

COMPASSCO₂

MAIN CHALLENGES ADDRESSED AND INNOVATIONS BROUGHT BY COMPASSCO₂

Daniel Benitez (DLR)

COMPASSCO₂ Final Workshop

*Back to the Future: A Forward-Thinking Approach to
Concentrating Solar Technologies - Key Takeaways from the
COMPASSCO₂ Project*



April 24th, 2025



9h30 – 14h30 CEST

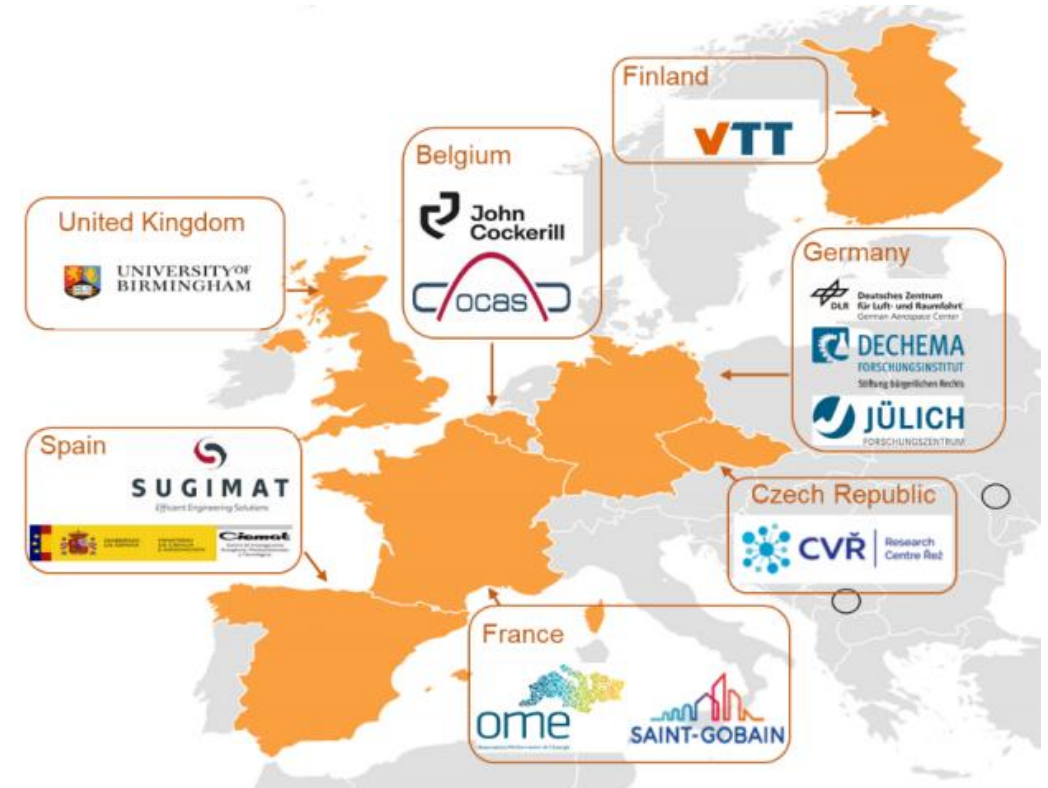


Husinec u Řeže, Czech Republic &
Online 

About COMPASsCO₂

Funding source	Horizon2020 Topic: Novel high performance materials and components
Budget	Approx. 6 Mio. EUR
Duration	54 months (November 2020 – April 2025)
Start TRL	2
End TRL	5

