

Certification of carbon removals



This briefing provides a pre-legislative synthesis of the positions of national, regional and local governmental organisations on the European Commission's forthcoming initiative on carbon removal certification. It forms part of an EPRS series offering a summary of the pre-legislative state of-play and advance consultation on a range of key Commission priorities during its 5-year term in office. It seeks to present the current state of affairs, examine how existing policy is working on the ground, and identify best practice and ideas for the future on the part of governmental organisations at all levels of the European system of multilevel governance.

Summary of findings

EPRS analysis of the positions of partner organisations at European Union (EU), national, regional and local levels suggests that the following main considerations should be reflected in the discussion on the European initiative on the certification of carbon removals.

- **Carbon removal projects in the EU regions relate chiefly to agriculture, forestry and land use.** Projects involving geological reservoirs or other means of carbon storage in materials used to make sustainable circular products are less frequent and tend to be located mostly in north-western EU regions. There is a considerable lack of knowledge on the implementation of carbon removal projects that is very much related to a lack of EU measurement, reporting and verification (MRV) methods. A commonly accepted EU carbon removals certification system could further facilitate the development of carbon removal projects.
- There is a broad consensus that the details of **certification of carbon removals** need to be addressed. Various national and regional authorities have come up with their own MRV techniques that can be used as a point of reference. Evidence collected from targeted questionnaires offers an overview of various problems and issues on the topic of carbon removal certification that require further reflection and action.
- There are **technical and scientific questions** that need to be addressed so that MRV methods can be further consolidated. Certification questions relate to the suitability of carbon removals in nature and industry, specific regional characteristics and the incentives that should be used, as well as the mechanisms for measuring carbon dioxide (CO₂) that is offset. In addition, the duration of storage for each project and the setup of minimum quality requirements for carbon removals need to be discussed. It is also important that carbon removal projects do not have a negative environmental impact (such as carbon leakages).
- The EU can play a vital role in developing the certification process and providing knowledge and funding opportunities for interested parties who would like to further engage with carbon removal projects.



1. Current state of play

Background

On 30 November 2022, the European Commission is due to publish a legislative proposal for a regulatory framework for an EU carbon removal certification scheme. This framework would govern the award of verified carbon removal certificates to various actors in various economic sectors. CO₂ removals are considered [necessary](#) to deliver on the climate targets set in the [Paris Agreement](#). In the [EU Climate Law](#), the contribution of carbon removals towards the 2030 emission reduction target is limited, but will be needed to deliver climate neutrality by 2050, and negative emissions thereafter.

In the climate system of our planet, natural processes in oceans, plants and soils sequester CO₂ from the atmosphere and store it, providing a carbon sink function. The Regulation on Land Use, Land-Use Change and Forestry (LULUCF) ([\(EU\) 2018/841](#)), currently under [revision](#) as part of the 'fit for 55' package, provides the legal framework under which the Member States must ensure a certain level of carbon sink function from the LULUCF sector. Under the common agricultural policy, various eco-schemes in the agricultural sector can support practices intended to increase the carbon sequestration potential of soils and biomass. The [2020 farm to fork strategy](#) included the [carbon farming](#) initiative, in which the forthcoming carbon removal certification scheme will play a key role.

In preparation for the proposal, in December 2021 the Commission published a [communication](#) on sustainable carbon cycles, identifying key areas in which carbon removals might be increased, and where a certification scheme for such removals could create the basis for new industrial value chains and business opportunities. The communication put forward a target for the land sector to contribute, through carbon farming practices, 42 million tonnes of CO₂ equivalent (MtCO₂e) in removals to the [provisionally agreed](#) net removal target of 310 MtCO₂e under the revised LULUCF Regulation by 2030. Carbon farming practices increase the natural sequestration of carbon in living biomass, (dead) organic matter, and soils, thereby increasing the carbon sink function of the land sector. At the same time studies indicate that such practices also increase soil fertility and improve biodiversity conditions.

Another target of the Commission's carbon cycle communication was to deliver, annually by 2030, 5 MtCO₂ removed from the atmosphere and stored permanently. This can be achieved using direct air capture with carbon storage (DACCS) technology. Direct air capture (DAC) technology uses chemical solutions to bind CO₂ from captured air from the atmosphere, the air is released while the CO₂ is stored. The technology is in its nascent stages and only [19 DAC plants](#) were operational in 2021. Key barriers for DAC to overcome, include the resources needed, such as heat, energy or water, depending on specific technology used. DAC installations are still expensive to run, and further efforts are needed to reach scale. The target might also be achieved using bioenergy with carbon capture and storage (BECCS) facilities, where the biomass sequestered CO₂ from the atmosphere is captured in the process of producing energy. For both technologies there is a need to ensure the CO₂ transport infrastructure and permanent storage sites. The [Connecting Europe Facility](#) supports CO₂ transport infrastructure. A framework to measure, monitor, report and verify carbon removals could lead to a new source of income for land managers and DACCS or BECCS operators alike, were certificates to entitle holders to public support or if they could be traded on a [carbon market](#).

