

TRANSPORT NOTES (Made in 2013)

Inland Waterways Authority of India

- India has an extensive network of inland waterways in the form of rivers, canals, backwaters and creeks.
- The total navigable length is 14,500 km, out of which about 5200 km of river and 4000 km of canals can be used by mechanised crafts.
- Freight transportation by waterways is highly under-utilised. The total cargo moved (in tonne kilometres) by the inland waterway was just 0.1% of the total inland traffic in India, compared to the 21% figure for United States. Cargo transportation in an organised manner is confined to a few waterways in Goa, West Bengal, Assam and Kerala.
- Inland Waterways Authority of India (IWAI) is the statutory authority in charge of the waterways in India. It does the function of building the necessary infrastructure in these waterways, surveying the economic feasibility of new projects and also administration and regulation.
- Inland Waterways Authority of India (IWAI) was created in October 1986. The Authority primarily undertakes projects for development and maintenance of Inland Waterway Terminal infrastructure on National Waterways through grant received from Ministry of Shipping, Road Transport and Highways. The head office is at Noida. The Authority also has its regional offices at Patna, Kolkata, Guwahati and Kochi.

National Waterway 1

- Allahabad–Haldia stretch of the Ganges–Bhagirathi–Hooghly river system.
- Estd = October 1986. Length = 1620 km
- Fixed terminals = Haldia, BISN (Kolkata), Pakur, Farrakka and Patna.
- Floating terminals = Haldia, Kolkata, Diamond Harbour, Baharampur, Ghazipur, Varanasi, Allahabad etc.

National Waterway 2

- Sadiya — Dhubri stretch of Brahmaputra river.
- Estd = September 1988. Length = 891 km
- Fixed terminals = Pandu.
- Floating terminals = Dhubri, Tezpur, Dibrugarh, Bogibil, Saikhowa, Sadiya etc.

National Waterway 3

- Kottapuram-Kollam stretch of the West Coast Canal, Champakara Canal and Udyogmandal Canal.
- Estd = February 1993. Length = 205 km
- Fixed terminals = Vaikom, Kottapuram, Cherthala, Kollam and Alappuzha etc.

National Waterway 4

- Kakinada–Pondicherry stretch of canals and the Kaluvelly Tank, Bhadrachalam – Rajahmundry stretch of River Godavari and Wazirabad – Vijayawada stretch of River Krishna.
- Estd = November 2008. Length = 1095 km

National Waterway 5

- Talcher–**Dhamra** stretch of the Brahmani River, the Geonkhali - **Charbatia** stretch of the East Coast Canal, the Charbatia–Dhamra stretch of Matai river and the Mangalgadi - Paradip stretch of the Mahanadi River Delta.
- Established = November 2008. Length = 623 km

National Waterway 6

- Lakhimpur to Bhanga of river Barak.
- Established 2013. Length = 121 km
- The 121-km stretch of Lakhimpur-Bhanga of the Barak river will soon become a national waterway, the sixth in the country.
- The Inland Waterways Authority of India will execute the project in two phases. The first will be completed by **2016-17** and the second by **2018-19**, integrating the waterways in the northeast and helping cargo transport through Assam, Nagaland, Mizoram, Manipur, Tripura and Arunachal Pradesh.



NATIONAL WATER GRID of INDIA

The distribution of rainfall in India is highly unequal and seasonal. The rivers having their origin in the Himalayas are perennial, while those of Peninsular India are generally seasonal. During the months of general rains, much of the water is wasted during floods and flows down to the sea, but in the dry months of the year there is scarcity of water. Consequently, there are droughts and famines in one part of the country and floods in the other regions. The problems of droughts and floods can be minimised through the **inter-basin linkages or through national water grid**, under which, water from one river basin can be transferred to another basin for optimum and judicious utilisation.

The salient features of the National Water Grid are as follows:

1. The **Ganga-Kaveri Link Canal** passing through the basins of Son, Narmada, Tapi, Godavari, Krishna, Penner, and Kaveri.
2. The **Brahmaputra-Ganga** Link Canal passing through Bangladesh.
3. The **Narmada Canal** passing through Gujarat and Rajasthan.
4. The Canal from **Chambal to Central Rajasthan**.
5. The Link Canals between the rivers of the **Western Ghats towards the east**.

The Ganga—Kaveri Link Canal:

1. At the request of the Government of India, a UNO team prepared a project report on the Ganga-Kaveri Link Canal. The main objectives of the project are to **safeguard against the recurring floods in the Ganga Basin** and to **assure more water to the comparatively less rainfall** receiving areas of central India.
2. Under this project, the Ganga is to be linked with Kaveri by a man-made canal; 2636 km.
3. Proposed to provide drinking water to its command area, water for irrigation and sanitation.
4. Generation of hydel-power, navigation, flood control, tourism promotion, and recreation.
5. The Ganga-Kaveri Link Canal is thus, a multi-purpose project of immense size. If completed, the country will no longer have to depend so much on monsoon, the vagaries of which are well known.
6. The scheme proposes to draw 60,000 cusecs of water from the Ganga, constructing a barrage near Patna, and lift its water by large pumps to a point near the boundary of the basins of Ganga and the Narmada from where it will be possible to distribute the water by gravity via dug-up canals or through existing rivers to the west or south.
7. The flood waters of the Narmada and the Godavari could also be used profitably by a separate water grid.
8. Water for the inter-basin transfer would be derived from the Ganga only during the four months of the rainy season (July to October) when the flow exceeds on an average by 100,000 cusecs.
9. The length of the Ganga-Kaveri Link Canal will be between 2400-3200 km, depending upon the actual alignment finally chosen, with smaller secondary branches connecting areas chronically prone to droughts.
10. It is also proposed to supply the Ganga water to Bihar, Uttar Pradesh, Jharkhand, Chhattisgarh, Madhya Pradesh, and Rajasthan by pumping additional water during the lean water season. Similarly to meet partially the water demand of the chronically drought prone

areas of Rajasthan, Gujarat, Madhya Pradesh, Chhattisgarh, Maharashtra, Andhra Pradesh, Karnataka, and Tamil Nadu.

11. A site near Patna having an elevation of about 46 metres above sea level will be the starting point which would collect the surplus water from the Ganga. From here, the water would be pumped into a series of reservoirs between the watersheds of the Narmada and Son, **involving a pumping lift of 335 to 400 m.**
12. From this elevation (**Bagri Reservoir on the Narmada 423 m above sea level**), a lined aqua-duct will convey the water to the south utilising the natural water resources of the Wainganga, Pranhita, and Godavari, and crossing the Krishna and the Penner to Kaveri, upstream of the Upper Anicut.
13. Storage would be provided enroute, especially on the ridge regions to conserve the water for the dry season to provide adequate run-off which would be utilised during the dry season.
14. The project involves huge expenditure, massive survey operations and strong administrative decisions. Since it will take a decade or more to complete the project which has several administrative and socio-ecological constraints, the government has not yet taken any decision to execute the project.

The Brahmaputra—Ganga Link Canal

1. The Brahmaputra is a mighty river which carries a discharge of 3500 to 5000 cumecs even during the dry season. Much of this water is beyond the requirement limit of the basin and is wasted. On the other hand, there is a scarcity of water in the lower Ganga basin, especially during the dry months. Hence, the diversion of excess water from the Brahmaputra to the Ganga may meet this water deficit, which shall help in the economic development of the region.
2. The Brahmaputra-Ganga Link Canal Project involves the construction of a diversion barrage at Dhubri (Lower Assam), and a 320 km long feeder canal linking the Dhubri Barrage to the Farakka Barrage.
3. A portion of this feeder canal will lie in Bangladesh for which an international agreement between India and Bangladesh has to be signed.
4. This canal will provide irrigation water to Bangladesh also. The canal may augment the flow of level in the Padma River (Ganga in Bangladesh) during the lean months of the year.
5. Besides, the link canal would provide cheap inland navigation facility to both the countries.
6. Due to lack of concurrence from Bangladesh and involvement of huge financial expenditure, the scheme has not yet been started.

Other Water Grids http://www.nih.ernet.in/rbis/india_information/interlinking.htm

1. **The Narmada Link Canal to Gujarat and Rajasthan:** Under the Sardar Sarovar Project, there is a proposal to build a terminal storage dam across the Narmada River near Navagam.
2. a diversion canal linking the place to regions of Kachchh (Gujarat) and western Rajasthan.

Chambal Link Canal:

1. 500 km
2. connecting the Chambal River with the Indira Gandhi Canal.
3. The canal would provide water to the central parts of Rajasthan.

4. It will involve a lift of 200 to 250 m.

Links between the Rivers of the Western Ghats to the East:

1. The rivers of the Western Ghats carry enormous quantity of water during the rainy season. Due to steep gradient and the narrow coastal plains much of the water goes to the Arabian Sea as waste.
2. This water may be diverted to the rain-shadow areas of the Western Ghats through the diversion canals where it can be utilised for irrigation.
3. The **Periyar Diversion Scheme, constructed** several years ago, is such a type of model scheme where the surplus water of the west-flowing Periyar river has been collected in a barrage and diverted through a tunnel across the Sayadri, so as to meet the water needs of the drought prone areas of Tamil Nadu in the east.

TRANSPORT

(i) road, (ii) rail, (iii) inland waterways, (iv) coastal shipping (coastal and international), and (v) airways.

Roads

India has one of the largest road networks in the world with an aggregate distance of 3.4 million kilometers. Roads in India connect village to village and village to urban centres. Moreover, roads offer door-to-door service and their construction can be undertaken even in areas of difficult terrain and steep slopes. The movement of goods is safer through road transport. They help the farmers to move their perishable commodities (flowers, fruits, milk, and vegetables) to the urban markets. The role of roads in the economic development and regional planning cannot be underestimated.

The country's road network consists of: (i) Expressways, (ii) National Highways, (iii) State Highways, (iv) Major District Roads, (v) Other District Roads, and (vi) Village Panchayat Roads. The road network comprises 70,550 km of National Highways, 128,000 km of State Highways, 470,000 km of Major District Roads, and about 2,650,000 km of other District and Rural Roads.

Highways and Roads in India

National Highways:

1. The Central Government is responsible for the development and maintenance of the National Highways System.
2. 70,548 km.
3. Development and maintenance work of the National Highways through three agencies: (i) the NHAI (ii) the State Public Works Department (PWD), and (iii) BRO.
4. Massive National Highways Development Projects (NHDP) being implemented by the National Highways Authority of India (NHAI).

Some of the important National Highways Projects under progress are given below:

Golden Quadrilateral (GO)

1. NHDP has taken up a massive programme of road building in the country.
2. Launched in January 1999

3. Golden Quadrilateral Project is perhaps one of the largest projects of road building in the country.
4. The project is being implemented by the NHAI.

The National Highways Development Project has the following components:

(i) Phase I—Golden Quadrilateral: This phase comprises connecting Delhi-Mumbai, Chennai, and Kolkata-Delhi by six-lane super highways. It has a total length of 5846 km. The four sides of the quadrilateral have varying length. The side of the quadrilaterals between Delhi and Mumbai is 1419 km long, Mumbai to Chennai 1290 km long, Chennai to Kolkata 1684 km long, and Kolkata to Delhi 1453 km.

(ii) Phase II-

(i) The North South Corridor: This corridor aims to connect the National Highways from Srinagar & K) to Kanniyakumari including Kochi-Salem;

(ii) The East West Corridor: Silchar in Assam to Porbandar in Gujarat.

(iii) Phase III

1. Phase three comprises widening of the existing National Highways to 4/6 lane standard.
2. connect state capitals, seaports & important tourist locations with Golden Quadrilateral. Traditionally, the road projects used to be financed by the government. But in the last decade after the liberalisation or globalisation, a significant contribution is being made by the private sector.

To encourage the private sector, several steps have been taken by the government:

1. Declaration of the road sector as an industry.
2. Provision of **capital subsidy** up to 40 per cent of the project cost.
3. Full **tax exemption** in any consecutive 10 years out of the first 20 years of the project.
4. Government shall meet all expenses relating to land and other pre-construction activities.
5. **FDI up to 100 percent** in road sector.
6. Easier **ECB norms**.
7. Higher **concession period** (upto 30 years).
8. Right to **collect and retain toll**.

State Highways in India

128,000 Km (2010) developed and maintained by the various agencies of the state and union territories. The funds, however, are also provided by the Central Government for the development of roads under the following schemes.

(a) Funds from the **CRF** are provided for improvement of state roads other than the rural roads.

(b) 100% grant for inter-state connectivity projects and 50 per cent for projects of economic importance.

(c) Roads are also being developed in rural areas under the **(PMGSY)**.

Express Highways

These are multi-lane well-paved highways used for movement of goods and traffic. Some of the important express highways are (i) Mumbai-Kolkata-Dum-Dum Airport Highway, (ii) Durgapur-Kolkata Express Highway, and (iii) Mumbai-Pune Express Highway.

District Roads

These roads mostly connect the towns and large villages with one another and with the district headquarters. responsibility of the Zila Parishad and the PWD.

Village Roads

Village roads are constructed and maintained by the village panchayats. These roads are generally, narrow and zig-zag. They are generally not suitable for heavy mechanised traffic. The length of rural roads is 26,50,000 km.

International Highways

Under the agreement with the Economic and Social Commission on Asia and Pacific (ESCAP) some of the country's highways linking neighbouring countries have been declared international highways. **These highways are of two types:**

- (a) The Main Arterial Routes, linking the capitals of the neighbouring countries like (i) Lahore-Amritsar-Delhi-Agra-Kolkata-Golaghat-Imphal-Mandalay (Myanmar), Agra-Gwalior-Hyderabad-Bangalore-Dhanushkodi, and (iii) Barhi-Kathmandu;
- (b) The routes joining the main cities, seaports, and industrial centres with the arterial road-network, like (i) Agra-Mumbai Road, (ii) Delhi-Multan Road, (iii) Bangalore-Chennai Road, and (iv) Golaghat-Ledo Road.

