



ADVANCED ELECTRIFICATION OF KEY INDUSTRIAL REACTIONS



Funded by
the European Union

Grant agreement No 101294850, ELEKTRA project.
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Objectives

Accelerate the decarbonisation of steelmaking by replacing conventional fossil-fired, heat-driven reactor units with compact, efficient and flexible electrified technologies.

Design, build and demonstrate a technology platform based on 3 intensified electrified reactors.

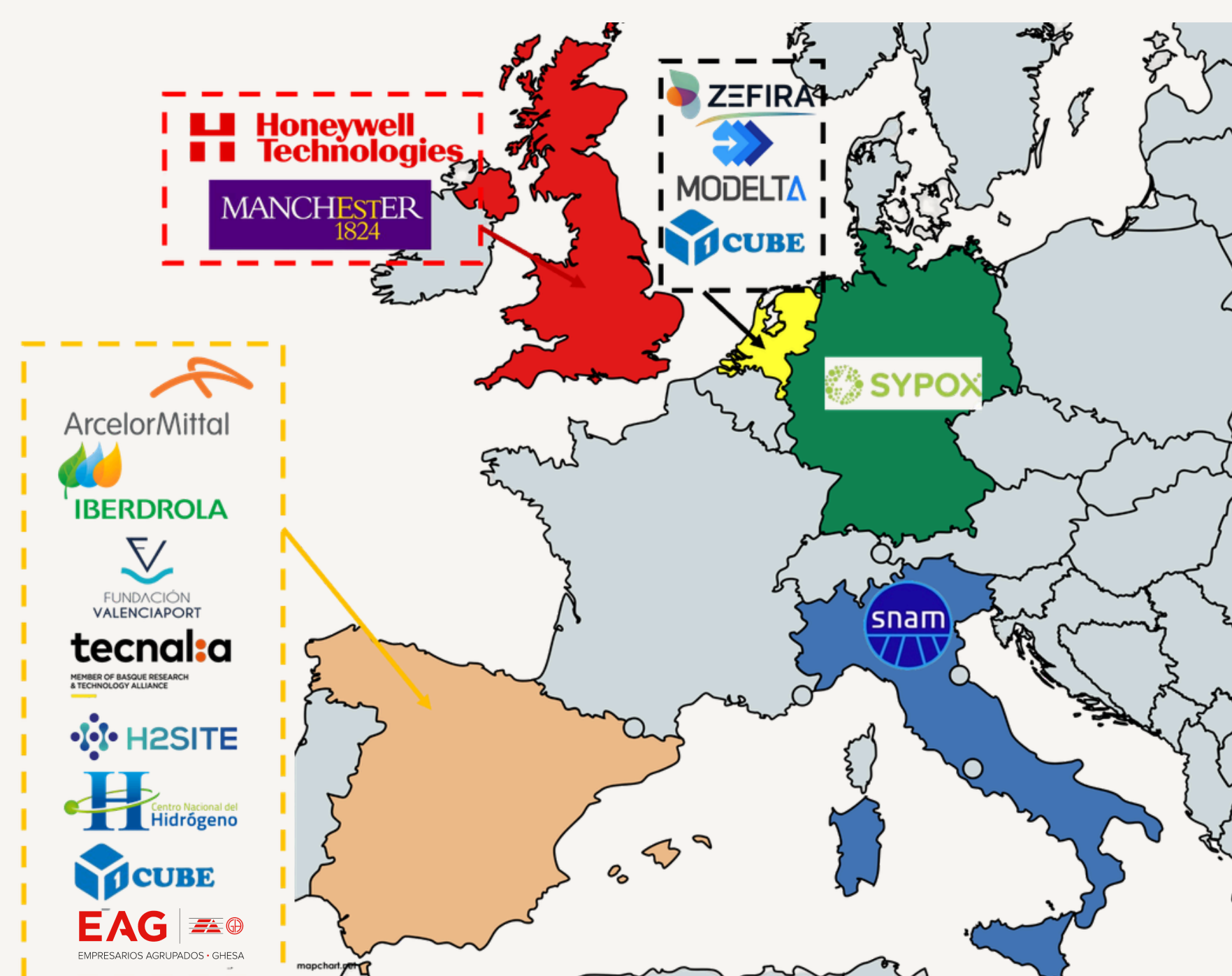
Each reactor targets a different bottleneck in the transition from today's carbon-intensive steel production to future low-carbon and hydrogen-based steelmaking.

Create a new generation of electrified reactor technologies for climate-neutral steelmaking.

ELEKTRA links short-term efficiency improvements with medium-term blast furnace decarbonisation through CO₂ conversion and carbon recirculation, and long-term hydrogen-based direct reduction towards net-zero steelmaking.

