What – capture the CO_2? (and store it under ground)

Concrete day | Helsinki | CCS | Vetle Houg

25.01.2024

Heidelberg Materials

Concrete is the foundation of our society

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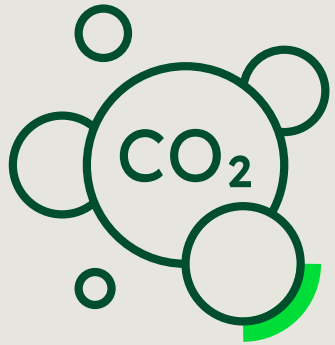
We are aware of our footprint – and we will lower it!



~7 % of global CO_2 emissions from cement and concrete

(In Norway, ca 3 % of CO_2 emissions)

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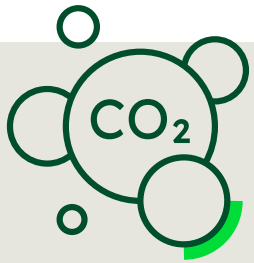


Can we make concrete a carbon neutral material?

Concrete

In our attempt to tame the nature we use the most destructive material on Earth

Our main levers to reduce emissions

Alternative fuels

Alternative raw materials

Carbon capture

Our bold project: Brevik CCS – the world's first in the cement industry!

When all traditional levers are fully utilized, what's next?
Capturing CO_2!

Demonstrate that **it is possible to decarbonize** a hard to abate sector

400 kt

CO_2 capture per year

A long journey with many steps

>7500 hours testing with Aker's MTU

2005 Full scale desk study

2011 Pre-engineering

2013 Kick off TCB

2014 Technology testing

2016 Feasibility study

2016 Concept study

2018 FEED study

2020 Longship launched

2021 Start of construction

2025 Operational

Attention

Our 2030 commitment:

