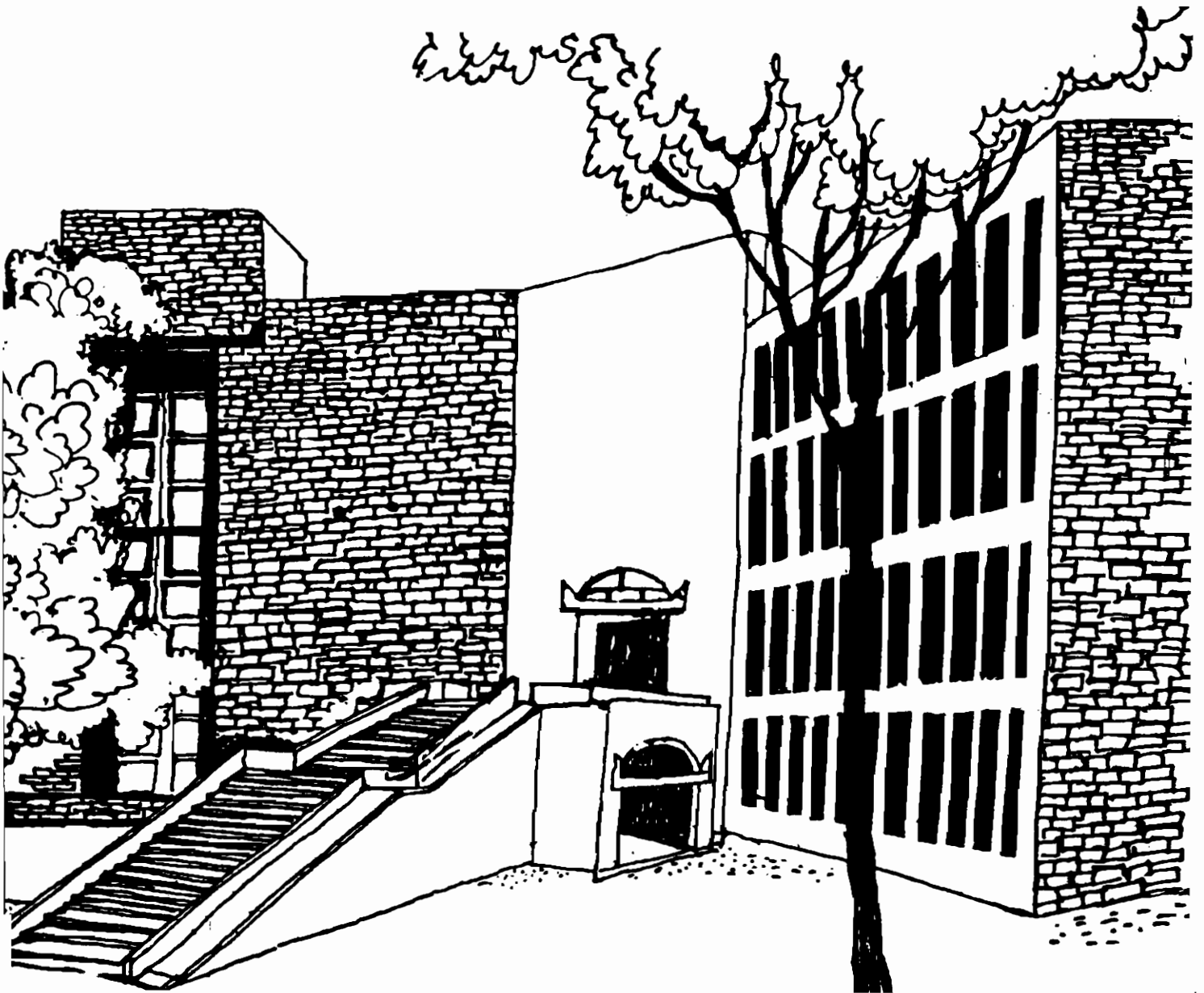




# Working Paper



THE TRUCKING INDUSTRY - AN INTRODUCTORY NOTE

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## THE TRUCKING INDUSTRY - AN INTRODUCTORY NOTE

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### **1. INTRODUCTION**

Movement of goods is essential for the distribution of finished goods from the manufacturing centre to the consumption centre and raw materials from the source to the production centre. There are several modes of transport used for the movement of goods viz, Rail, Road, Water, Air, Pipeline and Ropeways. Rail is primarily used for movement of bulk commodities over long distances. Road is used for moving bulk and packaged goods over short to medium distances. Water transport is mainly used for exporting and importing goods. For domestic transport, it has got limitations because movement is possible only in areas which have navigable water ways, with necessary support infrastructure. Further, its speed is quite slow. Air transport, being a faster mode compared to other means of transport, is preferred for very high value commodities and commodities of perishable nature. Pipeline is used exclusively for transporting fluid bulk products like petroleum goods, natural gas, slurries etc. Ropeways are used for transporting bulk products like ironore, coal over short distances. The primary modes for movement of goods in most of the countries (and in India) are Rail and Road.

Of late, movement of goods by roads has gained considerable importance in India. The road transport industry is penetrating into the market through a strategy of services. They provide service from the platform of the consignor to the door of the consignee. Besides, they accept goods in small quantities. Unlike Railways, they have the capacity to penetrate into isolated rural and hilly areas, where laying a railway becomes expensive. Because of the ease of departure as soon as the vehicle is loaded, and the load itself being significantly less than the unit load in Railways, they have been successful in cornering the market for short haul movements of all types of goods and a significant share of the long haul movements which need rapid transportation. Railways, at present give importance to a commodity which forms a rake load, since the movement will become faster leading to quicker wagon turn around. Due to these factors, the Railways are left to carry low priced bulk commodities like coal, iron ore, steel, etc., while the road transport gets the high value merchandise.

This paper examines the Indian trucking industry in greater depth over the remaining sections. Section 2 highlights the significance of the trucking industry in India. The demand for freight transportation by road along with the breakeven distance

for rail vs. road mode choice is discussed in section 3. The various inputs needed for providing good road freight transport service, namely roads, vehicles, terminals and service management are described in sections 4 to 7 respectively. The implications of the trucking industry is discussed with respect to energy, employment, safety and government regulation successively in sections 8 to 11. Section 12 titled 'future' discusses the key issues of concern for the future of the trucking industry.

