Nordic perspectives on the future carbon market

2026

Contents

Executive Summary

This report analyses the current status, challenges, and future outlook of durable carbon dioxide removal (CDR) in the Nordic region, focusing on Norway, Sweden, and Denmark. We combine insights from a targeted survey of Nordic companies, expert interviews and analysis of transaction data on CDR since 2022. This mixed-methods approach informs a quantitative outlook on future CDR demand through 2040 across three scenarios based on various assumptions of factors that either enable or constrain growth.

Summary of status quo

- Recent years have seen strong growth in demand, but from a low starting point. Moreover, this demand has been driven by a highly concentrated number of buyers.
- Public–private co-financing has enabled early project deployment within durable CDR.
- Demand from the Nordics lags behind other regions, but pioneering projects have made the Nordics a supply-side juggernaut.
- Currently, major demand-side barriers include a perceived conflict between CDR credits and direct emissions reductions, as well as reputational concerns stemming from scandals related to non-durable carbon credits.

Summary of outlook

- The future of the durable CDR market is at a critical threshold.
- A scenario with enough scale to align with the 1,5°C target of the Paris Agreement is currently considered highly unlikely. More likely scenarios see the global volumes of CDR reach between 0.2–1 $GtCO_2e$, far under the 3 $GtCO_2e$ needed to be Paris-aligned.
- Significant stimulation is needed, both on the demand- and supply-side.

Beyond mere offsetting, the carbon market should be viewed as a catalyst for scaling technologies and industries essential for business models and infrastructure of a low-carbon future.

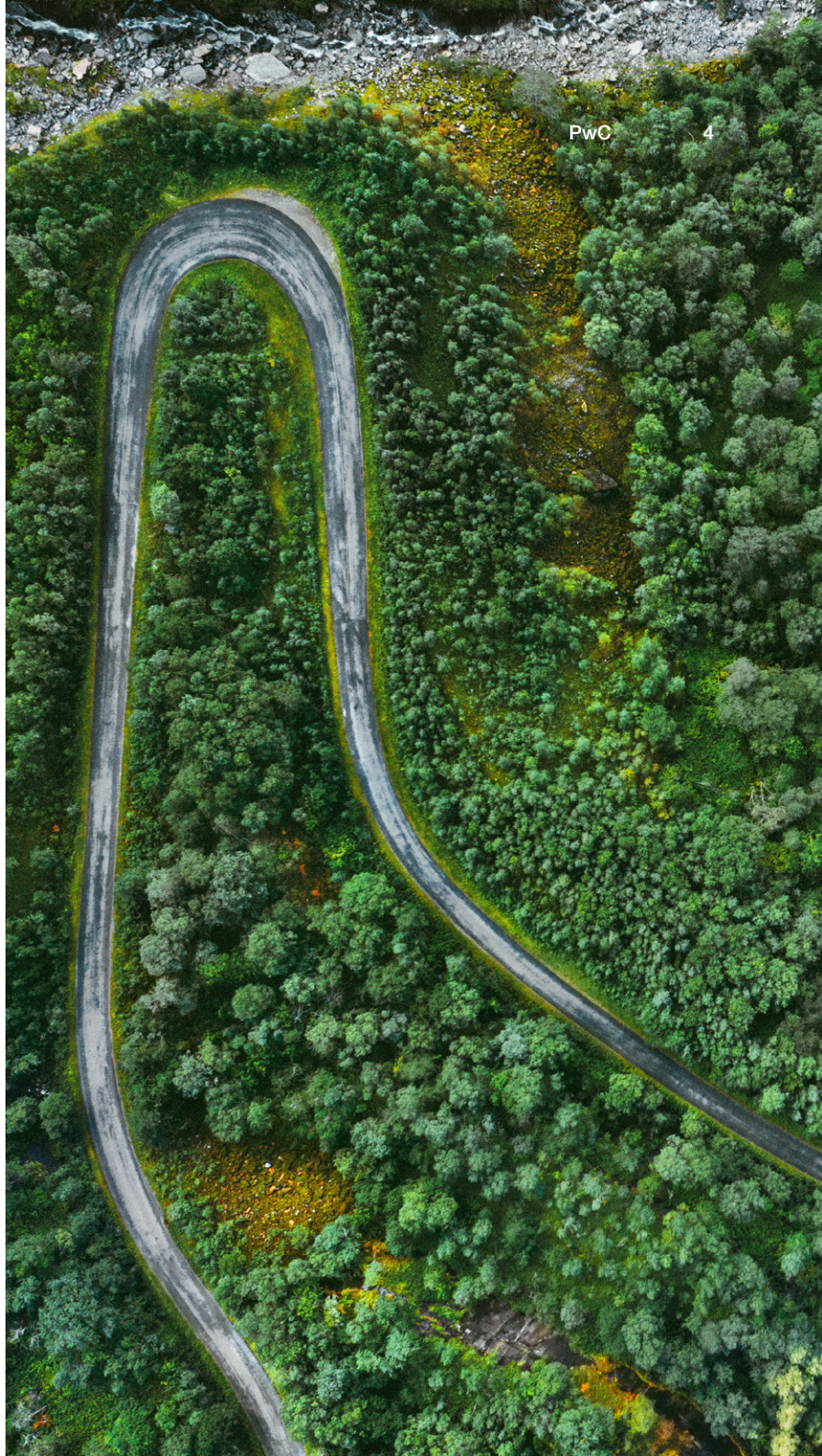
Recommendations

For companies

- Quantify residual emissions to identify compensation needs and treat emission reductions and carbon removal as complementary strategies.
- Prioritise durable, high-quality carbon removal projects – ideally from local suppliers – to contribute to decarbonisation near or in your own value chain.
- Start small if necessary. Band together through collective buying models to lower barriers to engagement and secure better contracts.

For governments

- Establish national CDR frameworks with clear targets, milestones, and distinct CDR goals to ensure integrity and predictability for stakeholders.
- Implement serial funding schemes on the national level to ensure deployment.
- Fund maturing projects to reduce risk and unlock private demand.
- Invest in shared infrastructure, such as regional CO_2 hubs that solve coordination issues.
- Integrate carbon removal in the EU Emission Trading System (ETS) to accelerate industrial decarbonisation and predictable scaling of CDR.
- Implement Carbon Takeback Obligations (CTBOs) to create a predictable and long-term compensation mechanism for fossil fuel producers and importers.



Understanding the role of carbon markets

Carbon offsetting in the context of Net Zero-targets

Global warming will likely exceed 1,5°C within the next few years[1]. Overshooting 1,5°C increases the risk of severe and potentially irreversible climate impacts that threaten both the planet's ecosystems and human societies[2].