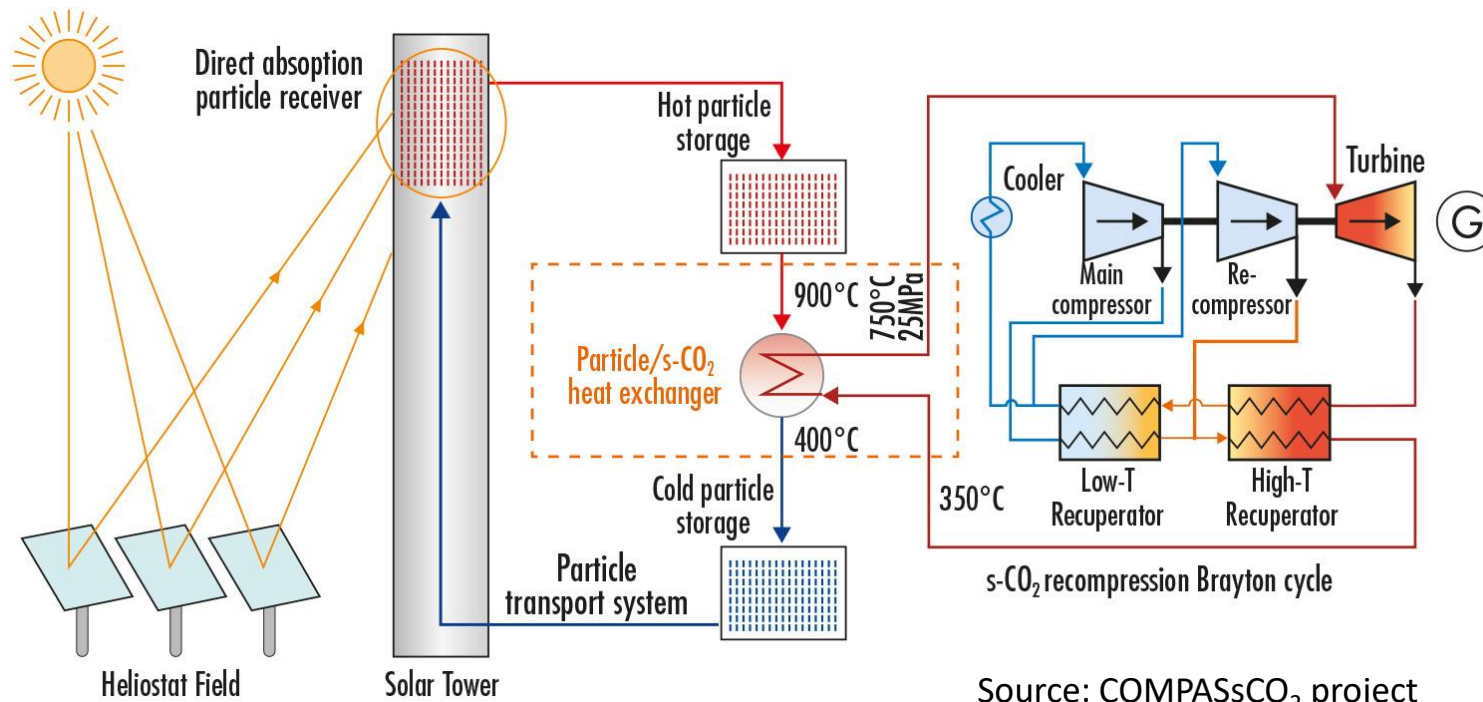
12 partners from 7 countries



About COMPASsCO₂

The project aimed to develop **advanced components & materials** that withstand **extreme operating conditions** to effectively integrate :

CST plants with solid particles and sCO₂ Brayton power cycle



CST: concentrated solar thermal
sCO₂: supercritical carbon dioxide



Advantages:

- High cycle efficiency
- Compact system design
- Particles as heat transfer and storage medium



