Carbon Credits

Currency of the Next Decade?

Mukunda Kaushik

Senior Analyst

Agenda

01 | **CO_2 removal (CDR): State of the Market**

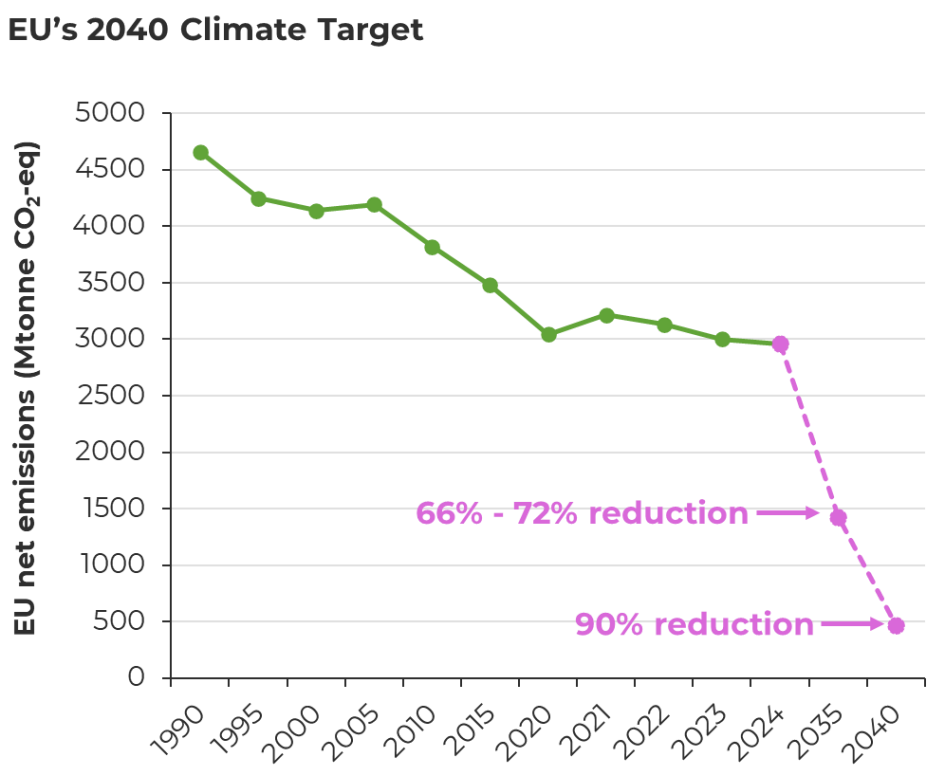
02 | Trajectory: Success and Learnings

03 | Outlook and Key Takeaways

The EU 2040 Climate Target

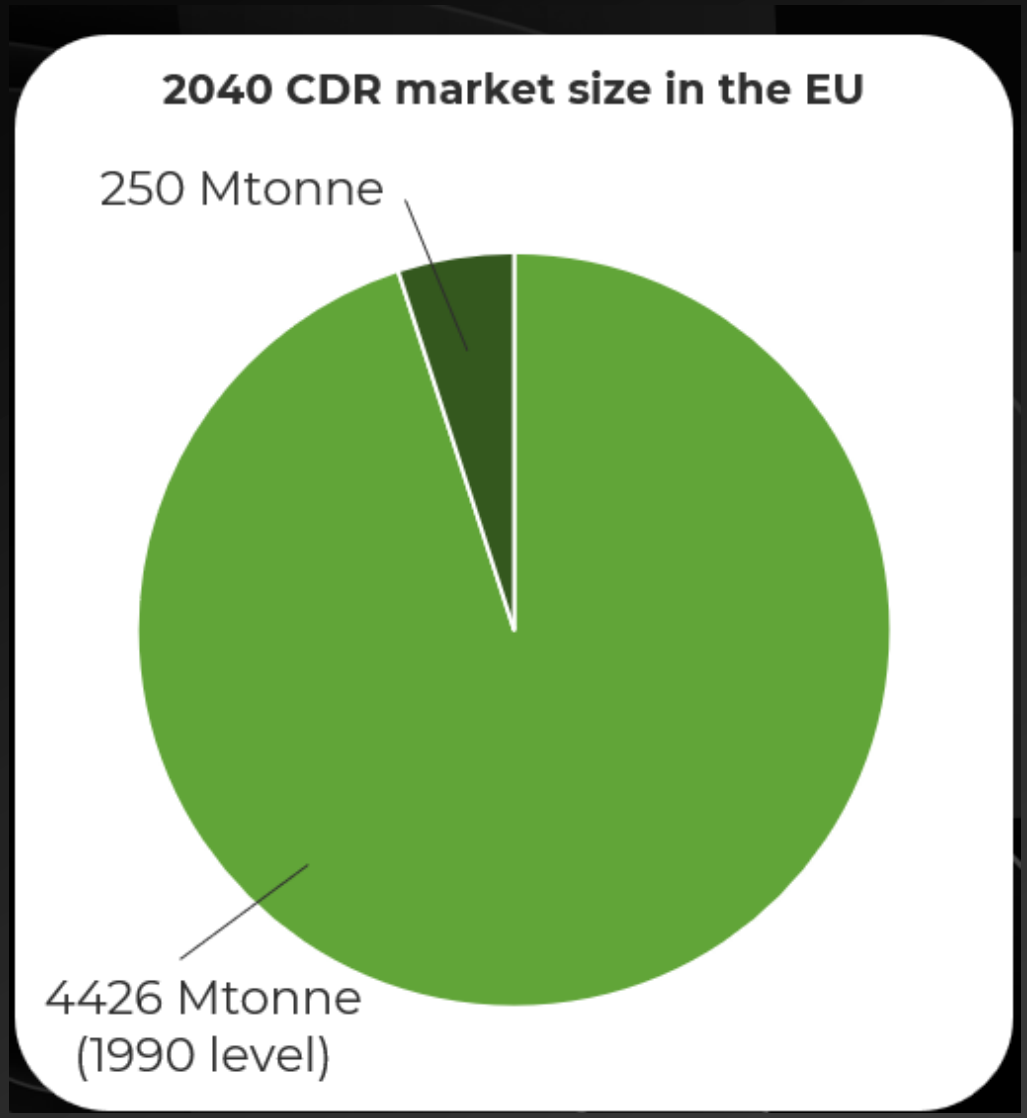
In December 2025, the EU committed to reduce its net emissions by 90% in 2040.

