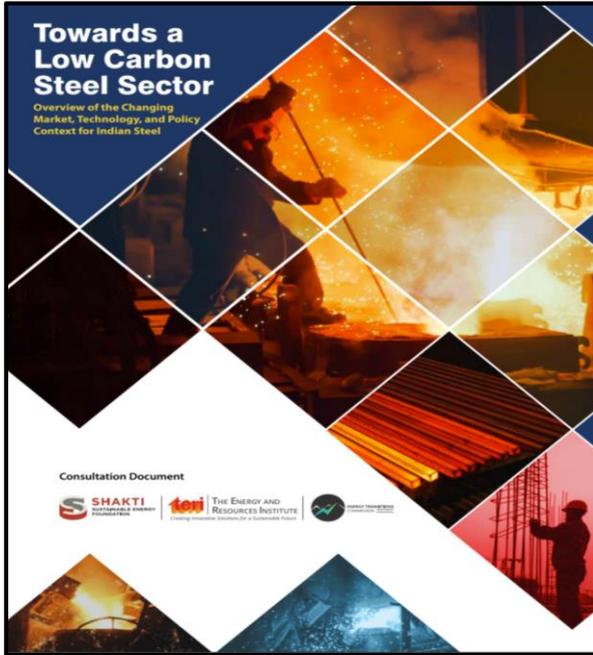


Achieving Green Steel: Roadmap to a net zero steel sector in India

Taruna Idnani, Project Manager,
TERI

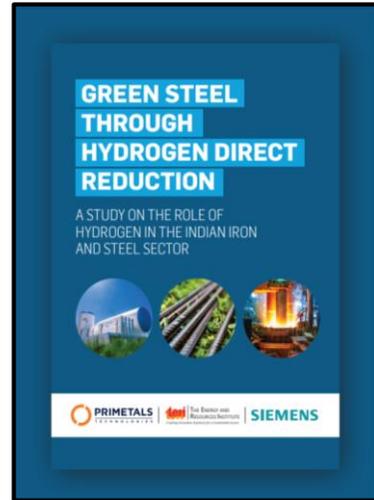


TERI's Work in Steel Sector

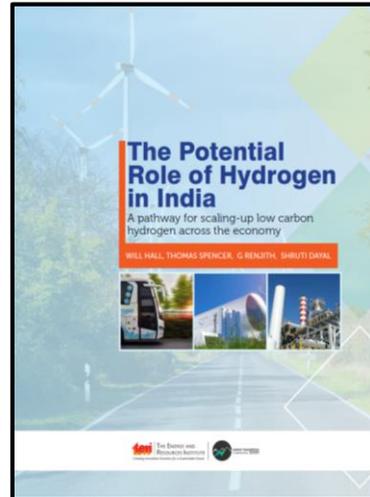


2020: Towards a low carbon steel sector

2020: The Potential Role of Hydrogen in India



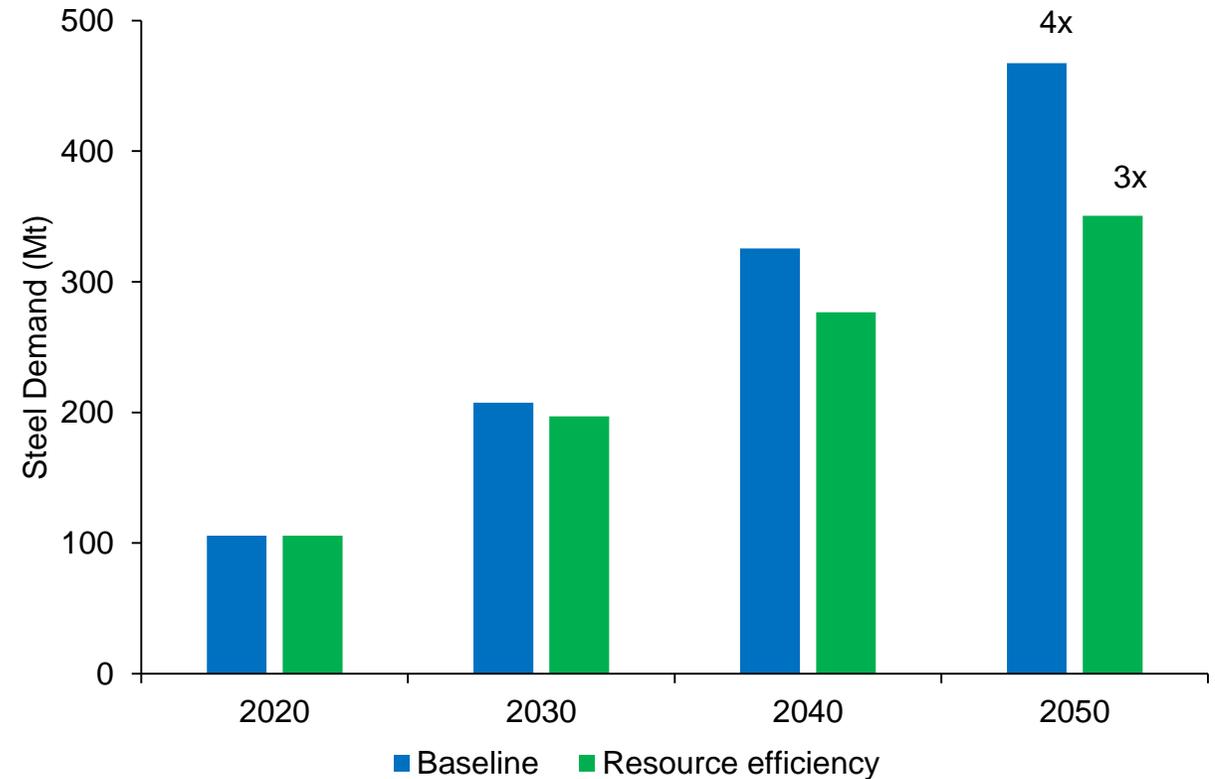
2021: Green Steel through Hydrogen Direct Reduction



