

# Logistics, Infrastructure and the Steel Industry

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## Part I

### Estimated Requirements

Estimated volumes of transportation of iron & steel products and raw materials and estimated requirement of energy, land & water is given in Table-1.

PARTICULARS	2011-12 ACTUAL	PROJECTED / ESTIMATED	
		2016-17	2025-26
<b>Production, MT</b>			
Crude Steel	73.79	128.1 !	244.0
Finished Steel	73.41	115.3	202.0
Hot Metal	40.96	86.0	164.0
Pig Iron for Sale	5.78	7.7	14.2
Semi-finished Steel for Sale	27.93	40.0	69.0
Sponge Iron	24.83	43.0	81.0
Iron Ore Pellets	30*	75	145
<b>Iron &amp; Steel Products to be Transported, MT</b>			
Domestic : i. Finished Steel	70.92	115.3	202.0
ii. Semi-finished Steel	28.40	40.0	69.0
iii. Pig Iron	5.39	7.7	14.0
iv. Sponge Iron	20.33	34.0	65.0
v. Iron ore pellets	10.0*	14.0	22.0
<b>Sub-Total</b>	<b>135.04</b>	<b>211.0</b>	<b>372.0</b>
Export & Import : i. I & S Products	12.35	15.0	26.0
ii. Iron Ore Pellets	10.0*	11.0	23.0
<b>Sub-Total</b>	<b>22.35</b>	<b>26.0</b>	<b>49.0</b>



Steel industry is highly capital intensive and energy intensive. For the industry to operate at optimum efficiency and to generate adequate returns to shareholders, following aspects are critical.

- Availability of required quality and quantity of raw materials
- Expanding market for steel products
- Logistics and infrastructure support in terms of transportation, energy, land and water.

This paper examines the status of logistics and infrastructure to meet the needs of steel industry particularly in the context of achieving finished steel consumption of 115.3 million tonnes by 2016-17 (as projected by working group on iron & steel for the twelfth plan) and 202 million tonnes by 2025-26 ( as projected in the draft national steel policy, 2012).

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<b>Total Iron &amp; Steel Products</b>	<b>157.39</b>	<b>237.0</b>	<b>421.0</b>
<b>Raw Materials Required</b>			
Iron Ore : Domestic	115.4	183.0	352.0
Import	0.6	20.0	40.0
<b>Sub Total</b>	<b>116.0</b>	<b>203.0</b>	<b>392.0</b>
Coking Coal : Domestic	9.1	13.0	32.0
Import	31.8	76.0	147.0
<b>Sub Total</b>	<b>40.9</b>	<b>89.0</b>	<b>179.0</b>
Non-coking Coal : Domestic	23.0	38.0	86.0
Import	2.0	7.0	15.0
<b>Sub Total</b>	<b>25.0</b>	<b>45.0</b>	<b>101.0</b>
Metallurgical Coke : Import@	2.1	3.0	5.0
Ferrous Scrap : Domestic	7.0*	14.0	23.0
Import	5.7	7.0	10.0
<b>Sub Total</b>	<b>12.7</b>	<b>21.0</b>	<b>33.0</b>
Fluxes & Additives : Domestic	24.5*	41.0	80.0
Import	5.5	10.0	18.0
<b>Sub Total</b>	<b>30.0</b>	<b>51.0</b>	<b>98.0</b>
<b>Total Raw Materials : Domestic</b>	<b>179.0</b>	<b>289.0</b>	<b>573.0</b>
Import	47.7	123.0	235.0
<b>Total</b>	<b>226.7</b>	<b>412.0</b>	<b>808.0</b>
<b>Energy Required : i. Power, MW</b>	<b>5,300*</b>	<b>8,200</b>	<b>16,000</b>
ii. Boiler Coal, MT : Domestic	15.0*	21.0	30.0
Import	5.0*	10.0	30.0
<b>Sub Total</b>	<b>20.0</b>	<b>31.0</b>	<b>60.0</b>
iii. Fuel Oil, 10 <sup>3</sup> T	1015	1150	1950
iv. Natural Gas, Million NM <sup>3</sup>	1400	2500	2500
<b>Water Requirement, Million M<sup>3</sup></b>	<b>225*</b>	<b>360</b>	<b>650</b>
<b>Land Required, Acres</b>	<b>==</b>	<b>==</b>	<b>52000#</b>
<b>Total Transportation Required, MT</b>	<b>405</b>	<b>681</b>	<b>1261</b>
<b>Estimated Port Traffic, MT</b>	<b>75</b>	<b>159</b>	<b>314</b>

\*Estimated, ! Capacity-140 MT, # @500 acres/MT for new capacity of 104 MT of crude steel, @ There will be some domestic transport of coke also.

