

# SD CHALLENGES IN CEMENT & CONCRETE



SD Days EPFL

6.03.2026

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# THE CHALLENGES ARE KNOWN

## CLIMATE CHANGE & RESOURCES SCARCITY

### CLIMATE CHANGE

**REDUCTION OF  
CO<sub>2</sub>-EMISSIONS BY 50%  
TILL 2030**

**NET-ZERO TILL 2050**

#### CEMENT

5% OF CO<sub>2</sub>-EMISSIONS IN  
SWITZERLAND

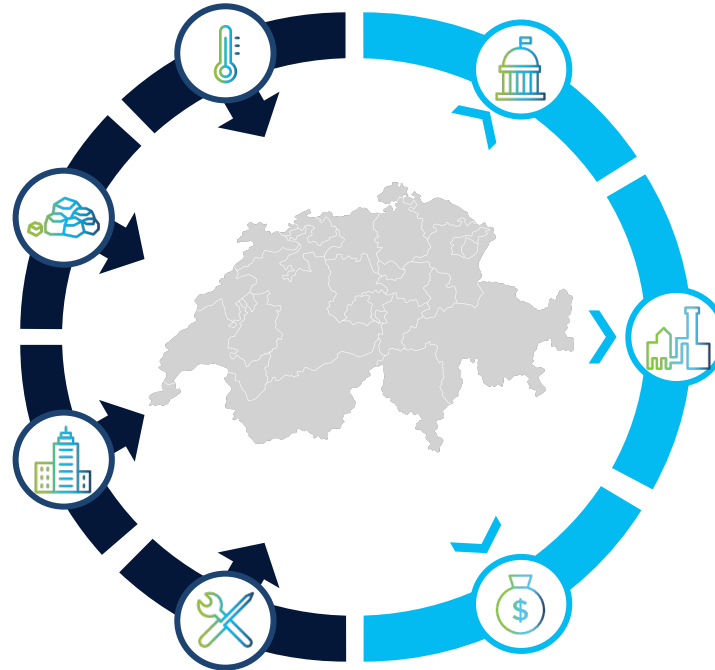
### RESOURCES SCARCITY

**RESOURCES NEED OF SWISS  
CONSTRUCTION INDUSTRY**  
70 Mio t/year

**CONSTRUCTION AND  
DE-CONSTRUCTION WASTE**  
74 Mio t/year

**OVERSHOOT DAY  
SWITZERLAND**  
May 7, 2025

**CIRCULARITY RATIO  
SWITZERLAND**  
6.9%



