

INDUSTRY OVERVIEW

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Telecom industry at Global level

The Telecom industry in India is the second largest in the world with a subscriber base of 1.17 bn as of September 2022 (wireless + wireline subscribers). India has an overall tele-density of 84.86 %, of which, the tele-density of the rural market, which is largely untapped, stands at 58.01 % while the tele-density of the urban market is 134.62%.

By the end of January, 2023, the total number of internet subscribers increased to 839.18 Million (narrowband + broadband subscribers), out of which 44.25% of the internet subscribers belonged to the rural areas. The average monthly data consumption per wireless data subscriber has also increased by 22,605% to 16.40 GB in June 2022 from 61.66 MB in March 2014.

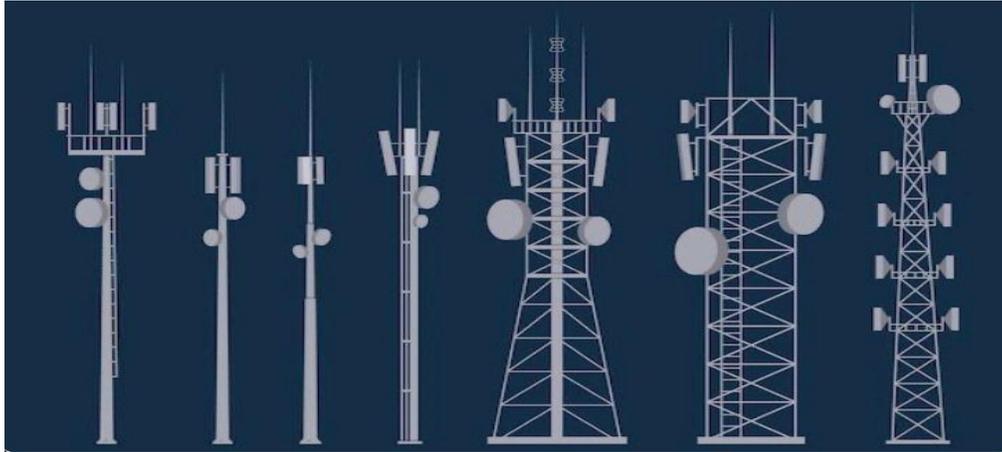
The industry’s exponential growth over the last few years is primarily driven by affordable tariffs, wider availability, roll-out of Mobile Number Portability (MILLIONP), expanding 3G and 4G coverage, evolving consumption patterns of subscribers, Government’s initiatives towards bolstering India’s domestic telecom manufacturing capacity, and a conducive regulatory environment.

To further expedite digital connectivity, the Government has approved the auction of IMT/5G spectrum for deployment of 5G services within the country. This auction was successfully held by the end of July, 2022 and grossed \$18.77 bn.

The Telecom sector is the 3rd largest sector in terms of FDI inflows, contributing 6.43% of total FDI inflow, and contributes directly to 2.2 Million employment and indirectly to 1.8 Million jobs. Between 2014 and 2021, the FDI inflows in the Telecom sector rose by 150% to \$20.72 bn from \$8.32 bn during 2002-2014. 100% Foreign Direct Investment (FDI) has now been allowed in the Teleco.

(Source: <https://www.investindia.gov.in/sector/telecom>)

Telecom industry Scenario in India



The Telecommunications industry is divided into following subsectors: Infrastructure, Equipment, Mobile Virtual Network Operators (MILLIONVO), White Space Spectrum, 5G, Telephone service providers and Broadband.

As per GSMA, India is on its way to becoming the second-largest smartphone market globally by 2025 with around 1 Billion installed devices and is expected to have 920 Million unique mobile subscribers by 2025 which will include 88 Million 5G connections. It is also estimated that 5G technology will contribute approximately \$450 Billion to the Indian Economy in the period of 2023-2040.

India added over 500 Million new smartphone users over the last decade. We are expected to have 850 Million smartphone users by 2026, representing 55% of the total population.

Under the Union Budget 2023, The Government of India plans to set up one hundred labs for developing applications using 5G services in engineering institutions to realize a new range of opportunities, business models, and employment potential.

