PROMOTING BIOGENIC CARBON CAPTURE AND STORAGE IN THE NORDIC REGION THROUGH CARBON MARKETS

When and how to cooperate under Article 6 of the Paris Agreement?

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Policy Brief

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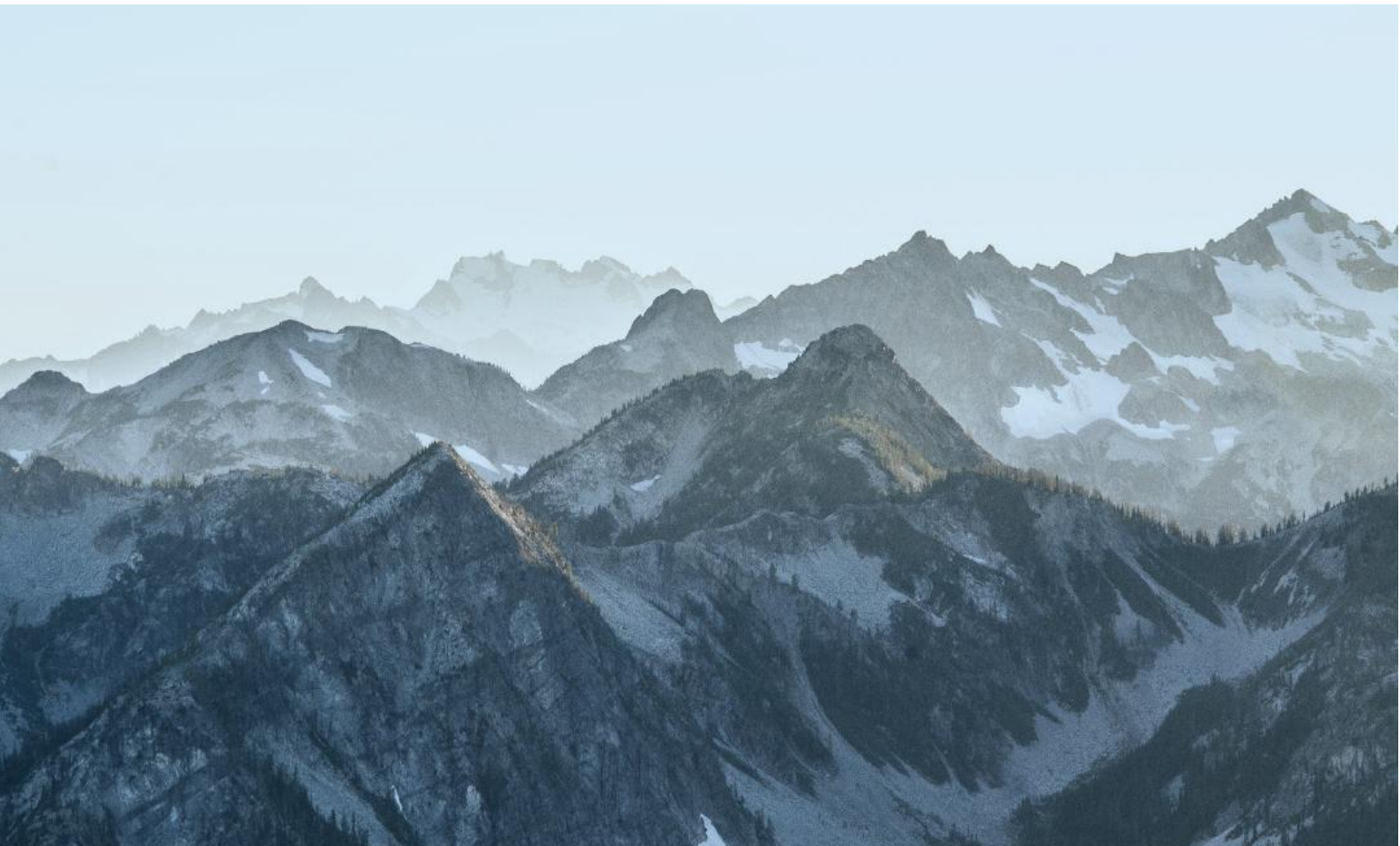

Promoting bio-CCS in the Nordic region through carbon markets

The capture and durable storage of biogenic carbon dioxide (bio-CCS) is an emerging solution that can contribute to achieving our global climate change mitigation goals by removing carbon dioxide from the atmosphere. To be financially viable, these removals need to be monetised, for example through state support or the sale of carbon credits in carbon markets. This policy brief explores the role of carbon credits in supporting bio-CCS in the Nordic region, taking into account the Paris Agreement, the voluntary carbon market and the EU context.

Key messages on supporting removals from bio-CCS with carbon markets

- Meeting global net zero requires scaling up public and private finance for bio-CCS
- Carbon market cooperation can leverage public and private finance for bio-CCS
- How public and private entities finance, use and claim removals from bio-CCS matters for the environmental integrity and cost-effectiveness of climate change mitigation action
- Countries need to set up arrangements for quality control, tracking, accounting and reporting to engage in Paris-aligned carbon market cooperation
- EU engagement in carbon market cooperation under the Paris Agreement would require updates in EU law

This policy brief focuses on the opportunities and requirements for supporting bio-CCS through carbon market cooperation under Article 6 of the Paris Agreement. It provides recommendations for bio-CCS developers, carbon credit buyers, Nordic and EU officials and other stakeholders on the robust generation, trading, tracking and use of carbon credits from bio-CCS. For further details, see the discussion paper "Promoting biogenic carbon capture and storage in the Nordic region through carbon markets – How and when to cooperate under Article 6 of the Paris Agreement?".