On the overall subject of [sustainable carbon cycles](#), the Commission took a broad view on processes using, removing or storing carbon, keeping a dual focus on promoting a circular economy and climate action. While the targets above were the only direct carbon removal targets, the December 2021 communication also touched upon carbon capture and storage (CCS), and the circularity or substitution of carbon feedstock in industry – in particular in the chemicals and plastics sectors. The [circular economy II package](#), expected to be published on 30 November 2022, will address several aspects of the use of fossil-based carbon in plastic products. The 2009 CCS Directive ([2009/31/EC](#)) meanwhile covered the geological storage of CO₂.

Stakeholders, and the Commission itself, have raised several key points to be addressed to ensure a robust framework with high environmental integrity. The main questions often concern the accurate measurement of sequestered carbon in nature-based solutions and the permanence of the storage in view, for instance, of the increasing forest fires and changing climatic conditions. For the technological solutions there are also the questions of defining permanent storage, and also tracking captured carbon, to be used as an alternative in products. The question of the responsible use of resources to achieve carbon removals is also often highlighted. As for point source CCS, it is necessary to note that this does not deliver removals, but rather emissions avoidance.

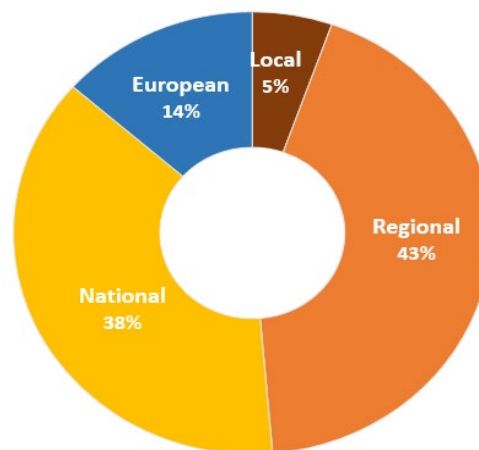
The European Parliament has acknowledged the need for carbon removals, though it continues to give [priority](#) to direct emission reductions over removals. In a 2019 [resolution](#) Parliament touched upon the importance of carbon sinks and of carbon farming practices and called for greater action to implement DACCS and CCS. In its 2021 [resolution](#) on the new circular economy action plan, Parliament called on the Commission to establish a regulatory framework for certification of all nature-based and technological carbon removal solutions, including carbon capture, utilisation and storage (CCUS). The Committee on the Environment, Public Health and Food Safety (ENVI) is preparing an own-initiative report ([2022/2053\(INI\)](#)) on the topic of sustainable carbon cycles. Alexander Bernhuber (EPP, Austria) is the rapporteur.

The Commission launched a call for evidence on 7 February 2022, to further inform the process towards adoption of a regulatory framework for the certification of carbon removals within the EU. A public consultation took place simultaneously and both processes closed on 2 May 2022.

Methodology

The data sources for this briefing were obtained through: **general requests** for input from governmental organisations at all levels of government and **proactive desk research** aiming to obtain additional relevant input. Requests for input on key European Commission priorities were sent to all the governmental organisations in the Linking the Levels Unit network. This was carried out by means of the monthly newsletter *The Link*,¹ with calls sent each month between February and June 2022 to an expanding network, reaching over 1300 contacts by the end of that period. Second, pro-active desk research was carried out to gather further information from other governmental organisations online. This process took place from February to October 2022, with a view to closing identified analytical gaps. This outreach strategy garnered 90 documents from the governmental organisations of 19 EU Member States. Those documents are analysed in this briefing. A **questionnaire** on the topic of carbon removals certification was also sent to various national and regional authorities with a view to expanding knowledge on this topic. Figure 1 shows the input obtained according to the level of government from which the documents originate.

Table 1 – Input percentage of governmental organisations' documents analysed in this briefing



Source: EPRS.

2. Positions of governmental organisations to date

The key themes relating to carbon removal certification dealt with here are:

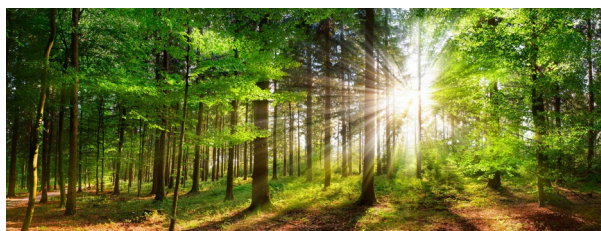
- 1 examples of carbon removals in agriculture, forestry, land use and industry;
- 2 measurement, reporting and verification (MRV) techniques; and
- 3 limitations of carbon removal.