## 2. SIGNIFICANCE OF TRUCKING INDUSTRY

The truck population in India has grown at a rate of 7.2 percent per annum between 1950-51 to 1988-89. The total number of trucks in 1988-89 was 1.14 million. Data for early 80's shows that the truck population in India per million population is just 900 trucks (excluding tractor-trailer combination) as against a corresponding figure of 151200 trucks in U.S.A. (Kadiyali, 1986). On the other hand, the average annual utilisation of trucks in India was more than double. In U.S.A. the annual truck utilisation was 19200 kms. compared to 40130 kms. in India. These figures for India have increased since then. At present, there are over 1300 trucks per million population and the utilisation of trucks is around 70,000 Kms. per year.

For the development of a country a good transportation network is essential. It is accepted that the growth of transportation sector in a country which is experiencing development will be higher than the GNP growth. Development in transportation sector would influence industrial development. This improves the socioeconomic conditions of the people, resulting in an increase in their requirement of transportation. Further supply of transport sector would generate more economic growth, thus continuing as a chain phenomenon. In India also the picture is not very different. To understand this phenomenon we have compared the growth in GNP and transportation. The GNP during 1990-91 was Rs.512,000 crores. This has grown from Rs. 9325 Crores in 1950-51 - a compounded growth rate of 10.5% per annum. During the last decade, the growth was 14.1% per annum. Growth of vehicles (all types) between 1950-51 to 1988-89 was 11.1% per annum and during the last decade it was 15.1% per annum. The freight moved by roads increased from 5.5 billion tonne-kms in 1950-51 to 275 billion tonne kms in 1988-89, a growth rate of 10.8% per annum. Their share in the total freight moved increased from 11 percent in 1960-61 to 54 percent in 1988-89. With a payload of 6.2 tonnes per truck, this would mean that the vehicle Kms. grew from 0.8 billion Kms. in 1950-51 to 44.4 billion Kms. in 1988-89, a growth rate of 11.4% per annum.

Road and road transport activities have a high employment potential. A Planning Commission study showed that while a 'unit' of investment created 10400 jobs in road and road transport, it generated only 5200 jobs in agriculture, 5000 in housing, 1900 in railways and 1700 in small and large industries (NCAER,1974).

While these figures are useful for a relative comparison, the study does not clarify the absolute amount of what a 'unit' of investment is.

In India 99.75% of the goods movement by road is handled in the private sector. They are fundamentally unorganised with a large number of small enterprises. Information about the nature of movement and other operational details are not documented properly. Whatever little information available is only through surveys and studies conducted for specific purposes. Consequently, research on this subject is very limited.

### **3. DEMAND FOR ROAD FREIGHT TRANSPORT**

The mode choice for transportation of freight movement is determined by factors like:

- cost
- distance
- nature of the commodity
- quantity
- connectivity of the place
- urgency etc.

Most of the above criteria ultimately show up as 'costs'. Costs are generally defined as operator's and user's cost. Those incurred by the operator are:

- repairs and maintenance costs of vehicles and right of way
- operating costs of vehicles
- overheads, replacement and investment costs for generating additional capacity, taxes, etc.

Those incurred by the users are:

- packing
- carting
- handling
- transit losses
- inventory and warehousing costs.

Though these costs are separated as operators' and users' cost, ultimately the user will have to bear all these costs. The freight charges levied by the operator from the user depends on the extent of services catered for and the volume and weight of the commodity to be transported. User's decision to send a commodity by rail or road depends on a number of factors like the type of good, freight charges, urgency, etc. Nevertheless, from the national point of view it is important to look at the best modal mix to optimise the resource cost incurred for various commodities.

#### **Break Even Between Rail and Road:**

In the late seventies, the Planning Commission set up the National Transport Policy Committee which worked out the resource costs for various commodities (NTPC, 1980). Cost data for rail is available for wagon load and rake load separately for diesel

single line, diesel double line and electric double line. Similarly for road, the cost for transporting goods from metropolitan cities to mofussil towns and between two mofussil towns are available. Figures stated in the NTPC report are from the RITES study on resource cost (entrusted to them by Planning Commission) for 13 commodities. The per unit distance cost of movement by rail reduce considerably over distance, due to the economies of scale. Thus, by considering the total cost incurred and the distance to be traveled, a break even distance arises, between rail and road. The National Transport Policy Committee has computed these values which is summarised in the Table 1. It is economical to send the commodities by rail if the distance is more than the break even.

Table 1: Break Even Distance for Various Commodities

Commodity Group	Break Even Distance (Kms)
Cotton	706
Tea	701
Potatoes	467
Small Machinery	435
Steel Tubes and Pipes	311
Wheat	247
Sugar	241
Livestock	233
Cement	222
Coal	201
Fertilizer	200

Source: NTPC, 1980.

The comparative advantage of sending commodities through road is more in the case of expensive and perishable items like cotton, tea, vegetables small machinery, etc., even for short distances. At the same time, in the case of low priced bulk items it is desirable to send them through railways for longer distances. The optimal mix between rail and road would now be determined by the distribution of the lead for each commodity. The average lead figures for some of the commodities are given in Table 2.

The consequence of the breakeven distance and the average lead is reflected in the percentage share between rail and road and average leads within each mode. For example, cement has a break even distance of 222 kms, while the average lead is 524 kms. This resulted in a nearly 90% share by rail in 78-79 and 84% share in 86-87. A comparison of a shift in the percentage share between rail and road for various commodities is offered by two studies, NTPC 1980 and RITES 1988, whose data is given in Table 3.a and 3.b respectively.

