

Heidelberg Materials journey from Horizon Europe to EU Innovation Fund

Brussels | CCUS and the EU | Jan Theulen

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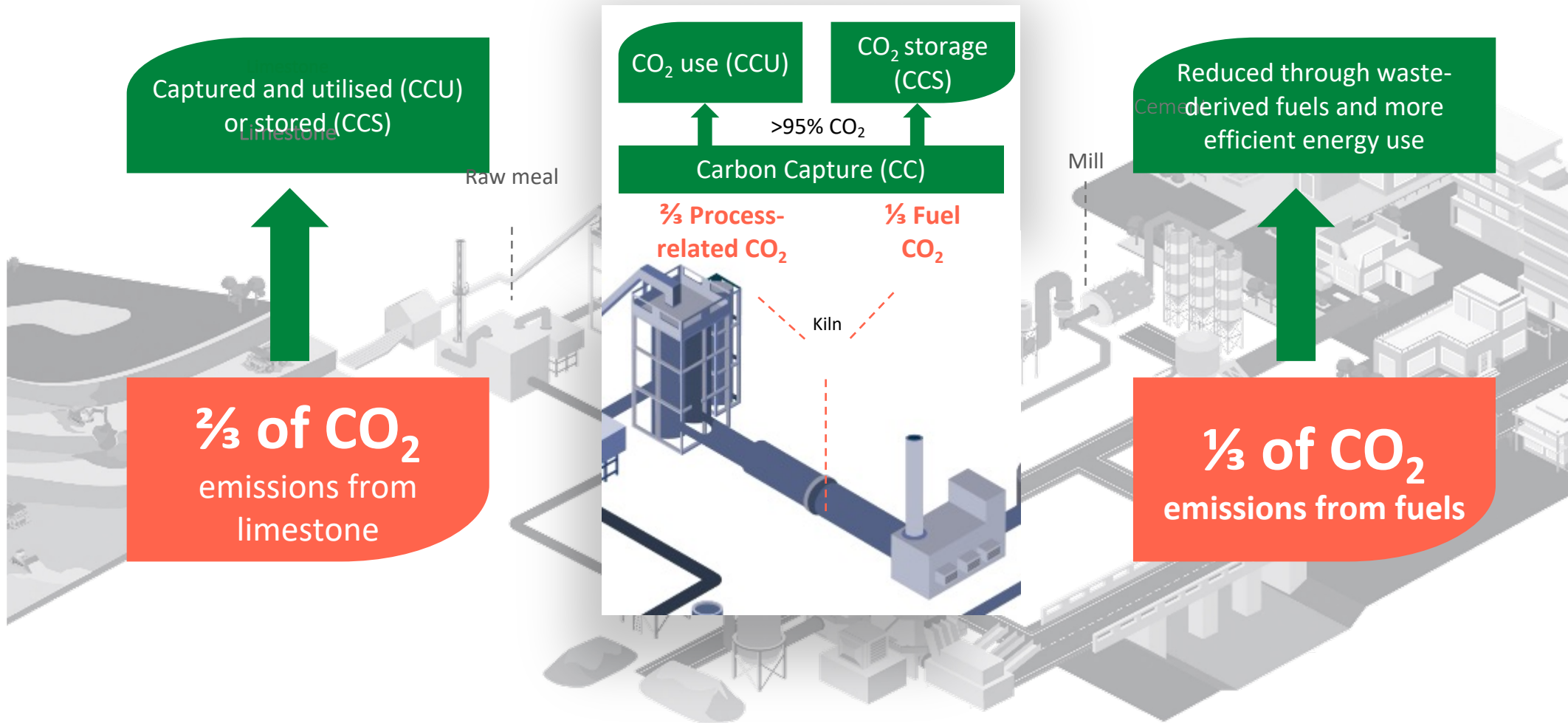


