



# Q&A on Carbon Capture and Utilisation

*Eurogas recommendations explained*

23 July 2025

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## Understanding Carbon Capture and Utilisation (CCU) technologies<sup>1</sup>

### Q1: What is Carbon Capture and Utilisation?

CCU encompasses a range of technologies that capture carbon compounds, typically as carbon dioxide (CO<sub>2</sub>), carbon monoxide (CO)<sup>2</sup> or solid carbon and repurpose them as feedstock for various applications (e.g. fuels, various materials)<sup>3</sup>. There are two main ways of using the captured carbon<sup>4</sup>:

- **Direct utilisation:** CO<sub>2</sub>/carbon<sup>5</sup> is used without undergoing chemical transformation. An example of this is its application in the production of synthetic fuels, where CO<sub>2</sub> serves as a raw material in fuel synthesis.
- **Indirect utilisation:** the captured carbon undergoes chemical conversion before being incorporated into new solid or liquid products. For instance, CO<sub>2</sub> can be transformed into value-added chemicals such as methanol, which is used in fuel production and chemical manufacturing.

### Q2: Where does the solid carbon originate from?

As above, carbon can be used both in its gaseous (CO/CO<sub>2</sub>) and solid forms (C). In nature, solid carbon can be found in diamonds or graphite.

However, it can also be produced through man-made processes. This is the case of:

- **Solid carbon originating from methane/propane pyrolysis:** methane pyrolysis/plasmalysis is one of the potential low-carbon hydrogen (turquoise hydrogen) production processes. Through thermal energy, the bond between carbon and hydrogen in the CH<sub>4</sub> molecule is broken. As a result, hydrogen and solid carbon are obtained as co-products. This production process does not release any direct CO<sub>2</sub> emissions into the atmosphere, as the thermal reaction takes place in the absence of oxygen without combustion, and the resulting carbon remains in its solid state<sup>6</sup>. If the use of this solid carbon is subsequently encouraged and incentivised for the creation of an end-product, it becomes a

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<sup>1</sup> [A Concise Guide to Carbon Capture and Utilisation](#), CO<sub>2</sub> Value Europe.

<sup>2</sup> Solid carbon is an example of carbon monoxide, which is obtained through very specific production processes (i.e., methane pyrolysis). Date? Same for all

<sup>3</sup> [Carbon Capture and Utilization \(CCU\) | Federal Environment Agency](#).

<sup>4</sup> [CO<sub>2</sub> Capture and Utilisation, IEA](#).

<sup>5</sup> In this document, we refer to “CO<sub>2</sub>/carbon” to explicitly distinguish between carbon dioxide (CO<sub>2</sub>) and other carbon forms, notably solid carbon. We intentionally avoid using “carbon” as a generic umbrella term, as this could lead to misconceptions about the differing properties, physical states, and roles of CO<sub>2</sub> and solid carbon — all of which have distinct implications for handling, infrastructure needs, and CCU applications.

<sup>6</sup> Justin Prabowo, Leo Lai, etc, [Solid carbon co-products from hydrogen production by methane pyrolysis: Current understandings and recent progress - ScienceDirect](#) (2024)

valuable resource, supporting not only the principles of a circular economy but also overall emission reductions: first, by avoiding emissions during hydrogen production, and second, by replacing the need for virgin carbon/material. If the solid carbon originates from biogenic sources, its added value is even greater, as it can potentially lead to negative emissions, depending on how it is ultimately used.

- **Bio-charcoal (Biochar) from biomass pyrolysis:** organic biomass (i.e. wood, crop residues, or manure) is put in an oxygen-free environment where the high temperatures (400-800 °C) lead to the formation of this solid charcoal<sup>7</sup>.

