The future of heat in a circular energy-intensive industry: Heat grid at ArcelorMittal plant of Gent (part of project Hurricane)

EnergyFest 2026
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6/2/2026

Co-funded by the European Union

HURRICANE is funded under the call HORIZON-CL4-2023-TWIN-TRANSITION-01-37 within Horizon Europe, the European Union's framework programme for research and innovation (grant agreement no.:101138494)

Sustainability

Our ambition

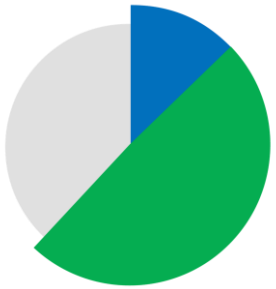
- Being climate neutral by 2050

Did you know…
Our steel is already greener than elsewhere in the world

Climate neutral by 2050: how will we do that?

Efficiëntie

- Heat: steam turbine, heat grid (Hurricane)
- Energy: wind, solar , TRT*, RecHycle



Green Primary (EAF*)

- Circularity- scrap
- Elektrification

Smart Carbon

- Circularity – bio fuel - Torero
- Steelanol
- CCS* - VOKA-AKT declaration of Mons

*TRT: Top gas Recovery Turbine
*EAF: Electric Arc Furnace
*CCS: Carbon Capture & Storage

Lot of waste heat

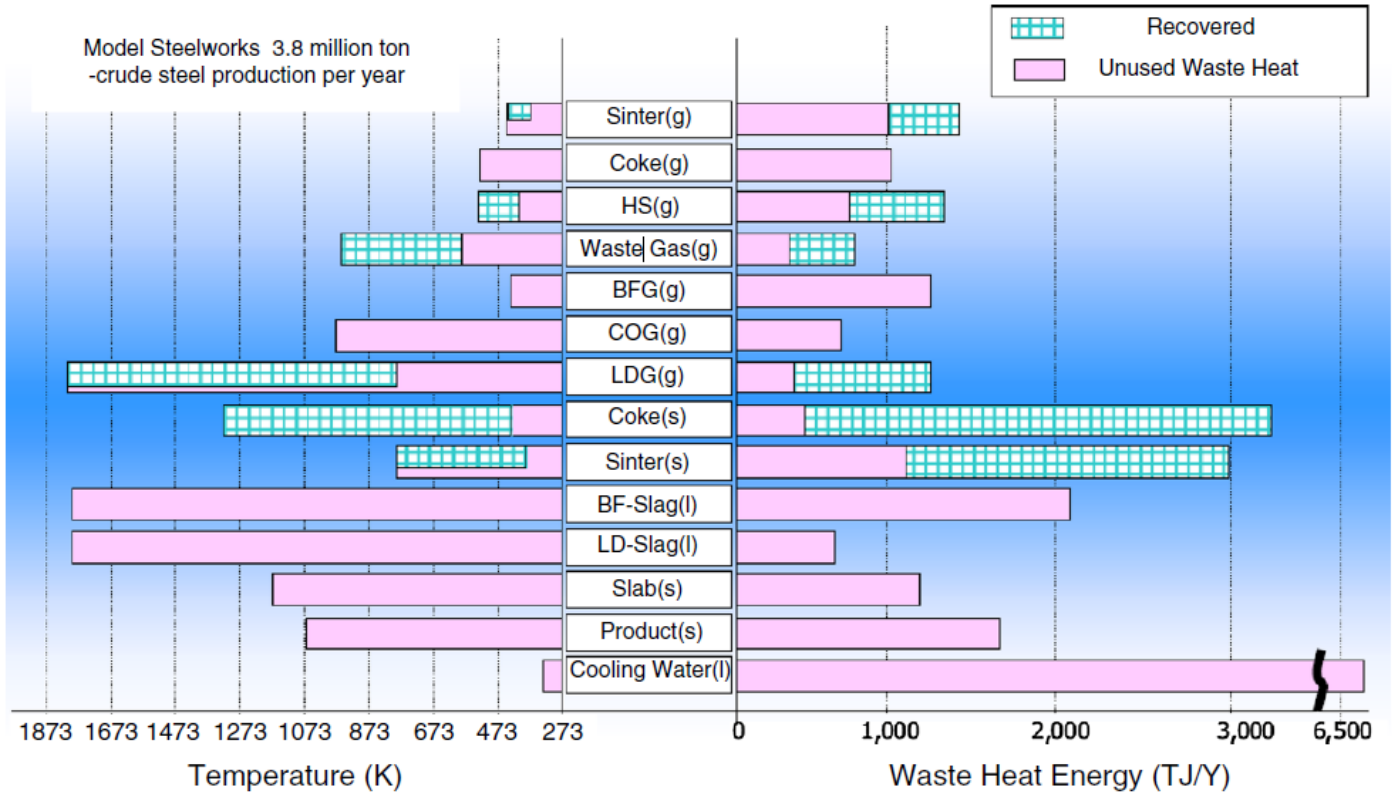


Fig. 1. Waste heat for various processes of steelworks.[2]

Publication “Thermoelectric Generation Using Waste Heat in Steel Works”