Reducing current emissions is the most important mitigation effort to limit further temperature rise and its impacts. However, if the world wants to return temperatures to 1,5°C or 2°C after an overshoot, methods and technologies that remove CO_2 from the atmosphere will have to be deployed on a large scale.

Carbon dioxide removal (CDR) is not a substitute for emission reductions. Rather, it is a complementary mitigation tool that will be needed to address residual emissions and to counterbalance CO_2 already released into the atmosphere.

Net-zero is achieved when anthropogenic greenhouse gas (GHG) emissions are equal to GHG removals, resulting in no further increase in atmospheric greenhouse gas concentrations. To reach net-zero by 2050, it is estimated that between 7–9 $GtCO_2e$ (i.e. billion tonnes) will have to be removed from the atmosphere per year by 2050. Currently, about 2 $GtCO_2e$ are removed yearly through nature-based methods such as afforestation and reforestation[3]. The technological solutions to remove additional CO_2 from the atmosphere are proven, but deployment is still far behind the needed scale to be on track to reach 1,5°C or 2°C[4].

Most large companies have committed to ambitious net-zero targets, and an increasing number are also engaging in the voluntary carbon market (VCM). To date, the vast majority of credits traded originate from projects that reduce or avoid emissions, such as renewable energy deployment or avoided deforestation. Only a small share of credits sold today are based on durable carbon dioxide removal.

However, there has been a clear shift in expectations since 2020. Experts, academics, and civil society organisations have increasingly emphasised that companies should move beyond traditional avoidance- and reduction-based credits and instead rely on carbon removal to offset emissions. The shift toward carbon removal reflects a recognition that credible net-zero pathways require remaining emissions to be neutralised through removals. Unlike avoidance

and reduction projects, which prevent new emissions from occurring, CDR solutions actively remove CO_2 from the atmosphere. This normative shift has been operationalised in the context of corporate net-zero pathways through frameworks such as the Oxford Net Zero Principles and the Science Based Targets initiative.

What about the Nordics?

Scaling up durable CDR is important to reach international climate targets, but it also represents a strategic industrial opportunity in the region. It is well documented that the Nordics have the right prerequisites to build a robust CDR supply, with a large potential for bioenergy with carbon capture & storage (BECCS) from forest-based industries, renewable energy capabilities, and significant geological carbon storage potential. But what about the demand side? Are Nordic companies planning to engage in the market for durable carbon removal credits? These questions lie at the core of the analysis conducted by PwC and ZERO.

In a context of economic and geopolitical uncertainty, alongside expanding corporate net-zero commitments, this report takes the pulse of the Nordic market for durable CDR and assesses the outlook for future demand in the voluntary carbon market.

The focus is exclusively on durable CDR. Nature-based solutions are essential to achieving global climate goals and play a critical role in both mitigation and adaptation. However, they differ in terms of permanence and risk profile and therefore serve a distinct function within the broader climate mitigation landscape.

Methodology leveraged in this report

To examine the outlook for CDR credits within the carbon market, we combined three primary sources to understand the current status and potential drivers that will determine future developments:

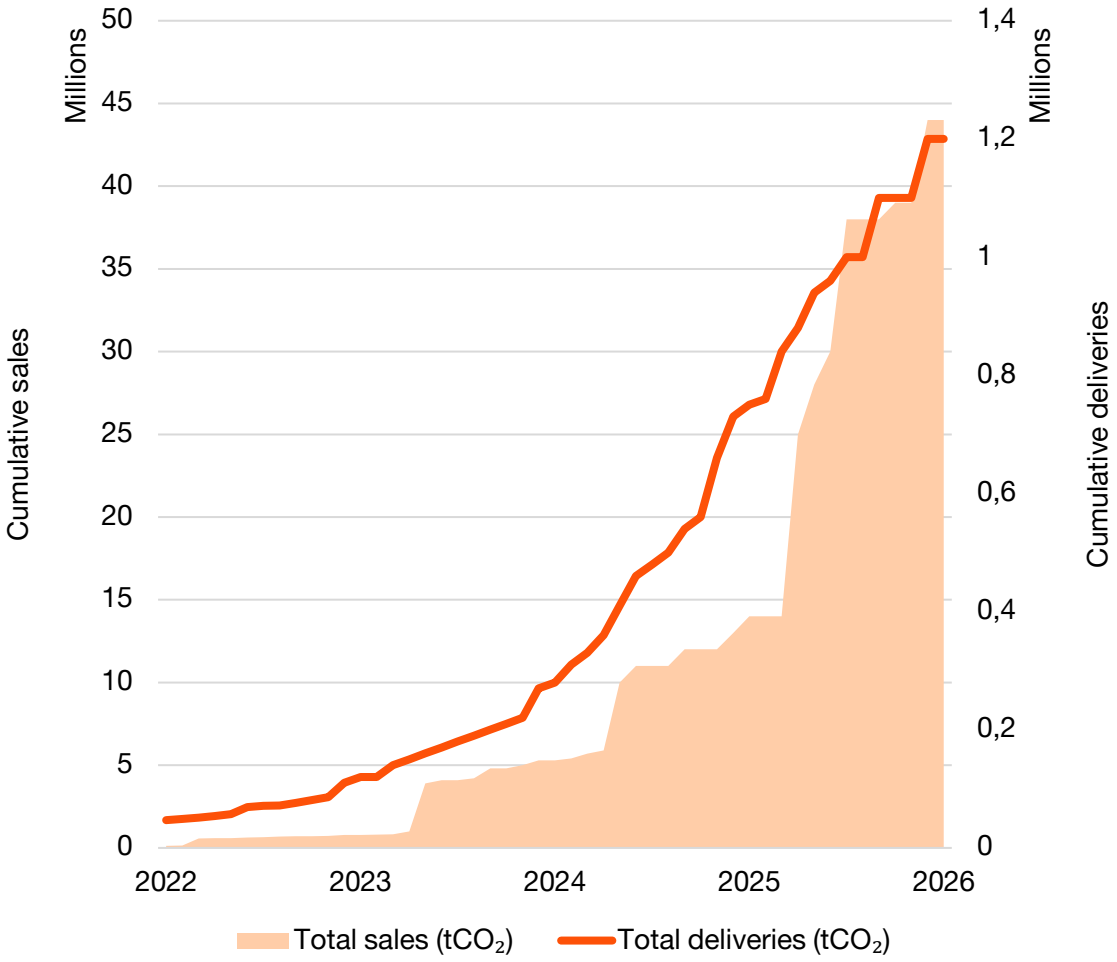
1. **A targeted survey of corporate actors in Norway, Sweden and Denmark to better understand Nordic demand.** The survey was distributed to 150+ Nordic companies and was designed to capture buyer motivations, perceived barriers, procurement strategies, and demand for different types of removal credits.

