european cement research academy

Deployment of CO_2 Capture in the Cement Industry

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CCS-conference

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Concrete – The Liquid Stone

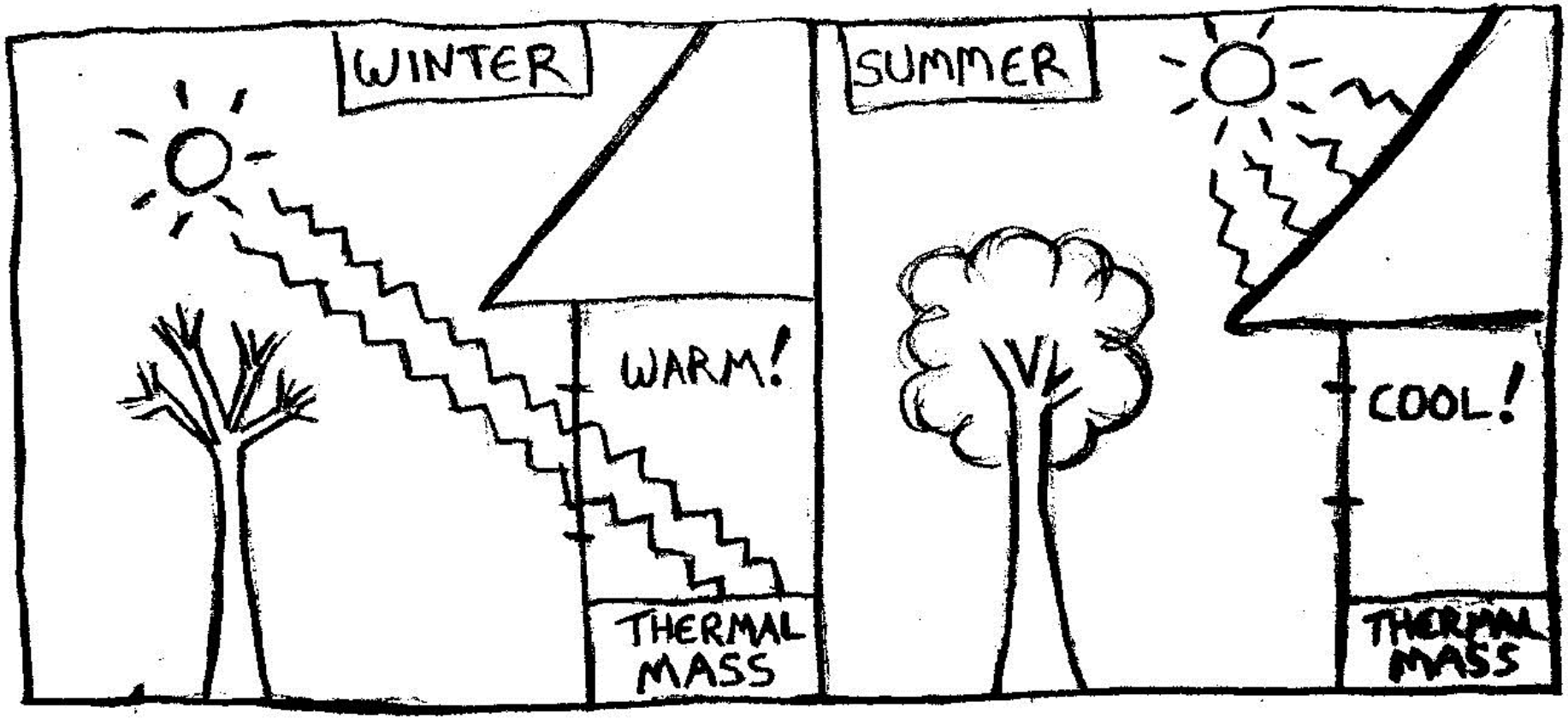
- A unique product with many innovative applications!

Concrete – The Liquid Stone

- Safety:
  - Concrete is a proven fire resistant product! It does not burn or melt and retains its structural stability at high temperatures
  - Concrete allows for resiliant homes and buildings!

Concrete – The Liquid Stone

- High Thermal Mass – Indoor temperature remains stable!



