	10.7	27.7	19.3	25.6	12.8
	Israel	0.7	1.0	0.0	2.7	6.1
	China	0.0	0.0	0.4	0.7	1.8
	Algeria	0.1	0.0	0.0	0.0	1.1
	France	0.0	0.0	0.7	0.4	0.7
	United Arab Emirates	0.4	0.9	1.7	1.1	0.6
8604	**Railway maintenance-of-way service vehicles**					
	World	0.0	4.2	0.0	6.5	3.5
	Myanmar	0.0	4.1	0.0	6.4	2.5
	Malaysia	0.0	0.0	0.0	0.0	0.7
	Singapore	0.0	0.0	0.0	0.0	0.3
	Kenya	0.0	0.0	0.0	0.0	0.0
	Iran, Islamic Republic of	0.0	0.0	0.0	0.0	0.0
8608	**Signaling devices for railways, waterways & airports**					
	World	3.3	2.2	4.3	4.6	2.3
	Bangladesh	0.0	0.0	0.3	1.1	0.4
	Sri Lanka	0.2	0.2	0.5	1.6	0.4
	Denmark	0.0	0.0	0.3	0.3	0.4
	South Africa	0.0	0.0	0.5	0.3	0.3
	Saudi Arabia	0.0	0.2	0.0	0.2	0.3
8601	**Rail locomotives powered from an external source of electricity**					
	World	0.0	19.9	0.0	0.0	0.0
	Germany	0.0	19.9	0.0	0.0	0.0
8603	**Self-propelled railway/tramway coaches**					
	World	0.2	5.3	0.0	0.0	0.0
	Bahrain	0.0	0.0	0.0	0.0	0.0
	China	0.0	0.0	0.0	0.0	0.0
	Senegal	0.0	5.3	0.0	0.0	0.0
	Singapore	0.0	0.0	0.0	0.0	0.0
	United Arab Emirates	0.0	0.0	0.0	0.0	0.0
8605	**Railway passenger and special purpose coaches, not self-propelled**					
	World	0.0	0.0	0.0	1.1	0.0
	Myanmar	0.0	0.0	0.0	1.1	0.0
	Thailand	0.0	0.0	0.0	0.0	0.0

Source: Data derived from Trade Map, ITC; EXIM Bank Research

POTENTIAL MARKET IN AFRICA

At HS-86 (2 digit code), Africa's imports from world have exhibited an increase from US$ 1088 mn in 2010 to US$ 1481 mn in 2014, with its share in world imports increasing, albeit in small amount, from 4.2% to 4.6% during the same period. It has also been observed that the Africa's imports from World has been growing at an annualized average growth rate (AAGR) of 10.4% during 2010 and 2014, which was higher than world's import at an AAGR of 6.2%.

The share of the top 10 importers of railway, tramway locomotives, rolling stock, equipment (HS – 2 Digits - 86) in Africa has a share of 75% in its total imports and hence can be targeted as key markets for India's exports to Africa for these categories of products. The key importers as in 2014 being South Africa (21.1%), Ethiopia (10.8%), Morocco (8.1%), Mozambique (6.9%), and Algeria (5.8%). Other countries which are having a share more than 5% are Nigeria, Egypt, and Tunisia.

It may be noted that countries like Ethiopia and Mozambique have exhibited a triple digit AAGR of 350.3% and 301.9%, respectively, during 2010 and 2014. The share in imports of these countries during the same period has also shown a significant increase from 0.2% to 10.8% in the case of Ethiopia, and 0.4% to 6.9% in the case of Mozambique. Data shows that South Africa too has witnessed a considerable increase in import share from 12% in 2010 to 21.1% in 2014.

Exhibit 19: Africa's Imports of Railway, Tramway Locomotives, Rolling Stock, Equipment by Africa from World (HS-2 digit - 86)

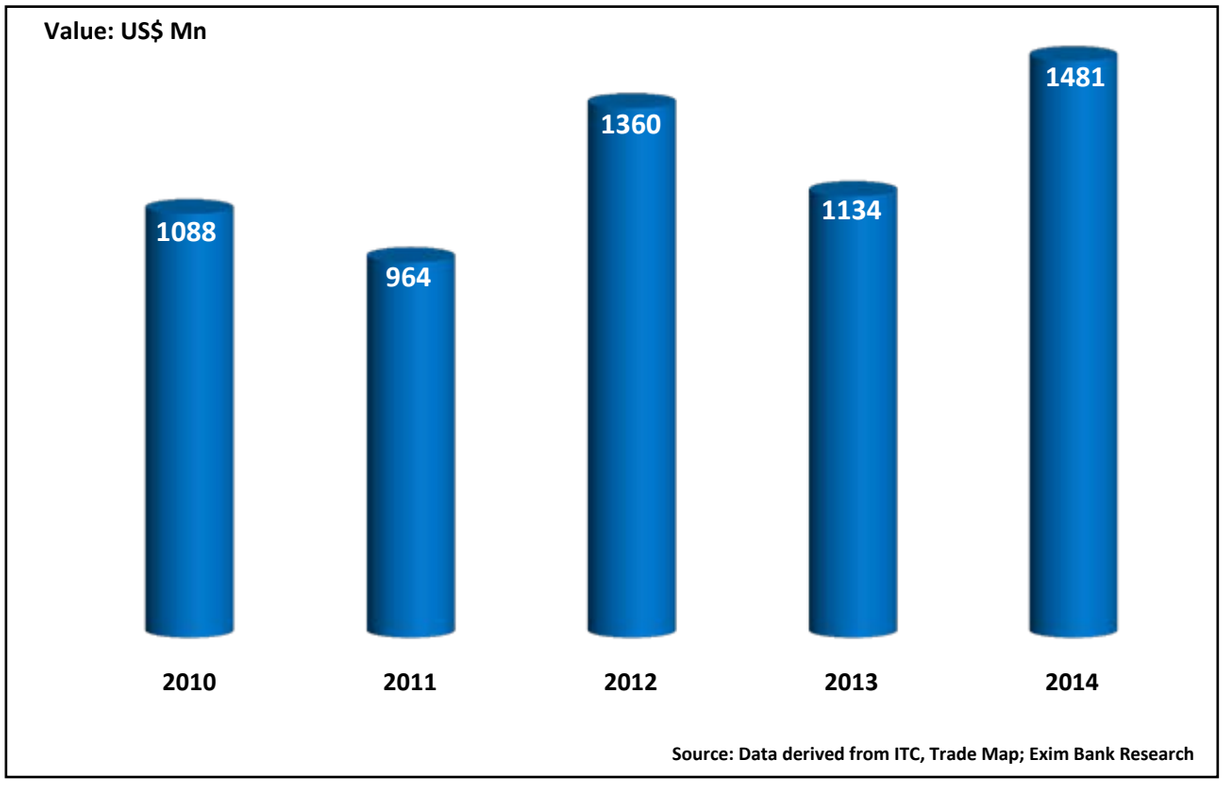


Table 13: Key Importers of Railway, Tramway Locomotives, Rolling Stock, Equipment by Africa (HS – 2 Digits - 86)

Importers	Imports in Value US$ Million					Share in Africa's Imports		AAGR
	2010	2011	2012	2013	2014	2010	2014	2010-14
South Africa	131	229	253	266	312	12.0	21.1	26.9
Ethiopia	2	3	9	13	161	0.2	10.8	350.3
Morocco	203	47	168	179	120	18.6	8.1	38.5
Mozambique	4	42	21	68	102	0.4	6.9	301.9
Algeria	262	183	46	25	86	24.1	5.8	22.1
Nigeria	45	41	81	109	81	4.2	5.5	24.0
Egypt	35	142	191	74	73	3.2	5.0	70.4
Tunisia	139	35	144	55	64	12.7	4.4	47.8
Mauritania	9	22	38	24	57	0.8	3.9	81.2
Tanzania	4	13	28	13	53	0.3	3.6	156.0
Total of the Top 10	**833**	**758**	**979**	**827**	**1110**	**76.6**	**75.0**	**9.7**
Africa Aggregation	**1088**	**964**	**1360**	**1134**	**1481**	**100.0**	**100.0**	**10.4**
World	**25740**	**31635**	**35020**	**31931**	**31927**			**6.2**

Source: Data derived from Trade Map, ITC; EXIM Bank Research

A further analysis has been done to find out the current countrywise import appetite for the various categories of Railway, Tramway Locomotives, Rolling Stock, and Equipment at 4 digit code for HS-86. It is found that Parts of railway or tramway locomotives or rolling-stock (HS 8607) was the largest imported item having a share of 27%, followed by Cargo containers designed to be carried by one/more modes of transport (HS 8609)having a share of 19%, and Railway or tramway goods vans & wagons, not self-propelled (HS 8606) having a share of 12%. These three together constitutes 58% of the imports alone.