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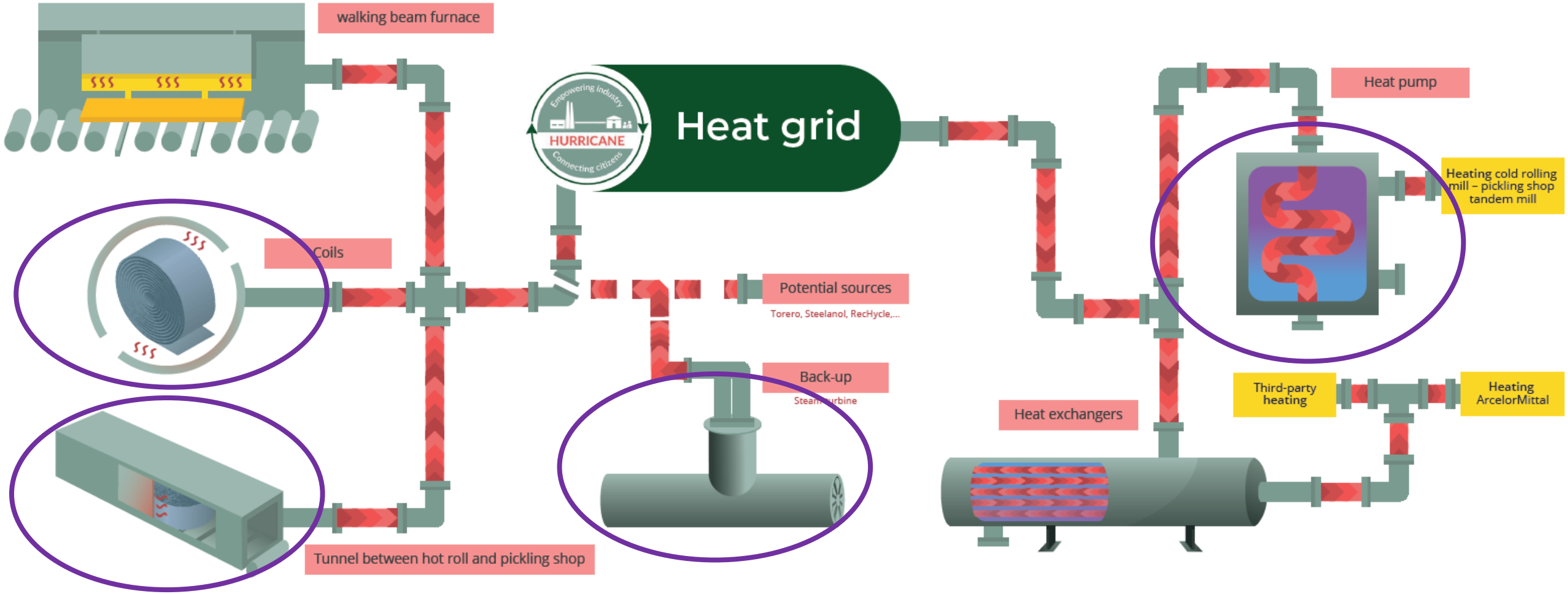
High-temperature energy recovery/conservation is already implemented.

ArcelorMittal

- 35 % of our steam use is originating from waste heat recovery (basic oxygen furnace, walking beam furnace 1, galvanizing line 4). The rest is produced with siderurgical gases.
- Combustion air and/or gas is preheated on several places (cokes factory, cowpers, walking beam furnaces, …)
- Heat from compressors is recuperated, …
- Hot charging slabs, …

Now it’s time to focus on low-temperature energy recovery

Demonstrations – circular hub



Technologies for a circular hub

Heat recovery solutions

- Innovative heat exchanger technology for both radiative and conductive heat exchangers

Heat upgrading solutions

- 3 MW heat pump to upgrade heat from the low temperature heat grid

Heat grid back up

- Steam expansion turbine as back up for the heat grid to guarantee continuous supply of heat

