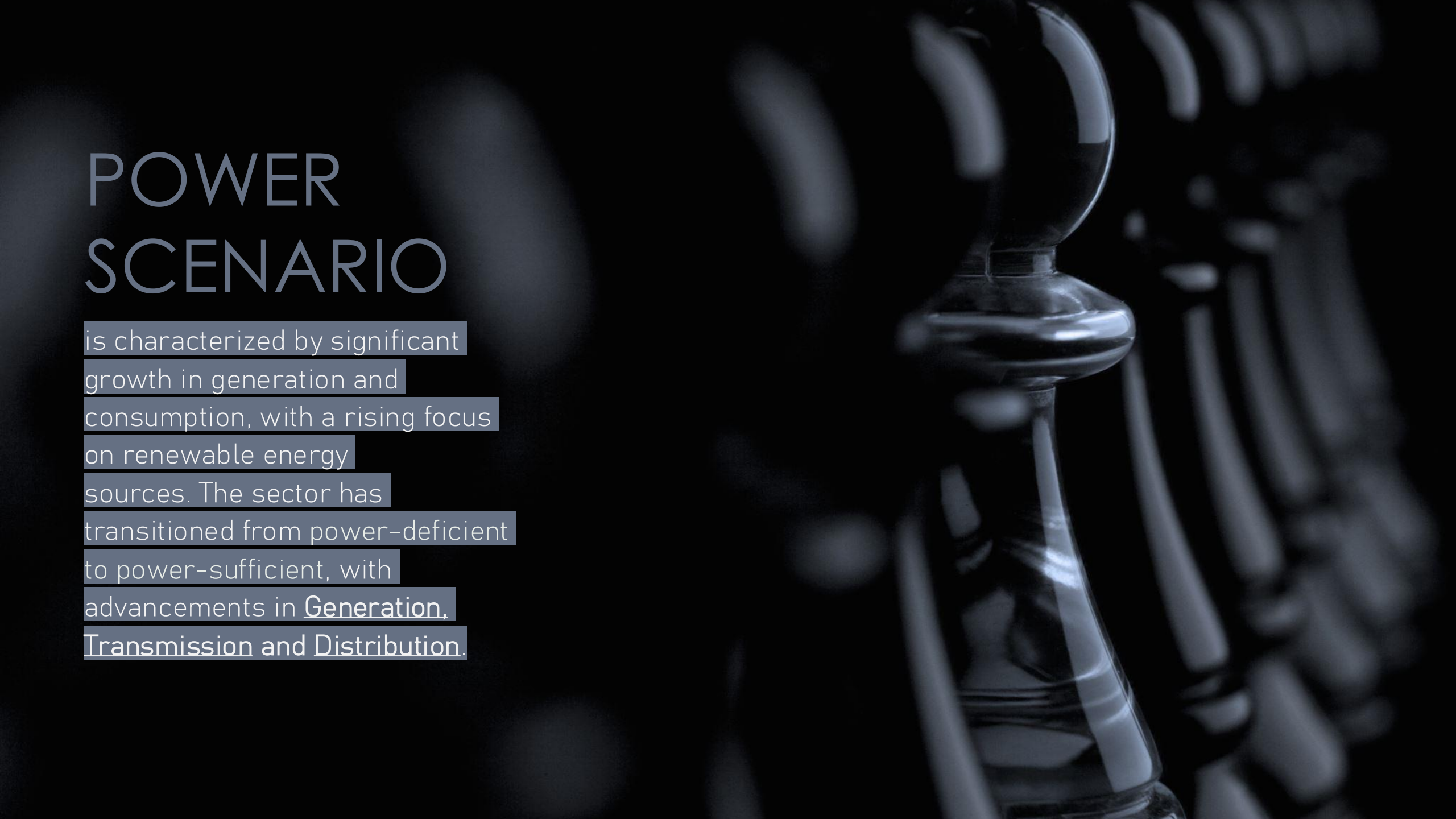
TEJANSHU DABARIYA

POWER SITUATION OF INDIA

(Where India's Energy Stands)

POWER SCENARIO

is characterized by significant growth in generation and consumption, with a rising focus on renewable energy sources. The sector has transitioned from power-deficient to power-sufficient, with advancements in Generation, Transmission and Distribution.



