

Policy Recommendations



Promote Resource Efficiency and Green Steel Adoption

- Enhance iron ore beneficiation to meet growing demand and ensure feedstock for hydrogen-based direct reduced iron (DRI) production, promoting circular economy practices.
- Develop a green steel taxonomy with standardised definitions, certifications, and market incentives such as green procurement mandates and tax benefits.



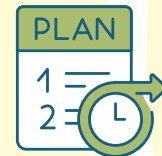
Reduce Costs for Green Hydrogen and Steel

- Create financial support mechanisms (e.g., public investments and carbon markets) to bridge cost gaps for green steel.
- Ensure low-cost renewable electricity (INR 2/kWh) by streamlining regulations, investing in grid infrastructure, and securing long-term power purchase agreements.



Drive Innovation and Energy Efficiency

- Support R&D in cement technologies (e.g., calcium looping and regenerative downdraft heating) and incentivise waste heat recovery (WHR) systems through subsidies and carbon credits.
- Align WHR with renewable energy obligations to maximise adoption and energy savings.



Establish Long-Term Hydrogen Strategies

- Establish infrastructure for storage and distribution, carbon pricing, and co-firing hydrogen with alternative fuels.
- Use advanced market commitments (AMCs) to stimulate demand and de-risk investments, supported by public-private partnerships and international collaborations.



This is an abridged version of the detailed report. Please scan this QR code to read more.

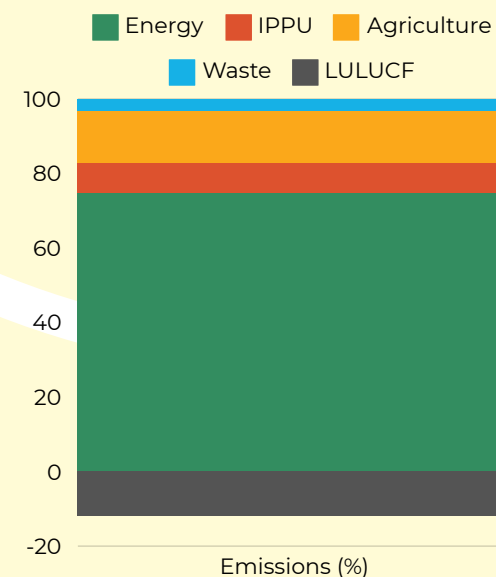
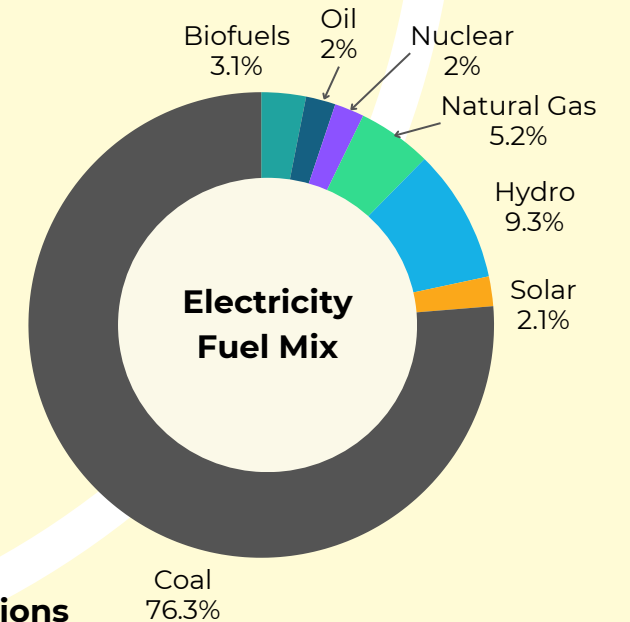
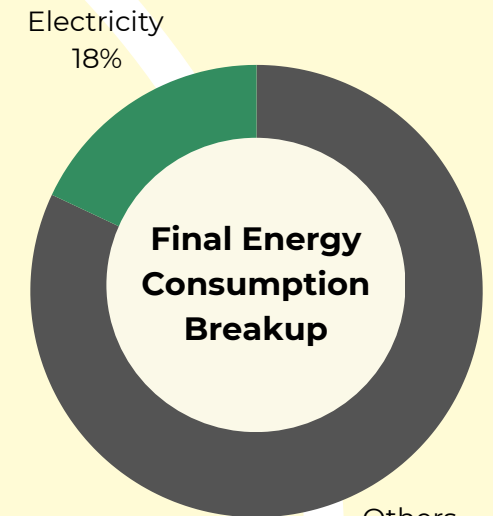
Advanced Process Simulation Modelling for Hydrogen Application in Steel and Cement

A Technical and Economic Assessment



Why Hydrogen?