Concrete is essential for building a sustainable society

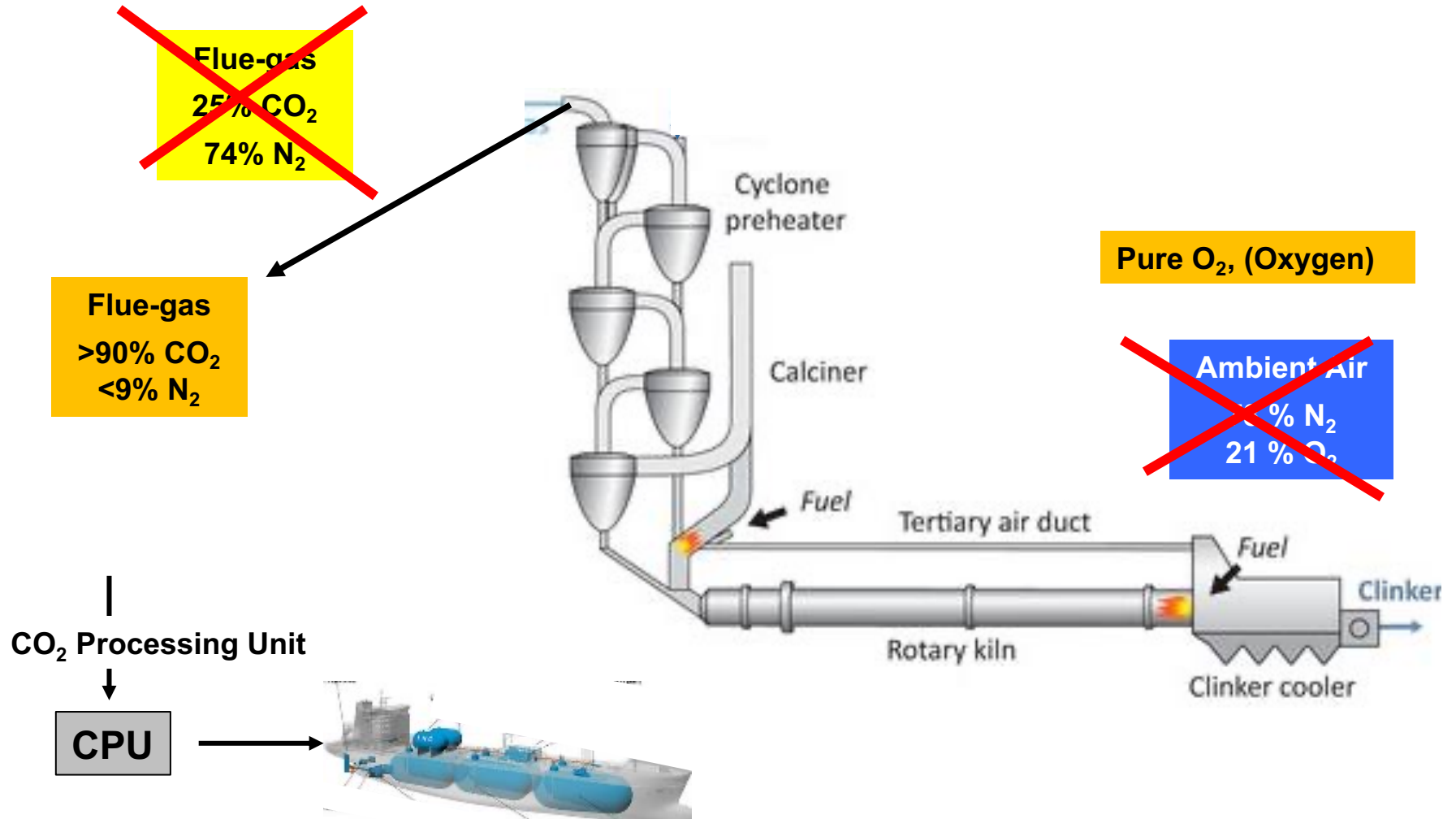


- Durable & multipurpose application
- Designable & flexible
- Produced & sold locally
- Sound absorbent
- Carbonating CO₂ during life-time
- 100% recyclable