This policy brief and the discussion paper have been prepared as part of the research project "Nordic bio-CCS cooperation through Article 6", funded by the Swedish Energy Agency. The project examines the conditions for promoting the capture and durable storage of bio-CCS in the Nordic region through carbon market cooperation under Article 6 of the Paris Agreement. The views presented in this paper are of the authors' and do not represent the position of the Swedish Energy Agency.

Meeting global net zero emissions requires scaling up public and private finance for bio-CCS

The Paris Agreement includes a global goal to limit temperature rise to 1.5°C. This requires halving global emissions by 2030 and achieving a balance between global greenhouse gas (GHG) emissions and removals by mid-century (i.e. global net-zero GHG emissions). To keep this global goal within reach, it is imperative to accelerate the pace and scale of emission reductions around the world, in order to limit the accumulation of GHGs in the atmosphere. However, even with drastic emission reductions, it is not feasible to fully eliminate all emissions for technical, financial, or other reasons, especially in the short-to-medium term. To achieve a global balance between emissions and removals, the hard-to-abate emissions still remaining would need to be counterbalanced at the global level by removing carbon dioxide (CO_2) or other GHGs from the atmosphere through biological or engineered processes. In its sixth assessment report, the Intergovernmental Panel on Climate Change (IPCC) defines Carbon Dioxide Removal broadly as "anthropogenic activities removing carbon dioxide (CO_2) from the atmosphere and durably storing it in geological, terrestrial or ocean reservoirs, or in products." Removals that involve capturing CO_2 from the incineration of biomass or directly from air, and durably storing the captured CO_2, are sometimes referred to as industrial or engineered removals or negative emissions, to distinguish them from removals associated with shorter-term storage and a greater reversal risk.

This policy brief focuses on bio-CCS which is an emerging solution for capturing CO_2 emissions from biomass combustion and other biogenic sources, such as waste incineration and pulp and paper production, and storing them durably, for example in deep geological formations. The carbon capture and storage (CCS) component incurs significant additional costs, and generates only removals in return, unless the durable storage of captured carbon can be combined with productive use, such as for enhanced oil recovery. In all other cases, investing in bio-CCS is financially viable only if the resulting removals can be monetised. In the absence of obligations to deploy bio-CCS, options to monetise these removals include provision of state support and the sale of GHG units (carbon credits or emission allowances, see below) in carbon markets.

The Nordic countries have significant untapped bio-CCS potential and an interest in promoting bio-CCS activities. In the Nordic region, the developers of the first bio-CCS activities are already utilising state support and (future) revenue from the sale of carbon credits to reach financial viability. For a case study of bio-CCS cooperation between Microsoft, Ørsted, Denmark and Norway, see the discussion paper "Promoting biogenic carbon capture and storage in the Nordic region through carbon markets – How and when to cooperate under Article 6 of the Paris Agreement?".

Carbon market cooperation can leverage public and private finance for bio-CCS

Mobilising finance with carbon market cooperation

Carbon market cooperation is a means to mobilise public and private finance to support bio-CCS. Through carbon markets, entities that reduce emissions or enhance removals beyond their own needs and requirements can sell them as GHG units in carbon markets to receive carbon finance. There are two main types of GHG units: emissions allowance issued under emissions trading systems (ETSs) and carbon credits issued under carbon crediting programmes (see Box 1 below). Emission allowances and certain carbon credits can be used for compliance with legal obligations and carbon credits can also be used for voluntary purposes. The voluntary carbon market caters for voluntary buyers and compliance carbon markets for compliance buyers. Entities that generate removals from bio-CCS could potentially receive emission allowances under ETSs and/or carbon credits under a carbon crediting programme, and sell them in the carbon markets to buyers that want to use them for compliance or voluntary purposes. This policy brief focuses on supporting removals from bio-CCS through carbon credits.

Box 1. Emissions trading and carbon crediting

Under ETSs, the regulator caps the total emissions of covered entities and issues **emission allowances** against this cap. Participants can trade these allowances. One allowance typically represents the right to emit one metric tonne of carbon dioxide equivalent (tCO_2e). Participants can be countries or non-state entities within specific sectors and regions. Participants must cover their emissions with allowances (or eligible carbon credits, see below). Allowances can be bought in auctions and bought and sold in the carbon market. In some cases, participants may receive allowances for free. ETSs focus on limiting emissions but they could also incentivise the enhancement of removals in case the regulator issues allowances for removals. This would enable entities that invest in removals to earn revenue by selling their removals as allowances to ETS participants. In a net-zero context, removals could even be the main source of emission allowances. Under a net-zero-aligned emissions cap, the number of allowances would approach zero over time. Once the allowances associated with the emissions cap are exhausted, any emissions remaining within the ETS would need to be covered with allowances from removals.

Carbon credits are issued by carbon crediting programmes for emission reductions or removals that meet the programme's criteria and apply methodologies approved by the programme. According to internationally established carbon credit criteria, a carbon credit represents one tCO_2e of emission reductions or removal enhancements that is additional to what would happen without the incentive from carbon credits, quantified relative to a crediting baseline using robust baseline and monitoring methodologies, and independently verified. Any leakage and risk of reversal should be assessed and fully addressed, double counting should be avoided and environmental and social safeguards in place. The carbon crediting programmes approve methodologies, register activities, issue carbon credits and record their voluntary use (retirement or cancellation) in a carbon registry. Some programmes are managed by international bodies while others are managed by national or non-state entities. Carbon credits can be bought and used voluntarily and, in some cases, they may be eligible for compliance use (see Box 3).