ELEKTRA CONSORTIUM

composed of 15 partners
from 5 European countries
(of which 12 industrial
partners)



Project Details

Project number: 101294850

Project name: ADVANCED ELECTRIFICATION OF KEY INDUSTRIAL REACTIONS

Project acronym: ELEKTRA

Topic: HORIZON-CL4-INDUSTRY-2025-01-TWIN-TRANSITION-31

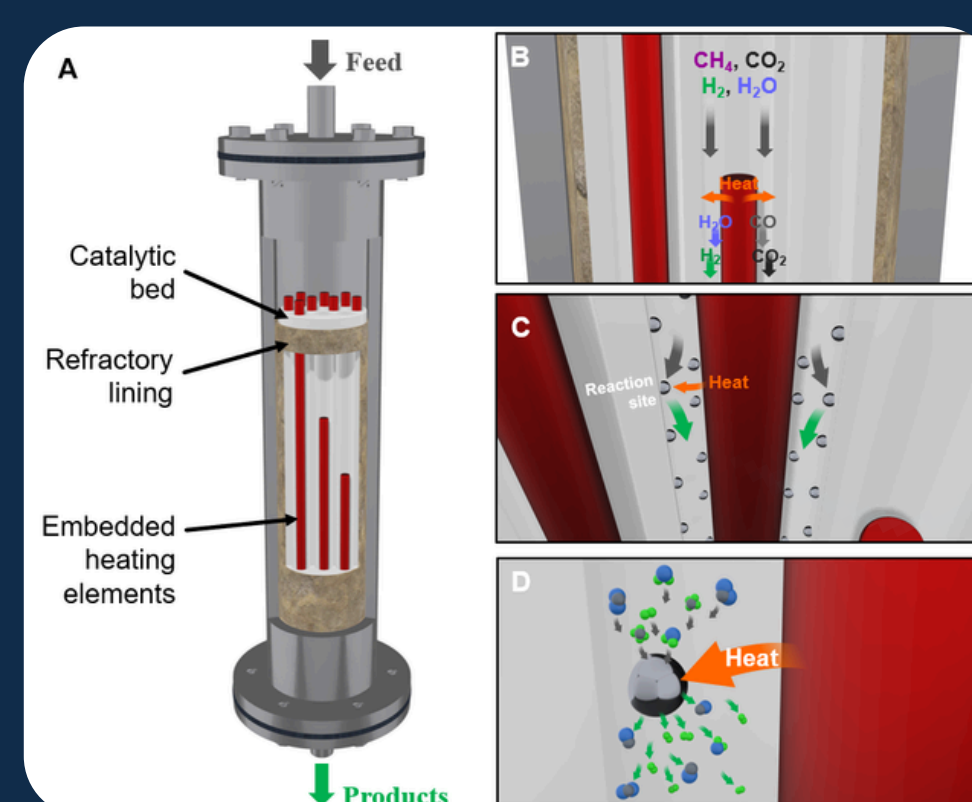
Duration: 48 months - **EU funding:** € 9,693,173.23

Project Coordinator: IBERDROLA (SPAIN)

Top Gas Recycling

Electrified reforming replaces conventional fuel combustion with direct resistive heating, eliminating combustion-related CO₂ emissions while achieving >95% thermal efficiency.

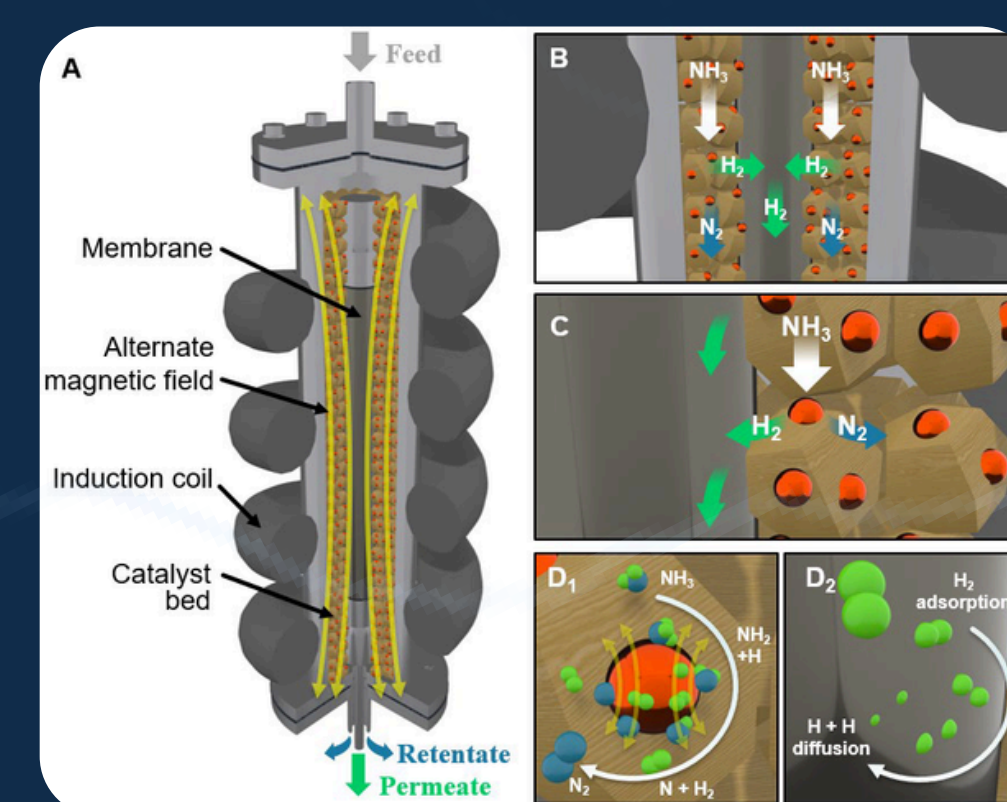
DRI top gas is reformed with natural gas into a CO- and H₂-rich gas that is fed back to the shaft furnace to reduce iron ore.