This target requires significant activity between 2024 and 2035.



"We have agreed to a legally binding 2040 target of 90% , and up to **5% international credits**. We have reaffirmed the flexibilities that we've put on the table."

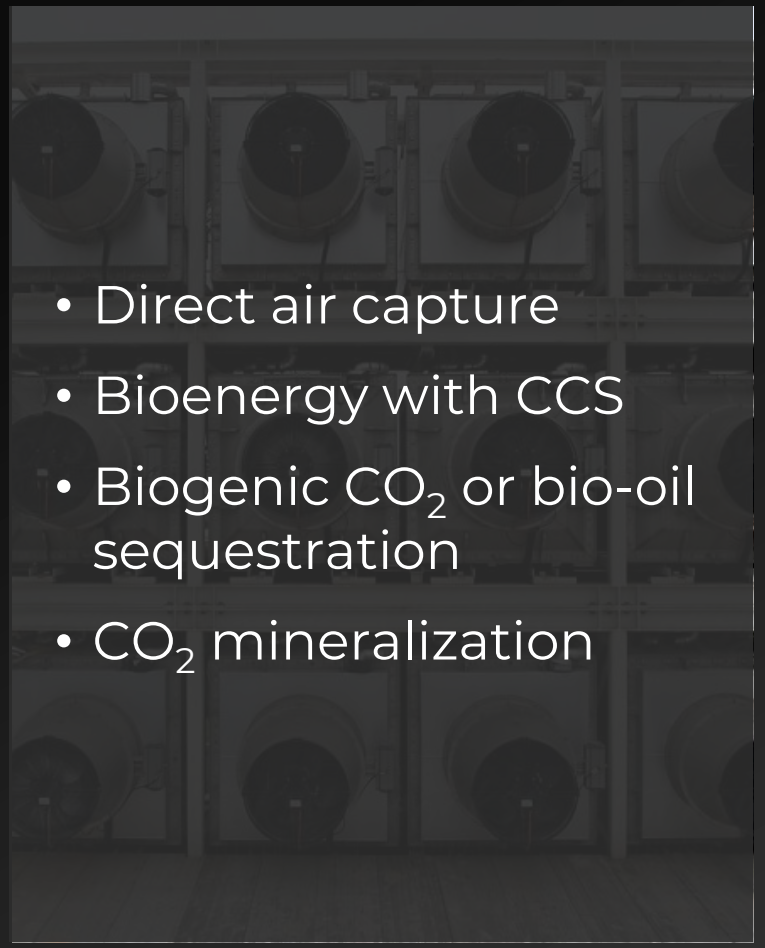
Wopke Hoekstra, EU Climate Commissioner



Nature/Land-Based Solutions

- Forestry
- Wetland restoration
- Soil carbon
- Biochar
- Enhanced weathering

CCUS-Based Solutions



- Direct air capture
- Bioenergy with CCS
- Biogenic CO_2 or bio-oil sequestration
- CO_2 mineralization

Ocean-based Solutions

- Direct ocean capture
- Ocean alkalinity enhancement
- Biomass sinking
- Artificial upwelling or downwelling

The EU is creating compliance carbon markets

The European Commission published the CRCF framework in Dec 2024.

The first certifications will be recognized and issued in 2026, after which, certifications will be eventually be moved to a central EU registry.


LAST UPDATED: OCTOBER 03, 2025

Industry Event Recap: The EU CRCF Technical Workshop (enhanced rock weathering)

Lux Take: The balance between agricultural priorities (yield, soil health) and carbon market priorities (verified removals) will define the adoption curve of enhanced rock weathering (ERW).