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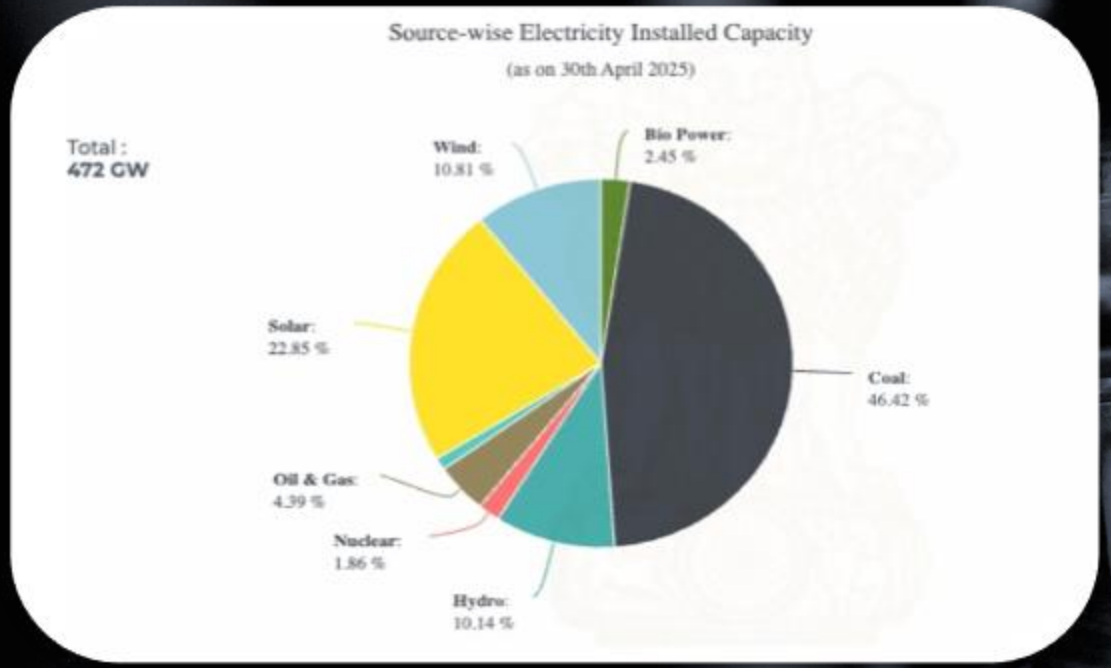


GENERATION

472.47 GW

Total installed capacity

(As on Apr'25)

TRANSMISSION

4,94,732 ckm

Length of Transmission Lines

(As on Apr'25)