2. **Interviews with leading experts working within the carbon market,** ranging from financial institutions, data brokers, large-scale suppliers, corporate buyers and intermediaries. These provided rich insights into market dynamics, motivations, barriers and trends.

3. **Analysis of historical transaction data since 2022.** Using data primarily from CDR.fyi, we were able to quantify a baseline for demand both globally and within the Nordics. The baseline was also complemented by findings from our survey.

By combining these three sources of insight, we developed a quantitative outlook to estimate future demand for CDR credits through 2040. The model also draws on leading publications and studies of carbon markets to inform key assumptions. We have set assumptions that both enable and constrain demand, allowing us to construct forward-looking trajectories. These are presented in Chapter 3 across three distinct scenarios. The outlook is not intended to be a prescriptive prediction, but rather an informed perspective on various scenarios on demand-side developments.

CDR sales and deliveries have both seen triple digit compounded growth rates over the last four years



Market status for durable CDR

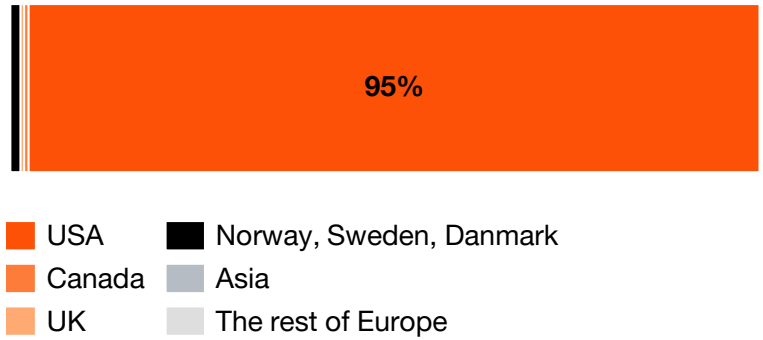
Global CDR demand is scaling fast

Durable CDR has gradually evolved from a scientific concept into an engineered solution that is increasingly being incorporated into corporate net-zero strategies. This development is reflected in the rapid growth in market activity over recent years. According to transaction data from CDR.fyi, global sales of CDR credits have increased from approximately 130,000 tonnes in the beginning of 2022 to a record 44 million tonnes by January 2026, corresponding to a compound annual growth rate of 329%. While the vast majority of these volumes are forward-looking purchase agreements (around 97%), delivered volumes have also grown sharply. Actual deliveries have increased at a compound annual growth rate of 125% over the same period, reaching around 1,2 million tonnes. While there has been severe growth in the trade of CDR credits over the last couple of years, these still represent only a fraction of total credits sold. In 2024, less than 10% of total credits sold were from carbon removal projects[5]. However, there is a general shift in preferences in the VCM, moving toward higher-quality credits that is reflected in their premium pricing[6].

The growing demand is dominated by a few buyers

The majority of credits sold to date have been purchased by US-based conglomerates, mainly within the technology and financial sectors. These companies are characterised by high profitability with relatively low emissions in scope 1 and 2 and vast value chain emissions in scope 3. Of the transactions over 1000 tonnes sold to date, Microsoft alone accounts for 87% of these. Conversely, Nordic companies only represent 1,4 % of the recent demand.

Demand split of transactions above 1000 tCO_2e to date



Nordic companies remain on the fence when it comes to purchasing carbon removal credits

Despite the growing focus on CDR in carbon markets, many Nordic companies remain cautious when it comes to purchasing credits from CDR projects. While interest is increasing, few companies have translated this into concrete plans. The following are the most central barriers to buying credits.

- The most significant barrier on the demand side is the perceived conflict between offsetting and direct emissions reduction measures, indicating a perceived conflict between reducing emissions and purchasing credits simultaneously.
- Reputational risk emerges as the second most cited barrier and seems to be an important obstacle when companies consider future purchases. Multiple respondents express concern that buying carbon credits could be perceived as an attempt to “buy out” of responsibility for emissions reductions and increasing the risk of accusations of greenwashing. Historically, the voluntary carbon market has struggled with credibility, driven by longstanding concerns over weak additionality and the temporary nature of certain credit types, particularly those based on avoided emissions.
- In addition, sustainability leaders report challenges in communicating and justifying the premium price of carbon removal credits to boards and financial decision-makers. Combined with concerns around legitimacy and reputational risk, this is a central barrier to engaging in the market.

Among Nordic companies that have purchased CDR credits, geographic proximity to the underlying project emerges as a relevant decision factor. This appears to be especially

important for smaller buyers, potentially reflecting a preference for increased transparency, credibility and closer alignment with local climate action. The Scandinavian bank Nordea, for example, has identified geographic proximity as an important consideration in its purchase of credits from Inherit Carbon Solutions.

Nordic projects are pioneering the supply side of the market, enabled through public-private partnerships

Despite accounting for only a small share of global demand, Nordic companies represent a disproportionately large share of supply. Of the carbon removal credits sold to date, 36% originate from suppliers in Norway, Sweden and Danmark. Large-scale projects are currently under development in these counties, supported by ambitious and targeted policy frameworks. While project developers take on a significant share of the financial risk, public funding and the sale of credits in the voluntary carbon market has been decisive in enabling projects to reach final investment decision.

Supplier split of transactions above 1000 tCO_2e to date

Policy landscape for carbon dioxide removal in Norway, Sweden and Danmark

The EU's 2030 climate target is to reduce emissions by at least 55 % below 1990 levels on average across participating countries[i]. The newly proposed climate target for 2040 is to reduce emissions by 90% compared to 1990 levels. In the communication on the 2040 target, it is explicitly stated that reaching the 2040 target and net-zero require CDR to address residual emissions in hard-to-abate sectors. During the 2026 revision of the Emissions Trading System, the commission will determine where CDRs should be reported and accounted for. In early February 2026, the EU adopted methodologies for certifying durable carbon removal activities, namely biochar, DACCS, and BECCS. This is an important milestone for the emerging carbon removal market in Europe.

Denmark: Using state-backed auctions to scale carbon removal toward net-negative emissions

Denmark's Climate Act commits the country to a 70% emissions reduction by 2030 and net-zero emissions by 2050, compared to 1990 levels. In 2022, the Danish government further strengthened its ambitions by introducing a new target: climate neutrality by 2045 and net-negative emissions of 110% by 2050. Achieving this target explicitly relies on scaling carbon dioxide removal. This is the government's own target and is not set in law.