# VALUE CHAIN OF CEMENT & CONCRETE: IDEAL FOR CIRCULAR ECONOMY!



~9 Mio t/year  
Holcim  
Construction  
Materials  
sold in the market



~4.8 Mio t/year  
Waste  
recovered by Holcim



**RECYCLE**

# >80% DECONSTRUCTION CONCRETE IN SWITZERLAND IS RECOVERED



**NATURAL  
AGGREGATES**



**Recycling-AGGREGATES**

# SMART CRUSHER

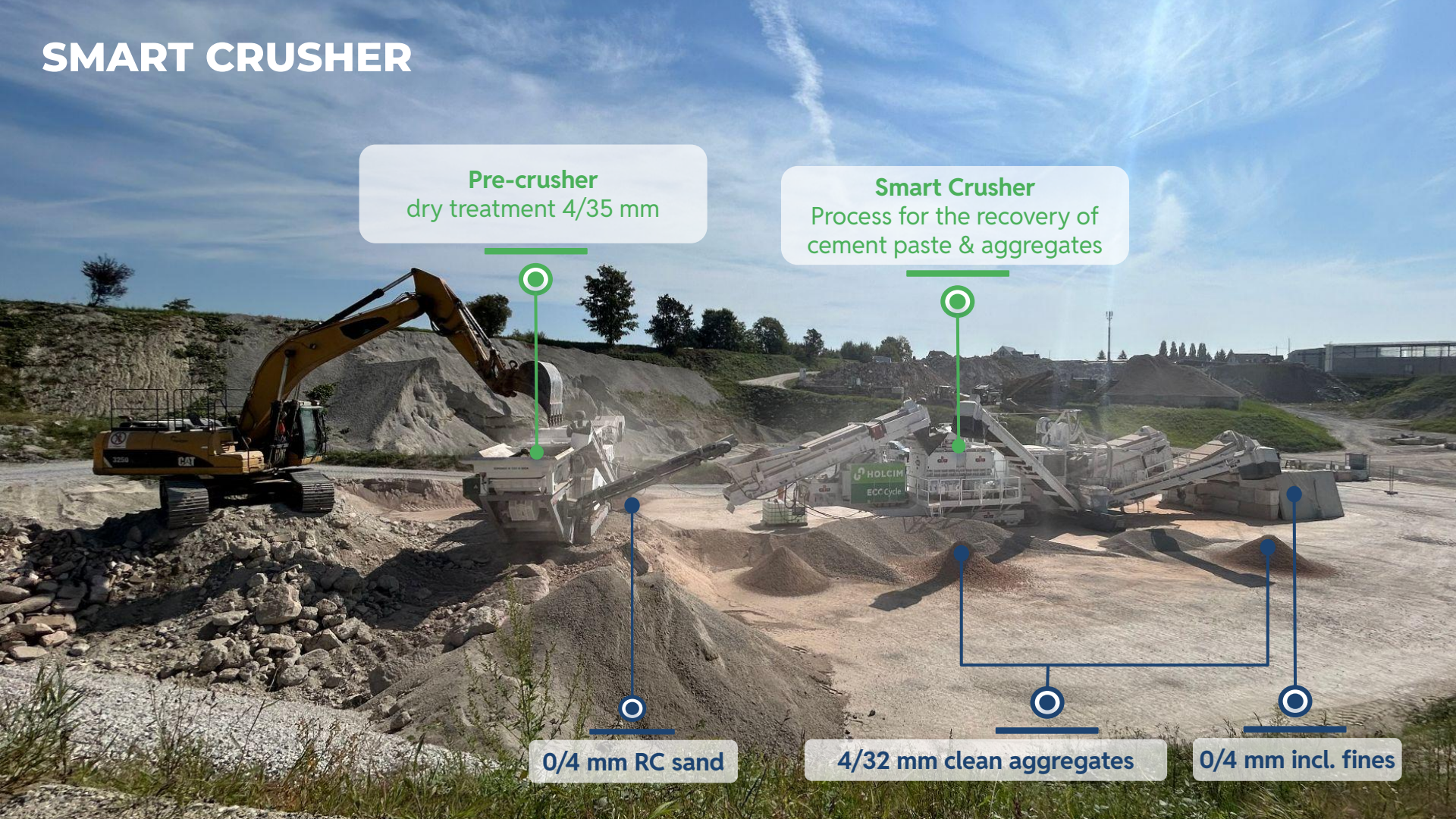
**Pre-crusher**  
dry treatment 4/35 mm

**Smart Crusher**  
Process for the recovery of  
cement paste & aggregates

0/4 mm RC sand

4/32 mm clean aggregates

0/4 mm incl. fines



**cement to cement**

0 - 0.150

0 - 4

8 - 16

4 - 8

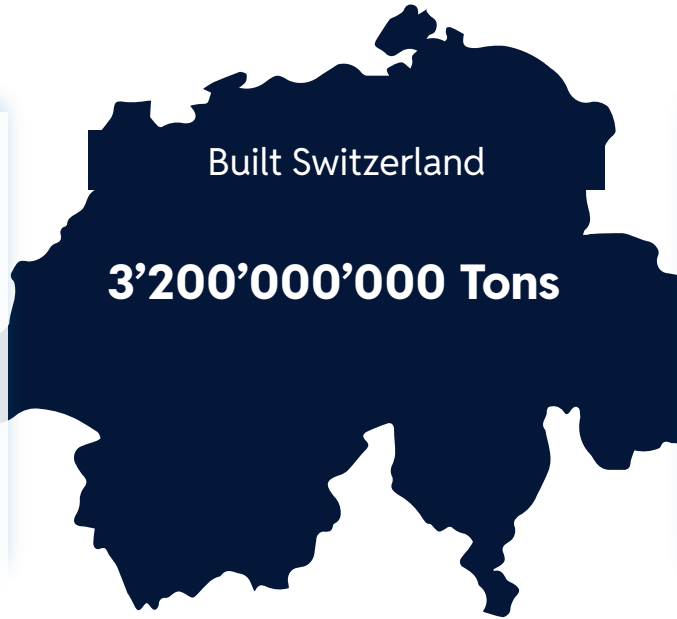
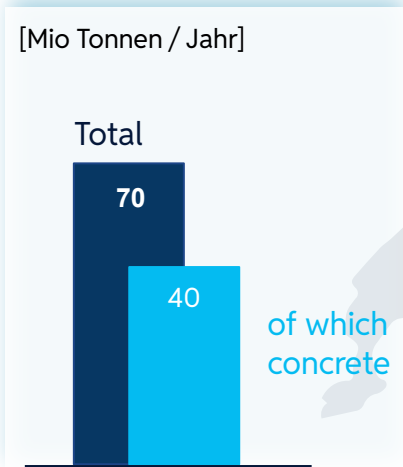
**aggregates to aggregates**