Supporting additional emission reductions and removals with carbon credits

Through carbon credits, countries and companies can support more mitigation than they could achieve on their own, provided that the carbon credits are of high integrity and they are used responsibly to complement, not to substitute, other mitigation efforts. This can enable higher ambition. Public and private entities can buy carbon credits to voluntarily support mitigation beyond their value chain or boundary. These are sometimes used as a basis for making climate claims. In some cases, carbon credits may be eligible for compliance use, e.g. for international compliance towards nationally determined contributions (NDCs) under the Paris Agreement or under the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) or for compliance on a regional, national or sub-national level, e.g. under ETSs and carbon tax schemes.

The Paris Agreement sets up the international framework for carbon market cooperation, including guidance for cooperation involving internationally transferred mitigation outcomes (ITMOs) and the Paris Agreement Crediting Mechanism (PACM) for generating Paris-aligned carbon credits (Box 2). This framework caters for both compliance and voluntary carbon credit markets.

Carbon credits are issued by carbon crediting programmes, which aim to ensure carbon credit integrity through quality criteria, baseline and monitoring methodologies and third-party verification. Such programmes can cover different jurisdictions, ranging from the whole world to subnational units. The PACM sets the international benchmark for Paris-aligned carbon credits. In the context of international aviation, the CORSIA's Technical Advisory Body assesses carbon crediting programmes against the scheme's eligibility criteria. In the voluntary space, the Integrity Council for the Voluntary Carbon Market (ICVCM) has been assessing carbon crediting programmes and methodologies against its Core Carbon Principles since 2024.

Carbon credits from bio-CCS can be issued under programmes that have approved methodologies for bio-CCS. The first bio-CCS methodology was launched in June 2024, by Puro.Earth, a privately governed crediting programme. Paris-aligned methodologies, including specific requirements for removals, are developed under the PACM, and the first methodologies are expected to be approved in 2025. The European Commission will govern a framework for certifying removals within the EU, and aims to adopt the first set of methodologies by the end of 2025.

Carbon credits can be authorised by countries as ITMOs, in line with international guidance under Article 6.2 of the Paris Agreement. An ITMO represents an additional emission reduction or removal that is not counted towards the NDC of the host country (i.e. the country where the mitigation takes place) and is thus available to be uniquely counted by the buyer. This makes ITMOs suitable for international compliance use towards NDCs or CORSIA. ITMOs can also be used for voluntary purposes, including voluntary offsetting and contributions to global ambition-raising.

Box 2. ITMOs and Paris-aligned carbon credits

The Paris Agreement's rulebook for market-based cooperation was adopted in December 2021, and largely finalised in November 2024. These rules continue to evolve over time through decisions adopted under the Paris Agreement.

Countries, and public and private entities authorised by countries, can engage in cooperation involving **ITMOs** in line with international Article 6.2 guidance. ITMOs are real, additional and verified emission reductions or removals that the host country has authorised and first transferred for use towards NDCs, international mitigation and/or other purposes. Carbon credits from internationally, nationally or privately operated carbon crediting programmes could be authorised as ITMOs. Participating countries are responsible for ensuring environmental integrity, applying robust accounting and promoting sustainable development. They must have national arrangements for authorising and tracking ITMOs and they must report ITMO-relevant information regularly under the Paris Agreement. Authorisation commits the host country to adjusting its emissions balance by applying corresponding adjustments for all first-transferred ITMOs. Countries that use ITMOs towards their NDC apply corresponding adjustments upon ITMO use. This avoids double counting of the mitigation outcome associated with the ITMO. The first ITMO authorisations were announced in November 2022 and the first issuances of ITMOs were announced a year later. Countries must submit their Biennial Transparency Reports, including information of any corresponding adjustments, every two years, starting from the end of 2024.

Under the PACM, emission reduction and removal activities can generate Paris-aligned carbon credits (**Article 6.4 Emission Reductions**, A6.4ERs) if they apply PACM-approved methodologies and meet other relevant requirements. Countries may also authorise A6.4ERs as ITMOs under Article 6.2. The A.64ERs that are not authorised as ITMOs are called Mitigation Contribution Units (MCUs) and they may contribute to mitigation in the host country. The PACM is overseen by an international Supervisory Body. The PACM became operational at the end of 2024, enabling the approval of new methodologies (potentially also for bio-CCS activities) and the issuance of A6.4ERs under the PACM from 2025 onwards.

