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EDITORIAL ANALYSIS

India's Renewable Surge: NSO Data Shows Progress, But the Grid Challenge Looms

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INTERVIEW ANGLE

"Energy Statistics India 2026 shows India's CO2 growth at just 0.7% — the slowest in two decades. Is the renewable transition actually working, or are lower industrial growth and efficiency gains doing the heavy lifting?"

WHY IN NEWS

The NSO's Energy Statistics India 2026 (33rd edition) documents India's renewable energy potential at 47,04,043 MW, T&D losses reduced to 17%, and CO_2 emissions growth slowing to 0.7% in 2025 — the slowest in two decades (excluding the pandemic). The data comes alongside India's updated NDC committing to 60% non-fossil capacity by 2035.

THE NUMBERS THAT MATTER

India's installed RE capacity CAGR of 10.93% (2016–2025) is genuine progress. At this rate, India has added more than double its 2016 renewable capacity over the decade — a transformation driven primarily by solar, with wind growing more slowly due to land constraints in high-wind states.

The 5 percentage-point reduction in T&D losses (22% to 17% over a decade) is less celebrated but equally important. At India's scale — 1.3 trillion units of electricity transmitted annually — a 5-point loss reduction translates to hundreds of billions of units of energy saved. T&D loss reduction is the cheapest form of energy efficiency.

The 0.7% CO_2 growth in 2025 — the slowest in 20 years outside the pandemic — is the headline achievement. It suggests that India's energy intensity is improving: more economic activity per unit of carbon emitted. This is what the NDC's emissions intensity metric tracks, and the trajectory is encouraging.

WHAT THE DATA DOESN'T SHOW

NSO Energy Statistics measures quantities and capacities; it doesn't capture grid stress, curtailment, or integration challenges. India's rapidly growing renewable capacity is increasingly running into a grid that was designed for centralized, dispatchable coal power. Solar and wind are variable — they produce when the sun shines and wind blows, not when demand peaks.

Grid curtailment — where solar and wind power is wasted because the grid cannot absorb it — is a growing problem in high-RE states like Rajasthan, Gujarat, and Tamil Nadu. Estimates suggest India curtailed several billion units of renewable energy in FY 2024-25. This curtailment doesn't appear in generation statistics — making the transition look smoother than it is.

THE BATTERY STORAGE IMPERATIVE

The 60% non-fossil target by 2035 cannot be achieved without large-scale Battery Energy Storage Systems (BESS). At high renewable penetration — beyond 40% of installed capacity — grid stability requires storage that can absorb afternoon solar surpluses and discharge during evening demand peaks (the "duck curve" problem).

The government's Viability Gap Funding (VGF) scheme for BESS (launched 2024) is a step in the right direction, but the scale of support remains limited. India's battery manufacturing capability — despite PLI schemes — relies heavily on Chinese cells. Building a domestic battery supply chain that does not recreate the solar panel import dependency problem is a policy challenge that the NSO data does not yet reflect.

CREDIT FLOW AND PRIVATE INVESTMENT

Energy Statistics India 2026 documents a six-fold increase in credit flow to the energy sector: ₹1,688 crore (2021) to ₹10,325 crore (2025). This reflects growing bank confidence in renewable energy projects — but the absolute number remains modest for a sector requiring hundreds of billions in annual investment. Green bonds, infrastructure investment trusts (InvITs), and foreign direct investment in RE are filling part of the gap, but financing costs in India remain higher than in developed markets, creating a structural cost disadvantage for Indian RE projects.

UPSC RELEVANCE

Energy Statistics India 2026 key data; NSO; T&D losses; RE CAGR; CO_2 emissions growth; BESS; VGF scheme.

MAINS GS-3:

"India's renewable energy transition is impressive in installed capacity but faces grid integration, storage, and financing challenges. Discuss."

ESSAY:

"Energy security and energy transition are not the same problem, though they share the same vocabulary."

📌 FACTS CORNER — KNOWLEDGEPEDIA

ENERGY STATISTICS INDIA 2026 (NSO, 33RD EDITION):

Total RE potential: 47,04,043 MW (solar ~71%)

RE generation FY 2024-25: 4,16,823 GWh

Installed RE CAGR (2016–2025): 10.93%

T&D losses: 17% (FY 2024-25) down from 22% (FY 2015-16)

CO_2 emissions growth: 0.7% (2025) — slowest in 20 years ex-pandemic

Per-capita energy consumption: 15,296 MJ (2015-16) → 18,096 MJ (2024-25)

Credit to energy sector: ₹1,688 crore (2021) → ₹10,325 crore (2025)

GRID CHALLENGE:

Duck curve problem: Solar surplus afternoon → storage needed for evening peak

BESS: Battery Energy Storage Systems — VGF scheme launched 2024

Curtailment: Waste of RE due to grid absorption limits — growing problem in Rajasthan, Gujarat, Tamil Nadu

OTHER RELEVANT FACTS:

Top 6 RE states (70% of national potential): Rajasthan, Maharashtra, Gujarat, Andhra Pradesh, Karnataka, Madhya Pradesh

PLI scheme for solar modules: 10 GW domestic manufacturing target (initial), expanded

Green bonds: RBI sovereign green bond framework launched FY 2022-23

InvITs (Infrastructure Investment Trusts): Vehicle for long-term RE project financing

Sources: NSO/MoSPI , Ministry of New and Renewable Energy , Mint

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