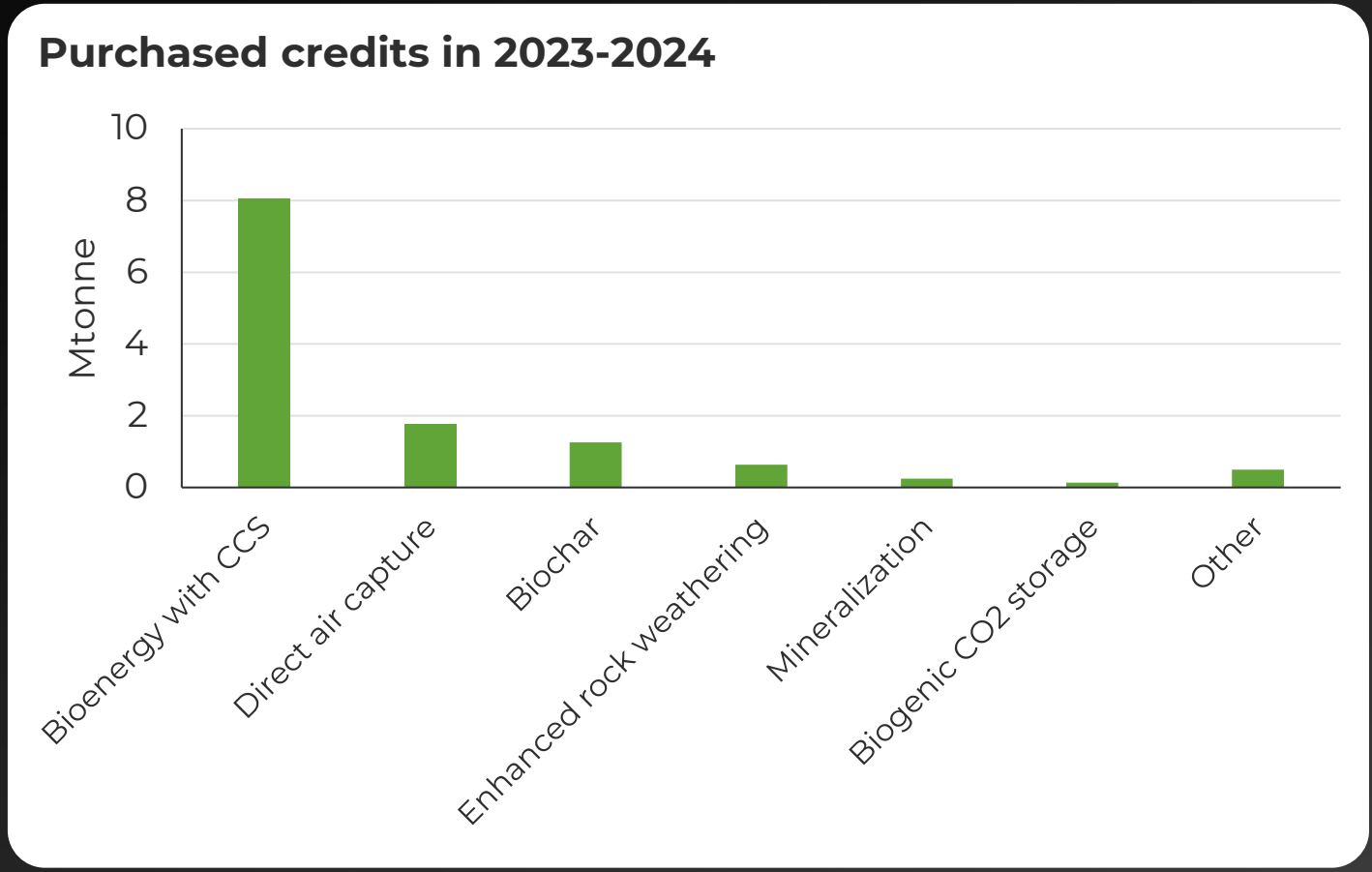
LAST UPDATED: OCTOBER 03, 2025

Industry Event Recap: The EU CRCF Technical Workshop (ocean alkalinity enhancement)

Lux Take: Lux has consistently recommended clients to ignore ocean alkalinity enhancement (OAE), and the technical workshop confirmed that governments, industry, and public stakeholders won't allow OAE to move toward real-world scaling even if scientific research suggests...

There are growing purchases beyond forestry

- Companies purchased ~ 13 Mtonne of carbon credits sourced from beyond nature-based solutions in 2023 – 2024.
- BECCS and DAC were the top 2 choices of buyers, signaling a growing demand for high-integrity credits.
- New CDR pathways are emerging, led by biogenic CO_2.



Three trends in recent purchase agreements

Appetite for engineered and novel CDR

- BECCS
- 6.5 Mtonne CO_2 over 15 years, after 2029

- OAE
- 115 ktonne CO_2 in 2026-2030
- USD 272/t-CO_2

Early signs of corporates with strategic intent

- Bio-oil storage
- 100 ktonne CO_2 by 2030
- USD 470/t-CO_2

- DOC
- 30 ktonne CO_2 by 2030

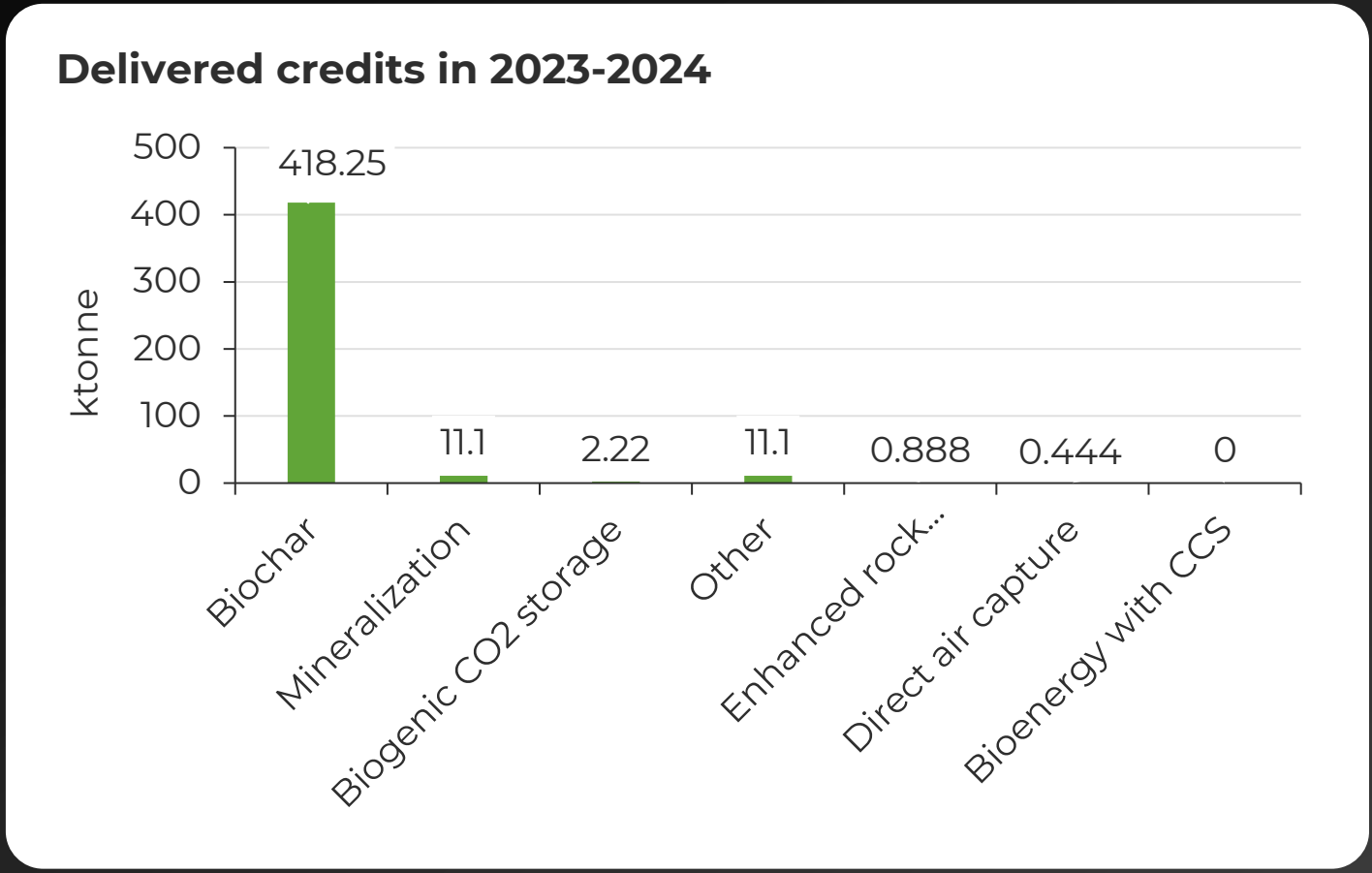
Long-term agreements yield lower weighted costs

