

HYINHEAT

Project introduction

Successful R & I in Europe 2024

11th European Networking Event

16/02/2024

Düsseldorf

Dr.-Ing. Christian Schwotzer

The project in brief

Title: Hydrogen technologies for decarbonization of industrial heating processes

Acronym: HyInHeat

GAP No.: 101091456

Call: HORIZON-CL4-2022-TWIN-TRANSITION-01-17

Start/End: 01/01/2023 to 31/12/2026 (48 months)

Total budget: 23.96 Mio. €

EU contribution: 17,71 Mio. €

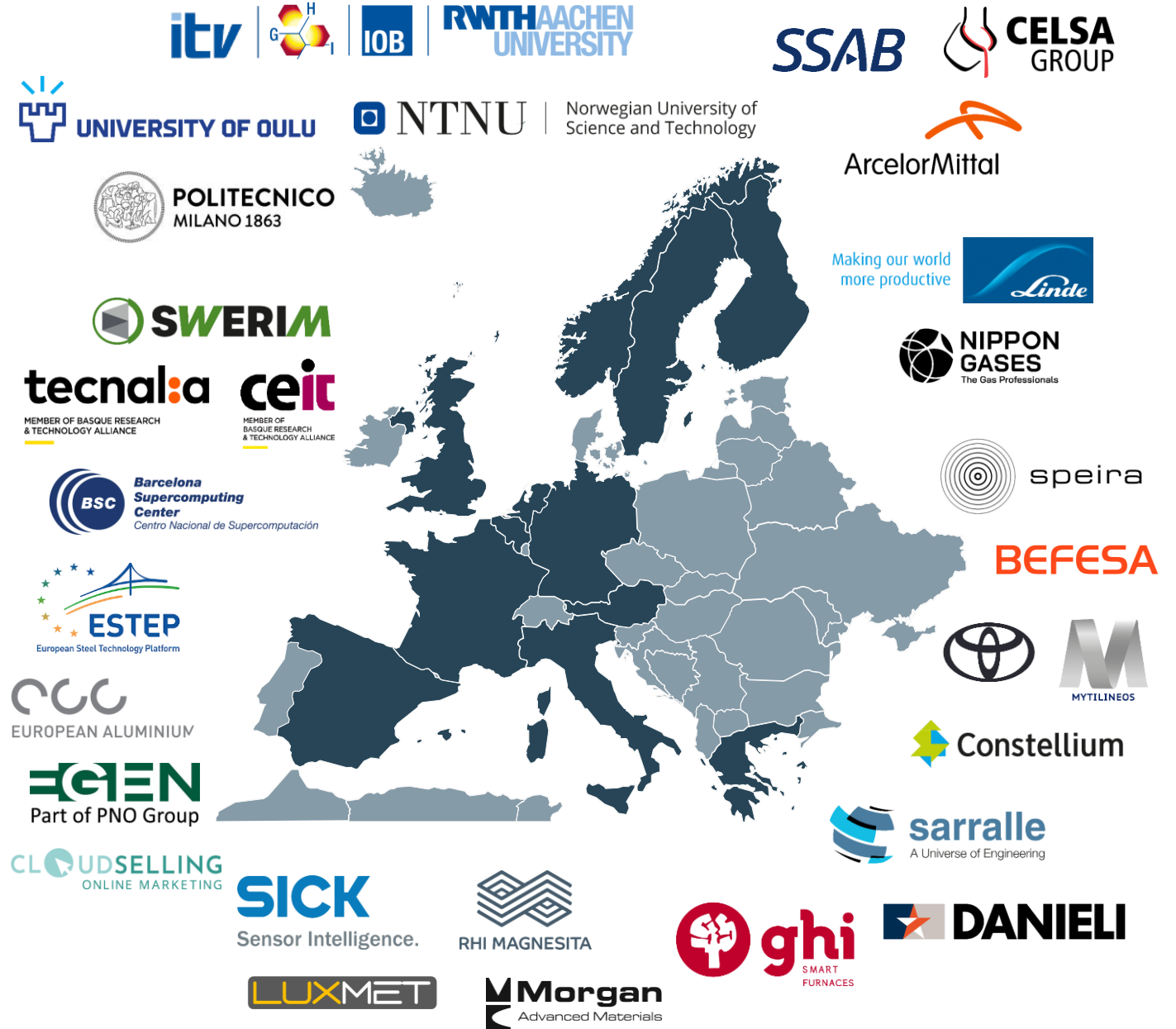
Coordinator: RWTH Aachen University

The overall goals

- 🔥 Significant reduction of CO₂ emissions of the industrial processes with H₂ heating
- 🔥 NO_x levels of the processes at least not higher than the equivalent fossil fuel based solutions
- 🔥 Improved energy efficiency of the industrial processes
- 🔥 Significant reduction of H₂ fuel consumption of the developed process with regards to the current fossil fuel demand
- 🔥 Competitive costs of the developed technologies