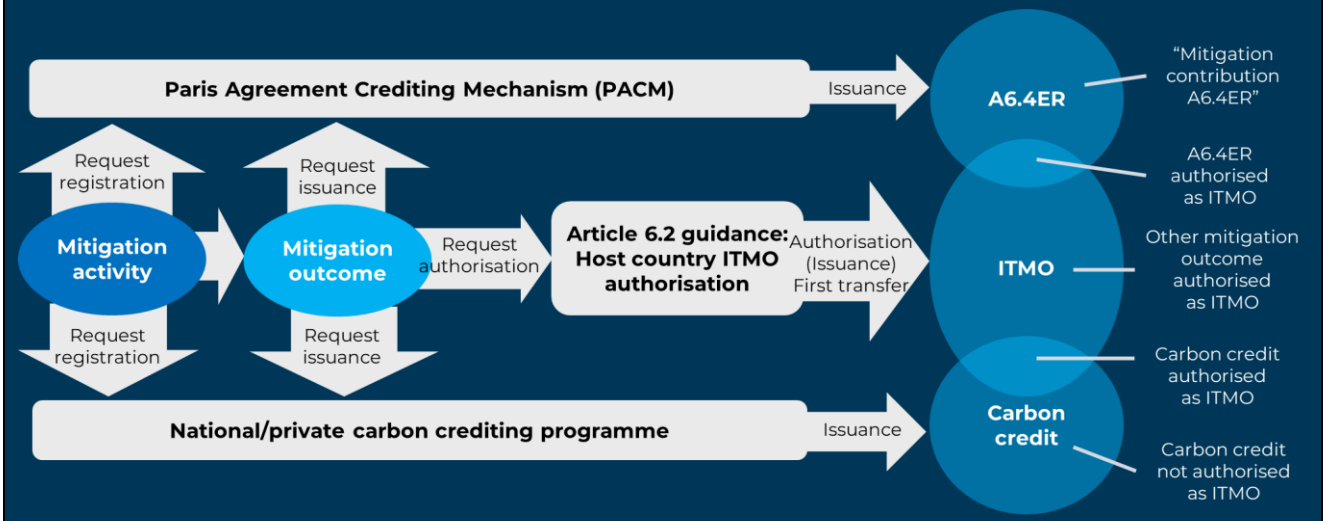

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Figure 1. Carbon credits, Article 6.4 Emission Reductions and ITMOs

Using carbon credits voluntarily and making credible claims

The voluntary use of carbon credits and related claims are subject to public scrutiny and evolving regulation on corporate sustainability reporting and anti-greenwashing. Companies are increasingly expected and even required to publicly disclose climate-related information and align their business models and internal decarbonisation targets with the global 1.5°C goal. Carbon credit buyers are expected to transparently report their value chain emissions separately from their carbon credit use and disclose details of their carbon credit use, such as the amount of carbon credits based on emission reductions and removals, how their environmental integrity has been demonstrated, whether and to what extent they count towards national targets, and what role carbon credits have in the buyer's climate strategies and targets. Anti-greenwashing regulation requires green claims to be truthful and transparent. They must not mislead consumers into thinking that an organisation or product has better environmental performance than it actually does.

During the past two decades, organisations have used carbon credits from various carbon crediting programmes for voluntarily counterbalancing ("offsetting" or "compensating") the climate impact of their emissions and making related offset claims (e.g., that an organisation or product is "carbon neutral"). Offsetting is used to cover historical and/or current emissions, using carbon credits based on emission reductions and/or removals. In their net zero target year (e.g., 2050), companies can offset[1] their "residual emissions" using permanent removals to achieve net zero. Residual emissions denote emissions that remain in the net zero target year and thereafter, after the company has reduced its value chain emissions in line with a science-based long-term emission reduction target.

Voluntary offsetting has been heavily criticised, due to concerns relating to using carbon credits to avoid or postpone reductions in own value chain emissions, questionable carbon credit quality and double claiming of the underlying mitigation outcomes by more than one entity (public or private entity or government). These concerns can be addressed by requiring entities that make claims based on carbon credits to reduce also their own value chain emissions in line with science, use only high-integrity carbon credits and avoid double claiming[2]. The first requirement can be met through science-based targets and action, the second with trusted carbon crediting programmes and methodologies, and the third by using ITMOs. While there is broad agreement on the first two requirements, views on the third requirement diverge (see Box 3). In recent years, contribution claims have emerged as an alternative to offset claims.

[1] Note that this type of offsetting is referred to as "neutralisation" in the SBTi Corporate Net Zero Standard.

[2] The avoidance of double claiming has been called by, inter alia, Carbon Market Watch, Gold Standard, ISO 14068-1 Carbon Neutrality Standard, the Nordic Code of Best Practice for the Voluntary Use of Carbon Credits and a group of EU countries. SBTi, ICVCM and Voluntary Carbon Markets Integrity Initiative have not taken a stance on this issue. Many carbon credit suppliers and corporate buyers call for allowing avoid double claiming between voluntary offsetting and national targets.

Box 3. Good practice for the voluntary use of carbon credits and related claims

There is broad consensus on the need for non-state actors to prioritise reductions in their value chain emissions and not to use carbon credits from outside their value chains to substitute these value chain emission reductions. There is also wide agreement that, in the net zero target year and beyond, companies that have reduced their value chain emissions in line with science can use permanent removals to counterbalance residual emissions and achieve net zero. On the way to net zero, companies are encouraged to also support mitigation beyond their value chains. This can be done through carbon credits and conveyed through voluntary offset or contribution claims. The importance of ensuring the high integrity of carbon credits is undisputed.

Regarding the need to avoid double claiming between voluntary climate claims and national mitigation targets, there are diverging views. Prior to the Paris Agreement, most countries did not have national mitigation targets. Double claiming between voluntary offsetting and national mitigation targets was avoided by using carbon credits generated in those countries, allowing the underlying mitigation to be uniquely claimed for voluntary offsetting. Under the Paris Agreement, all countries have national mitigation targets. The need to avoid double claiming between voluntary climate claims and national mitigation targets is a topic of contention, with some arguing that double claiming illegitimises offset claims. However, the inverse is not true; there is broad agreement that uniquely claimed high-integrity mitigation outcomes are legitimate for offsetting. The authorisation of mitigation outcomes as ITMOs by the host country allows these mitigation outcomes to be uniquely claimed by the buyer.

