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Advanced Indirectly Heated Carbonate Looping Process (ANICA)

4th ACT Knowledge Sharing Workshop, Athens
6th-7th November 2019

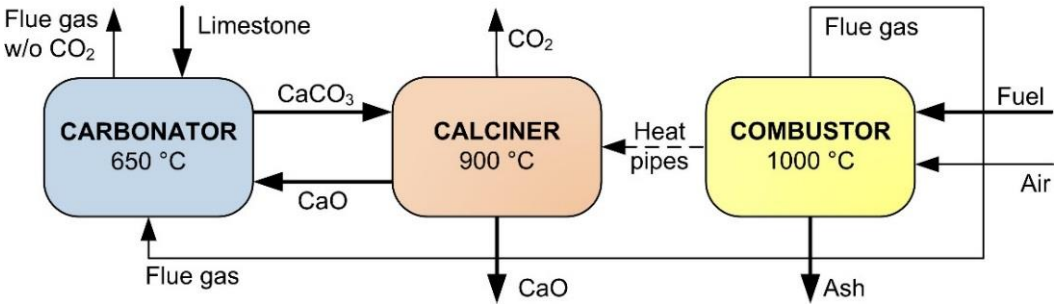
Carina Hofmann

Accelerating CCS Technologies

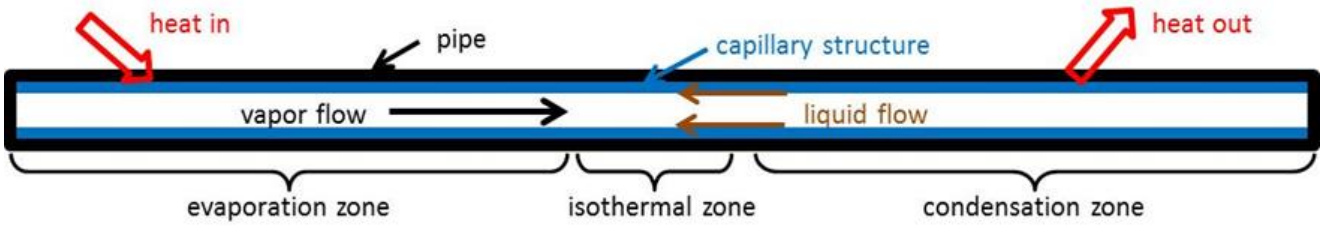
Process overview

Indirectly Heated Carbonate Looping (IHCaL) Process

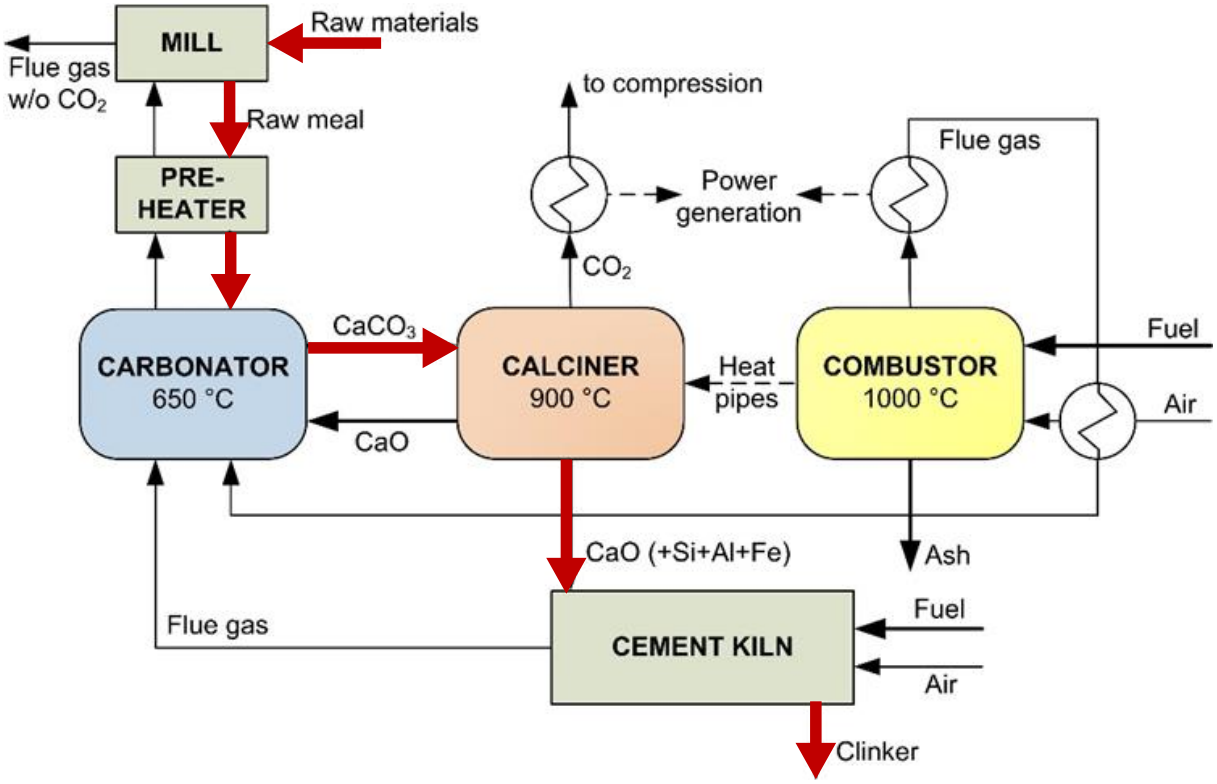
Source: VDZ



- No oxygen for calciner → **high efficiency** (1.5 – 2 % points efficiency drop)
- No fuel in calciner → **few impurities** (sulfur, ash), **low deactivation**
- Almost **pure CO_2** stream at calciner exit
- Very low efficiency drop (~4 % points, incl. CO_2 compression)
- Technology validated in pilot scale (0.3 MW_{th})



Integration of IHCaL process into cement plants



- Effective use of spent sorbent as raw material
- Intergration of heat for preheating and power generation
- Cheap waste materials are suitable as fuel

Key Performance Indicators (KPIs)

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KPI	Target
CO_2 capture efficiency	> 90 %
CO_2 purity	> 95 %
Net efficiency for power co-generation	> 45 %
Sorbent utilization	> 90 %
CO_2 avoidance costs	< 25 €/t
Net CO_2 emissions	< 0

Main objectives

- Advanced key process performance parameters (see slide before)
- Development of 1D- and 3D-models of dual fluidized bed reactors
- Demonstrate technology in relevant environment (300 kW_{th} pilot plant)
- Risks, economic performance, and environmental impact of full process
- Provide basic design and cost estimation of 20 MW_{th} demo plant