Digital integration

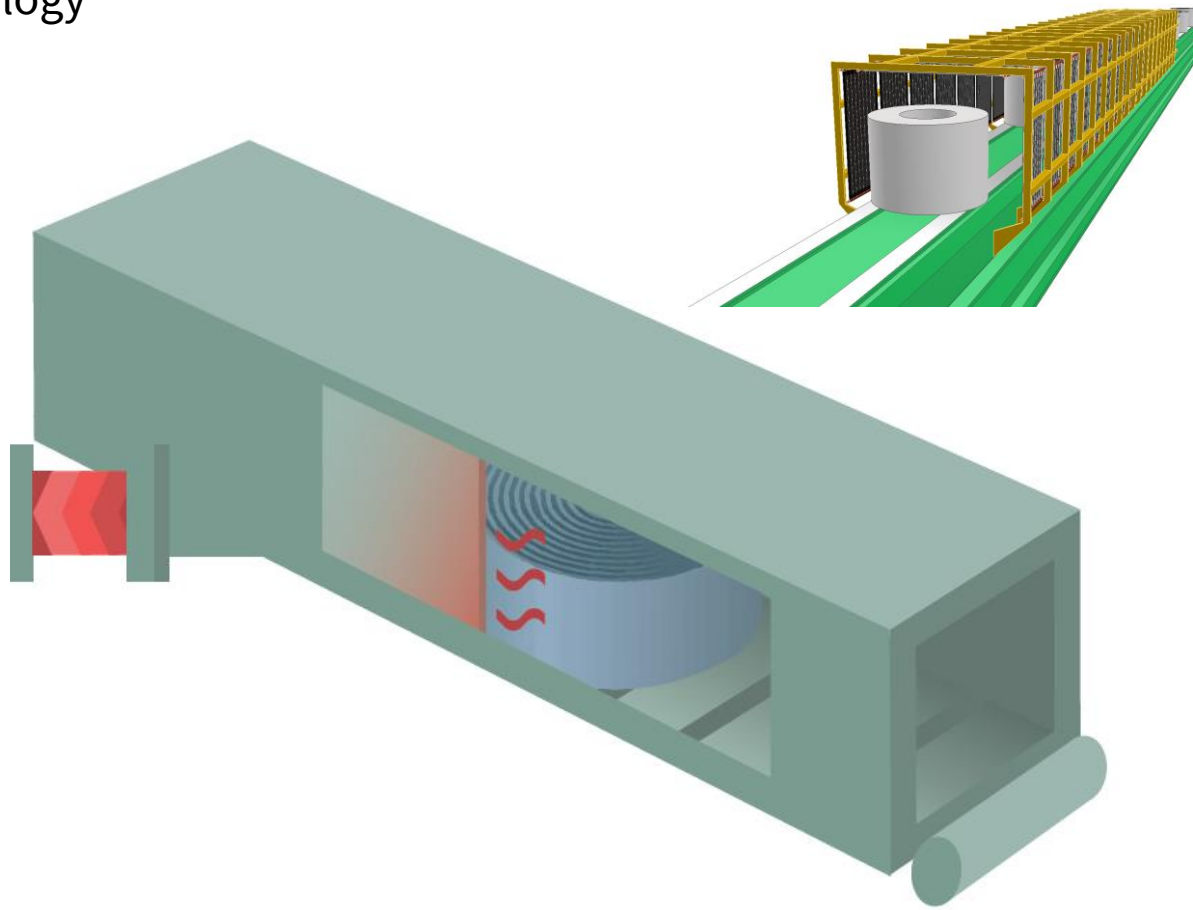
- Smart monitoring and control systems

Technologies/demonstrations

Heat recovery solutions: innovative heat exchanger technology

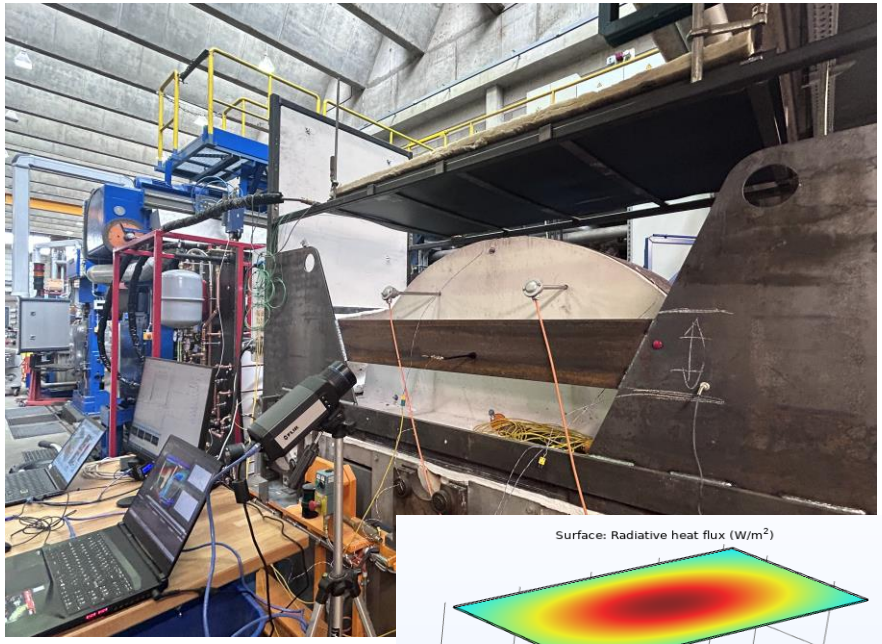
Radiative heat exchanger

- Coils are leaving the hot strip mill at approx. 500 – 600 °C
- First-of-their-kind panels collect heat by radiation
- Enables the recovery of up to 3 MW of power (with a potential of >18 GWh per year)
- TRL: 5 → 7