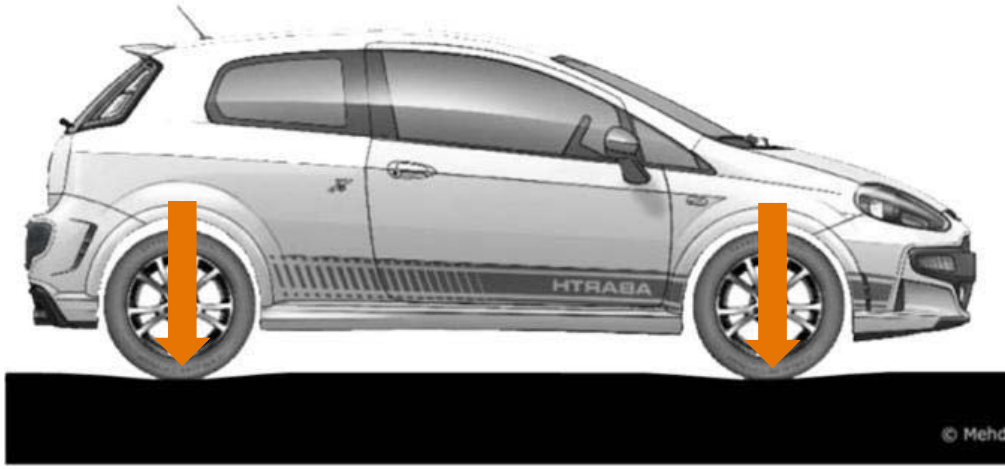
Concrete – The Liquid Stone

- Infrastructure – Energy efficient roads

Pavement / Vehicle Interaction

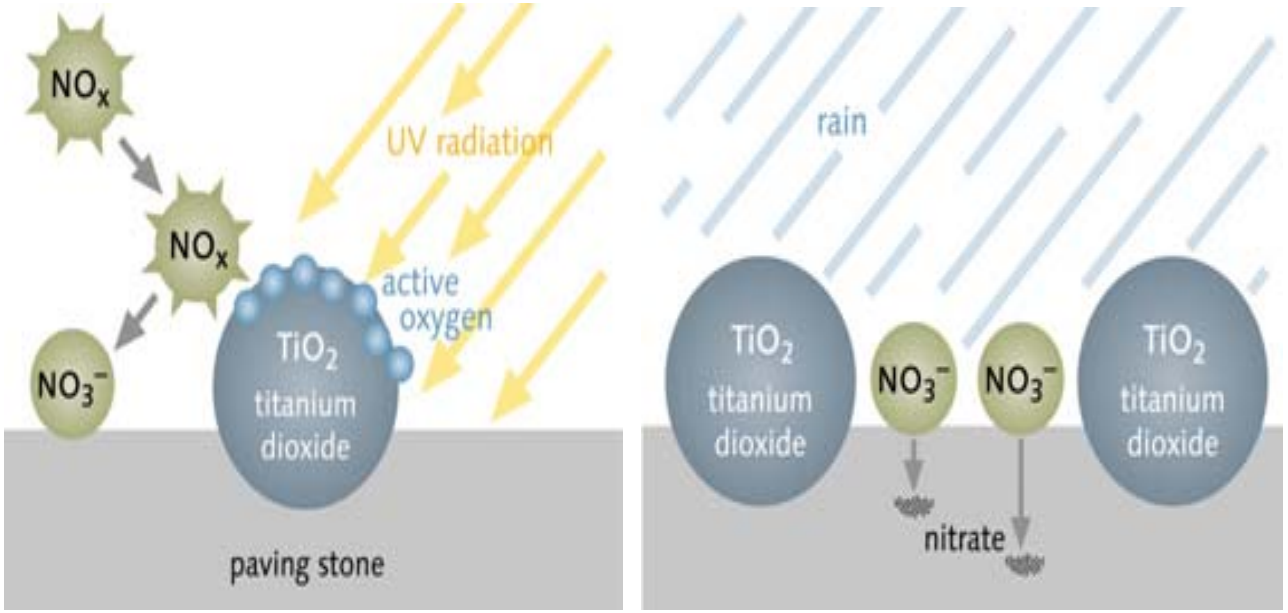
Stiffness

Stiffness and Deflection
Rigid vs Flexible



Concrete – The Liquid Stone

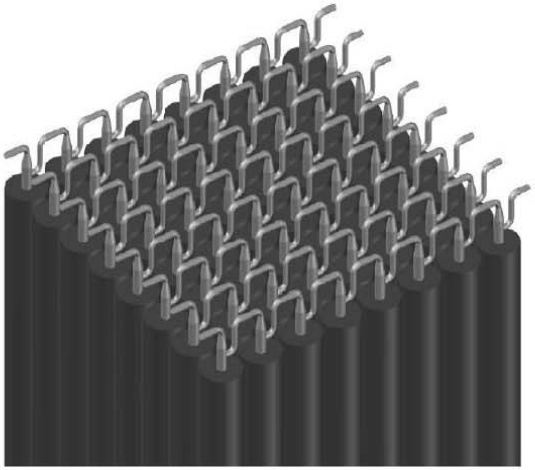
- Air cleaning – TioCem® reduces Nox in cities!