In the Paris era, contribution claims have emerged as an alternative to offsetting to convey voluntary contributions to mitigation beyond organisations' value chains. Contribution claims do not convey that the claimant's own emissions have been counterbalanced ("netted") through this contribution. Contribution claims could be based on carbon credits with or without authorisation as ITMOs. MCUs and other carbon credits that are not authorised as ITMOs may contribute to the host country's national mitigation targets while the voluntary cancellation of ITMOs contributes to global ambition-raising beyond existing NDCs. Contribution claims may have a lower risk of misleading consumers compared to offset claims, but the demand for contribution claims is uncertain.

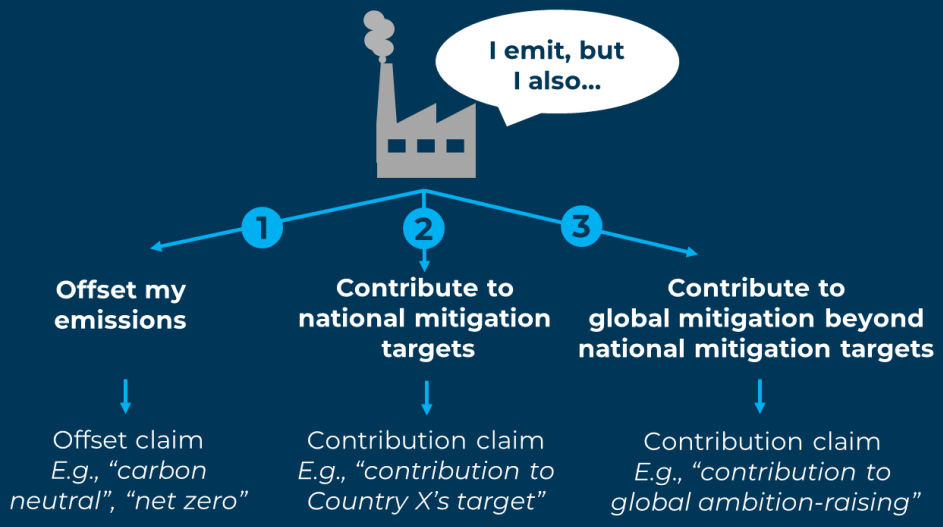

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Figure 2. Voluntary climate claims

How public and private entities finance, use and claim removals from bio-CCS matters for climate integrity and cost-effectiveness

Aligning with the mitigation hierarchy through targets and internal carbon pricing

Without science-aligned emission reductions, the global net zero goal will be missed. This is why it is important to support, use and claim removals in line with the mitigation hierarchy, that is, in ways that complement, and do not substitute, science-aligned emission reductions. Supporting and using removals, including via carbon credits, should not lead to entities reducing less emissions within their boundaries or supporting less emission reductions beyond their boundaries.

In general, some actors are concerned that the availability of low-cost carbon credits disincentivises entities from reducing their own emissions in line with science at a higher unit cost. This disincentive could be addressed through a science-aligned target for internal emissions reductions and/or a science-aligned internal carbon price for each tonne of emissions emitted by an entity. The target would prevent carbon credits from being used to substitute necessary internal reductions while the internal carbon price would prevent a low carbon credit market price from influencing the entity's decision-making on the extent of internal emission reductions, effectively removing the incentive for buyers to focus on the unit price as the decisive factor in selecting which carbon credits to buy.

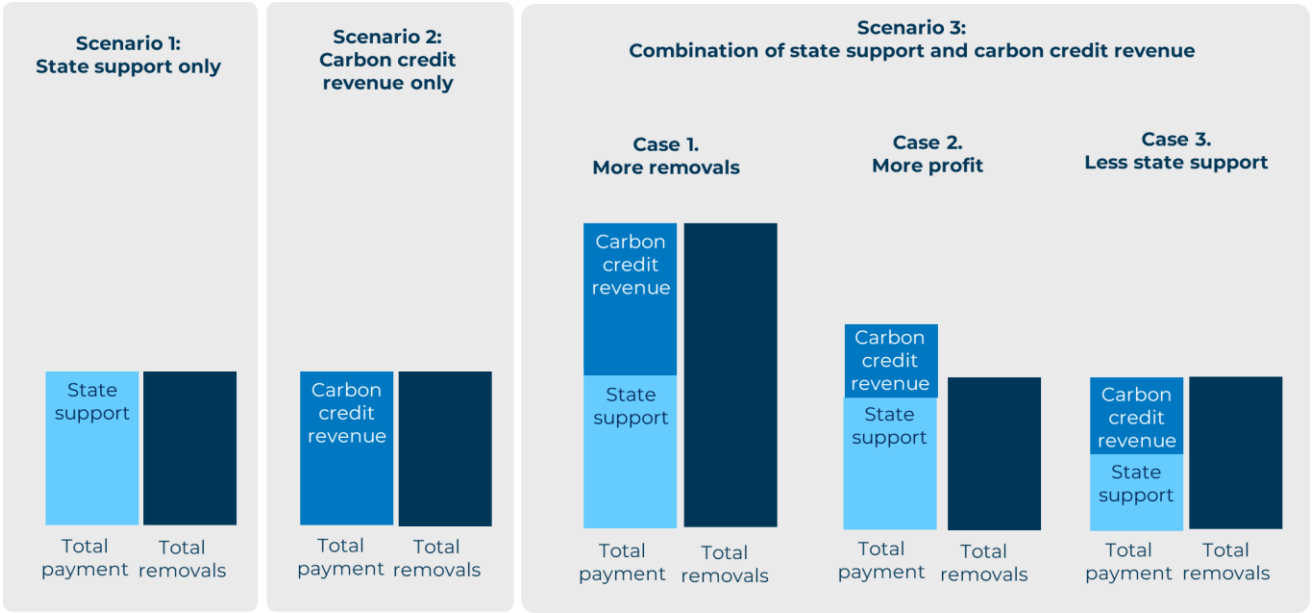
The relatively high price of bio-CCS credits safeguards against using bio-CCS credits instead of reducing own emissions due to cost-efficiency. However, if carbon credit buyers pay a lower carbon credit price for bio-CCS credits due to the activity also receiving state support (see below), the government essentially subsidises carbon credit generation and distorts the carbon market. Governments need to carefully consider how to use scarce public resources efficiently and design state support in a way that enables the use of carbon credit revenue to make more removals from bio-CCS activities financially viable without undermining the overall ambition of climate action.