Examples of carbon removals in agriculture, forestry, land use and industry

A number of documents point to the fact that the main areas of carbon removal experiments relate to agriculture, forestry and land use. For carbon reduction schemes to be measured effectively, carbon removal schemes must be efficient. These carbon removals are usually part of wider environmental protection, biodiversity and agricultural policy strategies. Carbon removal projects are either nature- or technology-based. In many parts of Europe, carbon removal techniques seem a recent innovation. Carbon removals in industry, geological reservoirs and carbon storage in materials used to make sustainable circular products are emerging fields but still limited to certain regions and Member States. A [map of CCUS projects](#) shows that many are still at the planning stage or in early/advanced development. Most of these projects are located in north-western Europe.

In the **Netherlands**, under the 2021-2030 [draft integrated national energy and climate plan](#), certain projects are being considered for LULUCF-based carbon removal. These include adjustments to the management of peat meadow areas, agricultural soils (both pasture and arable land) and forests and the natural environment, as well as land use changes, such as the planting of forests. The government regards CCS as an unavoidable transition technology that can be used to reduce carbon emissions in sectors where no cost-effective alternatives will be available in the near future. CCS may, in the future, play an important role in achieving negative emissions and may pave the way for the development of green hydrogen and CCU. The Netherlands supports [Porthos](#), a project in which CO₂ from industry in the **Port of Rotterdam** will be transported and stored in empty gas fields beneath the North Sea. The CO₂ transported and stored by Porthos will be captured by various companies, which will then supply their CO₂ to a collective pipeline running through the Rotterdam port area. The CO₂ will then be pressurised in a compressor station and transported through an offshore pipeline to a North Sea platform. From there, the CO₂ will be pumped in an empty gas field.

Figure 1 – Rays of sunlight in a green forest



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[Denmark's](#) objectives relate to the promotion of clean energy technologies and national objectives, with long-term targets for the deployment of low-carbon technologies, including for decarbonising energy and carbon-intensive industrial sectors and, where applicable, for related carbon transport and storage infrastructure. The country's 2019 state budget provided financial support for the implementation of the following measures: improvement of biogas plants, and a behavioural campaign

with climate labelling and analysis to improve the monitoring and accounting of carbon dioxide storage in soils and forests.

According to [Denmark's](#) national energy and climate plan, research in carbon capture and storage will pave the way for climate neutrality. The plan also includes an account for emissions and removals from land use, land-use change and forestry ('LULUCF') occurring in the following land accounting categories: (i) 'afforested land': land use reported as cropland, grassland, wetlands, settlements, and other land converted to forest land; (ii) 'deforested land': land use reported as forest

land converted to cropland, grassland, wetlands, settlements, and other land; (iii) 'managed cropland': land use reported as cropland remaining cropland, grassland, wetland, settlement, other land converted to cropland, and cropland converted to wetland, settlement and other land; (iv) 'managed grassland': land use reported as: grassland remaining grassland, cropland, wetland, settlement and other land, converted to grassland, and –grassland converted to wetland, settlement and other land; (v) 'managed forest land'.

The Danish forests are expected to be a steady sink in the coming years. This is due primarily to the expectations of increased forest area with a related rise in carbon stock. Cropland and grassland are major sources, primarily due to the large area with cultivated organic soil in Denmark. Furthermore, **Denmark, Belgium and Flanders** have also concluded a [specific arrangement](#), which makes it possible to transport CO₂ between the two countries with the purpose of permanent geological storage and have now specifically concluded an arrangement on how cross-border transportation of CO₂ can take place under the London Protocol, which has for long been an unanswered question in the development of the international value chain.

In **Sweden**,² there is growing interest in carbon removal among companies that want to offset emissions. There has been a lack of financial incentives for operating full-scale bio-CCS plants. Since 2019, facilities have, however, had the opportunity to apply for support for projects that aim to create negative emissions. An intensive process is under way to get the operating support and the entire chain for bio-CCS in place. The adopted budget for 2022 introduced operating support for bio-CCS, for which there is a great potential. The largest biogenic point emission sources arise from the incineration of residual flows within the pulp and paper industry, as well as electricity and district heating production, including waste incineration. There is growing interest in climate compensation among Swedish municipalities and cities that have their own climate targets. Several municipalities have strategies for achieving negative emissions within their borders, for example through better management of green areas, use of biochar, increased construction with wood and bio-CCS. In 2022, Sweden deposited a declaration on provisional application of the revised Article 6 of the London Protocol, which allows transboundary transport of CO₂ for disposal.