Concrete – The Liquid Stone

- Green Energy Generation
  - Solar: NEST - New Energy Storage Technology
  - Wind mills

Parallel – sequential piping arrangement

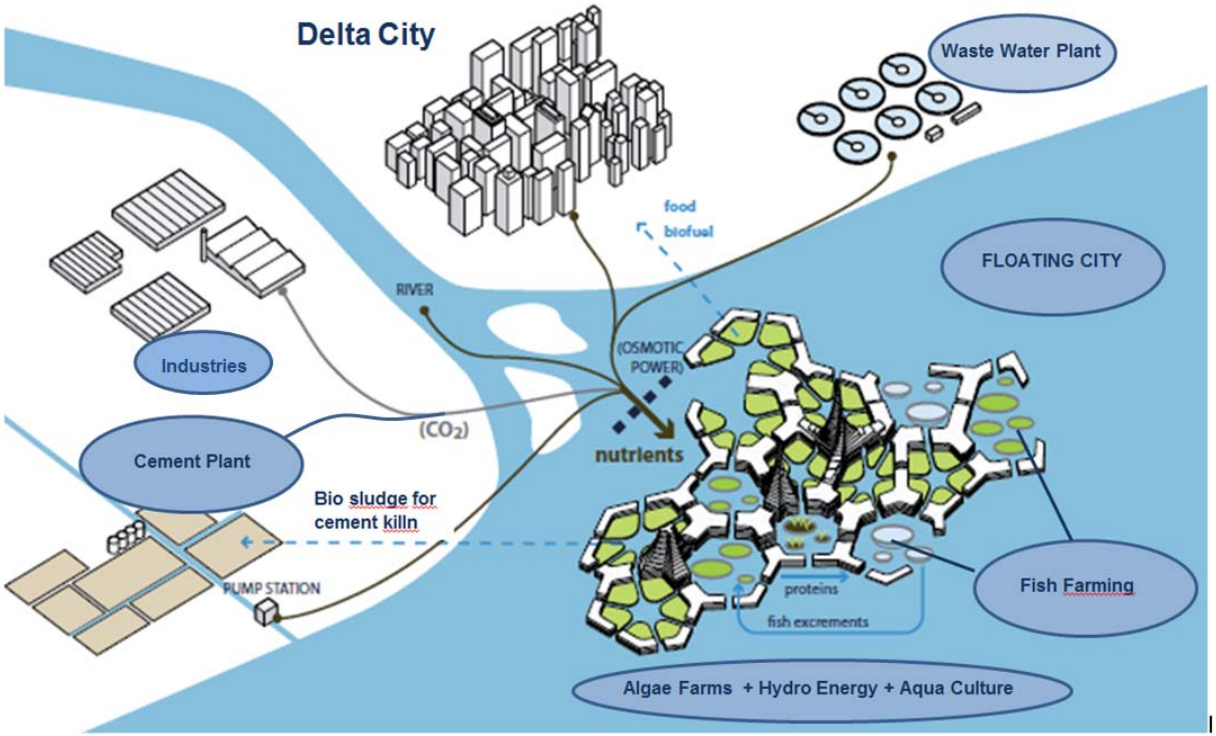


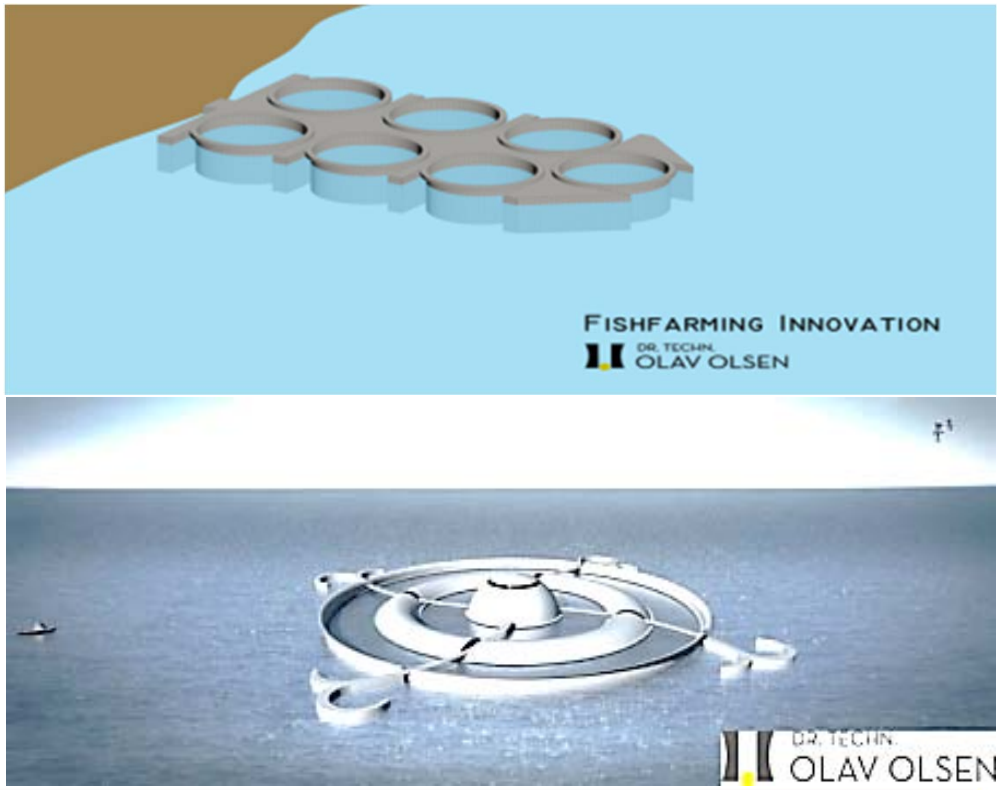
Example: 1000 MWh_t NEST storage*

Concrete – The Liquid Stone

