Green Steel Policy

Source: TH

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_2 per tonne** of crude steel, higher than the global average of 1.9 tonnes of CO_2.

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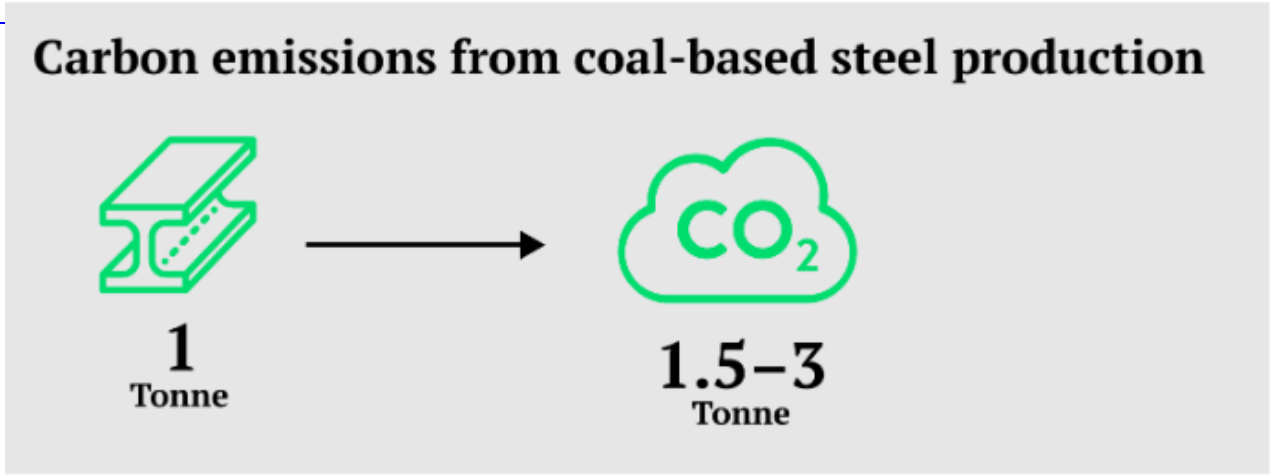


Steel production today accounts for 8% of total global CO2 emissions. Infographics: Azote

- **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_2 reduction

	Strategy	Examples	Current outlook
Blast furnace efficiency (BOF)	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
Biomass reductants	Use biomass as an alternative reductant or fuel	Tecnored process	Process possible in South America and Russia, due to biomass availability
Carbon capture and usage	Capture fossil fuels and emissions and create new products	Bioethanol production from CO_2 emissions	Not available on an industrial scale

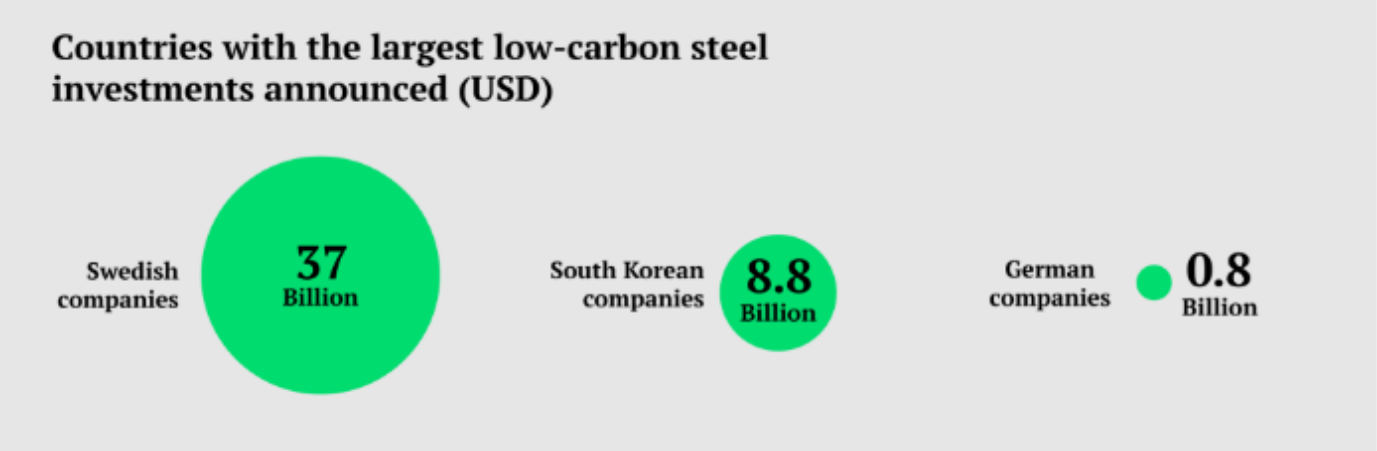
Full decarbonization possible

	Strategy	Examples	Current outlook
Electric arc furnace (EAF)	Maximize secondary flows and recycling by melting more scrap in EAF	EAF – usage to melt scrap	Technology readily available at competitive cost
DRI plus EAF using natural gas	Increase usage of DRI in the EAF	Current DRI plus EAF plants using natural gas (NG)	Technology readily available
DRI plus EAF using H_2	Replace fossil fuels in DRI process with renewable energy or H_2	MIDREX DRI process running on H_2 HYL DRI process running on H_2	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.



- **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 14th 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