In India, over 80% of final energy requirements are met through fossil-based fuels such as coal, oil, and natural gas, primarily for thermal energy in applications such as power plants and internal combustion engines. Hydrogen offers a scalable, low-carbon alternative, serving as fuel and feedstock to decarbonise industries such as steel, cement, and chemicals.



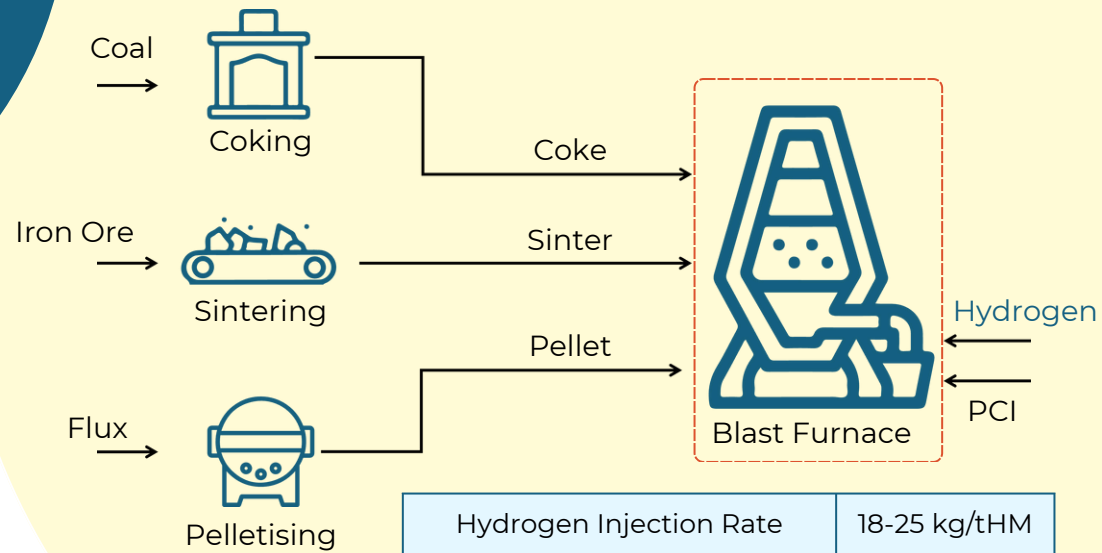
Total Emissions (GgCO₂e)
25,31,069

How Can Hydrogen be Utilised?