### Q3: What different kinds of nature-based carbon can this technology capture?

- **Fossil carbon** originates from organic matter that was buried and transformed into coal, oil, or natural gas over millions of years. When these are processed into fuels that are burned for energy, the stored CO<sub>2</sub> then gets released into the atmosphere<sup>8</sup>. Capturing and utilising this carbon for product manufacturing enhances circular economy, as it “recycles” the carbon that can be used another time before being released.
- **Biogenic carbon** comes from biological sources (i.e. trees and plants) that absorb carbon from the atmosphere as part of their natural carbon cycle through photosynthesis. When these biological sources are used in for energy production, the previously captured carbon is released back into the atmosphere<sup>9</sup>. Capturing the released carbon could provide significant environmental benefits: it allows us to recycle the carbon in a new cycle, which started when it was captured from the atmosphere.
- **Geological/geogenic carbon** refers to the emissions that originate from the Earth’s mantle, including volcanic activities and geothermal systems, particularly in in active tectonic zones and volcanic regions<sup>10</sup>.
- **Unavoidable process emissions** result from the very nature of certain chemical or physical processes in industrial processes, and cannot be eliminated. A key example is cement production, where the CO<sub>2</sub> is released during the heating of limestone<sup>11</sup>.

### Q4: What are the mechanical sources of the captured carbon?

- **Industrial emissions:** in sectors that are particularly challenging to decarbonise, such as cement, steel, and chemical production, carbon capture equipment can be installed at emission sources to

<sup>7</sup> [Pyrolysis – European Biomass Industry Association.](#)

<sup>8</sup> [Fossil vs biogenic CO2 emissions – Bioenergy.](#)

<sup>9</sup> [Fossil vs biogenic CO2 emissions – Bioenergy](#)

<sup>10</sup> [Where do geological CO2 emissions come from? - Institut de Physique du Globe de Paris.](#)

<sup>11</sup> [CCUS, CEMBUREAU.](#)

prevent CO<sub>2</sub> from being released into the atmosphere. This is especially crucial for industries where process-related emissions are unavoidable.

- **Power plants:** carbon capture technologies can be integrated into power plants that rely on carbon - fuels, such as natural gas, oil and coal and their bio- or electricity-based counterparts (e.g. biomethane, e-methane). By capturing the CO<sub>2</sub> at the point of combustion, these systems help mitigate emissions from these types of electricity generation. If the capturing technologies are installed on power generation installations that operate on renewable fuels, such as biogas, capturing the CO<sub>2</sub> can provide even greater environmental benefits thanks to its biogenic origin: you are capturing CO<sub>2</sub> that originates in the atmosphere, and which has been used for power production (see bioenergy sources).
- **Direct Air Capture (DAC):** unlike point-source capture, DAC technologies extract CO<sub>2</sub> directly from the atmosphere. Although it can be energy-intensive, DAC plays a critical role in offsetting historical emissions and achieving negative emissions by removing already-existing CO<sub>2</sub> from the atmosphere.
- **Bioenergy sources:** certain bioenergy processes, such as biogas and biomethane production, bioethanol fermentation, and biomass combustion release CO<sub>2</sub> that can be captured and repurposed. Since this CO<sub>2</sub> originates from natural sources, capturing and utilising it contributes to a more sustainable carbon cycle.

#### Q5: What can captured carbon be used for?

The captured carbon can be used in various applications across multiple industries. Key end-uses include but are not limited to:

- **Synthetic fuels and chemicals** - CO<sub>2</sub> can be converted into synthetic fuels such as methane, methanol, and aviation fuels. Additionally, CO<sub>2</sub> is used as a feedstock in the production of chemicals like urea, which is widely used in fertiliser production.
- **Building materials** – captured carbon can be mineralised and into concrete, aggregates, and other construction materials. This not only reduces emissions from cement production but also enhances the durability and strength of building materials.
- **Food and beverage industry** - CO<sub>2</sub> is widely used in the food sector for carbonation in soft drinks, beer and other beverages, as well as for packaging and refrigeration purposes.
- **Agriculture and horticulture** - carbon is used in greenhouses to enhance plant growth by increasing photosynthesis efficiency, leading to higher crop yields. When in its solid state, biochar can also be used as a soil enhancer for agricultural processes<sup>12</sup> and, hence, be permanently stored.