Measurement, reporting and verification (MRV) techniques

Figure 2 – Carbon removals can limit climate change and global warming



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In certain EU Member States and regions experimental certification seems to be under way. For instance, in **France**, the [Bas-Carbone label](#) aims to promote the emergence of additional greenhouse gas (GHG) emissions reduction projects, by setting up a framework for monitoring, reporting and verifying GHG emissions, allowing the valuation of additional emission reductions, carried out voluntarily by natural or legal persons in various sectors of activity. The term 'emission reductions' designates either quantities of GHGs whose emission has been avoided or quantities of GHGs sequestered.

The label came in response to demand for voluntary local compensation for GHG emissions. Project leaders will be able to be remunerated by a voluntary partner (public or private actor), who will be able to have their contributions recognised for the additional emission reductions resulting from these projects. These emission reductions are recognised following verification. Once recognised, emission reductions are neither transferable nor exchangeable. Emission reductions can only be used for the voluntary offsetting of emissions from non-state actors (companies, communities, individuals, etc.). From 1 March 2022, [project monitoring](#) will be carried out by the Regional Directorates for the Environment, Planning and Housing (DREAL). This means that the labelling of

projects and the recognition of emission reductions will be carried out by the regional prefects. This de-centralisation of project appraisal will allow better management, closer where the projects are based, and better monitoring.

In **France**, when it comes to the land use, land-use change and forestry (LULUCF) sector and the policies and measures to ensure compliance with Regulation (EU) 2018/841 with regard to the forest-wood sector, four levers are identified as complementary: the substitution of energy-intensive materials with biosourced products; the energy recovery of biosourced products or waste from these products to be a substitute for fossil fuels; carbon storage in wood products and products made from waste wood; and carbon sequestration in the forest ecosystem. The policies in the agricultural field are aimed at improving monitoring of the reduction of emissions from livestock effluents, developing renewable energies of agricultural origin, improving farms' energy performance, and maintaining and increasing carbon stocks on plots and in the soil.

On forests, the measures in place seek to promote carbon sequestration in the forest ecosystem through better forest management, and to develop the use of bio-sourced products. In the energy sectors, mention is made of energy decarbonisation, energy efficiency, energy storage, smart transport and distribution network management, and carbon capture, storage and reuse solutions. The decarbonisation of energy production relies solely on the following energy sources: biomass resources (waste from agriculture and wood products, wood energy, etc.), heat from the environment (geothermal energy, heat pumps, etc.) and carbon-free electricity. The national biomass mobilisation strategy ([SNMB](#)) aims to develop the use of biomass, in particular for the mitigation of climate change. Geographically, the strategy covers **18 regions (mainland France plus Guadeloupe, Guyana, Martinique, Réunion and Mayotte)**. It will tie in with the regional biomass plans (SRB) being developed in the regions.

In October 2022 the agriculture ministers of the **Visegrad Group and Bulgaria, Croatia, Romania and Slovenia** made a [joint declaration](#) on the challenges and opportunities facing Member States in relation to EU carbon farming initiatives. They welcomed the Commission's plan to present a legislative proposal on certification of reduction of CO₂ removals so as to scale up carbon farming capable of providing an additional source of income for farmers, land managers and foresters. They recognised that the establishment of such a certification framework in a way that is fully coherent with other Union's initiatives and objectives and, where possible, compatible with existing national initiatives, was an essential stepping stone towards the transparent recognition and remuneration of activities that sequester CO₂ from the atmosphere. They called on the Commission to present: certification rules that would take into account the specific nature of the agricultural sector. They also requested an impact assessment, so as to set evidence-based requirements for high-quality, realistic and efficient measurement, monitoring, reporting and verification of both the CO₂ removed from the atmosphere and the duration of storage. They asked the Commission to address the risk of reversal and the risk of carbon leakage increasing GHG emissions elsewhere. They expected all this to eventually lead to increased interest from farmers, land managers and foresters in participating in carbon farming schemes.

In **Sweden**, the Swedish Energy Agency has been appointed as auctioneer and has been tasked with investigating and preparing operating support and investigating how CCS can be broadly implemented. The goal is to be able to implement a CO₂ storage programme so that upwards of 2 million tonnes of CO₂ per year can be captured and stored. The operating support will be designed as a 'reverse auction', where the actors submit bids for how much CO₂ they can separate and store and at what cost. The actor who can deliver bio-CCS at the lowest cost wins the tender and receives the support. The first reverse auction should be announced in 2023. The actors involved estimate that it will take around 3 years from awarding bids to separation. This means that storage of biogenic CO₂ will begin in 2026 at the earliest. When it comes to carbon storage in forests and land, consideration is being given to certain nature-based measures that do not entail clear risks of reduced production or sustainably produced biomass. Measures such as rewetting of drained peatlands or wetlands, afforestation, forestry and energy forestry are considered possible measures

that could be included in an initial certification system. Active afforestation of disused agricultural land that would otherwise be passively afforested is a possible measure. In addition to these measures, catch crops are seen as a suitable measure for increased carbon storage. Biochar can result in long-term carbon storage if used as a soil amendment.