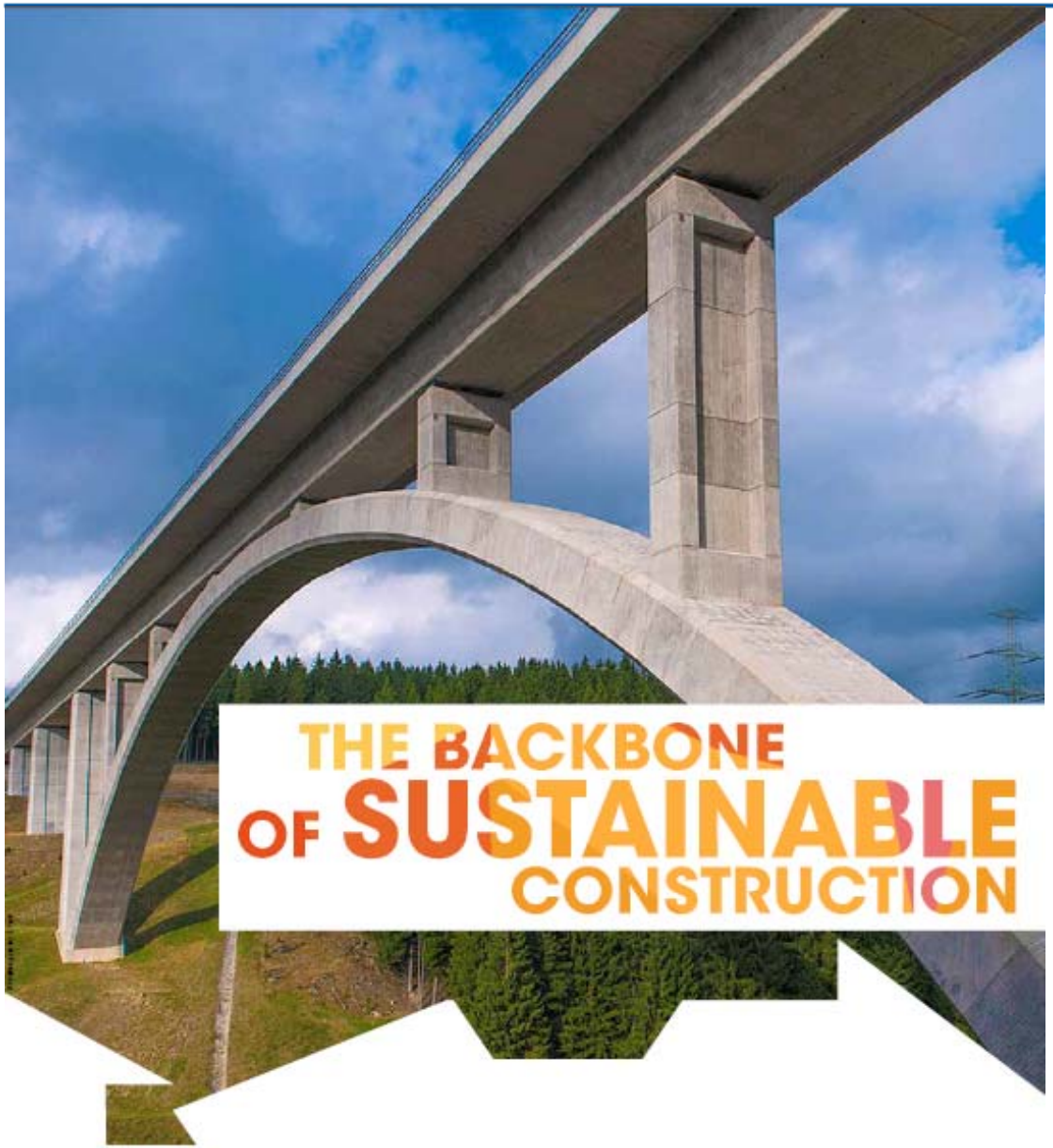
Overseas Infrastructure

- Fish Farming
- Water Houses





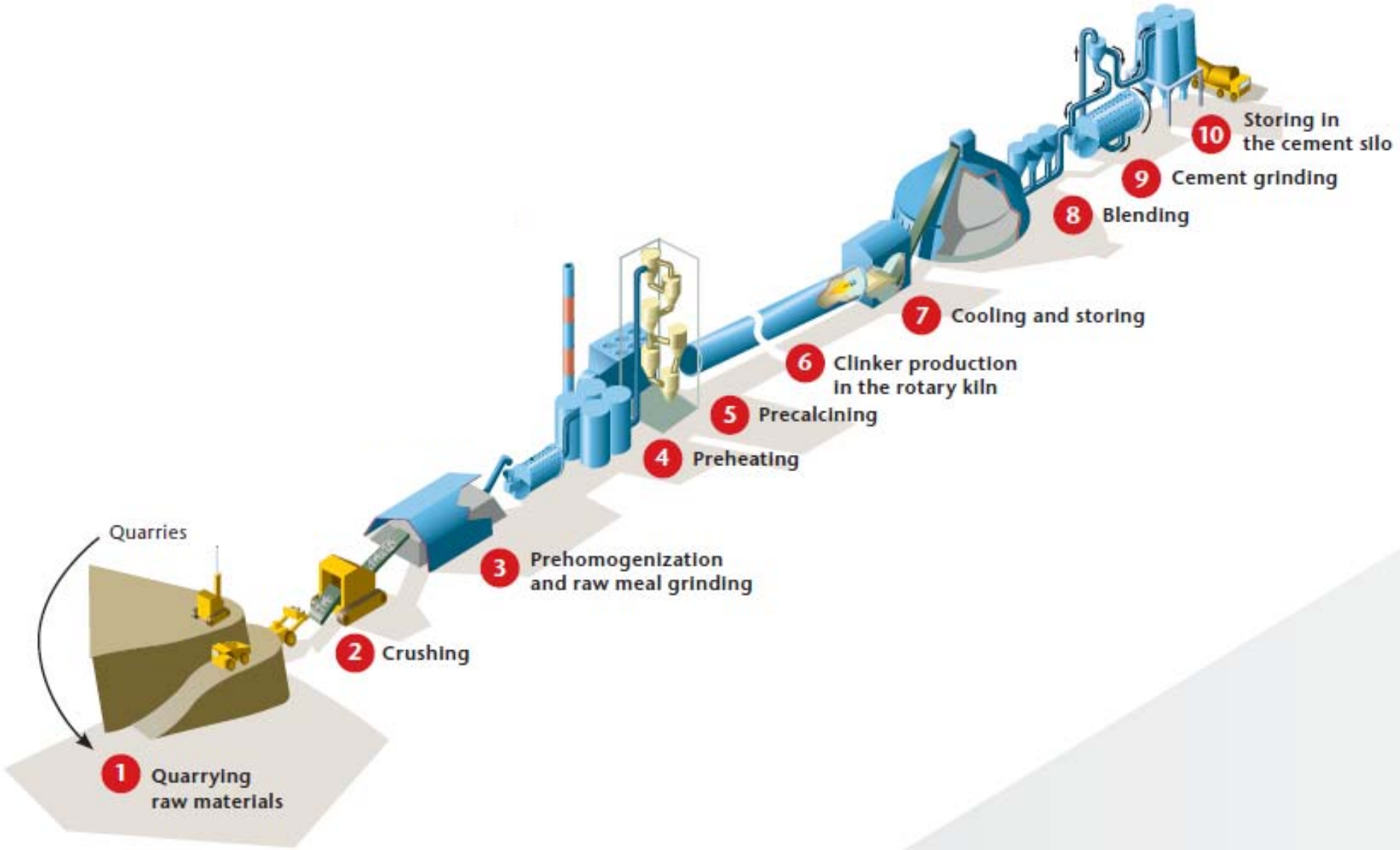
Concrete – backbone of sustainability



THE CONCRETE INITIATIVE

solutions for Europe's future

Cement manufacture at a glance



CEMBUREAU, ECRA and CSI

CEMBUREAU