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<sup>12</sup> [Biochar application: A sustainable approach to improve soil health - ScienceDirect.](#)

- **Plastics and polymers** - CO<sub>2</sub> can be chemically converted into raw materials for the production of plastics.
- **Batteries** – the captured carbon can be used to substitute natural graphite<sup>13</sup>, offering a sustainable alternative in the production of batteries<sup>14</sup>.

#### Q6: What is the value of CCU? Why should policymakers incentivise its deployment?

These technologies can avoid the release of CO<sub>2</sub>/carbon originating from industrial installations<sup>15</sup> and its use in the production of marketable goods.

CCU plays a crucial role in promoting circular economy<sup>16</sup>. Instead of treating CO<sub>2</sub>/carbon as a GHG, this approach integrates it into a continuous cycle of reuse, reducing dependence on virgin carbon<sup>17</sup> for material, fuel and energy production. By reutilising captured CO<sub>2</sub>/carbon, CCU helps minimise waste, lower reliance on fossil-fuel-based carbon sources, and can support more sustainable industrial practices.

Overall, the environmental benefits of CCU largely depend not only on the origin (as described above) but also on the end-use of the captured CO<sub>2</sub>/carbon. If the CO<sub>2</sub>/carbon is utilised in applications where it is permanently stored, such as mineralisation in building materials, it can result in a net reduction of GHG emissions. On the contrary, if the captured CO<sub>2</sub>/carbon is used in short-lived products, such as fuels or chemicals that are later combusted the main benefit is the reduced reliance on virgin carbon sources, which contributes to resource efficiency and circularity. Even in these cases, using the captured CO<sub>2</sub>/carbon instead of extracting new CO<sub>2</sub> still lowers the overall GHG footprint.

Indeed, a key advantage of CCU is its potential to establish a continued carbon cycle within a circular economy framework. If CO<sub>2</sub> emissions from CCU-based products are re-captured and reused in subsequent production cycles, this creates a self-sustaining loop where emissions are repeatedly cycled rather than contributing to atmospheric accumulation.

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<sup>13</sup> Graphite has a layered structure that consists of rings of six carbon atoms arranged in widely spaced horizontal sheets. [Graphite | Properties, Uses, & Structure | Britannica.](#)

<sup>14</sup> [Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Critical Raw Materials Resilience: Charting a Path towards greater Security and Sustainability.](#)

<sup>15</sup> [Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Securing our future Europe's 2040 climate target and path to climate neutrality by 2050 building a sustainable, just and prosperous society.](#)

<sup>16</sup> [Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – Towards an ambitious Industrial Carbon Management for the EU.](#)

<sup>17</sup> Any fossil, geological or biogenic carbon molecule not previously used.

Additionally, if CCU is applied to installations running on renewable energy sources, such as biomethane production, it can become a powerful tool for the achievement of carbon neutrality by 2050. In this case, if the biogenic CO<sub>2</sub>/carbon<sup>18</sup> is used and stored permanently in products, it can achieve net-negative emissions.

Beyond its sustainable and circular economy benefits, CCU can drive significant economic advantages by fostering innovation, creating high-quality jobs, and supporting the emergence of new industrial clusters. Additionally, these technologies can stimulate regional development, attract investment, and enable synergies across sectors such as chemicals, fuels, and advanced materials.

### Q7: What is the status of CCU under EU law?

The EU has begun making progress in incentivizing CCU technologies by acknowledging their potential in various regulatory and policy frameworks:

- The [Communication on Sustainable Carbon Cycles \(COM\(2021\) 800\)](#) underlines the need to reduce our primary resource consumption and move toward a circular economy. To achieve this objective, the text underlines the need to promote technological solutions for CCU.
- The [EU ETS \(Directive 2003/87/EC\)](#) allows exemptions from surrendering allowances for CCU in two cases:
  - If the captured carbon dioxide is permanently removed from the atmosphere. According to Article 12(3b), this exemption applies only to CO<sub>2</sub> that is bound in a product for several centuries and cannot be released into the atmosphere, even at the end of the product's life. The list of permanent CCU products can be found in the Annex to [Delegated Regulation 2024/2620](#). However, it is limited to CO<sub>2</sub> and mineral carbonates. Besides, it applies only to a narrowly defined section of construction products.
  - In case of certified RFNBOs and low carbon fuels as foreseen in the ETS Monitoring and Reporting Rules ([ETS MRR, Implementing Regulation 2018/2066](#)).

