



# India's Power Sector in 2030: Shift to Renewables and Coal's Decline

**For Prelims:** Central Electricity Authority (CEA), [Paris Agreement](#), Targets of Renewable Energy, [climate commitments](#)

**For Mains:** [India's energy transition](#) and future power generation mix, challenges faced in the adoption of renewable energy sources, progress of India in achieving its renewable energy targets

## Why in News?

Recently, the [Central Electricity Authority \(CEA\)](#) (Ministry of Power) released a new publication titled **Report on Optimal Generation Mix 2030 Version 2.0**.

- This is an **updated version of the report published in 2020** titled **Report on Optimal Generation Capacity Mix for 2029-30**.
- The report highlights the changes expected in India's energy mix, with a **decline in coal's share and a rise in renewable energy (RE) sources**.
- Earlier, the [CEA released the latest draft of the National Electricity Plan \(NEP\) 2022-27](#).

## What are the Key Highlights?

- **Coal Share in Power Mix:**
  - Coal's share in the power mix is projected to **decline from 73% in 2022-23 to 55% in 2030**.
  - **Impact on Coal Usage:**
    - Although the share of coal in power generation is set to reduce, in absolute terms, **coal power capacity and generation will increase between 2023 and 2030**.
    - Coal capacity is projected to **rise by 19%**, and generation is expected to **increase by 13%** during this period.
- **Solar Energy Contribution:**
  - [Solar energy](#) is expected to play a significant role in the power mix, lifting the overall load.
    - Projections indicate a **quadrupling of solar capacity** from 109 GW to 392 GW by 2030.
    - Solar generation is expected to increase from 173 BU to 761 BU in the same period.

## Note:

- **Power capacity differs from generation.** Capacity is the maximum power a plant can produce and is expressed in watts (or gigawatts or megawatts).
- Generation is the actual amount of power produced in one hour, expressed in **watt-hours or billion units (BU)**.

- **Contribution of Other RE Sources:**
  - Projections for large [hydropower](#) and [wind energy](#) remain **modest in the future power mix.**
    - Large hydro generation is expected to **increase from 8% to 9% by 2030.**
    - **Wind generation**, on the other hand, is **projected to decrease to 9%** in the updated version (from **12% in the previous report**).
  - Renewable sources, including small hydro, pumped hydro, solar, wind, and biomass, are expected to account for **31% of the power mix in 2030, compared to the current 12%.**
- **Role of Natural Gas in the Power Generation Mix:**
  - Despite aspirations to increase the share of [natural gas](#), its contribution to power generation remains small.
  - The report estimates the likely retirement of 2,121.5 MW of coal plants by 2030, with 304 MW set to be retired during 2022-23.
- **Greenhouse Gas Emissions:**
  - The **power sector contributes approximately 40%** of India's total [greenhouse gas emissions](#).
  - Power sector emissions are projected to **rise by 11%, reaching 1.114 Gt CO2 in 2030**, accounting for 10% of global power sector emissions.
- **Climate Commitments**
  - **In terms of [climate commitments](#)**, CEA's projections indicate that India is likely to **over-achieve on its pledge to the [Paris Agreement](#)** - to have 50% of installed power capacity from non-fossil sources by 2030.
  - As per the report, India's share of capacity from non-fossil sources will be 62% by 2030. The share will be 64% if [nuclear power](#) is considered.

## What are India's Targets of Renewable Energy Power Generation?

- **India's Renewable Energy Targets:**
  - **175 GW Renewable Energy Capacity by 2022:**
    - 100 GW of Solar Power.
    - 60 GW of Wind Power.
    - 10 GW of Biomass Power.
    - 5 GW of Small Hydro Power.
  - **500 GW Non-Fossil Fuel Based Energy by 2030:**
    - Announced by Prime Minister Narendra Modi at COP26 summit.
  - **50% Electricity from Non-Fossil Fuel Sources by 2030:**
    - Pledged in India's [Nationally Determined Contributions \(NDCs\)](#) under the [Paris Agreement](#).
- **India's Global Ranking:**
  - The 4<sup>th</sup> largest installed capacity of solar and wind power in the world.
  - The 4<sup>th</sup> most attractive renewable energy market in the world.

