

# Transition to carbon neutral steel making

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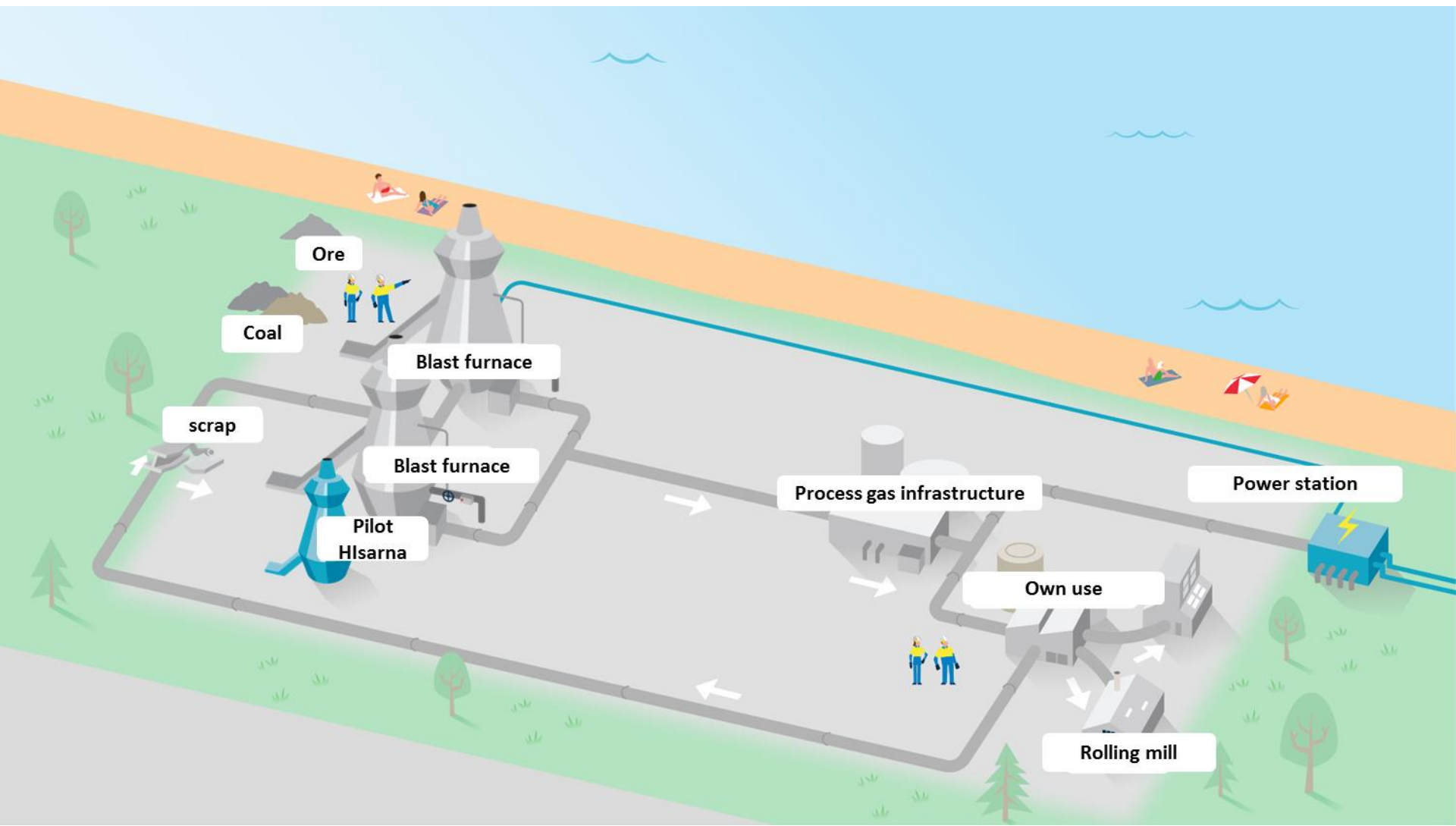
**Strategic Value Chain workshop Low  
Carbon industry**

