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# **DEFENDING NET-ZERO: A NEW ROLE FOR CARBON DIOXIDE REMOVAL**

by Felix Schenuit

LibMod Policy Paper

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## About the author

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## KEY MESSAGES

- **Without visible short-term progress in implementing carbon removal capacities, Carbon Dioxide Removal (CDR) risks political failure.** Ongoing climate backsliding – the deliberate weakening and rollback of climate policy – threatens to erode the political foundation for CDR.
- **The recent surge of interest in CDR has been driven by the recognition that it is indispensable for achieving net-zero targets. If political commitment to net-zero targets weakens, CDR loses its justification – and investment will stall.** Unlike other decarbonization options, CDR offers no immediate gains in competitiveness or resilience, making it uniquely dependent on a stable and credible climate policy framework.
- **CDR policy must therefore be reoriented to actively defend the net-zero objective. A passive accounting logic – “net-zero requires CDR” – is no longer sufficient.** What is needed is a proactive, industrial policy-driven approach that positions CDR as a strategic enabler of credible and feasible climate targets.
- **In a political landscape dominated by security, resilience, and competitiveness, CDR needs a new narrative. It must move from being seen as a “last-mile option” to a strategic investment in technological leadership.** This requires delivering initial CDR capacities before 2030 and focusing in the short term on a small number of scalable, near-term projects rather than a broad portfolio of methods. Demonstrating that CDR works in practice and capacities exist already today is not a side issue – it is central to sustaining the credibility and feasibility of net zero.
- **This requires a strategic reorientation of CDR policy toward near-term objectives: delivering visible projects in the short term, managing expectations rigorously, avoiding investment delays, and building industrial alliances.** In the current political context, resolving all outstanding questions regarding the comprehensive integration of CDR into the climate policy architecture is of secondary importance. Priority should instead be given to a strategic industrial policy approach focused on speed, scalability, and future market access. Demonstrating that CDR is deployable today would actively contribute to stabilizing and defending net-zero targets – rather than leaving CDR passively dependent on their political fate.

# CARBON DIOXIDE REMOVAL IN TIMES OF CLIMATE BACKSLIDING

Carbon Dioxide Removal (CDR) is indispensable for achieving climate neutrality. In recent years, this necessity has become the central argument for establishing CDR as a core component of climate policy. Much of the debate has focused on modelling residual emissions in net-zero target years as accurately as possible and initiating a corresponding scale-up of CDR through policy initiatives and investment. This perspective implicitly assumes that residual emissions will generate sufficient political pressure to drive the deployment of CDR – an expectation that is becoming increasingly fragile under current political conditions.

Climate policy and politics are increasingly characterized by tendencies toward climate backsliding, defined as the weakening, undermining, or dismantling of existing climate policies. Spanning national, European, and international levels, these developments pose a fundamental challenge to CDR. One that has so far been underestimated within the CDR community. Unlike other key pillars on the pathway to net-zero CO<sub>2</sub>/GHG emissions – such as the expansion of renewable energy, the phase-out of fossil fuels, improvements in energy efficiency, or the development of hydrogen infrastructure – CDR does not directly enhance industrial competitiveness or strategic resilience. From today's perspective, CDR does not generate a tradable product with intrinsic economic value. Its deployment therefore depends almost entirely on climate policy frameworks that assign a price to emissions, establish regulatory obligations or otherwise create demand, thereby enabling viable business models for CDR.

Accelerating climate backsliding risks developing into a profound crisis for CDR. The most extreme case can currently be observed in the United States: if CO<sub>2</sub> is no longer classified as harmful,<sup>1</sup> the fundamental rationale for investing in its removal from the atmosphere would effectively disappear. While developments within the European Union are less drastic, they may lead to similar outcomes. Any political questioning of the net-zero GHG target undermines the central justification for CDR as an integral component of climate policy. The less credible the net-zero target becomes, the weaker the argument for addressing residual emissions through CDR. At the same time, the structural disadvantage of CDR becomes an even greater liability, as it is not well aligned with dominant political priorities such as competitiveness, economic resilience, and security.