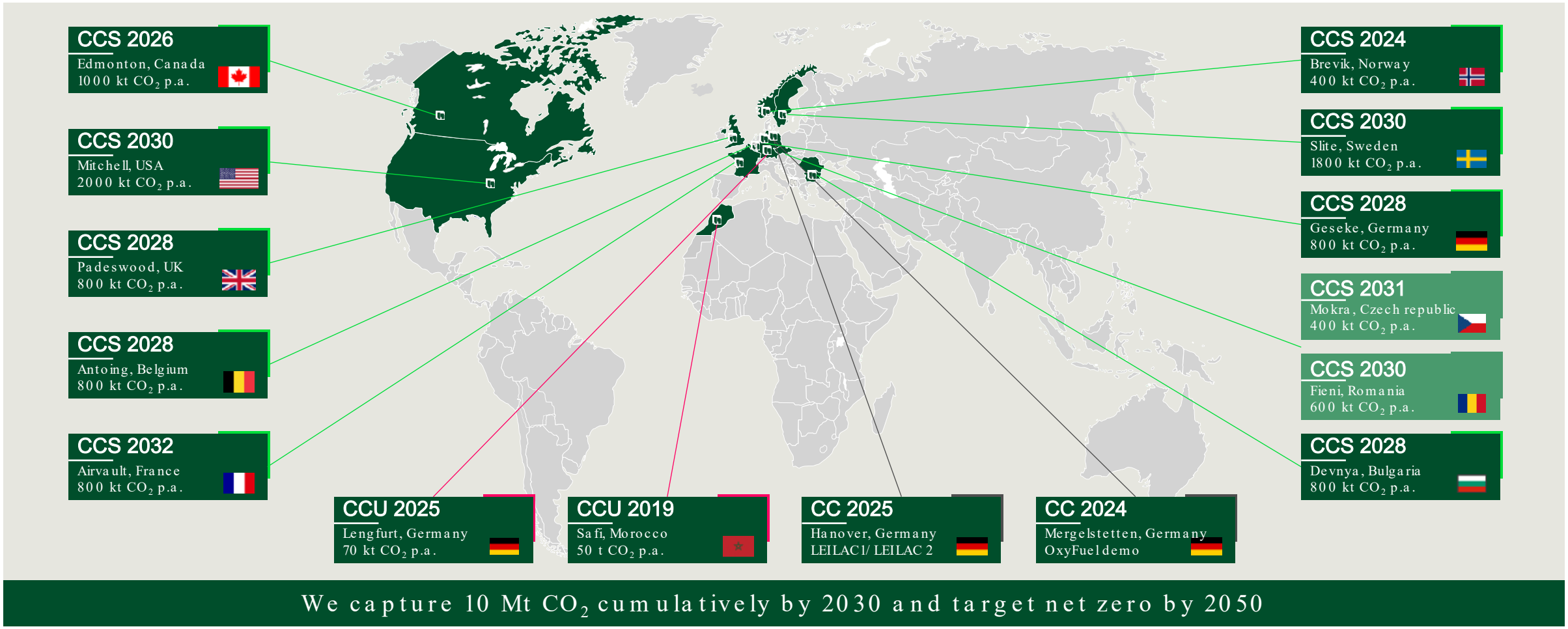
Capture

10 mil. tonnes

of CO_2 cumulatively through our CCUS projects

We drive the decarbonisation of our sector and provide low-carbon products

Driving CCUS with extensive and most advanced project portfolio in the sector



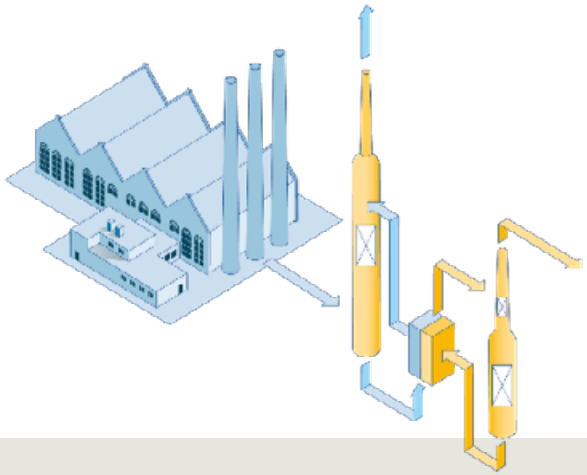
We capture 10 Mt CO_2 cumulatively by 2030 and target net zero by 2050

The Longship project: Create a CO_2 value chain

1. Carbon capture
    - Brevik cement plant
    - Hafslund Celsio incineration plant
    - Yara Sluiskil, fertilizer*
    - Ørsted bio-energy*
2. Transport to Øygarden
3. Pipeline to storage in North Sea

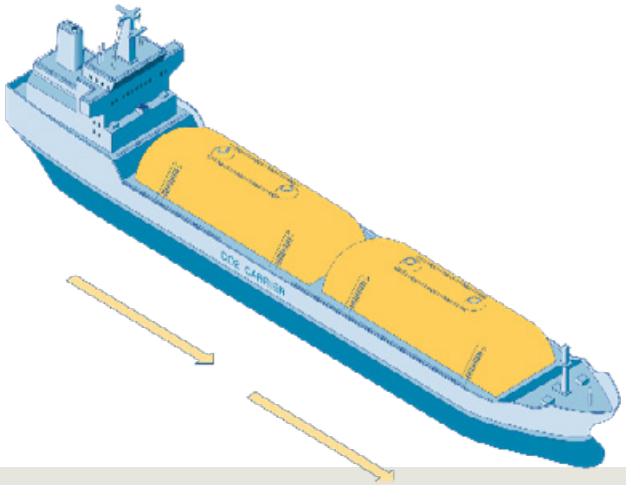
*Not part of Longship, but will deliver to Northern Lights

Carbon capture, transport and storage – not that new as you think!