Table 2: Average Lead for Various Commodities (Kms)

Commodity	Average lead (Kms)
Salt	1018
Iron & Steel	857
Edible Oils	782
Foodgrains	751
Chemical Manures	729
Coal	688
Non-Ferrous Metals	676
Chemicals & Drugs	595
Cement	524
Fruits & Vegetables	507
Bamboos, Timber & Wood	494
Limestone & Dolomite	480
Mineral Oils	441
Iron Ore	325
Agri. Products	--

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Source: Report on Commodity flows - RITES 1986-87

Table 3.a: Commodity Movement by Rail and Road (1978-79)

Commodity	% Share (Tkms)		Average Lead (Kms)	
	Railways	Highways	Railways	Highways
Fruits & Vegetables	26.0	74.0	1281	386
Non-Ferrous Metals	47.1	52.9	1067	423
Chemicals & Drugs	48.7	51.3	1277	487
Edible Oils	53.2	46.8	1364	396
Bamboos, Timber & Wood	66.2	33.8	970	312
Agri. Products	69.6	30.4	--	--
Iron & Steel	84.2	15.8	1101	371
Mineral Oils	88.7	11.3	656	230
Cement	89.9	10.1	717	286
Foodgrains	90.8	9.2	1278	277
Chemical Manures	90.9	9.1	1039	267
Salt	91.6	8.4	1427	320
Limestone & Dolomite	94.4	5.6	371	267
Coal	95.2	4.8	691	408
Iron Ore	99.9	0.1	529	96
Total All Commodities	82.2	17.8	808	354

Source: NTPC, 1980



Table 3.b: Commodity Movement by Rail and Road (1986-87)

Commodity	% Share (Tkms)		Average Lead (Kms)	
	Railways	Highways	Railways	Highways
Fruits & Vegetables	22.5	77.5	1480	425
Chemicals & Drugs	28.0	72.0	1334	489
Non-Ferrous Metals	33.6	66.4	1137	561
Bamboos, Timber & Wood	46.9	53.1	1041	337
Edible Oils	51.8	48.2	1379	534
Agri. Products	57.6	42.4	--	--
Iron & Steel	72.2	27.8	1191	496
Foodgrains	76.3	23.7	1146	355
Mineral Oils	82.8	17.2	504	276
Cement	83.7	16.3	678	242
Limestone & Dolomite	84.3	15.7	544	293
Chemical Manures	84.3	15.7	989	302
Salt	88.3	11.7	1388	337
Coal	90.6	9.4	717	496
Iron Ore	98.5	1.5	325	318
Total All Commodities	74.2	25.8	778	378

Source: Report on Commodity flow, RITES 1986-87

There is a significant increase in the share of goods traveled by road. This, as mentioned earlier, is due to the stiff competition provided in the field of freight movement by roads, the difficulty faced by railways in catering to wagon load traffic and the flexibility offered by road transport. Between 78-79 and 86-87, the major gainers for road are Chemicals and Drugs, Non-Ferrous Metals, Agri. Products, Iron & Steel, Foodgrains and Chemical Manures. The average lead by road has also significantly increased for these commodities.

The freight traffic by road has been increasing; 5.5 billion tonne kms in 1950-51 to 275 billion tonne kms in 1988-89. Similarly, the share of goods transported by road also showed a considerable increase during this period; it increased from 11% in 1950-51 to 54% in 1989-90. Table 4 gives the pattern of freight movement by Rail and Road and the number of trucks. Such a massive increase in the share and quantity can be attributed to the structural changes in the economy resulting in dispersal of economic activities and the inherent advantages of road transport in handling non-bulk traffic from door to door. The dispersal of industries results in better availability of goods in different corners of the country. Consequently, the average lead comes down. Further, due to the railway's policy of promoting long distance bulk commodity movement, there is likely to be an increase in the demand for road transport for movement of goods like cement, fertilizers, steel etc..

Table 4 : Number of Trucks and Freight Movement by Road.  
(1950-51 to 1988-89)

Year	No. of Trucks	Freight Movement (Billion Tonne Kms)		Percentage Share (of Tkms)	
		RAIL	ROAD	RAIL	ROAD
1950-51	81888	44.1	5.5	89	11
1955-56	119097	59.6	8.9	87	13
1960-61	167649	87.7	35.0	71	29
1965-66	258977	116.9	55.0	68	32
1970-71	342577	127.4	66.0	66	34
1975-76	350393	148.3	73.0	67	33
1980-81	526608	159.0	98.0	62	38
1985-86	878100	206.0	193.0	52	48
1986-87	901534	223.0	210.0	51	49
1987-88	1014980	231.0	238.0	49	51
1988-89	1140000	230.0	275.0	46	54

Source: 1. No. of trucks from 1950-51 to 1977-76 - NTPC, 1980  
 2. No. of trucks from 1976-77 to 1988-89 - CMIE, 1991  
 3. Freight movement from 1950-51 to 1975-76 - NTPC, 1980  
 4. Freight movement from 1980-81 to 1985-86 - CC.Rao, 1987  
 5. Freight movement from 1985-86 - CMIE, 1991

#### 4. ROADS

The road network in India is quite extensive, covering a distance of 1.97 million Kms. (both surfaced and unsurfaced). The surfaced road length in 1950-51 was only 160,000 Kms. which increased to 960,000 Kms. in 1989-90, a compounded growth rate of 4.7% per annum. The percentage of surfaced roads increased from 39.3% in 1950-51 to 48.7% in 1989-90. Considering the kind of development and the increase in traffic that has taken place during the last 40 years, this achievement is quite low.

The proportion of National Highways (NHs) in 1950-51 was 5% and it came down to 1.7% in 1989-90. This is because of the other roads getting more priority to connect remote areas. Though other roads are vital in feeding to the NHs, Rail heads and ports, the share of traffic in these roads is very low. Detailed information about the traffic on these roads are not available but unofficial estimates show that about 75% of the traffic is on NHs. It is also estimated that 30% of the NHs have single lane pavement. The grid as a whole is grossly insufficient to take the increasing traffic, resulting in severe capacity constraints. Table 5 gives the increase in roads since 1950-51.

In addition to the low coverage in terms of length, there are also maintenance inadequacies. It is estimated that 28.74% of the NHs condition is good, 52.46% fair and 18.81% poor. The main reason for this low maintenance is inadequate expenditure. The shortfall in actual expenditure for maintenance as a percentage of

the norms is around 33% (Mahalingam 1991). Apart from this paucity of actual expenditure, it is noted that 40% of this expenditure was to repair the highways from the damages caused by floods and cyclones.