The World Bank provides funds for the maintenance of these roads.

Air Transport in India

India has bilateral Air Service Agreement with 103 countries. Recently, new Air Services Agreement have been signed with Mexico and Chile. Air transport is the fastest mode of transport. It has reduced geographical distances, making the world a village.

The main advantages and disadvantages of the air transport are:

1. easily reach the remote and difficult terrains
2. It is the fastest mode of transportation.
3. Air-transport plays a vital role at the time of emergency.
4. Air-transport is, however, adversely affected at the occurrence of fog, mist, and stormy weather.

Civil Aviation

1. AAI constituted on 1st April 1995, operates 127 airports including civil enclave and defence airfields for Commercial Airlines operations. The Ministry of Civil Aviation is responsible for the formulation of national policies and programmes for the development and regulation of civil aviation and for the devising and implementing of schemes for an orderly growth and expansion of civil air transport. Its functions also extend to overseeing the provision of airport facilities, air traffic services, carriage of passengers and goods by air, safeguarding civil aviation operations, regulation of air transport services, licensing of aerodromes, air carriers, pilots, and aircraft maintenance engineers.
2. Ahmadabad, Amritsar, Bangalore, Chennai, Delhi, Guwahati, Hyderabad, Jaipur, Kochi, Kolkata, Mumbai, Panaji, Srinagar and Thiruvananthapuram are the international airports.

3. The improvement in the infrastructural facilities at the airports need heavy capital investment which the government cannot afford of its own. Therefore, private domestic and foreign investors including Non-Resident Indians have been encouraged to participate in the process of improvement of the Indian Airlines.
4. In order to help the Indian exports to make their exports more competitive, the Government had introduced in April 1992 an 'Open Sky Policy' for cargo. Under this policy, foreign airlines or association of exporters can bring any number of freighters to the country for upliftment of cargo. The Government has also permitted market forces to determine cargo traffic with IATA rates as the floor rates.
5. India has **bilateral Air Services Agreement with 101 countries.** A revised Air Service Agreement between India and USA was signed in 2005 replacing earlier Agreement, signed in 1956. The revised agreement grants unlimited access to the designated airlines to any point of call in the territory of the other country as against four airports under the earlier agreement.
6. The Air India was constituted in 1947, after which the Air India International launched its first service to London via Cairo and Geneva on June 8, 1948 with Constellation aircraft.
7. In 1952, the Planning Commission recommended the nationalisation of Air Transport Industry which was effected in March 1953 with the creation of nationalised Corporations— Air India International Limited, which retained its identity and international flag carrier status; and the. Indian Airlines, to operate domestic services.
8. Air India operates 173 flights per week serving 59 stations (45 international and 14 domestic). Air India also has **code-share agreements with 12 airlines** to offer its passengers more destinations and convenient connections.
Indian Airlines Indian Airlines was set up under **the Air Corporation Act, 1953** with an initial capital of Rs. 3.25 crore with its Headquarters at Delhi. The India Airlines is the major domestic air carrier of the country. The Indian Airlines operates to 55 domestic stations alongwith its wholly-owned subsidiary Airlines, Allied Services Ltd. (Alliance Air). Besides Indian Airlines also operates to 18 international stations. The Indian Airlines presently has a fleet of 73 aircrafts comprising 03 Airbus, A-300s; 48 Airbus, A-320s, 5 Airbus, A-319s; 11 Boeing 737s; 18 Dornier DO-228; and 04 ATR-42-320. All B-737 and ATR aircrafts are operated by Alliance Air. In addition to Air India, there are: Jet Airways, Kingfisher Airlines, Deccan Aviation Co; Jetlite, Paramount Airways, MDLR Airways, Jagson Airlines and Go-Air airlines.
9. **The Pawan Hans Helicopters Ltd (PHHL):** The company was **incorporated in 1985** with the objective of providing helicopter services to the petroleum sector, linking inaccessible areas of the country and operating charters for promotion of tourism. Private Companies In addition to these, five companies are providing services in India : out of these Jet Airways and Air Sahara are operating on domestic as well as international air-routes, while Air Deccan, Kingfisher, and Spice-Jet are operating on domestic routes only. Problems

Problems of Air Transport of India

- Running in Loss
- Strikes
- Decline in Quality of Service
- High Aircraft-Man Ratio

- The airlines manpower base is one of the highest in the world. Its average is about 700 employees per aircraft as against an average of 225 employees internationally.
- Stiff Competition
- Old Aircrafts
- Expensive Fares
- Mismanagement and Political Interference

Transport Planning

It may be ascertained from the description and analysis of the transport network of the country that there is urgent need of coordination in the railways, roads, air, and water transport. There are still several areas in the country which are not easily accessible. Many villages of the country are not linked with metalled roads. Moreover, there is a stiff competition between the railways and the roads transport which exposes a faulty transport planning. Moreover, much attention has not been paid towards the development and maintenance of water transport. Air travel is very expensive for the ordinary citizens. The following attempts, if taken together may improve the transport system of the country appreciably.

1. Geographical Bases of Transport Planning

Planning for transport should be based on geo-graphical conditions of terrain, topography, slope, and climate. For example, roads and railways are the good means of transportation in the plains, while roads and airlines/helicopters can be a good alternative in the mountainous areas.

2. Comprehensive Transport Plan

3. promote **integration** amongst different modes of transportation.

4. Single Broad Gauge in Railways

5. Widening of Roads

6. **Water transport** development and its maintenance deserve more attention as it's the cheapest mode of transportation.

7. **Infrastructure:** The social amenities at the railway stations, bus-stands, and airports need a substantial improvement.

8. New Technology

9. Involvement of Private Sector

Communications in India

Postal System

- second half of the 18th century.
- by Lord Clive in the year 1766
- further developed by Warren Hastings by establishing the Calcutta **General Post Office (GPO)** under the Post Master General in the year 1774.
- In Bombay and Madras, the General Post Office came into existence in 1786 and 1793
- The **Act of 1873** first regulated the Post Office on a uniform basis to unite the post office organisation throughout the three presidencies into one All India Service.
- Post Office of India was placed on the present administrative footing about one hundred and fifty years ago on October 1, 1854.
- The statute presently governing the postal services in the country is the **Indian Post Office Act, 1898.**

- Besides providing postal communication facilities, the post office network has also provided facilities for remittance of funds, banking and insurance services from the latter half of the 19th century.

Postal Network

At the time of Independence there were 23,300 post offices throughout the country. In April 2005, the country has 1,55,500 post offices, of which 1,39,100 are in the rural areas and 16,400 in the urban areas. As a result of this seven-fold growth, today India has the largest postal network in the world.

The postal network consists of four categories of post offices, viz., (i) Head Post Office, (ii) Sub-Post Offices, (iii) Extra Departmental Sub Post Offices, and (iv) Extra Departmental Branch Post Offices.

Mail System

First class mail, viz., post cards, inland letters, and envelopes are given airlift wherever found advantageous, without any surcharge, between stations connected by air.

Second class mail, viz book packets, registered newspapers, and periodicals are carried by surface transport, i.e. trains and road transport.

International Mails

India is a member of the Universal Postal Union (UPU) since 1876 and of the Asian Pacific Postal Union (APPU) since 1964. These organisations aim at extending, facilitating, and improving postal relations among other countries. India exchanges mail with more than 217 countries by air and surface.

Money can be remitted from selected foreign countries to India by way of **money orders and postal orders**. India has money order service with 27 countries. India has two-way money order service with Bhutan and Nepal wherein money orders can be sent to and received from these countries. With the remaining 25 countries, only inward service is available. **British Postal Orders and Irish Postal Orders** are encashable in India at selected post offices.

India Post 2012 Project

- ‘India Post 2012’ project is a multi-faceted IT automation programme which was cleared in year 2010 by Cabinet Committee on Economic Affairs
- India Post 2012 aims at transforming Department of Posts into a “**Technology Enabled, Self Reliant Market Leader**”.
- This translates into **5 initiatives covering** increased market share and revenues, new products and services, improved service delivery, motivated workforce and rural development.
- As part of 11th five year plan, **this IT modernization project has been undertaken in two phases**. In Phase-I, post offices up to **double handed levels** were supplied with IT hardware and in Phase-II, the program has been built on 3 cornerstones as follows:

Infrastructure – The project aims to establish Data Centre / disaster recovery centres to house all transactions and data, nationwide networking of all post offices including rural post offices,

supply of computer hardware to non computerized post offices, mail offices and rural post offices with a vision to create a fully managed, secure and centrally governed IT infrastructure.

Software Solutions – Creation of integrated, modular software solution covering Postal operations, Banking, Insurance, logistics, help desk and call centre. The IT project also envisages accrual based accounting and centralized payroll processing. The project will also bring in ecommerce solution enabling India Post to make all web and mobile based transactions.

Change/Project Management –The IT Project will carry out this important activity by conducting workshops, training, re-skilling for enabling change and addressing concerns and issues of employees. It will also cater to communication and awareness at regular intervals to drive change.

Project Benefits:

Benefits for Customers:

- Better financial inclusion for the common man in the rural and semi-urban
- Effective and transparent delivery of social security and employment guarantee schemes
- Increased consistency and reliability in delivery system in line with global standards
- Multiple channels of access through post office counters, kiosks, internet, mobiles.
- Better visibility of various articles in the mail stream and transparency in financial services such as banking, insurance etc.
- Improved customer satisfaction due to faster and more reliable services in postal, logistics, banking, insurance and retail operations

Benefits for Department of Post (DoP):

- Significant enhancement in revenue & market shares
- Better decision making and operational planning
- availability of management information in a timely manner
- Potential reduction in the transaction cost and availability of manpower
- Increased productivity and accountability

Benefits for Employees:

- Employees will have an opportunity to learn, build and enhance new skills and expertise
- Reduction in manual work which will result in enhanced productivity levels
- Opportunity to deliver enhanced IT enabled services to their customers leading to a significant reduction in customer complaints
- Improvement in employee engagement and empowerment
- Provide an opportunity to work in an innovation based culture
- Opportunity to be part of a growing and vibrant organization

Telecommunication in India:

Salient Features: National Telecom Policy (NTP) 2012

In the first week of June 2012, the Union Cabinet has approved the **National Telecom Policy (NTP) 2012**. The policy has been released after a delay of one year as it was earlier conceived as NTP 2011.

Salient features & Analysis:

- it promises broadband for all with a minimum download speed of 2 megabits. However, the actual implementation of this feature might be challenging. This is because still India does not have a good broadband penetration. In fact, broadband penetration has been a policy failure in India so far.
- make India a global hub of domestic manufacturing. This is a mammoth objective and the policy is yet not clear, how this is to be achieved. We here note that in the draft policy it was mentioned that there would be a preferential market access for Indian Vendors, to help telecom manufacturing boost in India. But, the idea was rebutted by the Ministry of Commerce, because the preferential market access for Indian Vendors would violate India's commitments at the WTO and GATT. This has been followed by an explicit commitment from the Department of Telecommunication that WTO and GATT's concerns would be kept in view while issuing guidelines implementation and operationalization.
- Rural teledensity to be taken from 39 to 70% in next 5 years. It also sets a target that every single Indian has a phone by 2020.
- new unified licensing regime which allows companies to provide ISP, fixed line, international long distance, national long distance, and a few other services through a single licence. The department has proposed a cost for the unified license to be Rs. 10 Crore. So far, this unified license has not attracted many companies as the companies may be concerned regarding various aspects of migration to the unified license.
- delinking of licenses from spectrum. It's worth note that the February 2012 Judgement of Supreme Court had mandated the spectrum auctions, so separation of spectrum and license is already a reality.
- liberalization of the spectrum.
- Full Mobile Number Portability
- One Nation – Free Roaming. The consumers who use national roaming can expect to pay local call charges. But it is still unclear when the 'free roaming' will be initiated. There are no visible timelines for full mobile number portability also.
- The NTP 2012 mentions cloud computing, next generation networks, IPV6 and Voice over Internet Protocol (VoIP) as thrust areas. All of these are forward-looking aspects of the policy. It's worth note that for last few years, the cellular mobile operators have opposed the VoIP for average users. So, we have to wait and watch whether average Internet users will be allowed to use VoIP.

The NTP has not touches several issues such as spectrum pricing, reserve price for the upcoming 2G auctions, historical pricing of spectrum for operators who have received spectrum beyond 6.2 MHz and the more recent contentious issues of refarming, etc. All of them will have to be dealt via executive decisions.