- Representative organisation of the cement industry in Europe

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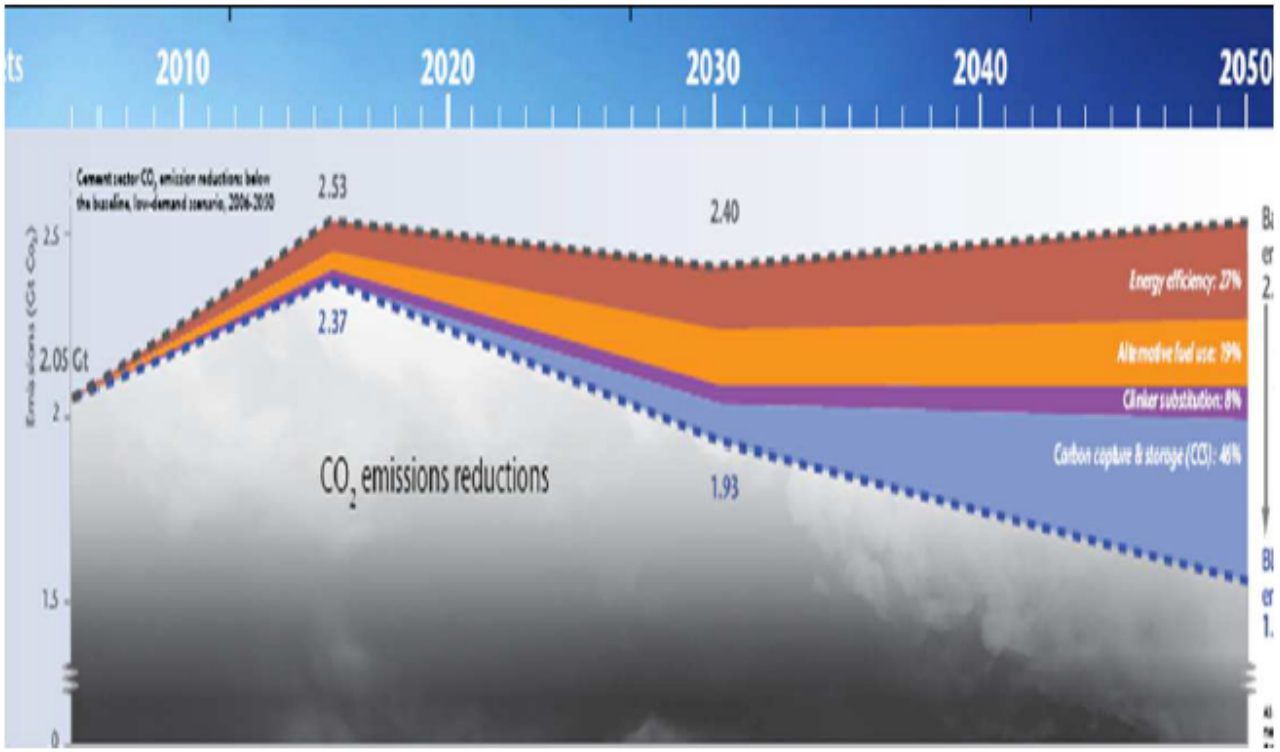
- Platform of the European cement industry for research activities
- Network of universities, research institutes, cement companies and equipment suppliers

Cement Sustainability Initiative