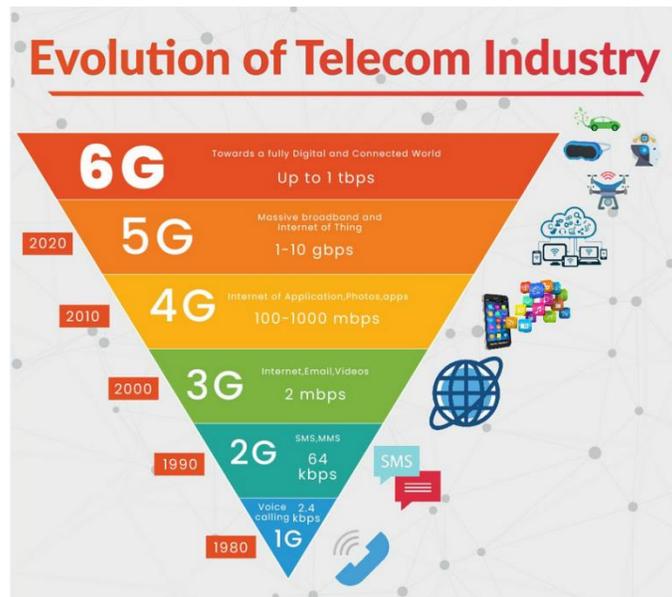
The DoT is targeting a combination of 100% broadband connectivity in the villages, 55% fiberisation of mobile towers, average broadband speeds of 25 mbps and 30 lakh kms of optic fibre rollouts by December 2022. Broadband connections rise to 816 Million in September 2022 from 61 Million in March 2014, growing by 1238%. By December 2024, DoT is looking at 70% fiberisation of towers, average broadband speeds of 50 Mbps and 50 lakh kms of optic fibre rollouts at a pan-India level.

- India climbs up six slots and now placed at 61st rank as per Network Readiness Index 2022.
- India secures 2nd rank in “Mobile broadband internet traffic within the country” and “International Internet bandwidth”.

- Internet connections jumped from 25.15 crore in March 2014 to 83.69 crore in June 2022, registering a growth of 232%.
- Broadband connections rose from 6.1 crore in March 2014 to 81.62 crores in September, 2022 growing by 1238%.
- Average revenue realization per subscriber per GB wireless data reduced to Rs. 10.29 in June, 2022 from Rs. 268.97 in December 2014, a reduction of more than 96.17%.
- Average monthly data consumption per wireless data subscriber increased by 266 times to 16.40 GB in June, 2022 from 61.66 MB in March 2014.
- India secures 3rd rank in “Annual investment in telecommunication services” and “Domestic market size”.
- 5G services have been started in 238 cities distributed across all license service areas as of 31st January 2023.
- India jumps 10 spots in median mobile speeds globally from 79th position in December to 69th place in January 2023.
- Total telephone connections rose to 117.02 crore in October 2022 from 93.30 crore in March 2014, with a growth of 25.42 % in the said period. The number of mobile connections reached to 114.4 crore in October 2022.
- Urban telephone connections rose to 64.99 crores in October 2022 from 55.52 crore in March 2014, a growth of 17.06% while the growth in rural telephone connections was 37.69%, which is double of urban increase, rising from 37.78 crore in March 2014 to 52.02 crores in October 2022. The rural tele-density jumped from 44% in March 2014 to 57.91% in October 2022.

(Source: <https://www.investindia.gov.in/sector/telecom>)

Evolution of Telecom Infrastructure Industry in India



In 2000, The Telecom Infrastructure Industry came into existence with DoT inviting applications for IP-I registrations. Prior to that, telecom service providers were installing towers and other passive infrastructures on their own and there was no sharing. Even up to 2005, the telecom towers were being operated under integrated model and no sharing was taking place. Only a few operators shared towers on barter system. However, post 2005, the tower industry evolved under independent tower companies which maintain and install assets like tower and related infrastructure for renting/ leasing to telecom service providers for providing cellular telecom services. Thus, the concept of sharing became popular as the towers were shared in a nondiscriminatory, transparent, and cost-effective manner, by a neutral/ independent infrastructure service provider. India's telecom journey has moved paces away from the first telegraph.

India's telecom journey has moved paces away from the first telegraph communication set up in Kolkata and is on a dizzying trajectory towards digitalisation. Telecom infrastructure is the backbone of "Digital India" program.