In 2022, the Danish Parliament agreed on a large support scheme for CCS and CDR with a total budget of DKK 28,7 billion. The Danish Energy Agency has established three reverse auction schemes that awards contracts to projects that can capture and store CO_2 with the lowest cost per tonne. These include the CCUS Fund and the CCS Fund, which support the capture and permanent storage of both fossil and biogenic CO_2, while the NECCS Fund is dedicated exclusively to projects capturing biogenic CO_2.

Ørsted Bioenergy & Thermal Power was awarded funding for a full-scale CCS project under the first tender in the CCUS fund. The project aims to capture 430,000 tonnes of biogenic CO_2 annually from 2026, and the contract lasts for 20 years. Ørsted has signed a commercial agreement with Northern Lights for cross-border transport and storage of CO_2 and has sold over 3,6 million tonnes of CO_2 removal credits to Microsoft and an additional 330 000 tonnes to Equinor.

BioCirc CO_2 ApS, Bioman ApS, and Carbon Capture Scotland Limited were awarded funding under the NECCS Fund for eight years. Together, the projects will ensure the capture and storage of 160,350 tons of CO_2 annually.

i Norway, Sweden, and Denmark all fulfill their 2030 climate targets within the EU's climate framework. The countries also have national climate targets, but implementation, accounting rules, and sectoral obligations are governed by EU climate legislation. Norway participates through the EEA Agreement.

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largest mega-deals originating in Scandinavia.

Sweden: Legally anchoring net-zero and deploying BECCS through competitive auctions

Sweden's Climate Act, adopted in 2017, legally binds the country to reduce emissions by 63% by 2030, 75% by 2040, and 85% by 2045, relative to 1990 levels, and to reach net-zero emissions by 2045. The remaining emissions can be addressed through supplementary measures, including carbon dioxide removal. While Sweden also allows increased carbon uptake in land-use and the use of international mitigation under Article 6, carbon removal has to date been the preferred pathway to compensate residual emissions.

The Swedish government launched a reverse auction scheme for bioenergy with carbon capture and storage (BECCS) projects, with the first auction round completed in 2024. Under this scheme, the Swedish Energy Agency awards 15-year contracts to projects that can capture and store biogenic CO_2 with the lowest cost per tonne.

Stockholm Exergi won the first auction, receiving around SEK 20 billion, aiming to capture 800,000 tonnes annually. Stockholm Exergi has also signed a long-term commercial agreement with Northern Lights and has sold 5.1 million tonnes of credits to Microsoft and 0.2 million tonnes to Frontier Buyers.

Öresundskraft's combined heat and power (CHP) plant in Helsingborg has received public support through the Industrial Leap (Industriklivet) programme. The project is expected to reach final investment decision in 2026 and aims to capture approximately 100,000 tonnes of biogenic CO_2 annually. It has also announced offtake agreements for carbon removal credits with local real estate companies.

Norway: Demonstrating CCS through one-off state investment and dedicated support for a carbon value chain around transportation and storage

Norway's Climate Change Act sets a target to reduce emissions by 55% by 2030, 70–75% by 2035, and 90–95% reduction by 2050, compared to 1990 levels. Norway does not have a binding net-zero target, nor an explicit role for carbon dioxide removal in achieving long-term climate goals.

In 2020, the Norwegian government launched the Longship project as a flagship initiative to demonstrate a full-scale CCS value chain, providing public funding to two capture projects and one storage project. Unlike the Swedish and Danish schemes, which are structured as ongoing or recurring support mechanisms, Longship was implemented as a one-time funding decision.

The capture projects include Heidelberg Materials' cement plant in Brevik and Hafslund Celsio's waste-to-energy plant in Oslo. The construction of the CCS plant at Heidelberg Materials' facility was completed in 2025 and is delivering CO_2 for offshore storage, while the Hafslund Celsio project is expected to be completed in 2029.

Together, the two plants are expected to capture approximately 750,000 tonnes of CO_2 annually, with around 400,000 tonnes from Heidelberg Materials and 350,000 tonnes from Hafslund Celsio. Transport and permanent storage of the captured CO_2 will be provided by the Northern Lights project. Around 50% of the CO_2 captured at Hafslund Celsio is biogenic, enabling negative emissions. Hafslund Celsio has entered into a long-term offtake agreement with Microsoft for the purchase of 1.1 million tonnes of carbon dioxide removal (CDR) credits over a ten-year period.

Takeaways from the current CDR market

With this historical context and status in mind, we can draw three broad takeaways when informing the outlook of the CDR market.

1. There has been formidable growth, but the rollout of large-scale CDR is slow and sporadic. Even considering the impressive 200+% annual growth rates we have witnessed in recent years, the current scale of the CDR market is still small, especially when compared to volumes needed to reach the temperature targets of the Paris Agreement. According to a global independent scientific assessment on CDR from Oxford University[7], durable CDR technologies, which have been the focus of this report, currently represent less than 0.1% of all carbon removal, with the remaining coming from

nature-based removals. To succeed with limiting global warming to 1,5°C, the Oxford study suggests an aggressive push for more durable forms of CDR will need to increase volumes to around 2.5 $GtCO_2e$ per year by 2035. Current estimates place durable CDR rates at around 0.0013 $GtCO_2e$ per year, illustrating just how far away we are from this near-impossible target.

2. Economic and geopolitical developments have reshaped political priorities, affecting support for climate measures.
The development of large-scale CDR projects across the Nordics has been affected by a series of geopolitical and economic disruptions in recent years. Global supply chain disruptions following the COVID-19 pandemic, combined with rising raw material prices, have increased costs and extended lead times for key equipment. High global inflation has further exacerbated these challenges, resulting in delays and cost overruns for several projects.

Russia's invasion of Ukraine triggered a widespread energy crisis in Europe, driven by reduced natural gas imports to Europe. This led to sharp increases in energy prices, forcing governments to prioritise energy-saving measures and short-term energy security. As a result, some energy-intensive CCS and CDR projects may have become less financially attractive.

More broadly, geopolitical instability has shifted political attention and public resources toward defence, industrial competitiveness, and cost-of-living measures. This has constrained governments' capacity to prioritise climate measures.

3. Market immaturity constrains both supply and demand for carbon removal.
Although interest in carbon removal is growing, several barriers continue to constrain demand and slow market development. For suppliers, developing CO_2 capture projects and selling removal credits remains largely uncharted territory. The market is complex and immature, making the path to commercialisation difficult to navigate.

Industrial actors seeking to develop bioenergy with carbon capture and storage (BECCS) face a clear "chicken-and-egg" dilemma: projects must reach a certain level of maturity to attract buyers, yet without purchase agreements or public support, achieving that maturity is often not feasible. As a result, many initiatives stall before reaching final investment decision.

Market outlook

Considering the status of CDR developments summarised in the previous chapter, PwC and ZERO have outlined **two core drivers** that we believe will underpin the outlook for the future of the global CDR market.

