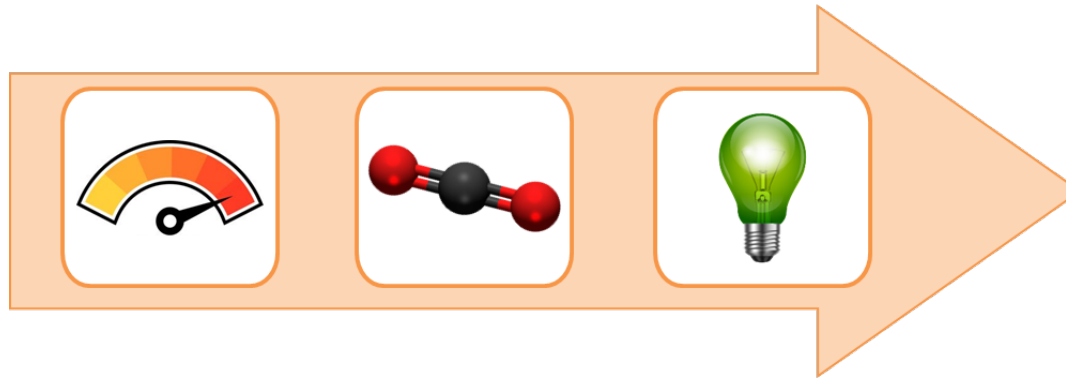


INDUSTRY DECARBONISATION THROUGH INNOVATIVE HEAT TO POWER CONVERSION SYSTEMS



Prof. Savvas A. Tassou & Dr. Giuseppe Bianchi

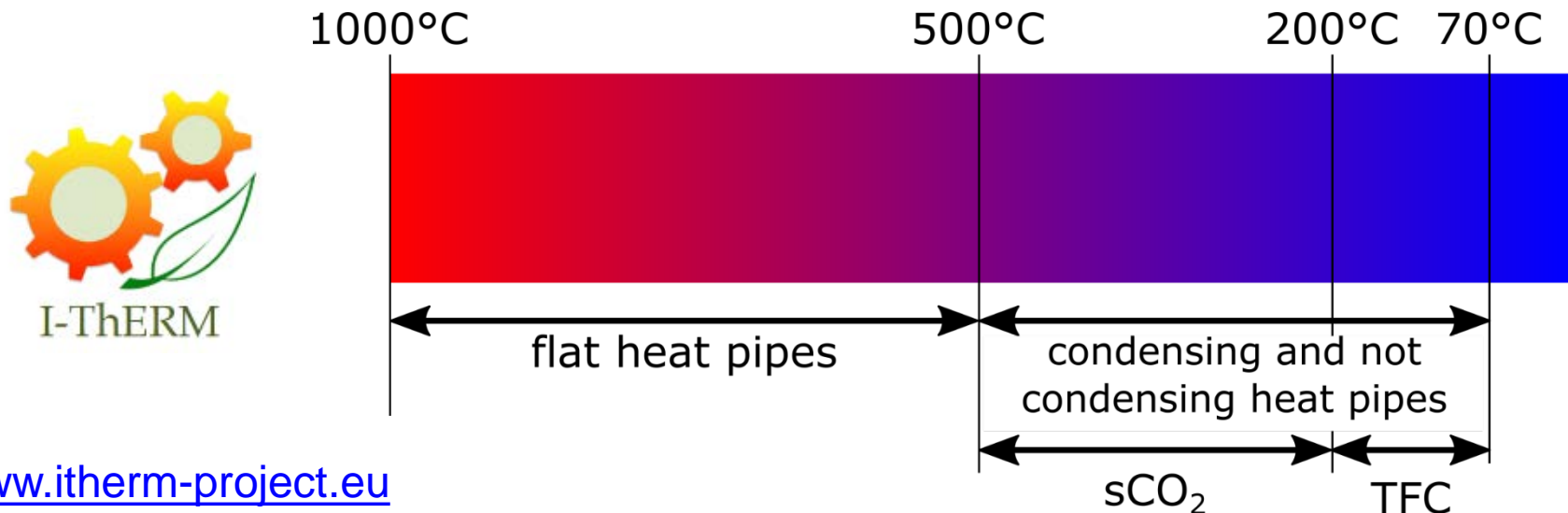
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About us & the I-ThERM project

- Brunel is a Research-led university in West London
- Coordinators and lead researchers in the I-ThERM project



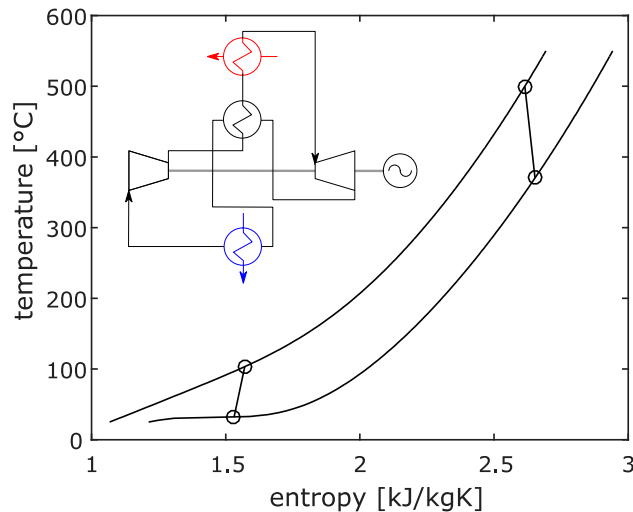
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 680599