- Biogenic CO_2
- 450 ktonne CO_2 over 13 years
- USD 200/t-CO_2

- DAC
- 100 ktonne CO_2 by 2032
- USD 100/t-CO_2

The gap between purchases and deliveries

- Only 3% of carbon credits sold in 2023 – 2024 were delivered in the same timespan, and the deliveries are almost entirely from biochar.
- The top 2 purchased technologies hold the least delivery count, indicating high technical barriers.



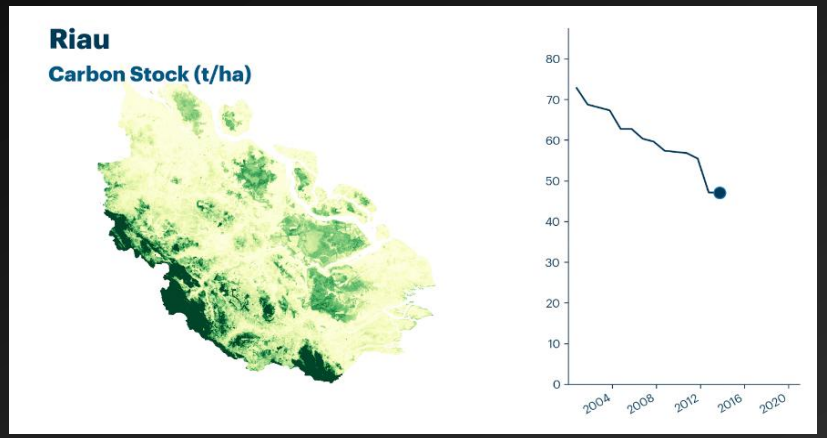
The four main risks with CDR

1 CARBON RE-RELEASE

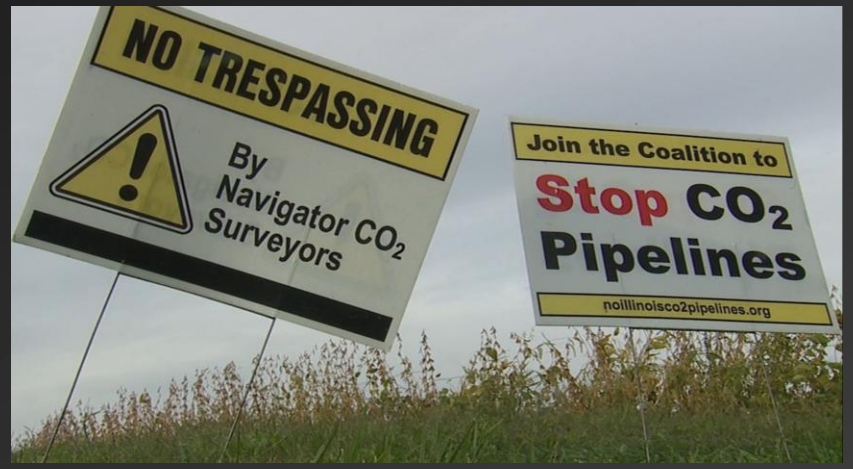
2 ADVANCING REGULATIONS

Zero emission vehicles: first 'Fit for 55' deal will end the sale of new CO2 emitting cars in Europe by 2035

