



Future-ready Transmission System

Prelims: Future-ready Transmission System, Cyber Security, Smart Grids, Discoms, CEA.

Mains: Need for Future-ready Transmission System.

Why in News?

Recently, Ministry of Power has accepted the Recommendations of the Task Force Report to adopt the **Future-Ready Transmission System** in India.

- The task force was set up by the Ministry of Power in September 2021 under the chairmanship of POWERGRID to suggest ways for modernization of the [Transmission Sector](#) and making it smart & future ready.

What are the Key Recommendations?

- The task force has recommended a **bouquet of technological and digital solutions** which have been clubbed under,
 - Categories of modernization of existing transmission system,
 - Use of advanced technology in construction & supervision, operations & management,
 - Smart & future-ready transmission system,
 - Up-skilling of the workforce.
- The Task Force has recommended **Centralized Remote Monitoring, Operation of Substations including SCADA** (supervisory control and data acquisition), Flexible AC Transmission devices (FACTS), [Cyber Security](#), [Drones](#) & [Robots](#) in construction/inspection of transmission assets etc.
- Also recommended **benchmarks for transmission network availability and voltage control** based on performance of global transmission utilities.

What is the Need for a Future-ready Transmission System?

- **Meeting Growing Energy Demand:**
 - With India's population growing and the economy expanding, there is an increasing demand for energy.
 - A future-ready transmission **system can help meet this demand by enabling the transmission of power from new power generation sources** to the distribution network.
- **Integration of Renewable Energy:**
 - India has set an ambitious target of achieving 500 GW of [Renewable Energy](#) capacity by 2030.
 - A future-ready **transmission system can help integrate this large-scale renewable energy** into the grid by ensuring efficient transmission and distribution of power.
- **Improved Grid Stability:**
 - A future-ready transmission system can help improve grid stability by enabling the

integration of advanced technologies such as [smart grids](#), energy storage systems, and demand response systems.

▪ **Increased Efficiency:**

- A future-ready transmission system can **help reduce transmission losses, which currently account for around 22% of the total power generated in India.** By reducing transmission losses, the country can save a significant amount of energy and reduce greenhouse gas emissions.

▪ **Enhancing Grid Resilience:**

- A future-ready transmission system can help enhance grid resilience by providing backup power during emergencies, ensuring the availability of power during [natural disasters](#) and **preventing blackouts.**

▪ **Meeting Sustainable Goals:**

- A modern transmission grid is vital to achieve the government's vision **to provide 24x7 reliable and affordable power to the people** and also meet the sustainability goals.
- Modern transmission systems can play a significant role in meeting sustainable goals by **enabling the integration of renewable energy, reducing greenhouse gas emissions,** and improving energy efficiency.

What are the Challenges to the Transmission System in India?

▪ **Fossil fuel derived energy:**

- Thermal power based on fossil fuels such as coal, natural gas and diesel accounts **for 80% of the country's generation.**
- Moreover, the majority of plants in India **are old and inefficient.**

▪ **Higher Cost of Fuel:**

- Coal extraction from state-run Coal India, has stagnated due to **delayed environmental clearances, land acquisition** troubles and little investment in advanced technologies.
- Many power companies have to **look for coal mines overseas and source more expensive imports** (despite having abundant coal reserves).

▪ **Discoms Facing Losses:**

- Tariffs haven't risen enough for years to cover costs for subsidies in the agriculture sector. Also, high aggregate technical and commercial (AT&C) losses, has forced electricity distributors (discoms) into losses as high as 40% in some states, while the country-wide average is 27%.

What is the Potential of the Transmission Sector?

- India is the **third-largest producer and consumer of electricity worldwide**, with an installed power capacity of 408.71 GW as of 31st October 2022.
 - As of October 31, 2022, **India's installed renewable energy capacity (including hydro) stood at 165.94 GW**, representing 40.6% of the overall installed power capacity.
- The Government of India is preparing a 'rent a roof' policy for supporting its target of generating 40 GW of power through solar rooftop projects by 2022. It also plans to set up 21 new [Nuclear Power Reactors](#) with a total installed capacity of 15,700 MW by 2031.
- The [Central Electricity Authority \(CEA\)](#) estimates India's **power requirement to grow to reach 817 GW by 2030.** Also, by 2029-30, CEA estimates that the share of renewable energy generation would increase from 18% to 44%, while that of thermal energy is expected to reduce from 78% to 52%.

Way Forward

- By **investing in modern transmission systems**, India can achieve its sustainable energy goals while **meeting the growing energy demands of the country.**
- In the current decade (2020-2029), the Indian electricity sector is likely to witness a major transformation with respect to demand growth, energy mix and market operations.
- India wants to **ensure that everyone has reliable access to sufficient electricity at all times**, while also accelerating the clean energy transition by lowering its reliance on dirty fossil fuels and moving toward more environmentally friendly, renewable sources of energy.

- Future investments will benefit from strong demand fundamentals, policy support and increasing government focus on infrastructure.

UPSC Civil Services Examination, Previous Year Questions (PYQ)

Q. Give an account of the current status and the targets to be achieved pertaining to renewable energy sources in the country. Discuss in brief the importance of National Programme on Light Emitting Diodes (LEDs). (2016)

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