

Strengths

2021–2023

ExxonMobil launched a dedicated **cement CCS** business line (Feb 24, 2021).

LafargeHolcim & Schlumberger New Energy formed a **CCUS partnership** (Feb 24, 2021).

HeidelbergCement pledged to capture **1.8 Mt CO₂/yr** at its Leimen plant (Jun 24, 2021).

2024–2025

Heidelberg Materials commissioned the world's first **industrial-scale cement CCS** plant at Brevik (400 kt CO₂/yr; Jun 20, 2025).

Holcim launched the **€400 M OLYMPUS** project (2 Mt/yr; Jun 03, 2025).

Hakkers deployed Paebbl's **carbon-storing cement** in Rotterdam (Jun 19, 2025).

What Changed / Resolved / Validated

✓ *Opportunity validated:* Full-scale, continuous **cement CCS** is now operational.

✓ *Strength deepened:* Early R&D partnerships evolved into **turnkey commercial deployments**.

Weaknesses

2021–2023

CCS efforts were largely **feasibility studies** (e.g., ITOCHU / Nippon Steel / Taiheiyo Cement joint study in Japan, Aug 24, 2023).

Indiana pilot at Heidelberg's Mitchell plant remained at **technical-validation** stage (Feb 24, 2023).

No dedicated downstream **CO₂ utilization** pathways in commercial cement production.


2024–2025


Cemex's Knoxville plant serves only as a **DOE test center** (Jan 24, 2025), not full-scale capture.

Heidelberg NA began **test-well drilling** at Limestone Ridge for CarbonSAFE (Mar 24, 2025).

C-Capture's novel capture tech is still in **R&D/testing** (May 24, 2024).

What Changed / Resolved / Validated

 *Risk resolved:* Commercial-scale CCS techno-economic viability was **proven at Brevik**, removing pilot-stage uncertainty.

 *New Weakness:* Scale-up now hinges on **energy / feedstock availability** and partner-tech readiness.

Opportunities

2021–2023

ABB & CMG modeled cement CCS processes in **commercial simulations** (Nov 24, 2023).

CarbonCure & Heirloom partnered on **CO₂-to-cement** pathways (Nov 24, 2023).

Lafarge Canada & Svante Tech launched a **pilot** for modular CCS (May 24, 2023).

2024–2025

Kapture & Horizon Power completed a **DAC-cement hybrid pilot** demonstrating viable CO₂ removal (Jun 10, 2025).

Orlen & Equinor advanced **CCS-hub siting studies** in Poland (Mar 24, 2025).

Baker Hughes & Frontier Infrastructure announced a **UK regional CCS cluster** (Mar 24, 2025).

What Changed / Resolved / Validated

✅ *Opportunity validated:* **DAC-integrated cement** approaches have moved from concept to working pilots.

🚀 *Growth confirmed:* **Multi-partner CCS hubs** are now funded and progressing toward FID.

Threats

2021–2023

US DOE issued **competitive funding calls** with unclear award timelines (Mar 24, 2023).

EU Commission selection of Titan's CCU demo lacked **deployment schedule** (Jul 24, 2023).

Hanson's Ketton plant part of UK BEIS cluster but **regulatory path** remained untested (Jun 24, 2022).


2024–2025

CarbiCrete & Canal Block launched **cement-free concrete** (Jan 24, 2024), creating a substitute threat.

Aggregate Industries urged clarity on the UK's **£22 bn CCS fund** (Jan 24, 2025), underscoring policy risk.

NeoCarbon & Carbonaide's **precast CCUS panels** intensify competition (Feb 24, 2025).

What Changed / Resolved / Validated

 *Risk resolved:* Operational data from Brevik and Olympus have **mitigated greenwashing** and funding-gap concerns.

 *New threats:* **Alternative low-carbon binders, regulatory volatility, and DAC-native competitors** heighten market pressure.