In [Poland](#), there are plans to develop the potential of forest areas for CO₂ sinking and to launch research projects aimed at developing better methods CO₂ balance calculation. One research project, to be funded as part of the Forest Carbon Farms pilot project, concerns verification of the mitigation capabilities of forest areas as a result of undertaking additional measures in these areas. Poland will use the Canadian [CBM-CFS3](#) model – a stand- and landscape-level modelling framework that can be used to simulate the dynamics of all forest carbon stocks required under the UN Framework Convention on Climate Change. The project aims to develop CO₂ balance calculation methods, e.g. for reporting purposes, and to determine possibilities for applying additional economic measures to improve the balance of greenhouse gas on forest land. The Forest Carbon Farm project envisages an attempt to achieve increased CO₂ removal from forest areas through additional forest management activities, to be carried out within the impact area. One effect of the Forest Carbon Farm project is the improvement of the system for acquiring forest-related data for emission reporting and removal purposes, as envisaged in the project, by launching measures aimed at building a carbon removal model for forests in central European conditions.

In [Italy](#), a new Italian law on forests and forest supply chains offers advice and guidelines to support regional administrations in relation to forestry management. Minimum criteria and guidelines for the sector are identified, including, training of workers, registration of competent companies, recognition of the status of forests as abandoned cultivated land, and setting guidelines for management and forestry planning. Sustainable forestry management is to be recognised as a tool aimed at ensuring an increase in carbon absorption, including in the production of quality timber products. The **Italian regions** must, as part of the air quality plans, start to apply practices aimed at reducing emissions produced by agricultural activity, including the coverage of structures for storing sewage and the use of the correct methods for spreading of manure.

Figure 2 – Maintaining wetlands/ rewetting can be part of carbon removal strategy



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Department of the Chamber of Agriculture to set up a donation platform for a large number of small and medium-sized donations for new forest formation. The platform could also be used to issue donation receipts and, if desired, make a link with the purchase of CO₂ certificates ('forest futures'). [Schleswig-Holstein](#) is currently developing a new approach, applying the climate points model and establishing a climate agency, through which it should be possible to reward CO₂ savings potential per hectare (and year). Land owners should be rewarded for the CO₂ savings potential that can be achieved through climate protection measures on their land. Each land-owner would assign the right to waterlogging and management rights permanently to a public body and agree to implementation of waterlogging measures on their land. In return, the concrete annual savings potential of CO₂ that could be achieved on the area would be rewarded in a permanently capitalised way. A climate point calculator – in the form of an app – will offer landowners the opportunity to estimate CO₂ determination and the financial impact by choosing weighing up different waterlogging options. An interactive map of Schleswig-Holstein on the accompanying website is intended to provide information on the progress of the waterlogging measures and the amount of

A report by the [Schleswig-Holstein](#) state parliament declares the intention to wet as many raised bogs as possible and to use their natural landscape-ecological function as carbon stores and carbon sinks, nutrient and pollutant filters, water reservoirs and restored habitat for animals and plants. Another is the reforestation of damaged areas.

They are in talks with the Schleswig-Holstein Investment Bank ([IB.SH](#)) and the Forestry

CO₂ set. In the medium term, the concept of 'climate points' is to be further developed. With this approach, the promotion of climate protection and biodiversity can be coupled with the generation of a socially relevant and new, future-oriented, source of income for farmers.

In **Catalonia**,³ a [voluntary greenhouse gas emissions offsetting programme](#) has been running since 2016 with 25 social entities running projects aimed at reducing GHG emissions. Once the emissions reductions of these projects are externally verified, these private organisations can offset the emissions that they could not reduce internally, through this local emissions reduction programme. An entity manages the buying and selling of GHG credits. The methodologies used to calculate reductions from the projects implemented are public. The projects include biomass and solar energy, electrical vehicles with renewables, food waste prevention, and building rehabilitation with energy saving criteria. The concept of carbon farming is new in the agro-forestry sector. Catalonia is promoting the transition of Catalan sawmills from pallet and biomass producers to producers of construction timber, by investing in new sawing lines, CLT technologies and forestry mechanisation.

When it comes to agricultural sector carbon removals, the [IRTA](#) (Catalan Institute for Agrifood Research and Technology) is planning a project whose objectives are to: i) identify and optimise best agricultural practices to mitigate the effects of climate change; ii) generate new knowledge of carbon dynamics in agrosystems, GHG emissions and carbon sequestration; iii) develop a monitoring, reporting and verification (MRV) system of GHG emissions and carbon sequestration levels; and iv) study the synergies of these measures with other agro-ecological benefits, with special emphasis on improving the efficient use of water and soil biodiversity.