An analysis has been done to identify the potential markets for each of the 9 categories of products under HS-4 digit code 86. From the analysis it is evident that a handful of countries are supplying the bulk of its products to a particular country. This is being possible for a number of reasons from the size of the orders being small, to the country encouraging monopoly due to long term contracts, or may be since not other countries have exhibited interest to explore the market. While countries like China has been a key exporter to Africa, European countries like France, Germany, and Spain have also been catering to the African market demand. South Africa has been another very critical source for the African continent for supplying railways and the various categories of railway equipments. In some cases like, railway or tramway goods vans & wagons, not self-propelled (HS 8606) and Railway passenger and special purpose coaches, not self-propelled (HS 8605), they were the only suppliers to the key importing countries, although of a small value.

Exhibit 20: Share in Africa's Imports from World of Various Categories of Railways and equipments under HS-4 digit Code - 86

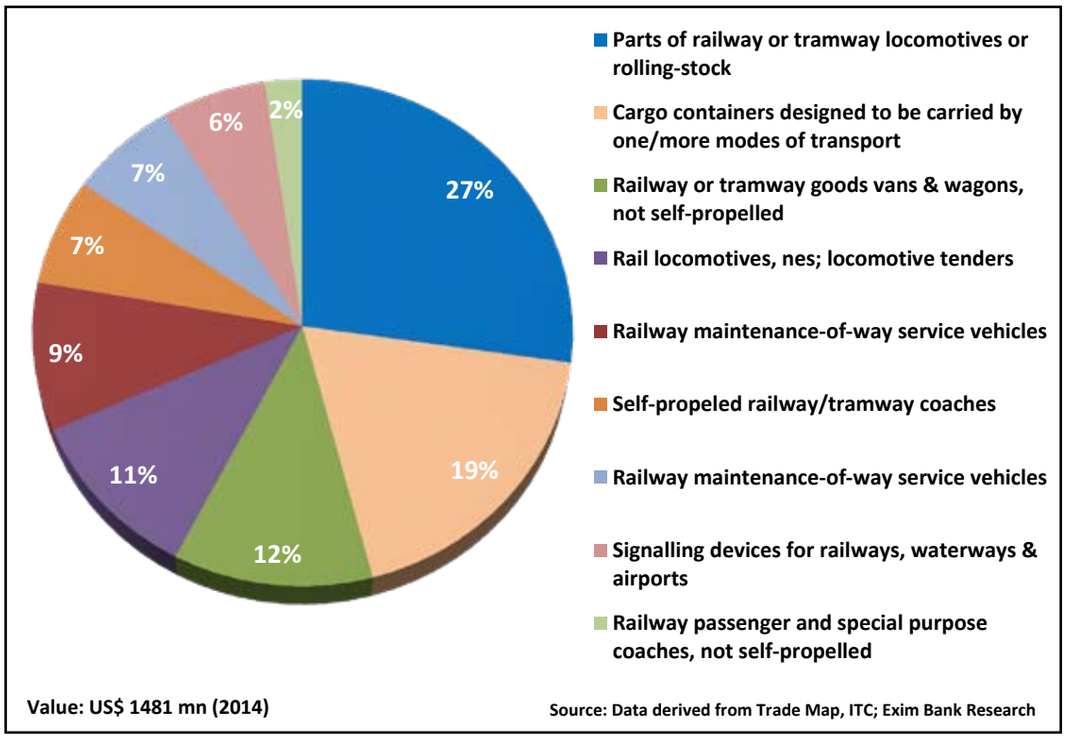


Table 14: Key Importers of Various Categories of Railway, Tramway Locomotives, Rolling Stock, Equipment under HS – 4 Digits – 86 in Africa (Values are in US$ million)

HS Code	Importers	2010	2011	2012	2013	2014	Key Exporters to the Market
8607	**Parts of railway or tramway locomotives or rolling-stock**						
	Africa	204	265	337	350	404	
	South Africa	88	151	178	184	165	China (40%), USA (30%), Italy (13%), Brazil (6%), India (2%)
	Egypt	7	12	36	40	49	Hungary (42%), Germany (22%), South Korea (11%)
	Tanzania	1	2	4	6	44	South Korea (40%), India (24%), Malaysia (21%)
	Algeria	10	12	10	9	27	Spain (41%), France (19%), USA (11%)
	Mauritania	8	11	9	22	20	France (45.2%), USA (19%), Belgium (14%)

HS Code	Importers	2010	2011	2012	2013	2014	Key Exporters to the Market
8609	**Cargo containers designed to be carried by one/more modes of transport**						
	Africa	163	182	261	267	275	
	South Africa	22	37	51	45	37	China (21%), HK (18%), Germany (11%)
	Nigeria	39	32	70	30	33	China (28%), USA (19%), Germany (8%)
	Angola	19	18	32	50	30	China (18%), Portugal (18%), South Africa (11%)
	Congo	2	3	8	12	17	China (22%), Portugal (12%), France (12%)
	Ethiopia	2	2	6	5	14	China (36%), Italy (13%), Germany (8.6%)
8606	**Railway or tramway goods vans & wagons, not self-propelled**						
	Africa	23	32	97	126	173	
	Morocco	0	1	0	49	80	France (99%)
	Mauritania	0	1	0	1	29	China (57%), Switzerland (41%)
	Ethiopia	0	0	0	1	16	China (99%)
	Botswana	1	1	6	20	11	South Africa (99%)
	Swaziland	0	0	4	0	7	South Africa (100%)
8602	**Rail locomotives, nes; locomotive tenders**						
	Africa	34	91	146	185	159	
	Mozambique	1	16	11	24	45	Brazil (64%), South Africa (33%), India (1%)
	South Africa	1	33	11	10	26	Australia (62%), Spain (19%), Italy (2%)
	Ethiopia	0	0	0	1	19	China (97%)
	Liberia	0	1	0	2	18	USA (100%)
	Sudan (North + South)	1	2	7	5	15	Germany (100%)
8601	**Rail locomotives powerd from an ext source of electricity**						
	Africa	74.8	10.5	7.7	26.7	139.8	
	South Africa	0	0	2.5	19.8	75.9	China (100%)
	Tunisia	1.1	0	0	0	54.3	NA
	Malawi	0	0	0	0	5.7	South Africa (100%)
	Mozambique	0	0.2	0.1	0	3.3	South Africa (100%)
	Nigeria	0.1	0.1	0	0	0.3	India (37%), China (36%), Turkey (14%), Germany (12%)

HS Code	Importers	2010	2011	2012	2013	2014	Key Exporters to the Market
8603	**Self-propelled railway/tramway coaches**						
	Africa	464	260	372	74	101	
	Ethiopia	0	0	0	0	57	China (100%)
	Algeria	230	154	16	0	15	Spain (99%)
	Nigeria	0	0	0	0	14	China (99%)
	Egypt	0	44	106	0	10	South Korea (99%)
	Zambia	0	0	0	0	5	South Africa (99%)
8604	**Railway maintenance-of-way service vehicles**						
	Africa	55	27	22	36	99	
	Ethiopia	0	0	0	0	41	China (100%)
	Algeria	5	5	0	4	21	Austria (72%)
	Morocco	0	0	0	3	9	Austria (52%), Italy (44%)
	Djibouti	0	0	0	0	4	NA
	Mozambique	0	0	0	3	4	South Africa (60%), Portugal (13%), Spain (11%)
8608	**Signaling devices for railways, waterways & airports (HS 8608)**						
	Africa	46	26	36	61	95	
	Nigeria	0	1	0	2	24	Italy (36%), China (33%), Austria (23%)
	Mozambique	1	2	2	6	18	Japan (51%), South Africa (17%), Brazil (15%)
	Morocco	3	2	1	15	12	France (57%), Spain (42%),
	Algeria	14	7	6	4	12	Austria (24%), Italy (21%), France (21%)
	Egypt	2	3	12	11	7	Spain (99%)
8605	**Railway passenger and special purpose coaches, not self-propelled**						
	Africa	24	70	81	9	34	
	Cameroon	0	0	0	0	18	China (100%)
	Angola	0	0	61	0	7	South Africa (99%)
	Mozambique	0	0	0	0	4	South Africa (99%)
	Morocco	0	2	0	0	3	Belgium (100%)
	Malawi	0	0	0	0	2	South Africa (100%)