## Logistics

Road transportation has a share of over 50% in the total freight traffic in India. The picture compared to China and US (in the year 2007) is shown in Table-2.

PARTICULARS	Mode of Transportation (%)				Total Freight BTKM
	Road	Rail	Water	Air	
China	22	47	30	<1	5275
US	37	48	~14	<1	5930
India	57	36	6	<1	1325
Emissions per TKM (g Co2)	84	28	15	>1000	

Of the 1325 BTKM freight in India, 850 BTKM was bulk traffic and balance 475 BTKM non-bulk. As per a study, road traffic is economical up to a distance of 400 km; rail traffic between 400 and 700 km and combination of rail and water beyond 700 km. Road and rail infrastructure capacity (in 2007) in some select countries is shown in table-3.

It can be seen that India lags behind in both infrastructure and freight volumes. Projected

**Table-3**

Country	Rail (Track Km Per '000 sq. km of Arable Land)	Road (Km Paved Per '000 sq. km of Arable Land)
Germany	417	5.6
South Africa	143	
France	137	
US	137	2.2
China	54	1.1
India	44	1.1
Japan		21.8
UK		7.1

freight traffic in India by 2020 is 3450 BTKM. Estimated transportation costs in US Cents/T are: Water-US 1.1 and India 1.9; Rail-US 1.9 and India 3.2 and Road- US 10.8 and India 13.8. Road transportation is not only costlier but also emits more CO<sub>2</sub>.

## Rail Transportation

Total Freight carried by Indian Railways and steel related traffic carried during last four years and projected for 2016-17 is shown in table-4 (in million tonnes).

In 2011-12, nearly 50% of the steel related traffic was carried by rail. However, it is projected to drop to 44% by 2016-17 and is likely to further fall to about 40% by 2025-26. More and more finished products are being transported by road due to difficulties in rake formation. The issues related to rail traffic are:

- Since independence, route kilometre has grown at a CAGR of 3%, while track kilometre (additional lines on existing routes) has grown at a CAGR of 6.6%. During this period, freight and passenger traffic have grown at a CAGR of 54%. This has resulted in oversaturation of important rail networks.
- Rail freight tariffs are high. Freight rates in India are nearly four times that in US.
- Transit times are high and there is no guarantee on transit time for freight trains. A freight train may take 6 to 8 days for a journey of 2000 Km.
- Most railway goods sheds suffer from issues of access and evacuation of traffic.
- Special wagons are not available for special products. Special types of steel for automobile production have to be carried by trucks as the existing wagons do not offer the kind of protection these special products need.
- The processing of customer requests for

**Table-4**

PARTICULARS	2009-10	2010-11	2011-12	2012-13*	2016-17
1. Total Freight Carried	887.79	921.73	969.78	1009.83	1413.00
2. Steel Related Traffic					
A. Coal	40.08	44.19	46.69	49.27	71.75
B. Iron Ore-domestic	89.10	92.78	95.03	96.51	151.00
C. Iron Ore-export	43.64	25.68	9.67	5.00	
D. Raw Materials Other Than Iron Ore	11.60	13.30	14.48	14.99	17.00
E. Iron & Steel Products	31.85	32.82	34.86	36.13	59.00
<b>Total</b>	<b>216.27</b>	<b>208.77</b>	<b>200.73</b>	<b>201.90</b>	<b>298.75</b>
3. Steel / Total, %	24.36	22.65	20.70	19.99	21.14

new wagon designs is cumbersome.

- Railways give preference to customers who can provide full train load. They are reluctant to run mixed trains to carry different types of cargo which may have to be delivered to more than one customer.

- Container trains are accorded low priority on the railway network.

In addition to above railway specific problems, there are issues related to steel industry due to which, it is difficult to substantially increase steel related rail traffic. Small units which cannot offer even a few wagon loads of traffic at a given time, account for over 50% of iron and steel production. In 2011-12; 90% of pig iron, 93% of sponge iron, 77% of semi-finished steel, 73% of long products, 35% of flat products and 75% of alloy steel products were produced by such small units. Their products as well as raw materials mostly move by road.

**Road Transportation**

Issues in respect of road movement are :

- Road network coverage is not adequate. Total length of road network is estimated at 42 lakh kilo meters of which national highways account for just 2% and state highways only 4%. Balance 94% consists of district, rural and other roads.