Table 5: Growth of Roads Since 1950-51

Year	Surfaced (000 kms)	Un- surfaced (000 kms)	Total (000 kms)	National Highways (#)	National Highways (%)	Surfaced (%)
1950 - 51	157	243	400	20	5.00	39.25
1955 - 56	209	270	479	21	4.38	43.63
1960 - 61	263	261	524	24	4.58	50.19
1965 - 66	343	427	770	24	3.12	44.55
1970 - 71	398	520	918	24	2.61	43.36
1975 - 76	551	698	1249	29	2.32	44.12
1980 - 81	683	807	1490	32	2.15	45.84
1985 - 86	825	901	1726	32	1.85	47.80
1986 - 87	858	922	1780	32	1.80	48.20
1987 - 88	888	955	1843	32	1.74	48.18
1988 - 89	920	985	1905	32	1.68	48.29
1989 - 90	960	1010	1970	34	1.73	48.73

Source: Centre for Monitoring Indian Economy (CMIE) Aug.1991

Due to the high congestion felt in some of the major NHs, the concept of Expressways were introduced in India. Till now none of these expressways are open to traffic but work in certain trunk lines are in progress. In 1985, the Indian government signed an agreement with World Bank for loan assistance of about Rs.240 Crores for financing some highway projects. This include two expressway projects viz. Ahmedabad - Vadodara Expressway in Gujarat and Calcutta - Palsit section of Durgapur Expressway in West Bengal.

Since some of the congestion is attributable to trucks parked along the NHs, the Ministry of Surface Transport is considering the proposal to set up 'Laybys' along NHs for truck parking. These are intended as need-based facilities and meant to be provided at locations which have already significant parking demand, eg. where a cluster of wayside eating places/dhabas and other establishments already exist (Ministry of Surface Transport, 1990). This is likely to reduce the bottlenecks caused due to parking of trucks in such crowded centres.

## 5. VEHICLES

Commercial vehicles are classified into three types -Light Commercial Vehicles (LCVs) with a payload less than 3 tonnes, Medium Commercial Vehicles (MCVs) with a payload between 3 and 7.5 tonnes and Heavy Commercial Vehicles (HCVs) with a payload greater than 7.5 tonnes. All three kinds of vehicles are used for trans-

portation of goods. At present, the overloading of the commercial vehicles is upto 200% in India. Till mid 80's the number of manufacturers of these vehicles were using indigenous technology which was not very good. With the Japanese collaboration, especially in the case of LCVs, the technology improved and competition for the earlier manufacturers became very stiff. This has led to improvements in the technology used by earlier manufacturers through better R&D efforts. There are two major companies in India manufacturing medium and heavy commercial vehicles, viz., Tata Engineering and Locomotive Co. Ltd. (TELCO) and Ashok Leyland. They contribute about 95% of the trucks and the remaining are produced by Simpson and Co., Hindustan Motors and Premier Automobiles (Dixit et.al.,1990).

#### Number of Trucks - An Inter State Comparison

Distribution of registered trucks in the states show an uneven picture. To understand this distribution, we have compared the number of trucks with variables like population, area, and total number of vehicles (Table 6). Maximum number of vehicles are registered in Maharashtra and the lowest is in Andaman Nicobar (Since figures are not available separately for Daman & Diu, Mizoram, Lakshadweep, Sikkim, Arunachal Pradesh, Dadra and Nagar Haveli, these are included in 'Others'). The number of trucks per million population varies from 434 in Uttar Pradesh to 10992 in Goa. National average is 1269. There are seven states with a ratio less than the national average. Union territories like Chandigarh and Delhi recorded very high ratios of above 8000. This is due to the low tax structure prevailing in these union territories. Figures given represent the trucks registered in that centre and need not be the actual number of trucks plying in these centres. The high ratio in Goa is due to vehicles registered here when it was still a Union Territory with low tax structure.

If we compare the number of trucks with the area (no of trucks per thousand sq km) the maximum is in Chandigarh and Delhi (65500 and 53266 respectively). The national average is only 330. The number of trucks per thousand sq kms varies from 62.34 in 'Others' to 65500 in Chandigarh. There are twelve States/UT which have figures lower than the national average.

The percentage of trucks to total number of vehicles registered is high in the States/ Union territories which are either backward or where other modes of transport are inadequate. At the national level, 7.24% of the total vehicles registered are trucks. Assam, Himachal Pradesh, Meghalaya, Manipur and Tripura, Jammu & Kashmir and Andaman and Nicobar have high percentage; 21.01, 21.00, 17.40. 16.45 and 16.54 respectively. Lowest is recorded in Pondichery (1.91%). Chandigarh and Delhi which showed a high number of trucks per thousand sq kms. have only 3.28% and 6.13% of vehicles as trucks, lower than the national average.

Table 6: Comparison of trucks with Population, Area and Total Vehicles

States	Trucks (1)	Population (Million) (2)	Area (in Th. Sq.Km.) (3)	Total Vehicles (4)	(1)/(2) (5)	(1)/(3) (6)	(1)/(4) (7)
Andhra Pradesh	52800	66.31	275.1	908510	796	192	5.81
Assam	41100	22.30	78.4	195660	1843	524	21.01
Bihar	79150	86.34	173.9	679450	917	455	11.65
Gujarat	74450	41.17	196.0	1394740	1808	380	5.34
Haryana	29050	16.32	44.2	355730	1780	657	8.17
Himachal Pradesh	11300	5.11	55.7	53820	2211	203	21.00
Jammu & Kashmir	14100	7.72	222.2	85230	1827	63	16.54
Karnataka	52200	44.82	191.8	1023930	1165	272	5.10
Kerala	55800	29.01	38.9	447220	1923	1434	12.48
Madhya Pradesh	60700	66.14	443.4	916900	918	137	6.62
Maharashtra	171100	78.71	307.7	2145020	2174	556	7.98
Manipur & Tripura	6700	4.57	32.8	40720	1465	204	16.45
Meghalaya	3250	1.76	22.4	18680	1846	145	17.40
Orissa	18700	31.51	155.7	220530	593	120	8.48
Punjab	39850	20.19	50.4	1004230	1974	791	3.97
Rajasthan	32700	43.88	342.2	596880	745	96	5.48
Tamil Nadu	73950	55.64	130.1	1036000	1329	568	7.14
Uttar Pradesh	60150	138.76	294.4	1291000	433	204	4.66
West Bengal	86900	67.98	88.8	649330	1278	979	13.38
Goa	12850	1.17	3.7	111410	10992	3473	11.53
Andaman Nicobar Island	800	0.28	8.3	5370	2878	96	14.90
Chandigarh	6550	0.64	0.1	199980	10218	65500	3.28
Delhi	79900	9.37	1.5	1302840	8527	53267	6.13
Pondicherry	1300	0.79	0.5	68020	1648	2600	1.91
Others	5700	3.45	91.4	44670	1650	62	12.76
<b>Total</b>	<b>1071050</b>	<b>843.93</b>	<b>3249.6</b>	<b>14795870</b>	<b>1269</b>	<b>330</b>	<b>7.24</b>