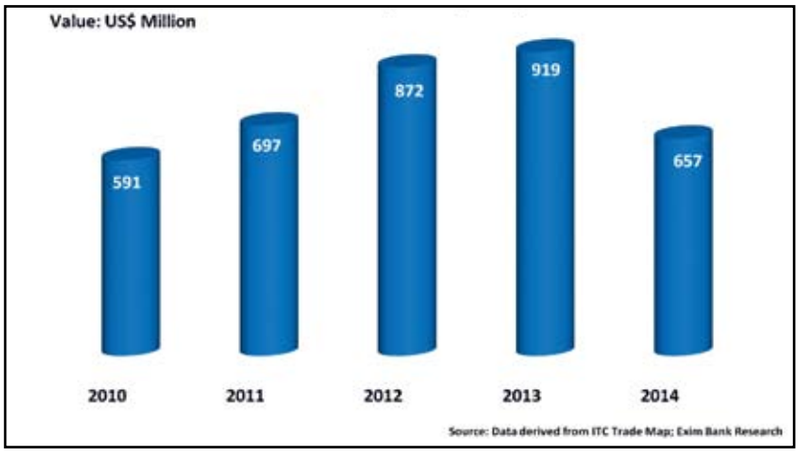
Source: Data derived from Trade Map, ITC; EXIM Bank Research

POTENTIAL MARKET IN SOUTH EAST ASIA

South East Asia's imports from world of products under 2 digit HS - code 86 (Railway, Tramway Locomotives, Rolling Stock, Equipment), exhibits a modest increase of 5% AAGR during the period 2010 to 2014. Imports in South East Asia have increased from US$ 591 mn in 2010 to US$ 657 mn in 2014. Singapore which was having a share of 5.6% during 2010 has been showing a robust demand as its share increased to touch 36.6% in 2014. Indonesia too has shown gradual increase in imports over the last 5 years. Its imports have increased from US$ 85 mn in 2010 to US$ 176 mn as its share increased from, 14.4%. It is observed that Vietnam's imports albeit of a small amount of US$ 61 mn (as in 2014) has shown an AAGR of 51.8% while its share in imports in South East Asia touched 9.2%.

An analysis under 4 digit HS Code – 86, reveals that the highest share of the item that is imported by South East Asia belongs to Self-propelled railway/ tramway coaches (HS 8603) having a 34% share alone in total imports of the region. Singapore and Indonesia are the primary consumers, followed by Malaysia. Both the top importers receive their supplies primarily from China.

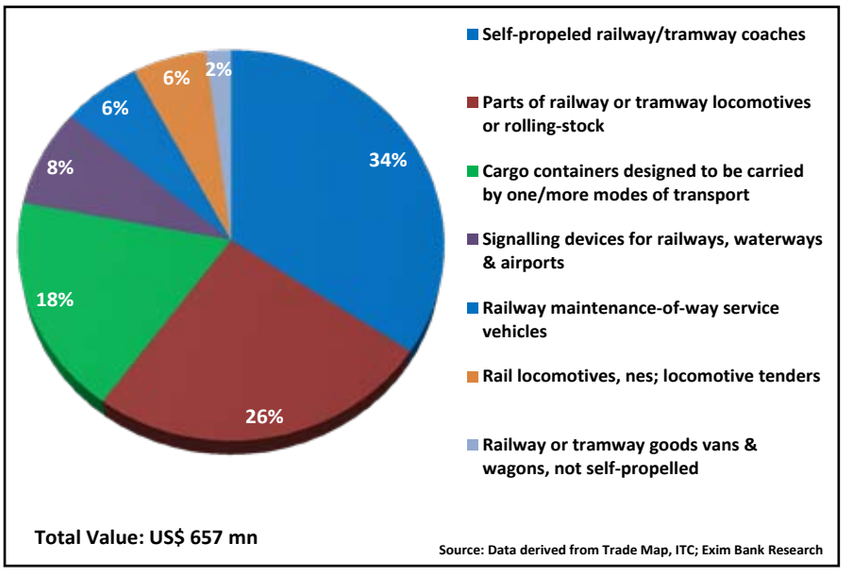
Exhibit 21: South East Asia's Imports of Railway, Tramway Locomotives, Rolling Stock, Equipment from World (HS-2 digit - 86)



The other products under HS code 86 at 4 digits shows that while the key import markets for these products vary slightly, China remains as a dominant supplier to the entire South East Asian Region.

While assessing the key suppliers (exporters) to the major markets it is observed that India figures only in Malaysia's imports of parts of railway or tramway locomotives or

Exhibit 22: Share in South East Asia's Imports from World of Various Categories of Railways and equipments under 4 digit HS Code - 86



rolling-stock (HS 8607), as amongst the top 3 with a share of 16%.

Another key observation is of European countries which are catering to the import need of Thailand and Indonesia for Railway maintenance-of-way service vehicles (HS 8604). While Poland, Romania and Italy are providing goods and services to Thailand, Austria and France is penetrating the Indonesian market.

Table 15: Key Importers of Railway, Tramway Locomotives, Rolling Stock, Equipment by South East Asia (HS - 2 Digits - 86)

Importers	Imports in Value US$ Million					Share in South-East Asia's Imports		AAGR
	2010	2011	2012	2013	2014	2010	2014	2010-14
Singapore	33	240	68	145	240	5.6	36.6	182.5
Indonesia	85	139	133	530	176	14.4	26.8	73.1
Malaysia	327	209	521	69	91	55.3	13.9	14.7
Thailand	80	23	84	107	61	13.5	9.3	44.9
Viet Nam	25	55	30	24	61	4.2	9.2	51.8
Myanmar	6	12	18	34	16	1.1	2.4	42.9
Philippines	29	10	9	5	5	5.0	0.8	-26.9
Cambodia	3	3	3	1	3	0.4	0.5	54.8
Brunei Darussalam	3	4	6	3	2	0.4	0.3	7.6
Lao PDR	0	1	1	1	1	0.1	0.1	30.4
South East Asia Total	**591**	**697**	**872**	**919**	**657**	**100.0**	**100.0**	**5.0**
World	**25740**	**31635**	**35020**	**31931**	**31927**			**6.2**

Source: Data derived from Trade Map, ITC; EXIM Bank Research

Table 16: Key Importers of Various Categories of Railway, Tramway Locomotives, Rolling Stock, Equipment under 4 Digits HS – Code 86 in South East Asia (Values are in US$ million)

HS Code	Importers	2010	2011	2012	2013	2014	Key Exporters to the Market
8603	**Self-propelled railway/tramway coaches**						
	South East Asia	79	200	508	98	225	
	Singapore	0	1	0	13	128	China (99%)
	Indonesia	0	36	31	44	45	China (82%), Japan (18%)
	Malaysia	17	156	474	2	23	China (91%), Germany (9%)
8607	**Parts of railway or tramway locomotives or rolling-stock**						
	South East Asia	258	125	131	240	167	
	Indonesia	35	54	53	123	66	USA (61%), China (21%), France (4%)
	Singapore	17	20	22	55	60	USA (53%), Japan (14%), France (9%)
	Malaysia	166	25	24	40	24	Germany (17%), India (16%), China (13%)
8609	**Cargo containers designed to be carried by one/more modes of transport**						
	South East Asia	115	71	59	87	118	
	Thailand	7	7	17	19	33	China (58%), Singapore (10%), Vietnam (6%)
	Singapore	11	14	12	19	29	China (40%), Thailand (16%), USA (14%)
	Indonesia	15	21	15	25	22	China (34%), Germany (19%), Singapore (15%)
	Viet Nam	16	19	5	4	10	Singapore (36%), China (16%), Malaysia (14%)
8602	**Rail locomotives, nes; locomotive tenders**						
	South East Asia	31	124	11	324	38	
	Malaysia	8	5	2	4	16	China (90%), UK (9%)
	Indonesia	22	10	3	315	16	USA (99%)
8604	**Railway maintenance-of-way service vehicles**						
	South East Asia	43	16	42	30	40	
	Thailand	3	5	22	1	16	Poland (67%), Romania (22%), Italy (7%)
	Indonesia	0	2	6	12	14	Austria (91%), France (7%)

HS Code	Importers	2010	2011	2012	2013	2014	Key Exporters to the Market
8608	**Signaling devices for railways, waterways & airports**						
	South East Asia	33	42	58	51	53	
	Singapore	5	3	10	16	20	China (36%), Taipei (17%), UK (10%)
	Indonesia	5	16	15	11	12	Germany (44%), France (18%), Malaysia (10%)
	Malaysia	13	12	15	7	12	UK (39%), China (23%), Germany (12%)
Note: Products identified have a minimum imports to the South Easian Market of US$ 10 mn as in 2014							

Source: Data derived from Trade Map, ITC; EXIM Bank Research

7. SELECT EXIM BANK SUPPORTED RAILWAY PROJECTS

Exim Bank provides competitive finance at various stages of the business cycle covering import of technology, export product development, export production, export marketing and export credit at pre-shipment and post-shipment stages, and investments overseas. It operates a wide range of financing and promotional programmes. Finance is provided in Indian Rupees and foreign currencies. The Bank finances exports of Indian machinery, manufactured goods, and consultancy and technology services on deferred payment terms. It also seeks to co-finance projects with global and regional development agencies to assist Indian exporters in their efforts to participate in such overseas projects.