**up to ~400 kt/year CO<sub>2</sub> savings**

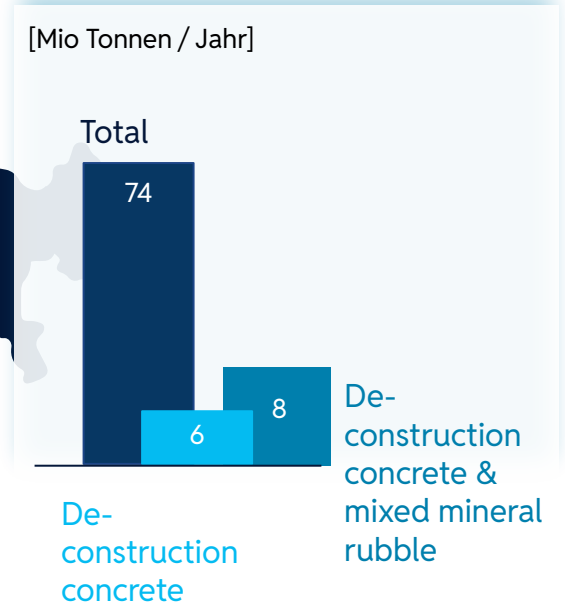
16 - 32

# REDUCE & REUSE & RECYCLE

## Need for new construction materials



## Construction & demolition waste



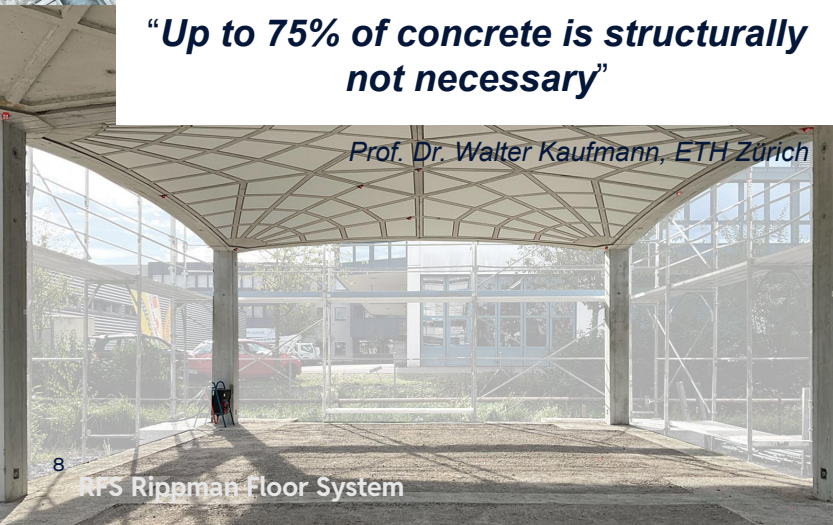
Quelle: Empa MatCH (2016), BAFU (2019)