The upcoming consultation on the 2026 ETS revision will explore, amongst other topics, the review of the current GHG monitoring and reporting rules for non-permanent CCU. It will also examine whether non-permanent CCU emissions should be accounted at the point of capture (upstream accounting) or when the CO<sub>2</sub> is eventually released into the atmosphere (downstream accounting)<sup>19</sup>..

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<sup>18</sup> Results from the decomposition, digestion or combustion of biomass or biomass-derived products. European Biogas Association (EBA), [Biogenic-CO2-from-the-biogas-industry\\_Sept2022-1.pdf](#)

<sup>19</sup> Recital 97, [Directive \(EU\) 2023/959 of the European Parliament and of the Council of 10 May 2023 amending Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union and Decision \(EU\) 2015/1814 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading system](#).

- The [ReFuelEU Aviation \(Regulation \(EU\) 2023/2405\)](#) aims to reduce the aviation sector’s carbon footprint by mandating an increased use of Sustainable Aviation Fuels (SAFs), which can be aviation biofuels<sup>20</sup>, synthetic aviation fuels<sup>21</sup> or recycled carbon aviation fuels<sup>22</sup> (based on CCU).
- The [Fuel EU Maritime \(Regulation \(EU\) 2023/1805\)](#) aims to reduce the maritime sector’s carbon footprint by mandating GHG emissions reduction targets which can be achieved by using any technologies and any fuels provided they are certified as RFNBO, RCF or low carbon (based on CCU).
- The recast [Renewable Energy Directive \(Directive 2018/2001\)](#) includes provisions related to the use of renewable fuels of non-biological origin (RFNBO) and recycled carbon fuels (RCFs), both of which can involve CCU processes. Under [Delegated Regulation 2023/1185](#), the GHG emission calculation methodology considers various factors in the formula, including  $e_{\text{ex-use}}$ , which accounts for CO<sub>2</sub> emissions that are avoided by using the CO<sub>2</sub> in fuel production – emissions that would have been otherwise released in the atmosphere. However, Annex A.10 of the Delegated Regulation introduces a sunset clause, limiting the use of CO<sub>2</sub> from ETS sources<sup>23</sup> as of 2036 for electricity generation and 2041 in other settings.
- The [Carbon Removals Certification Framework \(CRCF, Regulation \(EU\) 2024/3012\)](#) establishes a voluntary Union certification framework for permanent carbon removals, carbon farming and carbon storage in products. The certification methodologies for the different categories will be adopted in the form of a Delegated Regulation. Adding to what is foreseen under the EU ETS, the Regulation provides a definition of ‘carbon storage in products’ which covers carbon captured and stored in products for at least 35 years (Article 2.11).
- The [Industrial Carbon Management Strategy \(COM/2024/62\)](#) recognises the potential of CCU and underlines the need to fully assess its climate benefits while also identifying and addressing the existing structural and regulatory barriers to deploying CCU.
- The [2040 Climate Target Impact Assessment](#) shows that CCU will represent a large share of industrial carbon management, both in 2040 and 2050, with progressively increasing shares of e-fuel

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<sup>20</sup> Complying with the definition of biofuels under Article 2, second paragraph, point (33), of [Directive \(EU\) 2018/2001](#).

<sup>21</sup> Aviation fuels that are ‘renewable fuels of non-biological origin’, as defined in Article 2, second paragraph, point (36), of [Directive \(EU\) 2018/2001](#).

<sup>22</sup> Aviation fuels that are of non-biological origin, the energy content of which is derived from non-fossil low-carbon hydrogen, which meet lifecycle emissions savings threshold of 70 % and the methodologies for assessing such lifecycle emissions savings pursuant to relevant Union law (Article 3.13 [ReFuelEU Aviation](#)).