Over the years Exim Bank has been involved in an array of projects involving supporting the Railways **(Annexure 2).** These has been as diverse as facilitating design, procurement and construction of railways line overseas, to facilitating international joint venture projects in India, to helping Indian companies in securing contracts abroad. Select such cases are highlighted as follows.

1. GHANA: DESIGN, PROCUREMENT AND CONSTRUCTION OF RAILWAY LINE UNDER THE MULTI-MODAL TRANSPORT CORRIDOR

Exim Bank has facilitated the design, procurement and construction of 84 km railway line from Tema to Akosombo under the multi-modal transport corridor in Ghana. The scope of the proposed EPC contract would include, design and construction of the railway line and the railway heads at Tema and Akosombo

The transport of domestic freight and transit freight between the Accra-Tema Region and Northern Ghana, and further afield to Burkina Faso, Mali and Niger, is essentially road based and largely dependent on the National Road Routes west of Lake Volta connecting the north-south corridor via Kumasi, Tamale and Bolgatanga. This road based dependency and lack of other transport alternatives has led to very heavy use of the road system. Particularly between Accra and Kumasi, there are attendant problems related to the need to increase road capacities and strengthen maintenance regimes because of the ever increasing use by commercial vehicles, a high proportion of which tend to be overloaded.

Consequently, a new railway line from Tema northwards to Akosombo is considered to help to revitalize the eastern section of the eastern railway line. This Tema-Akosombo Rail line will become a major transit corridor linking the port of Tema to the northern part of Ghana and the landlocked countries of Burkina Faso, Mali and Niger.

The said project is of significant importance to Government of Ghana and seeks to redress the imbalance between transport modes for long distance transit and domestic freight movements from Accra/Tema region northwards, and vice

versa. In particular, freight movements via Tema Port, from where alternative transport solutions might improve existing port operations, will result in reduced vessel waits and container dwell time.

This project will be executed by Afcons Infrastructure Limited, a leading Indian construction company involved in the field of transport infrastructure and having undertaken several railways projects in India and overseas.

2. INDIA: DESIGN AND CONSTRUCTION OF UNDERGROUND TUNNELS FOR KOLKATA METRO RAIL

Exim Bank has facilitated the execution of deemed export contract secured from Kolkata Metro Rail Corporation (KMRCL) for design and construction of three underground stations. The contract is funded by the Govt. of India, the Govt. of West Bengal and the Japan International Corporation Agency (JICA).

ITD-ITD Cem JV (ITDJV) is a Joint Venture between Italian-Thai Development Public Company Ltd, Thailand (51%) and ITD Cementation India Ltd, India (49%). It is incorporated as a Special Purpose Vehicle (SPV) in 2009 for execution of large infrastructure projects in India. The JV is engaged in construction of structures like elevated stations, construction of tunnel and other foundations and specialist engineering work.

ITD-ITD Cem JV is executing a contract for design and construction of three underground stations namely Central, Sealdah and Phoolbagan, plus one cross over at Sealdah at Kolkata, approximately 4 km long x 2 numbers minimum 5.4 M dia. twin board tunnel and cut & cover and ramp structure for about 550M including architectural works etc. The entire project package is referred as UG 2 (Under Ground) and is valued at ₹ 908.63 crore secured from Kolkata Metro Rail Corporation (KMRCL). The contract is funded by the Govt. of India, the Govt. of West Bengal and the Japan International Corporation Agency (JICA).

Under this project, the underground and elevated railway totaling 14 km in length in Kolkata, the state capital of West Bengal will be constructed to cope with the growing traffic demand as well as to accelerate the modal shift from automobile to the metro system, thereby contributing to regional economic development and improving the urban environment through alleviation of traffic congestion and reduction of exhaust fumes. In addition, reduction in emissions of global-warming gases by replacing automotive traffic is anticipated.

With the population density of 25,000 people/km Kolkata city is one of the most overpopulated cities in the world. The major means of public transport in the city is buses, however, the area under transport usage in Kolkata city is mere 6% and extremely small in contrast to many other major Indian cities. Traffic congestion has been a serious problem in the city, however, expanding the road capacity by widening existing roads or constructing new roads is difficult due to excessive overcrowding. Under these conditions, building a mass rapid transit system has become a pressing issue for Kolkata city so as to to alleviate traffic congestion as well as to reduce air pollution caused by exhaust fumes and emission of global-warming gases.

The project envisages construction of railway in east-west direction throughout Kolkata city, passing under Hooghly River and the commercial district

in the city center, and is expected to cater to about 500,000 passengers/day once it begins functional. For the better service to realize the modal shift from private owned vehicles to the metro system, the Project will bring about synergistic effect of a network with the North-South Line.

3. INDIA: DESIGN AND CONSTRUCTION OF UNDERGROUND TUNNELS FOR CHENNAI METRO RAIL

Exim Bank has also funded the design and construction of underground tunnels for Chennai Metro Rail.

Bank has funded Transtonnelstroy-Afcons Joint Venture (TAJV)[23], a consortium of Afcons Infrastructure Ltd. (AIL) and a Russian infrastructure major, Transtonnelstroy Ltd. having secured two major metro projects – UAA01 and UAA05 for the construction of Chennai Metro Rail. AIL holds 99% equity in TAJV and the balance 1 % is held by Transtonnelstroy Ltd., Russia.

Chennai Metro Rail, which has been designed to be a rapid transit rail system, will be executed in two phases. The two project contracts – UAA01 and UAA05 – are valued INR 1,924 crore and INR 1,231 crore respectively. The first phase comprises two corridors – Corridor 1 from Meddavaram to St. Thomas Mount and Corridor 2 from Madhavaram to Lighthouse via Radhakrishnan Salai. About 55% of the corridors would be underground and the rest would be elevated.

The projects involve the design and construction of nine underground stations and tunnels associated with the stations, covering a distance of 8.60 km. UAA01 falls under corridor 1 of the project and covers a distance of 5.50 km spanning Washermanpet to Egmore stations, with five stations viz. Washermanpet, Mannadi, High Court, Chennai Central and Egmore. UAA05 falls under corridor 2 of the project and covers a distance of 3.10 km comprising four stations from Shenoy Nagar to Thirumangalam.

The estimated base cost of the entire Phase-I of the project is INR 14,000 crore. Of this the Central and State Governments together are expected to contribute about 41% of the project cost. The balance has been met by the Japan International Cooperating Agency (JICA).

4. INDIA: DESIGN AND CONSTRUCTION OF DELHI MRTS PROJECT OF PHASE-III

Exim Bank is also involved in the Delhi Metro project for the execution of deemed export contract for design and construction works of Delhi MRTS Project of Phase-III awarded by Delhi Metro Rail Corporation (DMRC) to Pratibha Industries Limited (PIL).

The detailed scope of work includes design and construction of tunnel between Hauz Khas Station and Kalkaji Station by Shield TBM, Tunnel near Chirag Delhi and Kalkaji Stations, Underground ramp beyond Kalkaji station by Cut & Cover method, Underground Metro stations at Panchsheel Park, Chirag Delhi, GK Enclave-I, Nehru Place and Kalkaji by Cut & Cover Method on Janakpuri West-Botanical Garden Corridor of Delhi MRTS Project of Phase-III.

[23]TAJV has successfully executed the Delhi Metro Project and is currently executing the first underwater metro tunnel below Hooghly river in Kolkata.

A detailed environmental impact assessment for the entire project was undertaken to minimize the negative environmental impact during the construction stage. Storm water drains have been identified at various sites for drainage of waste water from construction, and sites have been earmarked at convenient locations for temporary and permanent disposal of soil arising out of tunneling and other construction works. A close check was required to be kept on air and noise pollution during construction and adequate rehabilitation and fire protection measures are taken to ensure minimum inconvenience to the public. For every tree cut during construction, DMRC has planted 10 trees as compensatory afforestation. Around 26,000 trees have been planted at Najafgarh, Isapur and Rebla Khanpur.