Furthermore, prioritising removal-based carbon credits over emission reduction-based carbon credits already now, when significant volumes of cost-effective emission reduction potential remain untapped, increases the risk that cost-effective emission reduction opportunities are not implemented. This would require an equivalent increase in removals to counterbalance the failure to reduce emissions in line with science. Thus, in principle, any high-integrity carbon credits contribute equally to limiting the global net emissions, regardless of whether they are based on emission reductions or removals, provided that they have negligible reversal risk or any reversals are fully addressed.

Combining public and private finance to achieve more or pay less for bio-CCS

In the absence of obligations to deploy removals from bio-CCS, or to support such deployment, state support and carbon finance are the two main sources of finance for bio-CCS activities. Activities can be financed fully by state support, fully by carbon finance or through a combination of these two (see example in Box 4).

In the two first scenarios, where there is only one source of finance, this source would need to cover the full cost of the bio-CCS component needed to make the investment viable and the total volume of removals from bio-CCS would be limited by this source's budget for removals from bio-CCS. In Scenario 3, the combination of state support and carbon finance could finance more removals from bio-CCS compared with the amount that either of these sources could achieve with its own budget. The maximum amount of removals from bio-CCS could be achieved if both sources paid the full unit cost of generating removals from bio-CCS (Case 1). On the other hand, if finance sources were combined solely for the purpose of boosting the bio-CCS activities' profits and/or reducing the total amount of state support available for bio-CCS (Cases 2 and 3), this could reduce unit costs for the carbon credit buyers and/or the state rather than increase the amount of removals.



Source: Authors

Figure 3. Scenarios for supporting removals with state support and carbon credit revenue

Box 4. Example: Combining state support and carbon credit revenue to support bio-CCS

For illustrative purposes, consider that a bio-CCS developer needs 300 EUR per tonne of CO_2 removal to make the investment in bio-CCS viable and the host government and a carbon credit buyer each have a maximum budget of 30 million EUR to finance removals from bio-CCS. With 30 million EUR, the activity owner could generate up to 100,000 t of removal.

Scenarios 1 and 2: Financing removals with only state support or only carbon finance

On their own, the state (Scenario 1) or the carbon credit buyer (Scenario 2) could finance a maximum of 100,000 t of removal.

Scenario 3: Financing removals with a combination of subsidies and carbon credit revenues

In principle, if projects are financed through a combination of state support and carbon credits, more removals can be achieved compared to Scenarios 1 and 2.

Case 1. More removals

In Case 1, the maximum budgets of the state and carbon credit are combined, resulting in 60 million EUR of finance for removals. With a unit cost of 300 EUR/t, this would result in 200,000 t of removals, which is twice the level achieved by state support or carbon credits on their own.

Case 2. More profit

In Case 2, the activity owner receives 290 EUR/t of state support for 100,000 t of removal. The owner would need at least 10 EUR/t more to make the generation of these removals financially viable. Let us assume that the activity owner secures a higher carbon price of 95 EUR/t for selling the generated 100,000 t of removal as carbon credits. Although the combined state support and carbon credit revenue could potentially enable the generation of up to 128,333 t of removal, the activity owner only generates 100,000 t of removal. Thus, it makes an excess profit (rent) of 85 EUR/t.

Case 3. Less state support

In Case 3, the amount of removals is kept constant at 100,000 and the state support covers any gap between the carbon credit unit price and the threshold level of 300 EUR/t. For example, if the activity owner has secured a carbon credit price of 150 EUR/t for 100,000 t of removal, the state would provide support of 150 EUR/t for those 100,000 t of removal. The amount of removals would be the same as in Scenarios 1 and 2 but, in this case, the government and the carbon credit buyer share the costs and effectively cross-subsidise each other. While this means that carbon credit revenue can reduce the amount of state support needed to achieve a given volume of removals, it also means that state support is used to subsidise carbon credit prices. Governments that wish to use carbon credit revenue to minimise state support could, for example, rank bidders based on the highest carbon credit unit price secured and thus lowest state support per unit required. However, this may raise questions about additionality, if the activity would have been fully financed with state support in the absence of carbon credit revenue. Furthermore, in practice, carbon credit prices and related revenue may be uncertain at the time of allocating the state support, especially in light of the voluntary nature of most current demand for removal credits. In order to use public resources efficiently, state support should cover no more than any gap between the carbon credit sale revenue actually achieved and the funding needed to make the activity viable.

Avoiding double claiming to make credible claims

All emission reductions and removals that are reported in the national GHG inventory count towards the host country's mitigation target, unless they are outside the scope of the target and/or the host country authorises them as ITMOs and applies corresponding adjustments in accordance with Article 6.2 guidance, thus excluding these outcomes from being counted towards the national target. This gives rise to the risk of double claiming, that is, more than one entity claiming the same emission reduction or removal. Double claiming should not be conflated with reporting of emissions in GHG inventories. The parallel reporting of the same emissions and removals in national and organisational inventories is not a concern, since the overlapping inventory boundaries do not undermine the validity of the reported information. By contrast, claiming the same mitigation outcome towards both national targets and voluntary offsetting could be considered to undermine the validity of the voluntary offset claim (see above).