<sup>23</sup> Annex A.10(a), [Delegated Regulation 2023/1185](#).

production and carbon used for storage in materials<sup>24</sup>. The role of CCU in the energy transition has also reaffirmed in the 2040 Climate Law proposal<sup>25</sup>.

- The [Net Zero Industry Act \(NZIA, Regulation \(EU\) 2024/1735\)](#) aims at scaling up EU’s domestic manufacturing of clean technologies to strengthen EU competitiveness at the international level. In this context, the text identifies several technologies classified as ‘net-zero’ and deemed essential for Europe’s decarbonisation. Including CO<sub>2</sub> utilisation technologies.
- The [Low-Carbon Fuels Delegated Regulation](#)<sup>26</sup> establishes the accounting methodology for calculating GHG emissions from the production and use of low-carbon fuels. It includes net emissions savings from carbon captured and used, with explicit references to solid carbon<sup>27</sup> which, however, are limited in scope. In particular, it is classified it as not emitted only if part of co-products, in line with the definition of permanent use (Delegated Regulation (EU) 2024/2620)<sup>28</sup> or if meets the requirements of the CRCF methodology on permanent carbon storage (which still has to be defined). Besides, the draft methodology also replicates the sunset clause for CO<sub>2</sub>ETS sources, as introduced with Delegated Regulation 2023/1185 (see above), while including emissions from mixed municipal waste in this category of emissions with the sunset clause.

## Recommendation 1: Support all types of applications of captured carbon

*whether in gaseous or solid form, e.g. long-term binding of CO<sub>2</sub> and carbon in products, as well as in the production of plastics, chemicals, synthetic fuels and fertilisers. Additionally, promote CCU in waste incineration, in line with the EU objective of enhancing circular economy.*

### Q8: What is the difference between permanent, long-lasting and non-permanent CCU?

Carbon Capture and Utilisation (CCU) can be classified based on the duration for which the captured CO<sub>2</sub>/carbon remains sequestered before potentially re-entering the atmosphere. Based on the three proposed categories, a list of various CCU processes should be created:

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<sup>24</sup> Figure 10: Carbon Captured by end application, [Commission Staff Working Document \(Part 3\) accompanying the 2040 Climate Target Communication](#).

<sup>25</sup> [Proposal for a Regulation of the European Parliament and of the Council amending regulation 2021/1119 establishing the framework for achieving climate neutrality](#).

<sup>26</sup> Commission Delegated Regulation (EU).../.... Of 8.7.2025 supplementing Directive (EU) 2024/1788 of the European Parliament and of the Council by specifying a methodology for assessing greenhouse gas emissions savings from low-carbon fuels.

<sup>27</sup> Page 9, [241024-Low-Carbon-Fuels-Delegated-Regulation-Eurogas-assessment-and-recommendations.pdf](#)

<sup>28</sup> The list of recognised permanent CCU applications should be amended to cover a broader set of carbon types and end-uses. On top of it, it does not address the question of solid carbon used in “non-permanent” CCU products.

- **Permanent CCU** involves converting captured CO<sub>2</sub>/carbon into materials or processes where it can be stored for several centuries and does not re-enter the atmosphere<sup>29</sup>. For instance, this is the case for some mineralisation pathways, where the CO<sub>2</sub> is used to produce carbonates for construction materials like concrete<sup>30</sup>. This category of CCU contributes to long-term climate mitigation and is often placed on the same footing as Carbon Capture and Storage in geological formations. Unfortunately, from an EU regulatory standpoint, this category does not consider all carbon compounds (i.e. solid carbon), but rather only carbon dioxide use, and is limited to a small range of potential permanent applications.
- **Long-lasting CCU** refers to applications where the captured CO<sub>2</sub>/carbon is used in products or materials with extended lifespans (i.e., for at least 35 years) but is eventually released back into the atmosphere over time<sup>31</sup>. For instance, CO<sub>2</sub>-based plastics.
- **Non-permanent CCU** involves short-term uses where the captured CO<sub>2</sub>/carbon is then re-released into the atmosphere relatively quickly, but the use of captured CO<sub>2</sub>/carbon can provide benefits in terms of circular economy as it avoids the release of virgin fossil sourced CO<sub>2</sub>. For instance, the production of synthetic fuels.