5. INDIA: DESIGN AND CONSTRUCTION OF STATIONS AND ASSOCIATED TUNNELS OF THE MUMBAI METRO

Exim Bank has helped J. Kumar Infraprojects Ltd. (JKIL) for executing a deemed export contract for design and construction of underground stations and associated tunnels of the awarded package(s) of Line 3 (Colaba-Bandra-Seepz Line) of the Mumbai Metro [L3MM].

JKIL in a 74:26 Joint Venture with China Railway No. 3 Engineering Group Co. Ltd. (CR3) has bid for the L3MM Project. CR3 is also its JV partner for DMRC project. The JV formation is done owing to pre-qualification criteria for bidding. CR3 is a WOS of China Railway Group Ltd. (CRGL), which is the largest integrated construction group in the world by revenues. CRGL is majorly owned by China Railway Engineering Corporation (CREC), which is ultimately owned by State-owned Assets Supervision and Administration Commission (SASAC).

The L3MM Project entails design and construction of underground stations and associated tunnels along Line 3 of Mumbai Metro - from Colaba to SEEPZ which is 33.50 km long. The total line is divided into seven packages (each of a project size of ~ INR 2500 crore) with 26 underground stations and one yard. This is entirely underground and will be implemented by Mumbai Metro Rail Corporation Ltd. (MMRC), a wholly owned company of MMRDA. Total cost of the project is ~ INR 23,200 crore with an implementation period of ~ 5 years. The project is part funded by JICA to an extent of ~ INR 13,200 crores with the balance being funded by Central & State Govt.

The project is expected to reduce road congestion, besides reducing the load on the Western Line between Bandra and Churchgate suburban Stations. L3MM is being implemented through the engineering, procurement and construction (EPC) model. Construction is expected to begin in early 2016 till 2020. The project has a deemed export status.

6. SOUTH AFRICA: MANUFACTURING AND SUPPLYING CONCRETE SLEEPERS

Exim Bank has extended a Foreign Currency Term Loan to GPT Concrete Products South Africa (Pty) Limited (GPTCPL) under direct funding programme of overseas entity. GPTCPL is an overseas subsidiary of GPT Infraprojects Limited (GPTIL), the flagship company of the GPT Group.

Coromandel Fertilisers Limited (CFL) had made a strategic investment in Foskor, South Africa in 2008, to have a regular source of phosphoric acid for their Indian operations. As part of improving the logistics for moving phosphate rocks from the mines to the plant location, CFL wanted to lay a separate railway line, and had discussed the same with Transnet Freight Rail, a division of Transnet Limited, a company under the Ministry of Railways, Republic of South Africa.

GPTCPL entered into an agreement with Transnet Freight Rail to secure a contract for manufacturing of 1 million concrete sleepers to Transnet Freight Rail, South Africa. The plant was set up at Ladysmith, South Africa at an estimated project cost of US$ 6.8 mn.

7. SENEGAL: ACQUISATION OF RAILWAY COACHES AND LOCOMOTIVES

Bank had facilitated a line of credit to the Governments of Senegal and Mali to acquire railway coaches and locomotives for strengthening the railway network in Senegal and Mali. Under this, India supplied and commissioned 12 new Meter Gauge Coaches and 6 locomotives to Senegalese importer “Petit Train de Banliieue”, a suburban train network connecting Dakar with nearby cities of Thies, St. Louis and Kaolack.

These locomotives are performing daily services on the suburban network, while one of these are also servicing once a week between Dakar and Bamako (Mali). These Indian coaches and locomotives have been contributing significantly towards the movement of passengers between Dakar and the region around. The suburban service is plying about 10000 to 15000 people. Further the travel cost by train from suburbs to Dakar has become much cheaper than road transport and travel time is 25 minutes as against 90 minutes by road.

8. SRI LANKA: RAILWAY LINE CONSTRUCTION OF THE MADHU ROAD TO TALAI MANNAR RAILWAY LINE

Exim Bank has funded the Government of Sri Lanka through the Government of India’s concessional lines of credit for construction of the Madhu Road to Talai Mannar Railway Line in the Northern Province of Sri Lanka.

The scope of the work of the contract covers various works required for the restoration of the railway track between Madhu Road to Talai Mannar section of Medawachchiya to Talai Mannar railway line in Northern Province of Sri Lanka. It also covers construction of the railway track including formation, bridges, drainage, platforms as per the requirement of Sri Lanka Railways, rolling stock required for the execution of works.

The contract envisages the design and construction of Madhu Road to Talai Mannar Railway Line in the Northern Province of Sri Lanka. The scope of the contract covers construction of the railway track including formation, bridges, drainage, station buildings, platforms, housing as per the requirement of Sri Lanka Railways, rolling stock required for execution of works. The Railway Line from Medawachchiya to Talai Mannar in the Northern Province of Sri Lanka was constructed in 1914. It was a part of an overall plan to link Sri Lanka and India. However, due to the conflict in Northern Province in Sri Lanka, the traffic in this line was suspended from 1990. With the normalization of the situation, the Government of Sri Lanka is giving topmost priority for the restoration of infrastructure in the Northern region and the President of Sri Lanka has constituted

a Special Task Force for redevelopment of the Northern Region.

Exim Bank's funding to the Government of Sri Lanka is a part of the financial assistance provided for reconstruction of the Northern Region. The Medawachchiya to Madhu Road section of the railway line is being also simultaneously being restored. In the Madhu Road to Talai Mannar section of the railway line, there are 6 crossing stations and 3 substations. Since the line is not in operation for the last 20 years, it will be restored to almost a new railway line construction which will be executed with Medawachchiya as the main establishment.

9. SRI LANKA: CONSTRUCTION OF MEDAWACHCHIYA TO MADHU ROAD RAILWAY LINE

Another stretch of the Sri Lankan Railways that has been funded by Exim Bank, though its Lines of Credit program is the construction of the Medawachchiya to Madhu Road Railway Line.

The scope of work covers construction of the railway track including formation, bridges, drainage, and platforms as per the requirement of Sri Lanka Railways' rolling stock required for the execution of works.

The contract envisages the design and construction of Medawachchiya to Madhu Road Railway Line in the Northern Province of Sri Lanka. The scope of the contract includes supply of materials and rolling stock required for project execution, execution of work and reconstruction of platforms. The Railway Line from Medawachchiya to Talai Mannar in the Northern Province of Sri Lanka was constructed in 1914. It was a part of an overall plan to link Sri Lanka and India. However, due to the conflict in Northern Province in Sri Lanka, the traffic in this line was suspended from 1990, With the normalization of the situation, the Government of Sri Lanka is giving topmost priority for the restoration of infrastructure in the Northern region and the President of Sri Lanka has constituted a Special Task Force for redevelopment of the Northern Region.

10. SRI LANKA: SIGNALLING AND TELECOMMUNICATION SYSTEM FOR RAILWAY

Exim Bank has facilitated a concessional credit line to the Sri Lanka Railways for the design, supply, installation, testing and commissioning of signaling and telecommunication system for railway network in northern and Talai Mannar railway lines in Sri Lanka.

The scope of the work of the contract covers various works required for the restoration of the railway track between Madhu Road to Talai Mannar section of Medawachchiya to Talai Mannar railway line in Northern Province of Sri Lanka. The scope of work covers construction of the railway track including formation, bridges, drainage, and platforms as per the requirement of Sri Lanka Railways, rolling stock required for the execution of works.

The restoration of land transport i.e. roads and railways are a part of the plan for restoration of the damaged infrastructure in the Northern Province of Sri Lanka. The Government of Sri Lanka has accorded priority to the reconstruction of rail track and signalling system from Vavuniya to Kankesanturai on the Northern line and from Medawachchiya to Talaimannar Pier on the

Talaimannar line for ensuring redevelopment of the northern region of the country. The train traffic on the Northern line beyond Anuradhapura to Kankesanturai and on the Talaimanannar line beyond Medawachchiya is controlled form Anuradhapura Control Centre. The signaling system from Anuradhapura to Medawachchiya is operational but consists of mechanical signalling and an old type of telephone system. Hence, in order to have an efficient train operation on the Northern Line and the Talaimannar Line, signalling and telecommunication system north of Anuradhapura (including Anuradhapura) needs to be replaced.