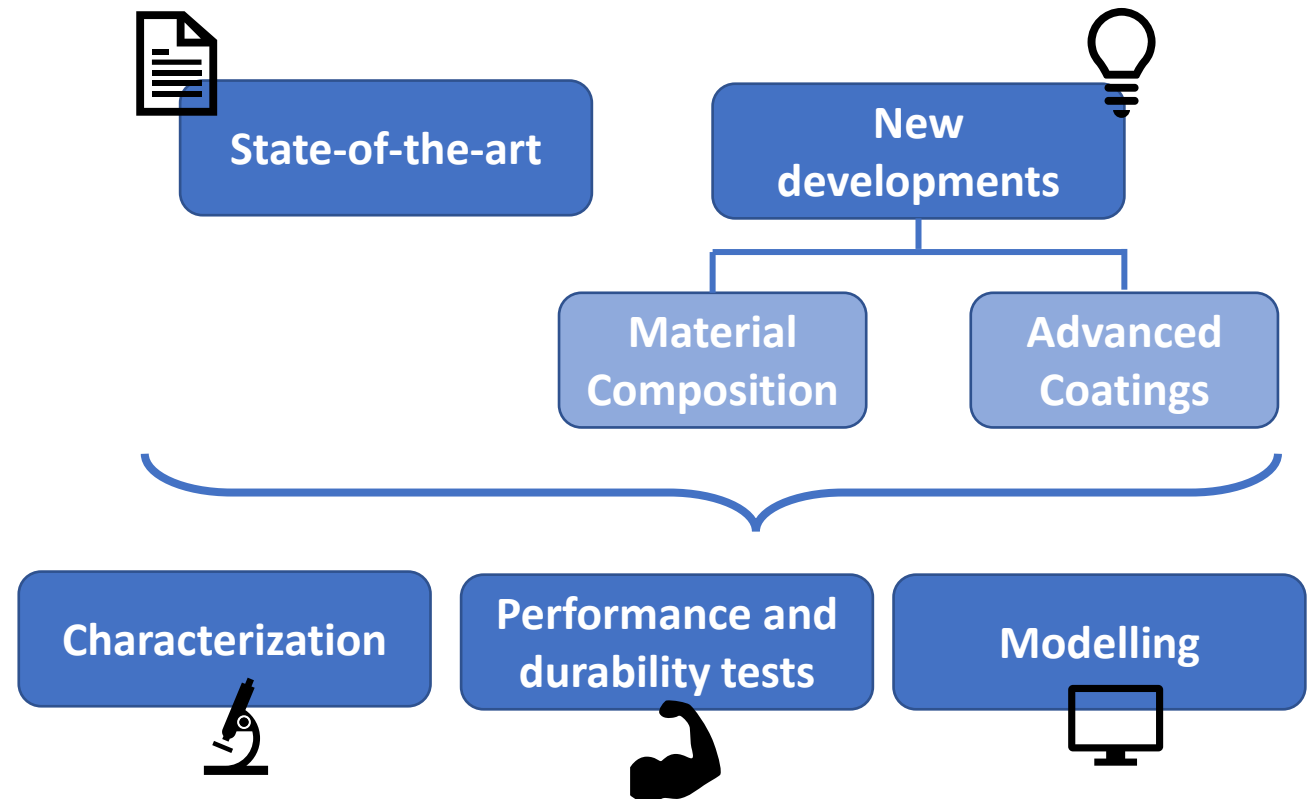
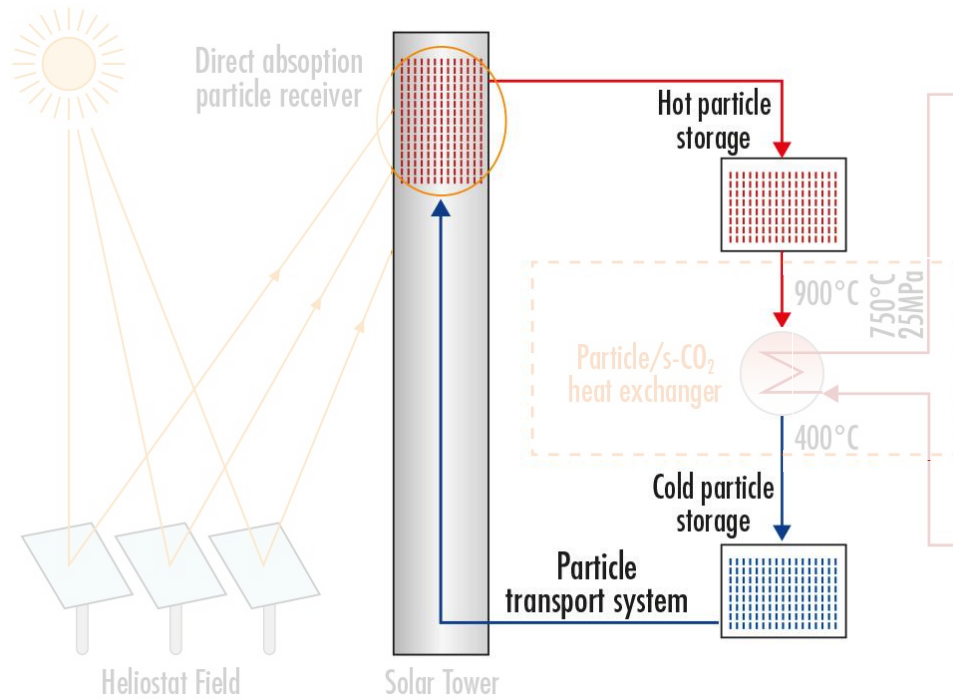
Challenges:

- High temperatures
- High pressures
- Corrosion/Oxidation
- Erosion due to particles
- Cyclic thermal Loads

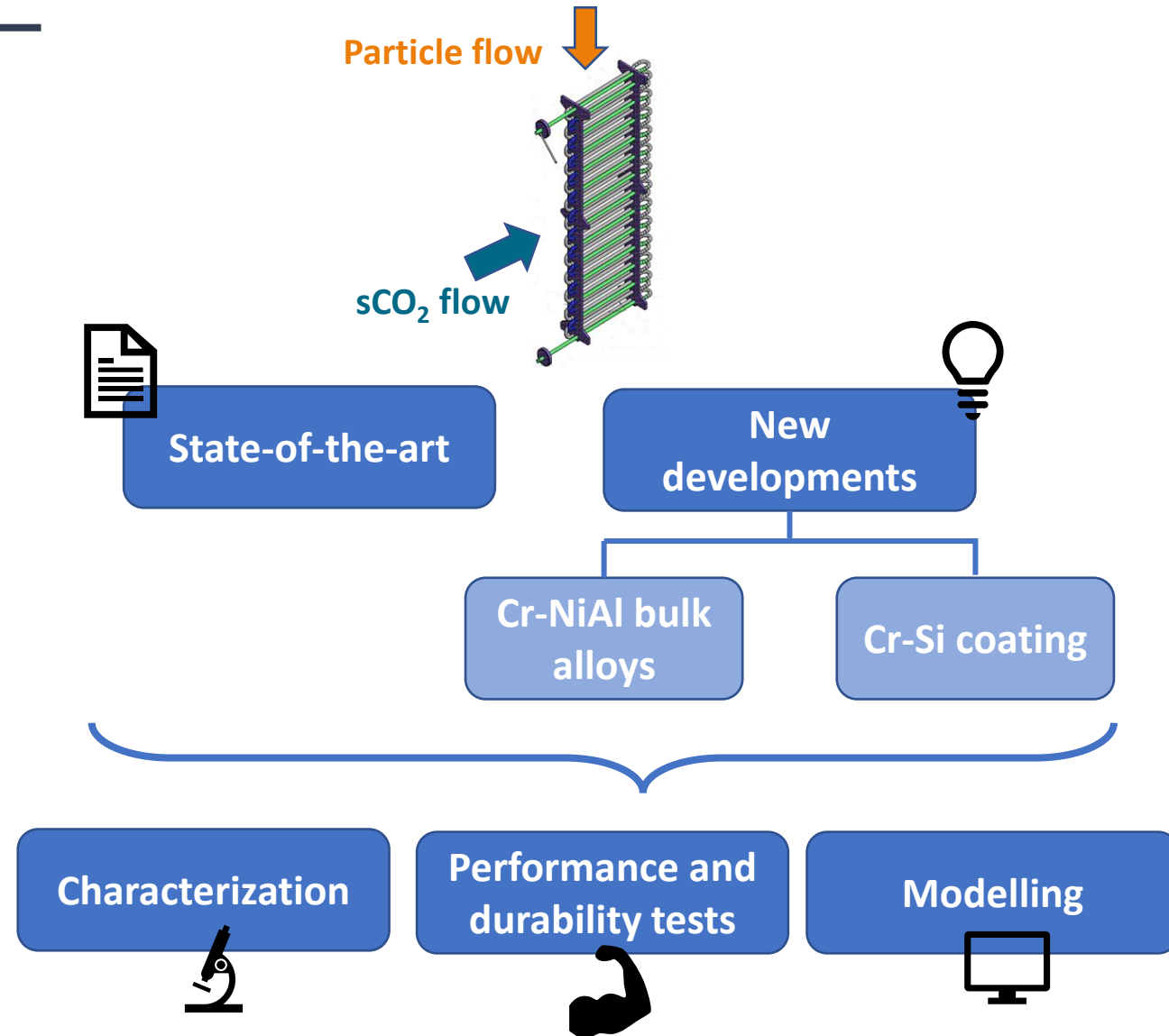
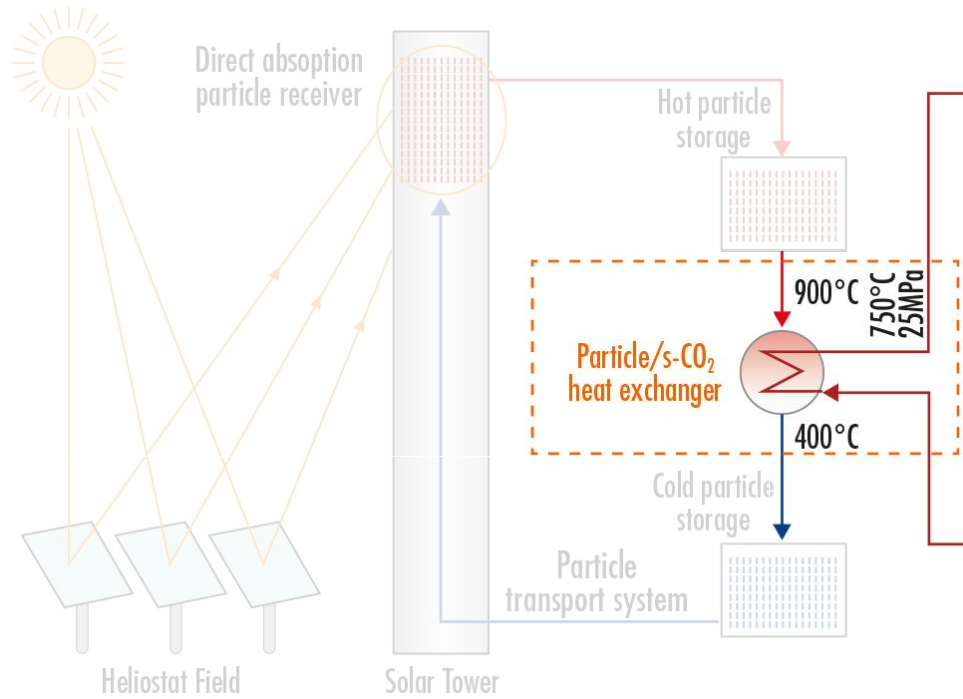
Project Objectives