DISTRIBUTION

1,694 BUs

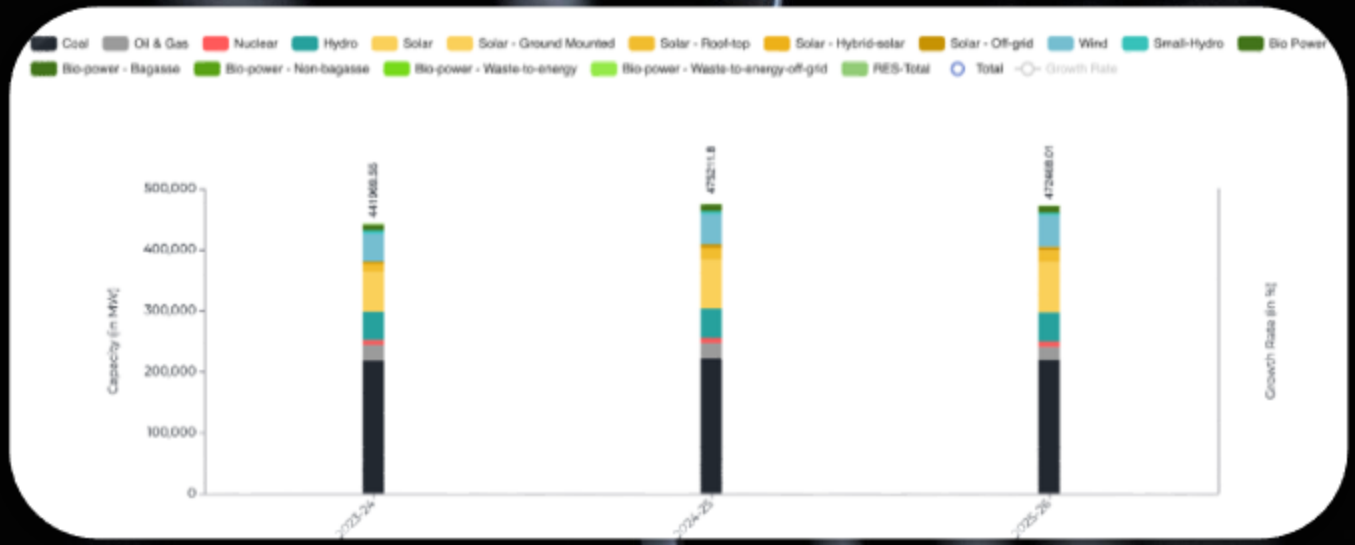
Total Electricity Requirement

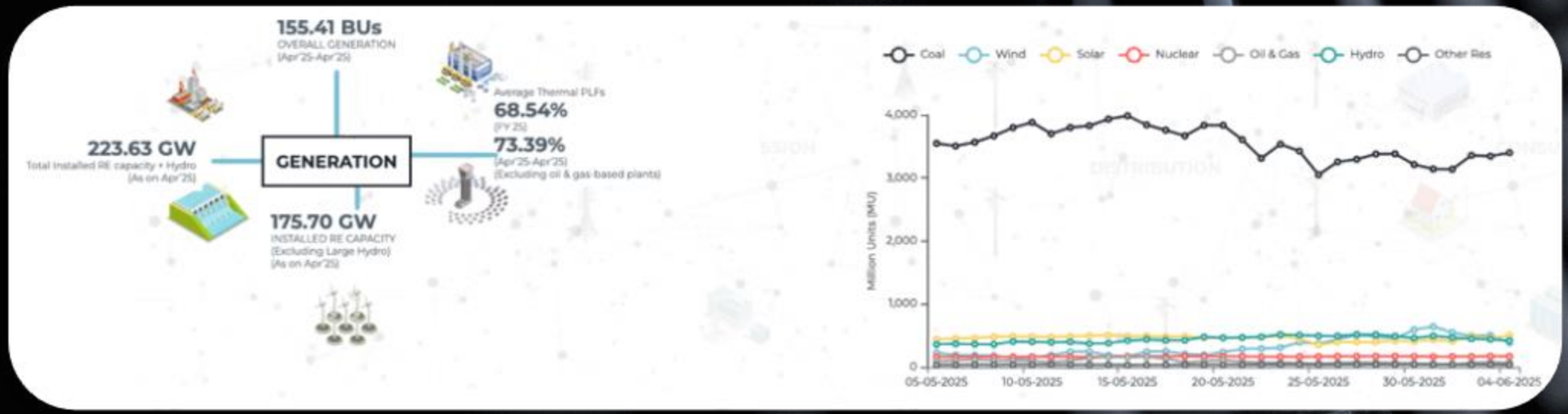
(FY 25)

GENERATION CAPACITY

- India’s total installed capacity **~472.47 GW** as of 2025.
- Breakdown by source:
  - Coal: ~200 GW
  - Renewables (solar, wind, hydro, biomass) ~180 GW
  - Gas, nuclear, others: balance capacity
- Growth driven by government policies and private investments.
- Increasing share of renewables due to climate goals and international commitments.

