Last Mile Connectivity, Propelling Power Transmission Sector in India - A Snapshot

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Source: Channel Checks

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Section – Landscape View of Power Transmission Sector in India

Power Transmission Sector in India – A Know How

Section

Power Transmission Sector in India – A know how

India's Power Transmission networks constitute the vital arteries of the entire power value chain. It goes without saying that the growth of power sector is contingent to development of a robust and a non collapsible transmission network. Over the past decades, the total power capacity has witnessed commendable growth, with more than 401 GW of generation capacity currently installed in India. However, India's peak load supply is only 204 GW, and aggravating this situation further is that some of India's power surplus regions do not have adequate power evacuation infrastructure which could alleviate the recurring supply shortages in other parts of the nation.

. Though, significant efforts in terms of providing smooth policy & regulatory framework along with massive investments have been planned in the past for strengthening the power transmission infrastructure in country. But, continuous cases of congestion in the transmission lines witnessed in the recent past is a testimony of much more efforts are still required to pull up the transmission segment in the country. The issues related to generation and distribution sectors, rightfully, got due focus from policy makers and industry stakeholders

Transmission which is the critical link of power supply with no fall back option got down played due to multiple reasons. Despite of all the fall back, India was able to achieve **"One nation one grid"** in 2013. This has been achieved by integrating all the five regional electricity grids into one interconnected & synchronous national electricity grid. Further, inter regional links have been augmented from 35.9 GW in 2013 to 112.2 GW as of Feb 2022.

Commensurate with the generation capacity addition plans, transmission and distribution network has also been planned to facilitate power reaching the ultimate consumer. Additionally, green energy transmission corridors have also planned by the GoI for better evacuation & integration of increasing renewable energy capacity in the grid.

Presently, India boasts a power transmission line network of **4,57,416 circuit kilometres (ckm)** as of April 2022, with a transformation capacity of **1,11,1768 MVA**.

Growth in Power Transmission Network in India

Over the past two decades the power transmission network in India has witnessed a growth of close to 67% and has been expanded with a length of 3,05,147 ckm from a period 2002-2022. Maximum growth into the same was observed during the period 2012-17 with a capacity addition of 1,10, 370 ckm. Exhibit 1.1 indicates the year wise growth witnessed in power transmission network of India.

Transmission capacity in ckm

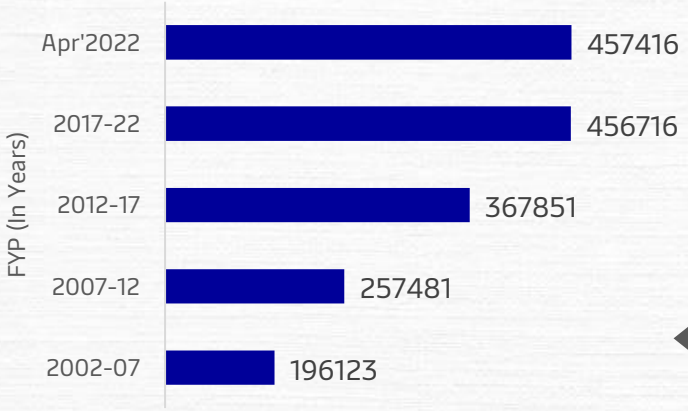


Exhibit 1.1 Progress witnessed in the power transmission lines in India from 2002-2007 to 2017-2022

Percentage growth witnessed in transmission capacity

Note -

Years indicated in Exhibit 1.1 indicated the five-year plans (FYP), that can be seen below.

2002-07: 10th FYP
2007-12 : 11th FYP
2012-17 : 12th FYP
2017-22 : 13th FYP

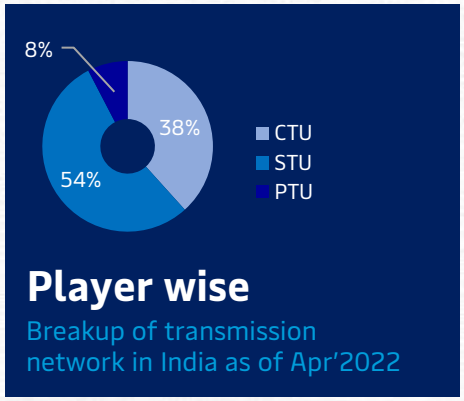
22%
Growth in power transmission network during the period 2002-07