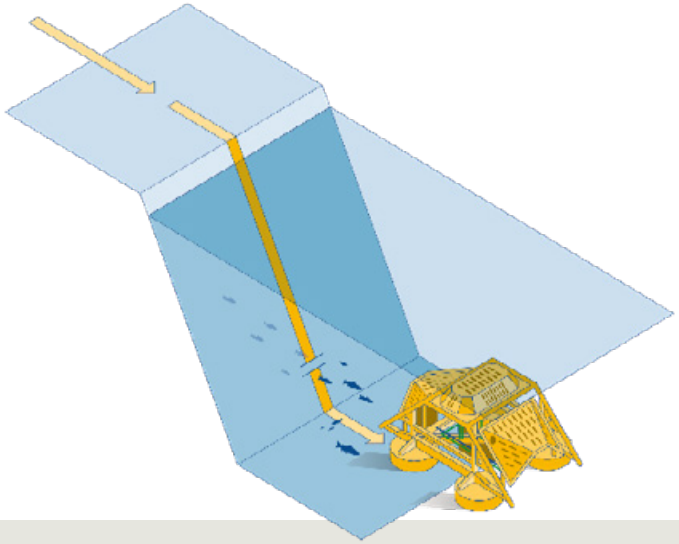
Capture

- Solvents used for CO_2 capture since 1930s
- Multiple units in operation
- Large technology development effort to lower cost



Transport

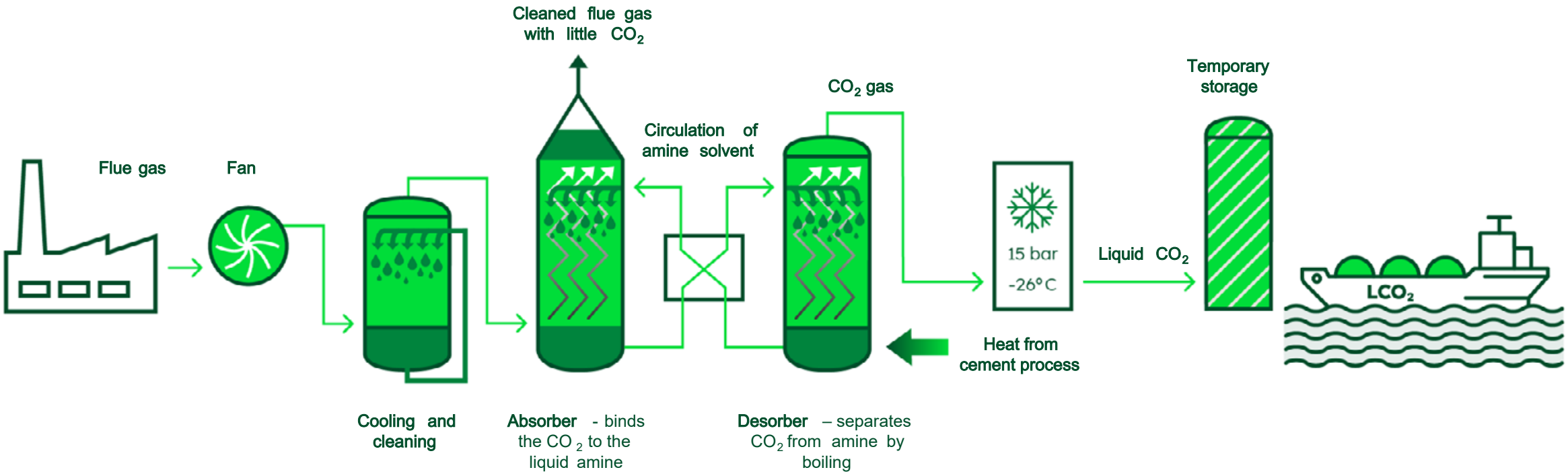
- CO_2 pipelines in operation since 1970 s
- Around 2,600 km of existing pipelines
- Ship transport of CO_2 based on modified LPG technology



Storage

- Injection for CO_2 for enhanced oil recovery since the 1970 s
- CO_2 stored on the NCS since 1996 (Sleipner)

How we capture CO2 – with a liquid amine process



June 2023. Preparation work before heavy-lift campaign.