Conclusion:

National Telecom Policy 2012 has not promised a time-bound implementation on some key issues and is not a magic wand that can immediately spark investor confidence. It cannot sweep away the anxieties of the sector, which have accumulated since A. Raja's tenure. If we read it

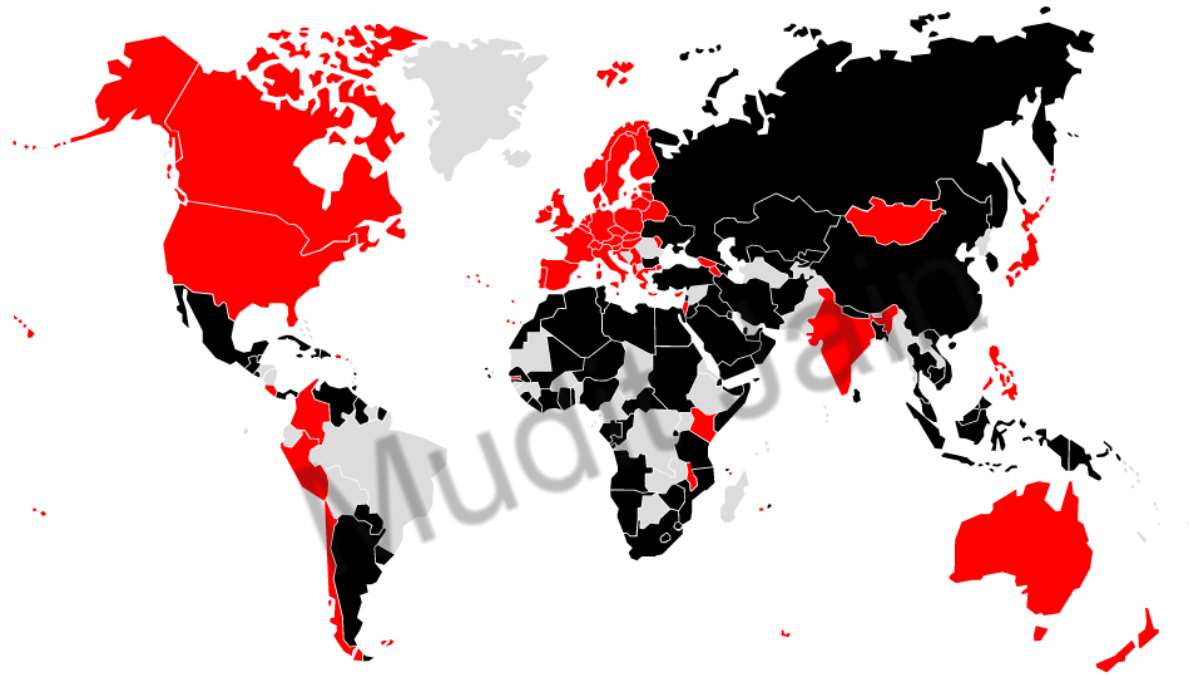
carefully, we find that it has actually supported the controversial policy of refarming the 800 MHz band and redistributing spectrum to fresh applicants.

However, for a consumer's point of view, the NTP 2012 is the beginning of a new golden age in communications. For a consumer, the numbers will be portable and there will be a roaming free communication across all circles of country. This will be helpful for a rapidly increasing migrating population.

Internet

As on December 31, 2006, there are 400 licenses for provision of Internet Services out of which 128 have signed Licenses for Provisions of Internet Services (including Internet Telephony). Based on reports received from Internet Service Providers till March 2006, there are approximately 12.00 million Internet subscribers in India (India 2010).

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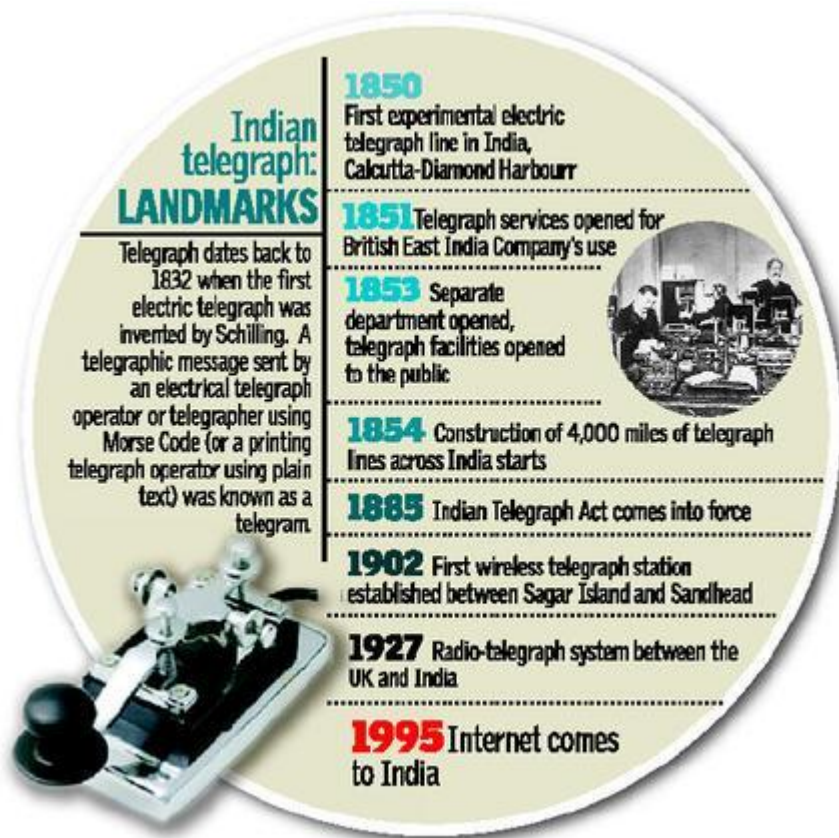


Manufacturing of Telecom Equipments

The Indian telephone industry manufactures a complete range of telecom equipments using state of the art technologies designed specifically to match the diverse terrain and climatic conditions. Production of telecom equipments has increased from Rs.16,090 crore in 2004-05 to Rs. 17,833 crore in 2005-06. There is heavy demand of the mobile phones from domestic and international markets. It is expected that within the next decade, India is expected to become a manufacturing hub for telecom equipments.

Telegraph and Telephone Service

Dot, dash, full stop: Telegram service ends July 15



- Financial constraints have forced the Bharat Sanchar Nigam Ltd to wind up the telegraphic service, which would be remembered mainly as a historically inexpensive but relatively quick method of sending alerts related to births, deaths and emergency situations.
- The growing use of mobile phones and Internet has led to steep decline in the usage of the telegraphic service
- After stopping telegram service for overseas communication earlier this year, we have now decided to discontinue it for the domestic market from July 15.
- In India, the first telegraph message was transmitted live through electrical signals between Calcutta (now Kolkata) and Diamond Harbour, a distance of about 50 km, on November 5, 1850; and the service was opened for the general public in February 1855.
- Over the years, the BSNL made several technical upgrades in the telegraph service, with the latest being the introduction of a web-based messaging system in 2010. However, growing Internet penetration and cheaper mobile phones in the last decade have kept people away from the 182 telegraph offices across the country.
- “In May 2011, we revised telegram charges after six decades to arrest declining revenues...but it did not work. It is estimated that the BSNL is suffering an annual loss of Rs. 300 - 400 crore from its telegraph service alone.
- However, there will be no job cuts and all those working in telegraph offices will perform other jobs related to telephone and Internet services,” the official added.
- The BSNL’s financial performance in recent years has been alarming. From a profit of Rs. 575 crore in 2008-09, the telecom giant has been reporting massive losses for the last three years. In 2012-13, its losses stood at a staggering Rs. 8,198 crore.

Radio, Television, and Cinema

Radio, television and cinema (films) are the electronic media of mass communication, unlike

postal, telegraphic, telephone, and telex services which are essentially of personal nature. Unlike telephone, radio is a means of wireless communication. It is a very powerful medium to transmit and receive useful information, news and variety of entertainment programmes including sports. At the time of Independence, there were six radio (Akashwani) stations. At present All India Radio is accessible to almost 98.5 per cent of the total population of the country. Doordarshan is the national television service of India. It started in 1959. It is one of the largest and essential networks in the world with over 900 transmitters. Its programmes are watched by over 500 million viewers in their homes. Its commercial advertisements brought in a huge revenue of over Rs.10,000 million in 2005-06. Now under the open skies policies a large number of private parties registered in India. It manages radio and television channels and have been assigned to private parties registered in India. It manages radio and television services under the supervision of parliamentary Committee. Cinema is the most popular means of entertainment in India. It is the largest producer of feature films in the world. Hindi films by far is the most dominant section. Almost all the regional languages bring out their own films almost continuously. Personal computers and Internet services have brought about a new revolution in the age of explosion of information technology.

Print Media

The total number of newspapers and periodicals being published was over 42,000 on December 31, 2006. Hindi publication has the largest share of over 40 per cent of the total. Books are an equally important means of communication for preserving and propagating knowledge, information and entertainment to posterity.

International Trade of India

It is an important tertiary sector of economy which is carried out at the local, regional, national, and international levels. India has a long tradition of trading with countries located far and near. Today we are living in a fast shrinking world mainly because of tremendous advances in both transport and communications. We are living in an economically interdependent world, where the world itself has turned into a global village with a self-contained economy. Because of fast means of transport and communications, India conducts international trade with about 200 countries with an endless list of around 8000 commodities. The share of trade in the GDP is about 15 per cent, which engages 7.3 per cent of work force in the country.

There was a time when commodities were imported only for domestic consumption. But now more and more countries including India, have been importing certain raw or semi-processed materials, not for their own domestic consumption, but to process them further and export them after value addition. Indirectly, what the country exports are items of human skills.

For example, Japan exports cotton and woollen textiles although it imports all its requirements of raw materials from other countries. The same is true of mineral based industries.

India imports raw cashew nuts only to re-export them after they are further reprocessed.

India imports crude diamonds and other precious stones only to process them further and re-export them as highly finished fine products at a considerable upward margin. India also imports gold and silver and exporting them in the form of attractive and expensive ornaments. International or foreign trade has played a crucial role in India's economic growth. During the colonial days India used to export almost entirely agricultural raw materials.

India's traditional exports consisted of jute, cotton, tea, spices, hides, skins, oil-seeds, especially ground- nut. At present, instead of exporting raw materials, India is exporting jute-packing materials (gunny- , bags, linen, and carpets). In place of cotton, India exports quality yarn, cotton fabrics, including hosiery, readymade garments and skilled and semi-skilled workers. India also exports silk woollen, and synthetic textiles, processed marine products, manufactured leather goods, sports goods (cricket bats, hockey sticks, etc.) engineering goods like fans, sewing machines, bicycles, three-wheelers, scooters, cars, commercial vehicles, chemicals and allied products, carpets, rice, processed food, medicines, electric goods, books and films.

According to [Department of Commerce](#), the **fifteen largest trading partners of India** represent 62.1% of Indian imports, and 58.1% of Indian exports as of December 2010. These figures do not include services or foreign direct investment, but only trade in goods.

The largest Indian partners with their total trade (sum of imports and exports) **in millions** of US Dollars for calendar year 2012–2013 are as follows:^[1]

Country	Exports	Imports	Total Trade	Trade Balance
 United Arab Emirates	36,265.15	38,436.47	74,701.61	-2171.32
 China	13,503.00	54,324.04	67,827.04	-40,821.04
 United States	36,152.30	24,343.73	60,496.03	11,808.57
 Saudi Arabia	9783.81	34,130.50	43,914.31	-24,346.69
 Switzerland	1,116.98	29,915.78	31,032.76	-28,798.80
 Singapore	13,608.65	7,754.38	21,363.03	5,854.27
 Germany	7,244.63	14,373.91	21,618.54	-7129.28
 Hong Kong	12,278.31	8,078.58	20,356.89	4,199.74
 Indonesia	5,331.47	14,774.27	20,105.75	-9,442.80
 Iraq	1,278.13	20,155.94	21,434.07	-18,877.81
 Japan	6,099.06	12,514.07	18,613.14	-6,415.01
 Belgium	5,506.63	10,087.16	15,593.80	-4,580.53
 Kuwait	1,060.80	16,569.63	17,630.43	-15,508.83

 Iran	3,351.07	11,603.79	14,954.86	-8,252.72
 South Korea	4,201.49	13,461.25	17,662.73	-9,259.76

This list does not include the [Gulf Cooperation Council](#) (GCC), which includes two (UAE and Saudi Arabia) of the above states in a single economic entity. As a single economy the [Gulf Cooperation Council](#) (GCC) is the largest trading partner of India with almost \$160 billion in total trade.^[2]

As a single economy, the EU is the second largest trading partner of India with €40.5 billion worth of EU goods going to India and €39.4 billion of Indian goods going to the EU as of 2011, totaling approximately €79.8 billion (\$104 Billion USD) in total trade.^{[3][4]}

India is also the largest export and/or import partner of the following countries:

Exports^[5]

[Guinea-Bissau](#) - 56.0%

[Nepal](#) - 55.7%

[Tanzania](#) - 14.1%

[Togo](#) - 13.7%

[Guinea](#) - 10.3%

Imports^[6]

[Nepal](#) - 51.0%

[Mauritius](#) - 23.7%

[Sri Lanka](#) - 21.3%

[Kenya](#) - 20.7%

[United Arab Emirates](#) - 17.0%

Salient Features of Foreign Trade

1. Unfavourable Balance of Trade: India is importing enormous quantity of crude-oil, petroleum, petroleum products, precious stones, gold, silver, copper, machinery, cashewnuts, fertilisers, and mainly exporting agro-based products, engineering goods, commercial automobiles, etc. The balance of trade and balance of payment are still unfavourable as import exceeds the export.

2. More Export of Manufactured Goods: India is exporting nearly 8000 commodities, and the number of exports of finished commodities is increasing appreciably.

3. Worldwide Trade: India exports its products to 200 countries and imports from 150 countries.

4. Change in Import: Earlier India used to import almost all types of machinery, precision instruments, surgical equipments, automobiles, and electrical goods. Now India is exporting all sorts of machinery including vehicles, electronic, and chemical goods, and importing raw materials like diamonds, precious stones, gold, cashew-nuts, jute, mineral ores, and raw and semi-processed raw materials.

About 96 per cent of our foreign trade is carried out through sea routes. Trade through land routes is limited either because of the physical barriers of Himalayas or the less friendly relations with the neighbours.

5. Trade through Selected Ports

India has only 12 major international seaports which handle about 92 per cent of foreign trade. The remaining seaports handle insignificant amount of the foreign trade.

6. Insignificant Position in the International Trade

India has almost 17 per cent of the total population of the world but unfortunately, its share in the International trade is less than one per cent.

7. State Trading

Over 95 per cent of the overseas trade is done in public sector by the state agencies. There is insignificant trade done by the private undertakings.