In our illustrative example in Box 4, double claiming would occur if the carbon credit buyer uses the carbon credits to make a voluntary offset claim and the state counts the underlying removals towards its target. In this case, double claiming would imply that the host country and the carbon credit buyer are effectively subsidising each other's targets. Each of them pays only part of the cost but both claim the full results, rather than only their share of the outcomes. The voluntary offset claim is based on mitigation that the host country had committed to achieving even without carbon credit revenue.

The carbon credit buyer could avoid double claiming with the host country by using removals that are authorised as ITMOs. If the host country authorises some removals as ITMOs, for example the actual share of removals financed by carbon credit revenue (100,000 t in Scenario 3.1 and 50,000 t in Scenario 3.3), the carbon credit buyer could use these ITMOs for voluntary offset claims that avoid double claiming. Alternatively, the carbon credit buyer could avoid double claiming by making contribution claims (see above). Using our illustrative example, if the host country counts all the removals towards its national target, the carbon credit buyer could make a contribution claim to communicate that it has contributed to financing removals from a specific project in a specific country through the purchase of carbon credits. Compared to the voluntary offset claim, the main difference is that the carbon credit buyer would not claim that its contribution to removals counterbalances its own value chain emissions.

Countries need to set up arrangements for quality control, tracking, accounting and reporting to engage in Paris-aligned carbon market cooperation

Meeting international Article 6.2 requirements

Countries that participate in cooperation involving ITMOs need to have in place national arrangements for authorising ITMOs and access to a registry for recording and tracking ITMO-related information, such as authorisations, transfers and use. Furthermore, they need to report under the Paris Agreement on their ITMO cooperation and how they meet the international Article 6.2 requirements relating to environmental integrity, transparency, robust accounting and sustainable development.

The host country authorisation is a necessary step in turning emission reductions and removals into ITMOs. Authorisation commits the host country to ensuring environmental integrity, applying robust accounting in their emissions balance and reporting to the Paris Agreement. According to the international Article 6.2 guidance, ensuring environmental integrity includes, inter alia, checking that ITMOs are real, additional and verified, crediting baselines are set below business-as-usual and any reversals and leakage are addressed in full. Countries are also required to minimise negative environmental and social impacts.

Upon authorisation, the host country must submit an Initial Report that describes the authorised ITMO cooperation and how it meets the relevant requirements. ITMO-related actions should be recorded and tracked in a registry and reported annually. For all authorised and first transferred ITMOs, host countries need to apply corresponding adjustments in their emissions balance to avoid double counting, and report their emissions balance as part of their biennial reporting under the Paris Agreement. Countries that use ITMOs towards their NDCs must also apply and report corresponding adjustments in their biennial reporting.

Aligning ITMO cooperation with national climate action

Countries should implement ITMO cooperation in a way that safeguards, and does not undermine, the achievement of their national mitigation targets. This means that host countries should authorise as ITMOs only emission reductions and removals above and beyond what are needed to achieve their national targets, and only emission reductions and removals that are within the scope of their (unconditional) targets and reflected in the national GHG inventory. Otherwise, authorising emission reductions or removals as ITMOs would make it more difficult for the host country to achieve its national targets, since authorised emission reductions and removals cannot be counted towards its target.

Key steps for the national implementation of ITMO cooperation include developing a national Article 6 strategy, enacting relevant legislation, and establishing national Article 6 criteria, procedures and infrastructure for ITMO authorisation, recording, tracking and reporting. Countries may also enter into ITMO cooperation agreements with other countries.

Countries could make use of the PACM and other existing carbon crediting programmes in their national arrangements for authorising and tracking ITMOs. Countries should carefully assess which carbon crediting programmes are sufficiently stringent for demonstrating fulfilment of ITMO criteria regarding, for example, additionality, baselines and permanence, and to what extent these programmes and their registries can complement the national assessment, tracking and reporting procedures. Participating countries are ultimately responsible for ensuring environmental and social integrity and the achievement of their NDCs and they should not outsource national decision-making to external actors.

Source: Authors

Figure 4. Key elements in ITMO cooperation

EU engagement in carbon market cooperation under the Paris Agreement would require updates in EU law

Bio-CCS activities in the EU currently rely on public support and voluntary carbon markets

In the EU, bio-CCS activities are currently supported through the EU Innovation Fund, state support and forward contracts on the sale of removal credits to voluntary buyers, such as Microsoft. Current EU targets and policies do not provide incentives for bio-CCS in the EU. The Commission has been tasked to explore the potential inclusion of removals from bio-CCS in the EU emissions trading system as part of the 2026 revision of the system.

The European Climate Law sets EU-wide targets for 2030 and 2050 for emission reductions and removals regulated in EU law. For 2030, the EU has a binding target to reduce domestic net GHG emissions by at least 55 % compared to 1990 levels. This target is aligned with the EU NDC for 2030, which is a single joint NDC covering the EU and its Member States. The EU aims to achieve a balance between economy-wide emissions and removals within the EU by 2050, and "negative emissions" thereafter. Removals from bio-CCS are not currently counted towards the EU 2030 targets for the emissions trading, effort-sharing or land use sectors. Member States can, however, include removals from bio-CCS in their reporting to the EU. It is unclear whether such removals would be included in the EU GHG inventory and count towards the EU 2030 NDC.