Accelerating  
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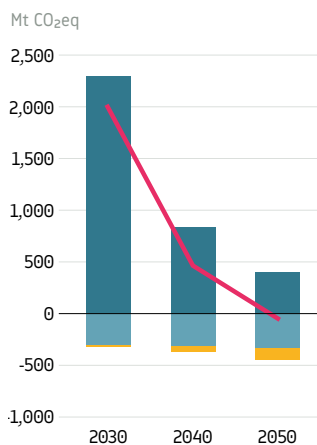
1 NYT, 12.02.2026: <https://www.nytimes.com/2026/02/12/climate/what-to-know-epa-endangerment-finding.html>

Adapting to these changing political realities requires a shift in the narrative around CDR. Rather than relying on a passive accounting logic – ‘net-zero targets necessitate CDR’ – a more proactive, industrial policy-oriented perspective is needed: “achievable CDR potential demonstrates both the credibility and the practical feasibility of net-zero targets.” While this reframing may appear subtle, it has far-reaching implications for policy design. It strengthens the strategic case for CDR and helps safeguard the political viability of net-zero as a long-term objective.

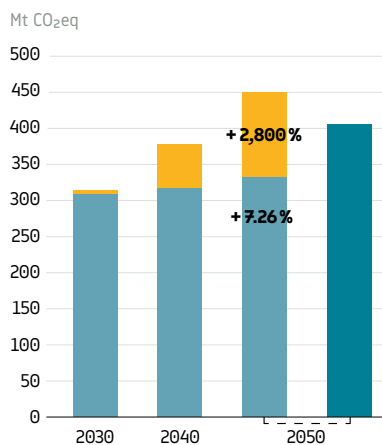
**Figure 1: Emission reductions and CO<sub>2</sub> removals on the path to net-zero greenhouse gas neutrality in the EU**

Based on the European Commission’s impact assessment for the recommendations on the 2040 target, SWD (2024) 63 final

**Emission reduction and CO<sub>2</sub> removal in 2030, 2040, 2050**



**Industrial and net LULUCF removals**  
CO<sub>2</sub> removal in 2030, 2040, 2050 and residual emissions in the EU



**Mean value scenarios 2 & 3**  
from impact assessment,  
Europe’s 2040 target

- Residual emissions (CO<sub>2</sub>eq)\*
- Net LULUCF CDR\*\*
- Industrial CDR\*\*\*
- Net emissions, CO<sub>2</sub>eq\*\*\*\*

**CDR** Carbon Dioxide Removal (CO<sub>2</sub> removal)  
**LULUCF** Land Use, Land Use Change, and Forestry  
**CO<sub>2</sub>eq** CO<sub>2</sub> equivalent

Source: Impact Assessment, Europe’s 2040 Target, SWD (2024) 63 final

- \* Figure 4
- \*\* Figure 95
- \*\*\* Figure 2
- \*\*\*\* Figure 4

Source: Schenuit/Treß, 2025: Scaling Industrial Carbon Dioxide Removal: Policy Options for a Short-Term Strategy.  
<https://www.swp-berlin.org/publikation/scaling-industrial-carbon-dioxide-removal-policy-options-for-a-short-term-strategy>

# DIFFICULT POLITICAL STARTING POINT: INCREMENTAL PROGRESS IN CDR POLICY AND INSUFFICIENT EMISSIONS REDUCTIONS

## Incremental progress in CDR policy

Over the past decade, CDR has evolved rapidly as a topic of scientific, political, and societal relevance. A growing number of research initiatives, non-governmental organizations, and dedicated advocacy groups have contributed to its increasing visibility in climate policy debates. In Germany, the most tangible outcome reflecting its growing relevance is the introduction of Section 3b of the Federal Climate Change Act, which establishes indicative targets for “technical sinks” in 2035, 2040, and 2045, alongside the targets for the Land Use, Land Use Change and Forestry (LULUCF) sector set out in Section 3a. Additional developments include earmarked public funding for CDR and the ongoing – yet still incomplete – process of developing a “long-term strategy for negative emissions”.