- **Political enablers driving supply:** this core driver includes the political decisions that can support the take-off of large-scale projects, herein increased fiscal incentives and credits (e.g. tax credits and grants), government procurement mandates for durable CDR, and alignment on frameworks and rules between countries and corporates (i.e. Article 6 of the Paris Agreement).
- **Consumer trust & competence driving demand:** this core driver includes the various building blocks needed to increase overall appetite for CDR, including widely adopted integrity standards and transparent MRV, offsetting as an integral part of corporate decarbonisation strategies, and increased knowledge and understanding surrounding the value of CDR above other offsetting options.

The various combinations of the two drivers above will result in a market response that will define the outlook of the market more broadly. Tipping-points, or lack thereof, will mark critical moments of momentum based on dynamics between technological maturity, price, volume, and ease of transactions. To illustrate the outlook, we have constructed three scenarios based on various iterations of factors that enable or constrain growth.

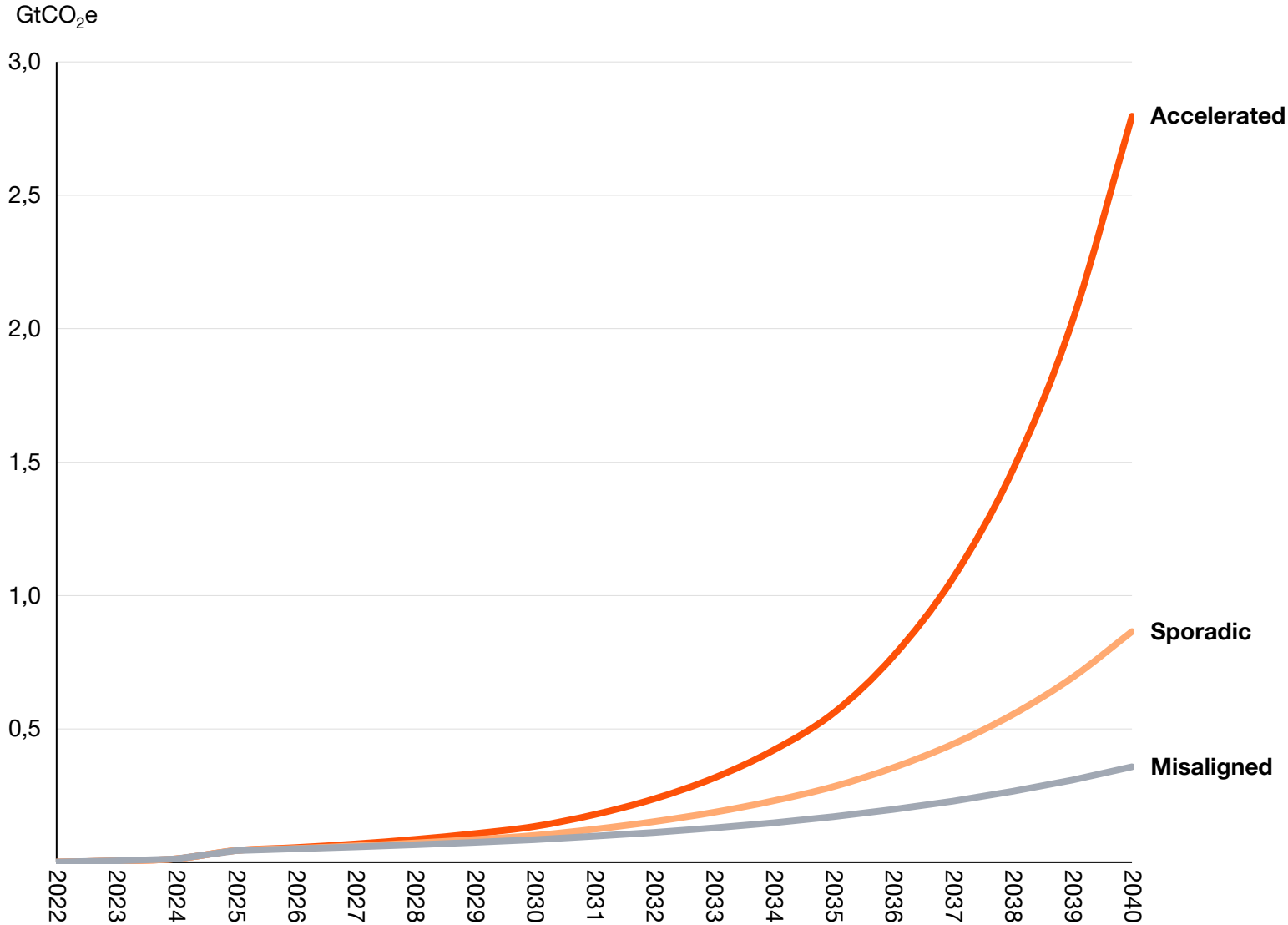
Overview of scenario assumptions and key outcomes

↑ Growth enabling ↓ Growth constraining

Timeline	Accelerated	Sporadic	Misaligned
Now–2030	↑ Strong, predictable climate policy signals in line with Paris Agreement ↑ Rapid development of international standards that define best-practice credits and frameworks for its accounting ↑ Significant growth in clean energy buildout to power DAC/BECCS facilities ↑ Large inflow of long-term private-public capital backed by offtake commitments from major buyers or buyers' clubs	↑ Global climate policy and support for Paris-alignment becomes highly uneven across regions ↓ Standards and accounting frameworks exist but are partially inconsistent across regions ↑ Infrastructure for transportation and storage develops slowly ↓ Demand continues to grow, but isolated to early-mover industries (i.e. technology and finance)	↓ Global climate policy is unprioritized across nearly all regions, resulting in missed global targets for 2030 ↓ Very limited access to clean energy needed to power large scale projects ↓ Investors remain risk-averse to CDR projects, limiting public-private partnerships significantly ↓ Standards are drafted, but never adopted to a critical mass ↓ Lack of major buyers and/or failure to scale buyers' clubs
2030–2035	↑ Broad global alignment on the role of durable removals in corporate net-zero strategies ↑ Fast build-out of transport and storage capacity worldwide to meet rapid growth in credit-demand ↑ CDR technologies reach commercial maturity as costs decline	↑ Several companies include durable removals in climate action plans, but this remains niche ↓ Expansion in storage infrastructure is isolated to Northern Europe and parts of North-America ↓ Clean energy grows moderately, though most is not dedicated to large-scale CDR projects	↓ Nearly all corporate net-zero strategies do not include durable removals ↓ Energy scarcity and technological hurdles persist, making the limited supply expensive ↓ Low levels of transport and storage capacity outside of pioneer regions ↓ Investors withdraw or pause activity
2035–2040	↑ Mature, reliable global storage networks are available across many industrial economies ↑ CDR recognized as a stable, financeable asset class ↑ CDR is considered mainstream in corporate climate action plans **Outcome:** Mature CDR technology and available clean energy enables high-volume growth to reach nearly 3 GtCO2e by 2040. Average price per ton is halved from current levels	↓ Consumer and investor trust is relatively high, but bottlenecks in transportation and storage infrastructure stalls growth **Outcome:** Multiple CDR-projects show commercial viability, but global volumes reach 0.75 - 1 GtCO2e by 2040. Average price per ton reaches around two thirds of current levels	↓ High costs and energy constraints limit deployment, with little expansion in transport and storage infrastructure ↓ Trust and investments remain very low, while companies consistently perceive tension between direct emissions reduction and offsetting through CDR **Outcome:** An unfavorable marco-environment sees CDR struggling to reach 0.2 GtCO2e by 2040. Average price per ton remains three fourths of current levels
Nordic implications	High global competition and volume growth transitions the Nordics from a "pioneer" to a "domain expert", well positioned to commercialise transfer of know-how	The Nordics remains a leading region within CDR, but moderate to low growth from other regions limits the potential for scaling a regional ecosystem around the carbon value chain	Low levels of growth and global competition leaves the Nordics as a niche provider of a niche solution – strongly limiting overall value creation and climate impact