(Capacity In MW)





GENERATION MIX

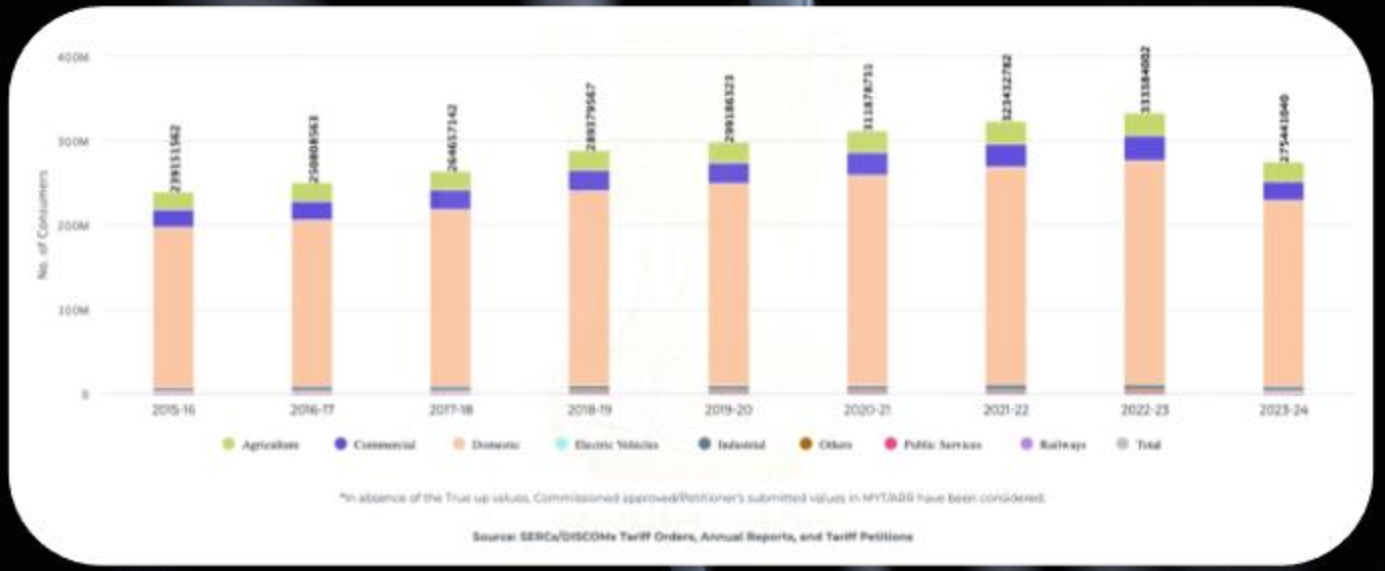
- Coal-based thermal power plants:
  - Still dominant in the power mix almost ~43% of installed capacity.
- Renewables (solar, wind, hydro):
  - Growing rapidly with falling technology costs.
- Gas and nuclear:
  - Provide flexibility and support grid stability.
- Transition towards a more balanced and environmentally friendly mix.
- India’s energy transition targets to reduce coal’s share and boost non-fossil capacity to 50% by 2030.

(State Level Highest Generation)

CONSUMPTION AND DEMAND

- India’s power consumption grows at **~5–6% annually**.
- Economic growth, industrial expansion, and urbanization drive demand.
- Peak demand crossed **250 GW** in recent summers.
- Urban vs. rural:
  - Urban areas have higher per capita electricity use.
  - Rural electrification achieved, but quality and reliability vary.
- Efforts to reduce Aggregate Technical & Commercial losses.

(Consumption by No. of Consumers)