- National highways carry about 40% of total road traffic. Consequently, highways are severely congested and freight takes three times more time to reach the destination compared to developed countries.

Road quality in India is not good. About 50% of the roads are paved. However, Motorable roads are less than 10% of road network. In many stretches, national highways are two laned and in some stretches even single laned. This reduces the capacity to handle large traffic load.

- Over 50% of the commercial vehicles

are of small size. Actual sales in 2010-11 and the projected sales in 2016-17 are shown in Table-5.

- Trucking industry is highly fragmented in India. Nearly 70% of truck owners own between 1 and 5 trucks. This leads to unhealthy competition and overloading. Percolation of technology in terms of better vehicles, tracking, safety etc. is slow. Average age of truck is over 10 years.

- Sometimes it is difficult to get proper trucks to transport heavy machinery of non-standard dimensions. Number of registered motor vehicles and special vehicles as on 31-03-2011 in some select states is shown in Table-6

- Trucks have to pass through multiple check points. They have to stop for payment of toll tax, octroi etc. As per a study, in a journey of 2,150 Km between Kolkata and Mumbai, a truck has to stop for as many as 32 hours at various check points at 26 different locations.

**Table-5**

Type of Commercial Vehicle	Sales in 2010-11 (Nos)	Projected Sales in 2016-17 (Nos)
Maximum mass up to 7.5 T	3,16,140	8,97,962
Mass between 7.5 T to 35.2 T	2,75,235	6,04,133
<b>Total</b>	<b>5,91,375</b>	<b>15,01,895</b>

- Truck drivers are not skilled enough to accurately record delivery details, understand delivery documents and handle queries.

- Warehousing capacity is inadequate and available capacity is of poor quality. Besides there are issues of connectivity, lack of parking, low capacity of individual warehouse, security etc. This leads to high warehousing cost. So far as steel industry is

concerned, this could prove to be a bottleneck while transporting spares and consumables.

**Sea Ports**

India is having 13 major sea ports; seven in the east coast and six in the west coast (all controlled by Government of India). They have a total capacity of 748 million tonnes (2012-13). Traffic handled between 2007-08 and 2011-12 varied between 520 and 570 million tonnes (growth remaining flat). Capacity utilisation in 2011-12 was about 75%. Turnaround time of ships in Indian ports is high. Table-7 shows port wise turnaround time during last two years.

JNPT, which is a premier port, has a turnaround time which is two times that of Colombo and Singapore ports. This is due to congestion on berths and slow evacuation of cargo. Volume wise, JNPT was the third largest in 2011-12 having handled 65.75 million tonnes. Kandla (82.5 MT) and Vizag (67.42) were first and second. During 2011-12, steel related port traffic was 13.4% of total traffic handled by major ports. Cargo to be handled by major ports in 2016-17 is projected at 899 million tonnes (Capacity is expected to reach 985 million tonnes considering establishment of two new ports in AP and West Bengal). Steel related traffic in the year will be 159 million tonnes (17.7%). In terms of traffic handled, none of the ports figures in World's top 15. In 2010, the largest port in the World was Shanghai in China, having handled 650 million tonnes. 15th largest was Rizhao, also in China and it handled 221 million tonnes. 10 Chinese ports figure in top 15. Singapore was the third largest, having handled 463 million tonnes. Existing depths at India's major ports are not able to attract very large vessels. Coastal shipping is hampered by inadequate port and land side infrastructure.

Total cargo to be handled by 2016-17 is 1601 million tonnes (expected to reach 2940 million tonnes by 2025-26). Steel related traffic will be 10 to 11% in both these years. The minor ports operated by state governments and the new ports in the private sector have to handle 702 million tonnes in 2016-17 (volumes handled in 2010-11 were 294 million tonnes). Minor ports are located at Machilipatnam & Kakinada in AP, Okha, Bharuch, Bhavnagar & Surat in Gujarat, Ratnagiri in Maharashtra, Karwar in Karnataka, Kozhikode & Alappuzha in Kerala and Nagapattinam in Tamil Nadu. Major Ports in the private sector are :

- Karaikal port limited, Tamil Nadu- to

**Table-6**

State	Total Number of Vehicles ('000)	Number of Multi-axled / articulated Vehicles ('000)	% of Special Vehicles
Andhra Pradesh	10189	241	24
Bihar	2673	73	27
Chhattisgarh	2766	83	30
Gujarat	12993	276	21
Jharkhand	3113	172	55
Karnataka	9930	217	22
Maharashtra	17434	389	22
Odisha	3338	78	23
Tamil Nadu	15638	433	28
West Bengal	3261	249	8