The climate credit market designed at [LIFE CLIMARK](#) (2018-2022) included a cost-efficient *ex ante* methodology for estimating the impacts of sustainable forest management on carbon balances and other co-related benefits to water and biodiversity. Its replicability is being tested in the **Veneto region** of Italy. It includes a methodology to build in emissions avoided through fire prevention. Catalonia also has partners in the Horizon Europe Project [INFORMA](#) whose objectives include the improvement of MRV methodologies, but also the operationalisation of climate-smart practices in European forestry. According to Catalonia, the most relevant tools to support the uptake of carbon farming practices would be i) regulation and legal recognition of their benefits, ii) a clear and transparent methodology linking practices to impacts, iii) low transaction cost instruments, and iv) above all, an agreed diagnosis on where and which are the priority carbon farming actions that would provide the highest additional gain in carbon sequestration in each particular context. The 'resilient landscape' or 'green infrastructure' approach could provide this landscape-scale diagnosis, regional and local administrations have begun testing it. It will also be important to incentivise companies and local entities to invest in carbon farming practices, beyond volunteer actions (i.e. tax incentives, offsetting and environmental regulations).

For **Flanders**,⁴ the certification of carbon removals should aim chiefly to increase transparency, provide a level playing field for voluntary carbon markets, provide for better public incentives for nature-based and industrial carbon removals in EU and national funding programmes, increase the transparency of corporate sustainability reporting, and promote the credibility of climate neutrality claims. Flanders believes that the EU should establish comprehensive standard requirements for carbon removals to relate to monitoring, reporting and verification, duration of removal and the establishment of baselines and value added. Apart from the question of which functions in the certification process should be performed by private or public entities, it is important that the cost of setting up and maintaining the entire certification system does not exceed the revenue it generates. The EU certification framework should allow for different types or subcategories of certificates to reflect the diversity of carbon removal solutions and their characteristics.

Carbon removal providers should be held accountable for any rollback of removals, and should compensate for any rollbacks. Certificates could be issued with a specific duration (e.g. 5, 7 or 10 years) with optional extension. The carbon removal certificate should include the following: the type of carbon removal, the amount of carbon discharged, details of the carbon removal provider

and the owner of the certificate, information on monitoring, reporting and verification procedures, the duration of carbon storage, risk coverage and safeguards, information about the base case and the added value of the removal, its contribution to the Paris Agreement and the avoidance of double counting. The duration of carbon removal is a measure of the effectiveness of the measure and is thus a crucial parameter in the evaluation. Other issues to be considered are whether farmers who have always paid attention to carbon storage in the past and are now unable to realise additional storage should be rewarded. The issue of soils that have been showing a declining trend in carbon storage for year also needs to be addressed, and double counting/double payments avoided. Issues relating to the economic costs of the system and its legality are also raised.

Input from the **East & North Finland EU Office**⁵ mentions that as many as 20 companies and organisations are already providing voluntary carbon removal services in that region. There are many different levels of carbon neutrality pledges: company-level, municipality-level, regional and national. There are already carbon removal projects on the market and many companies have set 'carbon neutrality' targets and are interested in using carbon removals to offset 'carbon emission remnants'. The carbon removal potential in the LULUCF sector is large and the regions in East and North Finland are increasingly interested in setting up carbon storage markets. Some carbon removal companies are already using internationally recognised certification or verification schemes. For instance, the Finnish Standards Association has already indicated an interest in participating in a process to develop carbon removal certification. There is a [website](#) (still being developed) to improve knowledge of the carbon removal projects and their impacts. The project also delivers overall knowledge on carbon removal activities, prerequisites and broader impacts, etc. The Central Union of Forest Owners in Finland has already set up a [market place for nature values](#). The aim is mainly biodiversity values but these have also carbon dimension. According to the East & North Finland EU Office, in terms of certification, some kind of validation is needed for consumer protection. A market based approach could reflect better the need of companies and consumers and be more flexible. The public role should be to set up common rules, increase and distribute information, increase overall knowledge on carbon removals and possibly help small-holder forest owners to acknowledge their Carbon removal potential and enter the market.

In **Bavaria**,⁶ several initiatives on a local and regional level allow companies and other organisations, as well as end consumers, to compensate for their emissions by buying certificates, or to claim for having contributed to activities that benefit the climate. Moreover, the Bavarian State Government is in the process of defining a strategy to become carbon neutral in the years to come. Carbon capture is seen as a 'must' by Bavarian companies with some of them working on ways to make use of the captured CO₂ possibly in CO₂ enriched concrete or through methanol synthesis.