# SMART DESIGN MEETS SMART MATERIALS



*“Up to 75% of concrete is structurally not necessary”*

*Prof. Dr. Walter Kaufmann, ETH Zürich*



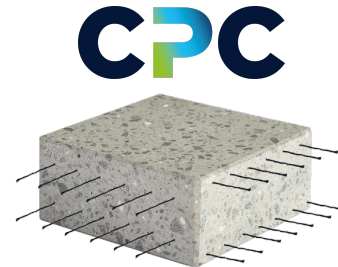
# CPC-EXAMPLE: INNOVATIONSLABOR GRÜZE

WINNER OF EDIE AWARDS 2025 “GREEN BUILDING / INFRASTRUCTURE PROJECT OF THE YEAR”



CPC-technology (Carbon Prestressed Concrete) realizes:

- reduction of resources need by ~80 %
- Reduction of CO<sub>2</sub>-footprint by factor 2-4
- Construction elements which can be easily reused



# CPC, SMART CONCRETE FOR CIRCULAR ECONOMY

MATERIAL & CO<sub>2</sub> EFFICIENT, MODULAR, RE-USABLE, DURABLE

## Structure of CPC Floor System



## Global Warming Potential of Flooring Systems



CPC flooring system shows lowest EPD CO<sub>2</sub> per m<sup>2</sup> and lowest material usage (load-bearing structure: -80% mass vs reinforced concrete, -50% vs TCC; whole system: -60% vs reinforced concrete, -35% vs TCC).

\* GWP in kg CO<sub>2</sub> eq/m<sup>2</sup>

# WHAT DRIVES CIRCULAR ECONOMY?

Material purity  
Separability



Economic viability



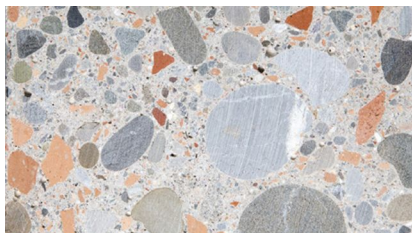
Free of contamination  
and harmful substances



Recycling-  
infrastructure



Technical re-usability



Regulatory framework

**sia**

# CONCRETE, THE CIRCULAR ECONOMY CHAMPION!

Material purity  
Separability



Economic viability



Free of contamination  
and harmful substances

Decarbonization



on transformation path

Recycling-  
infrastructure



Technical re-usability



Regulatory framework



# INNOVATION DRIVES DECARBONIZATION OF CEMENT

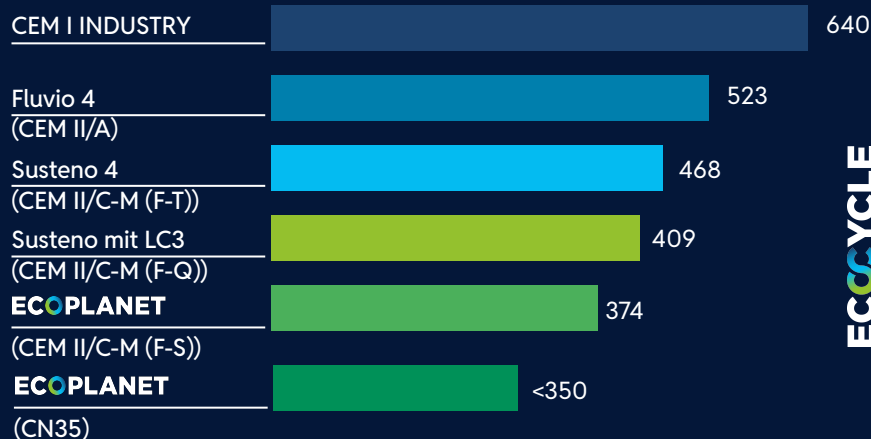
## NEW SCM: FROM RECYCLING COMPONENTS & CALCINED CLAY TO SYNMIC

### ECOPlanet with low clinker factor

Project Quai Vernets, Geneva  
Holcim ECOPlanet  
CF < 60%



### Global Warming Potential Schweizer Zemente\*



The next commercial cement will go to CF 35% and contain first elements of synMIC and activated CDM.

ECOCYCLE

# Concrete, the foundation for a 100% circular construction industry

ECOCYCLE

DUCTAL

ECOPACT

ECOPLANET

CPC

RFS

**Build new from old.**

Complete circularity through  
Recycling & Repair & Re-use

**Build more with less.**

Needs-based use of  
resources and materials.



**TOGETHER FOR SUSTAINABLE CONSTRUCTION**

**THANK YOU!**