



Second assessment of the draft technical specifications for certification under the EU CRCF

Biochar

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Summary of key findings and recommendations

This document provides an assessment of the revised draft technical specifications for the certification of permanent carbon removals through biochar under the EU CRCF provided by the European Commission, dated 12 March 2025. In some areas, the revised methodology has been improved, in particular by referring to relevant EU legislation to provide safeguards in the production and use of biochar. However, the methodology could still lead to no actual removals or significant overestimation of the amount of removals, as some key areas were not addressed.

We recommend further improving the certification methodology, in particular with regard to the following issues:

- **Only new mitigation activities should be eligible:** The revised methodology allows rewarding past climate action, without any restrictions. This sets a lower standard than all major existing carbon crediting programmes and violates the principles of the CRCF Regulation that removals should be additional. It also violates well-established principles for providing public funding. The methodology should include provisions to ensure that mitigation activities are only eligible if they are newly implemented and if they have considered the incentives from CRCF units when deciding to proceed with the implementation of the mitigation activities (see our textual proposal below).
- **Accounting for biomass use:** The methodology continues to fail to appropriately account for the GHG impact of increasing the use of biomass to produce biochar. A key shortcoming of the methodology is that it does not identify the baseline scenario for the use of the biomass. By setting the baseline to zero, the methodology assumes that an increase of biomass use to produce biochar (as feedstock and potentially as an energy source to produce the biochar) does not lead to greater emissions or fewer removals elsewhere. This assumption is not appropriate. In the absence of the biochar activity, the additional

biomass used to produce biochar would be available for other purposes and could substitute fossil fuels elsewhere (e.g. by producing electricity or heat). Such a diversion of the biomass from other uses to the biochar activity would lead to an increase in emissions elsewhere which is not accounted for in the methodology. This can lead to significant overestimation of net removals. In some instances, the additional biomass may be sourced from outside the EU which could even lead to indirect land-use changes and further emissions beyond the carbon included in the biomass.

Any biomass used for producing biochar should only be considered to be carbon neutral where it stems from biomass residues that would otherwise not be used and decay to CO₂ in the baseline scenario or from newly established and sustainable sources of biomass. The methodology should include provisions to identify such biomass sources. Such procedures are well-established practices in international carbon crediting mechanisms (see our textual proposals further below). Alternatively, the methodology could quantify the GHG impact of diverting the biomass from other common uses (e.g. co-firing in coal-fired power plant) to the biochar activity and calculate a respective GHG penalty.

The references to the RED III (section 6.2.3) do not include any such procedures and are therefore not sufficient to quantify the GHG impact of an increased biomass use for producing biochar. One might argue that, with reference to the RED III, a zero emissions impact is also assumed under the EU ETS for any biomass use, noting that any associated losses of carbon stocks are accounted for by countries in the LULUCF sector and through the EU LULUCF Regulation. However, in the context of the EU CRCF, assuming a baseline of zero and ignoring the GHG impacts of increasing biomass use would directly violate the objectives and quality criteria of the EU CRCF itself (i.e. quantifying removals and associated GHG emissions in a relevant, conservative, accurate, complete, consistent, transparent and comparable manner as laid down in Art. 4(7)). As a result, removals could be significantly overestimated. One CRCF unit issued for removals through biochar would not represent one tonne of net removals but a much smaller amount. It would also lead to untruthful claims being made in association with EU CRCF units, which might trigger lawsuits.

Significant overestimation of removals would have both environmentally and economically adverse impacts. Environmentally, it would lead to higher net emissions within the EU if CRCF units are used to offset emissions. Economically, it would distort the market for CRCF units. It would artificially steer investments to activities that overestimate removals and away from activities for which EU CRCF units represent actual removals. Second, if EU CRCF units were used as offsets – e.g. by their inclusion in the EU ETS – this would artificially make the implementation of removals economically more attractive and distort the level playing field in comparison to reducing emissions. This could delay and hinder a transition towards climate neutrality in the EU (see also our [cross-cutting findings](#) published in November 2024).