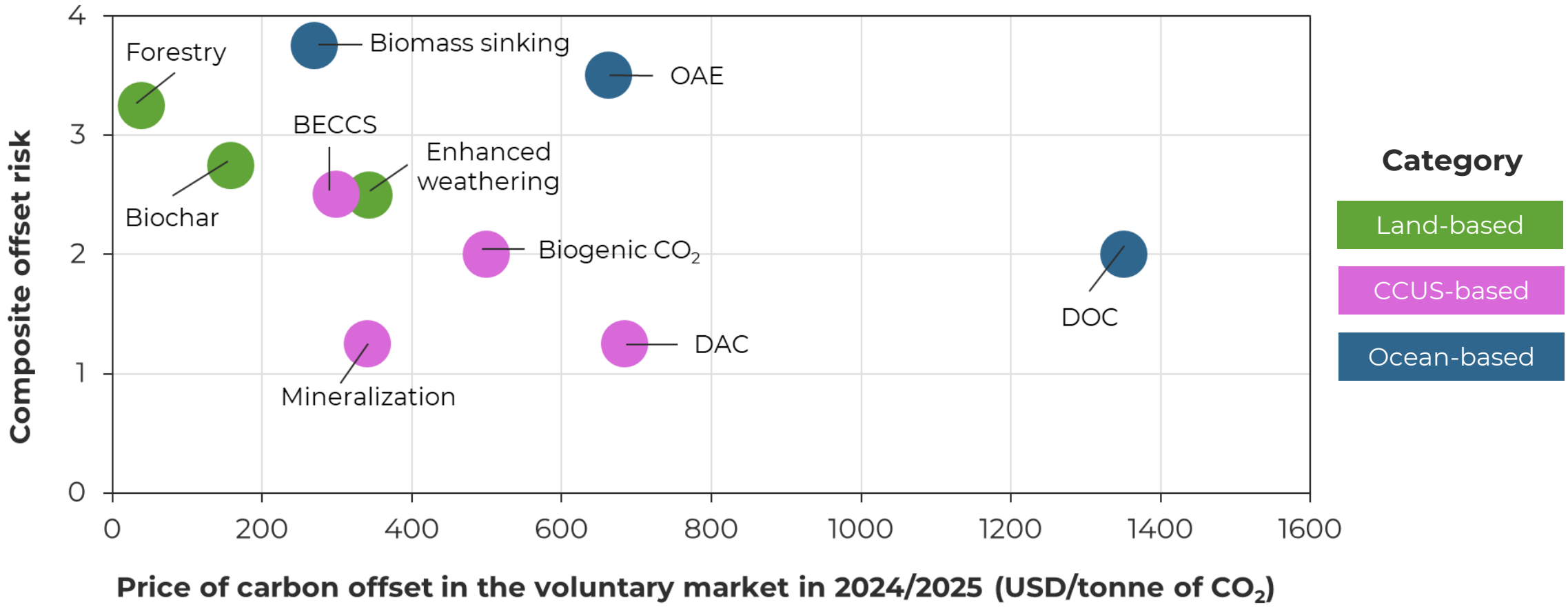
3 IMPRECISE QUANTIFICATION



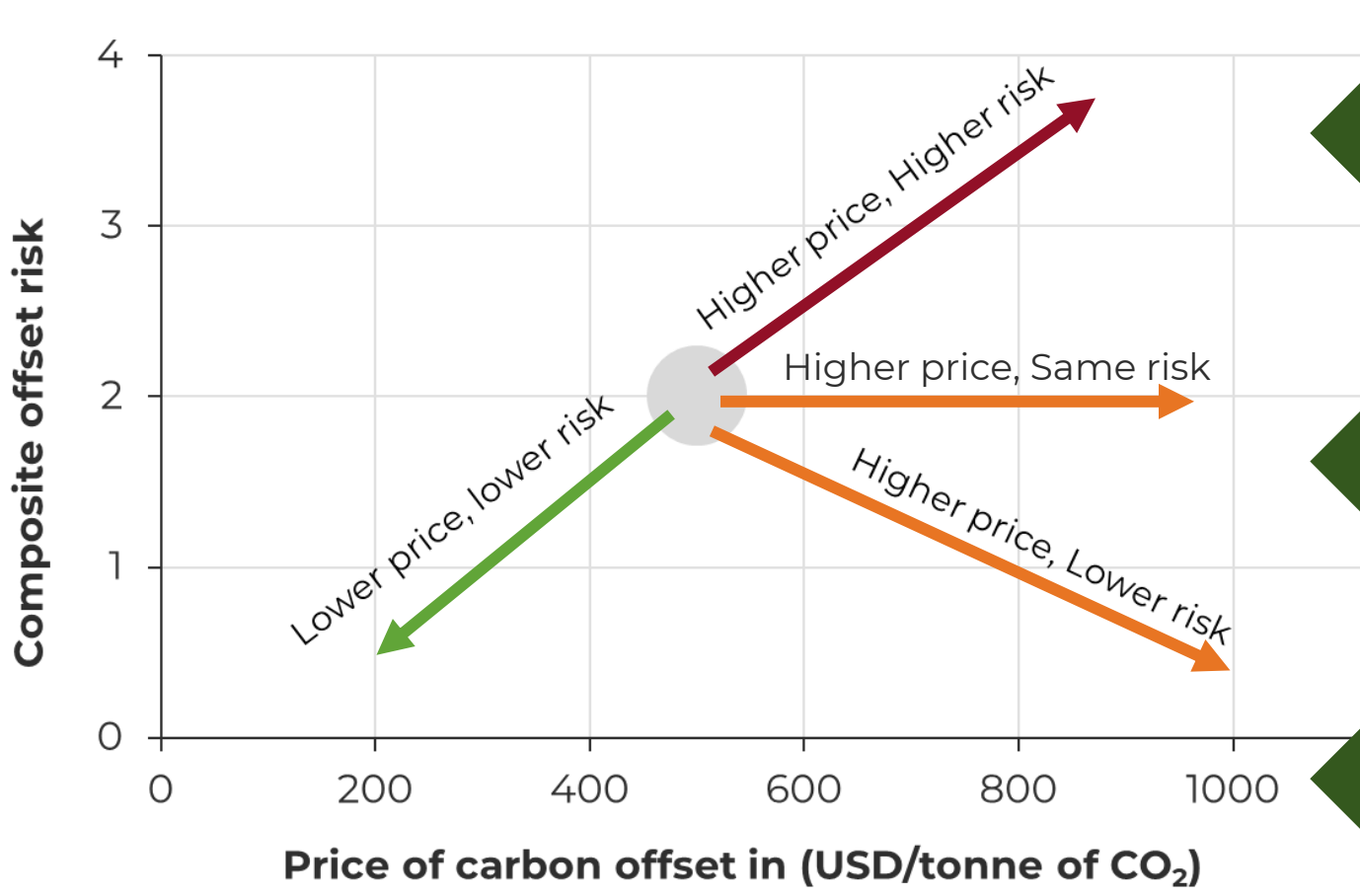
4 SOCIETAL BACKLASH



The Lux Carbon Negative Framework



Trajectories in the carbon market



New pilots and demonstrations

MRV and regulations

Technology innovation

Agenda

01 | CO_2 removal (CDR): State of the Market

02 | Trajectory: Success and Learnings

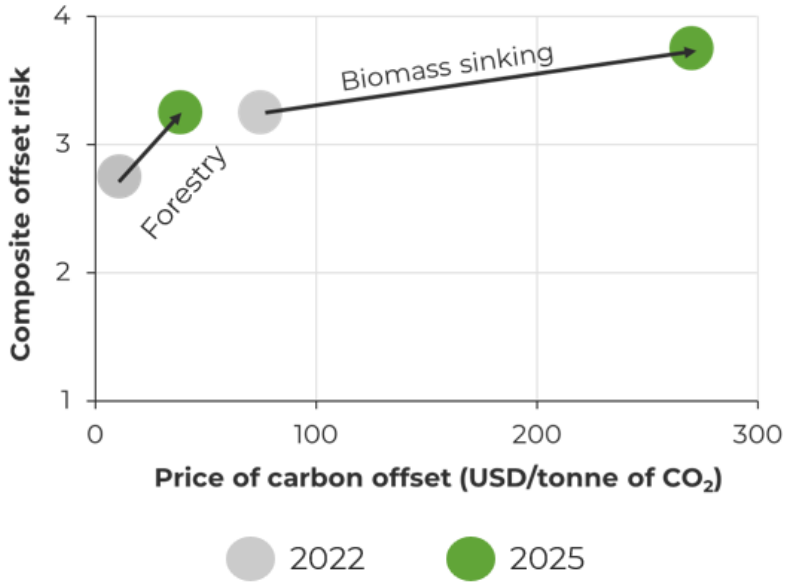
03 | Outlook and Key Takeaways

Higher Price and Higher Risk

Forestry and biomass sinking provide affordable credits but have one of the highest risk profiles.

Investing in digital tools has not brought down the risk, but has increased deployment costs, as reflected in the average credit price.

The need for offshore deployment has caused biomass sinking prices to significantly increase.



LUX TAKE