Currently, removals from bio-CCS activities, including from the EU, can be certified under some carbon crediting programmes operated by non-state entities, such as Puro.Earth. The EU framework for certifying removals is expected to be operational by 2027. This framework focuses on removals that count towards the EU targets and will thus not be authorised as ITMOs.

Member States' opportunities to engage in ITMO cooperation are currently limited

EU Member States can currently engage in ITMO cooperation only as buyers of ITMOs for use for purposes other than towards the EU NDC, e.g., towards national targets. The existing EU legislation does not allow ITMOs to be used towards the EU NDC nor to comply with the emissions trading system, effort-sharing or land use sector targets. Furthermore, the existing EU legislation does not enable emission reductions and removals generated within the EU to be authorised as ITMOs.

The EU expects some transfers under Article 6.2 to occur in the context of the EU's cooperation with Iceland, Liechtenstein, Norway and Switzerland, but, as of January 2025, the necessary arrangements and registries were not yet implemented. Their implementation will require changes in EU law, including amendments to existing regulations on, inter alia, Paris reporting and new legislation on Paris registries. If EU were to decide to allow ITMO use towards its 2040 NDC, ETS, effort sharing and/or land use sector targets, this would require changing the EU Climate Law and other relevant legislation.

Recommendations for generating, using and claiming removals from bio-CCS consistently with international good practice and the Paris Agreement

Entities that generate and sell removals from bio-CCS should:

- Seek to ensure the integrity of removals by applying criteria, methodologies and crediting programmes that are in line with good practice, taking into account the work done under the PACM and the ICVCM. This is important for safeguarding the achievement of global climate goals and the effective use of scarce resources.

- Ensure that potential buyers are aware of how the removals relate to national targets: removals authorised as ITMOs represent global ambition-raising compared with the existing national targets while other removals may contribute to existing national targets. This is important for promoting transparency and avoiding misleading claims.

- Follow the development of methodologies and claims regulation. This is important for promoting continuous improvement and maintaining trust in market-based cooperation.

Buyers of removals from bio-CCS should:

- Seek to buy high-integrity removals that apply criteria, methodologies and crediting programmes that are in line with good practice, taking into account the work done under the PACM and ICVCM, and use these removals only to complement, not to substitute, science-aligned reductions of own value chain emissions. This is important for safeguarding the environmental integrity of removals, the effective use of scarce resources and the achievement of global climate goals.

- Seek to ensure that that the carbon credit purchases do not displace public money that would (or could) have otherwise financed removals. This is important for the effective use of scarce resources.

- Ensure the integrity and transparency of claims based on the use of removals from bio-CCS, in line with relevant regulation and good practice, taking into account the relevant work done by governments and the EU as well as, for example, ISO, Voluntary Carbon Markets Integrity Initiative and the Nordic Code of Best Practice for the Voluntary Use of Carbon Credits. This is important for promoting transparency and avoiding misleading claims.

Governments that host bio-CCS activities and intend to support removals with state support and/or authorise removals as ITMOs should:

- Design state support for removals in a way that enables leveraging carbon market revenue to achieve more removals, rather than boosting profits or reducing the total amount of state support for removals. This is important for the achievement of global mitigation goals and the effective use of scarce resources.

- Set up national arrangements for authorising, tracking and accounting for ITMOs, including:

    - Article 6-aligned national criteria for emission reductions and removals authorised as ITMOs, including on additionality, baselines, permanence and monitoring and verification, and national procedures to assess the fulfilment of these criteria

    - a registry for tracking ITMO authorisations, transfers, use and cancellations
    - a national system for gathering and reporting ITMO-related information, including for the application of corresponding adjustments in the national emissions balance

  This is important for safeguarding the environmental integrity of ITMOs, the achievement of national targets and global climate goals and the effective use of scarce resources.

- Provide clear guidance on credible claims based on the voluntary use of carbon credits, including carbon credits with and without ITMO authorisation, consistent with relevant claims regulation and good practice. This is important for promoting transparency and avoiding misleading claims.

Governments that buy ITMOs based on removals from bio-CCS activities should:

- Seek to buy high-integrity removals that meet Article 6 criteria, taking into account the work done under the PACM, and use them only to complement, not to substitute, science-aligned reductions of domestic emissions. This is important for safeguarding the achievement of global climate goals and the effective use of scarce resources.

- Set up national arrangements for authorising, tracking and accounting for ITMOs, including:

    - clear, Article 6-aligned national criteria for emission reductions and removals authorised as ITMOs, including on additionality, baseline-setting, permanence and monitoring, and national arrangements to assess the fulfilment of these criteria;

    - a registry for recording and tracking ITMO-related information;

    - a national system for reporting ITMO-related information, including for the application of corresponding adjustments in the national emissions balance.

The EU should:

- Set up EU-level arrangements for ITMO authorisations, a registry for recording and tracking ITMO-related information, and EU procedures for reporting ITMO-related information.

- Explore opportunities to incentivise the generation of removals within the EU through market-based cooperation, taking into account relevant international standards and good practice, including the need to safeguard environmental integrity.

- Develop EU requirements for claims based on carbon credits, taking into account relevant international standards and good practice, including the need to safeguard environmental integrity.

All entities interested in market-based cooperation involving removals from bio-CCS should:

- Follow the development of methodologies and claims regulation, engage in stakeholder consultations, and raise awareness among relevant stakeholders. This is important for promoting continuous improvement and maintaining trust in market-based cooperation.

Perspectives
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