- **Cascade principles for biomass not sufficiently considered in defining eligible biomass types:** The revised methodology continues to fail to appropriately incorporate cascade principles for the use of biomass. A circular bioeconomy is part of the EU's Circular Economy Action Plan and the EU has developed guidance on cascading use of biomass. These principles inter alia require keeping carbon-storing biomass in its material form for as long as possible, take sustainable mobilized biomass as a starting point and promoting the highest economic added value. These principles should be reflected in the methodology by determining which type of biomass sources should be eligible for use towards biochar production.

- **Operating conditions of biochar plants should be defined more clearly:** Newbuilt biochar plants that may operate for decades should reflect state-of-the-art and not lead to lock-in GHG intensive practices which could undermine achieving the EU's climate targets. The revised methodology does not appropriately address the operating conditions of biochar plants. The methodology should specify that venting of methane is prohibited, that no fossil fuels shall be used in the biochar production plants and specify that biochar shall be produced based on pyrolysis, as other processes have too low temperatures. Biomass should only be sourced from within the EU.
- **Longer-term effects of biochar application are not monitored or considered:** According to the revised methodology, monitoring ceases at the end of the year following the certification period during which biochar is demonstrated to have been applied to the land. As a result, it cannot be evaluated whether the assumptions on the effects of biochar made mostly from laboratory experiments are correct and no checks regarding the degradation of biochar and the carbon contents of soils are foreseen. To account for these factors, monitoring must continue after biochar has been applied to the land or incorporated in livestock feed or other products for sufficiently long time periods. This should be done through representative measurements campaigns to gather further evidence related to priming by the European Soil Observatory. The certification methodology should be regularly updated on the basis of latest scientific insights. As long as the impacts of potential priming effects are unclear, provisions should be added to the methodology that a portion of calculated removals from biochar activities shall be withheld in a reserve and not issued to the respective operator. This portion shall only be issued as CRCF units once it can be scientifically proven that no release of CO₂ occurred after the biochar has been applied to the soil in order to account for such potential loss of soil carbon.
- **Double counting of BCR and soil carbon removals must be avoided:** It should be clarified in the methodology that if biochar incorporated into soils is certified for a certain area, no certification of increased soil organic carbon under a carbon farming methodology under the CRCF on the same area shall be possible.
- **No consideration of public funding:** The revised methodology does not prohibit other sources of finance to be combined with EU CRCF units. If biochar activities receive both public subsidies and CRCF units, this could artificially lower CRCF unit prices and implicitly subsidise continued fossil fuel use by the buyers of the units. The methodology should either exclude mitigation activities that receive public funding or proportionally attribute the removals or emission reductions to the financial support provided (see our more detailed analysis below).
- **Materiality threshold:** The proposed materiality thresholds continue to be inconsistent with the principle of conservative quantification. The methodology should be revised to include all emission sources or sinks, except where the exclusion is conservative (see our [cross-cutting findings](#) published in November 2024).

More detailed and further comments are provided below.

Detailed comments

1 Section 1: Definitions

- **Definition of biochar:** Biochar has a growing number of uses in agriculture, industry or construction. These uses require certain biochar qualities, e.g. use for any purpose requires compliance with EU REACH regulation, biochar as feeding supplement in agriculture or on soils requires compliance with EU feed regulation or fertiliser regulation. The initial version of the methodology did not recognise that different types of uses of the biochar require compliance with additional EU legislation. These differences are now addressed in sections 2 and 6 of the proposed methodology where more detail has been added in the revised methodology. We recommend that section 2 further clarifies eligible biochar uses and specifies how biochar used for different purposes has to comply with different elements of EU legislation and further requirements.

It would also be useful to add that biochar shall be produced by pyrolysis and exclude torrefaction and hydrothermal carbonisation. These processes have lower temperatures than 350° C and are excluded indirectly through the current temperature ranges in the definition. The addition would add clarity for the users.

- **Definition of greenhouse gases:** The revised draft methodology now defines greenhouse gases with reference to Part 2 of Annex V of the Regulation (EU) 2018/1999 (the Governance Regulation) (as opposed to the previous reference Annex II to Directive 2003/87/EC (ETS Directive) which includes an incomplete list). This is an improvement.
- **Global warming potential (GWP) values:** The initial version of the methodology defined CO₂e with a reference to 'global warming potentials' without further specification. Section 4 of the revised methodology now refers to GWP values detailed in Annex I of Commission Delegated Regulation (EU) 2020/1044 (Delegated Regulation under the EU Governance Regulation targeted for the use in the GHG inventory & projection reporting context) instead of referring to the IPCC's 5th Assessment report. This is an improvement in the revised methodology.
- **Definition of the term "biomass-derived fuels":** The revised methodology employs the term 'biomass-derived fuels' without defining it. Next to the 'definition of biomass' (which refers to the RED definition), a definition for 'biomass-derived fuels' should be added that encompasses 'biofuels', 'bioliquids' and 'biomass fuels' as defined under the RED.

