Expected impacts

Technology

The novel sCO_2 power block will offer an unprecedented combination of improved characteristics in terms of:

Efficiency · Flexibility · Integration · Safety · Components size · Input temperature range · Scalability

Environment

CO2OLHEAT will be a game-changer in WH utilisation as it will allow to:

Increase primary energy savings · Reduce GHG emissions · Significantly reduce water up to 100% · Reduce component raw materials by 30-40%

Economy

The CO2OLHEAT 2MW power block will bring about numerous monetary benefits:

• Estimated LCOE of 4c€/kWh • CAPEX from 2,5M€ to 3M€/MW • Avoided cost of electricity • Payback period between 4 and 8 years • Rate of return 18%

The Consortium

Project budget: €18.813.891,25
EU financing: €13.999.996,40
Duration: 4 years (June 2021 – May 2025)
Project coordinator: ETN Global

CO2OLHEAT

Supercritical CO_2 power cycles demonstration in **O**perational environment **L**ocally valorising industrial waste **HEAT**

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The concept

CO2OLHEAT is a Horizon 2020 project aiming at unlocking the potential of industrial waste heat (WH) and its transformation into power via supercritical CO_2 (sCO_2) power cycles. Highly innovative and cutting-edge technologies will be used to design and demonstrate in a real industrial environment the EU-first-of-its-kind 2MW sCO_2 plant.

This pioneer power block will generate completely clean energy while saving significant amount of primary energy and thus also CO_2 emissions.

The technology will be demonstrated in the CEMEX cement plant in Prachovice in the Czech Republic. The project will have six virtual replication sites through our Partners active in Resources and Energy Intensive Industries.

Key goals

Untapping industrial waste heat potential

Design of a novel waste-heat-to-power (WH2P) plant layout for WH valorisation at temperatures above 400°C

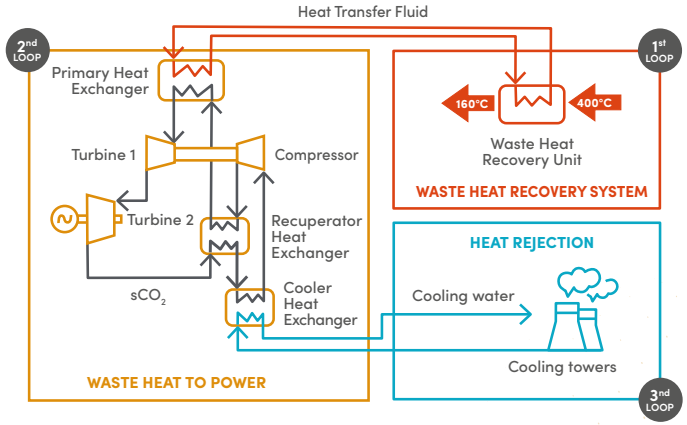
Innovations, economic viability and easy replicability

Development of the state-of-the-art sCO_2 power block offering numerous financial benefits and a vast replicability potential, which will be tested already during the project

Increase of energy efficiency

CO2OLHEAT will enable industries to improve their resource utilisation and will contribute towards a reduction of energy costs

Technology



CO2OLHEAT's WH2P application is based on a recuperated closed-loop Brayton cycle with sCO_2 as a working fluid. Thanks to its flexibility (compact size and capability to better accommodate load changes), high efficiency, and the ability to work with significant temperatures, the sCO_2 power block offers benefits beyond traditional WH2P applications.

Demonstration site

CEMEX cement plant in Prachovice (CZ) has a wide untapped waste heat potential amounting to ~16 MW. At the moment, it is not exploited in the facility, and it is rejected by means of water-cooling towers.

Replication sites

Şişecam – Glass Industry (Ankara, TR)

MYTILINEOS – Aluminium Industry (Viotia, GR)

CELSA – Steel Production (Barcelona, ES)

ENGIE Laborelec – Waste Incineration (Beringen, BE)

EDF – Power Generation CCGT (Montereau, FR)

RINA Consulting – Power Generation CSP (Cordoba, ES)