Climate Targets and India's Progress

Mains: GS-III – Ecology & Environment

Why in News?

There has been a lot of focus on the recent Aravalli judgment and its implications for mining operations across the green belt as well as the government's commitments regarding environmental standards and regulatory protection for ecologically sensitive areas.

What are India's Paris climate commitments (2015)?

- **Paris summit** – India had committed to four quantified climate targets, grounded in the principle of "*common but differentiated responsibilities".*
- It reflects how, historically, India's per capita emissions were low compared to emissions of other major countries like the U.S.

However, currently India is the world's ***3rd largest absolute emitter****.*

What are India's four quantified targets & its achievements?

- **Emissions Intensity Reduction**
  - **Target** – 33–35% reduction by 2030 (baseline 2005).
  - **Achieved** – ~36% reduction by 2020, a decade early.
- **Non-Fossil Fuel Capacity**
  - **Target** – India set renewable targets of 40% non-fossil capacity by 2030, later raised to 50%.
  - **Achieved –** By June 2025, non-fossil fuel sources made up 51% of installed capacity (495 GW), achieving the commitment early.
- **Renewable energy capacity**
  - **Target** – 175 GW of renewable energy capacity by 2022
  - Solar capacity surged from 2.8 GW (2014) to ~110.9 GW (2025).
  - Wind power increased more modestly from 21 GW to ~51.3 GW.
- **Carbon Sequestration**
  - **Target** - India pledged 2.5–3 billion tonnes by 2030,
  - **Achieved** - ~2.29 billion tonnes additional sequestration since 2005, leaving only ~0.2 billion tonnes to meet target (as per India State of Forest Report 2023).

What are the key structural factors enabling India's trajectory of emission intensity reduction?

- **Rapid expansion of non-fossil power capacity** – Solar, wind, hydro, and nuclear

has lowered carbon intensity.
- By 2023, non-fossil capacity exceeded by approximately 43%, and it reached roughly 50% by mid-2025.
- **Economic shift –** India's economic composition shifted toward lower-carbon services and digital sectors, resulting in a reduction in emissions per unit of GDP.
- **Efficiency programmes** – Like Perform, Achieve and Trade (PAT), UJALA curbed demand growth in industry and households.
- National assessments record measurable electricity savings and avoided emissions in FY2020-21.
- **Government driven programs** – Such as the National Solar Mission, Solar Parks Scheme, UDAY, PM-KUSUM, and rooftop solar have successfully added 25 GW of renewable energy every year.

What are the challenges that persist?

- **Persistent absolute emission** – Although India has reduced emissions intensity, its total greenhouse gas output remains high, around 2,959 $MtCO_2e$ in 2020, and has continued at elevated levels since.
- India's GDP has grown faster than its emissions, leading to a drop in emissions intensity but no overall decline in absolute greenhouse gas output.
- **Sectoral divergence** – National averages on emissions intensity mask sectoral divergence, while the power sector's CO_2 growth slowed in 2024–25, emissions from cement, steel, and transport continued to rise.

*Comparative Insights – Analyses by **Climate Transparency & IEA** show that India's rate of intensity decline exceeds that of many G-20 peers, but coal's large share keeps absolute per-kWh emissions high.*

- **Renewable Integration Gap** – Renewables supplied only ~22% of electricity in 2024–25 due to intermittency and lack of storage, despite greater than 50% installed non-fossil capacity.
- **Missed Targets & Future Ambitions** – The 175 GW renewables target for 2022 was missed, and although a 500 GW 2030 ambition is technically possible.
- **Storage bottleneck** – The Central Electricity Authority has forecast a demand of 336 GWh of energy storage for the 2029-30 period. However, as of September 2025, only 500 MWh of battery energy storage capacity is operational.
- **Execution bottlenecks** – Delays in grid connectivity and limited land acquisition in the power sector for projects.
- **Coal Dependence** – Despite rapid renewable growth, the backbone remains coal, with ~253 GW coal-based capacity continuing to dominate baseload supply.
- **Policy Mechanisms & Implementation Gaps** – Under the *Compensatory Afforestation Fund Act (2016)* the implementation of afforestation funds uneven across states (Delhi utilised only 23% (2019–20 to 2023–24)).
- **Green India Mission** - Regenerating 5 million hectares through regional projects in the Aravallis, Western Ghats, and Himalayas.
- **Climate change** – Satellite data shows leaf index "greening", but actual carbon

assimilation and productivity are weakened by warming and water stress, particularly in the Western Ghats and Northeast India.
- **Domination of plantations** – India will likely meet its 2030 forest sink target numerically, but plantation-heavy, governance-limited mechanisms, prioritises carbon accounting over ecological restoration and biodiversity health.

What lies ahead?

- **Policy Imperatives for Net-Zero 2070 –** For India's 2070 net-zero pledge to be credible, remaining intensity gains must be translated into absolute emissions reductions through a transparent coal phase-down timetable and industrial decarbonisation roadmaps.
- **India's transition path –** That lies ahead demands storage scaling, coal phase-down, forest governance reform, and transparent data tracking — governance, not just capital, will drive success.
- **Critical Five-Year Window –** The next five years are crucial to accelerate renewables, fix storage gaps, and strengthen government coordination on grid connectivity and land acquisition.
- India has largely met its quantified commitments, but the real challenge lies in turning installed renewable capacity into sustained generation and translating intensity gains into actual moderation of absolute emissions.

Reference

The Hindu | India's progress on its climate targets