Unavoidable process emissions require CCUS for deep decarbonization



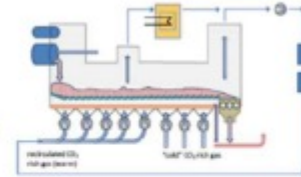
Oxyfuel is the central topic today of my presentation



ECRA – CEMCAP secured 9 mio € funding from the EU

Cooler Prototype: IKN, VDZ, HeidelbergCement

- design and operate an oxyfuel clinker cooler prototype on-site under realistic conditions at a HeidelbergCement plant. Design based on the layouts from ECRA's CCS project phase IV.A
- investigate the process reliability (cooling curve, sealing aspects) and the cement clinker quality



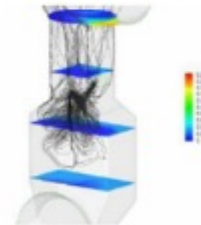
Burner Prototype: University of Stuttgart, A-Tec, VDZ, Sintef

- design, demonstrate and evaluate prototype burners and firing concepts under industrially relevant oxy-fuel conditions with coal and alternative fuels
- assess risks with oxy-combustion to evaluate the impact of an oxyfuel kiln and calciner firing concept on safety measures and required instrumentation.



Calciner Prototype: University of Stuttgart, A-Tec, VDZ, IKN, Italcementi

- status report on industrially relevant boundary conditions for different calciner designs and select experimental entrained flow oxyfuel calciner operating conditions.
- test entrained-flow calcination under oxyfuel conditions to assess the impact of oxyfuel process environments and fuel combustion on the raw mix calcination in a highly flexible electrically heated reactor



CO₂ separation @ calcining for 12 m€ EU-Horizon 2020

Consortium – Tier 1:



Consortium - Tier 2:

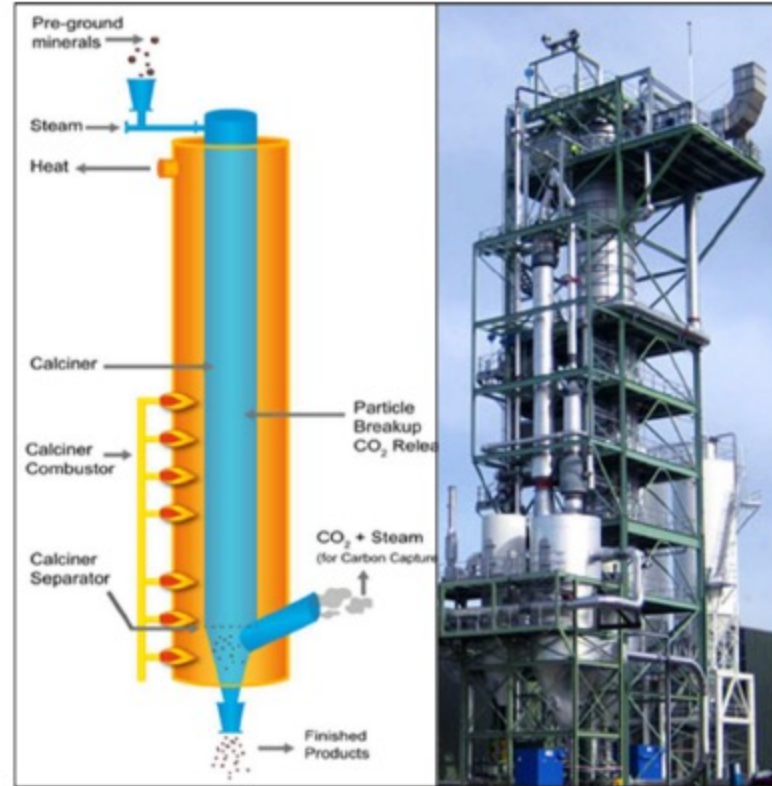


Indirect heating raw meal:

- Separate process CO₂
- Calix MgO proven process

10 tph demonstration plant, Lixhe-Belgium

- Cement & Lime applications

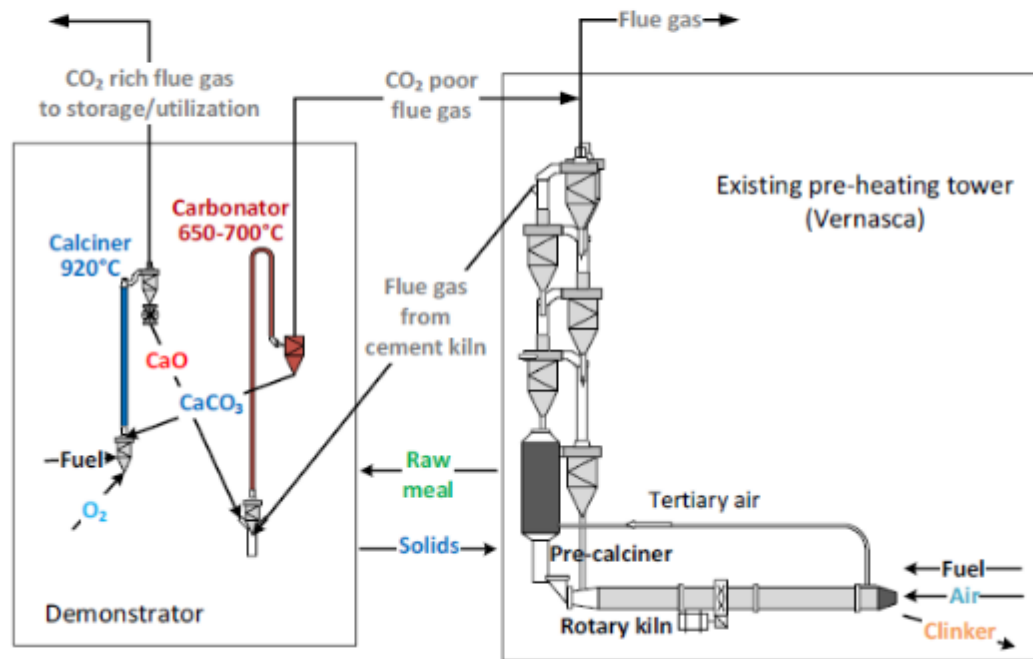


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Clean clinker production via calcium looping process