24%
Growth in power transmission network during the period 2007-12

30%
Growth in power transmission network during the period 2012-17

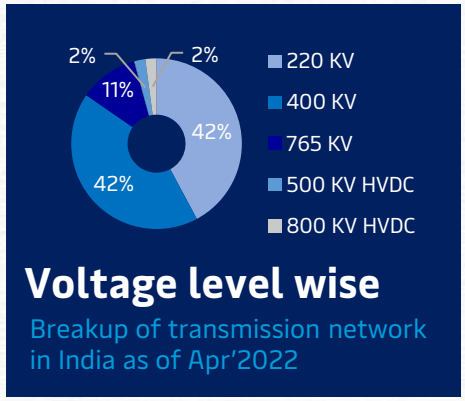
19%
Growth in power transmission network during the period 2017-2022

Source : Ministry of Power, CEA, Eninrac Research



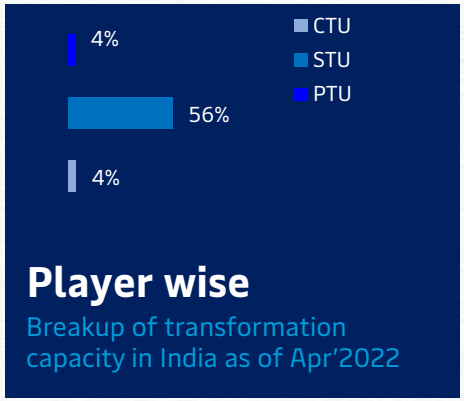
Player wise

Breakup of transmission network in India as of Apr'2022



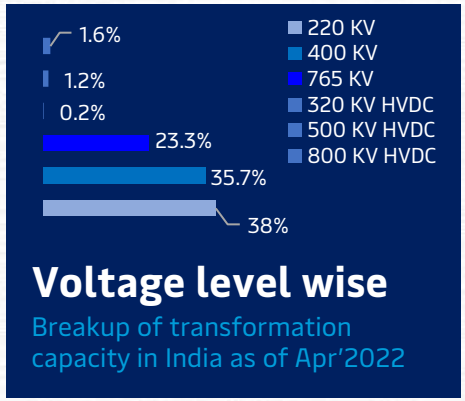
Voltage level wise

Breakup of transmission network in India as of Apr'2022



Player wise

Breakup of transformation capacity in India as of Apr'2022



Voltage level wise

Breakup of transformation capacity in India as of Apr'2022

Current transmission network by private transcos at different voltage levels

Voltage Level	Capacity (ckm)	Voltage Level	Capacity (ckm)
200 KV	1,049	**± 320 kV HVDC**	-
400 KV	22,965	**± 500 kV HVDC**	1,980
765 KV	8,886	**± 800 kV HVDC**	9,655

Source : Ministry of Power, CEA, Eninrac Research

Share of Private Transmission Companies (TRANSCO)

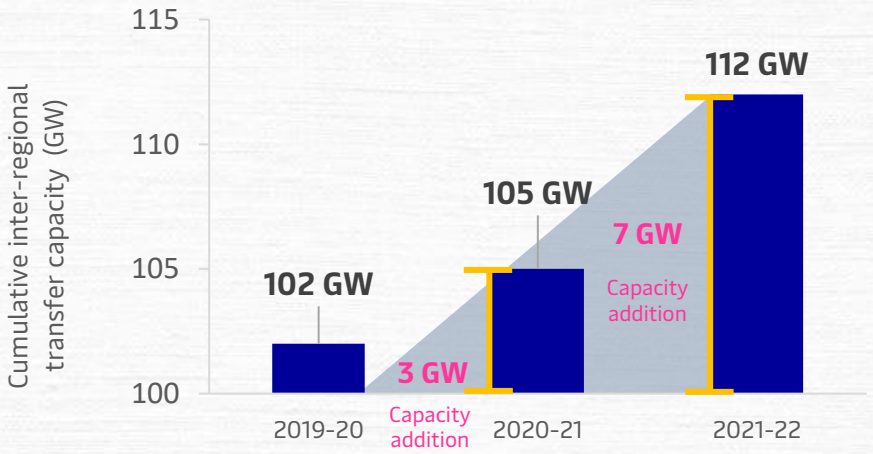
In India, majority of the power transmission network is owned by either PGCIL or by state transmission utilities. Cumulatively, these central & state transcos own 92% of power transmission lines in the country, leaving a share of only **8% with the private transcos** as of April'2022. Private sector participation in the power transmission sector in India came into existence during the 11th FYP i.e., a period from year 2007-12. During this period nearly **8,415 ckms** of transmission lines were developed by the private transcos. Soon this quantum witnessed almost a three-fold jump during 12th FYP with a network length of **24,621 ckms** as of Mar'2017. Presently, private transcos boasts a network length of **34,880 ckms** as of April'2022.