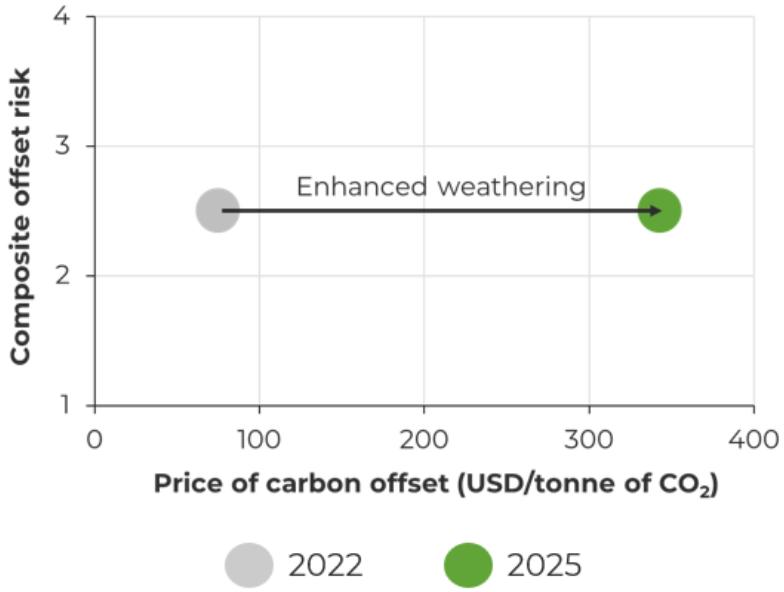
Ignore. The trajectory of these technologies will not change significantly. Continue for CSR and other initiatives, but not for sourcing high-quality credits at scale.

Higher Price, with Constant Risk

Enhanced weathering is the only technology that shows a major price shift over the last few years while retaining a similar risk profile.

The risk is not detrimental, but also not negligible. 50% to 60% of project costs are tied to measurement and data collection.

Therefore, costs increase as scale increases and projects need to be monitored for several years.



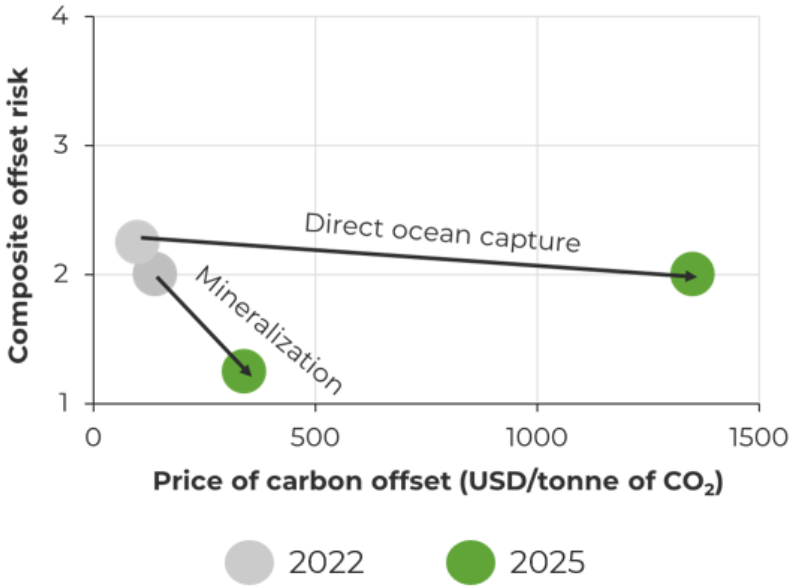
LUX TAKE

Wait and See. Continued deployment can lead to optimization of sampling density on soils . However, there will likely be lower-risk alternatives at this price range.

