

CARBOSOLA

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Gefördert durch:



Bundesministerium
für Wirtschaft
und Energie

aufgrund eines Beschlusses
des Deutschen Bundestages

Presentation structure

- Project summary
- Objectives & expected impact
- Scope
- Main results/outcomes
- Options for exploitation/collaboration/follow-up activities

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Project summary

Funding source	Federal Ministry for Economic Affairs and Climate Action
Budget	2.2 million €
Duration	42 months (October 2019 – March 2023)
Start TRL	3
End TRL	4

Partners

TU Dresden, Institute of Power Engineering, Chair of Thermal Power Machinery and Plants

Helmholtz-Zentrum Dresden-Rossendorf, Institute of Fluid Dynamics

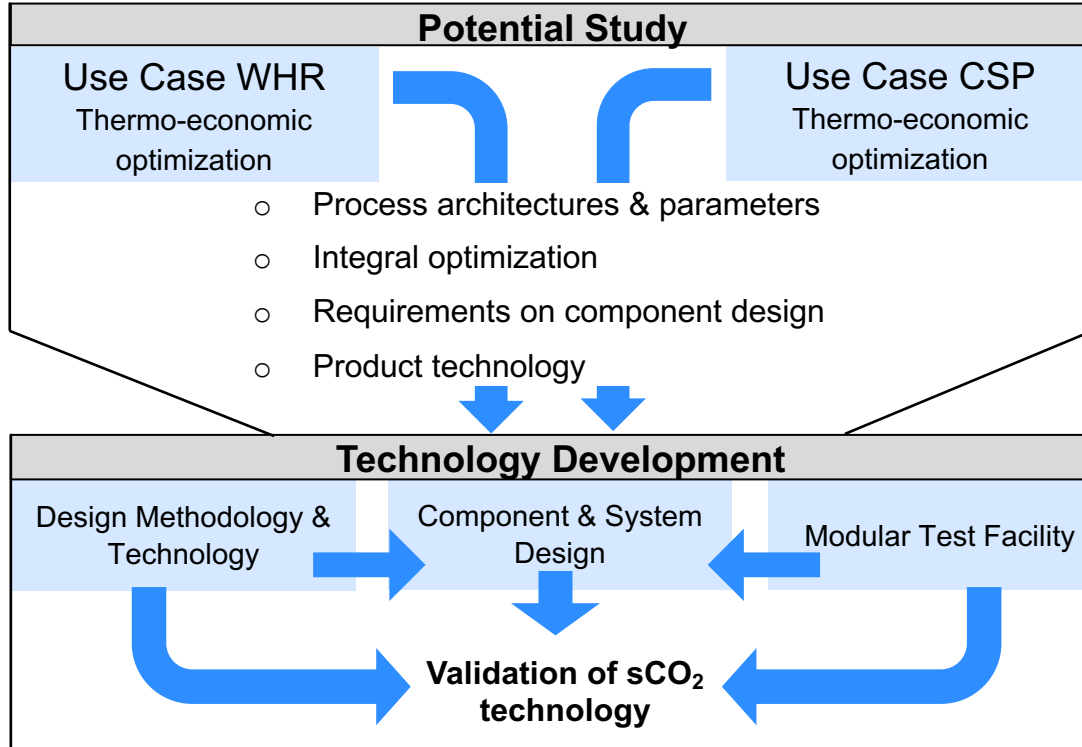
SIEMENS AG, Power & Gas Division Erlangen/Mülheim

German Aerospace Center, Institute of Solar Research

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Objectives & expected impact

SIEMENS
energy

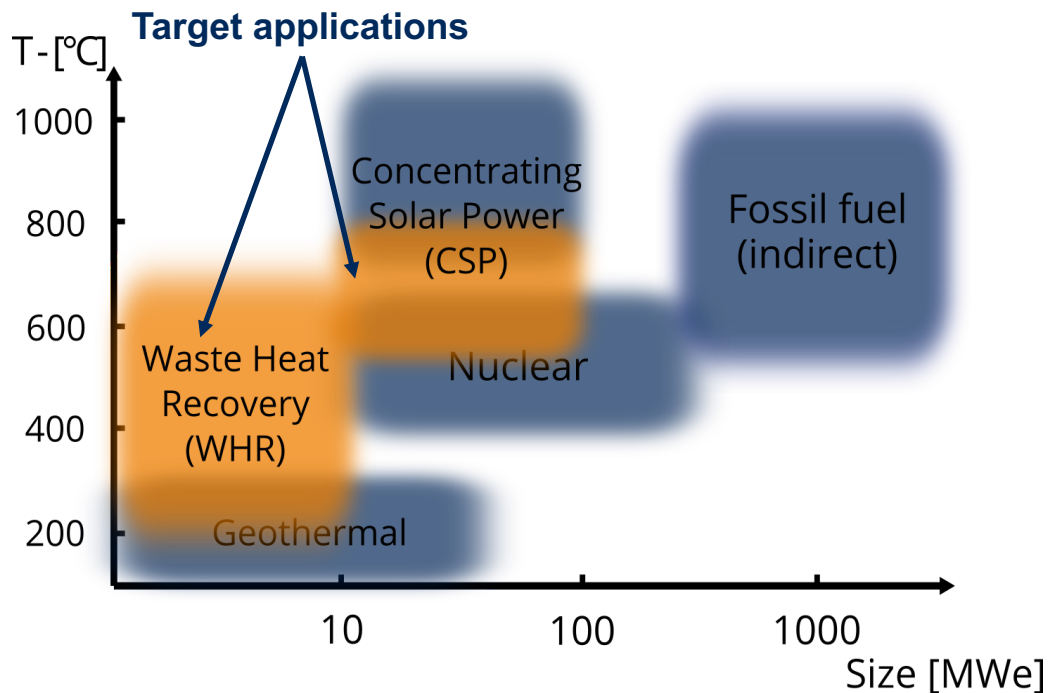


HZDR

HELMHOLTZ
ZENTRUM DRESDEN
ROSSENDORF

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Objectives & expected impact