2 Section 2: Scope

- **References to relevant EU regulations:** We strongly welcome the addition in the methodology that activities certified under the methodology must comply with relevant EU, national and local regulations; in particular the reference to the Fertilising Products Regulation, the REACH Regulation, the Animal Byproducts

Regulation and the Waste Framework Directive. It should be added to this list, that **biochar used in livestock feed must meet the feed hygiene requirements of EU Regulation 183/2005** (as specified in section 6.3.4.1 of the revised methodology).

- **Biomass should only be sourced from within the EU:** We welcome that the biochar production facility and storage must take place in the EU but we strongly repeat our recommendation to extend this requirement to the biomass feedstock for the biochar production. Thus, also the production of the biomass feedstock has to occur in the EU. Such extension to the biomass feedstock may also help prevent carbon leakage. The text (p. 3) should read: *“The biomass feedstocks, the biochar production facility and the storage location for the biochar shall be located in the European Union.”*

There are already reports of deforestation activities in African countries occurring for exports for biochar production. Without the proposed amendment that the biomass feedstocks must be produced in the EU, the EU would be responsible for triggering such detrimental developments.

- **Upstream emissions associated with biomass feedstocks:** The carbon removal process chain has to include the upstream emissions for the biomass feedstocks, e.g. the transport of the biomass feedstocks from the location where it is produced to the biochar facility. In contrast to the initial version of the draft methodology, these emissions are now included in the quantification section of the methodology. Yet, in the section on scope, it should be clarified as well that all upstream emissions fall under the scope of the methodology and shall be included in the carbon removal process chain.

The text should therefore read as follows: *“The operator applying for the certification is required to take on the responsibility for the entire carbon removal value process chain, either by providing all the required services (**production and transport of biomass feedstocks**, operation of a biochar facility, transport to market and storage by application to soils or incorporation in a product) themselves or by engaging with partners or subcontractors.”*

- **Only new mitigation activities, or existing activities registered under other carbon crediting programmes and transitioning to the EU CRCF, should be eligible:** The revised methodology continues to allow rewarding past climate action, without any restrictions. This sets a lower standard than all major existing carbon crediting programmes and violates the principles of the CRCF Regulation that removals should be additional. It also violates well-established principles for providing public funding. This could result in the issuance of many non-additional EU CRCF units. Consistent with best practice in carbon crediting, the methodology should be revised to limit eligibility to mitigation activities that have notified or publicly documented their intent to receive CRCF units or carbon credits issued under other carbon crediting programmes prior to the decision to proceed with a biochar activity.

The consideration of carbon credits when the decision is made to proceed with the implementation of a mitigation activity – commonly referred to as “prior consideration” in carbon crediting programmes – is a key prerequisite for additionality. Provisions on prior consideration are a requirement or recommendation in all

important quality assessment frameworks, including the ICVCM (2023) and the Carbon Credit Quality initiative (CCQI)¹. Agencies that rate the quality of carbon credits, such as Calyx Global, evaluate prior consideration in their assessment frameworks as well. The CDM and the Article 6.4 mechanism also include provisions on prior consideration.

Requirements for demonstrating prior consideration are important because they:

- Filter out mitigation activities for which there is a high likelihood that they would have occurred without revenues from selling CRCF units, and would thus not be additional as required by Article 5 of the CRCF Regulation;
- Are an effective approach for minimising the risk that CRCF units are claimed for removal activities when carbon finance was neither considered nor needed for the activities to proceed.

We propose to include the following text in the scope section of all methodologies:

“The operators shall provide publicly available documented evidence that they considered the incentives from CRCF units, or carbon credits issued under other carbon crediting programmes, on or prior to the calendar date on which they committed to implementing the mitigation activity (e.g., the date when contracts for the purchase or installation of equipment were executed or the date when the first expenditures are incurred).