Source: Total Vehicles and Trucks as on 31.3.1989 from Handbook of Statistics, 1990, Confederation of Eng. Industry  
Population for 1991. CMIE, Census First Results, Aug. 1991

## Vehicle Utilisation

Vehicle utilisation (Kms per vehicle per year) in India is very high since most of the movement of goods by trucks is for transportation, rather than pickup and delivery. Short distance pickup and delivery movements in rural and urban areas are mostly by animal drawn vehicles. In the case of developed countries, pickup and delivery is by motorized vehicles; hence the idle time is quite high.

The average payload in developed countries is less than 3 tonnes. Payload in India is the highest at 6.2 tonnes. Similarly the productivity of trucks is also very high in India, being above 300,000 tonne Kms/ year. This is due to the high utilization of the trucks by overloading the standard two axled rigid body truck and by reserving truck movement for long and medium hauls (Kadiyali, 1987). Lowest payload is recorded in Austria and Denmark at 0.9 tonnes each. Vehicle utilization, payload and productivity of goods vehicles in selected countries is given in Table 7.

Table 7: Utilisation of Vehicles in Selected Countries

Countries	Vehicle Utilisation (Kms/year)	Payload (tonnes)	Productivity (tonne kms/year)
Australia	20400	0.9	23802
Austria	50000	-	43598
Belgium	16781	3.6	60274
Chile	18862	2.6	49500
Denmark	24400	0.9	22576
France	20000	1.5	29456
Germany	21500	3.7	78912
India	40130	6.2	306110
Indonesia	50000	3.7	--
Italy	32000	3.9	87028
Panama	50000	-	69087
Uganda	32000	-	--
U.K.	25200	2.3	58754
U.S.A	19220	1.1	20649

Source: Kadiyali, 1986.

Informal discussions with the truck drivers reveal that in a day they cover about 300 Kms. Most of the maintenance is done on the way itself. However, even a conservative estimate of 250 days of operation in a year would mean that a vehicle would cover about 60,000 to 70,000 Kms. Most of the vehicle manufacturers while providing warrantee services take 100,000 Kms. per year as norms. Taking 6.2 tonnes as payload, the productivity of a truck will be above 400,000 TKMS. per year. Net tonne kms./vehicle /day will be around 1860.

## 6. TRUCK TERMINALS

For smooth functioning of the loading and unloading activity, without creating problems to other activities, it is essential to have proper well located truck terminals with adequate access and infrastructural facilities. In India, though we lack formal truck terminals, over a period of time many of the city centers have developed into a centre for trucking activity, mainly because of the landuse pattern where by most of these centers continue to function as wholesale markets. Since these centers are not designed for such activities, this has created an array of problems like congested roads due to the parking of trucks, loading and unloading activity which is a hindrance to smooth flow of traffic and it has increased the rate of accidents.

Given the nature of the trucking industry in India, where almost the entire activity is handled by private operators, the task of constructing truck terminals is neglected. Planned truck terminals with adequate parking facility, godowns etc. are practically nil in almost all cities. In some cities truck operators association have constructed truck terminals for its members with adequate storage and parking facilities. Ideally a terminal should be easily accessible to all modes of transport. This is not easily possible because each mode needs different handling equipments and the techniques deployed are different from each other. Considering the fast rate of growth of the trucking activity and their relative share in the freight movement, it is essential to have proper terminals constructed. Since the trucking activity is unorganised, it can be done only by associations, or the government should take initiative to construct them and should encourage the truck operators to utilize the facilities. Since lack of space is the major problem, an adequately equipped terminal with facilities would encourage operators to use it by paying a nominal fee. In selecting the location for such terminals due respect should be given to the organic development of existing centers of truck operations.

## 7. SERVICE MANAGEMENT

### Nature of Trucking Industry

Trucking industry in India is mostly unorganized. There are truck operators who own trucks but they do not directly receive and deliver goods. Trucking companies do the marketing and receive and deliver goods. There are two types of companies - fleet company and market company. A fleet company operates with its own trucks while a market company hires trucks from the operators for transporting goods booked with them. Almost all the fleet companies and most of the market companies are registered with the Indian Banks Association. Generally, a market company owns a maximum of 20% of the trucks utilized by them. They hire trucks from the operators as and when required.

### Trucking Company Organisation

A large trucking company usually has a head office, under which there would be regional, zonal and branch offices. This decentralized administration structure is to improve the efficiency of operation. Actual booking and delivery of goods takes place at the branch offices. A typical large trucking company would have a board of directors who make high level decisions. The executive head would be a managing director, who operates with the help of directors of finance, operations and administration. There would be managers for the regional and zonal offices with supporting managers for finance, marketing and administration. Branch managers report to the zonal manager.

The company's work involves two types; a) sales and b) administration. Sales includes booking, delivery and operations; administration includes dealing with accounts and finance, personal and legal matters and fleet management.

