The cement industry’s approach to carbon capture

ECRA’s approach from basic research towards an industrial implementation of carbon capture

- All low-carbon roadmaps require a significant reduction of CO₂, also in the cement sector.
- Correspondingly and according to CEMBUREAU approx. 60% of cement plants in the EU should be equipped with CCS technology by 2050.
- Based on the need to develop this breakthrough technology, ECRA is investigating its technical and economic feasibility in its CCS research project.
- A focus is also being placed on CO₂ reuse in cooperation with the University of Mons.
- In the current phase IV of the project an oxyfuel pilot plant is being prepared, taking economic and technical issues into account.

Post-Combustion and Oxyfuel Technology as potential capture solutions for the cement industry

Post-Combustion: Tail-end separation of CO₂ from flue gas by e.g. chemical absorption, adsorption, membranes or Calcium Looping.
- A very energy-intensive technology.
- Important projects: Norcem’s Brevik project (pilot testing), CEMCAP (prototype testing).

Oxyfuel Technology: Combustion with pure oxygen instead of air in combination with flue gas recirculation to increase the CO₂ concentration.
- Requires process and design adaptations.
- Important projects: ECRA (complete oxyfuel), LafargeHolcim / AirLiquide / FLSmidth (pilot testing of partial oxyfuel), CEMCAP (prototype testing).

Envisaged next steps towards an industrial-scale oxyfuel cement kiln

- Demonstration of technical and economic feasibility in an industrial surrounding.
- Designs: Brownfield (new installation using the infrastructure of existing line) or blackfield (rebuiting existing line).
- Size: Industrial-scale > 500 t/d
- Two potential locations (blackfield) have been selected.
- Projects costs estimated at up to 80 M €.
- Project includes engineering/construction, training and operation/scientific evaluation.
- Project requires significant funding which might only be available in 2019/20.

Potential sites for the oxyfuel demo project

Celleferro Plant:
- HeidelbergCement Group (Italcementi Plant)
- Plant located in Italy, close to Rome
- Kiln not used for daily production
- Pet coke as fuel; no alternative fuels
- Kiln currently on stand-by
- Lowest CAPEX / medium OPEX

Retznei Plant:
- LafargeHolcim Group
- Plant located in the south-east of Austria
- 100 % alternative fuels goal
- Currently operated at maximum production
- Low CAPEX / high OPEX