- Global effort by 24 major cement producers

Cement Sustainability Initiative - roadmap

Cement industry roadmap on CO_2 emissions

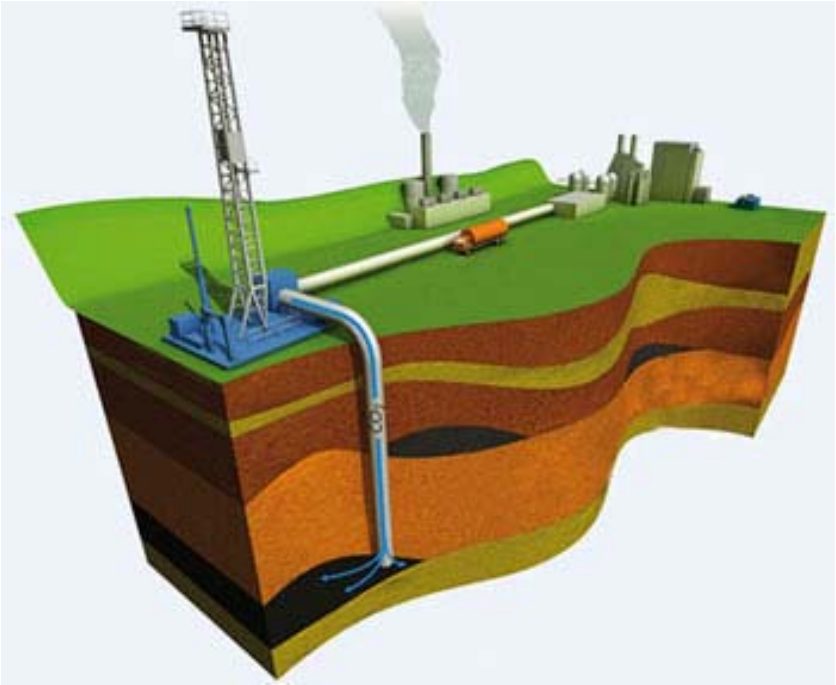


4 levers to reduce CO_2

- Energy efficiency 27%
- Alternative fuels (biomass) 19%
- Clinker substitution 9%
- **Carbon Capture & S/U 46%**