### Operational Procedure

In the trucking operation, the branch manager is the key person. He takes stock of goods every day evening, and the next day morning he has to decide the destinations to which he should send trucks. This decision is very crucial. Two most important factors that the branch manager considers are, the operational cost and the service. The branch manager, through his experience knows the busy zones and the weak zones. Decisions to send a partial truck load of consignment or to wait for another day to get a full truck load are entirely based on experience. If the destination is not in a busy zone, sometimes the consignments are handed over to the broker who would send it together with goods from other companies. Sometimes if they don't have enough load for a full truck to a particular destination, they send the load along with goods going to another destination in the same direction, for eg. goods from Ahmedabad to Coimbatore, if not enough for a full truck load, are sent along with goods to Bangalore. At Bangalore they would unload the goods for that station and the remaining goods are sent to Coimbatore along with other goods from Bangalore to Coimbatore. For such operations, the companies have transshipment points.

Trucks are obtained through brokers for transporting goods that cannot be handled by their own fleet. The broker is the middle man between the truck owners and the trucking company. Truck owners are scattered; some in the nearby towns and some in the nearby villages. It is difficult for the trucking company to contact them. A broker is used to get truck for two reasons, (i) his easy access to the truck owners and (ii) in the case of an emergency, like an accident, the broker takes the responsibility in tracing the driver though he doesn't directly compensate the losses. For the service rendered, the broker collects a commission from the owners - normally 8% of the trip rate. The rate for



the trips are not fixed. It is a decision based purely on the supply and demand conditions prevailing in the market. During harvesting season, due to the heavy demand, the rate goes up. Sometimes changes occur even within the same day.

Generally, the companies minimize the labour on their payroll. For eg. the branch office of a large trucking company in Ahmedabad has 20 people on its payroll, while they utilize the services of 40 people. Additional manpower is obtained from the contractors and the company has no dealings with the labourers directly. The contractor is paid on the basis of tonnage loaded or unloaded.

In case of loss during movement, the company takes full responsibility to compensate for the damages unless the loss is due to packaging problems. The company also takes the responsibility of giving door to door delivery, on demand by the consignor, at an additional cost. The trucking company also pays the octroi which is calculated from the invoice by the corporation. The money paid is collected from the consignee at the time of delivery of goods.

Most of the cities have Transport Associations, which is essentially a body to look after the interests of the members, ie. the trucking companies. They represent the problems faced by the members to the Government, deal with legal issues like dispute over tax, octroi, etc.. Some of them have truck terminals with facilities like godowns, parking space and other facilities required by drivers and cleaners.

## 8. ENERGY

Energy has a special significance in the transport sector. It is the second largest consumer of commercial energy. Consumption by various modes include different forms of energy and the intensity varies. Transport sector alone consumes 56% of the total oil consumed in India (Table 8).

Table 8: Sectoral Share of Energy Consumption (%)

Sector	<u>Commercial Energy</u>			<u>Specific fuels in 84-85</u>		
	60-61	79-80	84-85	Oil	Electricity	Coal
Household	20.6	15.7	18.2	29	11	3
Agriculture	3.6	9.4	9.8	10	16	-
Industry	39.2	38.2	36.4	5	62	78
Transport	33.8	32.8	31.4	56	2	13
Others	2.8	3.9	4.2	--	9	6
Total	100.0	100.0	100.0	100	100	100

Source: Planning Commission, 1985.

Regarding energy for freight movement by road, there are

many estimates by various sources. The freight movement by road for 1982-83 and implied diesel consumption, as estimated by various sources is given by the Advisory Board on Energy (Advisory Board on Energy, 1985). Using planning commission norms, i.e., 1 litre of HSD for 29 tonne kms., we have estimated the fuel consumption of freight movement by road for 1985 (Table 9). As per calculation, the consumption of HSD during 85-86 was 6.65 million tonnes and 9.48 million tonnes in 1989-90. The National Transport Policy Committee has estimated the freight movement by road under four scenarios. The figures shown in Table 9 is from the suggested ideal scenario. The Planning Commission estimate is based on a number of norms adopted for vehicle utilization, payload, etc.. The Working Group on Road Transport for the Seventh plan has made certain assumptions about payload, average kms per truck per year and load factor in estimating the freight movement by road.

In the case of railways, major share of goods are moved by diesel traction. The Advisory Board for Energy has derived fuel consumption norms for coal, diesel and electricity traction based on actual consumption for projecting the traffic separately for passenger movement and freight movement. Using these norms and the actual freight movement, we have estimated the fuel consumption. These figures are converted into Million Tonnes of Coal Replacement (MTCR) using the values given by the Advisory Board on energy (HSD 1 MT= 9.0 MTCR, Electricity 1 BKWH=0.785 MTCR). In terms of energy efficiency, railways are more desirable, for eg. 6.301 MTCR of diesel transports 119.68 BTKMS of freight, whereas 65.88 MTCR of diesel is used to transport 168.71 BTKMS (Table 10). In other words, railways are seven times more efficient than road in terms of energy consumption.

Table 9: Diesel Consumption for Freight Movement by Road.

Method	Rd. freight traffic (BTKMS)	Implied level of HSD use (Mt)
1) Extrapolations of NTPC est.	92	2.79
2) Derived from Planning Commission methodology	106	4.82
3) Derived from methodology adopted by the working group on Road Transport for the Seventh Plan.	179	5.09
4) Estimated from actual Freight movement (1985-86)	193	6.65
5) Estimated from actual Freight movement (1988-89)	275	9.48

Table 10 : Fuel Consumption for Freight Movement, 1984-85.

Mode	Freight Movement (BTKMS)	Norms	Consumption	
			In Actual Units	In MTCR Units
Rail (Elec)	55.38	0.022 (kwh/tkms)	1218360000 kwh	0.956
Rail (Dies)	119.68	5.850 (t/mtkms)	700128 T	6.301
Rail (Coal)	7.10	0.203 (t/tkms)	791700000 T	79.170
Road (Dies)	168.71	43.400 (t/mtkms)	7322014 T	65.880
Total	350.87	----	---	152.307

## 9. EMPLOYMENT

The size of the trucking Industry may be expressed in terms of the number of people it employs. It has been estimated that if the economy grows by 5%, the growth of transport is 15% (CC.Rao, 1987). Transport is thus a basic necessity for economic development. Road transport is important since it gives better access to people in backward and hilly tracts, where railway facilities are absent. Movement of goods by road, done mainly by private owners, generates employment directly and indirectly. Since the operation of these activities are mainly private owners, data regarding employment are not documented properly. NCAER, in 1972 conducted a study to estimate the employment in road transport and road construction (NCAER, 1974). To estimate the employment, NCAER carried out a survey of operators from 10 centers, mainly major cities, on a sample basis. According to this survey the direct employment per truck is 4.07 persons. The employment to vehicle ratio for various heads is given in Table 11.