At the European level, the European Commission has long acted as a key driver of the CDR agenda. However, it has recently refrained from setting explicit targets for CDR outside the LULUCF sector. Widely supported calls for separate targets were not taken up by the Commission, the European Parliament, or the Member States in the context of the 2040 mitigation

target of net 90% greenhouse gases. As a result, there is neither a clear market signal for scaling up CDR nor an explicit limit on its contribution toward achieving the 2040 target. Existing policy initiatives remain limited. They include the adoption of a voluntary Carbon Removal Certification Framework (CRCF), ongoing discussions on a potential European procurement mechanism, and an increasingly politicized debate on the integration of CDR into the EU Emissions Trading System (EU ETS). For the latter, the recent amendment to the European Climate Law already introduces initial provisions for integrating “domestic and permanent” removals into the EU ETS.<sup>2</sup>

Given these incremental developments, tangible progress in CDR deployment remains very limited. In its current form, CDR policy – and the projects implemented to date – are insufficient to credibly defend net-zero targets. On the contrary, the current state of play risks reinforcing doubts about their feasibility.

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<sup>2</sup> Amended Regulation (EU) 2021/1119 <https://data.consilium.europa.eu/doc/document/PE-5-2026-INIT/en/pdf>

## CDR depends on emissions reductions

The political starting point for CDR is shaped not only by the current state of policy and project deployment, but also by the trajectory of emissions reductions. In Germany, modelling studies highlight the scale of the uncertainty regarding these developments.<sup>3</sup>

The CDRterra project estimates residual emissions in 2045 at 60–130 Mt CO<sub>2</sub> and developed a scenario providing around 76 Mt of CDR.<sup>4</sup> However, projections from the German Environment Agency (UBA) indicate that Germany is far from this path: residual emissions are projected at roughly 212.5 Mt CO<sub>2</sub>-equivalent in 2045, excluding the LULUCF sector.<sup>5</sup> Adding to the uncertainty, the LULUCF sector has recently shifted from a net sink to a net source – a trend that could persist – further complicating the calculation of future CDR requirements.<sup>6</sup>

If the gap between stated targets and realistic emissions pathways becomes too large, the credibility of the net-zero objective erodes – and with it the rationale for large-scale CDR deployment.

While it may be argued that insufficient ambition in emissions reductions increases the need for CDR, political dynamics suggest the opposite. If the gap between stated targets and realistic emissions pathways becomes too large, the credibility of the net-zero objective erodes – and with it the rationale for large-scale CDR deployment. The larger the gap between projected residual emissions and realistic CDR potential, the harder it becomes to mobilize political and economic support for scaling up CDR. Because alternative mitigation options – such as renewable energy, energy storage, efficiency improvements, and grid expansion – are more mature, tangible, and often offer additional co-benefits, policy efforts are likely to prioritize further emissions reductions over the uncertain deployment of CDR. Framing higher residual emissions as a driver for CDR expansion is therefore misleading. In practice, it risks producing the opposite effect: if emissions do not decline to levels that can realistically be counterbalanced, CDR will lose relevance relative to other decarbonization options.

- 3 Prognos, 2025: [https://www.bundeswirtschaftsministerium.de/Redaktion/DE/Downloads/M-O/Negativemissionen-Dokumente/241017-l-ne-2-ag1-prasentation.pdf?\\_\\_blob=publicationFile&v=2](https://www.bundeswirtschaftsministerium.de/Redaktion/DE/Downloads/M-O/Negativemissionen-Dokumente/241017-l-ne-2-ag1-prasentation.pdf?__blob=publicationFile&v=2)
- 4 CDRterra, 2025: <https://cdrterra.de/news/wie-deutschland-co2-entnahme-hochskalieren-kann-und-wo-es-hakt/>
- 5 UBA, 2025: <https://www.umweltbundesamt.de/themen/klima-energie/klimaschutz-energiepolitik-in-deutschland/szenarien-projektionen/treibhausgas-projektionen/aktuelle-treibhausgas-projektionen#2025>
- 6 Thünen Institute, 2026: <https://www.thuenen.de/de/themenfelder/klima-und-luft/emissionsinventare-buchhaltung-fuer-den-klimaschutz/darum-werden-die-minderungsziele-fuer-die-landnutzung-verfehlt>; WBNK, 2025: [https://www.wissenschaftlicher-beirat-fuer-natuerlichen-klimaschutz.de/wp-content/uploads/WBNK\\_Zusammenfassung\\_Weiterentwicklung\\_ANK.pdf](https://www.wissenschaftlicher-beirat-fuer-natuerlichen-klimaschutz.de/wp-content/uploads/WBNK_Zusammenfassung_Weiterentwicklung_ANK.pdf)

# „IT’S THE SHORT TERM, STUPID“ – NEW PRIORITIES FOR CDR POLICY

The debate on CDR must shift from conceptual discussions to actionable strategy. What matters now is visible progress in the short term. Only tangible deployment of CDR can demonstrate that net-zero is not an abstract commitment, but a credible objective grounded in real and scalable CDR potential.

