

3. India's Power Sector Milestone (2025) – Environment

The year 2025 marked a historic pivot in India's energy trajectory. For the first time in the modern industrial era, India witnessed a structural decline in fossil fuel-based electricity generation, driven by an unprecedented surge in renewable energy capacity. This shift, mirrored by China, has effectively plateaued global fossil fuel power generation, signalling that the world may have finally passed "peak coal" in the electricity sector.

Global Energy Landscape – A 100-Year Shift

Renewables Surpass Coal – In 2025, renewable energy accounted for 33.8% of global electricity generation, officially overtaking coal (33.0%) for the first time in over a century.

Solar Dominance – Solar energy has emerged as the primary engine of growth, meeting roughly 75% of the total increase in global electricity demand.

Fossil Fuel Plateau – Global fossil fuel power generation recorded a contraction of 0.2%, indicating that while coal and gas still play a role, their growth has effectively halted at an aggregate level.

The Indian Context – Breaking the Growth Trend

Negative Growth in Fossil Fuels – Contrary to decades of sustained growth, India's fossil fuel-based power generation fell by 3.3% in 2025. This suggests that new demand is now being met almost entirely by clean sources.

The Solar Revolution – India added a staggering 38 GW of solar capacity in a single year, ranking second globally only to China. For the first time, solar has overtaken hydropower to become India's largest clean energy source.

Clean Energy Surge – Total renewable electricity generation grew by 24%, propelled by a combination of aggressive policy targets and the falling levelized cost of energy (LCOE) for solar and wind.

Catalysts for the 2025 Shift

Climatic Factors – A robust monsoon in 2025 maximized hydropower output, while a relatively milder summer reduced the "cooling load" (air conditioning demand), preventing the need for peak-load coal generation.

Aggressive Deployment – Strategic government pushes, including PLI schemes for solar modules and streamlined bidding processes, accelerated the installation of utility-scale solar parks.

Critical Challenges for 2026 – The Sustainability of Gains

Despite the 2025 milestone, the progress remains vulnerable to cyclical and structural hurdles –

Climate Variability – The 2026 forecast by the IMD suggests a "below-normal" monsoon. This could create a double-edged sword – reduced hydropower generation and increased electricity demand for groundwater pumping and air conditioning during heatwaves. Such conditions often force a temporary return to coal-fired power.

Transmission and Grid Congestion – The physical infrastructure of the grid must keep pace with generation. If transmission corridors are congested, surplus renewable power in one region cannot reach deficit areas, leading to "market splitting" and localized price spikes.

Institutional Hurdles – The transition to a unified market faces resistance from existing power exchanges concerned about losing autonomy, alongside the technical complexity of implementing real-time, nation-wide coordination algorithms.

The Future Architecture – Market Coupling and 'One Grid, One Price'

To cement the gains of the renewable transition, India is moving toward Market Coupling. Currently, multiple power exchanges (like IEX and PXIL) discover different prices for the same time slot, creating inefficiencies.

How Market Coupling Transforms the Sector –

Unified Price Discovery – All buy and sell bids across all exchanges are pooled into a single national pool. A centralized algorithm then discovers a Uniform Market-Clearing Price (MCP).

Elimination of Arbitrage – By creating "One Grid, One Price," it prevents traders from exploiting price differences between exchanges, ensuring DISCOMs (Distribution Companies) always access the lowest national price.

Optimized Transmission – The system identifies the most efficient path for electricity flow, reducing bottlenecks in the national grid and ensuring that cheap renewable power is not "curtailed" (wasted) due to local oversupply.

Better Renewable Integration – Since solar and wind are variable, a unified national market allows a surplus in a sunny state like Rajasthan to seamlessly balance a deficit in an industrial state like Maharashtra.

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