8. Increasing Import of Raw Material

India is importing cashew-nut, cotton, gems, jute, mineral ores, pearls, precious and semi-precious stones, and raw silk.

9. Increasing Import of Capital Goods

Goods like manufactures of metals, electrical and non-electrical machinery, transport equipments, chemicals, and new technology are being increasingly imported.

BALANCE OF TRADE AND BALANCE OF PAYMENT

The exports and imports of a country should be roughly equal in value, since the foreign exchange earned by exports is necessary to finance imports, but such a balance is rarely achieved. This is partly because trade passes through the hands of many different companies working independently, and thus an exact balance can never be reached, but is also due to fluctuations in markets leading to changes in import and export values over a period of years. The difference in value between imports and exports is referred to as the balance of trade. If exports exceed imports a country is said to have a favorable balance of trade, while if imports exceed exports it has an adverse balance of trade. The balance of trade only takes account of visible trade or the value of actual goods transferred from one country to another. But there are many other ways in which foreign exchange can be earned or spent. These are collectively called invisible trade which accounts for a quarter of all transactions with foreign countries can be worked out.

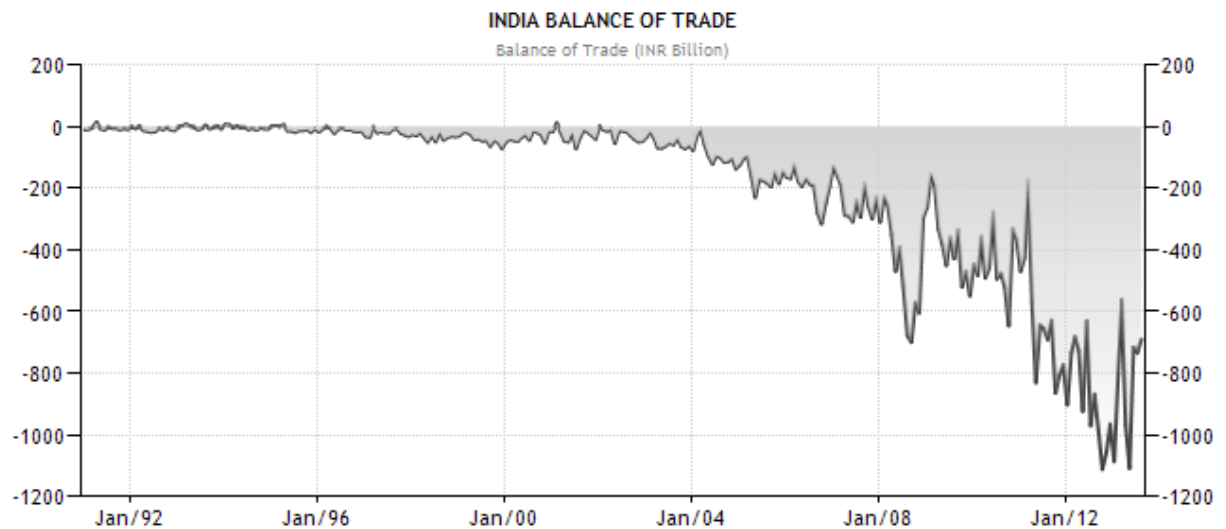
Transactions which bring money into the country are called invisible exports and can be of several kinds.

- 1. Payment for financial services** including insurance, banking, brokage, and other services carried out on behalf of foreigners.
- 2. Payment of transport services** such as shipping or air transport of passengers or freight.
- 3. Expenditure by foreign tourists.** important source of foreign exchange.
- 4. Interest and dividends on foreign investments.** India is earning a substantial amount
- 5. Remittance from emigrants**
- 6. Loans and aids from foreign countries or international organisations.**

Trade deficit narrows to \$10.9 billion as exports surge

NEW DELHI: India's trade deficit narrowed to a five-month low in August, as merchandise exports clocked double digit growth for the second consecutive month and imports declined, offering a glimmer of hope for the battered rupee.

The narrowing of the trade deficit sparked further appreciation of the rupee, and stock indices built on already strong gains before the data was released on Tuesday.



- All sectors that have a significant share in exports showed positive growth, barring that of jewellery. Gold imports declined by 70% to \$0.65 billion in August compared with \$2.2 billion a month ago.
- "Gold imports are coming down, but it will not impact the jewellery sector," Sharma said. The moderation in trade deficit will help lower the current account deficit, which touched a record 4.8% of GDP last year, triggering a massive depreciation of the rupee.
- The Reserve Bank and the finance ministry have taken a series of measures to curtail gold imports, which will help narrow the current account deficit.
- Crude oil imports grew in value terms on account of high increase in global crude oil prices.
- Oil imports rose to \$15.09 billion in August, registering an 18% year-on-year growth.
- **Forty five percent of exports have imported contents. I don't think weak rupee has any impact on positive export results**
- **Agriculture exports was a big contributor** to the overall high export growth, with rice exports rising 43.41% and marine products increasing by about 40%.
- To further curb imports, the government is looking at imposing duties on non-essentials imports.

THE FOREIGN TRADE POLICY 2009-14

1. Measures to revive investors' interest in SEZs.

- In view of the acute difficulties in aggregating large tracts of uncultivable land for setting up SEZs, while ensuring vacancy and contiguity, we have decided to reduce the **Minimum Land Area Requirement** by half.
- To provide greater flexibility in utilizing land tracts falling between 50-450 hectares, it has been decided to introduce a **Graded Scale for Minimum Land Criteria** which would permit a SEZ an additional sector for each contiguous 50 hectare parcel of land → efficient use of the infrastructure facilities created in such an SEZ.
- Further flexibility to set up additional units in a sector specific SEZ is being provided by introducing **sectoral broad-banding** to encompass similar / related areas under the same sector.

- On the issues relating to **Vacancy of Land**, while the existing policy allows for parcels of land with pre-existing structures not in commercial use to be considered as vacant land for the purpose of notifying an SEZ, it has now been decided that additions to such pre-existing structures and activities being undertaken after notification would be eligible for duty benefits similar to any other activity in the SEZ.

IT Exports constitute a very significant part of India's exports and IT SEZs have a major contribution in it. Exports from IT SEZs during financial year 2012-13 have exceeded Rs. 1.40 lakh crore registering a growth of over 70% over the previous year's exports.

- The present requirement of 10 hectares of minimum land area has been done away with. Now there would be no minimum land requirement for setting up an IT/ITES SEZ. Only the minimum built up area criteria would be required to be met by the SEZ developers.
- The minimum built up area requirement has also been considerably relaxed with the requirement of one lakh square meters to be applicable for the 7 major cities viz: Mumbai, Delhi (NCR), Chennai, Hyderabad, Bangalore, Pune and Kolkata.
- For the other Category B cities 50,000 square meters and for remaining cities only 25,000 square meters built up area norm will be applicable.

The present SEZ Framework does not include an **Exit Policy** for the units and feedback was that this was perceived as a great disadvantage. It has now been decided to permit transfer of ownership of SEZ units, including sale

Zero Duty Export Promotion Capital Goods (EPCG) Scheme

- Foreign Trade Policy has two variants under this scheme, namely, **Zero Duty EPCG** for few sectors and **3% Duty EPCG** for all sectors. During the last announcement on 5th June, 2012, a new **Post Export EPCG** Scheme was also announced which was notified on 18 February, 2013 by the CBEC.
- Based on the request of all stakeholders, Government has decided to harmonize Zero Duty EPCG and 3% EPCG Scheme into one scheme which will be a Zero Duty EPCG Scheme covering all sectors.

Following are the salient features of the Zero Duty EPCG Scheme:-

- Authorization holders will have export obligation of 6 times the duty saved amount. The export obligation has to be completed in a period of 6 years.
- The period for import under the Scheme would be 18 months.
- Export obligation discharge by export of alternate products as well as accounting of exports of group companies will not be allowed.
- The exporter who have availed benefits under Technology Up-gradation Fund Scheme (TUFS) administered by Ministry of Textiles, can also avail the benefit of Zero duty EPCG Scheme.
- The import of motor cars, SUVs, all purpose vehicles for hotels, travel agents, or tour transport operators and companies owning/operating golf resorts will not allowed under the new Zero Duty EPCG Scheme.

Reduced EO for Domestic Sourcing of Capital Goods

The quantum of specific Export Obligation (EO) in the case of domestic sourcing of capital goods under EPCG authorizations has been reduced by 10%. This would promote domestic manufacturing of capital goods. Reduced EO for units in the State of Jammu & Kashmir

Widening of Interest Subvention Scheme

- At present, 2% interest subvention scheme is available to certain specific sectors like Handicrafts, Handlooms, Carpets, Readymade Garments, Processed Agricultural Products, Sports Goods and Toys.
- The scheme had been further widened to include 134 sub-sectors of engineering sector.
- Government had also announced that the benefit of this scheme of 2% interest subvention could be available upto 31.03.2014.
- Government has now decided to include items covered under Chapter 63 of ITC and additional specified tariff lines of engineering sector items under the scheme.

Widening the Scope of Utilization of Duty Credit Scrip

- Duty Credit Scrips issued under Focus Market Schemes, Focus Product Scheme and Vishesh Krishi Gramin Udyog Yojana (VKGUY) can be used for payment of service tax on procurement of services within the legal framework of service tax exemption notifications under the Finance Act, 1994.
- Holder of the scrip shall be entitled to avail drawback or CENVAT credit of the service tax debited in the scrips as per Department of Revenue rules.

Market and Product Diversification

- The total number of countries under Focus Market Scheme and Special Focus Market Scheme becomes 125 and 50 respectively.
- ABOUT 126 new products have been added under Focus Product Scheme. These products include items from engineering, electronics, chemicals, pharmaceuticals and textiles sector.
- About 47 new products have been added under Market Linked Focus Product Scheme (MLFPS). These products are from engineering, auto components and textiles sector. 2 new countries i.e., Brunei and Yemen have been added as new markets under MLFPS.
- Exports of High Tech products would be incentivised and it would be separately notified by 30th June, 2013.
- The towns of Morbi (Gujarat) and Gurgaon (Haryana) have been added to the existing list of towns of export excellence for ceramic tiles and apparel exports respectively. These towns shall be eligible to get benefit under ASIDE Scheme.

Incremental Exports Incentivisation Scheme

- Government has announced Incremental Export Incentivisation Scheme on 26.12.12 for the exports made during January 2013 to March 2013.
- This scheme is available for exports made to USA, EU and Asia.
- It has been agreed to extend this scheme for the year 2013-14.
- The Government has also agreed to include additional countries under this. 53 countries of Latin America and Africa have been added with the aim to increase India's share in these markets. The present exports to each of these markets is less than US \$ 100 million.

Facility to close cases of default in Export Obligation

Requests have been received for grant of relief to close cases where there is default in export obligations pertaining to advance authorizations and EPCG authorizations. It has been decided to allow a facility to close such cases after payment of required duty, along with applicable interest. The duty + interest have to be paid within a limited period of six months from the date of notification of this scheme. The total payment shall not exceed two times the duty saved amount on default in Export Obligation.

Served from India Scheme (SFIS)

Service providers are entitled to duty credit scrips under Served from India Scheme at the rate of 10% of free foreign exchange earned during a financial year.

Duty Free Import Authorization Scheme (DFIA)

[Anti Dumping Duty](#) and Safeguard Duty was exempted under DFIA Scheme. Exemption from payment of Anti Dumping Duty and Safeguard Duty shall henceforth not be available after endorsement of transferability of such authorizations

Import of Cars

Import of cars/vehicles is permitted through designated ports only. Now import of cars/vehicles would also be allowed at ICD Faridabad and Ennore Port (TN).

Electronic Data Interchange Initiatives

e-BRC system allows Transmission of realization of export proceeds details from banks to DGFT in electronically secured format. The system has been made mandatory with effect from 17th August, 2012.

e-BRC data is also of use to different ministries/departments of Central Government and State Governments who have expressed interest in obtaining this data from DGFT.

Message Exchange System for exchanging shipping data relating to Focus Product Scheme (FPS), Focus Market Scheme(FMS), Market linked Focus Product Scheme(MLFPS), Status Holder Incentive Scrip(SHIS), Served From India Scheme (SFIS)and Agri Infrastructure Scheme shall be established with DG Systems.

An online system to resolve EDI issues has been established. The system generates a key number for each complaint for follow up.

INDIA—SPACE PROGRAMME

History:

- India's experience in rocketry began in ancient times when fireworks were first used in the country, a technology invented in neighbouring China, and which had an extensive two-way exchange of ideas and goods with India, connected by the Silk Road.
- Military use of rockets by Indians during the Mysore War against the British inspired William Congreve to invent the Congreve rocket, predecessor of modern artillery rockets, in 1804.
- After India gained Independence India recognised the potential of rocket technology in both defence applications, and for research development. Recognising the fact that a country as demographically large as India would require its own independent space capabilities, and

recognising the early potential of satellites in the fields of remote sensing and communication, these visionaries set about establishing a space research organisation.

Phase 1: 1960-70

- Dr. Vikram Sarabhai was the founding father of the Indian space programme. After the launch of Sputnik in 1957, he recognised the potential that satellites provided.
- Nehru, who saw scientific development as an essential part of India's future, placed space research under the jurisdiction of the Department of Atomic Energy in 1961.
- The DAE Director Homi Bhabha, who is regarded as the father of India's atomic programme, then established the **Indian National Committee for Space Research (INCOSPAR)** with Dr. Sarabhai as Chairman in 1962.
- From its establishment in 1962, the Indian space programme began establishing itself with the launch of **sounding rockets**, which was complemented by India's geographical proximity to the equator. These were established from the newly-established **Thumba Equatorial Rocket Launching Station (TERLS)**, built near Thiruvananthapuram in south Kerala.
- Subsequently, India developed indigenous technology of **sounding rockets called Rohini Family** of sounding rockets. Indian space programme endeavoured to indigenize every material supply route, mechanism, and technology.
- The space programme expanded and was eventually given its own government department, separate from the department of Atomic Energy.
- In 1969, the India Space Research Organisation (**ISRO**) was created
- **Department of Space** was established in 1972.