We have constructed forward-looking trajectories from the current baseline of CDR transactions based on the enabling and constraining factors described in the table on the previous page. The outlook is not intended to be a prescriptive prediction, but rather an informed perspective on various levels of growth according to the scenarios described.

Outlook scenarios for global CDR volumes



Scenario 1

Accelerated Scale

Summary
This scenario is linked to CDR scaling to align with the goals of the Paris Agreement. Rapid alignment of policy, finance, and market standards produces a sharp increase in high-integrity durable CDR supply and corporate offtake. Durable removals emerge as a scaled, investible market segment.

Core assumptions
- **Climate policy:** Strong, predictable global climate policy that aligns with achieving the 1,5°C goal of the Paris Agreement.
- **Infrastructure:** Sufficient pipeline of permitted storage and shared infrastructure to scale carbon markets in alignment with the Paris Agreement.
- **Standards:** Internationally recognized durability/permanence standards and registries adopted.
- **Incentives:** Significant fiscal incentives (tax credits, grants) and government procurement.
- **Corporate appetite:** Large offtake commitments from corporations and buyer coalitions.

Best-guess probability: Very unlikely
Achieving this requires multiple high-leverage elements to align (policy, capital, standards); highly optimistic and considered very unlikely.

Timeline & milestones
- **Now–2030:** Major markets like the EU and US align on integrity guidance for durable CDR; targeted tax credits/subsidies expand across the Nordics and Europe. Further expansion of shared CO_2 transport and storage infrastructure; SBTi framework is amended to allow for CDR offsetting within corporate climate strategies; liquid forward contracts[ii] scale rapidly.
- **2030–2035:** Rapid buildout of shared CO_2 transport & storage in European industrial hubs; insurers offer dedicated permanence products, over-the-counter markets and basic derivatives appear.
- **2035–2040 and beyond:** Durable CDR becomes a core instrument in corporate net-zero portfolios; infrastructure and financing enable gigatonne scale capacity growth. To align with trajectories that meet the Paris Agreement, volumes reach nearly 3 $GtCO_2e$ by 2040. Average price per ton CO_2e captured is consistently below 200 USD by 2040.

Implications for the Nordics
In this highly ambitious scenario, regions outside the Nordics begin scaling CDR projects with decisive political support and incentive schemes. Moreover, to hit the volume required for this scenario, Nordic share of global supply would fall drastically. In turn, the long-term outlook of this scenario shows that the Nordic region transitions from a “pioneer” to a “domain expert,” well positioned to commercialise the transfer of know-how. Domain expertise will largely be driven by continued political support for industrial-scale projects and technical experience with large-scale storage in the North Sea, spearheaded by the Longship initiative.

Though companies across the Nordics are expected to increase their purchasing volumes in this scenario, especially after 2035, consistent growth from all other regions makes the Nordic share of demand miniscule. This scenario also requires a significant ramp-up in renewable energy generation to power large scale BECCS and DACCS projects, as well as highly coordinated efforts to ensure sustainable allocation and management of biomass.

ii A liquid forward offtake agreement is a contractual arrangement where a buyer commits to purchasing a specific amount of a producer's future output at a predetermined price. These agreements are commonly used in project finance to secure revenue streams, enabling developers to secure financing for new projects

Scenario 2

Sporadic Scale

Summary
Though standards and MRV are matured in the short term, limited trust and knowledge-building among corporates hold back coordinated efforts and scaled demand. Support for CDR grows but limited to high-profit corporates within the technology and financial sector. The supply-side market grows steadily but unevenly; multiple technologies coexist, and cost-declines are moderate.

Core assumptions
- **Climate policy:** Global commitment to the Paris Agreement is consistently uneven across regions, causing progress to be slower and sporadic.
- **Infrastructure:** Infrastructure rollout is only adequate for regional clusters, not fully nationwide nor international across the Nordics.
- **Standards:** Standards and registries cover enough to reduce buyer uncertainty, but international accounting remains partly unsettled.
- **Incentives:** Targeted public funding and some tax incentives exist but not uniformly scaled.
- **Corporate appetite:** Demand from companies grows, especially after 2030, but this remains relatively niche.

Best-guess estimate of probability: Moderate
This is the middle road - plausible given current policy momentum, private interest and technical progress without requiring full policy alignment.

Timeline & milestones
- **Now–2030:** Global climate policy is in retreat, with support for the goals of the Paris Agreement decreasing, resulting in overshooting the 1,5°C threshold already by 2030; The EU and voluntary standard frameworks leads the standard-setting agenda for integrity guidance, creating some misalignment with other major markets; only a handful of major infrastructure projects are realised, resulting in a fragmented market.
- **2030–2035:** Incremental infrastructure projects get permitted; private capital flows to proven projects; offtake mainly via bilateral forward contracts and buyer coalitions.
- **2035–2040 and beyond:** Durable CDR becomes a meaningful, but not dominating, part of corporate carbon strategies; market matures with differentiated credit classes.

Implications for the Nordics
In constrained scenario, especially in the short term and into the early 2030s, the Nordic region remains a leading player within CDR, seeing only moderate growth from other regions. The main consequence is not only constrained volumes globally, but also a limitation in the creation of regional ecosystems surrounding the carbon value chain. Adjacent players in this ecosystem could be intermediaries like insurance providers, brokers, data providers and technical advisors. Contrary to the Accelerated scenario where the Nordics becomes positioned as a “domain expert” that can transfer know-how to other regions, the limitation behind the regional ecosystem inhibits the reach of these opportunities significantly. Also contrasting the broad increase in demand from all regions under the Accelerated scenario, this scenario sees demand being concentrated to global conglomerates mainly from North America.