Higher Price, but strong derisking achieved

DOC and mineralization have been able to decrease their risk profile, but have seen a significant price increase. DOC was the most expensive credit to purchase in the recent year.

To deal with costs, DOC companies are considering business model pivots that will allow regulatory support and existing learning curves for cost reduction.



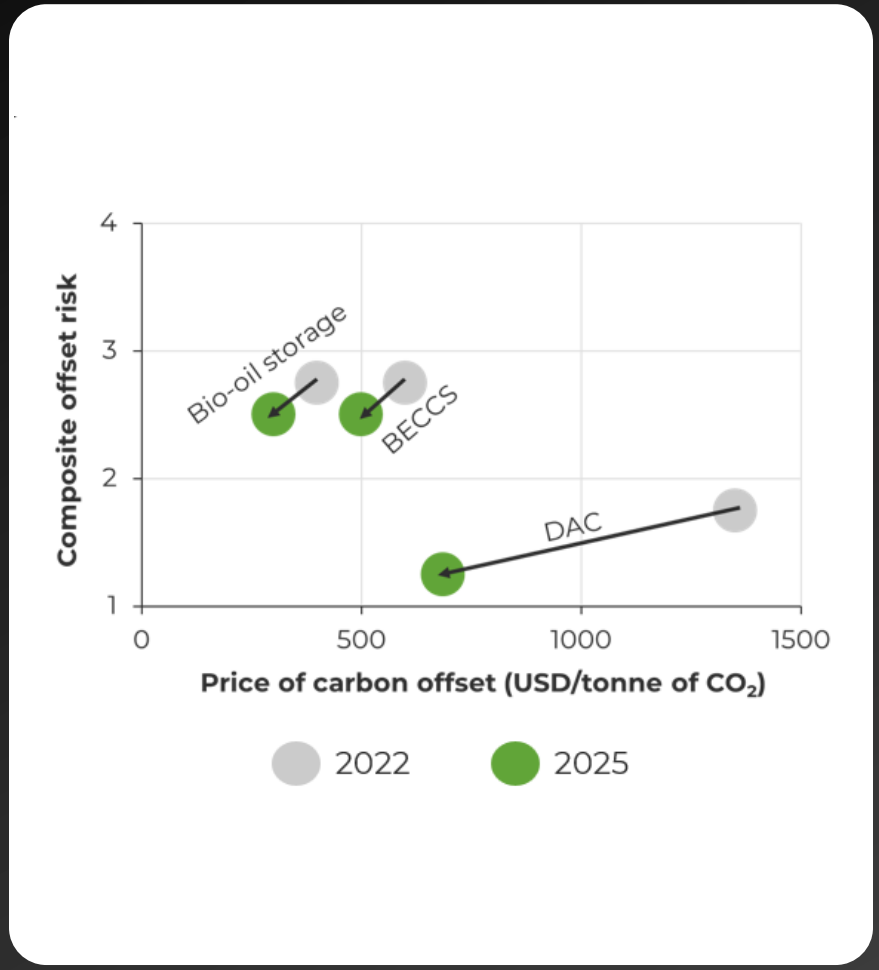
LUX TAKE

Engage. Deployment has provided learnings to reduce risk. Companies should now focus on cost reduction, unless markets show appetite to pay the premium.

The Holy Grail: Lower Price and Lower Risk

CCUS-based solutions (DAC, BECCS, and biogenic CO_2 storage) are moving in the most favorable trajectory, reducing both cost and risks. DAC specifically had several transactions valued below USD 1,000/tonne of CO_2.

The upstream focus in this segment is increasing, with companies increasingly selling credits from biogenic CO_2 storage.



LUX TAKE

Engage. While DAC and BECCS need regulatory support, biogenic CO_2 storage will see increased activity in the next five y ears. All processes here yield high quality offsets.

Agenda

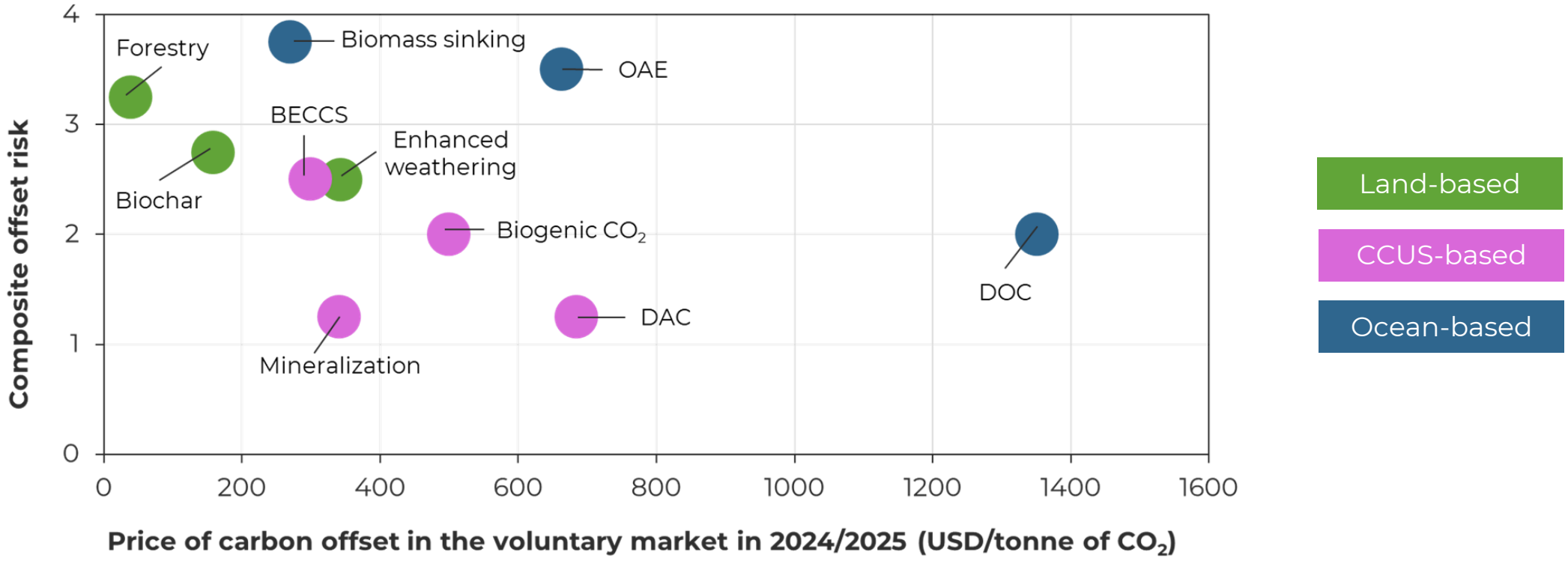
01 | CO_2 removal (CDR): State of the Market