- Develop highly durable and efficient particles for CSP plants
- Develop optimized materials for heat exchanger tubes in contact with particles and sCO₂
- Demonstrate material lifetime by measuring and modeling the degradation of the materials
- Design, construct and operate a particle/sCO₂ heat exchanger section in order to validate the degradation and heat transfer models
- Evaluate the economic benefits of a CSP-sCO₂ plant using the materials and components developed in COMPASsCO₂

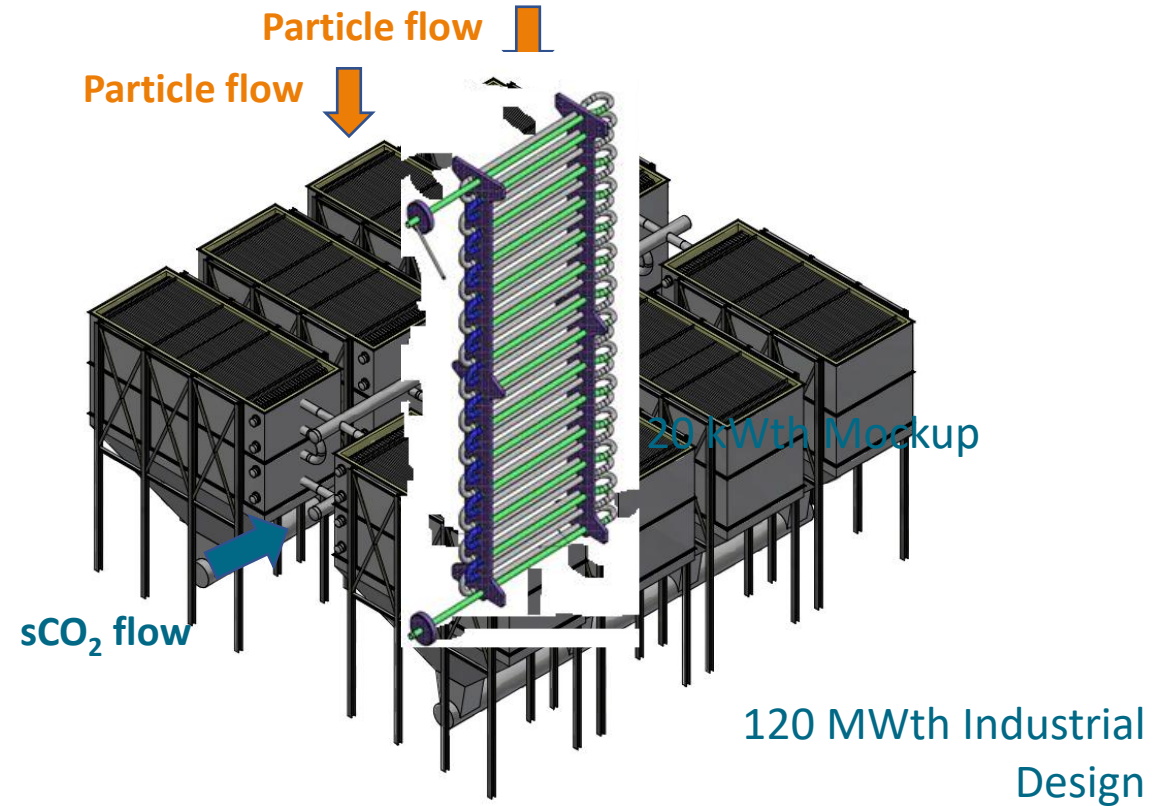
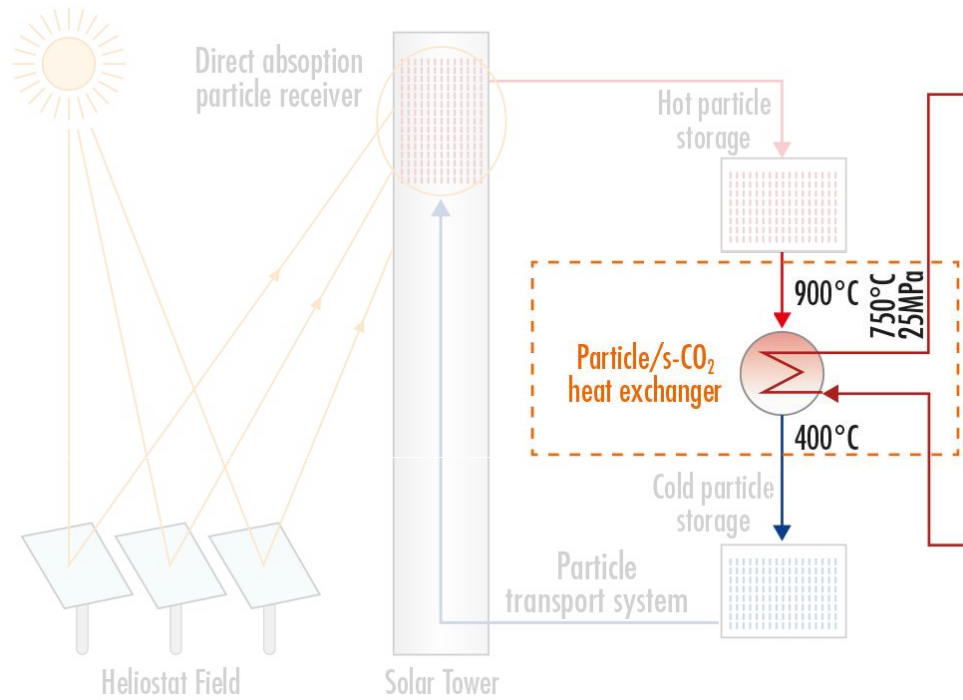
Particle Development



HEX Material Development



HEX Industrial Design





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COMPAS_sCO₂

THANK YOU



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<http://www.compassco2.eu/>



Co2Compa



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für Luft- und Raumfahrt
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