#### Q9: How to incentivise CCU in the EU regulatory framework?

To stimulate investment in carbon capture and utilisation (CCU) technologies, Eurogas recommends targeted incentives and financial support: without adequate incentives for using captured carbon, industries lack motivation to replace virgin fossil carbon with more sustainable alternatives, as the overall process remains more expensive.

First of all, the new Industrial Decarbonisation Bank should take a technology-neutral approach, ensuring that CCU technologies are adequately included and supported in its financing framework.

Secondly, Eurogas suggests developing lead markets for CCU-based products. Tools such as certification or labelling schemes (e.g., for plastics made using captured carbon) could help create demand. These labels should indicate the circular economy benefits and, where applicable, the environmental advantages of permanent and long-lasting carbon utilisation.

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<sup>29</sup> Article 12(3b), recast [EU ETS Directive 2003/87/EC](#).

<sup>30</sup> Article 3, [Commission Delegated Regulation \(EU\) 2024/2620 of 30 July 2024 supplementing Directive 2003/87/EC of the European Parliament and of the Council as regards the requirements for considering that greenhouse gases have become permanently chemically bound in a product](#).

<sup>31</sup> Article 2(11), [Regulation \(EU\) 2024/3012 of the European Parliament and of the Council of 27 November 2024 establishing a Union certification framework for permanent carbon removals, carbon farming and carbon storage in products](#).

Furthermore, current legislation remains limited by mainly focusing on CO<sub>2</sub> emissions. Carbon exists in various forms, all of which should be considered.

In this regard, the draft Delegated Regulation on Low-Carbon Fuels is a step forward—recognising carbon monoxide as a valid feedstock and explicitly referencing solid carbon, provided it qualifies for permanent use under Delegated Regulation (EU) 2024/2620, or complies with the CRCF methodology for permanent storage. However, the current list of recognised permanent CCU applications should be expanded to cover a broader set of carbon types and end-uses. It is also worth noting that the CRCF methodology referred to in the act has yet to be adopted.

An additional regulatory barrier that must be addressed promptly to effectively promote the circular use of CO<sub>2</sub> is the sunset clause on the use of fossil CO<sub>2</sub> in the production of RFNBOs, RCFs, and low carbon fuels, as set out in the RED and Gas Directive delegated acts respectively. These provisions create significant challenges for CCU project developers, who depend on long-term regulatory certainty and clear rules on CO<sub>2</sub> sourcing, typically with investment horizons of at least 20 years. Moreover, substantial volumes of unavoidable process emissions will persist beyond 2041 in hard-to-abate sectors such as cement, steel, and lime, where electrification or substitution options remain limited. In such cases, it is more sustainable to capture and reuse this fossil-based CO<sub>2</sub> rather than allow its release into the atmosphere. For these reasons, the sunset clauses should be reviewed to enable the continued development of CCU technologies and ensure their contribution to climate and circularity objectives.

### Q10: What is the link between waste incineration and CCU? Why should CCU be incentivised in these processes?

Compared to landfilling, waste incineration is a more sustainable and climate-friendly waste management solution<sup>32</sup>. Carbon capture equipment can be installed at waste incineration plants to ensure that emitted CO<sub>2</sub> is effectively captured and either utilised or permanently stored underground.

If combined with CCU, it supports circular economy objectives by recovering value from waste streams and reintegrating captured carbon into the industrial value chain. Incentivising CCU in this context is therefore essential to unlock its full mitigation potential, foster innovation, and ensure the economic viability of such climate-relevant infrastructure. The Low-Carbon Delegated Act rightly includes CO<sub>2</sub> from municipal waste incineration among its eligible sources, which is a positive development. The biogenic share of CO<sub>2</sub> from these installations is eligible without a sunset clause. However, the non-biogenic share remains subject to the previously mentioned sunset clause, already applying to ETS installations.