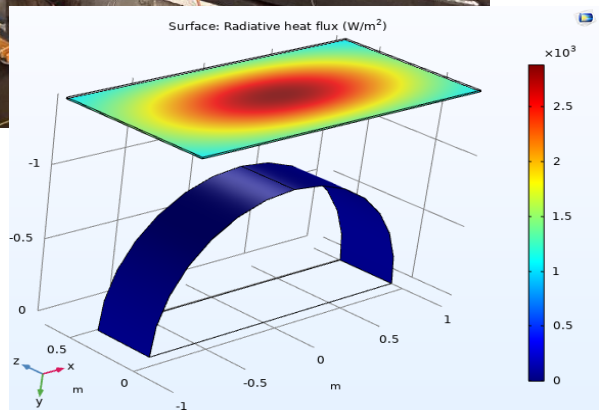


Technologies/demonstrations

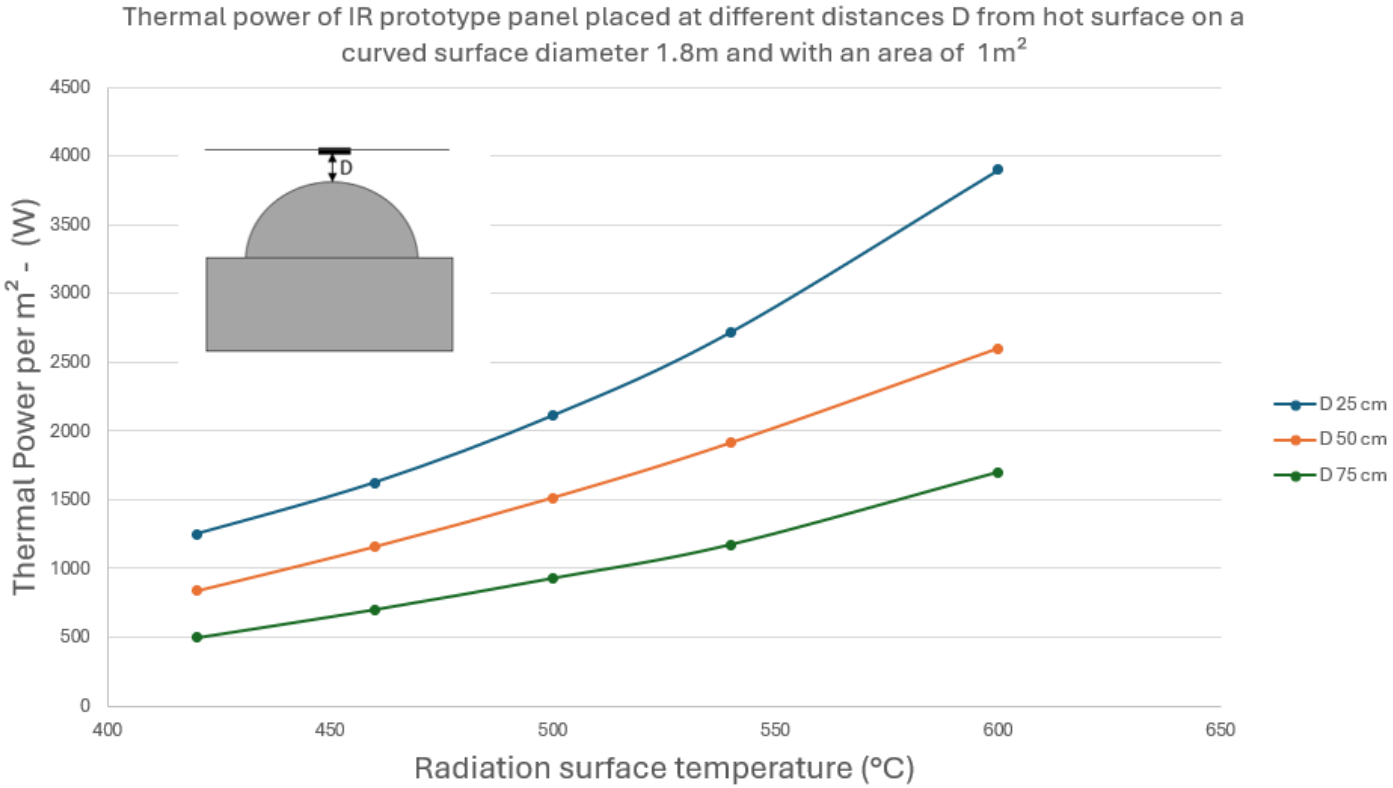
Heat recovery solutions: innovative heat exchanger technology - Radiative heat exchanger