Table 11: Employment to Vehicle Ratio in Truck Operation in India

Centres	Sample Size	Operation	Employment to Vehicle Ratio			Overall ratio
			Adm.	Repairs & Maintenance	Others	
Delhi	1203	2.14	0.75	0.98	0.29	4.16
Bombay	1654	2.33	0.97	0.96	0.34	4.60
Madras	178	3.26	0.88	0.99	0.10	5.23
Hyderabad	265	2.25	0.89	0.57	0.22	3.93
Ahmedabad	223	1.49	0.87	0.37	0.93	3.66
Simla	19	2.16	0.84	0.22	0.32	3.54
Amritsar	171	2.19	0.56	0.33	--	3.08
Jaipur	238	2.02	1.28	0.30	0.82	4.42
Kanpur	189	1.76	1.23	0.24	0.66	3.89
Calcutta	231	1.99	1.39	0.90	0.32	4.60
All Centres	4371	2.20	0.93	0.58	0.36	4.07
CRTC, Calcutta		1.80	1.00	0.50	--	3.30

Source: NCAER, 1974

More than half of the employment is engaged in 'Operation' (drivers, conductors and cleaners). 'Administrative' staff includes managers, accountants, clerks, peons, watchmen, godown keepers and 'Others' include persons who are employed on contract basis. In the repairs and maintenance category, persons who are employed directly by the truck operators as well as persons who are on job work are included. It was found that very few operators have their own repair and maintenance facilities. Operating staff in the case of public sector agency, CRTTC, Calcutta, engaged in transport of goods by road is 1.80 against 2.20 in the private sector. High ratio in the case of private sector could be due to the intensive use of vehicles in this sector. Looking at the nature of work, it is not likely to have undergone any major changes to alter the ratio. Hence, we have taken this ratio to estimate the employment generated by the trucking industry. During 1988-89, there were 1.14 million trucks on road. The number of people employed will be around 4.64 million.

## 10. SAFETY

Safety in India is quite low when compared to developed countries. It is estimated that the number of deaths caused due to road accidents is 49200. Compared to many developing countries like Pakistan, where the number of deaths per 1000 vehicles is 93.5, India's figure of 34 is low. At the same time, the figure is only 1.4 in Japan and 4.8 in Germany (Mathew, 1990). According to the Study Group on road safety (1972), more than 50% of the accidents are caused due to the fault of the driver. Table 12 gives the percentage share of accidents due to various causes.

Table 12: Cause of Accidents in India (1972)

1. Fault of the driver	53.1
2. Fault of the pedestrians	9.1
3. Mechanical defect in the vehicle	3.4
4. Fault of passengers other than the driver	1.4
5. Bad Roads	1.2
6. Bad weather	1.1
7. Other causes	23.2
8. Cause not known	3.9
<b>Total</b>	<b>100.0</b>

Source: Study Group on Road Safety, 1972 cited in Mathew et.al., 1990

### Accidents

Accidents data based on the type of vehicle involved is not available at the disaggregate level for recent years. According to the 1975 Motor Statistics, about 14% of the accidents are caused by trucks (Table 13). The rate of accidents show that every tenth goods vehicle on the road gets into an accident which is twice the

rate for all vehicles. One main reason for such a high rate is the overloading of trucks. Facilities available on Highways for truck drivers are also inadequate. This inadequate facilities makes them to drive longer time without any rest. Proper facilities like affordable lodging facilities at proper intervals would improve their conditions and it would also increase their concentration on driving.

Table 13: Motor Vehicle Accidents by Vehicle Type Involved (1975)

Type	Total	Total veh. on road	Acci./1000 veh.
Motor Cycles	7222	656050	11.09
Auto Rickshaws	2803	39709	70.59
Jeep	2790	552602	50.48
Motor Car	15476	384402	40.26
Taxi	7153	66820	125.89
Bus	15655	67500	231.89
Goods Vehicles	22039	219865	100.24
Misc. Vehicles	6864	142301	48.24
Total	80002	1621916	49.33

Source: Bagade, 1986.

Concern about road safety was raised time and again by different interest groups which resulted in setting up of the National Road Safety Council. This is to facilitate in creating a general awareness of road laws and discipline among road users to help in reducing the incidence of road accidents. The recommendations of the council include earmarking 1% of the total revenue collected as road taxes for road safety. Maintaining a data base of accidents, provision of truck parking complexes on NHs, educating school children about the traffic rules and improving road signs and signals on highways are to be undertaken.

The contribution from trucks in accidents occur mainly due to the drivers' fatigue, overloading, drunken driving and parking of trucks on highways which reduces the visibility for other vehicle drivers. To reduce this, strict enforcement of traffic rules, number of working hours of the truck drivers and provision of adequate parking facilities at different points etc. are required.

## 11. GOVERNMENT REGULATIONS

There are many regulations which influence the operations of the trucking industry. The important ones are discussed below.

Motor vehicles act is the main document which outlines the government policies regarding motor vehicles. The age old Motor Vehicles Act of 1939 was replaced by the Motor Vehicles Act of 1988. It came into effect from 1.7.1989. It incorporates many new changes. Rules regarding issuing driving licences are made much

more strict. Issuing of National Permits to trucks are relaxed without any limits. A goods vehicle registered in a state can commercially operate in that state. For inter-state movement, national permits are issued to goods vehicles. To get this permit, the owner will have to select five states at least for a minimum fee. Permits to operate in more than five states can also be obtained for an add-on fee for state.