Phase II: 1970-80

- India started designing and creating an independent launch vehicle.
- Began development of satellite technology, anticipating the remote sensing and communication needs of the future.
- Aryabhata in 1975 **by a Soviet booster**.
- **By 1979, the SLV was ready** to be launched from a newly-established second launch site, the **Sriharikota Rocket Launching Station (SRLS)**.
- The first launch in 1979 was a failure, attributed to control failure in the second stage. By 1980, this problem had been worked out. **The first indigenous satellite launched by India was called Rohini.**

Phase III: 1980-90

- ISRO was keen to begin construction of a satellite launch vehicle that would be able to put truly useful satellite into polar orbit. **The Augmented Satellite Launch Vehicle (ASLV)** was tested in 1987, but this launch was a failure. After minor corrections, another launch was attempted in 1988, and this launch again failed.

Phase IV: 1990-2000

The first successful launch took place in 1994 and since then, the PSLV has become the workhorse launch vehicle, placing both remote sensing and communications satellites into orbit, creating the largest cluster in the world, and providing unique data to Indian industry and agriculture.

Phase V: 2000-2010

In 2001, the first development flight of the GSLV took place. India is developing a project to send unmanned probe to the moon in 2008, as the first attempt at exploration of solar system. This project is called **Chndrayaan**.

ISRO has entered the lucrative market of launching payloads of other nations upon its rockets from Indian soil. ISRO is planning a mission to Mars early in the next decade.

CURRENT PROGRAMME

From the beginning, space activities in the country, concentrated on achieving self reliance and developing capability to build and launch communication satellites for television broadcast, telecommunications and meteorological applications; remote sensing satellites for management of natural resources.

Accordingly, ISRO has successfully operationalized two major satellite systems namely Indian National Satellites (INSAT) for communication services and Indian Remote Sensing (IRS) satellites for management of natural resources; also, Polar Satellite Launch Vehicle (PSLV) for launching IRS type of satellites and Geostationary Satellite Launch Vehicle (GSLV) for launching INSAT type of satellites.

Satellites

- INSAT
- IRS
- Satellite Navigation

Launch Vehicle

- PSLV
- GSLV

Satellite Applications

- SatCom Applications
- Remote Sensing Applications
- VRC

Indian National Satellite (INSAT) System

The INSAT series, commissioned in 1983, has today become one of the largest domestic satellites systems in the Asia-Pacific region comprising **ten satellites** in service.

1.	GSAT-10	Launched on Sep 29, 2012
2.	GSAT-12	Launched on July 15, 2011
3.	GSAT-8	Launched on May 21, 2011
4.	INSAT-4CR	Launched on Sep 02, 2007
5.	INSAT-4B	Launched on Mar 12, 2007
6.	INSAT-4A	Launched on Dec 22, 2005

7.	INSAT-3E	Launched on Sep 28, 2003
8.	INSAT-3A	Launched on Apr 10, 2003
9.	KALPANA-1	Launched on Sep 12, 2002
10.	INSAT-3C	Launched on Jan 24, 2002

Indian Remote Sensing (IRS) Satellite System

The Indian Remote Sensing (IRS) satellite system is one of the largest constellations of remote sensing satellites in operation in the world today. The IRS programme commissioned with the launch of **IRS-1A in 1988 presently includes eleven satellites** that continue to provide imageries in a variety of spatial resolutions from better than one metre ranging upto 500 metres.

1.	<u>SARAL</u>	Launched on Feb 25, 2013 by PSLV-C20
2.	<u>RISAT-1</u>	Launched on Apr 26, 2012 by PSLV-C19
3.	<u>Megha-Tropiques</u>	Launched on Oct 12, 2011 by PSLV-C18
4.	<u>RESOURCESAT-2</u>	Launched on Apr 20, 2011 by PSLV-C16
5.	<u>CARTOSAT-2B</u>	Launched on July 12, 2010 by PSLV-C15
6.	<u>OCEANSAT-2</u>	Launched on Sept 23, 2009 by PSLV-C14
7.	<u>RISAT-2</u>	Launched on Apr 20, 2009 by PSLV-C12
8.	<u>CARTOSAT-2A</u>	Launched on Apr 28, 2008 by PSLV-C9
9.	<u>CARTOSAT - 2</u>	Launched on Jan 10, 2007 by PSLV-C7
10.	<u>CARTOSAT-1</u>	Launched on May 05, 2005 by PSLV-C6
11.	<u>RESOURCESAT-1</u>	Launched on Oct 17, 2003 by PSLV-C5

Satellite Navigation

Indian Regional Navigation Satellite System (IRNSS)

IRNSS is an independent regional navigation satellite system being developed by India. It is designed to provide accurate position information service to users in India as well as the region extending up to 1500 km from its boundary, which is its primary service area. IRNSS will provide two types of services, namely, Standard Positioning Service (SPS) and Restricted Service (RS) and is expected to provide a position accuracy of better than 20 m in the primary service area.

GPS Aided GEO Augmented Navigation (GAGAN)

- The ISRO and the AAI are implementing the GAGAN project as a Satellite Based Augmentation System for the Indian Airspace for safety-of-life applications.
- The functional performance and operational requirements of GAGAN will be governed by the specifications as mentioned in the international standards.
- In the GAGAN-FOP, all the ground elements, namely, 15 Indian Reference Earth Station (INRES), 2 Indian Master Control Centre (INMCC) and 2 Indian Land Uplink Station (INLUS) were established and integrated.
- In addition to the existing Optical Fibre Cable (OFC) Data Communication Network, VSAT link is also established between almost all INRES sites and INMCC.
- The establishment of third INLUS at New Delhi and an additional data communication network are in progress.
- The first GAGAN navigation payload was flown on GSAT-8 which was launched on May 21, 2011 and the second on GSAT-10 launched on Sep 29, 2012.

Launch Vehicles

Today, Indian space programme has become self-reliant with the operationalisation of two satellite launch vehicles, PSLV, mainly for launching IRS class of satellites in polar orbits and Geosynchronous Satellite Launch Vehicle (GSLV) for launching communication satellites into geo-synchronous transfer orbit. GSLV can carry 2- 2.5 tonne satellite in to 36,000 Kilometer range for geo stationery transfer orbit and India was the sixth country in the world to have this capability.

So far ;

- PSLV has twenty three consecutively successful flights out of twenty four launches
- GSLV has four successful flights of seven launches

Satellite Applications

- INSAT system is providing tele-communications, television broadcasting, weather forecasting and societal application services such as tele-medicine and tele-education
- IRS System with Nine satellites in operation is providing data for a variety of application programmes such as Groundwater Prospects Mapping, Crop Acreage and Production Estimation, Potential Fishing Zone Forecast, Biodiversity Characterisation etc.
- In order to reach space-based services directly to the rural population, nearly 500 Village Resource Centres (VRCs) have been set up in association with NGOs, Institutes and Government Agencies.

INSAT Applications

1. The telephone circuit devices through INSAT connect remote inaccessible areas to major cities.
2. The launch of INSAT-4A during December 2005, INSAT-4B in and INSAT- 4CR in 2007 have ushered in Direct To Home (DTH) television services in the country. Television reaches 85 percent of India's population via INSAT.
3. Over 200 AIR stations are linked via INSAT network.

4. In the recent years, Very Small Aperture Terminals (VSAT) have revolutionised our telecommunications sector. INSAT supports over 20,000 VSATs for e-commerce and e-governance. NSE and BSE use VSAT technology across the country for instantaneous transactions.
5. Today exclusive channels are provided for interactive training and Developmental communication including distance learning.
6. India has an exclusive meteorological satellite Kalpana - 1. The imaging instruments (VHRR) & (CCD) collect meteorological data and provide timely warnings on impending cyclones. The data relay transponder in the INSAT system is used for collect real time hydro meteorological data for river monitoring flow forces.
7. The launch of **EDUSAT** on September 20, 2004 heralded new era in the field of distance education and today, about 35,000 class rooms are in the EDUSAT network providing services at primary, secondary and university levels.
8. The satellite based **telemedicine network** has expanded its network connecting 375 hospitals (305 remote and rural hospitals including those in Jammu & Kashmir, North Eastern region and Andaman and Nicobar Islands, 13 mobile units and 57 super specialty hospitals in major cities).

9. **Disaster Management Support (DMS) Programme of ISRO**

provides timely support and services from aero-space systems, both imaging and communications, towards efficient management of disasters in the country. The DMS programme addresses disasters such as flood, cyclone, drought, forest fire, landslide and Earthquake. These include creation of digital data base for facilitating hazard zonation, damage assessment, etc., monitoring of major natural disasters using satellite and aerial data; development of appropriate techniques and tools for decision support, establishing satellite based reliable communication network, deployment of emergency communication equipments and R&D towards early warning of disasters. To support the total cycle of disaster/ emergency management for the country, in near real time, the database creation is addressed through National Database for Emergency Management (NDEM), a GIS based repository of data. NDEM is envisaged to have core data, hazard-specific data, and dynamic data in spatial as well as a-spatial form.

ISRO has set up a satellite based VPN linking the National Control Room at MHA with DMS-DSC at NRSC, important national agencies, key Government Offices in Delhi and the Control Rooms of 22 multi-hazard-prone States. Further ISRO has developed and deployed INSAT **Type-D terminals** (portable satellite phones), INSAT based **Distress Alert Transmitter (DAT)** for fishermen, **Cyclone Warning Dissemination System (CWCS)** and DTH based **Digital Disaster Warning System (DDWS)** in disaster prone areas.



IRS Applications

Imagery taken by IRS Satellite System has found application in diverse fields ranging from agriculture, urban planning, Crop health monitoring, crop yield estimation and drought assessment. Soil mapping at different scales with relative ease has become a reality. IRS data has also been used for Ground Water potential zone mapping and mineral targeting tasks. The ocean applications of IRS data include potential fishing zone identification and coastal zone mapping. Forest cover mapping, biodiversity characterisation and monitoring of forest fire is now carried out using IRS imagery. IRS spacecraft provide timely inputs to Flood and earthquake damage assessment thereby providing the necessary supportive strength to disaster management. Even in the field of Archaeological survey, the utility of IRS imagery has been well established. resource monitoring and its management

Village Resource Centre (VRC)

Combining the services offered by INSAT and IRS satellites, a new concept namely Village Resource Centre (VRC) to provide information on natural resources, land and water resources management, tele-medicine, tele-education, adult education, vocational training, health and family welfare programmes has been established. Nearly 500 such VRCs have been established in the country.

Railways and Indian economic development

- **160th anniversary**
- 1st passenger train set off on 16 April 1853 from Mumbai to Thane, 34 kilometres away.
- Railways were the most important infrastructure development in India from 1850 to 1947. In terms of the economy, railways played a major role in integrating markets and increasing trade. In terms of politics, railways shaped the finances of the colonial government and the

Princely States. At the same time, Indian political institutions influenced railway ownership and policy, which in turn influenced railway performance. As the twentieth century progressed, railways became a force for independence and democracy.

- Railways were partially nationalised between 1880 and 1908 as the Government of India assumed a majority ownership stake in the former guaranteed railway companies. Dividend guarantees were a key feature of the early era of private ownership before 1880. Complete nationalisation occurred between 1924 and 1947 as the colonial government assumed full control over operations.
- The performance of Indian railways can be classified into two periods: pre-1920 and post-1920. There was a trend to higher output, productivity, and profits between 1850 and 1919, but after 1920 there was a leveling off.
- There is also clear evidence that railways raised incomes, but the magnitude of the effect and the precise mechanisms are still in doubt.
- Traffic developed slowly in the first decade of railway operations, but the subsequent increase in traffic surprised even official estimates. In the absence of comparable substitutes, Indians used railways to transport goods and people
- Historians have long argued that national income would have been far smaller in most countries if railways had never been introduced.
- Hurd was the first to make a social savings calculation for Indian railways. He assumed that without railways freight rates would have been between 80 and 90 per cent higher based on the observed differences between rail freight rates and those for bullock carts during the mid-nineteenth century.
- **Why did railways have a relatively large impact in India?** We think there are two reasons. First, railways were far superior to the existing transport technology in India. Bullock carts were not an effective substitute to railways and India did not have an extensive inland waterway network. Second, Indian railways experienced high levels of **total-factor productivity (TFP) growth** after they were constructed.
- They also contribute to agglomeration of economic activity, like the emergence of cities.
- It appears that railways' primary impact in the Indian economy was to **increase inter-regional and international trade.**