Laboratory trials

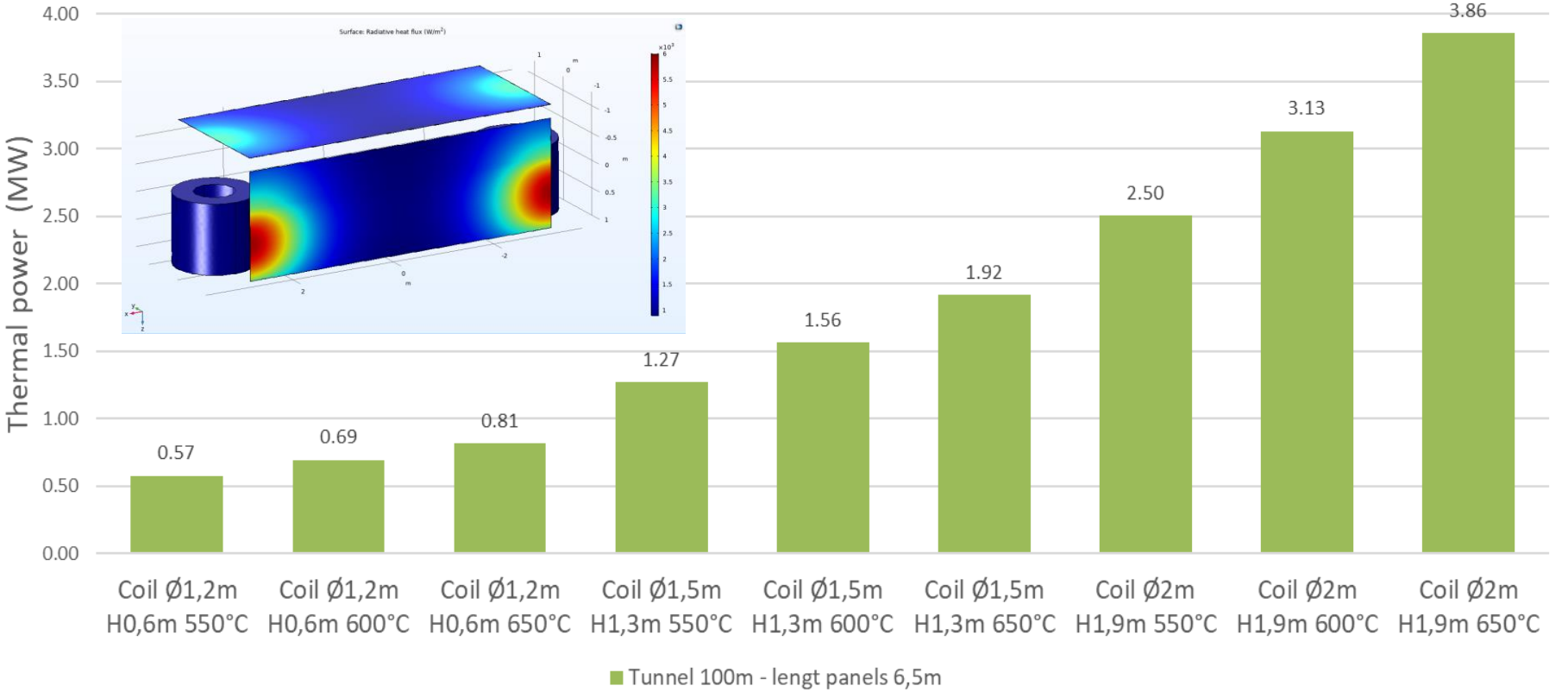


3D radiation heat transfer modeling



Technologies/demonstrations

Heat recovery solutions: innovative heat exchanger technology - Radiative heat exchanger



Upscalling 3D modeling industrial situation

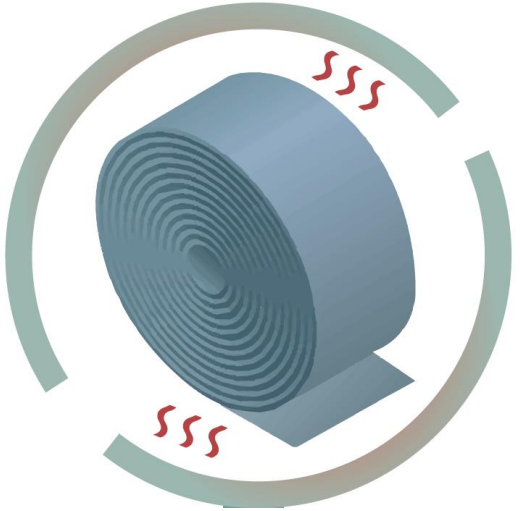
Average 1.56 MW up to 3.86 MW thermal power for the full coverage in the coil tunnel with a lenght of 100 meter.

Technologies/demonstrations

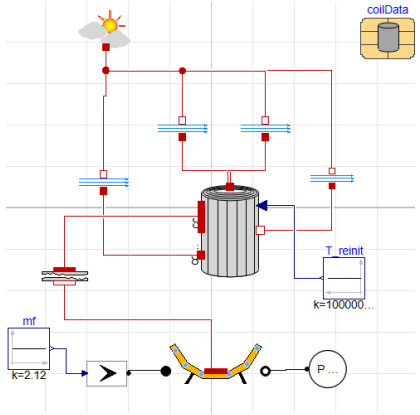
Heat recovery solutions: innovative heat exchanger technology

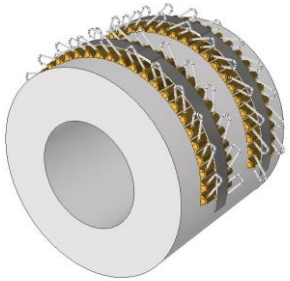
Conductive heat exchanger

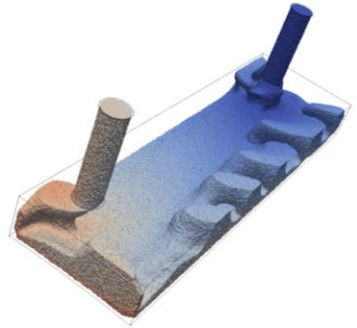
- Fast cooling of the coils
- Up to 300 kW per coil can be harvested
- Average number of coils produced yearly: 230.000 coils
- TRL: 5 → 7