2022: Achieving Green Steel

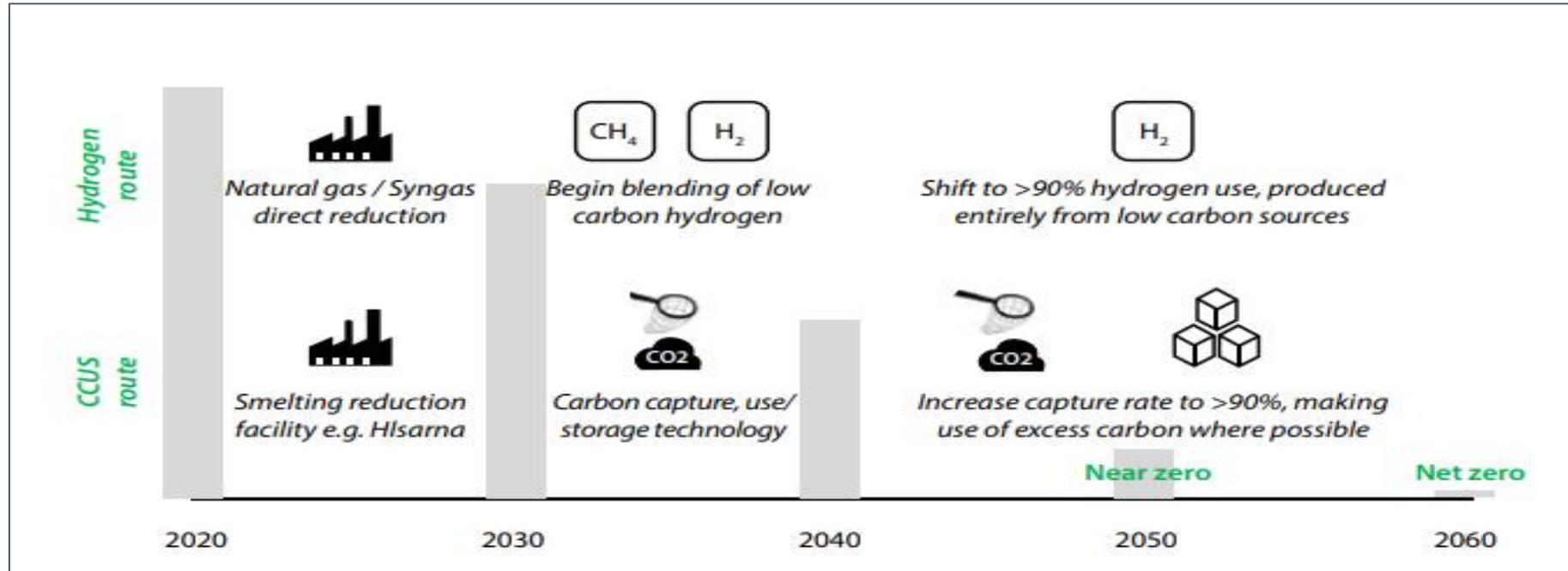
Demand for steel will increase significantly in the coming decades

- We expect steel demand to increase rapidly out to 2050, satisfying growing requirements of infrastructure development in India.
- By 2050, we expect steel demand to be around 350 Mt in such a scenario. New low carbon capacity will be required to meet this growth.



Source: TERI analysis

Pathways for decarbonizing primary steel production in India, 2020-2060 (TERI's Analysis)



The above figure illustrates two potential transition pathways for the leading technologies:

- For the hydrogen route, gas-based capacity could be built in the 2020s, using natural gas or coal-based syngas, which is more readily available. This could then be switched to low carbon hydrogen over time, reducing emissions without a significant change in the infrastructure.
- Steel producers could establish smelting reduction facilities, such as Hlsarna, over the coming decades, which could then be retrofitted with CCUS technology to reduce emissions.

A suite of policies would be required to accelerate transition

- A switch to greater use of hydrogen in steel sector would potentially be achieved over time without policy intervention as global costs of hydrogen production fall.
- However to meet global climate goals and to remain ahead of the curve on clean technologies, India should move ahead with an enabling policy framework that can accelerate the switch whilst supporting the sector.

DEMAND PULL	SUPPLY PUSH
Standards for 'green steel' e.g. Responsible Steel	Demonstration plant funding e.g. MST, MoS, MDBs
Preferential public procurement e.g. public works departments, IDDI	Put a price on carbon e.g. Indian ETS,
Private sector buyer clubs e.g. SteelZero, First Movers Coalition	Large-scale finance e.g. public and private, with support from MDBs

Source: TERI analysis

Key Messages

- The future of the Indian iron & steel sector will be dominated by 3 ‘macro trends’ – **development** (rapid demand growth), **digitalisation** and **decarbonisation**.
- To meet growing demand in a sustainable way will require new low carbon primary capacity. Based on our assessment, **hydrogen direct reduction is the most promising option for India**.
- With appropriate **policy support**, the Indian steel sector can put itself on a path towards net-zero emissions by 2070. This will require concerted and ambitious action now to make that a reality.
- There are significant ‘**first-mover**’ **advantages** for progressive companies, including access to funding, talent attraction and retention, and positive publicity.
- The result will be a **globally competitive steel sector**, supporting India’s ambitions of a self-reliant, net zero major economy.

Achieving Green Steel

Thank You

Further questions:

taruna.idnani@teri.res.in