The Motor Vehicles Act also provides for fitness certificates to ensure a good operating conditions of the truck. Every truck should get a fitness certificate from the Regional Transport Office. This is issued for a period of two years for a new vehicle, and for 9 to 18 months for an old vehicle.

Octroi, Entry Tax and other required documentation are regulations which are often perceived to be restrictive in nature. There are also provisions for hazardous commodity movement etc.

## 12. FUTURE

Future of truck movement will depend on a number of factors. Since the bulk of movement of goods in India are by roads and railways, the major factor influencing the movement of goods by roads are the changes in the railway policies. Other than this, the facilities rendered by the trucking companies which would attract more customers is also important. However, quantification of parameters which would affect the movement of goods in future is difficult. There are projections made by various departments/agencies for different purposes. We have attempted an estimate of the freight movement by taking into account the average payload, average distance traveled by a truck per annum as per current figures. The number of trucks for 2001 is estimated using the same growth rate as observed in the last 10 years.

Annual growth rate of number of truck (78-79 to 88-89)	9.90%
Payload (tonnes)	6.20
Average kilometer per truck/annum (Kms)	65000.00
Load factor	55.10%

Assuming a growth rate of 9.9% per annum, the number of trucks in 2001 will be 2941686. Considering the parameters mentioned above and the number of trucks, the freight movement will be 653.21 billion tonne kms.

### Roads

Financial outlay in our Five Year Plans for transportation has come down from 22% in the First Five Year Plan to 12.5% in the Seventh Plan. Allocation for roads was around 28%. Considering the fast rate of growth of trucks it is important to pay more emphasis for the development of roads. It has been established that better roads can reduce the fuel consumption and accident

rates. In the light of this it is important to have a road development policy whereby more investment on roads could reduce the cost of transport. Consequently, the price of transported commodities will come down. This would help in reducing the fuel consumption and the quality of life (Road Development Plan for India- 1981 to 2001,1984.).

### Production of Vehicles

Recently, due to the Government policy of allowing Indian Companies to collaborate with foreign motor companies, there are a few Companies which produce commercial vehicles with better fuel efficiency and better performance. But this is limited to light commercial vehicles, cars and two wheelers. To encourage the trucking industry it is essential to allow more such collaboration for heavy commercial vehicles also.

### Service Management

The present organizational structure was evolved over a period of time and modifications are done with experience. Such a structure, where most of the trucking companies depend on truck operators to meet their requirement of trucks, without owning it themselves is due to the uncertainty of getting goods and the financial constraints. Trucking companies prefer to hire vehicles as and when need arises so that they don't have to worry about the optimal utilization of vehicles.

Routing and scheduling of vehicles is purely based on the discretion of the branch manager who make decisions based on experience. Despite unscientific methods adopted, the existing system is fairly efficient. Considering the likely growth in the freight movement in future there are no reasons to believe that such an informal structure will collapse due to the inability to handle large quantity of goods.

NTPC had set up a working group on Transport pricing, taxation and subsidy to examine this question and to identify the optimal size of a profitable unit. It concluded that there is no evidence to prove that a single truck operator is not a viable unit. The present structure of trucking industry of any size has not only survived but it had also prospered. Working group also pointed out that since the existing structure had worked out well and prospered, there is no need for reorganization (Sundaram, 1984).

Though the optimum size of an organization for profitable operation is not important (considering the success of many small companies as observed by the working group setup by NTPC) there is a need to examine ways of ensuring financial assistance to small companies in terms of enabling them to have enough working capital, spare parts, maintenance facilities, etc.. Though the existing unorganised form of trucking industry has not only survived

but also prospered through a variety of strategies, as the scale of operations become large, the efficiency of the existing manual operations will go down. Computerisation in route scheduling and other administrative functions would make the operations more efficient. At least the large scale trucking companies should explore the potential advantages. At the same time, it is very difficult to determine any optimum size of the activity to go in for computerization. Research in this field is needed.

### Energy Consumption

Advisory Board on Energy has estimated the fuel demand for freight movement by road (Advisory Board on Energy, 1981). In this document the fuel estimation methods adopted by various departments / agencies are given. The working group on road transport for the seventh plan has assumed that 1 litre of HSD would yield 29 tonnes kms. This would mean that to transport 653.21 billion tonne kms, about 22.5 million tonnes of HSD will be required. Advisory Board on Energy has worked out some norms i.e., 0.0434 tonne of HSD is required for 1000 tonnes kms. If we take this norm the requirement for 384.74 billion tonnes kms will be 28.34 million tonnes.

### Employment

Direct employment per truck is 4.07 persons. It is very unlikely that in the coming 10 years this pattern would change, unless mechanisation takes over the loading and unloading process. Assuming that much changes will not take place, the direct employment in trucking industry (for 2841686 trucks) in 2001 will be 11972662 people.

### Losses and Damages

Trucking companies take the responsibility of losses in case of an accident. Some of the goods are insured with insurance companies which would pay the compensation for the damages in the transshipment. Trucking companies do not take the responsibility for such damages but in general they handle the goods more carefully than the railways. Measures are needed to improve road safety and minimizing the damages due to accidents.

### Container Movement

Movement of commodities by container facilitates intermodal transportation. This is quite popular in many of the countries. The container movement has not picked up in India, as originally envisaged. The reasons for the unpopularity of the container movement is

- i) It needs special trucks with open bodies. The number of trucks with open bodies in India is very less.



ii) Movement of empty containers involve extra expenditure and infrastructure.

iii) Facilities for handling containers are not quite adequate, even at ports.

Since containerization saves on packaging, unloading and loading costs at transit points, it is important to promote this medium. It has the advantages of being loaded into railway wagons and trucks.

We conclude that considering the inability of Railways to provide piecemeal wagons, it is essential to encourage the movement of goods by roads. In spite of the unorganized nature of the private companies engaged in the movement of goods, the trucking operation in India seems to be fairly efficient. This is partly reflected in the increasing rate in the growth of movement of goods by road. The road infrastructure and service management need to be improved substantially, to make the trucking industry vibrant. However, it is important to identify the commodities that can be transported economically by rail and develop strategies to encourage this, from an energy point of view.]

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