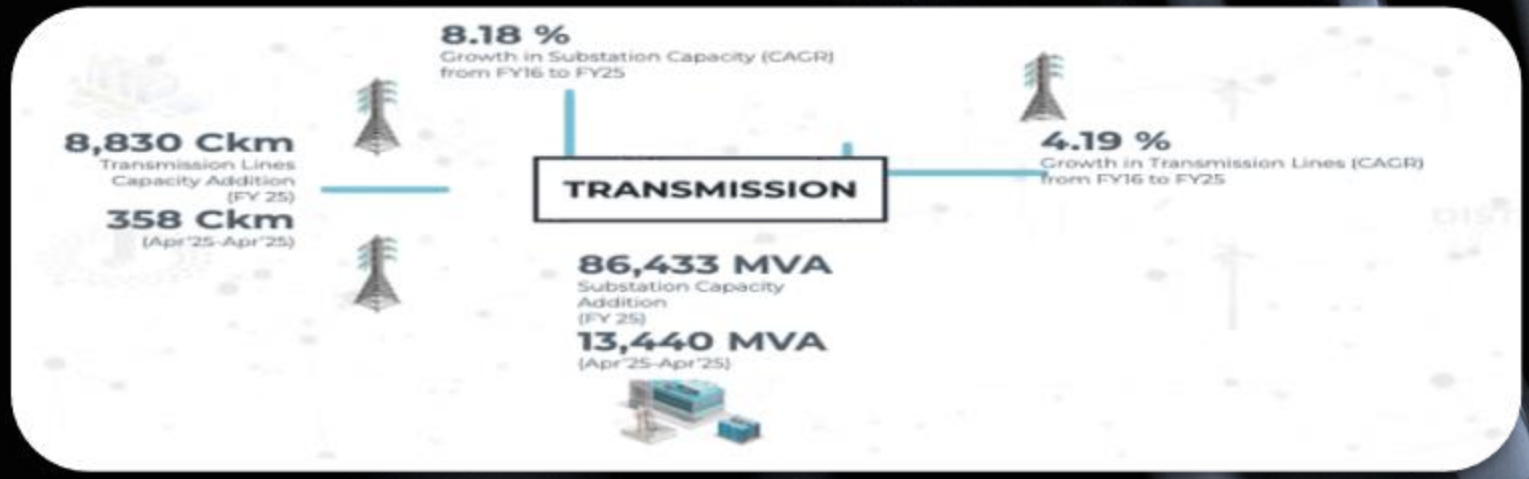
Transmission and Distribution

TRANSMISSION NETWORK :

- Over 4 lakh circuit km of transmission lines.
- National and regional grids integrated under “One Nation, One Grid.”

MODERNIZATION EFFORTS:

- Smart grid projects, automated metering infrastructure (AMI).
- Digital technologies to reduce losses and improve reliability.



Transmission and Distribution

LENGTH OF TRANSMISSION LINES	CENTRAL TRANSMISSION LINES	STATE TRANSMISSION LINES	JV/PRIVATE TRANSMISSION LINES
4,94,732 cKM	1,85,614 cKM	2,65,626 cKM	43,492 cKM

All numbers as on April'25

India Transmission Map

	Existing	Under Construction / Proposed
Select All		
132 KV		
220 KV		
400 KV		
765 KV		
1200 KV		
State / Other		
HVDC B-T- B		
HVDC Bipole		