Heat to power conversion expertise



High temperature sources ($>350^{\circ}\text{C}$)

- Steel & glass industry
- Concentrated solar & nuclear power
- Fossil fuelled power plants



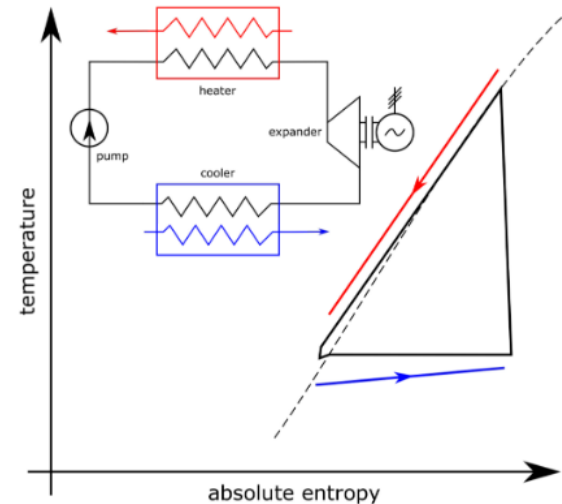
SUPERCRITICAL CO_2 (s CO_2) CYCLE

- More efficient than conventional cycles
- Very compact



Low temperature sources ($<200^{\circ}\text{C}$)

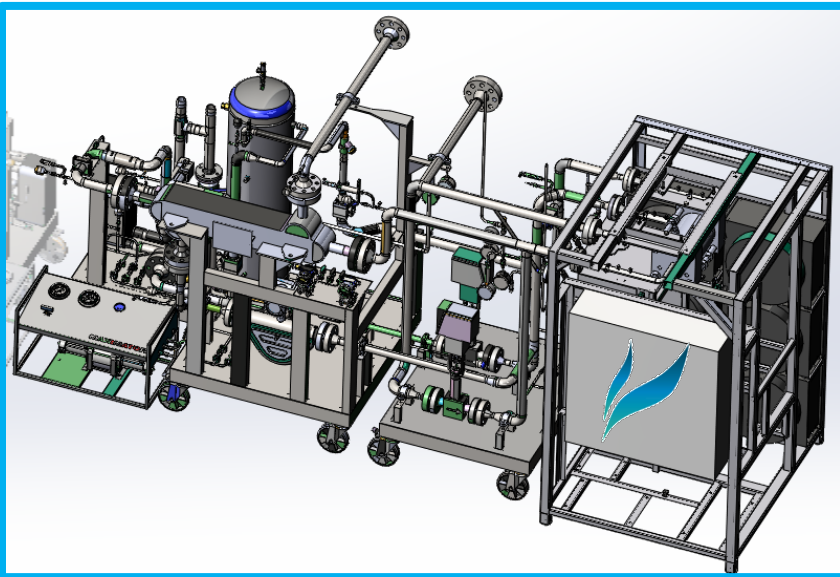
- Geothermal
- Food Industry
- Steel industry
- Chemical & petrochemical industry



TRILATERAL FLASH CYCLE (TFC)

- Better heat utilization than ORCs
- Quick return on investment

1st sCO₂ experimental facility in a European university



- 50kWe- 70 kWe design power output
- Direct heat recovery
- Single shaft turbomachinery
- Centralised facility control
- CE marked (PED compliant)



Turbomachinery
(Enogia)



Trilateral Flash Cycle system



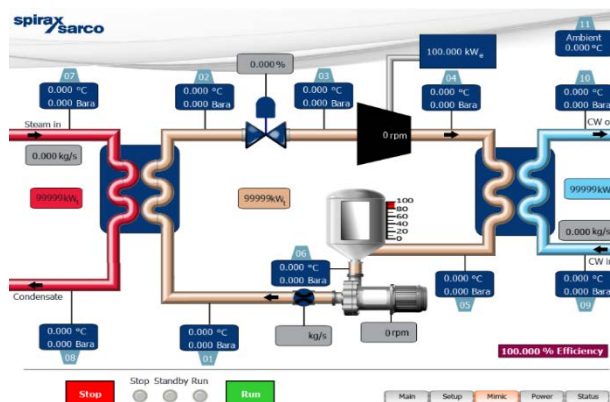
TFC system (Spirax Sarco)

- 100 kW_e design power output
- High-TRL design
- Two-phase expander
- Low GWP working fluid

Brunel contribution

- Thermodynamic design
- Transient modelling & control

Demonstration
site at Tata Steel-Port
Talbot (UK)



Other areas of Interest and expertise

- LC-SC3-EE-6-2018-2019: Business case for industrial waste heat/cold recovery,
- LC-SC3-EE-7-2020: Industrial (Waste) Heat-to-Power conversion,
- LC-SC3-EE-13-2018-2019-2020: Enabling next-generation of smart energy services valorising energy efficiency and flexibility at demand-side as energy resource
- LC-SC3-RES-7-2019: Solar Energy in Industrial Processes

Expertise

- Heat recovery and power conversion (Low and High temperature)
- CHP and tri-generation
- CO2 refrigeration and heat pump systems
- Energy Management in Industry (Dynamic simulation, energy vector integration and demand side management) – OPTEMIN Project - Demand side management
- Solar thermal technologies (concentrated and flat plate)

Forthcoming Events

Workshop on Energy
Recovery Conversion &
Management (ERCoM)

Brunel University London



www.foodenergy.org.uk/ERCoM_2019_Workshop.html