



## Green Steel Policy

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### Why in News?

The [Steel Ministry](#) is developing a comprehensive [green steel policy](#), encompassing the manufacturing process, required skill set, and funding support, as part of a complete [decarbonization strategy](#).

### What is Green Steel?

- **About:**
  - Green steel is the eco-friendly production of steel with lower [greenhouse gas emissions](#), possibly **reducing costs** and enhancing quality compared to traditional methods.
- **Need:**
  - **High Coal Consumption in Blast Furnace:** The steel manufacturing process, involving [blast furnaces](#), basic oxygen furnaces, and **electric arc furnaces**, is a major global source of carbon emissions, primarily due to the **high coal** and coke consumption in blast furnace operations.
    - A study suggests that with **steel demand projected to rise** through the 21st century, there is a strong incentive to seek low [greenhouse gas \(GHG\) emission](#) alternatives for steel production.
    - **India's domestic steel sector** contributes **12%** of the country's greenhouse gas emissions, with an emission intensity of **2.55 tonnes of CO<sub>2</sub> per tonne** of crude steel, higher than the global average of 1.9 tonnes of CO<sub>2</sub>.

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### Carbon emissions from coal-based steel production



Steel production today accounts for 8% of total global CO<sub>2</sub> emissions. Infographics: Azote

- **As a Low-Grade Carbon Production Method:**
  - It Includes [carbon capture and storage \(CCS\)](#), using [Green/Blue hydrogen](#), high

[biomass](#) utilization, and **artificial iron units (AIUs)** for reducing carbon emissions and producing high-grade steel.

## CO<sub>2</sub> reduction

	Strategy	Examples	Current outlook
<b>Blast furnace efficiency (BOF)</b>	Make efficiency improvements to optimize BF/BOF operations	Optimized BOF inputs (DRI, scrap), increased fuel injection in BF (e.g., hydrogen, PCI)	Technology readily available at competitive cost
<b>Biomass reductants</b>	Use biomass as an alternative reductant or fuel	Tecnored process	Process possible in South America and Russia, due to biomass availability
<b>Carbon capture and usage</b>	Capture fossil fuels and emissions and create new products	Bioethanol production from CO <sub>2</sub> emissions	Not available on an industrial scale

## Full decarbonization possible

	Strategy	Examples	Current outlook
<b>Electric arc furnace (EAF)</b>	Maximize secondary flows and recycling by melting more scrap in EAF	EAF – usage to melt scrap	Technology readily available at competitive cost
<b>DRI plus EAF using natural gas</b>	Increase usage of DRI in the EAF	Current DRI plus EAF plants using natural gas (NG)	Technology readily available
<b>DRI plus EAF using H<sub>2</sub></b>	Replace fossil fuels in DRI process with renewable energy or H <sub>2</sub>	MIDREX DRI process running on H <sub>2</sub>  HYL DRI process running on H <sub>2</sub>	Technology available at high cost

### ▪ Global Initiatives:

#### ◦ **First Movers Coalition:**

- It is an initiative of the [World Economic Forum](#) to decarbonize industrial sectors like steel.
- The **Coalition** announced it had **expanded**, with 55 companies and nine countries now committed to purchasing a proportion of the industrial materials and transport they need from suppliers using **near-zero or zero-carbon solutions**.

#### ◦ **The Industrial Deep Decarbonization Initiative (IDDI):**

- It encourages governments to **report environmental data** and use low-emission and near-zero emissions cement/concrete and steel in construction projects, with nine countries, including the U.S., having joined and set to declare their pledges.

#### ◦ **SteelZero and ConcreteZero:**

- The **Climate Group's** SteelZero and ConcreteZero initiatives are **corporate partnerships** with 25 and 22 companies respectively committed to using net-zero steel and low- and net-zero emission concrete — and effectively cement, as its key

ingredient.

- **European Union:**
  - By 2030, the [European Union](#) is projected to host nearly 50 green and low-carbon steel projects, driven in part by policies like the European Union's [Carbon Border Adjustment Mechanism](#).
- **Sweden:**
  - **Hybrit** supplied Volvo with the **first coal-free "green steel,"** while H2 Green Steel is constructing a **fossil fuel-free steel plant** in **Sweden** with a sustainable hydrogen facility, both striving for **environmentally friendly** steel production.

### Countries with the largest low-carbon steel investments announced (USD)



#### ▪ **India's Initiative:**

- The Steel Ministry is developing a [green steel policy](#), including process definition, required skills, and funding, with a focus on complete decarbonization.
- Already 13-odd **task forces** had been **formed** to determine the various modalities around green steel-making, including a definition of the offering.
- Recently, the 14<sup>th</sup> task force was set up to explore the option of using [biochar or biomass](#) (as an alternative in blast furnaces) in steel-making, thereby bringing down carbon emissions during the manufacturing process.
- India is exploring its own pure-hydrogen-based [DRI \(direct reduction of iron\) technology](#), with the project report currently under scrutiny, and also considering a consortium-based pilot for a hydrogen-based DRI facility.
  - The [Ministry of New and Renewable Energy](#) has allocated ₹455 crore for piloting the use of hydrogen in steel making.

### UPSC Civil Services Examination, Previous Year Question (PYQ)

**Q. In the 'Index of Eight Core Industries', which one of the following is given the highest weight? (2015)**

- (a) Coal production
- (b) Electricity generation
- (c) Fertilizer production
- (d) Steel production

**Ans: B**

**Q. Consider the following statements: (2009)**

1. MMTC Limited is India's largest international trading organization.
2. Neelachal Ispat Nigam Limited has been set up by MMTC jointly with the Government of Orissa.

**Which of the statements given above is/are correct?**

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

**Ans: C**

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