The Team

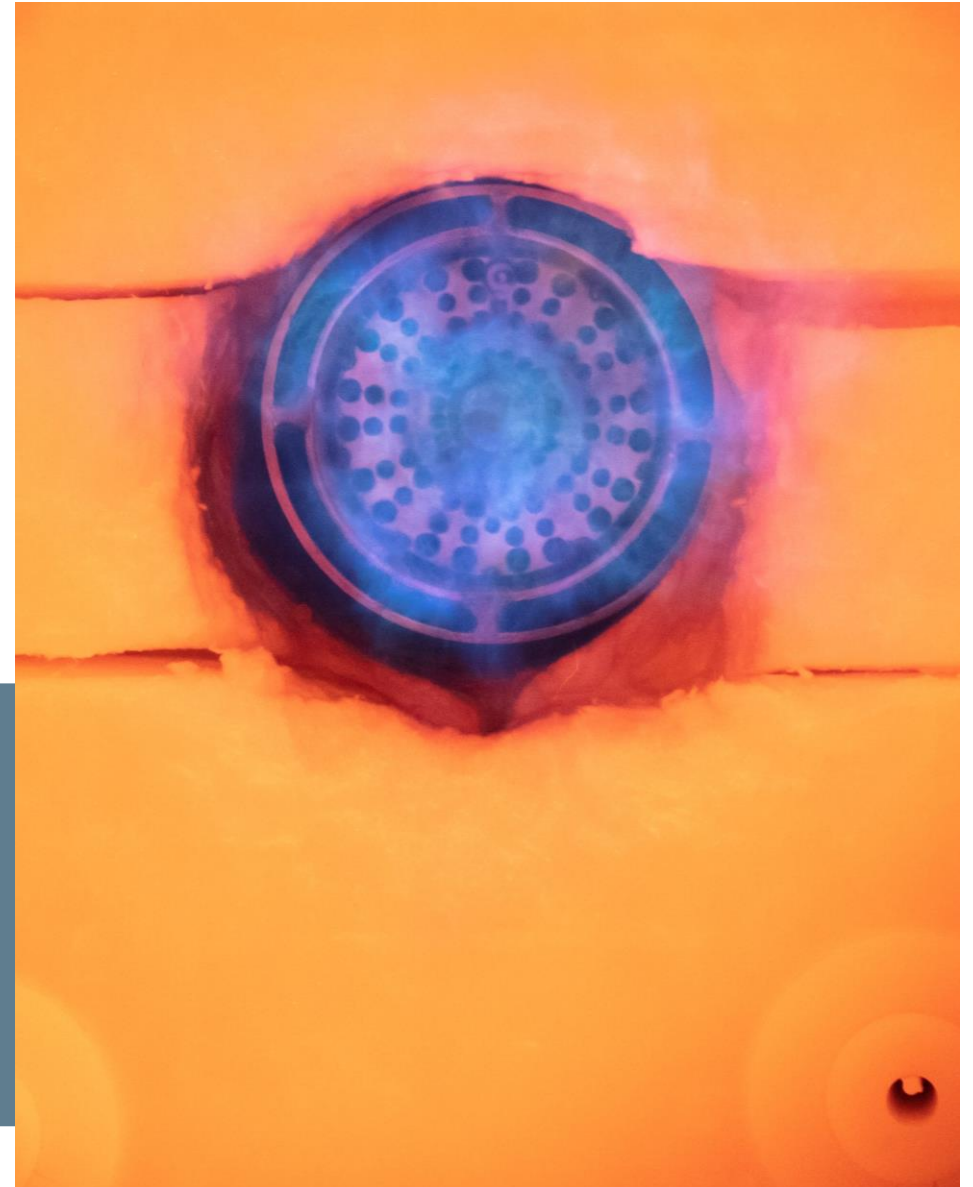
- 3 Steel and 5 Aluminium producers
- 9 Technology suppliers
- 4 Research and technology organizations
- 4 Universities
- 2 European associations
- 1 Green innovation consultant & marketing expert
- In total: 28 partners from 12 countries



The challenges

Gas-solid or gas-liquid interactions between furnace atmosphere and product | impact on refractory products and furnace materials | condensation of off-gas | heat transfer and temperature homogeneity | high-temperature chemistry for H_2/O_2 combustion | feed-forward and feed-back combustion control | higher combustion temperatures | higher NO_x formation rates | NO_x emission limit definition | emission measurement technology | safety and risk assessment | flame detection and monitoring

“HyInHeat uses a cross-sectorial approach addressing all the crucial tasks for an energy- and resource efficient integration of H_2 in two large European sectors, Steel and Aluminium, to be an integral part of the heating solutions throughout the processes of the value chains of the two sectors”





The objectives

Redesign heating processes for H₂ as fuel

8 demonstrators for H₂ heating | 1 full off-gas system redesign | 1 greenfield reheating furnace design study | 2 retrofit design studies

Modify heating equipment and infrastructure for use of H₂

4 burner modifications and optimizations | measurement instrumentation development for fuel supply and combustion control | H₂ compatible fuel supply implementation | refractory investigation and optimization

Develop O₂ combustion processes to improve efficiency

6 demonstrators with pure O₂ as oxidizer | 1 demonstrator with oxygen-enhanced combustion

Integrate instrumentation to characterize fuel composition & flow

2 measurement technologies for fuel quality | combustion control instrumentation development | NO_x emission measurement technology development | predictive emission monitoring

Prove economic viability compared to heating alternatives

Demonstrators as baseline | comparison on basis of KPIs | individual business case evaluation



Next steps | Call to action

Topics we would like to explore beyond HYINHEAT

Electrification of furnaces and processes | Flexibilisation of furnaces and processes | Optimization of energy and resource efficiency

Type and role of partners we are seeking

Producer | equipment supplier | R&D Institutes | Universities

Project partners with complementary expertise to start especially demonstration projects

Our previous scientific and technological expertise

Several national and international projects | expertise in thermoprocess technology and as well as project and proposal coordination

Get in touch



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