



## Green Steel

**For Prelims:** Green Steel, National Hydrogen Energy Mission (NHM), Steel Scrap Recycling Policy, PAT Scheme, CCUS Initiative, India's Commitments at the Conference of the Parties (COP26).

**For Mains:** Green Steel, Significance, Challenge and the Solution.

### Why in News?

Ministry of Steel seeks to reduce carbon emissions in steel industry through promotion of [Green Steel](#).

### What is Green Steel?

#### ▪ About:

- Green Steel is the **manufacturing of [steel](#) without the use of fossil fuels**.
  - This can be done by using **low-carbon energy sources such as hydrogen, coal gasification, or electricity** instead of the traditional carbon-intensive manufacturing route of coal-fired plants.
- It eventually **lowers [greenhouse gas emissions](#), cuts cost and improves the quality of steel**.
- **[Low-carbon hydrogen \(blue hydrogen and green hydrogen\)](#)** can help **reduce the steel industry's carbon footprint**.

#### ▪ Ways of Production:

- **Substituting the Primary Production Processes with Cleaner Alternatives:**
  - **[Carbon capture, utilization and storage \(CCUS\)](#)**.
  - Replacing conventional sources of energy with low-carbon hydrogen.
  - Direct electrification through electrolysis of iron ore.

#### ▪ Significance:

- The steel industry is the largest industrial sector in terms of intensive energy and resource use. It is **one of the biggest emitters of carbon dioxide (CO<sub>2</sub>)**.
- In view of commitments made at the **[Conference of the Parties \(COP26\)](#)** climate change conference, the Indian steel industry **needs to reduce its emissions substantially by 2030 and hit net-zero carbon emissions by 2070**.

### What is the Status of Steel Production in India?

- **Production:** India is currently the **world's 2<sup>nd</sup> largest producer of crude steel**, producing 120 Million Tonnes (MT) crude steel during financial year 2021- 2022.
- **Reserves: More than 80% of the country's reserves** are in the states of Odisha, Jharkhand, West Bengal, Chhattisgarh and the northern regions of Andhra Pradesh.
  - **Important steel-producing centers are** Bhilai (Chhattisgarh), Durgapur (West Bengal), Burnpur (West Bengal), Jamshedpur (Jharkhand), Rourkela (Odisha), Bokaro (Jharkhand).
- **Consumption:** India is the **2<sup>nd</sup> largest consumer of finished steel** in 2021 (106.23 MT), preceded by China as the largest steel consumer as per World Steel Association.

## What are the Related Government Initiatives?

- **Steel Scrap Recycling Policy, 2019:**
  - [Steel Scrap Recycling Policy, 2019](#) enhances the availability of domestically generated scrap to reduce the consumption of coal in steel making.
- **National Green Hydrogen Mission:**
  - Ministry of New and Renewable Energy (MNRE) has announced [National Green Hydrogen Mission](#) for green hydrogen production and usage. The steel sector has also been made a stakeholder in the Mission.
- **Motor Vehicles (Registration and Functions of Vehicles Scrapping Facility) Rules September 2021:**
  - It shall increase availability of scrap in the steel sector.
- **National Solar Mission:**
  - Launched by MNRE in January 2010, it promotes the use of solar energy and also helps reduce the emission of steel industry.
- **Perform, Achieve and Trade (PAT) Scheme:**
  - [PAT Scheme](#) incentivizes steel industry to reduce energy consumption.
- **NEDO Model Projects:**
  - [Japan's New Energy and Industrial Technology Development Organization \(NEDO\) Model Projects](#) have been implemented in steel plants for Energy Efficiency Improvement.

## UPSC Civil Services Examination Previous Year Questions (PYQs)

### Prelims

**Q. Which of the following are some important pollutants released by steel industry in India? (2014)**

1. Oxides of sulphur
2. Oxides of nitrogen
3. Carbon monoxide
4. Carbon dioxide

**Select the correct answer using the code given below:**

- (a) 1, 3 and 4 only  
(b) 2 and 3 only  
(c) 1 and 4 only  
(d) 1, 2, 3 and 4

**Ans: (d)**

**Exp:**

- Steel industry creates pollution as it uses coal and Iron ore whose combustion releases various Polycyclic Aromatic Hydrocarbons (PAH) compounds and oxides into the air.
- In steel furnace, coke reacts with iron ore, releasing iron and generating major environmental pollutants.
- The pollutants released from steel producing units are:
  - Carbon Monoxide (CO), hence, 3 is correct.
  - Carbon Dioxide (CO<sub>2</sub>), hence, 4 is correct.
  - Oxides of Sulphur (SO<sub>x</sub>), hence, 1 is correct.
  - Oxides of Nitrogen (NO<sub>x</sub>), hence, 2 is correct.
  - PM 2.5,
  - Waste Water,

- Hazardous waste,
- Solid waste.
- However, technological interventions in the form of air filters, water filters and other water saving, power saving and closed container can reduce emissions.
- **Therefore, option (d) is the correct answer**

### **Mains**

**Q1.** Account for the present location of iron and steel industries away from the source of raw material, by giving examples. **(2020)**

**Q2.** Account for the change in the spatial pattern of the Iron and Steel industry in the world. **(2014)**

**Source: PIB**

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