Key Milestones in India's Power Transmission Sector

Although, over the past decade a lot of development has been observed in India's power transmission sector. Having said so, some of major contributors to its transformation have been some landmark schemes/initiatives taken by the government of India. These are –

1. One Nation One Grid – To synchronise & strengthen all the regional grids have helped in optimal utilization of scarce natural resources by transfer of power from resource centric regions to load centric regions. 'One Nation One Grid' has already been achieved by integrating all the five regional electricity grids into one interconnected and synchronous National electricity grid in December, 2013. Further, inter-regional links have been augmented from 35950 MW as of Dec'2013 to 1,12,250 MW as of Mar'2022.

Exhibit 1.2 Details of the inter-regional power transfer capacity of national grid during the last three years

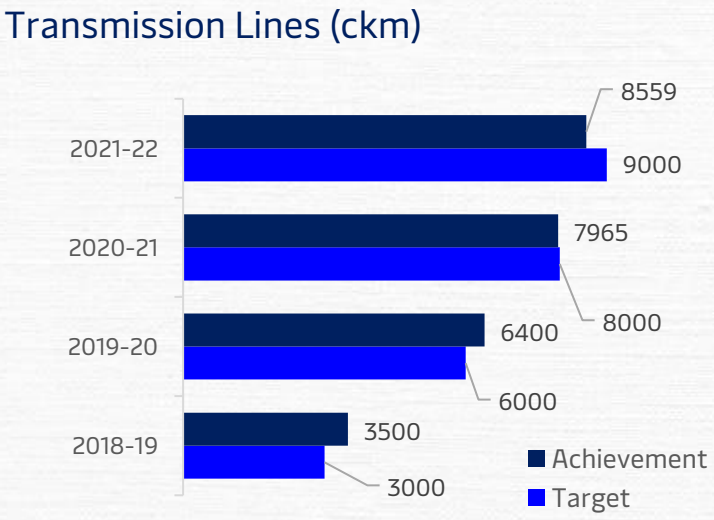


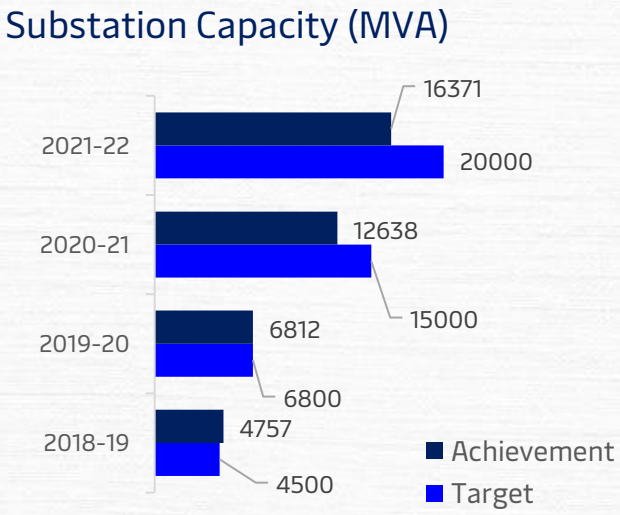
Source : Ministry of Power, Eninrac Research

Key Milestones in India's
Power Transmission Sector

2. Green Energy Corridor (GEC) – The government of India has announced development of green energy corridor (GEC) – intrastate transmission system under two phases to ensure better grid integration of renewable energy capacity. Phase I of this scheme was announced in 12th FYP. The GEC phase I has a planned network length of 9700 ckm with a power transformation capacity of 22600 MVA. The targeted RE evacuation is 24 GW. The key states through which the phase I network shall pass are – Andhra Pradesh, Gujarat, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan & Tamil Nadu. Phase I is anticipated to get completed by 2023. This shall further enhance the open access activities in these states in years to come. The year wise cumulative target and achievement made under GEC – Phase I scheme during last three years can be seen in Exhibit 1.3. Phase II of GEC has a targeted network length of over 10,000 ckm and is likely to be commissioned by 2025-26.