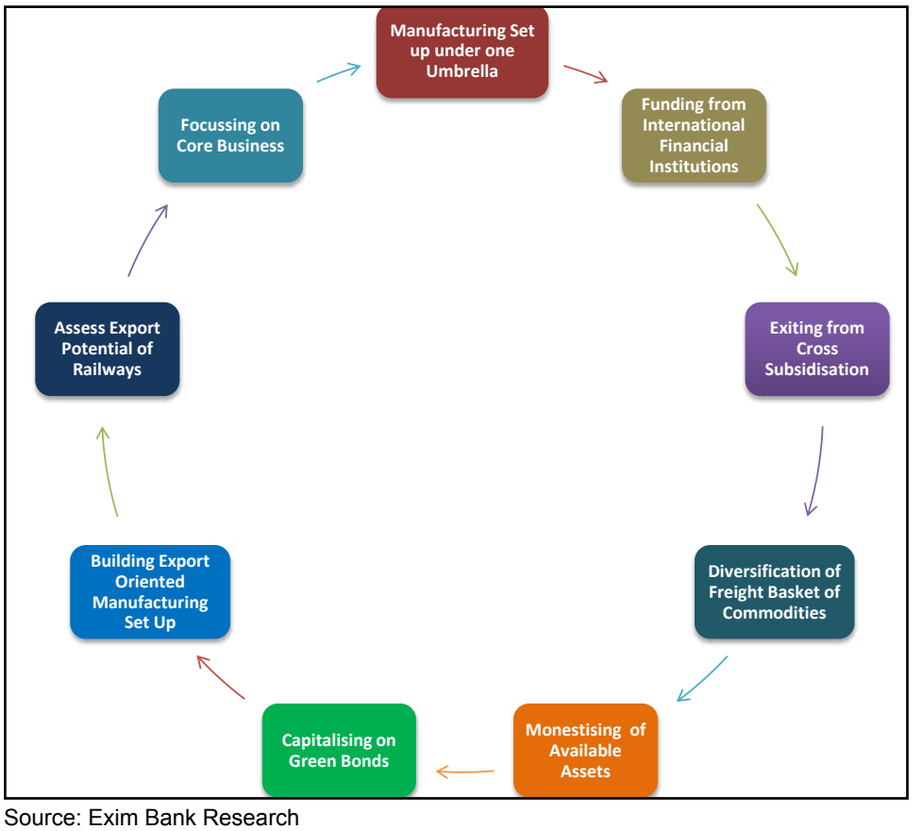
The contract covers various works required for the design, supply, installation, testing and commissioning of signalling and telecommunication system for railway network on the Northern and Talaimannar railway lines in Sri Lanka. In order to maintain uniformity in the signalling and telecommunication system of the entire section of railway network in the Northern province, the scope include sections from Anuradhapura to Kankesanthurai (258 km with 20 stations) and from Medawachchiya to Talaimannar Pier (56 km with 7 stations). The section length is 314 km which includes 27 stations.

8. STRATEGIES TOWARDS STRENGTHENING THE RAILWAYS

The railways in India have tremendous potential to grow both in the domestic market and overseas. While the Indian Railways has a huge infrastructure facility, most of it due to negligence and lack of capital infusion is becoming technologically obsolete. Further the sector has been perennially short of funds, and has not been able to generate enough resources by itself. Given the evolving situation it is not only important to identify areas to generate revenues for the railways, but also look at markets overseas which can be tapped. Indian manufacturing companies, private and public, should also gradually move into producing state of art products including metro, monorail, etc. through technology transfer or foreign collaboration.

Identified herein the chapter are some of the possible means wherein the Indian Railways as a whole and the sector in specific can be restructured to utilise its latent potential. This involves likely means of raising resources, to reducing costs, to learning from best practices overseas so as to monetise the existing assets, among many others.

Exhibit 23: Possible Strategies towards Strengthening the Railways



Source: Exim Bank Research

Building Export Oriented Manufacturing Capabilities

India has a huge opportunity to exports products and services and earn foreign exchange through the Indian Railways. The available infrastructural set up of railways in India is tremendous. While Indian Railways moves ahead towards greater restructuring, they should also build capacities to cater to the external environment while augmenting technological capabilities. Export possibilities in Africa and select regions in Asia are huge which should be tapped immediately. Having a legacy of having preparing detailed viability of railway projects, building rail coaches and engines, amongst other, all of which under Indian Railways as a singular organization, the country has the wherewithal to look abroad.

However, it is unfortunate that we are not in a position to boast of having world class rail coach manufacturing companies in India. India should increasingly look at technology transfer or joint collaboration with well renowned railways manufacturers like GE, Greenbrier, Trinity Industries and Westinghouse Air Brake Technologies (all based in the US), along with Alstom (France), Bombardier (Canada), China CNR Corporation and CSR Corporation (China), Nippon Sharyo (Japan), and Siemens (Germany).

China's FDI policy of compulsory stiff local-content in railways which stipulates 70–90 % of the products manufactured in the country, is worth emulating. This also would facilitate India's 'Make in India' initiative promoting manufacturing, while harnessing from technology transfer. This will be a win-win situation for both the investor and for India.

Indian Railways may consider even divesting stake to promote technology transfer either to foreign companies or Indian private sector. It may be noted that two new factories are being set up by GE and Alstom in Bihar which would add 200 locos to existing supply in a few years (More than 600 locos, purchased from DLW, Varanasi and CLW, West Bengal, are added to this fleet annually). China, has created the China Railway International Co Ltd, a joint subsidiary led by China Railway Corp, and a consortium of Indonesian State-owned companies which is now undertaking projects across the world.

Assess Export Potential of Railway

Railways in India have significant opportunities in both Africa and South East Asia, including in select countries of South Asia. While foreign investors are already setting up base in Africa, the corridors linking South East Asia and South Asia are gaining momentum. These opportunities needs to be tapped for both export of railways products like rolling stocks, and services where consultancy is required. India's exports of Railway, tramway locomotives, rolling stock, equipment (HS Code 86) to world stood at a mere US$ 140 mn, with a share of 18% to Africa and 6% to South East Asia. It may be noted that India's share is less than 2% in Africa's imports and less than 1.5% in South East Asia's imports of Railway, tramway locomotives, rolling stock, equipment (HS Code 86).

Indian Railways has a huge infrastructure for manufacturing wagons, coaches, and engines, which needs to look at these potential overseas markets which are on the verge of developing railway infrastructure. A focus on strengthening indigenous capabilities will also increase local

[24] Bonds not explicitly labelled as "green bond" but whose use of proceeds are aligned with the low-carbon, climate-resilient economy

production and domestic manufacturing as well make India a hub for technology, equipment and services export globally. IRCON has been executing projects in countries like Malaysia, Sri Lanka, Algeria, Bangladesh and Nepal, while RITES has been providing diversified and comprehensive array of consultancy and engineering services in transport infrastructure sector under a single roof. Both IRCON and RITES also should aggressively pursue opportunities in these latent markets.

Manufacturing Set up of Railways under One Umbrella

RITES has been one of the key export arm of Indian Railways and has been exporting locomotives, coaches, wagons, DMU train sets and other related equipment to Bangladesh, Myanmar, Sri Lanka, Mozambique and other African countries. However to bring in uniformity and an equal footing, all the railways manufacturing set ups like Bharat Wagon and Engineering Company Limited (BWECL), Braithwaite and Company Limited, Burn Standard Company Limited, Diesel Locomotive Works, Chittaranjan Locomotive Works, etc. should all come under one unit having a common balance sheet. The strengths of each of these entities should in the process compliment eachother. This will also possibly help them to improve themselves, and even better position them to bid for projects in developing economies.

The Bibek Debroy Committee report have proposed that all these existing production units should be placed under a government SPV known as the Indian Railway Manufacturing Company (IRMC). While this remains a government SPV, at least initially, under the administrative control of the Ministry of Railways, making it a government SPV makes it independent of the Ministry of Railways and the government, including in the determination of salary structures, and allows it to borrow.

Funding from International Financial Institutions

Railways have chalked out a plan for the period 2015-2020 which would involve around INR 8.5 lakh crore. The funding for the same as envisaged by the Indian Railways would be through a mix of internal generation by the Railways, Budgetary Support from the Government and through Extra Budgetary Resources, including market borrowings. The funding for the bulk of the investment plan, i.e. to the tune of INR 2.5-3 lakh crore would be provided by the Government, the Railways expects to generate INR 1 lakh crore as internal resources. Recently, the Life Insurance Corporation of India have committed an investment of INR 1.5 lakh crore to the Railways over the next five years. The Railways are also expected to generate Rs. 1 lakh crore through 63 private public partnerships.