August 2023: Installation of absorber

Intermediate CO_2 storage tanks.

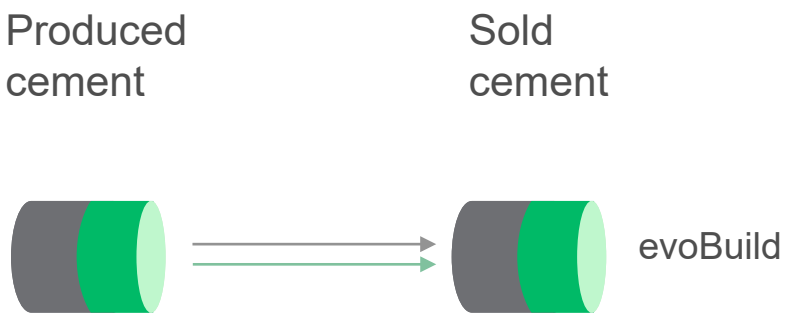
We are first in the world offering cement products based on CCS:

evozero evoBUILD

Two principal product ranges based on CCS in Brevik will be offered

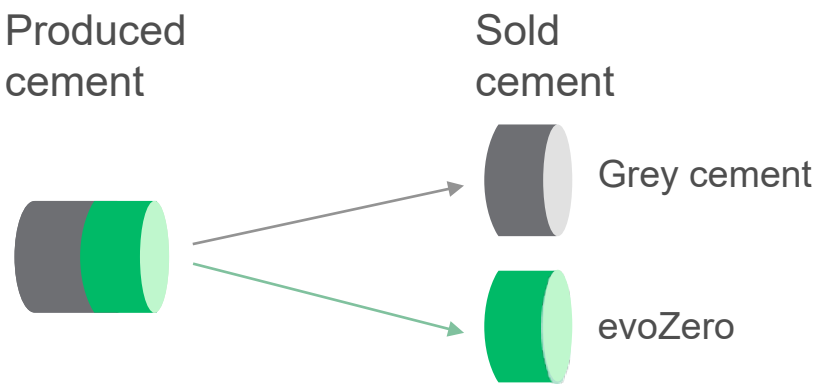
evoBUILD

CO_2 reduction from CCS is allocated with a technical principle.

