



CASE STUDY 4: Perspective of the cement industry. A focus on CO2 transportation

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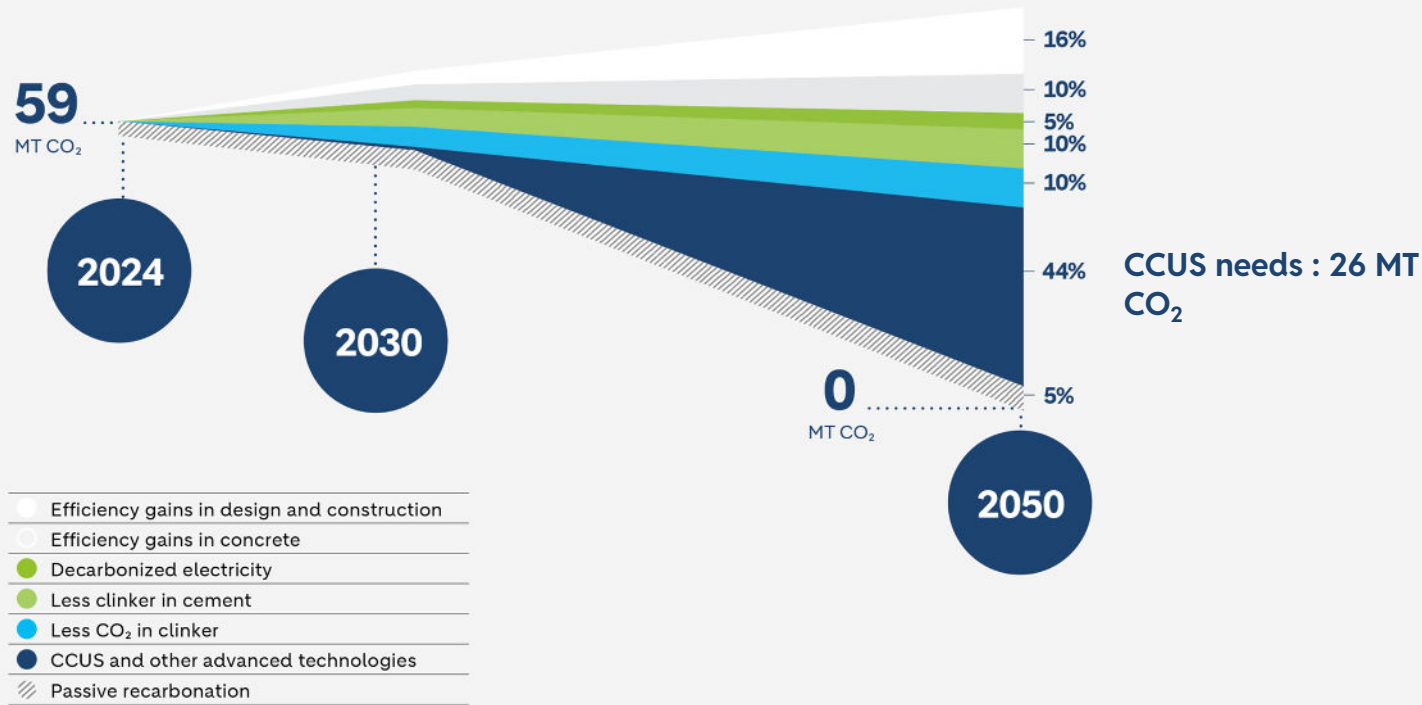
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HOLCIM'S PATHWAY TO NET-ZERO: CCUS IS KEY

CARBON CAPTURE, UTILIZATION AND STORAGE POTENTIAL OF 26 MT CO₂ BY 2050

OUR ABSOLUTE SCOPE 1 + SCOPE 2 EMISSIONS PATHWAY



CARBON CAPTURE UTILIZATION STORAGE

8 PROJECTS SUPPORTED BY EU INNOVATION FUND ADDING 6,8 MT CO₂

Portfolio of
16+ Projects
in Europe

8 Projects
Supported by the EU
Innovation Fund.

6.8MT
CO₂ captured by 2030



DECARBONIZATION THROUGH CCUS

8 GRANTS AWARDED FOR CCUS PROJECTS BY EU INNOVATION FUND

Go4ECOPlanet



Kujawy,
Poland

Carbon2Business



Lägerdorf,
Germany

eCapt-Rhône



Le Teil,
France

KOdeCO



Koromačno,
Croatia

Olympus



Milaki,
Greece

GO4ZERO



Obourg,
Belgium

CarboClearTech



Martres,
France

Carbon Hub CPT01



Campulung,
Romania

CO₂
capture

1,2 Mt

1.2 Mt

0.2 Mt

0.4 Mt

1.0 Mt

1,1 Mt

0.7 Mt

1.0 Mt

8

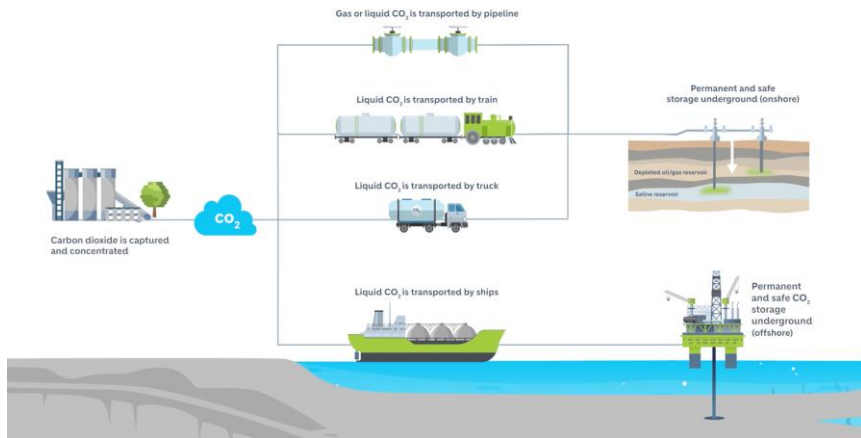
EU Innovation Fund grants awarded for
cement CCUS projects