However, going forward both by virtue of its need and its plans, it is advisable for the Indian Railways to look at alternate mechanisms to finance themselves. For example, the Railways may like to explore the possibility of funding from international agencies like Korea Exim. The nature of the support may be tied/untied which are looking to invest in India (with or without required underlying conditionalities like minimum Korean content / technology). Railways may also look at tapping other similar institutions which are keenly looking at the growing Indian market.

At the same time while Railways have been receiving funds for some of its projects from the World Bank and the Japanese Bank for International Cooperation (JICA), it is important that the bankability of the projects are also meticulously worked out since the borrowings from these agencies have financial liabilities attached to them in the form of payment of heavy interest and return of principal amount.

Exiting from Cross Subsidization

The tariff policy of the Indian Railways has traditionally followed the principle of cross subsidization in order to offset the losses incurred in passenger and other coaching services through additional revenue from freight movement. The reluctance is largely to raise passenger fares at the cost of the burdening freight charges. The latter's impact by way of inflation is arguably more pronounced than the perceived comfort from low-cost rail travel undertaken occasionally.

It is felt that both passenger fares and freight rates have to be demand-cum-market driven and fixed differently for different segments. The pricing should be fixed so as to yield a net return that corresponds to the scarcity value of the capital in the economy.

The time has, indeed, come to try out dynamic pricing for passenger travel in air-conditioned coaches. If airlines can have programmed systems for determining fares linked to travel date and real-time occupancy rates, the Indian Railways, too, could well adopt the same.

The right to subsidised rail travel should be limited only to those travelling by non-AC coaches. Government may consider a time-frame of around five years for phasing out cross-subsidisation of passenger traffic by freight.

Diversifying its Freight Basket of Commodities

Indian Railways has an excessive reliance on transporting five bulk commodities for revenue generation and persistently losing traffic to roads. These include, coal (49% share), iron ore (12%), steel (4%), cement (10.4%) and fertilisers (4.2%) which accounts for almost 80 % of Indian Railways' overall freight traffic. It may also be noted that the market share of the Railways in freight transportation has dropped from about 90 % in the 1950s to 33 % currently. It therefore becomes immensely important that the Railways diversify its portfolio to include products such as sugar, milk, agricultural products, among others. This also entails Indian Railways to procure high-capacity wagons to increase loading capacity.

Monetising of Assets through Out-of-Box Thinking

Investments in Railways are suffering as the share of internal generation of resources is gradually declining. The share has declined from 31% in 2009-10 to 24% in 2014-15. The Railways have to look out-of-box and monetize its assets to augment its revenue flow.

Railways have been focussing on ticketing as a primary source of revenue generation. However, if railways has a significant multiplier effect on the economy, it should be possible to generate revenue by monetizing the economic value that Indian railways can generate. In fact, many railway systems globally, have a significant percentage of their revenues generated from non-ticketing sources.

Indian Railways must increasingly appreciate the economic value that is trapped in its assets and its

ability to create wealth by marrying tangible and non-tangible assets of the railways with capital, in a manner that can create wealth for it to transform the organization altogether.

The existing assets of Indian Railways may be leveraged to raise resources, mostly on a contract basis. Some of the potentially feasible opportunities available for Indian Railways which could be utilised only on long term-lease or yearly contract basis, depending upon the assets, are:-

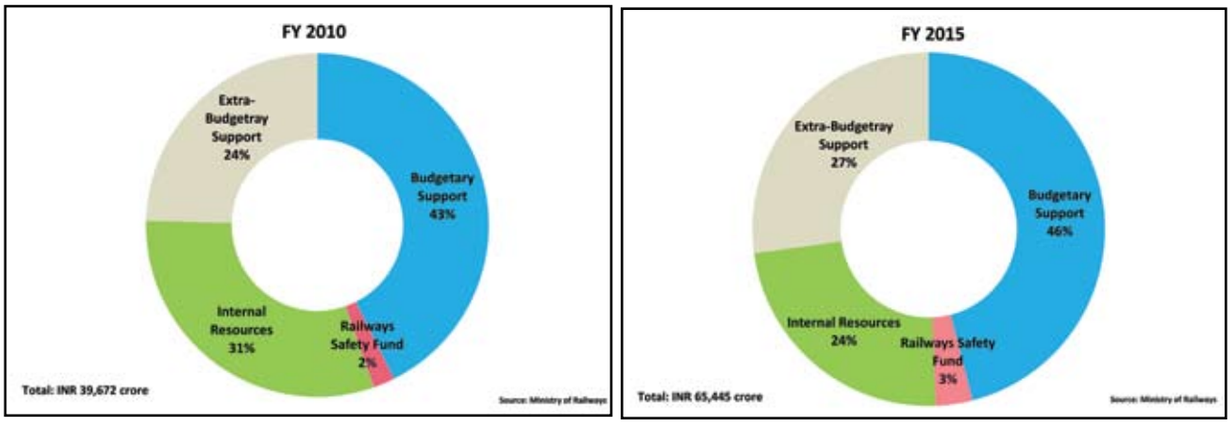
- Utilising the huge land available with it for commercial and rental purposes on lease basis;
- Generating more revenues by allowing better designed shops on platforms;
- Railway coaches being used more proactively as a source of advertisement;
- Introducing an exclusive coach with coffee shops, cafeteria, etc. on long distance trains;
- Providing pay-as-you-use Wi-Fi services on coaches;
- Refurbising existing rolling stock and modifying gauge for exports to select markets;
- Introducing differential tariffs on the basis of peak season and off season for premiere classes;
- Concessional rates for non-peak hours travel in Metro Rails;
- Incentives for using Pre-Paid Smart Cards;
- Generating revenues by creating state-of-art parking zones on railway land around the station; and
- Rail tickets could also potentially be used as a source of advertisement as is the case with air tickets.

Most of these suggestions highlighted above have been covered as a case study in Chapter 2 wherein these have been implemented successfully in some of the railway institutions in the World.

Moving out of Non Core Businesses

A lot of tasks carried out by the Indian Railways are not at the core of the prime business of rail transportation. These activities include running hospitals and schools, catering, real estate development, including housing, construction and maintenance of infrastructure, including running a

Exhibit 24: Financing Pattern of Railways



police force. For example, 125 hospitals available with the Railways could be made private/semi-private, while the railway employees continuing to benefit from a free/concessional treatment. This will eventually reduce maintaining these hospitals. Another aspect is the possible integration of the existing 168 Railway schools into the Kendriya Vidyalaya or Jawahar Navodaya Vidyalaya set-up. The children of railway employees may however continue to get a preference in these schools.

Capitalising on Green Bonds

Green bonds were pioneered by European Investment Bank in 2007 when it issued a €600 million 5-year green bond. The International Bank for Reconstruction & Development, a World Bank member institution, followed suit with SEK 2.325B (3.5% coupon, 6-year maturity) issuance as part of its "Development and Climate Change Strategic Framework". Since then, several supra-nationals, federal and local government agencies, commercial banks and corporates have issued green bonds.

Green bonds are conceptually very straightforward – standard fixed income instruments where the proceeds from the offering are applied exclusively towards funding 'green projects'. These projects are designed to promote climate and environmental sustainability. An example of a green project would include initiatives to reduce greenhouse gas emissions through investments in renewable power or clean transportation. Although there are divergent views on the definition of green projects, issues to date have recognized renewable energy, energy efficiency, soil treatment, and waste and water management projects as eligible for green use of proceeds.

The primary purpose of these bonds is to invest funds that support verifiable projects intended to achieve a specific climate or environmental purpose. Green bonds provide a means to unlock private capital for projects that support such purposes. Although green bonds do not differ much from traditional fixed income instruments, the reasons for issuing them can be multi-fold.

It may be noted that transport continues to be the dominant theme in the US$ 597.7 bn 'climate theme bonds'[24] universe, with US$ 418.8 bn bonds outstanding since January 1, 2005. Amongst the transport, rail accounted for 95% globally, largely from state backed entities. China Rail remains the largest issuer of any climate aligned bonds. European rail entities Eurofima (US$ 14.6bn), France's SNCF (US$ 11.0bn) and UK's Network Rail (US$ 44.1bn) are also significant issuers.

Export-Import Bank of India has successfully launched a 5 year Reg S Green Bond issue of US$ 500 mn. The Bond was the 1st ever USD-denominated Green bond offering out of India and the first benchmark-sized Green bond out of Asia in 2015. Exim Bank will use the net proceeds from the sale of the notes to fund eligible green projects in countries including Bangladesh and Sri Lanka. The exercise has attracted subscription of around 3.2 times the issue size, led by strong demand, across 140 accounts, with significant participation from green investors and real money accounts, upsized from US$ 250 mn. Majority (58%) participation from fund managers, while banks (20%), sovereign wealth funds/insurance companies (18%) were the other major investor classes. The issue was distributed 60% to Asian investors, 30% to EMEA and balance to offshore US investors.