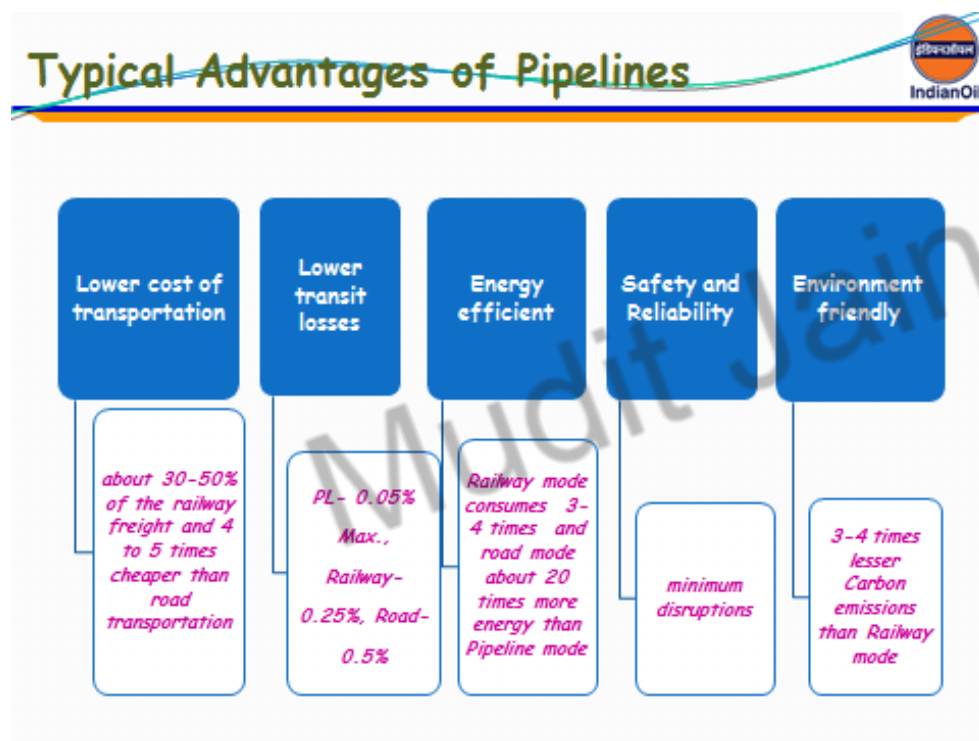
PIPELINES NETWORK IN INDIA

1. **First trunk pipeline** dates back to 1870s
2. Long distance pipeline transportation got a boost during World War-II when coastal tanker traffic was disrupted in U.S
3. Discoveries of giant oil fields in remote parts of the world led to development of correspondingly large crude oil pipeline networks
4. Pipeline industry has grown in parallel with the development of world oil industry.
5. First crude oil pipeline in India laid from **Digboi oil fields to Digboi refinery** before independence.
6. During 1960-63, Oil India Limited laid 1156 km long first trunk crude oil pipeline, from Naharkatiya and Moran oil fields to the refineries at Guwahati and Barauni.
7. IndianOil laid its first cross country product pipeline during 1962-64 to transport products from Guwahati refinery to Siliguri.
8. Subsequently, a number of product and crude oil pipelines were laid in the 60's, 70's and 80's, including sub-sea crude oil pipelines.

9. The pipelines laid during the 60's were designed, engineered and constructed by foreign companies. However, the exposure to this technology enabled Indian engineers to gain confidence, and the pipelines which came up later, were designed and constructed with indigenous expertise
10. India today has over 22500 km of major crude oil and product pipelines out of which IOCL owns & operates more than 11,000 km of Pipelines

Drivers for Growth of Pipelines in India

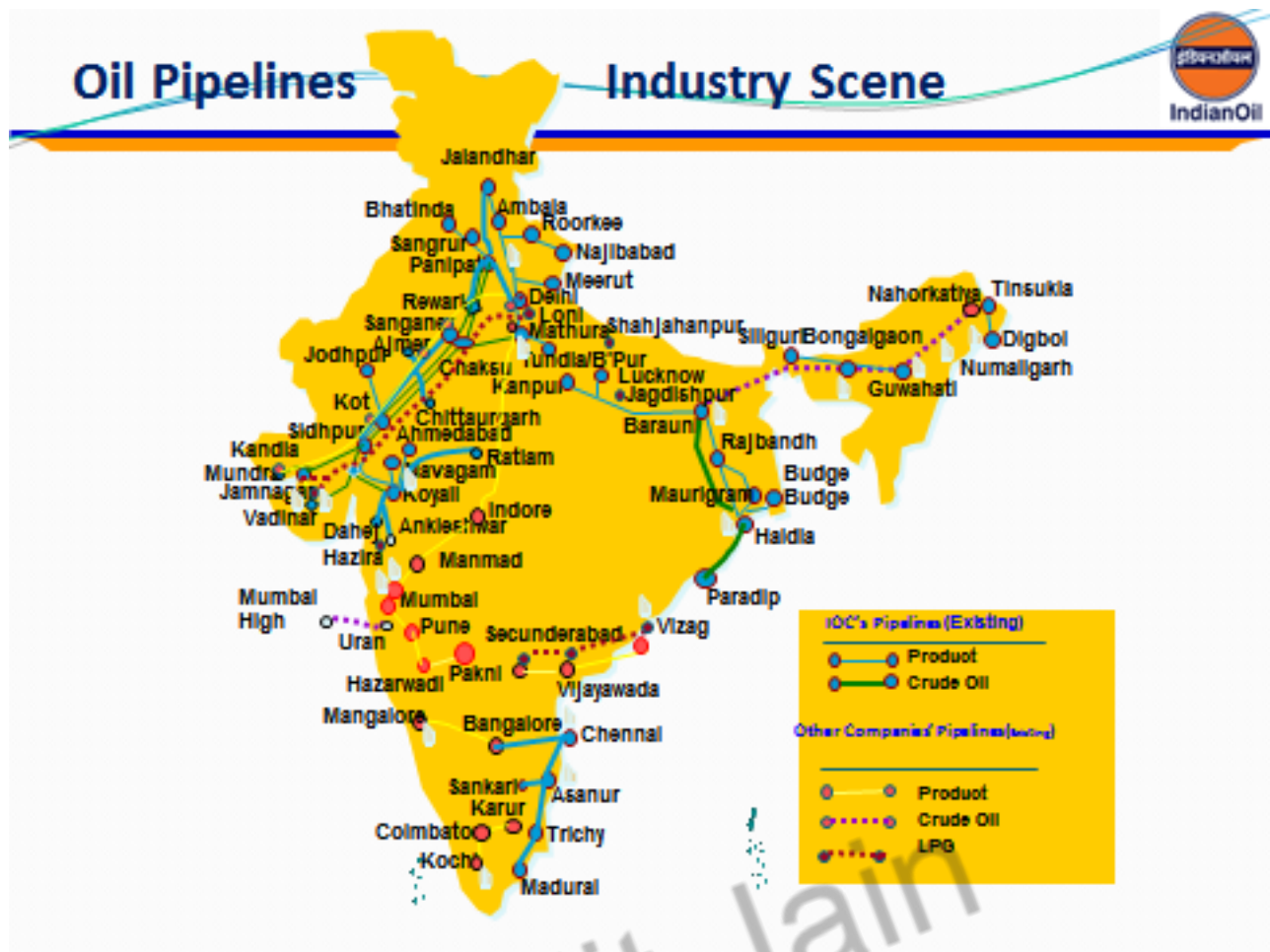
1. Low consumption of petro products in the initial years post independence
2. Early refineries in India installed at coastal locations requiring only coastal movement of crude oil
3. Refining capacities being low, products were either consumed locally or transported to the consumption centres by rail or road. After 1960, most of the refineries came up at land-locked locations necessitating laying of crude and product pipelines



Existing Liquid Pipelines : Industry

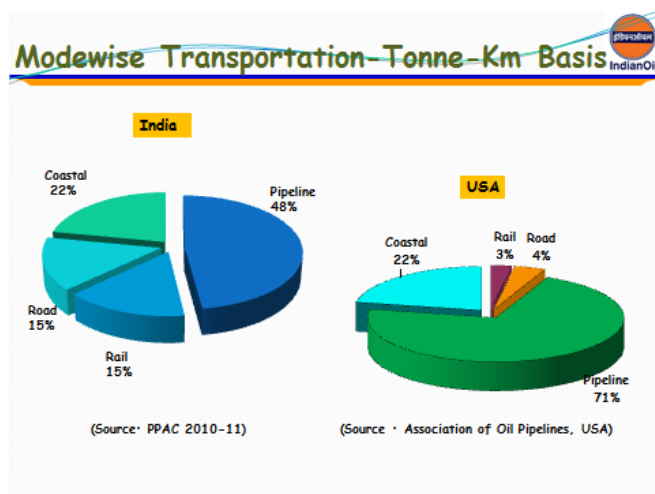
As on 1.12.2012

	IOCL	BPCL*	HPCL**	GAIL	OIL	ONGC ###	Cairn	Total Industry
Length (Kms.)								
Product	6632	1939	2776	1691	654	-	-	13692
Crude Oil	4376	935	1017	-	1193	676	667	8864
Total	11008	2874	3793	1691	1847.3	676	667	22556
Capacity (MMTPA)								
Product	36.86	10.35	22.27	3.6	1.70	-	-	74.78
Crude Oil	40.40	6.0	9.0	-	8.40	43.84	7.5	115.1
Total	77.26	16.35	31.27	3.6	10.1	43.84	7.5	189.88



Technological Developments

1. API 5L- X70 grades pipelines allows reduction in thickness of pipeline/ number of pump stations
2. **Intelligent Pigging** - To ascertain integrity of pipeline without disrupting operations
3. Horizontal Directional Drilling – Easy to cross major rivers; Crossing highways, Railways etc. without causing traffic obstructions
4. **Supervisory Control and Data Acquisition System - SCADA** applications allows better control and operation of pipeline system with less human intervention requirements
5. Leak Detection System



SOME IMPLEMENTED PROJECTS / BRIDGING GAP

1. Paradip- Raipur-Ranchi Pipeline
2. Kolkata ATF Pipeline
3. Guwahati ATF Pipeline
4. Debottlenecking of SMPL
5. Cauvery Basin Refinery-Trichy Pipeline
6. Paradip-Haldia-Durgapur LPG Pipeline

CHALLENGES

1. National Oil Companies facing **acute fiscal challenges** due to prevailing norms on product pricing and fund crunch for their expansion
 2. Statutory Clearances have become more complex; Projects are getting delayed on this account
 3. Land Acquisition Problems
- Railways and roads are inefficient modes of carrying petroleum products because they consume significantly more energy (320 BTU for railways and 1700 BTU for roads to move one tonne of petroleum products over one km) than pipelines for which the comparable figure is only 50-135 BTU.
 - In developed countries like the USA and the UK, almost all long distance transportation of petroleum products and gas takes place through pipelines. India is far behind these countries in realising the full potential of pipelines because it does not have a well-developed pipeline network.
 - A rapid development of pipelines, therefore, is essential to ensure that the share of this mode in the transportation of petroleum products and natural gas reaches the desired level.
 - It is estimated that around Rs 30,000 crore are likely to be invested over the next 10-12 years in setting up pipeline networks for liquid petroleum products. This is based on recommendations of the Sundararajan Committee.

In line with this perspective, the three major recommendations for the liquid petroleum product pipelines sector are laid out in the following sections.

1. Allow Unrestricted Entry For Setting Up Pipelines

- Pipeline networks should be developed on the basis of commercial considerations. Any organisation, whether from the private sector, public sector or joint sector, should be allowed to set up a pipeline. This will not only allow generation of the resources required for the development of a pipeline network, but also lead to its speedy and cost efficient implementation.
- Lower excise and custom duties on capital goods and instruments in the pipeline sector
- On the international front, the Government should assist interested developers by initiating talks with the South Asian Association for Regional Co-operation (SAARC) countries to develop an international pipeline network in the region. This will facilitate cost effective and speedy transfer of petroleum products and gas from surplus regions to deficient areas. For example, by entering into such a relationship with Bangladesh, India can not only source surplus gas from that country but also harness its own gas from Tripura.

- A case study from USA shows that allowing market based competition in pipeline development and operation can result in significant cost reductions.

2. Set up New Pipelines for Products under the Common Carrier Principle

- Pipelines are natural monopolies. Putting up a second pipeline where one already exists is normally not economically viable and is a waste of resources. Moreover, a single company's ownership of a monopoly transportation medium is inherently detrimental to the development of competition. To prevent such situations, the common carrier principle has been utilised in the USA and other developed countries.
- India should also use this principle for development and operation of all new pipelines for petroleum products, not for gas.
- It is very difficult to operate gas pipelines on the common carrier principle because this will allow a new producer to enter a pipeline of limited capacity forcing all other shippers in that line to reduce their volumes based on some allocation scheme. A reduction in volume by a producer already in the line could cause disruption in assured supplies to customers who cannot store it either. Therefore, a different operating principle is required for gas pipelines. In the USA, gas pipelines operate on a **contract carriage** basis which allow users and suppliers to enter long term contracts with pipeline owners to ensure assured supply. India will also have to design a different framework for operating gas pipelines.

3. Establish an Autonomous Pipeline Development and Regulatory Authority (PDRA)

An autonomous Pipeline Development and Regulatory Authority (PDRA) should be established to do the groundwork for speedy and cost efficient development of pipelines, regulate the trade of petroleum products and natural gas and ensure free and fair competition to protect the interests of the customers. The formation of the Regulatory Body could follow the guidelines set in the UK Petroleum Act 1975.

Transmission / infrastructure: India is a vast country and the pipeline network has been developed mostly in the northwest region. In 2008, a pipeline was built to link a new production region in the East to the existing network. In order to further develop the use of gas, it is critical to extend the transmission infrastructure to supply new cities and develop distribution networks. In both cases, the regulatory framework, in particular transport tariffs, should give adequate incentives for the new infrastructure to be built.

- Map 1 shows the existing pipeline infrastructure highlighting that large parts of India do not yet have access to gas due to lack of infrastructure. The size of the country and the fact that historically most of the production was located in the North West explain this situation.
- The start of **KG-D6** off the east coast provides an opportunity to supply new cities, in the South –Chennai, Bangalore, Tuticorin – but also in the North East.
- **Petronet's new LNG terminal in Kochi** (southwest coast of India) planned to start in 2012 could also enhance the development of pipelines in the southern region.
- **RIL and GAIL are gearing up to start the second phase of construction of pipelines to transport gas from the Krishna-Godavari Basin to the southern parts of the country.** The pipelines should be completed by 2012 with an estimated investment of INR 2 300 crore³ (USD 0.5 billion) from RIL.