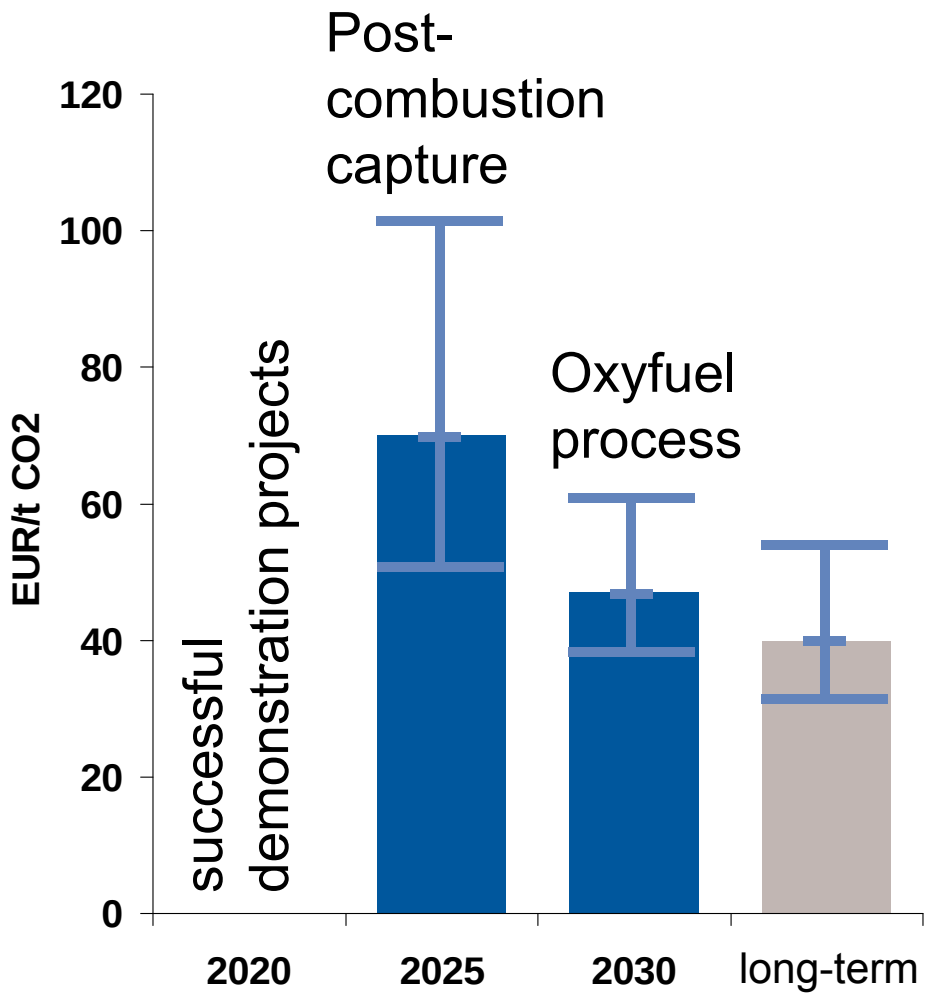
Carbon capture as a future option?

- Carbon capture seen as a breakthrough technology (e.g. in power sector)
- Long-term or bridging technology?
- Storage or reuse?
- High capture rate (also for process CO_2)

