Co-Creation Lab Housing and Construction

Proposal "Transforming the construction sector"
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Transition towards sustainable concrete

Vision: Sustainable concrete (EPFL/ETHZ 2018)

Reduction of CO$_2$ emissions depends on
• Investment in end-of-pipe technologies (CCS/CCU)
  • Reduction of clinker production by
    • Collaboration for material efficiency and substitution along the value chain
    • Reduced demand for new construction
Example: Concrete versus Wood

Optimisation traditionally suggested by cement/concrete industries:

- Clinker-reduced cement
- Minimizing Transports in the supply chain
- Considering carbon uptake

![Bar chart comparing environmental impacts of Holz- and Stahlbetonvariante for Graue Energie (MWh Oil-eq.), Treibhaus-potenzial (CO₂-eq.), and ökologische Knappheit (UBP).]
Example: Concrete versus Wood

Optimisation in structural engineering is much more effective:

- Amount of concrete can be reduced by 20%
- Amount of steel can be reduced by 30%

Next step: Do we need a new bridge?
Implications – Decoupling
Implications – Procurement

Who decides on...

- Strategy: Do we need a new building?
- Project design: Type of structure (Wood/Concrete, Frame/Arc)
- Project optimisation
- Construction works
Implications – Policies

• Economic incentives: rising CO$_2$-tax, or ETS with decreasing free allocation
• Public procurement: sustainability criteria or even conditions
• Development of buildings and infrastructure: encourage refurbishment and transformation, discourage new build
• New build: impose budget in terms of sustainability points in addition to financial budget
• ...
Develop a common understanding

Design the transition arena as a process for stakeholder involvement

- Develop a shared agenda
- Research projects
- Feasibility studies
- Procurement
- PR strategies
- Business models
- Initiate transition experiments
- Product innovations
- Built structures / buildings

- Cement
- Concrete
- Construction
- Housing