02 | Trajectory: Success and Learnings

03 | Outlook and Key Takeaways

The Lux Carbon Negative Framework

Biogenic CO_2, BECCS, and mineralization to increase share in the 2030s



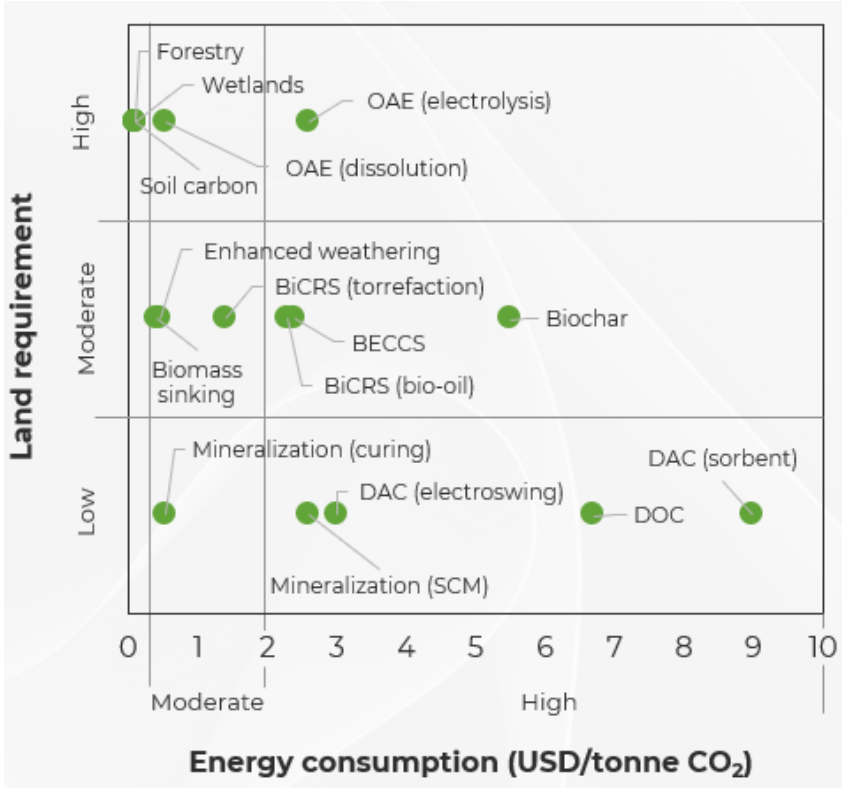
Resource intensity of CDR

Energy use drives cost but land and water-use increase project complexity

Engineered solutions exhibit a broad energy consumption range, cautioning against generalization.

Need for far-field measurements increases land use.

Mineralization shows a good balance in resource intensity.



Key Takeaways

1

Link CDR to support broader decarbonization

Beyond offsetting unabatable emissions, CDR is a currency for more time. With a Purchase and Retire strategy, companies can buy time for more permanent and emission reduction solutions to come to market.

2

CDR creates a near-term business case for biomass and biogenic CO_2

High quality CDR can attract private capital in the form of offtake agreements to the biomass value chain while key players in biofuels and biochemicals exercise restraint over high costs. The ethanol and biogas industry will become more active over the next five years.

3

MRV activity that does not result in risk reduction, is a long-term cost sink

This is a result of increased data sampling and analysis from new project deployment that do not yield the necessary standardization to phase out long-term MRV costs.

Thank You

VISIT
www.luxresearchinc.com

FOLLOW
@LuxResearch

CONNECT
LuxResearch

READ
http://www.luxresearchinc.com/blog/

EMAIL
questions@luxresearchinc.com

About Lux

Lux Research fuels innovators to not only imagine what's possible in the future but also operationalize innovation success in the near term. We deliver research and advisory services to inspire, illuminate, and ignite innovative thinking that reshapes and grows businesses. Using quality data derived from primary research, fact-based analysis, and opinions that challenge traditional thinking, our experts focus on finding truly disruptive innovations that are also realistic and make good business sense.

The "Lux Take" is trusted by innovation leaders around the world, many of whom seek our advice directly before placing a bet on a startup or partner — our clients rely on Lux insights to make decisions that generate fantastic business outcomes. We pride ourselves on taking a rigorous, scientific approach to avoid the hype and generate unique perspectives and insights that innovation leaders can't live without.

VISIT

www.luxresearchinc.com

FOLLOW

@LuxResearch

CONNECT

LuxResearch

READ

http://www.luxresearchinc.com/blog/

EMAIL

questions@luxresearchinc.com