DECARBONISING STEEL WITH HYDROGEN

The iron and steel industry is responsible for up to 10 percent of global greenhouse-gas emissions. Switching from carbon to hydrogen as a feedstock will replace CO₂ emissions with harmless steam emissions. The task is technologically feasible, but momentous in scale.

TOTAL INDUSTRY CO₂ EMISSIONS
- Pulp & Paper: 2%
- Aluminium: 2%
- Chemicals & Petrochemicals: 14%
- Cement: 27%
- Iron & steel: 25%
- Other industry: 29%

GLOBAL ANNUAL STEEL PRODUCTION
1,869 Mt

CO₂ EMISSIONS
3.7 Gt

TRADITIONAL ROUTE

Coal (Coke)
Iron ore
Blast furnace

CO₂

Steel

HYDROGEN-BASED

Iron ore

Hydrogen

Reactor

H₂O

Steel

e.g., HYFOR by Primetals Technologies

MORE H₂ APPLICATIONS

DIRECT REDUCTION replacing natural gas in shaft furnaces
H₂ INJECTION replacing coal in blast furnaces
H₂ BURNERS replacing natural gas
HYDROGEN PLASMA SMELTING REDUCTION replacing coal

HYDROGEN STEELMAKING

1,308 Mt of production capacity to convert
1t steel requires approx. 55 kg H₂

70% of total steel production is suitable for hydrogen route

WHAT WILL IT TAKE?

72,000,000 t of hydrogen per year
500 GW of electrolyser capacity
4,000 TWh of green electricity per year