- GAIL announced in August 2010 that it would invest about INR 30000 crore (USD 6.4 billion) over the next three years to build over 6600 km of pipeline and connect cities in Uttar Pradesh, Uttarakhand, Punjab, and Haryana by 2013.
- In particular, GAIL plans to lay 1 389 km of pipeline from Dabhol to Bangalore and to link the future Kochi LNG terminal to Mangalore (1 114 km).
- Another pipeline, the 2 050 km Jagdishpur-Haldia pipeline, is planned to link the existing network to the north-eastern part of India.
- RIL was authorised to build the 600 km long Kakinanda-Chennai pipeline to be commissioned by the second quarter of 2012, the 1 140 km Kakinada-Basudebpur-Howrah pipeline as well as the Chennai-Bangalore-Mangalore pipeline and the Chennai-Tuticorin – all of them also expected by 2012.

Imports and contracts

- As India does not have any pipeline connection, all the gas currently imported is LNG.
- India joined the global LNG market in March **2004 when the Dahej LNG terminal** went into operation.
- **Petronet LNG Limited (PLL), a joint venture** promoted by GAIL, IOCL, BPCL, GDF Suez, the Asian Development Bank (ADB) and ONGC was formed to import LNG in order to meet the growing gas demand.
- The **second LNG terminal is located in Hazira**, which was commissioned in April 2005.
- **The third terminal, the Dabhol-Ratnagiri LNG terminal, is expected to become operational.**

LNG import capacity could be extended to over 80 bcm (63 mtpa), if all planned terminals come to fruition (see Table 8 below). However, those investments are likely to face some difficulties

and delays related to lack of capital and difficulties to secure new supplies. The Gorgon LNG facility in Australia, which took the FID in 2009, will sell 1.5 mtpa to the Indian gas market.

However, the Indian gas market might be less ready to accept LNG prices at the same level as Japan, Korea or even China whose regasification capacity is increasing rapidly.

Import infrastructure

IEA's forecasts on demand and domestic production imply a supply gap of 18 bcm by 2015, increasing to 28 bcm by 2020 and 52 bcm by 2030. In any case, LNG seems set to remain the first source of imports for India for at least the five years to come. So far, India does not import by pipeline. While several projects are under consideration, they are still far from even taking Final Investment Decision.

LNG regasification terminals projects – the preferred option

India's import capacity consists of LNG regasification terminals with a current capacity of 13.5 mtpa (18 bcm). This capacity is expected to increase based on projects currently under construction and in planning. Only the 5.5 mtpa Dabhol and 2.5 mtpa Kochi are under construction with a start in 2010 and 2012 respectively. It is unlikely that all these LNG terminals will come online; so far only the Dabhol and Kochi can realistically come online before 2015 as the market faces an increase of domestic production and uncertainties on global prices. It is likely that many users will try to secure cheaper domestic gas before potentially looking at LNG. But some are likely to be built due to India's growing appetite for gas

Table 8: India LNG terminals, existing, under construction and planned

Terminal	Partners	Capacity	Supply source	Start-up date
Existing				
Dahej	Petronet LNG (GAIL, ONGC, Indian Oil and BPLC (each 12.5%), GDF Suez (10%), ADB (5.2%) and private shareholders (34.8%))	10 mtpa	Qatar – long term (7.5 mtpa)	March 2004
Hazira	Shell (operator, 74%), Total (26%)	3.5 mtpa	Merchant model	April 2005
Under construction				
Dabhol	NTPC, GAIL, Indian banks ¹⁵ (28.3% each) and the Maharashtra state Electricity Board (15%).	5.5 mtpa (1 mtpa initially)	Possible: Algeria, Qatar, Australia, Oman and Abu Dhabi	2010
Kochi	Petronet LNG	2.5 mtpa	1.5 mtpa for 20 years from ExxonMobil's Gorgon, Australia (2014-15). Possibly Qatar, Papua New Guinea	2012
Planned				
Dahej exp	Petronet LNG	2.5 mtpa	n.a.	2012
Hazira exp	Shell, Total	6.5 mtpa	n.a.	n.a.
Kochi exp	Petronet LNG	2.5 mtpa	n.a.	2014.
Mundra Port	GSPC (75%), Adani Group (25%) ¹⁶	6.5 mtpa	n.a.	2012
Mangalore	ONGC	5 mtpa	Possibly Oman, Qatar, Africa	2012
Pipavav Port	EssarGroup, Swan Energy, possibly GSPC Gujarat Pipavav Port Ltd. Intends to become a partner	5 mtpa	n.a.	2013
Ennore	TIDCO, OilIndia	5 mtpa	n.a.	2015
Haldia	Spice Energy	2.5 mtpa	Indonesia	2011
Kandla	Kandla Port Trust, possibly private companies	2 mtpa	n.a.	n.a.
Mangalore	MMTC, (Bharat Petroleum)	2.5 mtpa	n.a.	2015

Note: this data represents companies' expectations regarding online dates and not the IFA view.

Committed to growth: India's oil and gas industry

As the seventh largest country in the world, with the second highest population, India is a land of vast resources and has seen many developments over the last year in its oil and gas industry.

The Indian Government is supporting the growth of the country's natural gas market to help secure energy for the future.

At a recent pipeline conference, India's Prime Minister Dr Manmohan Singh said "The Indian Government has been consistently encouraging its national oil and gas companies to invest and pursue opportunities in both Indian and overseas oil and gas markets.

With this support India has seen an influx of activity over the last year with more projects proposed, construction commenced, and pipelines commissioned.

Proposed pipelines:

1. In April 2012, Turkmenistan and Pakistan signed gas sale purchase agreements for the proposed **1,680 km Turkmenistan – Afghanistan – Pakistan – India (TAPI)** Pipeline during a state visit to Pakistan by the Turkmenistan president.

- Under the agreement, Turkmenistan will provide 3.2 Bcf/d of natural gas from the South Yolotan/ Osman and adjacent gas fields through a pipeline.

Two Proposed Pipelines in South Asia



Map | • B 2139 heritage.org

- The TAPI Pipeline project would transport gas from Turkmenistan's gas fields through Afghanistan to Multan in Pakistan, and on to the **Indian township of Fazilka**. Estimated to cost more than \$US3 billion, the pipeline would have a total transmission capacity of 90 MMcm/d of gas.
- While the initial feasibility study of the TAPI Pipeline was conducted in 2004, momentum on project negotiations increased in mid-2010, and by the end of 2010 an intergovernmental agreement, gas pipeline framework agreement and Heads of Agreement were signed in Turkmenistan.

Gujarat State Petronet Ltd (GSPL) has been authorised to construct three natural gas pipelines by India's Petroleum and Natural Gas Regulatory Board (PNGRB).

- The **Bhatinda – Jammu – Srinagar pipeline** to Firozpur, Jalandhar, Hoshiarpur, Amritsar, Batala, Jammu and Srinagar. The **740 km pipeline** will have a design capacity of at least **15 MMcm/d** and run through the states of Punjab, Jammu and Kashmir.
- The Mehsana – Bhatinda pipeline** will have a design capacity of at least **30 MMcm/d**. The pipeline will be approximately **1,670 km long**, consisting of a 900 km trunkline passing through the states of Gujarat, Rajasthan, Haryana and Punjab, and 770 km of spur lines extending to Udaipur, Jodhpur, Bhilwara, Chhitorgarh, Ajmer, Jaipur, Alwar and Rohtak.
- The **Mallavaram – Bhopal – Bhilwara – Vijaipur pipeline** will pass through the states of Andhra Pradesh, Maharashtra, Madhya Pradesh and Rajasthan, and will be approximately 1,585 km long, not including spur lines. It will have a design capacity of at least 30 MMcm/d.



Punj Lloyd:

1. 115 km, 24 inch diameter **Kochi Kootanad Mangalore Bangalore** Owned by GAIL. Construction is expected to be completed in May 2013.



2. Working on the proposed 99 km long **Hazira Dahej Naphtha Pipeline Project** owned by Oil and Natural Gas Corporation (ONGC).
3. Punj Lloyd has been awarded a EPC contract from ONGC for an offshore project involving 122.5 km of **subsea pipeline in Bombay High**, Mumbai.
4. Commissioned by GSPL for a 39.4 km long **Submarine Pipeline Project**, which will involve both onshore and offshore construction in Mumbai.
5. BPCL Refinery to **Uran Bottling Plant pipeline** which will be both off and onshore.
6. Construction of the **Vijaipur – Kota pipeline** posed a number of challenges, including a requirement for specialised machinery and manpower to overcome the 20 per cent hard rock encountered along its route. The route also traverses the 400 m-wide River Parbati, which has a rocky bed.

7. GAIL has also contracted Punj Lloyd to construct the 825 km **Dabhol – Bangalore Pipeline Project**, which is currently under construction.

Dahej – Vijaipur – Dadri – Bawana – Nangal – Bhatinda cross-country pipeline

1. GAIL's recently commissioned **2,200 km** running through the northwest corridor of India
2. The pipeline project **covers eight states** including Gujarat, Madhya Pradesh, Rajasthan, Uttar Pradesh, Haryana, Delhi, Punjab and Uttarakhand (nangal)
3. There is hope that its extension would soon carry the gas from the TAPI Pipeline into the Indian hinterland.
4. This pipeline would not only interconnect with the existing network but also meet the demand-supply gap of natural gas in the northern region of the country.
5. Completed in a record 45 months, it traverses 399 water bodies, 25 national highway crossings and 35 railway crossings.
6. Project will spur industrial development across 40 industrial hubs and has the potential to energise power supply, urea productions, and provide cities along the pipeline network with natural gas for industrial and domestic applications.

With the amount of projects currently underway in the region, India will soon see a strong increase in the security of its gas supply. The recent developments offshore will help ensure the industry's development and help to build more projects around the region.

India has sought Russian cooperation for a plan to build a pipeline that would extend the proposed TAPI network to the latter's oil-rich Altai region via Kazakhstan and Uzbekistan. The proposed network would come in handy for OVL which has acquired considerable hydrocarbon assets in the central Asian region.

OVL already owns interest in **Sakhalin- I hydrocarbon reserve in Russia** and has, in 2009, bought **Imperial Energy** that has oil and gas assets in Siberia. Besides, the company has been looking at investment **opportunities in Sakhalin-3** and in Russia with government-to-government negotiations also taking place for the joint development of unexplored blocks in the oil and gas-rich regions of Russia.

Ports of India

- **Ports of India** are very important gateway for international trade i.e. imports and exports.
- Maximum of the cargo that goes out of the country and that comes in the country is through these ports of India.
- These ports play important role in strategic planning of imports and exports of country.
- **India's international trade by sea amounts to over 90% of foreign trade that take place via 13 major and 187 minor ports of India.**
- These ports of India are held responsible for playing a dominant role in developing the country's trade and commerce.
- Out of these 12 are managed by Government and one by Corporate. **The latest addition to the list of major ports of India is Port Blair.** It was added in June 2010, making it the 13th port in the country.

Major Ports of India

1. Mumbai Port

Mumbai port is the biggest and busiest of all the ports of India. Mumbai Port was established as the Bombay Port Trust on June 26, 1873. Mumbai port handles 11 per cent of the total sea-borne traffic of India. It is a natural deep-water harbor in the southern portion of the Ulhas River estuary. Not many people know that the official name of Mumbai harbor is “Front Bay”. The port was the pre-eminent commercial ports of India in the nineteenth and twentieth centuries. It is known as the gateway to India, and has been a primary factor in the emergence of Mumbai as the commercial capital of India.

2. Kandla Port

Kandla is a tidal port located on the Gulf of Kutch and is one of major ports of India on the west coast. It is one of the important ports of India in Kutch district of Gujarat state in western part. Kandla seaport is the result of partition. It was constructed in the 1950s as the chief seaport serving western India, after the partition of India from Pakistan left the port of Karachi in Pakistan.

3. Marmugao Port

Marmugao is one of the oldest Ports of India located on the west coast. The port also serves as a naval base. It is one of the premier iron ore exporting ports of India with an annual throughput of around 26.74 million tonnes of iron ore traffic. It was commissioned in the year 1888 and was declared a major port in 1964. Today the quantity of iron ore exported from Marmugao port constitutes 39 per cent of the total iron ore exports of India.

4. Visakhapatnam Port

Visakhapatnam is the deepest land-locked and protected port in India. It is one of the largest Ports of India in terms of the cargo handled. Visakhapatnam port also serves as home to the Eastern Naval Command of the Indian Navy. The port construction started in the year 1927 and completed in the year 1933. the first vessel entered the port on 7 October 1933. It is one of the busiest ports of India. It is the most scenic of all the ports as it is surrounded by a hill on the south side and is often compared to the Durban port because of this similarity.

5. Chennai Port

It is one of the oldest Ports of India located in the southern part. The Chennai Port has an artificial harbor. This gateway port for all cargo has completed about 130 years of service to India's maritime trade. Before it was made an artificial harbor, the initial piers were built in 1861 but was destroyed by 1868 and 1872 storms. Later the process of making an artificial harbor was initiated and the operation started in the year 1881.

6. Kolkata Port

Kolkata also enjoys the importance of one of the major ports of India. The Kolkata port is the only riverine port of all the ports of India and has two docks namely Kolkata dock and Haldia dock. Kolkata Dock System is situated on the left bank of the river Hooghly and has a

comprehensive range of facilities to handle and transport various cargo including heavy lifts. Kolkata port has the largest dry dock of all the major ports of India.

7. Jawaharlal Nehru Port (JNPT)

It is the fastest growing of all the ports of India. The port is located in Navi Mumbai and is managed by Jawaharlal Nehru Port Trust and controlled by the Central Government of India. It handles 65 per cent of India's container traffic. The port is connected pretty well with all major highways and railway stations.