NH₃ Cracking

ELEKTRA will introduce tailored induction heating into an innovative but proven at high TRL Catalytic Membrane Reactor that combines NH₃ decomposition and H₂ separation in a single step.

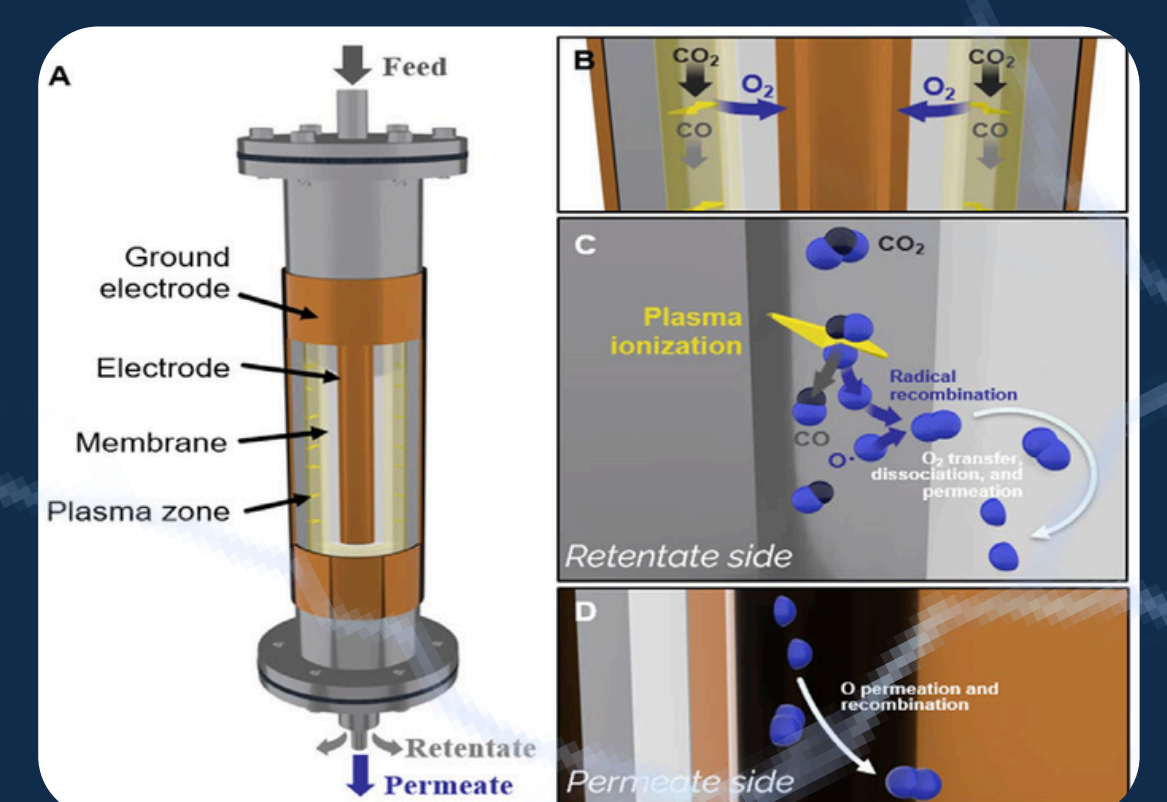
By continuously removing H₂ through membranes, the equilibrium is shifted and >99% NH₃ conversion is achieved, eliminating the need for downstream NH₃ recovery.



Plasma CO₂ Recycling

CO₂ dissociation into CO is directly coupled with O₂ extraction through an oxygen-selective membrane integrated into the plasma reactor.

This compact design suppresses recombination, improves energy efficiency, reduces parasitic equipment, and simplifies the balance of plant (BoP).



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