**Table-7**

Port	Average Berthing Time-port A/c-hrs		Average Turnaround Time port A/C-Days		Total Turnaround Time-Days		Average Output Per Ship-Tonnes	
	'11-12	'12-13	'11-12	'12-13	'11-12	'12-13	'11-12	'12-13
Kolkata	0.67	0.02	3.04	2.79	4.95	4.50	2786	2984
Haldia	13.10	20.49	2.53	3.05	3.66	3.99	6728	6072
Paradeep	1.17	1.16	2.69	2.47	6.33	4.39	15995	16625
Vizag	2.22	1.41	2.33	2.33	5.68	5.39	10701	10645
Ennore	0.02	0.05	0.08	0.09	2.17	2.95	27466	24498
Chennai	0.94	0.89	2.17	1.93	3.90	3.24	10846	12462
Tuticorin	18.96	8.40	3.79	3.35	4.89	4.31	6562	7621
Cochin	3.68	1.46	1.52	1.14	1.82	1.64	15784	15878
NMPT	0.96	1.20	1.88	1.96	2.94	3.29	13960	15917
Marmugao	15.23	19.38	2.49	2.80	4.80	3.93	16537	13233
Mumbai	7.70	8.33	2.96	2.87	4.94	5.02	7729	8842
JNPT	8.40	9.12	1.50	1.59	2.46	2.54	25762	26308
Kandla	42.96	49.20	3.97	4.37	6.42	6.40	13886	15091
Overall	11.15	12.30	2.56	2.58	4.44	4.20	10974	11749

reach 40 million tonnes by 2016-17.

- Gujarat pipavav port Limited, Gujarat- Capacity being expanded to 35 MT.

- Krishnapatnam Port Company limited, AP- Capacity to reach 100 MT by 2016-17.

- Gangavaram port limited, AP- Capacity to reach 42 MT by 2016-17

- South west port limited, Goa- Operated by JSW (Berths- 5A & 6A of Marmugao port) for coal, coke and limestone- Capacity: 5MTPA

- Chowgule ports & Infrastructure, Jaigad, Maharashtra- 5MTPA

- Dhamra port limited, Odisha- Capacity will reach 100 MT BY 2016-2017

- Essar Ports limited- Paradeep, Odisha and Vadinar & Hazira in Gujarat- total

capacity will reach 158 million tonnes

- Hazira port limited, Gujarat- Capacity-imported LNG: 10MT and container cargo: 1 million TEUs

- Adani port limited, Mundra, Gujarat- 80 million tonnes. To reach 200 MT by 2020

By 2016-17, the states of West Bengal, Odisha, Jharkhand and Chhattisgarh will account for 45% of projected crude steel capacity in the country. To meet the port related traffic of these plants, the eastern region (West Bengal & Odisha) requires more port capacity.

#### Air Cargo

There is not much scope for increasing transportation by air since major air ports are getting congested resulting in a long waiting

time. Waiting time for exports is 50 hours compared to world average of 12 hours, while for imports; it is 182 hours against world average of 24 hours. Tariffs are also high because of high fuel costs.

#### Logistics – Overall

The manufacturing industry is handicapped by inadequate logistics support. A national integrated logistics policy aiming at achieving at least 46% freight handling by rail, 6% by water, 1% by air and balance 47% by road by 2020, should be formulated. Logistics cost in India is 20% of product cost against 6 to 8% in China. Higher share of road transport coupled with high fuel cost, higher railway tariffs, high ground rents at ports, high levels of inventories etc. contribute to high logistics cost. The policy should cover among other things, following aspects.

- Construction of rail dedicated freight corridors

- Construction of coastal freight corridors

- National express ways (road)

- Rail and road links to ports, mines and industrial centres

- Construction of more ware houses with required infrastructure

- Construction of multimodal logistics parks.

- Manufacture of higher tare load railway wagons and high capacity trucks

- Introducing electronic tolling in case of road transportation

- Improving the quality of roads and increasing percentage of motorable roads to at least 50%

- Development of skills of personnel in logistics sector

- Creating necessary additional infrastructure (including railway electrification) and removing system bottlenecks, if any, in the existing rail, road and port sectors to reduce turnaround time of railway wagons, trucks and ships

- Increase the depth at major ports to enable handling higher size vessels

The Government is working on all these areas. But, the progress on the ground is very slow. For instance, development of 15,000 Kms of express ways is expected to be completed only by 2022. Besides the above measures, Indian Railways and Major Ports have to become more customer friendly.

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