8. New Mangalore Port

The New Mangalore Port, the only major port of Karnataka was inaugurated on 11th January 1975. It is the one of all the Ports of India to export Kudremukh iron-ore. The major commodities exported through the port are iron ore concentrates & pellets, iron ore fines, granite stones, containerized cargo etc. The major imports are crude and petroleum, oil and lubricants (POL) products, LPG, wood pulp, timber logs, finished fertilizers, liquid ammonia, phosphoric acid, other liquid chemicals, containerized cargo, etc.

9. Tuticorin Port

Tuticorin Port was a minor port until Tuticorin minor port and the newly constructed Tuticorin major port were merged and the Tuticorin Port Trust was constituted. Then it became one of the major ports of India and started exporting a variety of cargo meant for the neighboring countries of Sri Lanka, Maldives, etc and the coastal regions of India.

10. Cochin Port

Cochin is one of the fastest growing ports of India and a popular gateway to Indian peninsula. The port is located on the south-east coast of India. It is located on an island named Willingdon Island which is an artificial Island tucked inside the backwaters of Kerala.

11. Paradip Port

The foundation stone of the Paradip Port was laid in January 1962 by then Prime Minister Mr. Jawaharlal Nehru. Government of India declared Paradip as the eighth major port of India on April 18, 1966 making it the first major port on the east coast commissioned in independent India. It is one of the important ports of India that serve the eastern and central parts of the country.

12. Port Blair Port

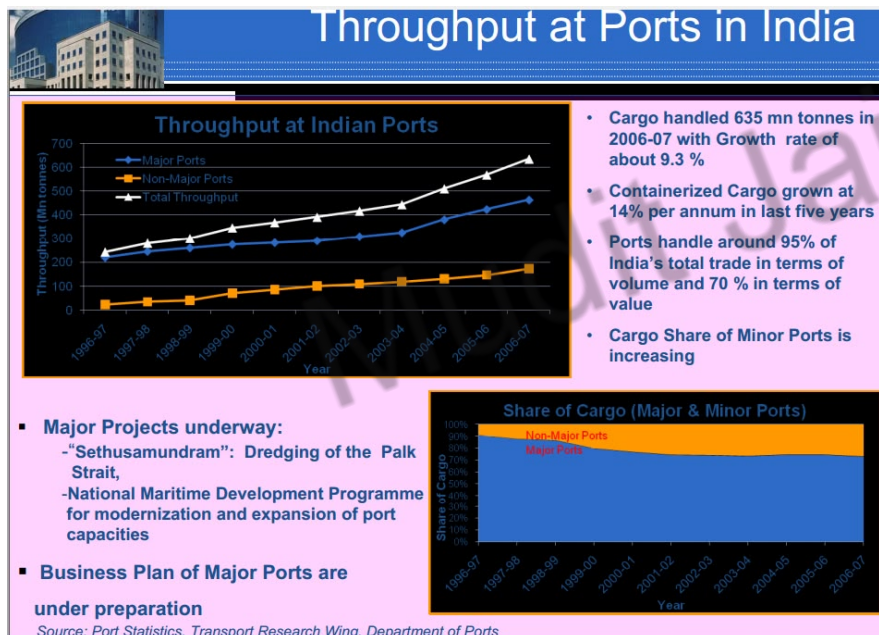
It is the newest of all the ports of India. It was declared a major port in the year 2010. Port Blair, the capital city of Andaman and Nicobar Islands in India is a very popular tourist destination famous for scuba diving and snorkeling. It serves as the main port of call for services from the mainland to the Union territory and is also the principal hub for shipping in the islands.

13. Ennore Port

Ennore is the only port in India which is a Public company rest of the ports of India are governed and managed by Government of India. It is designed as Asia's energy port and was initially started or envisioned as a satellite port to the Chennai Port to de-congest marine traffic. However, Ennore Port has evolved into a full-fledged port with the capacity to handle a wide range of products. The port has adequate road and rail links.

Ports Today:

1. Are dynamic nodes in the Supply chain involving complex international production / distribution network;
2. Have become Integrated Transport Centers and Logistics platforms for International trade, and
3. Stimulate Trade and Regional development
4. Developed under Land-lord Port and Private Port Model in India
5. Opportunities for Private Sector to either act as Port Operator at Major Ports or Port Developer at minor Ports



Future Growth Estimates of Ports in India

- **Cargo handling** at all the ports is projected to grow at 7.7% p.a. till 2013-14 with Minor ports growing at a faster rate of 8.5% compared to 7.4% for the Major ports
- **Traffic estimated** to reach 960 million tonnes by 2013-14
- **Containerized cargo** is expected to grow at 17.3% over the next 9 years
- **The New Foreign Trade Policy envisages doubling of India's share in global exports in next five years to \$150 billion**
- Growth in merchandise exports projected at over 13% p.a. underlines the need for large investments in port infrastructure
- Investment need of \$13.5 billion in the major ports under **National Maritime Development Program (NMDP)** to boost infrastructure at these ports in the next nine years



Public Private Partnership in Port Sector

POLICY

- 100% FDI under the automatic route is permitted for port development projects
- 100% income tax exemption is available for a period of 10 years
- Tariff Authority for Major Ports (TAMP) regulates the ceiling for tariffs charged by Major ports/port operators (not applicable to minor ports)
- A comprehensive National Maritime Policy is being formulated to lay down the vision and strategy for development of the sector till 2025

Projects developed through PPP

- Significant investment on BOT basis by foreign players including Maersk (JNPT, Mumbai) and P & O Ports (JNPT, Mumbai and Chennai), Dubai Ports International (Cochin and Vishakhapatnam) and PSA Singapore (Tuticorin)
- Minor ports are being developed by domestic and international private investors: Pipavav Port by Maersk and Mundra Port by Adani Group (with a terminal operated by P & O), Gangavaram under construction by Consortium lead by DSV Raju

The major challenges facing the transport sector are:

- roads are congested and of poor quality.
- Lane capacity is low - most national highways are two lanes or less.
- A quarter of all India's highways are congested.
- This leads to the deterioration of roads and high transport costs for users.
- Rural areas have poor access. Roads are significant for the development of the rural areas - home to almost 70 percent of India's population. Although the rural road network is extensive, some 33 percent of India's villages do not have access to all-weather roads and remain cut off during the monsoon season. The problem is more acute in India's northern and northeastern states which are poorly linked to the country's major economic centers.
- The railways are facing severe capacity constraints.
- Also, freight transportation costs by rail are much higher than in most countries as freight tariffs in India have been kept high to subsidize passenger traffic.
- Urban centres are severely congested.
- The dramatic growth in vehicle ownership during the past decade - has reduced rush hour speeds especially in the central areas of major cities.
- Ports are congested and inefficient. Port traffic has more than doubled during the 1990s
- Airport infrastructure is strained. Air traffic has been growing rapidly leading to severe strain on infrastructure at major airports, especially in the Delhi and Mumbai airports which account for more than 40 percent of nation's air traffic.

Key Government Strategies

India's Eleventh Five Year Plan identifies various deficits in transport sector which include inadequate roads/highways, old technology, saturated routes and slow speed on railways, inadequate berths and rail/road connectivity at ports and inadequate runways, aircraft handling capacity, parking space and terminal building at airports. Government aims to modernize, expand, and integrate the country's transport services. It also seeks to mobilize resources for this purpose and to gradually shift the role of government from that of a producer to an enabler. In recent years, the Government has made substantial efforts to tackle the sector's shortcomings and to reform its transport institutions. These include:

- Increasing public funding for transportation in its Five Year Plans.
- Launching the ambitious National Highway Development Program which has seven phases and is expected to be completed by 2012. It includes improved connectivity between Delhi, Mumbai, Chennai and Kolkata, popularly called the Golden Quadrilateral, in the first phase, North- South and East- West corridors in phase two, four laning of more than 12,000 km in phase three, two laning of 20,000km and six laning of 6,500 km respectively in phase four and five, development of 1,000km of expressway in phase six and other important highway projects in phase seven. Total expected investment is INR 2.2 trillion.
- Accelerated Road Development Program for the North East Region to provide road connectivity to all State capitals and district headquarters in the region.
- Financing the development and maintenance of roads by creating a Central Road Fund (CRF) through an earmarked tax on diesel and petrol.
- Operationalising the National Highway Authority of India (NHAI) to act as an infrastructure procurer and not just provider.
- Improving rural access by launching the Pradhan Mantri Gram Sadak Yojana (Prime Minister's Rural Roads Program).
- Reducing the congestion on rail corridors along the highly trafficked Golden Quadrilateral and improving port connectivity by launching the National Rail Vikas Yojana (National Railway Development Program)
- The development of two Dedicated Freight Corridors from Mumbai to Delhi and Ludhiana to Dankuni.
- Improving urban transport under Jawaharlal Nehru National Urban Renewal Mission (JNNURM).
- Upgrading infrastructure and connectivity in the country's twelve major ports by initiating the National Maritime Development Program (NMDP).
- Privatization and expansion of the Mumbai and New Delhi Airports and development of new international airports at Hyderabad and Bangalore.
- Enhancing sector capacity and improving efficiencies through clear policy directive for greater private sector participation. Large parts of the NHDP and NMDP are to be executed through public private partnerships (PPP).

World Bank Support

The World Bank has been a major investor in the transport sector in India. At present, it has ten projects in transport portfolio which include seven state road projects and one each for national highway, rural road and urban transport with total loan commitments for the transport sector in India as US\$3.48 billion. The main activities include:

India Highway

National Highway Development Project: The World Bank is financing highway construction on the Lucknow-Muzaffarpur corridors. It is also involved in other sector activities such as improving road road safety.

Rural Roads Program: The project supports the PMGSY in providing all weather roads to villages in four states – Uttar Pradesh, Jharkhand, Rajasthan and Himachal Pradesh.

State Roads Projects: State Highways are being upgraded in the states of Kerala, Mizoram, Uttar Pradesh, Tamil Nadu, Punjab, Himachal Pradesh, Orissa and Andhra Pradesh.

Mumbai Urban Transport Project: The project aims to improve transportation in the Mumbai Metropolitan Region by fostering the development of an efficient and sustainable urban transport system - suburban rail, bus and link roads - and building effective institutions.

Sustainable Urban Transport Project: The project aims to promote environmentally sustainable urban transport in various cities and support implementation of the India National Urban Transport Policy (NUTP).

Studies: In addition to the above, the Bank is involved in the preparation of various analytical works (AAA) in the transport sector in India. These include:

Ports : India Port Sector Study: The purpose of the proposed effort is to review the demand-supply situation with respect to the port sector, identify physical, financial and policy constraints to sector development and suggest mitigation measures for the same.

Construction Industry

India Construction Industry Study: Given the large development programs being launched to support the rapidly growing economy, the supply side constraints in terms of the construction industry capacity are a serious cause of concern. The study reviews these limitations and suggest mitigation measures. This study has produced two outputs titled "Indian Road Construction Industry: Ready for Growth?" and "Indian Road Construction Industry - Capacity Issues, Constraints and Recommendations".

Export Processing Zones in India

Export Processing Zones (EPZs)

Export Processing Zones (EPZs) can be summarized as a unit bearing clusters of specially designed zones of aggressive economic activity for the promotion of export. The main concept of Export Processing Zones was conceived in the early 1970s to promote the growth of the sickening export business of India. Further, the meaning of Export Processing Zones (EPZs) can be broadly defined as an area enjoying special government of India support with respect to fiscal incentives, tax rebates and other exclusive benefits for the growth of export.

Export Processing Zones (EPZs) also encompasses pre-defined infrastructural facilities and regulations pertaining to establishment of such zones and environmental stipulations, respectively. These Export Processing Zones of India were established to help the growth of Indian export commodities, especially from the fast growing sectors.

Objectives of setting up of Export Processing Zones (EPZs)

1. Encourage and generate the economic development
2. Encourage Foreign Direct Investments (FDI)
3. To channel the sources of foreign exchange within the system in a phased manner
4. Foster the establishment and development of industrial enterprises within the said zones
5. Encourage and generate wider economic activities by encouraging foreign investments for the development of the zones

6. To channel the foreign exchange earnings for the further development of these zones and explore new areas for the development of Indian exports
7. Encourage establishment and development of Indian industries and business enterprises and facilitate with proper infrastructure Generate employment opportunity
8. Upgrade labor and management skills
9. Acquire advanced technology for increased productivity
10. Ensure world class quality of products

Three-tier management system in Export Processing Zones (EPZs)

- Tier one is headed by the Ministry of Commerce headed by the Commerce Secretary, which drafts and implements policies and reviews the performance of each such zones
- Tier two is headed by the Board of Approval (BOA), which is responsible for examination of proposals for opening up of new enterprises in the zone and which is headed by a person of the level of Additional Secretary
- The Development Commissioner, who is the chief executive of the Export Processing Zone, heads the three tiers. The Development Commissioner is vested with the power for the day-to-day function of the zone. Further, he is the head of functions relating to administration, approval of investment, and he also enforces various regulatory provisions

Export Processing Zones in India

1. Kandla Free Trade Zone (KAFTZ), Kandla, Gujarat
2. Santa Cruz Electronic Export Processing Zone (SEEPZ), S. Cruz, Maharashtra
3. Cochin Export Processing Zone (CEPZ), Cochin, Kerala
4. Falta Export Processing Zone (FEPZ), Falta, West Bengal
5. Madras Export Processing Zone (MEPZ), Madras, Tamil Nadu
6. Noida Export Processing Zone (NEPZ), Noida, Uttar Pradesh
7. Visakhapatnam Export Processing Zone (VEPZ), Visakhapatnam, Andhra Pradesh