Exhibit 1.3 Year wise cumulative targets & achievements made under GEC – Phase I

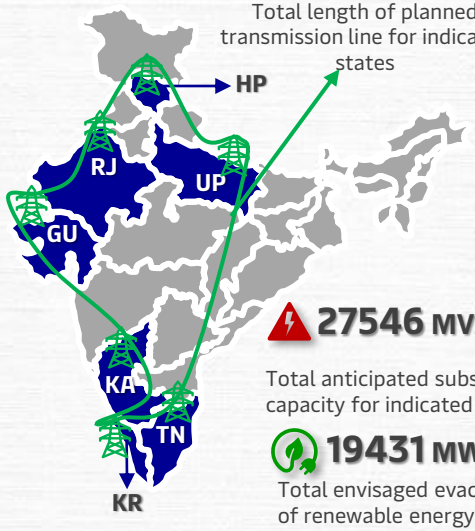


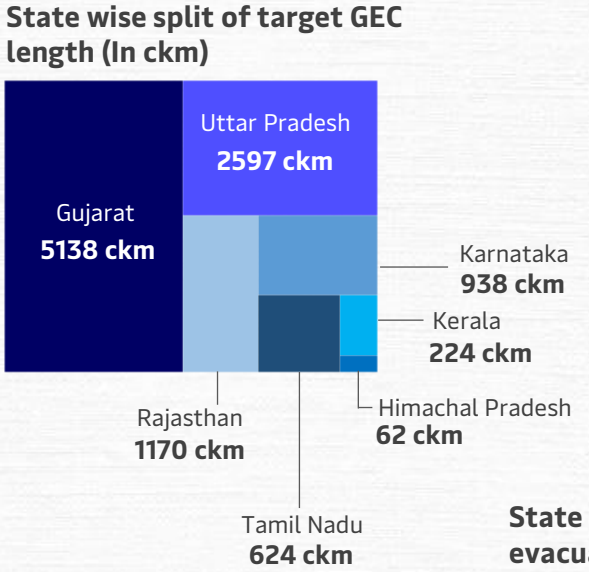


Source : Ministry of Power, MNRE, Eninrac Research

Key Milestones in India's Power Transmission Sector

Exhibit 1.4 Planned development under GEC-Phase II





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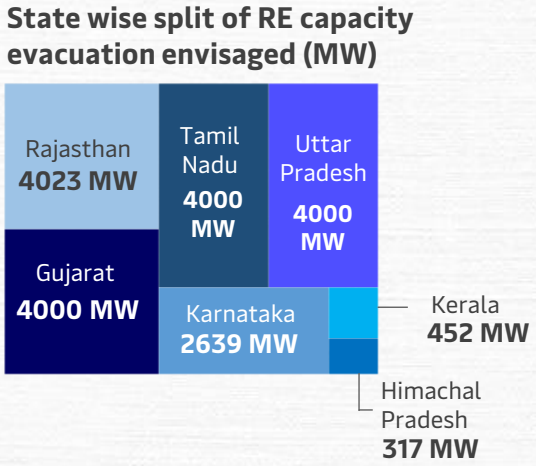
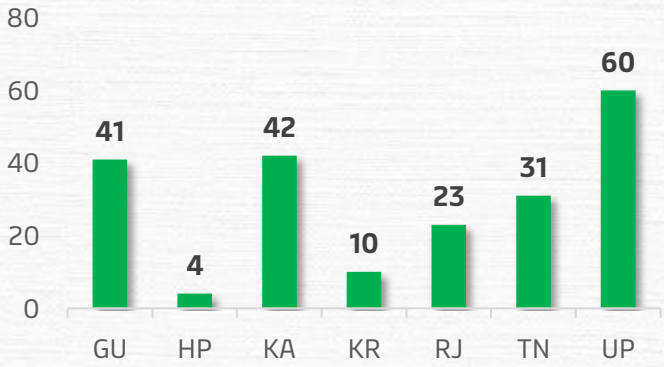
Total number of planned transmission projects under GEC-Phase II



Opportunity split across states vis-à-vis number of projects planned



Source : Ministry of Power, MNRE, Eninrac Research

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> Truth is ever to be found in the simplicity, and not in the multiplicity and confusion of things
>
> **- Sir Isaac Newton**

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