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Scope

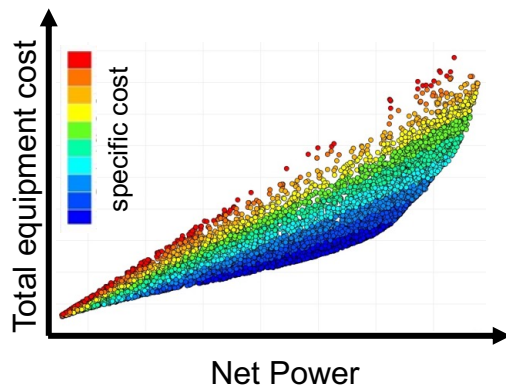
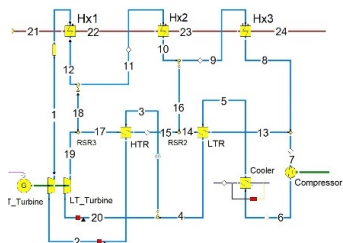
- Setting up a MW_{th} class sCO₂ facility, which targets development of WHR and CSP applications
- Technology development:
 - Component development and testing
 - Static and transient system analysis
 - Process reliability and safety
- Generic investigations:
 - Fluid composition / impact on cycle performance
 - Validation of CFD models
 - Heat transfer modeling
 - Near critical point stability criteria
 - Failure models and effect analysis (FMEA)
- Target parameters: $T = 600\text{ °C}$, $p = 300\text{ bar}$, $\dot{Q}_{\text{th}} = 2.5\text{ MW}$

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Main results/outcomes

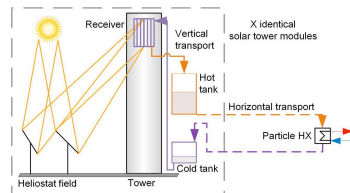
Use Case WHR

- Investigation of different configurations
- Cost models for components
- Cycle modeling with EBSILON®

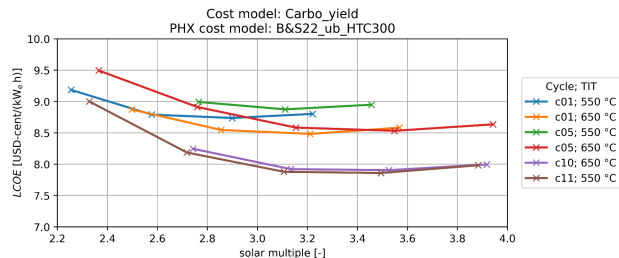


Use Case CSP

- Design of the CO₂ system
- Design of the CSP system
- Define of the LCOE



- Bauxite particles for heat transfer
- Cost optimization for various cycle designs

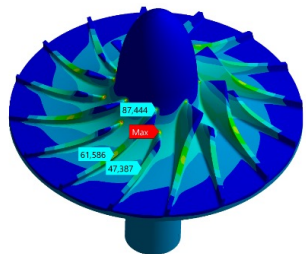
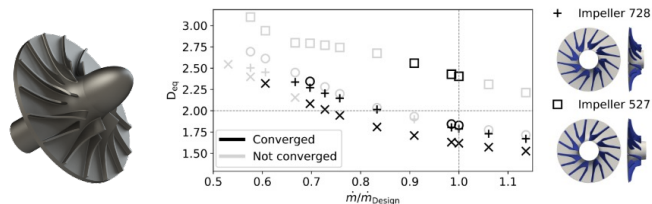


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Main results/outcomes

Design Methodology & Technology

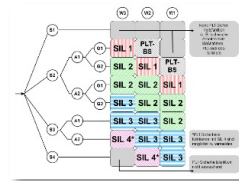
- Optimization of impeller design
- CFD and FEM-Modell development
- Iterative adaption of wall thickness
- Evaluation of 1067 designs



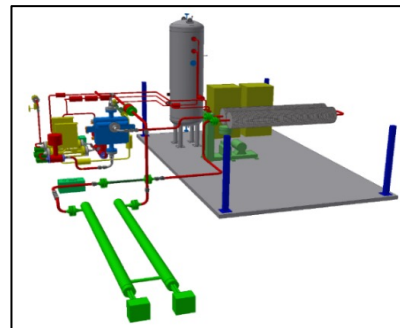
- Determination of Eigenfrequenz
- Design and manufacturing of fluid blower

Modular Test Facility

- Development of experimental facility
- Temperature of 600 °C, pressure of 300 bar
- Safety regulation
- Pressure vessel design



- Assembly of the components
- Commissioning and operation in 2023



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Options for exploitation/ collaboration/ follow-up activities

Granted and planned follow-up projects:

- EU-Project SHARP 
 - Planned start: end of this year
- CARBOSOLA II (Federal Ministry for Economic Affairs and Climate Action)
 - Proposal to be handed in

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Contacts

- For questions and inquiries, please contact:
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