(Source: <https://dipa.co.in/blog.php>)

Reforms in Telecom Sector

Government is committed to reforms in telecom sector. The Government has approved various structural and procedural reforms in the telecom sector. These reforms include Rationalization of Adjusted Gross Revenue; Rationalization of Bank Guarantees (BGs); Rationalization of interest rates and removal of penalties; Dispensing with the requirement of BGs (for auctions held after 15.09.2021) to secure instalment payments; Permission for surrender of spectrum after 10 years (in future auctions); Dispensing with the requirement of Spectrum Usage Charge (SUC) for spectrum acquired in spectrum auctions held after 15.09.2021; Removal of additional SUC of 0.5% for spectrum sharing; Permission for 100% Foreign Direct Investment (FDI) in telecom sector under automatic route subject to safeguards; Fixed time for spectrum auctions (normally in the last quarter of every financial year); Requirement of licenses under 1953 Customs Notification for wireless equipment replaced with self-declaration; Permission for Self-KYC; e-KYC rate

revised to only one Rupee; Dispensing with the requirement of fresh KYC for shifting from Prepaid to Post-paid and vice-versa; Replacement of paper Customer Acquisition Forms with digital storage of data; Easing SACFA clearance for telecom towers; and Addressing liquidity requirements of the Telecom Service Providers by way of moratorium/deferment. Government has also published draft Telecom Bill on 21st September, 2022. Regular consultations are carried out with industry, operators and their associations on various issues, including improving quality of services, bridging digital gap and ensuring security of the telecommunication networks.

Telecommunication facilities are not available in some of the villages in the country. The Union Cabinet on 27.07.2022 approved a project for saturation of 4G mobile services in uncovered villages of the country. To provide quality telecom services across the country, Government is implementing various schemes/projects under Universal Service Obligation Fund namely (i) Left Wing Extremism (Phase-I &II) projects; (ii) Aspirational Districts scheme; (iii) Commissioning of Submarine Optical Fibre Cable connectivity from Chennai to Andaman & Nicobar Islands; (iv) Scheme for connecting submarine Optical Fibre Cable from Kochi to Lakshadweep Islands; (v) BharatNet (Phase-I &II) projects; (vi) Comprehensive Telecom Development Plan for mobile connectivity in the North Eastern Region; and (vii) Provision of 4G mobile coverage in uncovered villages and seamless 4G mobile coverage of National Highway (NH - 223) in Andaman & Nicobar Islands etc. Government has also taken several policy initiatives to facilitate infrastructure growth for delivery of quality services. These include permitting trading/sharing/liberalisation of spectrum, sharing of passive & active infrastructure.

(Source: <https://pib.gov.in/PressReleaselframePage.aspx?PRID=1884066>)

Bharat 6G

The Government of India is catalysing the next-generation 6G research and innovation in the country to enable India to be a front-line contributor in 6G technology and manufacturing by 2030. In an all-of-nation approach involving industry, start-ups, academia, research laboratories, standardisation bodies and Government, the government is ensuring that India becomes not just atmanirbhar in this emerging and vital technology, but a significant contributor to the global good.



The Department of Telecommunications constituted a Technology Innovation Group on 6G (TIG-6G) on 1st November 2021 with members from various Ministries/Departments, research and development institutions, academia, standardization bodies, Telecom Service Providers and industry to develop Vision, Mission and Goals for the 6G and also develop a roadmap and action plans for 6G in India. The TIG-6G in turn constituted six Task Forces with industry, academia, R&D institutions and Government as members on

Multi-Disciplinary Innovative Solutions, Multiplatform Next Generation Networks, Spectrum for Next Generation Requirements, Devices, International Standards Contribution and Funding Research and Development.

The Six Task Forces under TIG-6G deliberated on various aspects of emerging telecom technologies and platforms in the next decade. They focused on innovations that leverage these new technologies to deliver solutions, the device ecosystem that will support these innovations, spectrum management that will enable the ongoing and oncoming explosion in wireless communications, the need to contribute our innovations to global standards and ensure interoperability, and requirement of adequate financing to carry out the Bharat 6G Mission.

The Bharat 6G Vision Statement

"Design, develop and deploy 6G network technologies that provide ubiquitous, intelligent and secure connectivity for high quality living experience for the world"



Bharat 6G Vision is based on principles of Affordability, Sustainability, and Ubiquity.

The Bharat 6G Mission Statement

The 6G TIG has enunciated a clear Vision for India in a 6G-driven world. The importance of the impending innovations and developments in 6G cannot be overstated for a country poised to become a global leader in the 6G revolution and one of the top three global economies. It is critical for India to be among the drivers of these new technological developments to best address the country's unique needs, as well as to become a leading supplier of affordable and transformative solutions globally. A Mission-oriented approach is thus imperative to take up the diverse technology development initiatives, studies and innovation efforts necessary to achieve this objective.

Based on the Vision 6G outlined herein, a Mission 6G shall be launched with the requisite organisational and financial resources to realise the Vision. Existing organizational strengths will be leveraged to the maximum and new governance structures will be kept lean to ensure agility and speed of execution. The research and start-up ecosystem will be tapped to bring innovations and new ideas to the table. Adequate provision for financial support will be made through explicit budgetary allocation to ensure that the efforts undertaken are not hobbled for want of funds.