Without such progress, two mutually reinforcing risks may materialize: first, that ongoing climate backsliding further erodes the political relevance of CDR, and second, that an anticipated phase of reality checks within the CDR sector itself undermines confidence in the feasibility of net-zero targets. Preventing this downward spiral requires a clear reprioritization of CDR policy.

## 1. Prioritize near-term, realizable potential

The immediate priority should be to unlock CDR potential that can be realized in the short term.<sup>7</sup> In the German and European context, this primarily involves creating incentives where biogenic residual and waste streams are already being utilized and can be complemented by Carbon Capture and Storage (CCS). Relevant applications include thermal waste treatment, biogas utilization, and industrial processes such as clinker and cement production.

The focus should be less on technological breakthroughs and more on integrating CDR deployment into existing value chains.<sup>8</sup> This includes shaping investment decisions in a way that systematically incorporates carbon removal capacities. Beyond their direct impact, such projects can generate important signaling effects and foster new industrial alliances among established actors. They also offer significant synergies with broader carbon management systems and infrastructures, particularly in relation to CO<sub>2</sub> transport and storage infrastructure.

In the short term, priority should therefore be given to a limited number of “lighthouse projects” rather than pursuing a broad portfolio approach. Strategic focus and visibility are critical to establishing CDR as a credible component of climate policy. A broader CDR portfolio, supported by systematic investment in technological breakthroughs, can and should be developed over the medium to long term – building on and expanding the alliances established through short-term initiatives.

The debate on CDR must shift from conceptual discussions to actionable strategy. What matters now is visible progress in the short term.

<sup>7</sup> Schenuit/Trefß, 2025: <https://www.swp-berlin.org/publikation/scaling-industrial-carbon-dioxide-removal-policy-options-for-a-short-term-strategy>

<sup>8</sup> Find out more: The LibMod / Bellona Germany Policy Paper. Key points on the technical removal of biogenic carbon: <https://libmod.de/policy-paper-eckpunkte-zur-technischen-entnahme-von-biogenem-kohlenstoff/>

## 2. Manage expectations – avoiding the “CDR soufflé”

CDR policy must be accompanied by consistent and realistic management of expectations. Structural constraints – including limited sustainable biomass, infrastructure bottlenecks, and the energy intensity of CDR methods – must be acknowledged early on. Recent years have seen hype around the CDR technology landscape. Lessons from the hydrogen debate suggest the importance of avoiding inflated expectations and preparing for inevitable setbacks. Early signs of this dynamic are already visible in the struggles of several high-profile startups.<sup>8</sup> There is a real risk of what might be called a “CDR soufflé”.<sup>9</sup> A wave of project failures or downward revisions of overly optimistic projections would not only undermine confidence in CDR but also weaken the broader credibility of net-zero targets – particularly given the limited and uncertain outlook for the LULUCF sector, which is unlikely to deliver net removals at the levels previously expected. Transparent communication about the limits and uncertainties of scaling CDR is therefore essential to maintaining political and public trust.

In the short term, priority should therefore be given to a limited number of “lighthouse projects” rather than pursuing a broad portfolio approach. Strategic focus and visibility are critical to establishing CDR as a credible component of climate policy.

## 3. Reassess the role of emissions trading for CDR – and vice versa

The role of the EU ETS in supporting CDR should be assessed with caution. An excessive focus on integrating CDR into the ETS risks weakening both CDR deployment and the effectiveness of the trading system itself. While integration may be appropriate in the long term, it is unlikely to provide meaningful incentives in the short term. Even under optimistic assumptions, any integration would begin gradually and only after 2030, while current uncertainties surrounding the future design of the ETS further limit its effectiveness as an investment signal.