6.8Mt CO₂ capture by 2030

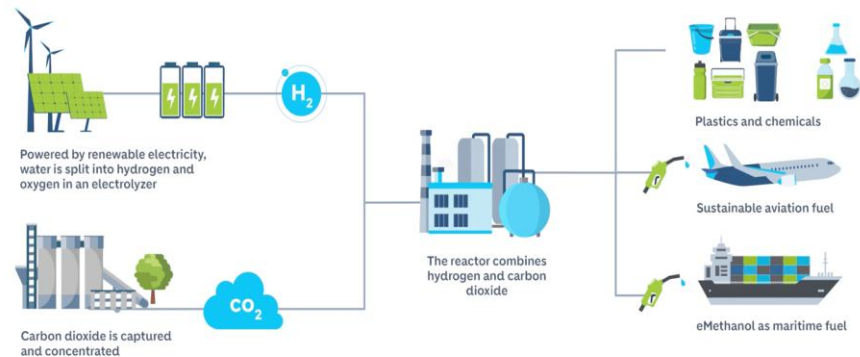
THIS CO2 NEEDS TO BE TRANSPORTED TO FINAL DESTINATION

VALUE CHAIN PIPELINE, RAIL AND BARGE/SEABORNE TRANSPORTATION

CARBON CAPTURE AND STORAGE (CCS) VALUE CHAIN



CARBON CAPTURE AND UTILIZATION (CCU) VALUE CHAIN



INLAND AND CO2 BARGE LOGISTICS

A FLEXIBLE, LOW DRAFT AND SUSTAINABLE SOLUTION FOR SHORT TO MEDIUM DISTANCE LCO2 TRANSPORTATION

- **LOW DRAFT DESIGN:** Enables seamless access to shallow inland waterways, requiring minimal onshore footprint and physical infrastructure
- **FLEXIBLE & SCALABLE:** Adjustable fleet sizes offer robust operational redundancy and the power to scale transport capacity dynamically
- **DECARBONIZED TRANSIT:** Provides highly reliable logistics for carbon routes, support zero-emission, battery-powered propulsion options
- **FLEXIBLE SETUPS - CONFIGURATION OPTIONS**
 - **SELF-PROPELLED BARGES:** Custom-designed for specific routes
 - **TUG-BARGE PUSH SYSTEMS:** Optimizes capital expenditure by matching a single high-efficiency tug with multiple barge units, doubles as floating storage to reduce onshore Capex requirements

LIQUID CO2 BARGE TRANSPORTATION

SPECIALIZED BARGE DESIGN TO TRANSPORT MEDIUM PRESURE LIQUID CO2

MEDIUM PRESSURE LCO2

Transport liquified
99,9% CO2 purity
16 bars
-35 °C



- Tug or self-propelled options
- Flexible Capacity driven by river characteristics and locks (e.g. 1,600 t for 110 m length, 11,5 m width and 2,5 m draft up to 5,000-7,000 t)

PORT DIMENSIONING

OPTIMISATION BETWEEN TRANSPORT AND TERMINAL IS A MUST

MEDIUM PRESSURE LCO₂

Storage tanks linked
to the barge sizes
Loading arms for
fast load/unload



- Storage tanks to allow a quick loading and unloading of the barges
- Storage capacity can differ from self propelled and tug barges
- One loading arm for barge should be sufficient to load 600 m³/h in a 6" pipe

LOCKS

BARGE DESIGN, CAPACITY AND TURN AROUND TIME HIGHLY DEPENDING OT THE ROUTE LOCKS

- Number of locks in the route
- Capacity of the locks
- Time to cross the lock
- Lock timetable



For large waterways with big locks (like the Rhine) these are ideal methods of transporting large amount of cargo. Where locks are smaller, and the combinations need to be decoupled, the benefit starts to diminish quite quickly

THERE IS A BIG OPPORTUNITY TO TRANSPORT LCO2 BY BARGE

IT IS RELATED TO CONNECTION TO RIVERS AND AVAILABLE INFRASTRUCTURE

River routes to port hubs



► **6,8 mt LCO2 per year to be transported from 2030 only for 8 flagship funded projects, More value to come**

► **Barge transport to connect plant with main port harbor Ideal for inland transportation**

► **Liquid CO2 requires specific barge design for medium pressure 16 bars and -35 °C to be maintained in the whole duration of the trip**

► **River characteristics and locks are essential to perform a competitive transport Barge size, capacity and time can be highly influenced**

► **Barge transport has to compete with pipeline and rail Reliability and cost as key drivers**



HOLCIM