The Mission will be completed in two phases:

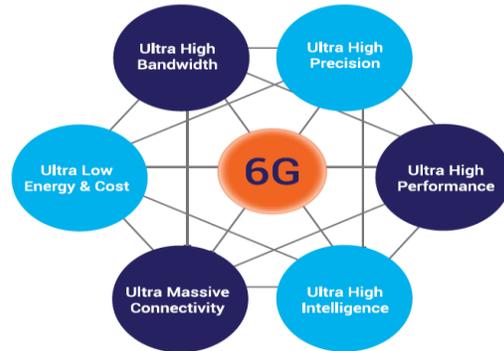
1. Phase 1 from 2023-2025 (2 years)
2. Phase 2 from 2025-2030 (5 years)

Bharat 6G Mission the Vision for 6G is fully aligned with the national Vision of Atmanirbhar Bharat and will seek to empower every Indian to become Atmanirbhar (self-reliant) in their lives. At the same time, it ensures that India takes its rightful place in the world as a

leading supplier of advanced telecom technologies and solutions that are affordable and contribute to the global good. The 6G Vision is thus timed just right for India's Aazadi ka Amrit Kaal.

Benefits of Bharat 6G

6G will build upon 5G technology and provide more reliable, ultra-low latency and affordable solutions with speeds almost 100 times faster than 5G to enhance and drive new communication applications. These technological advances will impact not just user experience but also transform economies and lives everywhere. It will very likely include intelligent network management and control, and integrated wireless sensing and communication while balancing the potential consequent carbon footprint with reduced energy consumption and a myriad of sustainable and eco-friendly initiatives.



Hyperconnectivity and advanced user experience delivered by 6G will improve and enable access to required information, resources (both virtual and physical), and social services without constraints of time and physical location. The advent of 6G will significantly reduce differences in regional and social infrastructure and availability of economic opportunities and will thereby provide alternatives to rural exodus, mass urbanization, and its related problems.

(Source: <https://dot.gov.in/bharat-6g>)

Initiative taken by Digital Infrastructure Providers Association

Green Telecom- Necessity for Telecom Infra Providers

Climate change is ultimately a very real threat and India's participation in the Conference of Parties (COP26) & Paris Climate Agreement (UNFCCC) has virtually recognized this threat. So, moving ahead in tune with global focus on climate change, it was imperative for us to undertake measures that would facilitate not just protection or preservation of our current environment, but it's also important to leave behind sustainable resources for our next generations. So, in order to tackle the predicament of dissuading climate change ills and maintaining steadfast growth in technology, Green Telecom is our answer to this predicament.



The government launched some key initiatives which ultimately beset right within the approach of Green Telecom:

a. National Energy Policy by NITI Aayog

It encouraged the development of storage technologies using Li-ion and outlined the immense potential of Renewable Energy Service Companies (RESCOs) as they can provide for the requisite capital, technology, and maintenance of Renewable Energy Technologies (RETs).

b. Green Energy Open Access

Open Access Transaction has been reduced from 1 MW to 100 kW for green energy, to enable small consumers also to purchase renewable power through open access.

c. National Digital Communications Policy 2018

The policy encourages the Digital Communications Sector to promote alternative energy sources vis-à-vis utilizing fuel cells, Li-ion batteries, and undertake R&D initiatives for exploration of more such energy sources.

From a Global perspective, at the Conference of Parties (COP26), India has committed to achieve 500GW of its installed capacity through non-fossil fuel and 50% of its energy requirements through RETs; Further, the Hon'ble Prime Minister rallied the rest of the G7 countries to support India's efforts in combating climate change by achieving climate neutrality by 2050 and achieving the 2030 agenda meanwhile Going green has become a necessity for Telecom operators with energy cost becoming as large as approx. 30% of the OPEX. With increase in the price of diesel and environmental concern about Green House Gas Emissions, the government authorities are fast making provisions for non-conventional energy, solar & wind power in both remote off grid sites as well as grid sites.

Energy consumption is directly linked to an operator's greenhouse gas emissions. Besides, considering the impact of the value chain on resources like land and water become vital. Therefore, clear, stringent sustainability criteria, and eco design of products also needs to be considered while procuring the requisite telecom equipment; which is where concepts like circular economy and life cycle assessment come into picture.

