

4. India's Power Sector

India's power sector has transitioned from a deficit-driven system to a more reliable and capacity-sufficient system due to sustained investments, policy reforms, and institutional strengthening over the past decade

1.Introduction

1. India's power sector has undergone a significant transformation over the past decade, marked by expanded capacity, improved access, and a growing shift towards renewable energy.
2. Despite notable progress, structural issues such as financial stress in distribution companies and energy transition challenges continue to persist.

2.Key Achievements in the Power Sector

Expansion of Installed Capacity

1. India's installed power capacity has reached over 520 GW, reflecting substantial growth in generation infrastructure.
2. This expansion has helped reduce power shortages to negligible levels, improving energy security and reliability.

Improved Energy Access and Consumption

1. Per capita electricity consumption has increased significantly, indicating rising living standards, industrialisation, and economic activity.
2. Universal electrification initiatives have ensured last-mile connectivity across rural and urban areas.

Financial Turnaround of DISCOMs

1. Distribution companies have reported profits after years of financial distress, signalling improved operational efficiency.
2. Reduction in Aggregate Technical and Commercial losses reflects better transmission efficiency and improved billing and collection systems.

3.Renewable Energy Transition

Rapid Growth of Renewable Capacity

1. Renewable energy capacity has crossed 250 GW, with significant year-on-year growth.
2. Solar energy leads the transition, followed by wind energy, reflecting diversification of the energy mix.

Global Leadership Position

1. India ranks among the top countries globally in solar, wind, and total renewable energy capacity.
2. This enhances India's credibility in global climate negotiations and energy transition leadership.

State-Level Leadership

1. States such as Rajasthan, Gujarat, Tamil Nadu, and Karnataka have emerged as renewable energy hubs due to favourable policies and resource availability.
2. Regional specialisation supports balanced national growth.

Climate Commitments

1. India aims to achieve 500 GW of non-fossil fuel capacity by 2030 as part of its Nationally Determined Contributions.
2. Renewable expansion contributes to reducing carbon emissions and promoting sustainable development.

4.Government Initiatives Driving Growth

Rural and Urban Electrification

1. Deen Dayal Upadhyaya Gram Jyoti Yojana improved rural electrification and feeder separation.
2. Integrated Power Development Scheme strengthened urban distribution infrastructure.

Universal Access

1. Saubhagya scheme ensured last-mile household electrification, significantly improving energy access.

Distribution Sector Reforms

1. Revamped Distribution Sector Scheme focuses on improving financial sustainability and operational efficiency of DISCOMs.
2. Large financial outlay supports infrastructure modernisation and loss reduction.

5. Policy and Regulatory Reforms

Financial Discipline Measures

1. Late Payment Surcharge Rules, 2022 introduce structured mechanisms for clearing dues and improving cash flow in the sector.
2. These measures enhance financial stability across the power value chain.

Electricity Amendment Bill, 2026

1. Promotes cost-reflective tariffs and rationalisation of cross-subsidies.
2. Encourages competition and efficiency through market-based procurement mechanisms.

National Electricity Plan (2023–2032)

1. Provides a long-term roadmap to meet rising electricity demand.
2. Emphasises capacity expansion, grid strengthening, and investment planning.

6. Challenges in the Power Sector

Financial Stress in DISCOMs

1. High subsidy burdens and delayed payments from state governments strain DISCOM finances.
2. Operational inefficiencies such as power theft and poor billing reduce revenue realisation.
3. Weak financial health limits investment in infrastructure and affects supply reliability.

Dependence on Coal

1. Coal continues to dominate electricity generation, contributing to high carbon emissions.
2. This poses challenges for environmental sustainability and climate commitments.

Intermittency of Renewable Energy

1. Solar and wind energy are variable and depend on weather conditions.
2. This creates challenges for grid stability and requires balancing mechanisms.

Tariff Distortions

1. Cross-subsidisation leads to higher tariffs for industrial users, reducing competitiveness.
2. Lack of cost-reflective pricing affects efficiency and investment incentives.

7. Way Forward

Technological Modernisation

1. Deployment of smart meters and digital billing systems can reduce losses and improve transparency.
2. Adoption of advanced grid management technologies can enhance efficiency.

Strengthening Grid Infrastructure

1. Expansion of transmission networks and green energy corridors is essential for integrating renewable energy.
2. Investment in energy storage solutions can address intermittency issues.

Tariff Rationalisation

1. Moving towards cost-reflective tariffs can improve financial sustainability.
2. Direct Benefit Transfers can protect vulnerable consumers while reducing cross-subsidies.

Diversification of Energy Mix

1. Reducing dependence on coal through increased renewable and nuclear energy adoption is necessary.
2. Promotion of green hydrogen and emerging technologies can support long-term transition.

Conclusion

1. India's power sector has made significant strides in capacity expansion, electrification, and renewable energy growth.
2. However, addressing financial, structural, and technological challenges is essential to ensure sustainable and resilient energy systems.
3. A balanced approach combining policy reform, technological innovation, and financial discipline will be key to achieving long-term energy security and climate goals.

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