The European Economic and Social Committee (EESC) [opinion](#) on restoring sustainable carbon cycles stresses that the topic of sustainable carbon cycles must be considered in a holistic manner: increasing carbon sinks and replacing fossil carbon as much as possible will require more biomass to be produced, which will affect the land sector. It states that carbon sequestration should be seen not only as a commercial opportunity, but also as a key component of European agriculture and forestry in the future and as a tool for climate action contributing to more resilient rural areas. It suggests that the CAP must provide the policy framework to pave the way for the low-carbon transition in agriculture and that a specific carbon market must be further promoted. It considers that the development of carbon sequestration will require a clear legal framework shared by the Member States. It claims that industrial solutions, such as permanent CO₂ storage in geological formations or mineralisation of carbon in innovative aggregates, will have to be sustainable and prevent negative impacts on biodiversity, ecosystems and communities.

The European Committee of the Regions is also preparing an [opinion](#) on Regional adaptation strategies for low carbon agriculture that is to be adopted during its plenary session in February 2023.

Limitations of carbon removals/carbon removal certification

The documents collected refer to a number of challenges and limitations in terms of the development of carbon removal certification and carbon removal projects. As seen in the previous section, the MRV techniques used in the various Member States and EU regions differ. For most regions who are active in carbon removal projects, the MRV process is under exploration and it is usually seen as quite a complex process. This also relates to the very nature of carbon removals: some nature-based carbon removal projects (e.g. reforestation or wetlands preservation) seem to be more common than others in industry, which still cause some concern. Therefore, some nature-based carbon removals form the basis of MRV techniques. Cautiousness in developing certain carbon removal projects is also holding back the development of more extensive MRV methodologies.

For instance, according to [Baden-Württemberg](#), the mixing of biochar in soils is said to have many beneficial effects, but these have not always been scientifically proven. Before a reliable recommendation can be given, there is a need for a comprehensive analysis of all greenhouse gases and the accumulation of carbon in the soil, along with a long-term view of both degradation rates and a balance sheet of greenhouse gas emissions from the ground. Furthermore, the potential of biochar should not be overestimated, since a large share of the biomass produced is already being used (as compost, or for energy recycling, etc.). The [Danish national energy and climate plan](#) mentions that there are sensitive assumptions and that uncertainties affect key results. For instance, in the LULUCF sector there is uncertainty associated with assumptions regarding: the harvest of crops and wood; the sample-based methodology used in the national forest inventory; temperature in the modelling of soil carbon; etc. Furthermore, according to [Schleswig-Holstein](#), a crucial question is the verifiable quality of the certificates and their recognition by third parties, which involves a considerable amount of effort.

Furthermore, there is no 'one type fits all' strategy for carbon removals; each region's natural characteristics and specific flora and fauna should be taken in to account when it comes to MRV. The varying forestry projects run in Catalonia, Sweden and Poland point to the fact that they are bound to better serve their own specific Mediterranean, Nordic or eastern European type of forests. In July 2015, the [Lower Saxony Carbon Dioxide Storage Act \(NKSpG\)](#) was passed. It mentions that because the oil and gas reservoirs in Lower Saxony are generally too small to store CO₂ from large point sources (such as hard- or lignite-fired power stations), the perspective for such large CCS projects depends on the deep saline aquifers (salt water-bearing porous formation). If CO₂ was injected into deep, saline aquifers, the initial pressure in the pore space of the saline aquifer would, as a rule, increase to accommodate the additional CO₂ volume. Salt caverns, such as those created artificially for gas storage, are not economically viable for long-term CO₂ storage. The law ensures that there will be no permanent storage of CO₂ in Lower Saxony. The [state parliament](#) agreed with the state government's view that the use of technologies to store carbon dioxide in the ground was neither sensible nor economical.

Furthermore, carbon removals must be done in such a way as to avoid a negative environmental impact, an idea which is also part of MRV suggestions. According to the [French national energy and climate plan](#), the development of low-carbon processes and technologies as well as the installation of new infrastructures must be studied carefully to avoid impacts in terms of soil and water pollution. Many other national and regional documents stated that it was important that the co-benefits of carbon removals (for water, soil quality, biodiversity, etc.) be properly monitored. In any case, carbon storage must not lead to negative environmental effects.

According to the **East & North Finland EU Office**, MRV limitations include the fact that carbon removal projects are diverse and the monitoring of actual removals is difficult (results based). Furthermore, there are no agreed rules (and some preconditions missing). There are diverse/polarised opinions on the topic and the problem of double accounting has not been solved (on-going work). Another important question is at what point or how carbon sequestration comes

into the carbon neutrality activity. First, all possible emissions should be minimised. There are problems with carbon sequestration projects, but the biggest is that of measuring carbon removals (carbon units). There is then the question of what constitutes 'real' and what 'assumed' removals. Other issues include the question of whether project risk management is in place, carbon leakage for some projects (integrity), the importance of not using units more than once ('double counting'). Double counting is not a big problem when the projects/activities are small and voluntary, but as the activity is expanding it would be good to address this issue as early as possible.