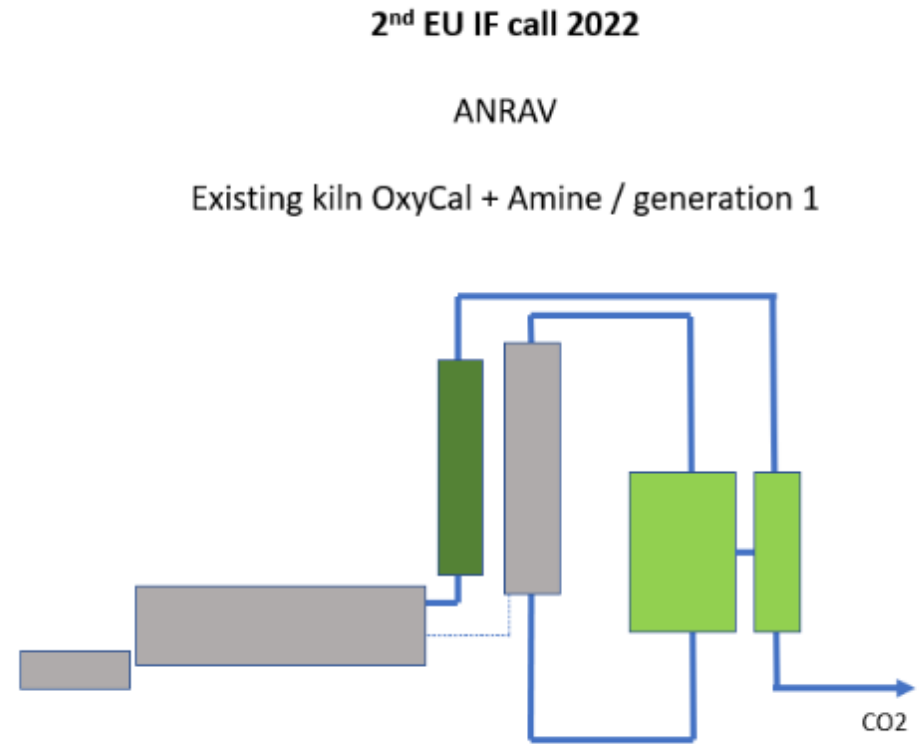
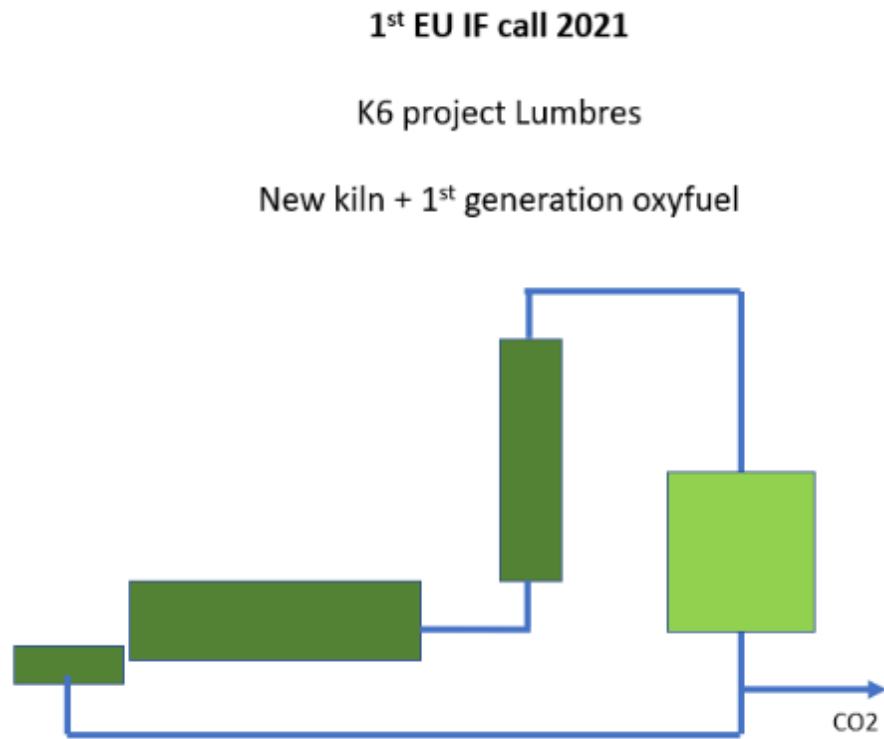
- CO_2 from kiln flue gases captured in the carbonator;
- The calciner of the CaL process is oxy-fired (in the full-scale plant the oxy-fired CaL calciner will act also as pre-calciner).



Integration of the Demonstrator within the existing cement plant (Vernasca)



ANRAV combines the learnings of CEMCAP, LEILAC and CLEANKER



People are important !

LinkedIn



HeidelbergCement

3 Jahre 3 Monate

- **Process Expert New Technologies - Decarbonation and Process Innovation**
Juli 2021–Heute · 1 Jahr 8 Monate
Heidelberg, Baden-Württemberg, Deutschland
Support in the testing and implementation of emerging CO2 capture technologies to achieve group sustainability goals. Technology expertise in oxyfuel, calcined clay, mineralization, electrification, solvent absorption, etc.
- **Engineer Industrial Tests and Implementation - Global Research & Development**
Dez. 2019–Juli 2021 · 1 Jahr 8 Monate
Leimen, Baden-Württemberg, Deutschland
- Planning and execution of industrial and semi-industrial trials for the development of new cementitious materials with low-CO2 footprint (calcined clays, carbonation of recycled concrete)



University of Stuttgart

5 Jahre 2 Monate

- **Research Scientist - Project leader**
Nov. 2014–Dez. 2019 · 5 Jahre 2 Monate
Stuttgart Area, Germany
Leader of international research projects in the area of emission reduction from combustion





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