The infrastructure industry has already taken a wide array of initiatives & measures towards Green Telecom:

a. 40% of the India's sites are now considered "Green Towers" as they burn less than 100 litres of diesel in a week, thereby cumulating a saving of 334 Million litres of Diesel annually.

b. 60% of all tower sites have been converted from Indoor to Outdoor; as Outdoor sites have natural ventilation and collectively utilise Free Cooling Units, they no longer require Air Conditioning (AC) units for maintaining safe-operation temperatures.

c. The industry is shifting towards complete usage of Lithium Ion Batteries instead of Lead Acid (VLRA) batteries which have extended battery life and higher energy yield imbibing & using the Renewable Energy Service Company (RESCO) model, which essentially supplies green energy to tower clusters and surplus/excess power is supplied to the community.

Green Telecom, is a step in the right direction towards fulfilment of this responsibility. The unnerving resolve shown by the industry and the authorities alike, to fulfil the vision of a Carbon Efficient India is second to none. With the collective synergy at the pith, India can emerge as a global leader and torchbearer for Green Initiatives in Technology through Green Telecommunications.

(Source: <https://dipa.co.in/blog.php>)

Challenges faced by Telecom Infrastructure Providers



- **Unavailability of 24X7 Electricity Board (EB) Supply**
In absence of availability of 24X7 power supply, telecom infrastructure providers are forced to depend upon alternate energy means like DG sets etc. This leads to increased CAPEX investments and increased OPEX due to higher cost of generation and diesel pilferage etc.
- **Exorbitant connection / last mile and miscellaneous charges**
Some states charge huge amounts as infrastructure charges for providing new connections. Even the charges for the last mile are exorbitant in some states and at times the last mile is not maintained by the DISCOMs.
- **EB tariff levied under Commercial category for telecom sector**
While the telecom tariffs in India are the lowest, the Electricity tariffs are being charged at substantial high rates under the commercial category. In most states the difference between both the category is significant, leading to burden overall telecom sector.
- **Priority Electricity Connection, EB connection pending issues**
New power connections can take anywhere up to 30-60 days, some states link NOC from Municipal Corporation as a pre-requisite for applying a new EB connection.
- **Billing Challenges, Online Delivery of Bills and payments**

The Telecom sector generates huge revenues for the DISCOMs, however the treatment is at par with a normal/residential customer, ideally we should be treated as a corporate customer. Majority of states have no centralized billing, provision of bills through e-mail etc. thereby unnecessarily adding physical collection / downloading of thousands of bills from the portal.

- **Non-Availability of Smart/Pre-payment Meters, faulty meter replacement**
Currently the presence of Smart meter in the country is negligible even in Urban areas. The Electricity (Rights of Consumers) Rules 2020, clearly states that –
No connection shall be given without a meter and such meter shall be the smart pre-payment meter or pre-payment meter.

Since telecom network is present at the site, functioning of a smart meter is very much possible.

- **Issues related to Open Access**
Power purchased through open access policy is currently a very costly affair and non-viable option. Open access allows large users of power — typically having a connected load of 1 megawatt (MW) and above, to buy cheaper power from the open market (Green Open Access Rules 2022, notified on 6th June, 2022, Green open access limit has been reduced to 100 KW).

(Source: <https://dipa.co.in/blog.php>)

Press Release

Press Release No. 30/2023

TRAI on March 31, 2023 had issued its recommendations on "Promoting Local Manufacturing in the Television Broadcasting Sector". Digitalization of the Indian broadcasting sector provided a unique opportunity for the growth of local manufacturers to cater to the demand. The Government of India recently launched initiatives such as 'Make in India' and 'Digital India' and has accorded highest priority to transform India into a global design and manufacturing hub.

There is a need to focus on emerging technologies and tenets of era of convergence and aim at building an eco-system for broadcast equipment Centre of Excellence IT lay be established for broadcast equipment or existing Telecom Centres of Excellence may be upgraded to focus on broadcast equipment as well.

Promote local manufacturing of other relevant components of the television broadcasting sector along the lines of Semicon India Program.

(Source: <https://www.trai.gov.in/notifications/press-release>)

Press Release No. 37/2023

Ease of Doing Business (EoDB) has been identified as one of the focus areas of Government in the recent decade. EoDB is a recognition of the fact that business. and

enterprise need to be enabled. Government is striving to improve the business environment at every stage across all the sectors. As a sector Regulator, it is incumbent upon TRAI to improve the business environment in the telecom and broadcasting sector.

TRAI has suo-moto floated a Consultation paper on "Ease of Doing Business in telecom and Broadcasting Sector" on 8th December 2021. Previously, TRAI undertook EoDB consultation mainly specific to DoT and MIB. However, the current exercise spans across multiple ministries/ departments. EoDB requires comprehensive review of end-to-end processes with 'Whole of the government' approach. One application - one window should suffice for all Inter-ministerial approvals.