**1 April 2019**

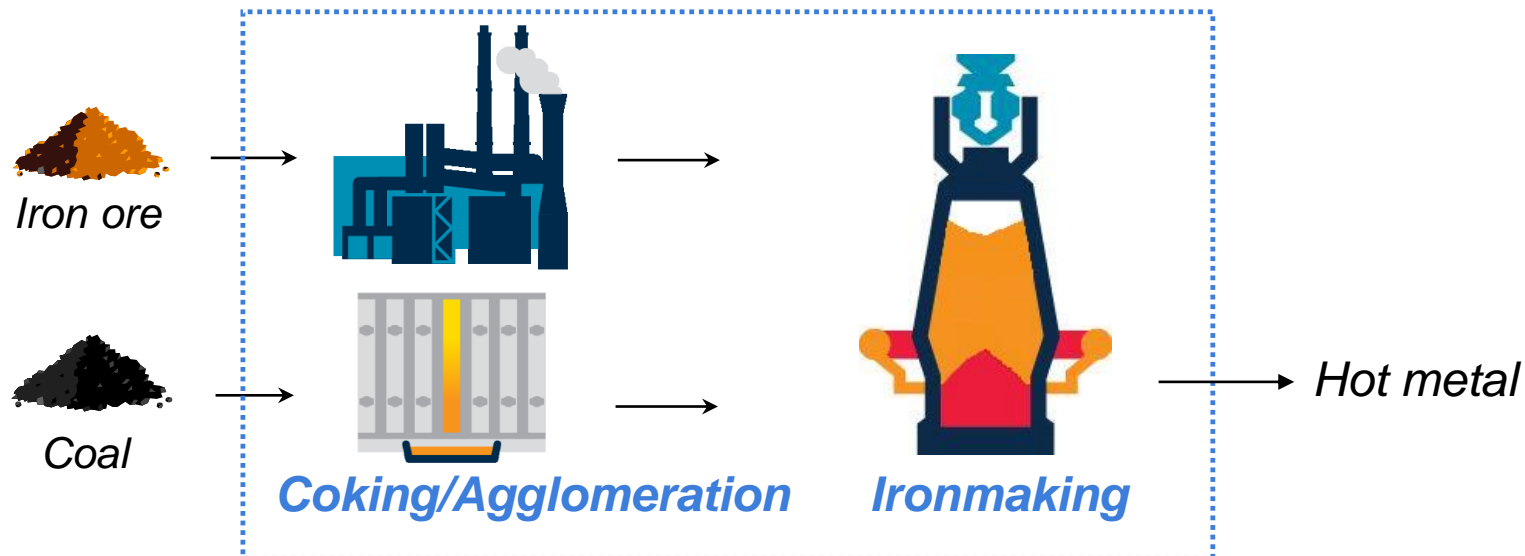
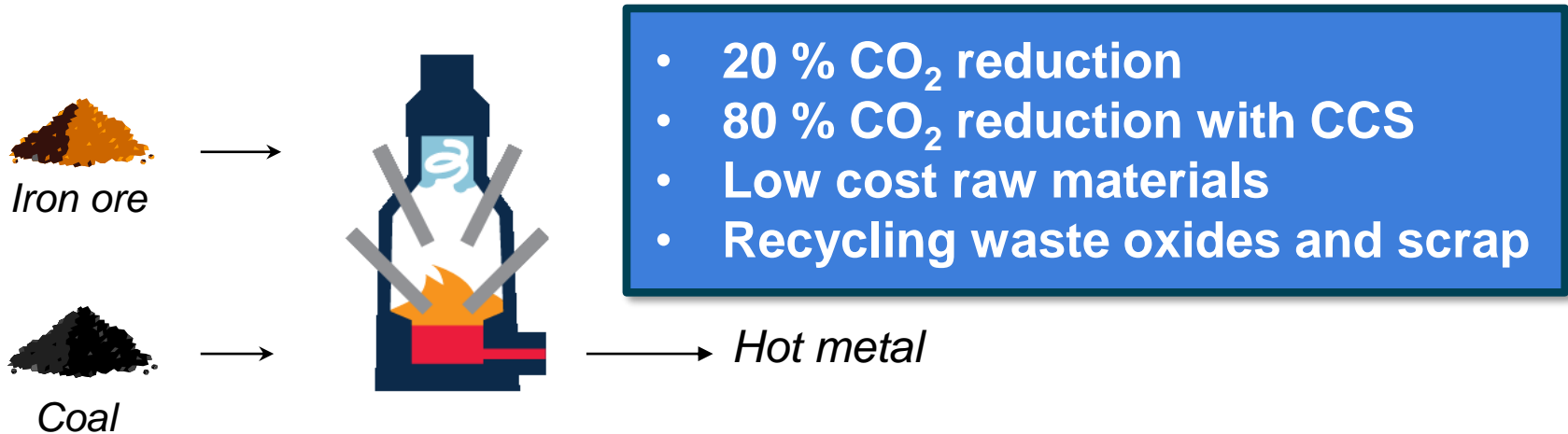