Relying on future ETS integration risks creating a “wait-and-see” dynamic, delaying investment decisions not only in CDR but potentially also in other decarbonization technologies. To counter this, governments should provide targeted support mechanisms that de-risk early investments – for example, by offering guarantees or compensation mechanisms in case future ETS integration does not materialize as expected. The central policy task at the national level is therefore to bridge the gap: enabling near-term deployment while EU-level regulatory frameworks continue to evolve.<sup>10</sup>

9 The Guardian, 2025: <https://www.theguardian.com/environment/2025/may/17/swiss-firm-that-captures-carbon-from-air-to-cut-workforce-by-more-than-10>

10 Building on the phrase “Hydrogen Soufflé” by Michael Liebreich: <https://about.bnef.com/in-sights/clean-energy/liebreich-the-pragmatic-climate-reset-part-ii-a-provocation>

11 Schenuit/Treß, 2025: <https://www.swp-berlin.org/publikation/scaling-industrial-carbon-dioxide-removal-policy-options-for-a-short-term-strategy>

## 4. Position CDR as strategic industrial policy

Finally, CDR policy should be more firmly embedded within an industrial policy framework. While CDR does not yet directly contribute to competitiveness or resilience, the development of a CDR sector can create opportunities for technological leadership in the medium- to long-term – particularly in countries with strong industrial bases, such as machinery and equipment manufacturing. Even if the climate backsliding continues in the coming years – political priorities can shift rapidly, as demonstrated by the European Green Deal. Increasing recognition of likely temperature overshoot pathways – and their potentially irreversible impacts<sup>12</sup> – can be expected to create a renewed CDR momentum in the 2030s. Preparing for this future demand is a strategic opportunity and a building block for maintaining the innovative strength of European industry and restoring its competitiveness. Countries such as Germany – and the European Union as a whole – should pursue industrial policy-driven initiatives tailored to their specific strengths and conditions, with a clear focus on speed, scalability, and future market access. Strategic international partnerships – for example with countries such as Canada, the United Kingdom, or Brazil – can further support the development of competitive CDR value chains. Crucially, early deployment should not be delayed by unresolved questions regarding long-term accounting frameworks. While these issues remain important, they should not become a barrier to initial investments in high-impact projects.

## Conclusion

Reprioritizing CDR policy along these four dimensions could help shift carbon dioxide removal from a long-term aspiration to immediate policy priority. If governments succeed in delivering visible projects, managing expectations, avoiding investment delays, and fostering industrial alliances, CDR can actively contribute to maintaining the credibility of net-zero targets – rather than remaining passively dependent on their political fate.

Countries such as Germany – and the European Union as a whole – should pursue industrial policy-driven initiatives tailored to their specific strengths and conditions, with a clear focus on speed, scalability, and future market access.

<sup>12</sup> Reisinger, Andy, 2025: Overshoot – Can we exceed and return to 1.5°C? <https://libmod.de/en/overshoot-can-we-exceed-and-return-to-1-5c/>

## Further publications on the topic of carbon management (in German)

- Eckpunkte zur technischen Entnahme von biogenem Kohlenstoff, gem. mit Bellona Deutschland, 2026  
<https://libmod.de/policy-paper-eckpunkte-zur-technischen-entnahme-von-biogenem-kohlenstoff/>
- CO<sub>2</sub>-Entnahme: zwischen Akzeptanz und Ablehnung, 2025  
<https://libmod.de/factsheet-co2-entnahme-zwischen-akzeptanz-und-ablehnung/>
- CO<sub>2</sub>-Speicherung an Land: Potenziale und Herausforderungen in Deutschland, 2025  
<https://libmod.de/co2-speicherung-an-land-potenziale-und-voraussetzungen-in-deutschland/>
- Overshoot – Einmal über 1,5 °C und zurück?, 2025  
<https://libmod.de/overshoot-einmal-ueber-15c-und-zurueck/>
- Eckpunkte für ein integriertes Carbon Management, 2024  
<https://libmod.de/eckpunktepapier-fuer-ein-integriertes-carbon-management/>
- Carbon Management Factsheet: Potenziale, Kosten, Zeithorizonte, Risiken und Herausforderungen, 2023  
<https://libmod.de/vier-factsheets-zum-stakeholder-dialog-carbon-management/>
- Carbon Management Factsheet: Geschäftsmodelle und notwendige Infrastrukturen, 2023  
<https://libmod.de/vier-factsheets-zum-stakeholder-dialog-carbon-management/>
- Weitere Veröffentlichungen und aktuelle Informationen zum Projekt finden Sie auf unserer Webseite:  
<https://libmod.de/themen/oekologische-moderne/negative-emissionen/>



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