## What is CEA?

- **About:**
  - The **CEA is a statutory organization** that advises the government of India on policy matters and formulates plans for the development of **electricity systems in the country.**
  - It was established in 1951 under the Electricity Supply Act 1948, which has been now superseded by the [Electricity Act 2003](#).
- **Functions:**
  - **Policymaking:**
    - Preparing the **national electricity plan and tariff policy.**
    - **Advising** the central government on matters relating to the **national electricity policy, rural electrification, hydropower development, etc.**

- **Technical Standards:**
  - Specifying the technical standards for construction, operation, and maintenance of electrical plants and electric lines.
  - Specifying the **grid standards and safety requirements** for operation and maintenance of transmission lines.
- **Data Collection and Research:**
  - Collecting and recording data on generation, transmission, distribution, and utilization of electricity and promoting r&d in the field of electricity.
- **Implementation Monitoring and Coordination:**
  - Monitoring the implementation of power projects and schemes.
  - Coordinating with state governments, state electricity boards, regional power committees, etc. on matters relating to electricity.

## What are India's Initiatives for Power Generation from RE Sources?

- **Solar Power:**
  - [National Solar Mission](#)
  - [International Solar Alliance](#)
  - [PM Kisan Urja Suraksha evam Utthaan Mahabhiyan \(PM-KUSUM\)](#)
- **Wind Power:**
  - [National Wind-Solar Hybrid Policy](#)
  - [National Offshore Wind Energy Policy](#)
- **Hydropower:**
  - [National Hydroelectricity Policy](#)
  - **Renewable Energy Status:** The government has declared large hydropower projects (>25 MW) as renewable energy sources, which will enable them to avail the benefits of renewable energy such as waiver of inter-state transmission charges, renewable purchase obligation, green energy certificates, etc.
- **Hydrogen:**
  - [National Hydrogen Energy Mission](#)
  - [National Green Hydrogen Mission](#)

## What are the Challenges in Adopting Renewable Energy?

- **Intermittency and Variability:**
    - RE sources are intermittent and variable due to **weather conditions**.
    - **Matching energy supply** with demand and **maintaining grid stability** becomes challenging.
  - **Grid Integration:**
    - Integrating large-scale renewable energy into existing power grids can be complex.
    - Upgrading grid infrastructure and balancing mechanisms is necessary for reliable power supply.
  - **Land and Resource Availability:**
    - Scaling up renewable energy installations requires significant land and resource availability.
    - Identifying suitable locations, acquiring land, and addressing environmental concerns can be challenging.
  - **Transition from Coal-dependent Economy:**
    - Coal still dominates the power sector in India, as it accounts for about **70% of the electricity generation**.
    - Also, coal sector in India is estimated to provide about **1.2 million** direct jobs and up to **20 million** indirect and dependent jobs.
      - Transition from it can lead to job losses in the coal sector and ensuring a smooth transition for affected communities needs to be addressed.
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## UPSC Civil Services Examination Previous Year Question (PYQ)

### Prelims

**Q. The term 'Intended Nationally Determined Contributions' is sometimes seen in the news in the context of (2016)**

- (a) pledges made by the European countries to rehabilitate refugees from the war-affected Middle East
- (b) plan of action outlined by the countries of the world to combat climate change
- (c) capital contributed by the member countries in the establishment of the Asian Infrastructure Investment Bank
- (d) plan of action outlined by the countries of the world regarding Sustainable Development Goals

**Ans: (b)**

### Mains:

**Q. Describe the benefits of deriving electric energy from sunlight in contrast to conventional energy generation. What are the initiatives offered by our government for this purpose? (2020)**

**Source: DTE**

PDF Reference URL: <https://www.drishtiias.com/printpdf/india-s-power-sector-in-2030-shift-to-renewables-and-coal-s-decline>