Hydrogen Injection in Blast Furnace Ironmaking as an Auxiliary Reducing Agent

Hydrogen as Feedstock

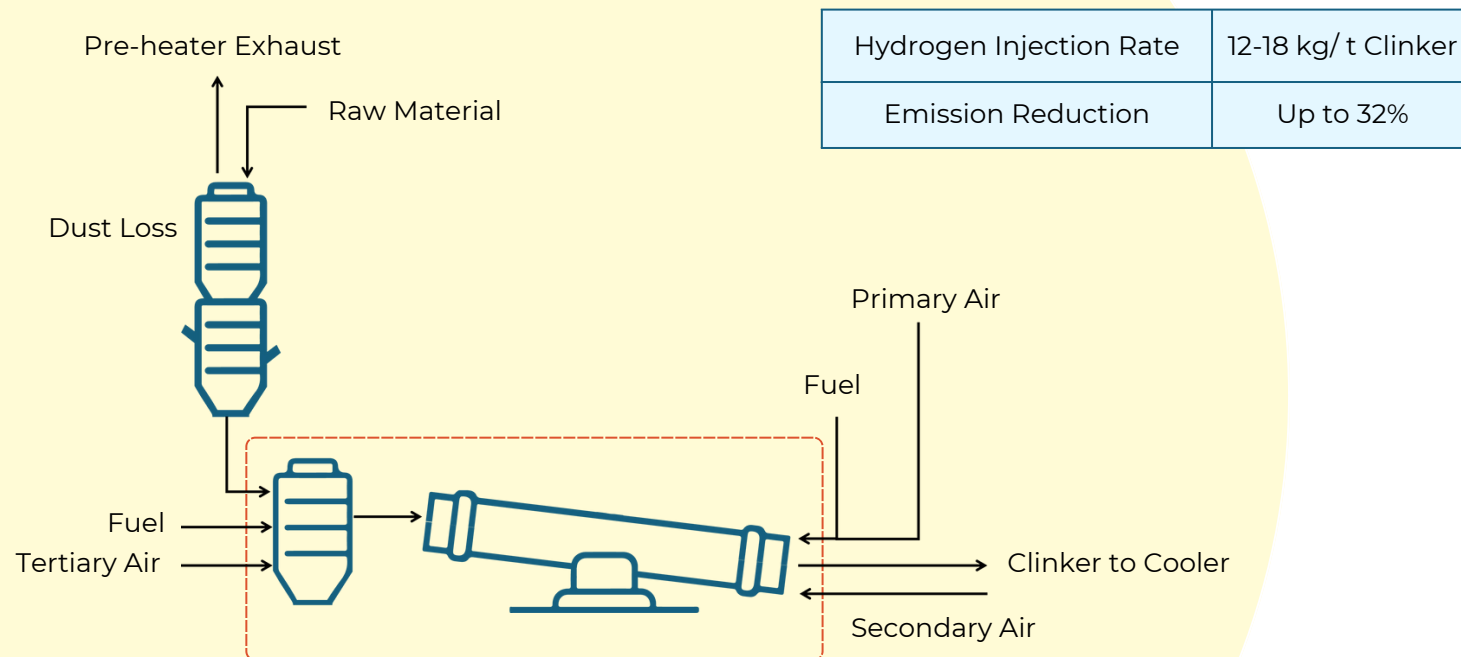
Hydrogen Injection in Blast Furnace



Hydrogen Injection Rate	18-25 kg/tHM
Emission Reduction	8%-9%
Possible Coke Reduction	-12 kg/tHM
Possible PCI Reduction	-19kg/ tHM

Hydrogen as Fuel

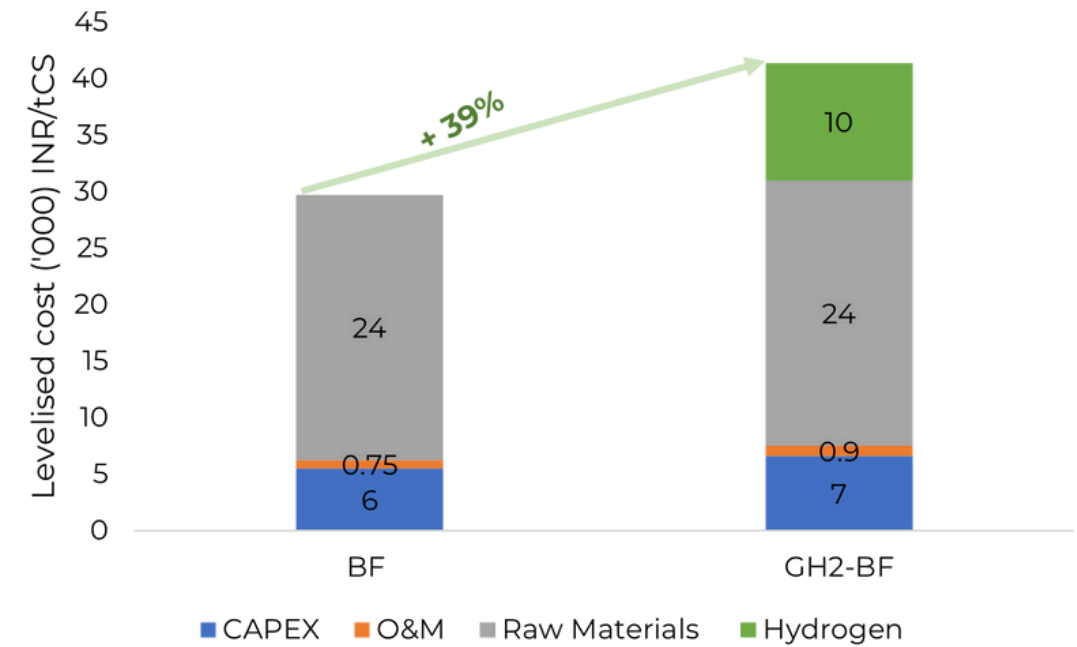
Hydrogen Injection in Rotary Kiln and Calciner



Hydrogen Injection Rate	12-18 kg/ t Clinker
Emission Reduction	Up to 32%

Steel Price Before and After Hydrogen Injection

Cost of Steel (Hydrogen Injection)



Steel Price Variation with Green Electricity Costs