Project structure

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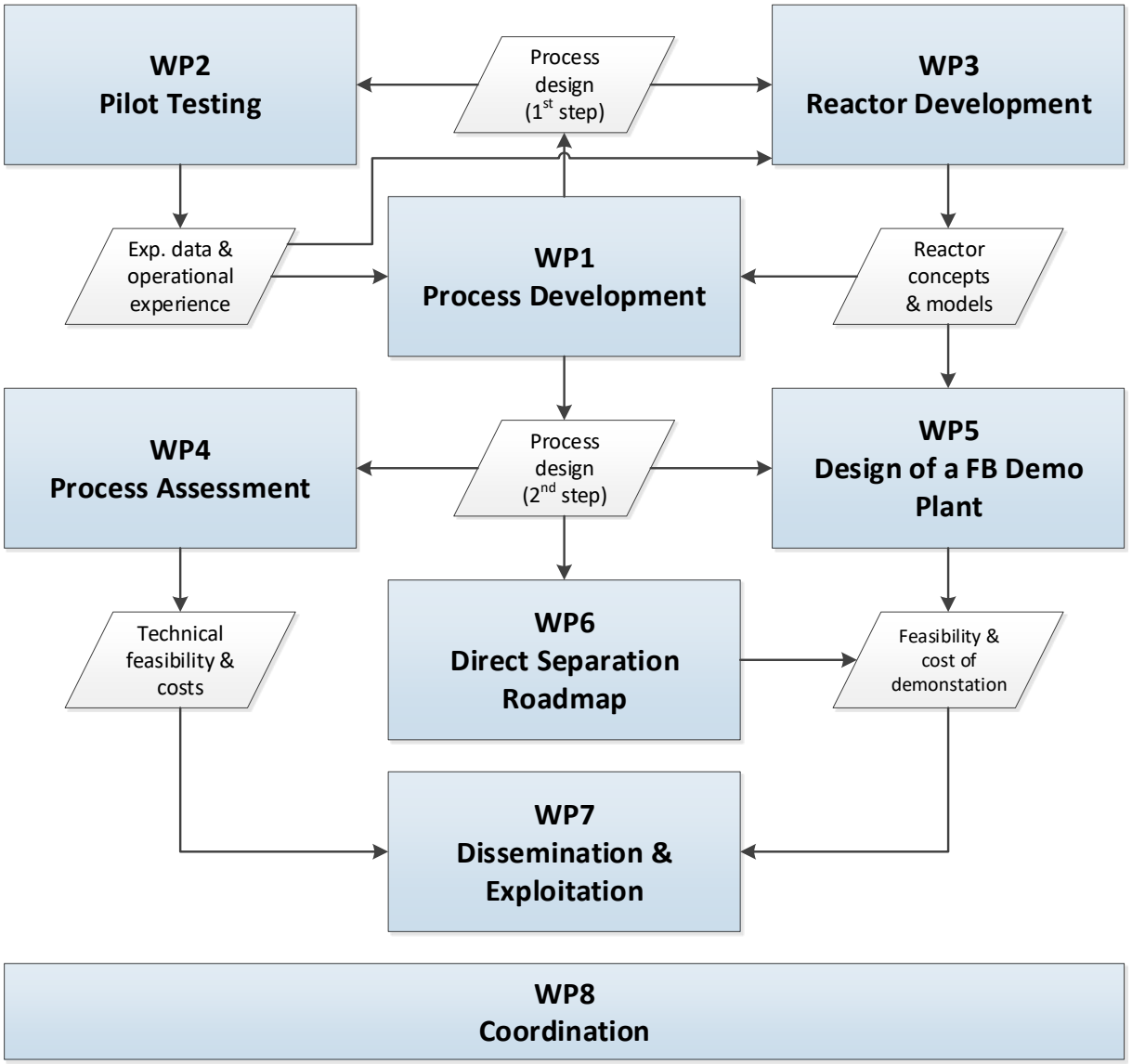

