

PARTNERS

The EMPHATICaL consortium, led by TNO, consists of a collaboration between 17 partners from 11 countries focused on developing the economic potential and sustainability of electrified metallurgical and e-methanol production.



Innovating Sustainable Metallurgy



The EMPHATICaL project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101177725.

Follow us

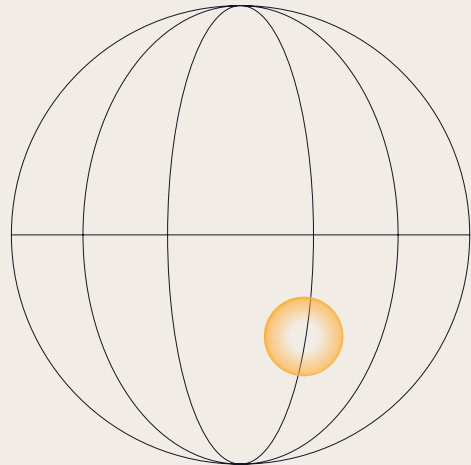


EMPHATICAL.EU

VISION

Our Commitment to a Sustainable Future

EMPHATICaL is an innovative 4.5-year project addressing **the challenges faced by the metallurgical industry in meeting 2050 climate goals**. It aims to efficiently convert **captured CO₂ into e-methanol and storable CO₂** in a cost-effective manner while promoting process electrification and fostering cross-industry collaboration to reduce energy consumption and greenhouse gas emissions.



Our Vision

To provide solutions to the metallurgical industry's transition towards climate goals by designing a First-Of-a-Kind (FOAK) demonstrator to capture and convert metallurgical CO₂ emissions into e-methanol.

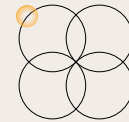
Our Objectives

To integrate innovative technologies to produce e-methanol using captured CO₂ and renewable energy, aiming to reduce energy use by 25% and reduce 41 million tons of CO₂ annually by 2050.

OBJECTIVES

Our Key Objectives for a Sustainable Future

The EMPHATICaL consortium is committed to developing the economic potential and sustainability of electrified metallurgical and e-methanol production.



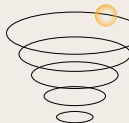
TRL7 Demo and Long-Term Implementation of EMPHATICaL

Design, procure, and construct a TRL7 demonstration to showcase consistent e-methanol production with high purity, energy yield, CO₂ capture, flexible operation, and material stability under industrial conditions, while also evaluating two business cases for feedstocks. Deliver a pre-FEED (Front End Engineering Design) for a modular FOAK plant, optimizing process design, economic feasibility, and addressing site-specific factors like renewable energy, H₂ costs, and CO₂ storage.



EMPHATICaL Process and System Evaluation

Optimise energy efficiency, reduce emissions, and lower costs by integrating AI-based controllers, developing process models, and evaluating integration into renewable grids while achieving significant energy yield improvements, energy and cost reductions, and net-zero or negative CO₂ emissions.



Bankable design for the FOAK Plant

Evaluate two business cases for feedstocks, deliver a pre-FEED for a modular FOAK plant, optimise process design, economic feasibility, and address site-specific factors like renewable energy, H₂ costs, and CO₂ storage.

INNOVATION

Transforming CO₂ into Sustainable E-Methanol

EMPHATICaL employs Calcium Looping (CaL) and Closed Loop Heat Pump Assisted Distillation (CL-HPAD) technologies to convert CO₂ emissions from electrified metallurgical processes into e-methanol powered by green hydrogen. This innovative approach reduces industrial emissions and promotes a circular economy and industrial symbiosis.