### Recommendation 2: Incentivise the use of biogenic carbon in CCU processes

*by acknowledging its potential as feedstock, and to achieve negative emissions through permanent CCU.*

### Q11: What is the state of biogenic carbon in the EU legislative framework?

As above, biogenic carbon refers to carbon derived from biological sources (i.e. trees and plants). While there is no explicit legal definition of ‘biogenic carbon’ at European level, the Renewable Energy Directive and EU ETS Monitoring and Reporting Regulation (MRR) reference related concepts, especially in the context of GHG accounting.

Key references include:

- Renewable Energy Directive (RED III):
  - Article 2(24) provides a definition of biomass.
  - Annexes V and VI stipulate that CO<sub>2</sub> emissions from the combustion of biomass shall be considered zero when calculating the GHG intensity of the fuels.
  - Delegated Regulation 2023/1185 recognises biogenic CO<sub>2</sub> as an eligible feedstock for the production of RFNBOs and recycled carbon fuels. The same recognition is currently included in the methodology on Low Carbon Fuels.
- EU ETS MRR (Implementing Regulation (EU) 2018/2066) states that emissions from RED-compliant biomass, RFNBOs, RCFs and low carbon fuels shall be reported but are zero-rated, provided that

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<sup>32</sup> Article 4, Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives.

The draft Delegated Regulation establishing the methodology for permanent carbon removals currently in the process of defining ‘biogenic CO<sub>2</sub>’ as CO<sub>2</sub> produced from a source of biomass by a chemical process acting on the carbon atoms in the biomass<sup>33</sup>.

### Q12: What climate benefits can be associated to CCU relying on biogenic CO<sub>2</sub>/carbon?

CCU technologies that use biogenic CO<sub>2</sub>/carbon can offer several climate benefits depending on the type of use:

- Permanent use (i.e., mineralisation or long-lived products) can result in **negative emissions**, since the CO<sub>2</sub>/carbon originally absorbed by the biomass is effectively removed from the atmosphere and stored over the long term. Under the EU ETS, such negative emissions are not yet recognised as contributing to the EU’s climate targets. The upcoming revision of this legislation should ensure that these climate benefits are fully recognised and accounted for.
- Non-permanent use (i.e., in synthetic fuels, chemicals) does not lead to permanent CO<sub>2</sub>/carbon removals, but it can contribute to a more **circular economy**, also displacing the need for additional virgin fossil carbon inputs.

### Q13: What are the enablers for the biogenic CO<sub>2</sub>/carbon market to support CCU development?

Unlocking the full potential of CCU based on biogenic CO<sub>2</sub>/carbon requires addressing certain key enablers within the EU regulatory framework.

First and foremost, the EU should adopt a legally sound, harmonised, and coherent definition of biogenic CO<sub>2</sub>/carbon under the CRCF draft methodology on permanent carbon removals to ensure consistent implementation and interpretation of the rules across all Member States.

Once this definition is in place, reliable certification schemes should also be developed, ensuring the traceability, sustainability, and climate performance of CO<sub>2</sub>/carbon sources. In parallel, a pragmatic and efficient trading system should be put in place to facilitate the free trade of certified biogenic CO<sub>2</sub>/carbon.

Additionally, the potential of negative emissions should be fully recognised under the EU ETS to enable the proper accounting of climate benefits linked to the permanent biogenic CO<sub>2</sub>/carbon use in CCU applications.

Finally, the transport of this captured biogenic CO<sub>2</sub>/carbon is a critical link in the CCU value chain, yet it remains a regulatory gap. A dedicated transport regulatory package is needed to provide clear, consistent and proportionate rules, enabling safe, traceable and effective carbon transport across regions and borders.