All transmission lines last updated till 24-Oct-2019

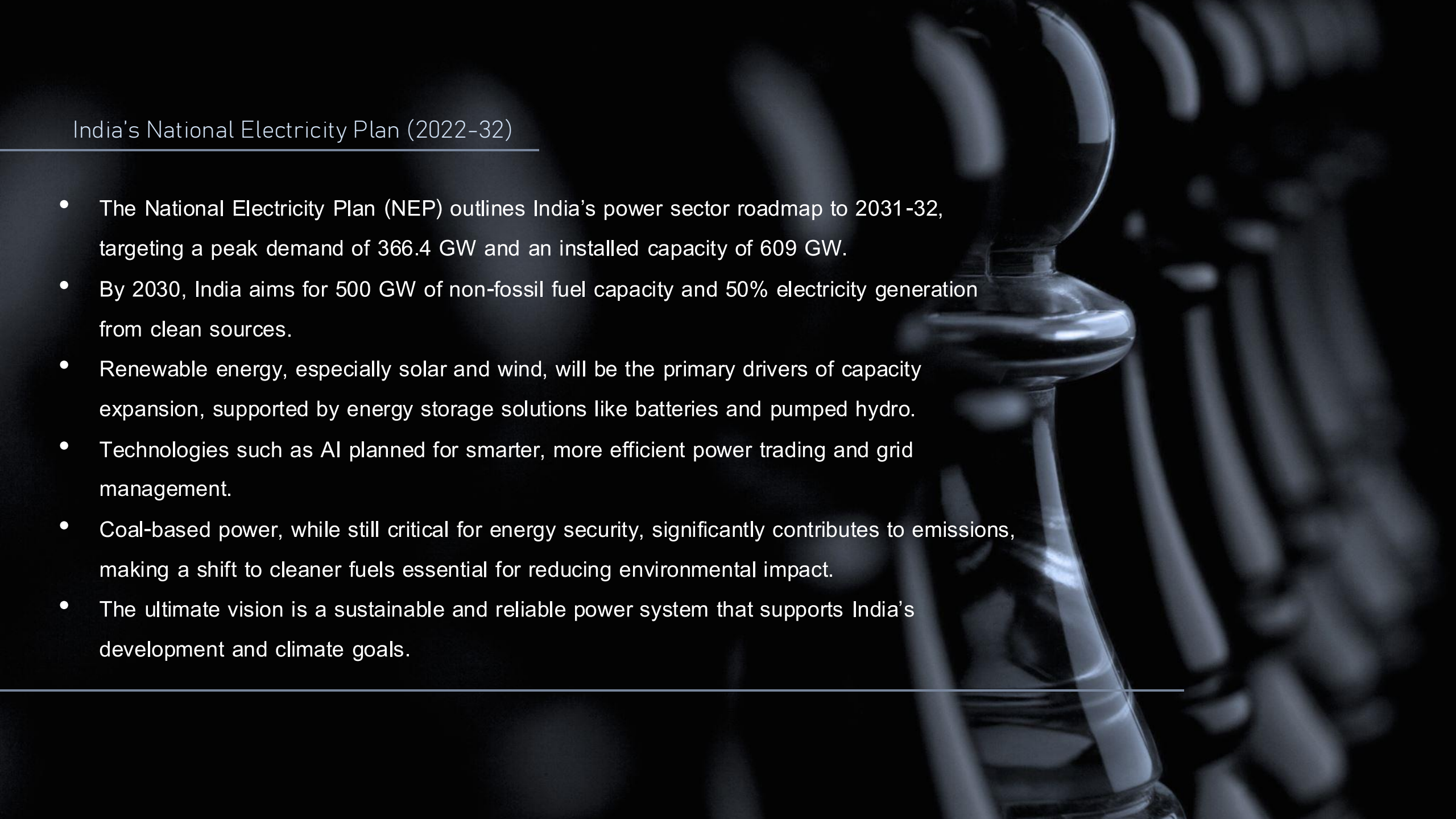
Transmission and Distribution

DISTRIBUTION :

- Managed by state utilities and private players.
- Challenges include financial health of distribution companies (DISCOMs).
- Distribution is a key link in the power supply chain, bridging the gap between generation and end users.
- Distribution Companies face high losses, low revenues, aging infrastructure, and payment delays
- Reforms include smart metering, tariff restructuring, and Direct Benefit Transfer .

POWER CAPACITY EXPANSION

- Coal-based power remains key, increasing from 211.86 GW (2022-23) to 220.49 GW (2024-25).
- Solar power grew rapidly from 66.78 GW to 100.33 GW, while wind energy reached 10.37% of total capacity.
- Hydropower capacity has been steady at around 46.97 GW.
- Despite renewable growth, challenges like grid integration, storage, and investment remain.
- Hydropower helps balance renewable intermittency but faces environmental and delay issues.
- Nuclear power from 6.78 GW (2022-23) to 8.18 GW (2023-24) and is set to expand further.



India's National Electricity Plan (2022-32)

- The National Electricity Plan (NEP) outlines India's power sector roadmap to 2031-32, targeting a peak demand of 366.4 GW and an installed capacity of 609 GW.
- By 2030, India aims for 500 GW of non-fossil fuel capacity and 50% electricity generation from clean sources.
- Renewable energy, especially solar and wind, will be the primary drivers of capacity expansion, supported by energy storage solutions like batteries and pumped hydro.
- Technologies such as AI planned for smarter, more efficient power trading and grid management.
- Coal-based power, while still critical for energy security, significantly contributes to emissions, making a shift to cleaner fuels essential for reducing environmental impact.
- The ultimate vision is a sustainable and reliable power system that supports India's development and climate goals.

THANK YOU

India’s journey towards a greener power sector is crucial for economic and climate goals.