Innovative WHR solutions: methodology





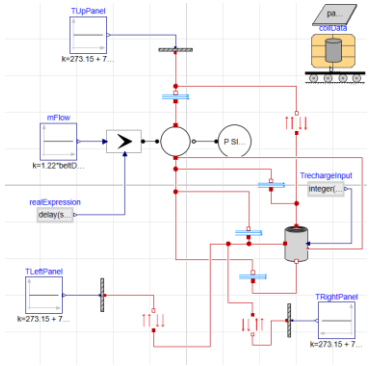


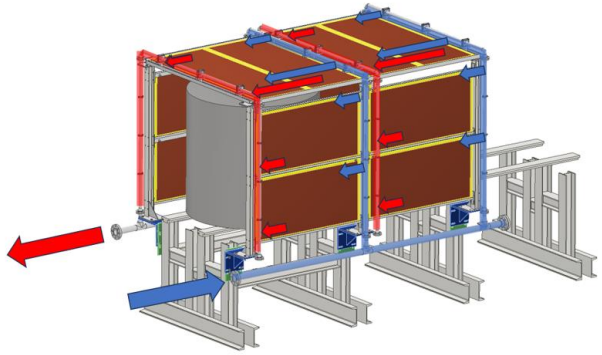
Thermal Modelling

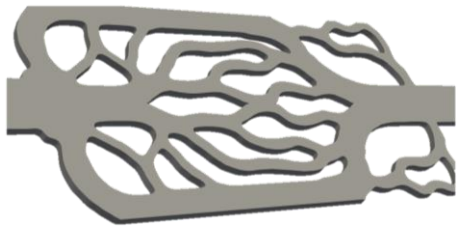
Concept Study

Design Optimization

>3 MW Recovery Potential



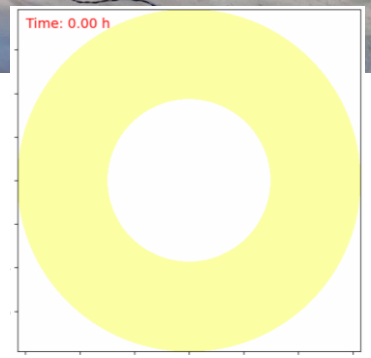




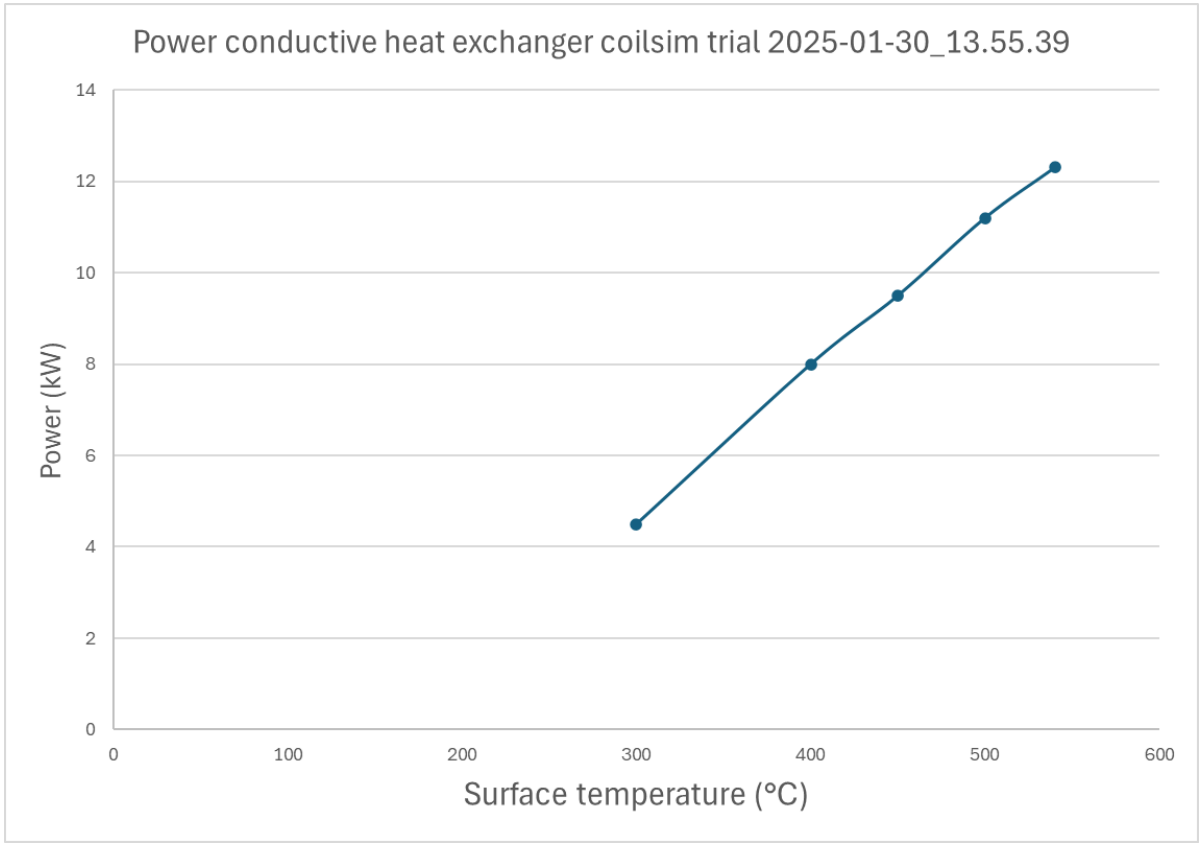
Technologies/demonstrations

Heat recovery solutions: innovative heat exchanger technology – conductive heat exchanger

Laboratory trials



2D simulation



Technologies/demonstrations

HEATEN
Power with Passion

HeatBooster: high-temperature heat pumps

Efficient, flexible, scalable, and sustainable heat pump solutions that minimize emissions, lower energy costs, and enable industries to decarbonize their heat supply.