Scenario 3

Misaligned & Unprioritised

Summary
Standards remain fragmented, policy support is weak and inconsistent, and high perceived risks related to permanence, greenwashing and trust keep prices volatile and supply growth limited. Durable CDR remains niche and constrained.

Core assumptions

- **Climate policy:** Global climate policy is sluggish and does not prioritise durable removals; regional political blocks also lose momentum behind CDR; 2030 targets are unmet.
- **Infrastructure:** Infrastructure and storage permitting slow; community opposition high in key areas.
- **Standards:** Standards are drafted but never adopted to a critical mass; registries and standards diverge even in the long term.
- **Incentives:** Limited or poorly targeted policy incentives; lack of prioritisation from both private and public sectors; capital shies away from long term risk.
- **Corporate appetite:** Lack of major buyers and/or failure to scale buyers' clubs across key regions like North America and Europe.

Best-guess probability: Moderate
Risks to scale persist because high barriers related to cost, permitting and trust remain even in the longer term; though current momentum in several jurisdictions reduces the chance that the market completely stalls, there is an equal probability that market misalignment results in sluggish and delayed scaling.

Timeline & milestones

- **Now–2030:** Conflicting standards and accounting guidance; a handful of pilots exist but without mainstream buyer confidence. Major buyers like Microsoft wrap up their purchases and leave a demand-side vacuum.
- **2030–2035:** Limited financing allocated to new projects; projects constrained by high cost, weak infrastructure, and reputational concerns from buyers; many promised projects delayed or cancelled. The overall market begins to fizzle out before the promised take-off.
- **2035–2040 and beyond:** Durable removals remain a small niche, with nature-based solutions remaining dominant; buyers begin looking for other abatement opportunities to address residual emissions; the overall voluntary carbon market is fragmented into divergent regulatory regimes hampering collective trust.

Implications for the Nordics
In this low-growth scenario, pioneering regions like the Nordics can be considered a niche provider of a niche solution, held back by sluggish demand growth. Moreover, early-movers lack significant global competition to stimulate ramped up innovation and scale, ultimately limiting both business potential as well as the broader climate impact it also offers.

Stimulating further scale

The previous chapters have shown that the market for CDR has developed rapidly over the past few years, evolving from a niche concept to a topic that is on the radar of many policymakers and corporate sustainability leaders.

At the same time, the analysis makes clear that the market remains fragmented, immature, and highly dependent on policy. The market outlook also highlights significant uncertainty around future market growth, reaffirming that progress in line with ambitious climate targets is highly dependent on coordinated and deliberate action across policy and markets. This final chapter outlines recommendations to address barriers and support further scale in the CDR market.

Recommendations for companies

Demand in the voluntary carbon market has been, and will continue to be, a critical driver for the early deployment of carbon removal solutions. While public policy is critical to secure predictable and sufficient funding for large-scale projects, companies play a key and often complementary role in making CDR projects bankable today.

As explained in Chapter 2, companies are on the fence about buying credits. Many are interested, but few have concrete near-term plans to engage in the market. The most prominent barriers holding companies back, found through this analysis, are 1) the perceived conflict between offsetting and reducing emissions directly, 2) reputational risks related to compensation, and 3) justifying a premium price for carbon removal credits. This next section focuses on overcoming these barriers.

Quantify residual emissions to clarify which emissions are eligible for compensation

Many companies state that they are not participating in the market for durable CDR because they prioritise emission reductions. While emission reductions are the most important mitigation tool for most companies, reducing emissions and purchasing CDR credits should not be seen as interchangeable actions. They serve distinct and complementary roles in achieving net-zero and are intended to coexist. CDR should address residual emissions and beyond value chain mitigation.

Quantifying emissions that are difficult or expensive to abate with current technologies helps clarify which emissions may ultimately require compensation. Although it is generally sensible to prioritise the most cost-effective abatement measures first, there is also value in planning for the most

Demand from the voluntary market alone is unlikely to scale CDR in line with the predicted need to meet global climate targets.

challenging mitigating measures in parallel. The appropriate balance will vary across companies. Firms with a large share of Scope 3 emissions often have limited influence on mitigation outside their own operations and value chain, making carbon removal credits a more relevant complement in the near to medium term. In addition, future supply remains uncertain and may fall short of anticipated demand, providing a strong rationale for early engagement and securing credits ahead of time.

Prioritise high-quality carbon removal projects. Ideally from local suppliers
The second barrier is reputational risk related to compensation and the credibility of credits more generally. Prioritising durable, high-integrity removal projects reduces reputational risk. More interestingly, we found that many companies that have already purchased CDR credits, as well as those considering doing so, tend to prefer geographically proximate projects. This is because buying credits from local projects increases confidence in the quality and additionality of a project. Additionally, funding local projects also helps contribute to local climate goals, which might be in a buyer's preference.

Start small and consider collective purchasing models.
Early engagement does not require large volumes. Small, carefully selected purchases can build competence and learning. Large-scale projects might prefer large agreements, but there are many smaller CDR projects, for example, biogas production or small waste-to-energy plants that can sell smaller volumes.

Pooling demand is another solution to make engagement more accessible. Frontier is an example of a coalition of companies pooling together funds to buy a larger amount of CDR to help catalyze large projects by creating predictable and strong demand. The EU recently launched the EU Buyers Club under the same principle. It will pool funding from private actors and collectively buy credits from projects.

Recommendations for governments and policymakers

The voluntary carbon market is a great source of funding for CDR and has been instrumental to the developments in number of projects so far. However, demand from the voluntary market alone is unlikely to scale CDR in line with the predicted need to meet global climate targets. This section outlines policy mechanisms to drive a predictable scale-up.

Establish a national CDR framework with clear targets and milestones.
A robust national CDR framework that defines the role of CDR within national climate policy will ensure that CDR does not deter emission reductions and give predictable demand signals to the market. A national CDR strategy should include the following three core elements.

- Quantifying the expected need for carbon dioxide removal to achieve national net-zero and net-negative targets, based on an assessment of residual emissions. This will guide subsequent funding and policy schemes.

> Purchasing carbon removal credits represents more than compensation alone. It contributes to financing critical climate technologies at an early and decisive stage of development.

- Establish a clear and binding volume target for CDR within the national climate law, separate from emissions reduction targets, to strengthen credibility and predictability. Sweden and Denmark have targets that indicate a need for CDR, but these could be more clearly defined.
- Include a ramp-up plan with intermediate milestone targets, providing a clear trajectory for investment and market scale-up.