# Tata Steel in IJmuiden today



## Hlsarna – One step from raw material to hot metal



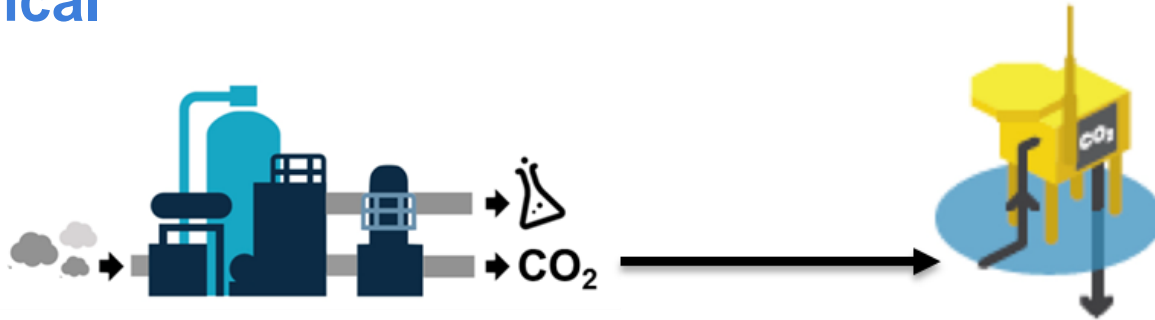
## Emission reduction



Next to CO<sub>2</sub> also other gaseous emissions are drastically reduced by the elimination of cokemaking and sintering

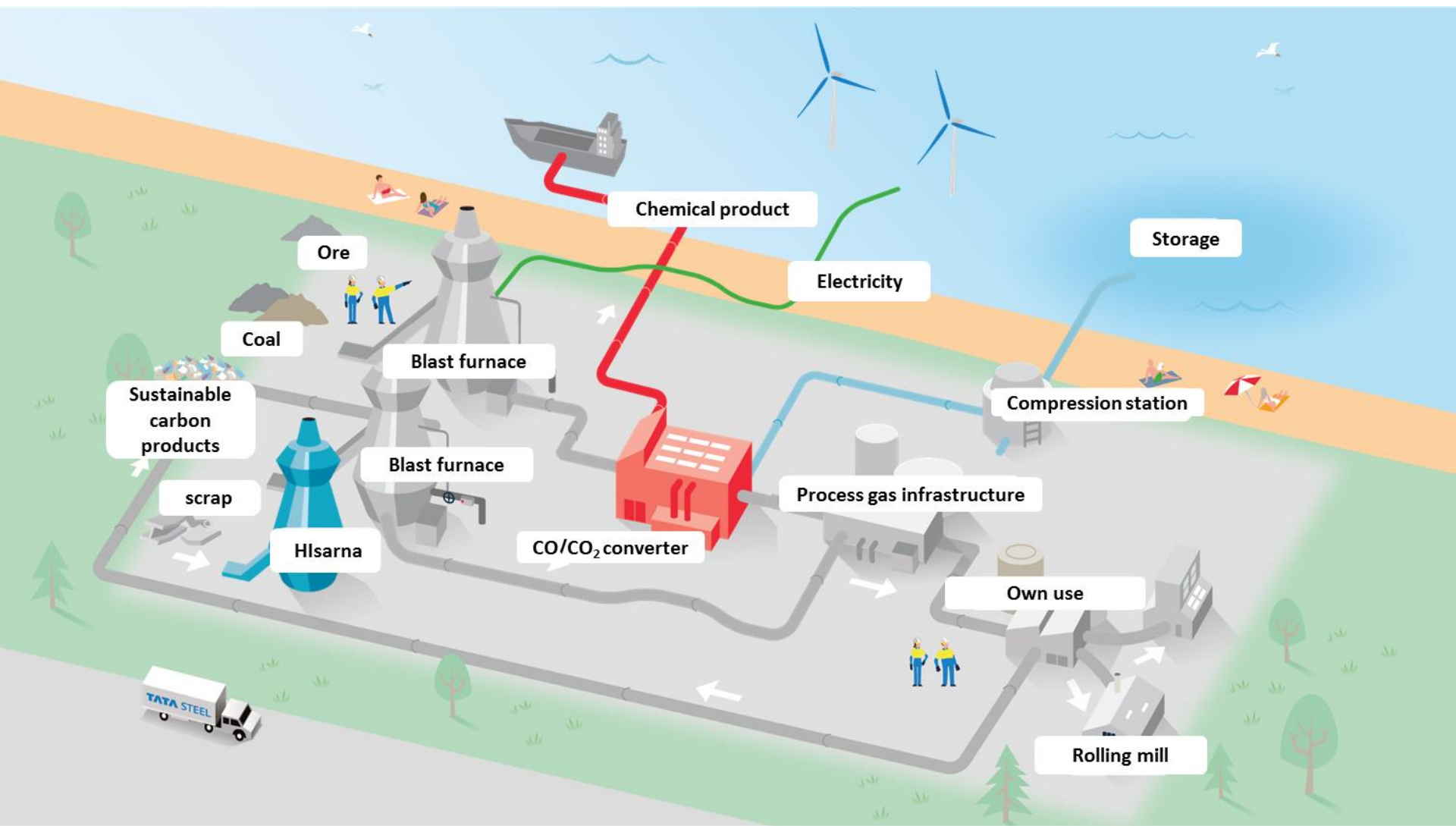
	Emission reduction		
	CO <sub>2</sub>	NOx	SOx
Hlsarna without CCS	20 %	70 %	60 %
Hlsarna with CCS	80 %	90 %	85 %