CASE HIGHLIGHTS	VALUES
COP	3.6
Thermal power output	3.3 MW_{th}
Working fluid	R-1233zde

70°C

Hot water

55°C

2 x HBL16-S/S

130°C

Hot water

128°C

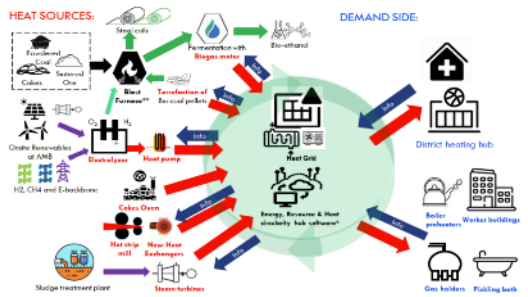


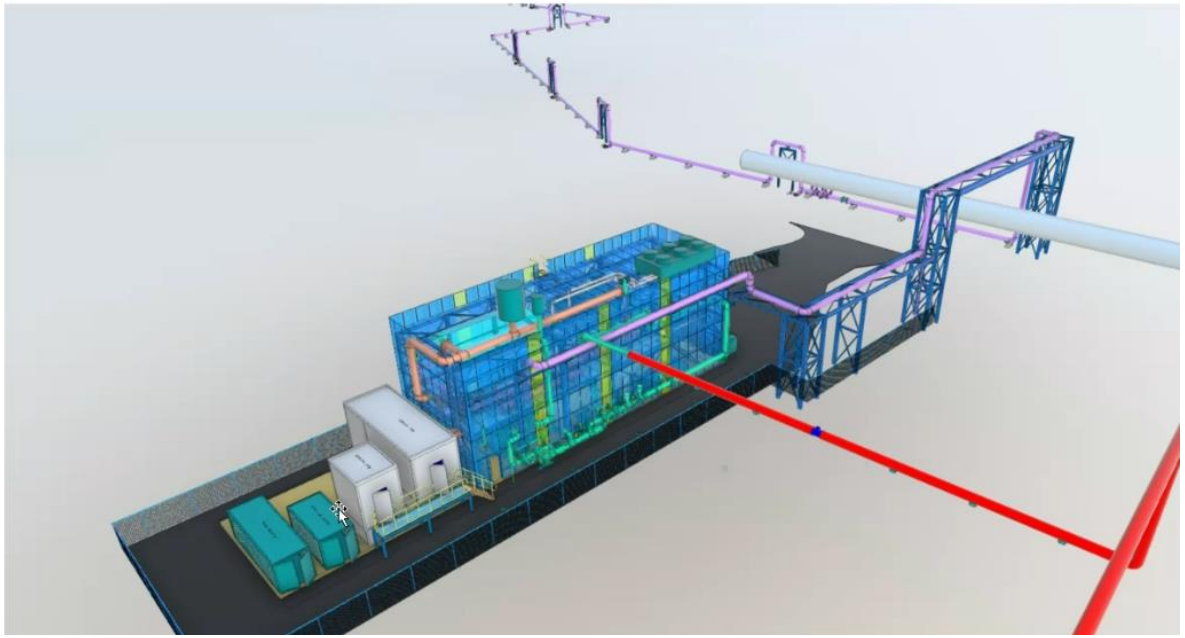
Figure 2. Concept figure

Technologies/demonstrations

Heat grid back up:

Steam expansion turbine

- Connected to a sludge treatment plant (treating 2/3 of the sludge of the Flemish households)
- HP steam 40 barg → LP steam 11 barg
- TRL: 7 → 9



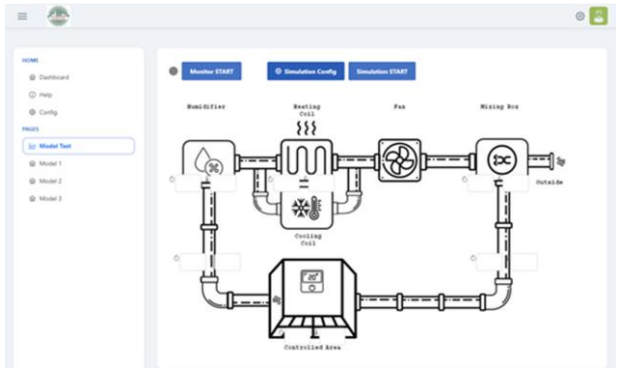
Demonstrations – Software tools

pathOpt

Network Design

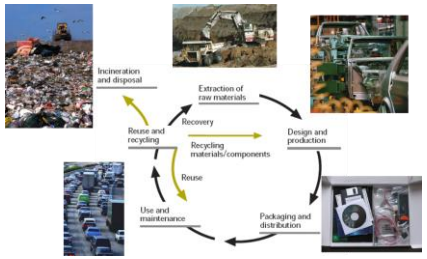
STORM

Smart control



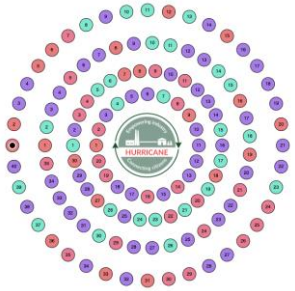
DT

Digital Twins



LCA - Life Cycle Assessment

Assess the potential environmental impacts and resources used throughout a product's life cycle