Implement serial funding schemes on the national level to ensure deployment

While CCS and CDR technologies are technically mature, they remain economically unviable under current carbon pricing. As a result, large-scale deployment is highly dependent on government support to bridge the funding gap. In practice, the combination of targeted policy incentives and emerging demand from the voluntary carbon market has been critical in making first-of-a-kind projects bankable.

Many countries are now implementing dedicated financial support mechanisms to accelerate deployment. Sweden, Denmark, Germany, Switzerland, Canada, the United States, and the United Kingdom have introduced a range of instruments, including reverse auctions, tax credits, public procurement, and carbon contracts for difference. In Norway, the government has announced plans to introduce a dedicated support scheme for CDR during 2026.

Government funding for maturing projects

There are some coordination challenges between buyers and suppliers in the CDR market. Project developers typically require long-term purchase commitments to reduce risk and justify large upfront investments for project development, while many corporate buyers are reluctant to commit until projects are sufficiently mature, often waiting until final investment decisions have been reached. This creates a classic "chicken-and-egg" problem: suppliers need early demand contracts to advance projects, while buyers wait for project maturity before entering into binding agreements.

In the absence of public support or risk-sharing mechanisms, this dynamic prevents many projects from progressing beyond early development stages. Offering public funding to support project maturation would reduce investment risk, contributing to maturation and potentially unlock private demand.

Government Investment in shared infrastructure in regional CO_2 hubs to solve coordination issues

A central barrier to scaling CCS and CDR is the lack of shared infrastructure. Current frameworks require individual projects to develop their own infrastructure, which risks under-dimensioning capacity for future CO_2 volumes and can result in higher unit costs and inefficient infrastructure use. Governments can take an active role in making sure that infrastructure is established and designed optimally. For example, by establishing regional CO_2 hubs, where multiple emission sources can share infrastructure and be connect to a CO_2 storage project. This can reduce risks in the individual projects and enable economies of scale. For CO_2-storage developers, large quantities of CO_2 are necessary to make investments in storage profitable. Aggregating CO_2

volumes in hubs can therefore make investments in storage more likely.

Integrate carbon removal in the EU Emission Trading System (ETS) to reach net-zero emissions in the industrial sector and for long term predictable scaling of CDR
The emission allowances in the EU Emissions Trading System (ETS) will be phased out by 2039. Integrating CDR into the EU ETS will therefore be necessary to enable net-zero emissions in the industrial sector. It is unrealistic to expect industry to eliminate all remaining emissions solely through abatement, without widespread industry death in Europe, and subsequent carbon leakage. Allowing the use of permanent carbon removal within the ETS is a cost-efficient way to address residual emissions in hard-to-abate industrial sectors.
The ETS is not sufficient to scale CDR on its own, but it will lead to a more predictable supply. However, carbon removal should complement, not replace, continued emissions reductions, and be subject to strict quality, permanence, and additionality criteria.

Moreover, integrating carbon removal into the ETS would help establish robust standards, monitoring practices, and governance structures for carbon removal more broadly. These standards could spill over into the voluntary carbon market, strengthening credibility, building trust among buyers, and reducing reputational risks. Finally, an ETS-based role for carbon removal would create predictable demand signals and support the scale-up of durable carbon removal solutions. The Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) is another regulated marked that can contribute to stable demand and upscaling.

Carbon Takeback Obligation as the final policy instrument
An extended producer responsibility approach can play an important role in scaling CCS and CDR sufficiently.
The Carbon Takeback Obligation (CTBO) is a proposed policy tool that aims to scale up CCS and CDR by internalising the cost of CO_2 disposal. Under the CTBO, companies that extract or import fossil fuels are required to ensure that an amount of CO_2 equivalent to the emissions generated by their products is permanently stored back underground, either through CCS or CDR. The obligation percentage increases over time, ultimately reaching 100% by 2050. The aim is that in 2050, every tonne of CO_2 that is extracted and emitted will, with this mechanism, be compensated for.

By integrating the cost of permanent CO_2 storage into the production and import of fossil fuels, the policy creates a predictable and long-term scale up of CCS and CDR and aligns continued fossil fuel use with net-zero objectives, by a regulated phase-out.

Reach out to discuss opportunities within carbon markets

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Definitions and abbrevations

BECCS	Bioenergy with carbon capture and storage refers to a climate mitigation technology that produces energy from biomass (organic matter) while capturing and storing the emitted CO2 in permanent geological storage.
Biogenic emissions	Carbon dioxide emissions originating from biological sources
CAGR	Compounded annual growth rate
CCS	Carbon capture and storage
CDR	Carbon dioxide removal
Climate neutrality	Ensure that human activities have no net effect on the climate system by reducing emissions and compensating for any remaining impacts across all climate forcers, not just emissions.
CTBO	Carbon take-back obligations, a supply-side climate policy requiring fossil fuel producers and importers to store a progressively increasing percentage of the CO2 generated by their products
DAC	Direct Air Capture refers to technology that separates CO2 from ambient air
DACCS	Direct Air Capture and Storage specifically combines the technology of DAC with permanent geological storage. DAC can be used for utilisation (such as for synthetic fuels), but only DACCS ensures durable net-negative emissions.
Durable CDR	Carbon dioxide removal methods that store CO2 for at hundreds of years .
GHGs	Greenhouse gases, the gases in an atmosphere that trap heat, raising the surface temperature of astronomical bodies such as Earth.
Gt	Gigatonnes, or the unit of mass equivalent to one billion metric tonnes
EU ETS	EU Emissions Trading System (EU ETS), the world’s first and largest international "cap-and-trade" carbon market, launched in 2005 to reduce greenhouse gas (GHG) emissions efficiently.
Hard-to-abate sectors	Industries where cutting greenhouse gas emissions is difficult because they rely on processes that need high temperature heat, fossil feedstocks, or have limited low-carbon alternatives - examples include steel, cement, chemicals, and aviation.

MRV	Monitoring, reporting, and verification
Net-zero	The amount of greenhouse gases emitted is balanced by the equivalent amount removed from the atmosphere.
SBTi	Science Based Targets initiative
Scope 1	Direct emissions from sources a company owns or controls
Scope 2	Indirect emissions from the generation of purchased electricity, stream, heat or cooling
Scope 3	Emissions occurring outside a company's own operations and value chain, for example, purchased goods and services or sold products.
tCO2e	Metric tonnes of carbon dioxide equivalent, the standard unit used to measure and report greenhouse gas (GHG) emissions.
VCM	Voluntary carbon market, where companies, organisations, and individuals can voluntarily trade carbon credits.

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