## Project Everest – CCU/CCS in cooperation with Dow Chemical



- Produce chemicals from CO (blast furnace gas and oxygas) and H<sub>2</sub> and store the CO<sub>2</sub>
  - Step 1: Gas cleaning
  - Step 2: Adjust CO/H<sub>2</sub> ratio to the requirements of the chemical conversion
  - Step 3: Capture CO<sub>2</sub> from the gasflow and compress it for transportation to storage area (Athos project)
  - Step 4: Convert the CO/H<sub>2</sub>/N<sub>2</sub> mixture into the desired chemicals (nafta)
  - Step 5: Recover the product from the gasflow
- CO<sub>2</sub> will partly 'contained in nafta and partly (mostly) stored (CCS via the Athos project)

# Tata Steel in IJmuiden in 2030



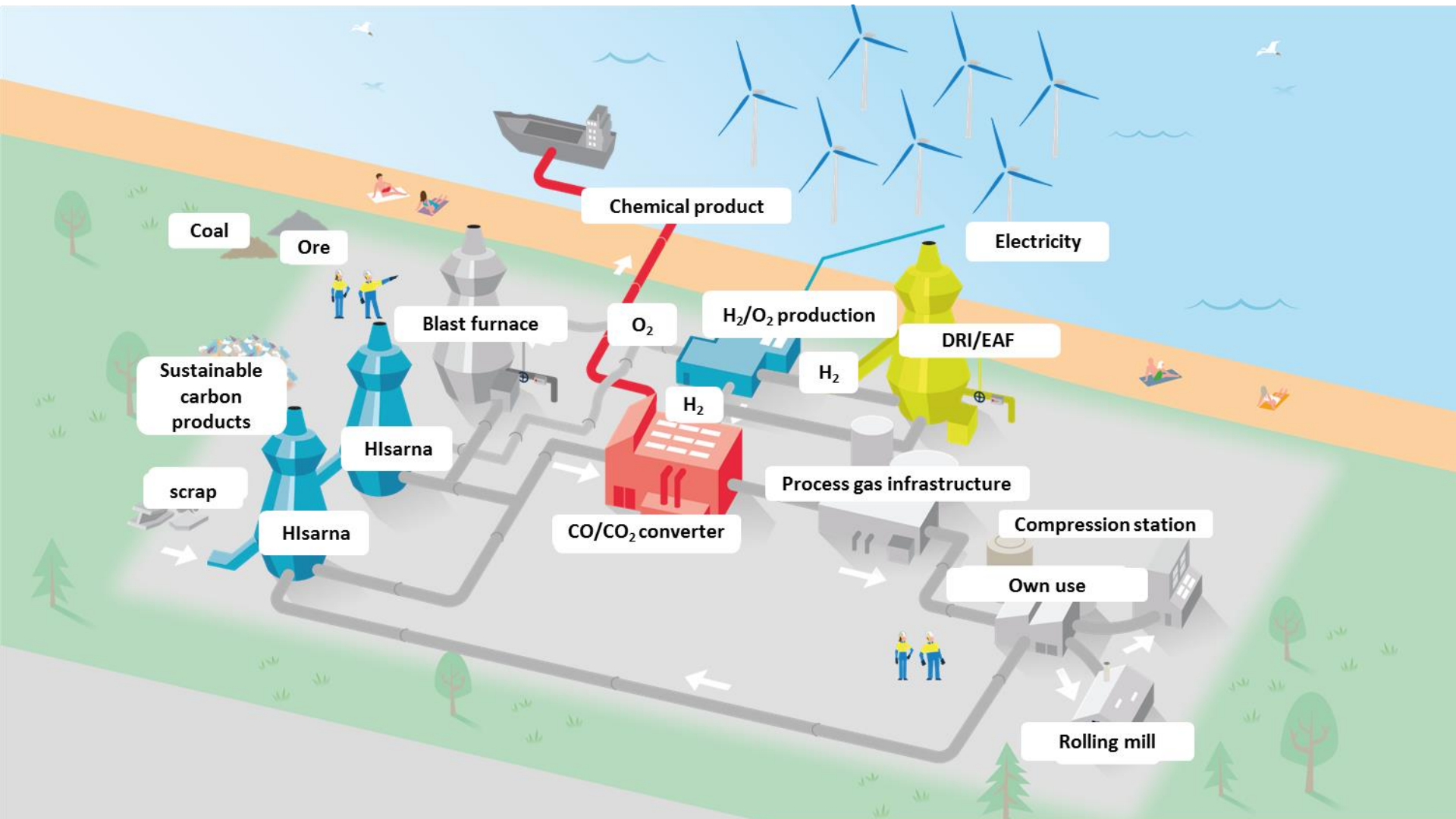
## Realisation 2030: Hisarna, CCU, CCS and start development of hydrogen

**CO<sub>2</sub> emissions will be reduced by approximately 4-5 MT**

- **Modified infrastructure** in IJmuiden for transition to circular deployment of waste gases
- **Industrial plant to produce chemical products** based on CO, in which CO<sub>2</sub> is captured
- **CCS infrastructure**: project EBN, Gasunie, Port of Amsterdam and Tata Steel in start-up phase
- **Hisarna** industrial plant (Tata Steel)
- **Start development of hydrogen** for the reduction of CCS and further transition to 2050
- Appropriate **financing** instruments



# Tata Steel in IJmuiden in 2050



## Framework conditions

### **Breakthrough technologies require breakthrough policies**

- Manage the transition at EU level
  - Member states should not 'go alone' thereby jeopardising the level playing field in the internal market
- Ensure the competitiveness of the EU industry
  - Address carbon leakage up to and after 2030
- Provide adequate financial support
  - Accept the risk to fail (the technical and financial risks are enormous)
- Provide adequate infrastructure
- Accept as a general principle that all technologies are necessary to achieve the goal, therefore no technology should be excluded

## IJmuiden will develop into a circular hub in 2050

- IJmuiden is a hub for the landfall of sustainable electricity and hydrogen production
- The electricity from wind PV off the coast of IJmuiden is being converted by a hydrogen plant
- Energy needs are met from renewable sources (mainly wind)
- Blast furnace gases are used as raw materials in chemical production using H<sub>2</sub>
- End of life plastics from the chemical industry are used in both Hisarna and the blast furnaces
- More scrap is used for blast furnaces and Hisarna
- CCS will be phased out
- CO<sub>2</sub> emissions go towards zero