300 kW_{th} pilot plant at TU Darmstadt

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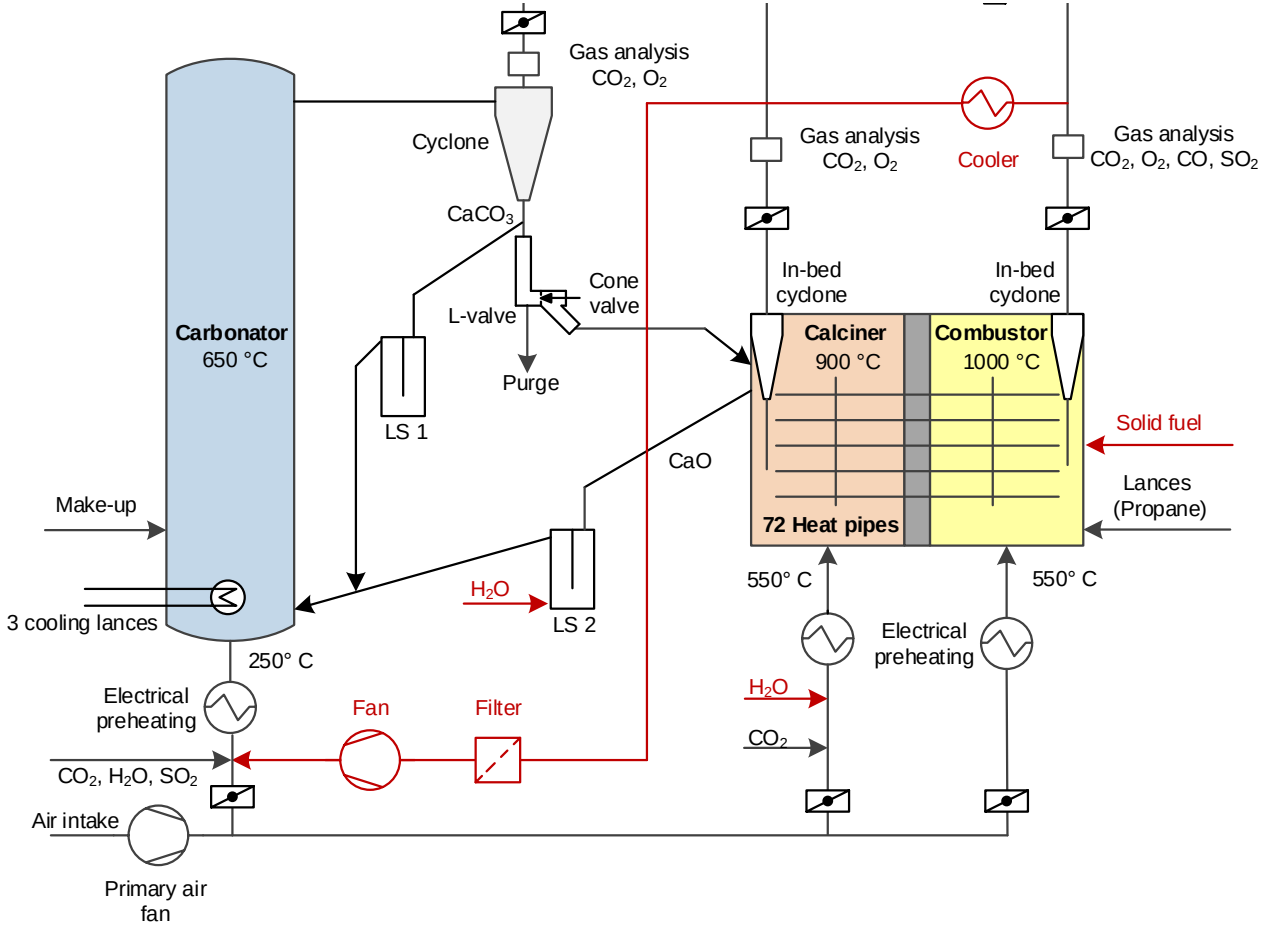

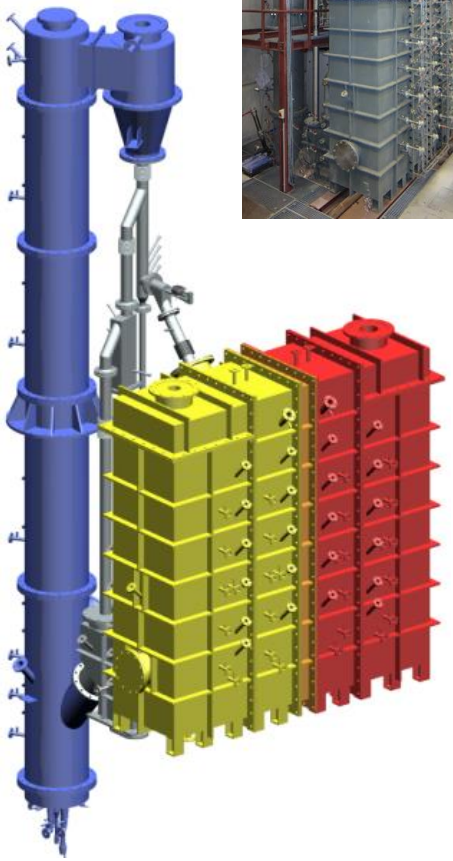

Outreach plan

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- Fully interactive **website**, regularly updated
- Presentation of results in two **public workshops**
- **Publications** in peer-reviewed journals and international conferences
- Every six month publishing of **industrially oriented newsletter**
- **Exploitation plan** including commercial propositions