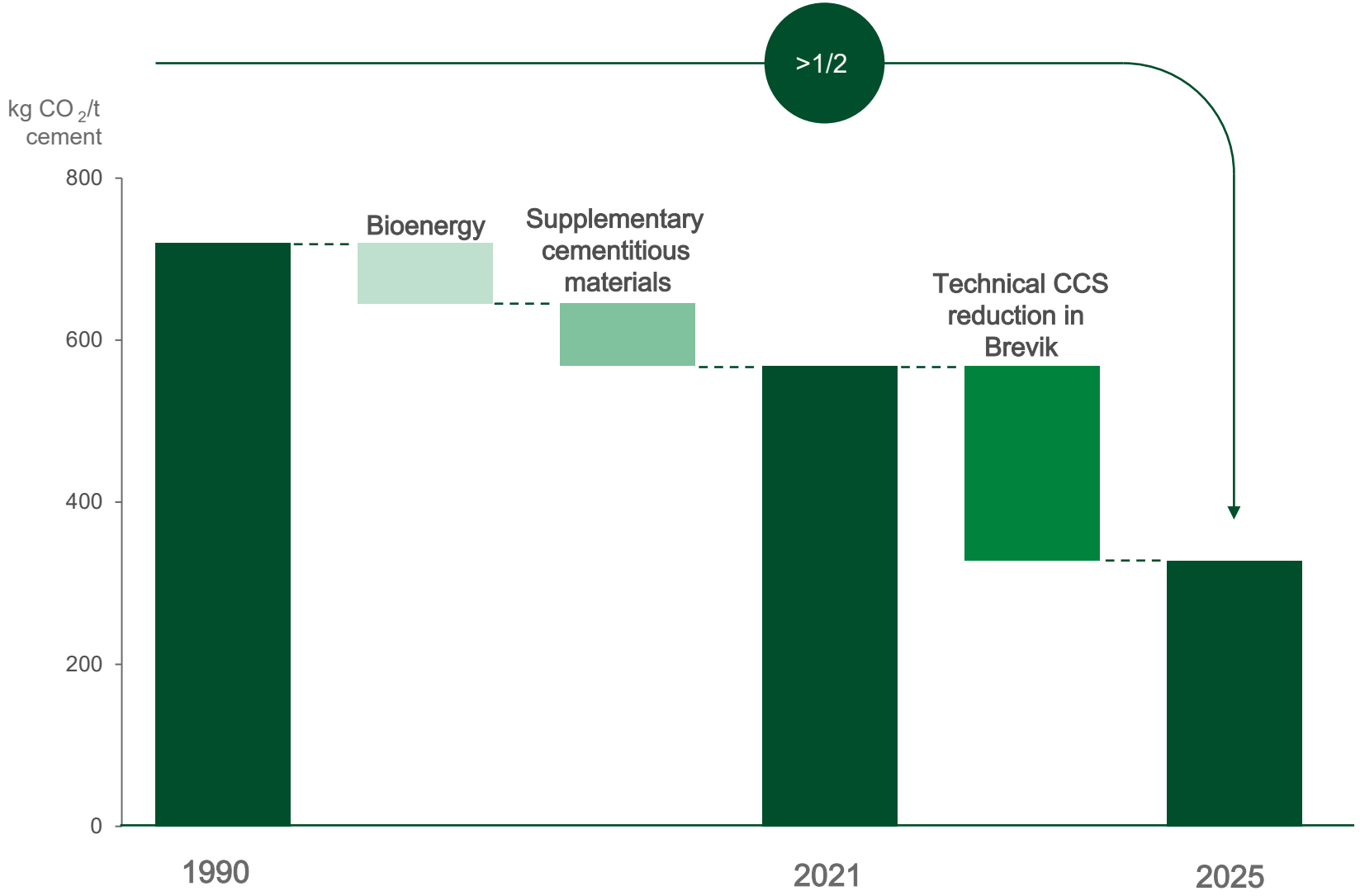


evozero

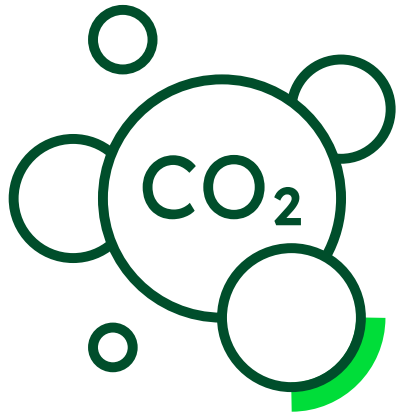
CO_2 reductions is attributed specifically to one product range according to mass balance principle.



Taking a leap with carbon capture!



EU-ETS price development



Cooperation, support and public acceptance: key pre -requisites

Interest for the project has been overwhelming
From students to royalty

Support from authorities and government
Every step of the way

Industrial partnerships along a value chain
Aim for replicability

Positive and inspiring media attention!

Interest for the project has been overwhelming

From students to royalty and a German vice chancellor! –

”

Lieber das CO_2 in die Erde als in die Atmosphäre

Rather leave the CO_2 in the ground than in the atmosphere

Robert Habeck , during visit at Brevik cement plant, January 7, 2023

Heidelberg Materials