Pipes & Furnaces

Gamification

EMS

Comprehensive Resource Management

Consortium Hurricane

Belgian Partners

ArcelorMittal

CRM GROUP

vito

Lokaal bestuur Zelzate

Sint-Jan-Baptist psychiatrisch centrum

provincie Oost-Vlaanderen

FINARMIT

warmzelzate

German Partners

DBFZ

HEATEN

Italian Partners

Università Politecnica delle Marche

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PDM

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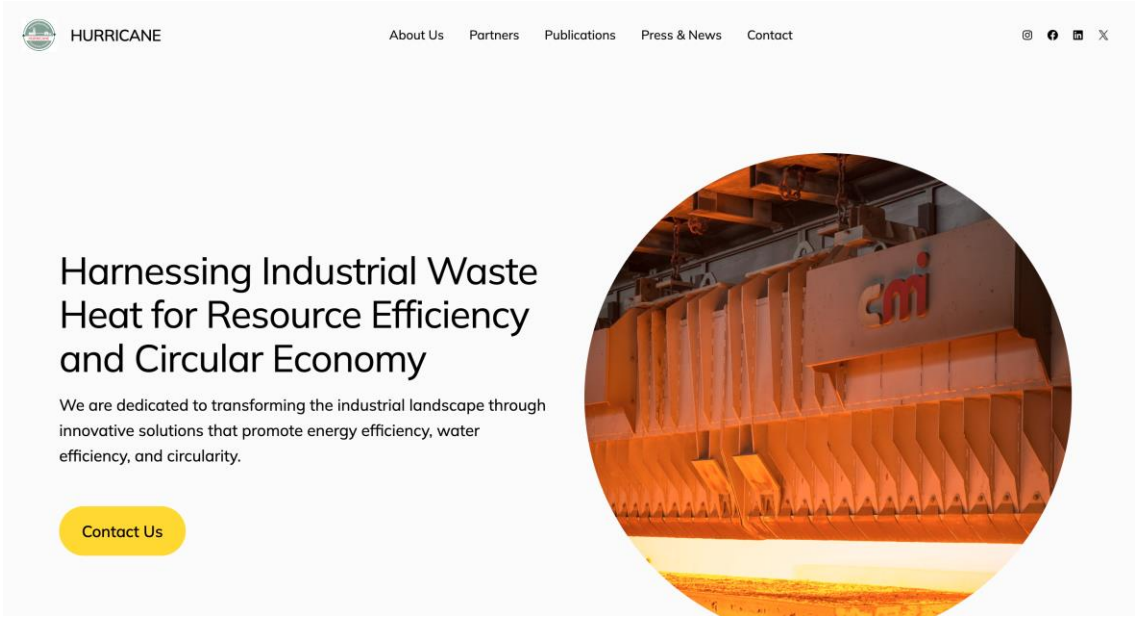

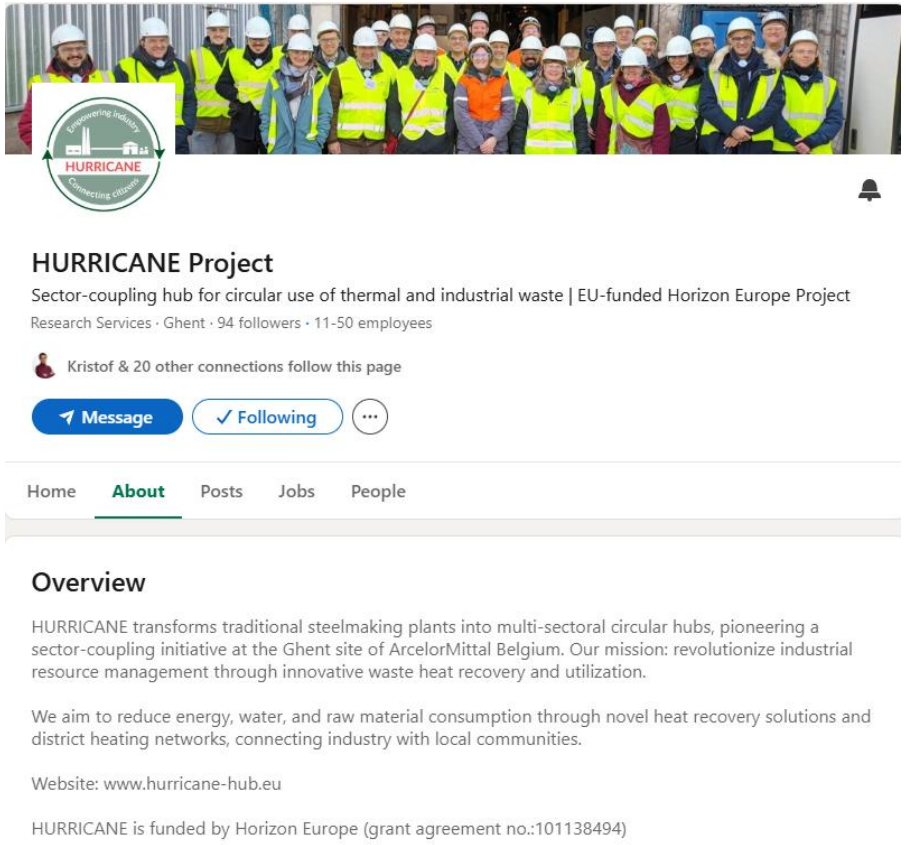

Thank you!

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