Accelerate commercialisation of CCS

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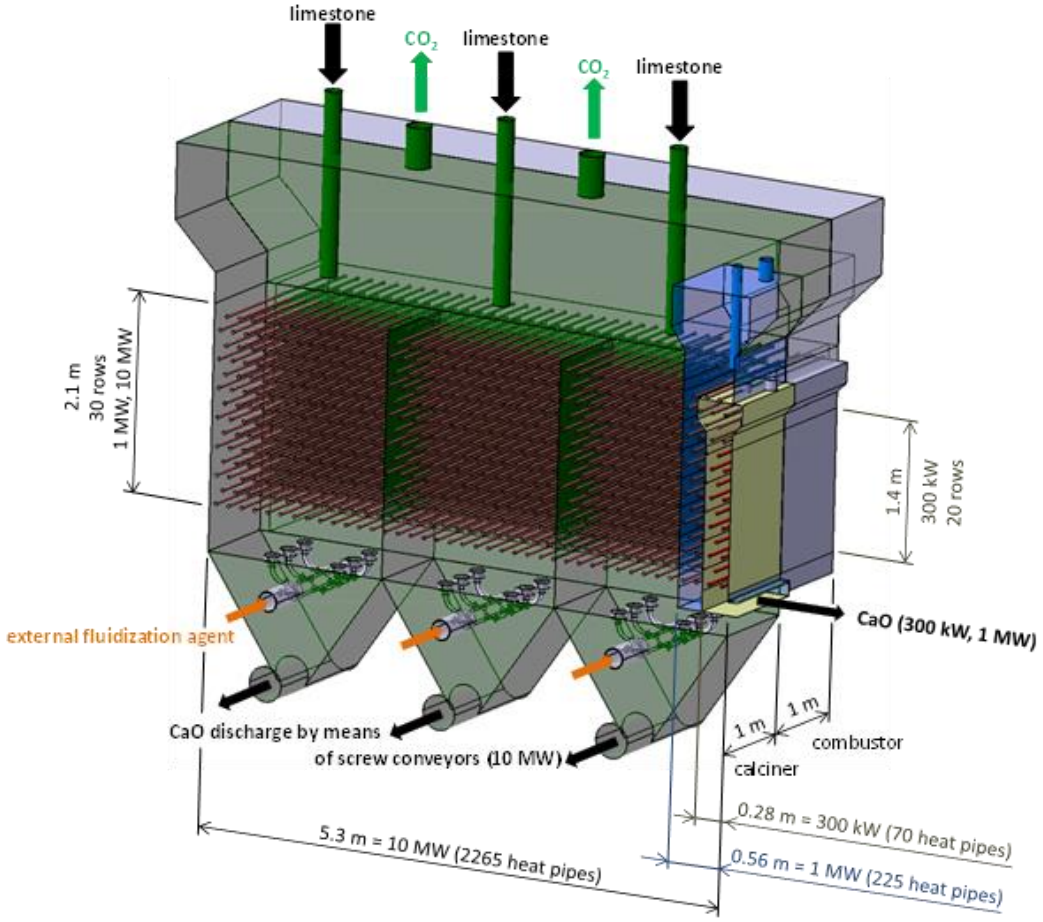
- Reduce CO_2 avoidance costs compared to state-of-the-art technologies
- Pilot testing in 300 kW_{th} plant under realistic industrial conditions (TRL 6)
- Design of demo plant in semi-industrial scale (TRL 7)



Consortium & Funding

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Thank you for your attention!

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