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<sup>33</sup> Article 1(5), [Draft Delegated Regulation supplementing Regulation \(EU\) 2024/3012 of the European Parliament and of the Council by establishing the certification methodologies for permanent carbon removals activities.](#)

## Recommendation 3: Provide clear guidance regarding the role and accounting of non-permanent CCU under EU law

### Q14: What does carbon accounting mean? How should the accounting of carbon emissions be done?

In the context of the EU ETS, carbon accounting refers to the process of monitoring, reporting and verifying (MRV) GHG emissions from covered installations and operations – primarily CO<sub>2</sub>. This process is essential to ensure compliance with the ETS’ cap and trade system<sup>34</sup>, where obligated entities have to surrender emission allowances for every tonne of CO<sub>2</sub> emitted<sup>35</sup>.

Currently, EU rules follow the so-called ‘polluters-pay principle’<sup>36</sup> which foresees that the entities responsible for the environmental damage should pay to cover the costs. Therefore, under the EU ETS, it is the original emitting installation that has to bear the ETS cost, which is paid upstream either by surrendering an allowance or by paying the ETS price.

Non-permanent CCU should be supported, but no ‘climate benefits’ – such as adjustments of surrendering obligations – should be granted under the ETS. Granting these benefits would undermine both the integrity of the ETS and the stability and predictability of EUA prices. To prevent double counting, all CO<sub>2</sub> should be accounted upstream (see next point). Even without integrating non-permanent CCU into the ETS, the emitting installations would still be able to recover part of their cost by selling the captured carbon to industrial users.

The obligation to surrender EUAs should remain with the original emitter, i.e., the operator who first generated the CO<sub>2</sub>, in accordance with the Polluter Pays Principle.

Upstream carbon accounting ensures that all emissions are accounted for under the ETS, avoids loopholes, and upholds both accountability throughout the value chain and the integrity of the ETS as a clear and predictable carbon pricing tool.

On the contrary, a downstream model would allow original emitters to offload emissions responsibilities onto downstream users, leading to unfair and distorted outcomes. It would introduce significant complexity and uncertainty, making it difficult to track emissions, product lifespan, recyclability, and end use – especially if the product exits the EU ETS scope or EU borders altogether.

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<sup>34</sup> [Cap-and-trade programme | UNFCCC](#).

<sup>35</sup> [Monitoring, reporting and verification - European Commission](#).

<sup>36</sup> [Ensuring that polluters pay - European Commission](#).

Shifting to a downstream accounting method would be particularly detrimental to the market attractiveness of recycled and synthetic fuels, as the CO<sub>2</sub>/carbon content would be passed on to the final users rather than paid by the initial emitter.

Should any changes to the accounting approach be considered, grandfathering rules must be implemented to protect ongoing investments and provide legal certainty for current projects.

## Recommendation 4: Incentivise and support the uptake of CCU products on the demand side

### Q15: How to incentivise the uptake of products made with captured carbon?

Recognition of CCU efforts outside the ETS framework can stimulate investments in this technology. For example, carbon contracts for difference (CCfDs) could bridge the gap between current market conditions and the real costs of deploying clean innovations.

Additionally, the application of the lead markets concept should be applied in a technology-neutral manner, only based on the carbon content and the origin of the energy sourcing of the end-product. In the specific case of CCU-based products, the labelling scheme could highlight the carbon origin (e.g. virgin/CCU-based content). Besides, adding CCU-related non-price criteria in private or public procurement rules could further support market uptake. This would help incentivise the use of recycled CO<sub>2</sub>/carbon in the economy and contribute to circularity objective.

To further incentivise the uptake of CCU, the current list of permanent CCU products under ETS Delegated Regulation 2024/2620 should be revised – as it is currently primarily limited to construction materials. It should be expanded to include other applications that result in permanent carbon sequestration, such as solid carbon derived from e.g., some low carbon hydrogen production pathways, or other processes used in manufacturing of permanent CCU products.

The ramp up of a market for non-permanent CCU products is closely tied to the development of CO<sub>2</sub> transport infrastructure, which itself requires a supportive and coherent regulatory framework. Such a framework should allow for the captured CO<sub>2</sub> to be moved via multimodal modes of transport, ensuring the effective and efficient connection of demand and supply and, in turn, the creation of a CO<sub>2</sub> market in Europe.