Devising a Successful Marketing Policy for Rail Freight

Indian Railways has a tremendous potential in freight segment, but an appropriate framework for market segmentation is missing. A framework, which takes into account both origin and destination like should be analyzed. Like in any other transport business, an origin-destination based systems perspective could be used. The primary categorization of origins would be industry/ collection centre, mine and port. The primary categorization of destinations would be industry, port and distribution center. The loss in market from railway freight to road freight can only be addressed while taking into account the feasibility in last mile connectivity. Incentive schemes could be explored aiming at promoting higher volumes of traffic particularly during the lean season, possible discount freight rates in empty flow directions and higher discounts for premier customers for bulk freight. This could be coupled with better logistic and warehousing facilities provided by railways.

ANNEXURE 1: BACKWARD AND FORWARD LINKAGES OF RAILWAYS ON SELECT INDUSTRIES

Industries Related to Railways	Spillover Effect on other Industries in the Value Chain
Rail equipments	Iron, steel and ferro alloys Other electrical Machinery Trade Machine tools Other non-electrical machinery Banking Miscellaneous metal products Electronic equipments(incl.TV) Land transportation incl. via pipeline Electricity
Electricity	Coal and lignite Petroleum products Trade Banking Electrical industrial Machinery Land transportation incl. via pipeline Construction Other electrical Machinery Railway transport services Other non-electrical machinery
Construction	Trade Iron, steel and ferro alloys Land transportation incl. via pipeline Iron and steel foundries Miscellaneous metal products Other non-metallic mineral prods. Forestry and logging Banking Coal tar products Business service

Industries Related to Railways	Spillover Effect on other Industries in the Value Chain
Land transportation including via pipeline	Petroleum products Hotels and restaurants Trade Rubber products Business services Miscellaneous textile products Other non-electrical machinery Communication Insurance Construction
Renting of machinery & equipment	Banking Electricity Construction Business services Hotels and restaurants Communication equipments Land transportation incl. via pipeline Electronic equipments(incl.TV) Other commercial, social & personal services Motor cycles and scooters
Banking	Communication Hotels and restaurants Land transportation incl. via pipeline Construction Electricity Insurance Electronic equipments(incl.TV) Railway transport services Business services Petroleum products
Medical and health	Drugs and medicines Hotels and restaurants Land transportation incl. via pipeline Trade Furniture and fixtures-wooden Electronic equipments(incl.TV) Banking Construction Communication Readymade garments

Industries Related to Railways	Spillover Effect on other Industries in the Value Chain
Trade	Land transportation incl. via pipeline Banking Hotels and restaurants Petroleum products Hand tools, hardware Business services Printing and publishing Electricity Insurance Construction
Petroleum products	Trade Banking Electricity Land transportation incl. via pipeline Railway transport services Air transport Other chemicals Communication Insurance Computer & related activities
Miscellaneous manufacturing	Banking Land transportation incl. via pipeline Plastic products Trade Other non-electrical machinery Watches and clocks Miscellaneous metal products Electronic equipments(incl.TV) Other electrical Machinery Communication equipment

Source: Derived from CSO's Input-output table

ANNEXURE 2: EXIM BANK FINANCED RAILWAY PROJECTS UNDER THE LINES OF CREDIT PROGRAM

Borrower	Project Description
ECOWAS Bank for Investment and Development	Supply of four (4) Air conditioned Diesel Multiple Units
Govt. of Angola	Supply of Machinery and Equipment, Technology and Training
	supply of coaches & other equipment
	Supply of locomotives & diesel multiple units
	supply of cars and inspection of gangcars
Govt. of Ethiopia	Contract for preparation of Detailed Project Report [DPR] of fixed infrastructure for Asaita - Tadjourah Railway Line [Ethiopia and Djibouti]
Govt. (s) of Senegal and Mali	Supply of 38 New Meter Gauge Railway Coaches with maintenance spares
	Supply of 3 Newly Manufactured 2300 hp Diesel Locomotive with maintenance spares
	Supply of diesel locomotive
Govt. of Sudan	Supply of 228 bogies & spares
	supply of spare parts for diesel locomotives
	1350 HP three new diesel electronic locomotive & spares
	Rehabilitation of 4 Hitachi locos of Sudan Railways Corporation
Govt. of Ghana	Suppl of railway wagons, equipments and materials
Myanma Foreign Trade Bank	HP Diesel Electric Fuel Locomotives
	Wheel loader
	Signaling and telecommunication equipment and accessories
	Locomotives & assemblies
	Hand Tie tamper
	Concrete Sleeper Plant

Borrower	Project Description
	Automatic Levelling, lining and tamping machine
	Heat treatment plant
	Machine Tools and Spare parts
	Mild steel section for steel girder
	Coaches and Spares of Railways
	Spare parts for YDM-4 India Locomotives
	Ultrasonic flaw detector and portable welding generator
	Thermit welding Set
	Machineries and equipments
	Rail gang Car with cran/without crane
	Small track machines and other equipments for track mechanized maintenance
	Supply of 5 new shunting locomotives, spare parts
	Supply of spare parts and tools for diesel locomotives
	Procurement of rolling stock, equipment and up-gradation of three major Railway Workshops
	Bentonite Bore Pile Equipment
	Supply of 100 Metre Gauge (MG) Bogie Hopper, 100 nos MG Bogie 40 feet Container Flat and 50 nos.MG Bogie Timber Wagons
	Supply of spares for 1350 HP Metre Gauge Diesel Electric Locomotives
	Supply of (57) Sets Nickel Cadmium Battery for Locomotive Engine Starting (54 cells/set)
	Supply Diesel Locomotive Engines, In service Metre Gauge Air-conditioned coaches and Mica under cutting machine
	Supply of machines and equipment
	37 Sets Nickel Cadmium Battery for Locomotive Engine Starting (54 cells/set)
	Supply of Hoses complete
	Supply of Cocks (L) and Cocks
	supply of spare parts for diesel locomotives

Borrower	Project Description
Govt. of Sri Lanka	Diesel Multiple Units Maintenance Facilities
	procurement of railway rolling stock
	Supply, installation and commissioning of machinery & plants
	HRD Training of 600 Sri Lanka Railways personnel
	Supply of 15 diesel multiple units
	Supply of capital unit exchange equipment (spare parts) for existing M8 class locomotives
	Upgradation of Colombo-Matara Coastal Railway Line
	Upgrading of Colombo- Matara Coastal Railway Line
	Supply of 5 diesel multiple units
	Diesel Electric Locomotives
	Design and construction of the Medawachchiya to Madhu Road Railway Line
	Construction of the Madhu Road to Talai Mannar Railway Line
	Design and reconstruction of the Omanthai to Pallai Railway Line
	Reconstruction of the Pallai- Kankesanthurai Railway Line
	Signaling and telecommunication system for railway network in Northern and Talaimannar railway lines
Govt. of Bangladesh	Consultancy contract -2nd Bhairab and 2nd Titas Railway Bridges in Bangladesh
	Construction of 2nd Bhairab railway bridge with approach rail lines and other related works [Lot-A]
	Construction of 2nd Titas railway bridge with approach rail lines and other related works [Lot-B]
	Procurement of 165 nos. BG Bogie Oil Tank Wagon and 6 nos. BG Bogie Brake Vans
	Procurement of 10 nos. Broad Gauge [BG] Diesel Electric Locomotives
	Procurement of 81 nos. MG Bogie Tank WagonS and 3 nos. MG Bogie Brake Vans
	Procurement of 16 nos. Broad Gauge [BG] Diesel Electric Locomotives
	procurement of 50 nos. of MG Flat wagons and 5 nos. MG Brake van with air brake

Borrower	Project Description
	Consultancy services for [a] Phase-I: Detailed feasibility study and safeguard policy study, [b] Phase-II: Detailed engineering design and bidding services, and [c] Phase-III: Construction supervision services for the purpose of construction of Khulna-Mongla Port Rail Line
	procurement of 170 nos. of MG Flat wagons and 11 nos. MG Brake van with air brake system
	Procurement of cutter suction dredger and ancillary crafts with other accessories
	Modernisation and strengthening of Bangladesh Standards and Testing Institution
	Supply of 120 Nos BG passenger carriages, capital spares, maintenance spares and tools with related services

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