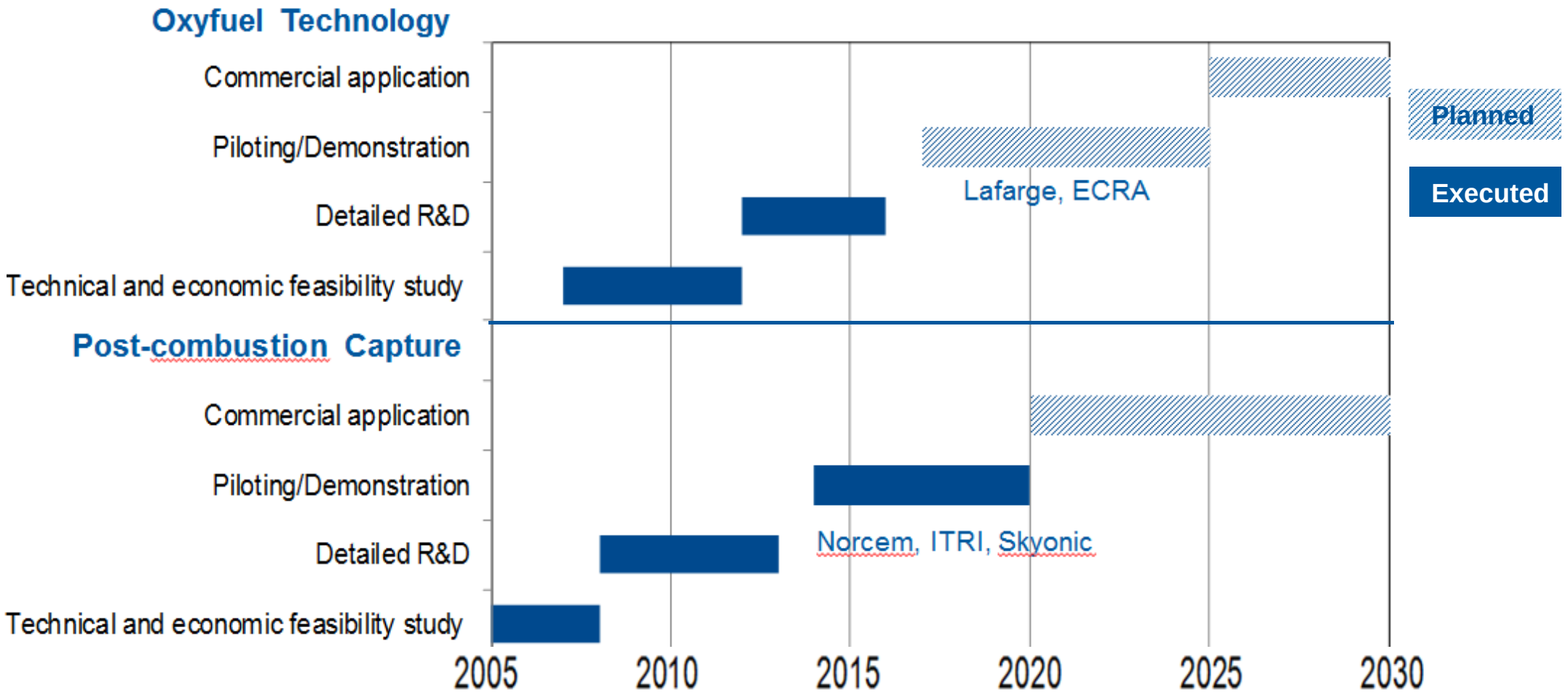


Carbon capture: Expensive and energy-intensive

- Cost per mitigated tonne of CO_2 (incl. transport and storage)
  - 50−100 €/t Post-combustion capt.
  - 40−60 €/t Oxyfuel process
- Serious increase in energy consumption
- Production cost is increased by factor 1.5 to 3



Technology readiness in the cement industry

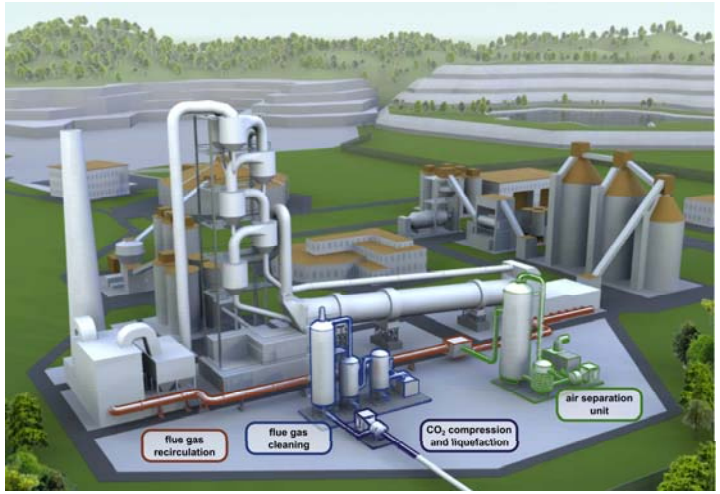


- Post-combustion capture: Short-term method
- Oxyfuel technology: Long-term solution

ECRA‘s CCS activities

- Climate protection and CO_2 reduction are important challenges for the cement industry
- 2007: ECRA CCS project investigating technical and economical feasibility
- 2014: First concept for an oxyfuel industrial kiln
- Today: Evaluation of potential plants and funding possibilities
- 2018 -2020: Industrial testing phase (with suitable funding)

source: willmarlakesarea2040.com



ECRA Chair at the University of Mons

- Since 2013: **Academic chair entitled "CO_2 to Energy: Carbon Capture in Cement Production and its Re-use".**
- UMONS academic background: CCS, absorption/adsorption techniques in industrial applications
- Chair supports research activities by financing fellowships for postdoctoral researchers or PhD students.
- Guidance by scientific committee with representatives from ECRA and UMONS

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Conclusion

- CO_2 reduction potentials of today's available technologies are limited
- Carbon capture and storage/utilization technologies are seen as a key technology or at least as bridging to reduce CO_2 emissions to achieve climate targets
- Currently, the legal and economic conditions would impair the competiveness of cement production
- Industrial testing: an essential step to fulfill the predicted target
- Sufficient funding essential as an accelerator of technology development

source: papundis worldpress

Thank you for your attention!

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