For **Catalonia**, there is also a fear that carbon farming may result in a new set of restrictions being 'imposed' on the agro-forestry sector from other sectorial policies. That is why it may be useful to consider already existing strategies and procedures in the agricultural and forestry sector. The biggest barriers that the region identifies are: i) the lack of a regulated obligation framework, and ii) the fact that the cost of carbon offsets from natural forest management projects in Europe is higher than that of existing alternatives, i.e. tree planting in developing countries. Also, according to **Sweden**, Bio-CCS, which deals with the separation, capture and storage of biogenic CO₂, is not currently economically viable for plant owners. Operational support for bio-CCS is therefore a necessity to get the system in place. In the longer term, additional financial incentives are needed at EU level. There is also a lack of clear regulation and incentives for bio-CCS at EU level.

The [joint declaration](#) by the agriculture ministers of the **Visegrad Group and Bulgaria, Croatia, Romania, and Slovenia** mentions several concerns that must be resolved, such as financial burdens, access to information and knowledge, regulatory obstacles, the high complexity and costs of robust monitoring, the establishment of a carbon credit, the timing of payments, and the availability of carbon credit markets. Carbon farming must not cause 'disproportionate administrative burdens' or penalise farmers, foresters and land managers for carbon release due to natural disturbances, or unjustifiably cause the decrease of their competitiveness in the context of globalised markets. The declaration also states that the certification framework should bring harmonised and clear rules for the interested parties and that the practical application of carbon farming is very site-dependent and that there cannot therefore be a one-size-fits-all approach.

3. Analysis of governmental organisations' positions

The documents that were analysed on the topic of carbon removal certification provide a number of insights on the topic. For various regional and local authorities carbon removal is a relatively new topic. Emerging carbon removal strategies and pilot projects are under implementation or under examination in some parts of Europe and also relate to the development of efficient MRV techniques. A number of EU regions are engaging stakeholders with the aim of further promoting carbon removal projects and setting up MRV techniques. Still, the process of carbon removal exploration is in its infancy in many European regions and Member States. A common EU MRV methodology could further facilitate the development of carbon removal projects.

Carbon removal projects take place mainly in the fields of agriculture, forestry and to a lesser extent industry. These carbon removals are usually part of wider environmental protection, biodiversity and agricultural policy strategies. The majority of carbon storage projects involving geological reservoirs or other media, as well as carbon storage in materials used to make sustainable circular products, tend to happen mostly in north-western EU Member States and their regions. Although carbon removal techniques may sound promising, considerable gaps in knowledge and experience could put policy agents off engaging in carbon removals and their MRV.

In certain documents, these knowledge gaps and a number of concerns and possible side-effects of carbon removals are mentioned (e.g. carbon leakages). Questions that seem to preoccupy the minds of policy practitioners are the following: in which fields is it better to explore carbon removals and how; which incentives should be used; and how can carbon removals be measured in an efficient manner in order to better certify the process. The absence of a commonly accepted MRV mechanism seems to be a major hindrance in further developing reliable carbon removal projects. In this

respect, the documents gathered mention a number of topics that need to be considered in MRV such as the specific characteristics of each region's soils, forests and environment, the duration of storage for each project, and the setup of minimum quality requirements for carbon removals. Knowledge transfer and training for potential stakeholders in carbon removal projects is a task to be considered. Finding adequate financial rewards to promote carbon removals for various sections of agriculture, forestry and industry is also named as a priority in the documents collected. The competitive nature of the carbon market is also stated as a hindrance, as carbon prices per tonne are much lower in third countries, thus rendering the EU market less attractive.

The added value of the EU in the carbon removal field is manifested in various ways in the collected documents, namely with mention of LULUCF legislation and possibilities of EU funding for carbon removals projects in various fields (e.g. the CAP, and LIFE+ projects for the environment, etc.).

EXPERT READING ON THE TOPIC

Jensen L., [Sustainable carbon cycles: Promoting removal, storage and recycling](#), European Parliamentary Research Service, October 2022.

ENDNOTES

- ¹ Governmental organisations wishing to subscribe to 'The LINK' newsletter can write to EPRS-LinkingLevels@europarl.europa.eu.
- ² All information related to Sweden that has been mentioned in this briefing has been provided through an EPRS targeted questionnaire that was received by the Swedish Permanent Representation to the EU, October 2022.
- ³ All information related to the Catalonia that has been mentioned in this briefing has been provided through a targeted questionnaire by the Delegation of the Government of Catalonia to the European Union, October 2022.
- ⁴ All information related to the Flanders that has been mentioned in this briefing has been provided through a targeted questionnaire by the General Representative of Flanders to the European Union, October 2022.
- ⁵ All information related to the East & North Finland EU Office that has been mentioned in this briefing has been provided through a targeted questionnaire by the East & North Finland EU Office, October 2022.
- ⁶ All information related to Bavaria that has been mentioned in this briefing has been provided through a targeted questionnaire by the Bavarian Representation in Brussels, October 2022.

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