In the case where the mitigation activity does not involve expenditure, operators shall demonstrate that they considered CRCF units, or carbon credits issued under other carbon crediting programmes, prior to the date when the first physical actions were taken to implement the removal activity.

Operators shall provide such documented evidence to the certification scheme no later than six months after the respective calendar date.

The provision of documented evidence and the notification to the certification scheme shall be assessed as part of the validation of the mitigation activity and confirmed by the certification body and checked by the certification scheme.”

- **Double counting of BCR and soil carbon removals must be avoided:** It should be clarified in the methodology that if biochar incorporated into soils is certified for a certain area, no certification of increased soil organic carbon under a carbon farming methodology under the CRCF on the same area shall be possible.
- **Lack of provisions to avoid double counting with other crediting schemes:** The revised methodology lacks provisions to avoid that two entities within the carbon removal value chain may claim the same removals from biochar production and storage as EU CRCF units (e.g. partners or subcontractors). Moreover, there are no provisions in place that would prevent an operator from seeking carbon credits or other environmental attributes in relation to these removals under other schemes. To avoid such double counting, it is well-established practice in carbon crediting methodologies to address this risk of double counting by requiring the operator (1) to declare that they will not seek carbon credits or other environmental attributes in relation to the removals under other schemes and that (2) legal

¹ <https://carboncreditquality.org/>

agreements with the relevant operators responsible for the value chain are in place to avoid such double counting. The methodology should be revised to include such provisions.

We propose the following text amendments:

“Avoidance of double counting

The operator shall provide a written declaration that they will not seek any carbon credits or other environmental attributes in relation to the removals from any other governmental, bilateral, multilateral or non-governmental programme or scheme.

Furthermore, the operator shall ensure that no other entity within the carbon removal value chain claims certification under the EU CRCF, or registration under another carbon crediting programme or environmental attribute scheme, in relation to the same removals from the biochar activity. Towards this end, the operator shall have legal agreements in place with all relevant other entities that may potentially claim such removals, or shall seek written attestation from these other potential entities, that the operator has the sole right to claim the removals under the EU CRCF and that the other entities will not claim any EU CRCF units or any carbon credits or other environmental attributes in relation to the removals under any other governmental, bilateral, multilateral or non-governmental programme or scheme.”

3 Section 3: Activity period, monitoring period and certification period

3.1 Activity period

- According to the revised draft methodology, the activity period shall be a maximum of 10 years and may be renewed without limitation. In our view, certification should not be possible for a longer period than the service life of the plant used to produce the biochar and the total maximum duration should be defined accordingly. This is common practice in methodologies in the voluntary carbon market and the Clean Development Mechanism.

3.2 Monitoring period

- Monitoring is required up until a year after the end of the certification period during which it is demonstrated that the biochar has been applied to the land (see comments in section 4.6.5 and 5).

3.3 Certification period

In this section, “DACCS and BioCCS” was not replaced by “BCR”; this should be revised.

4 Section 4: Requirements for quantification

4.1 Quantification of permanent net carbon removal benefit

- **Editorial:** The provisions of the CRCF regarding the use of plus and minus have been better explained on page 13 of the revised methodology. However, the presentation of the equations, with the description of the parameters starting with “minus”, is still confusing. The presentation of the equations should be improved.
- **Terminology:** The use of the term “lifecycle emissions” in the methodology is not consistent with common definitions of this term. Lifecycle emissions do not only include upstream emissions but also downstream emissions. For many terms, such as electricity or heat, this does not make sense. Emission factors for inputs should refer to the “process chain emissions”, rather than the “lifecycle emissions”.
- **Use of non-biogenic sources of carbon in the feedstock:** The use of non-biogenic materials in the biochar production process such as plastics, as referred to in describing the term Q_{biochar} on page 6, should be generally excluded (as for example in the World Certificate Biochar Guidelines). Unavoidable biomass contamination by plastic, rubber waste, and/or other fossil carbon-based products/polymers must not exceed 1% (m/m). The methodology has been improved by excluding biochar from production processes in which non-biogenic material is co-processed from application to soils. Additionally, carbon removal units for “mixed char” can now only be issued to biochar for which all threshold requirements for biochar incorporated in materials (section 6) are fulfilled. This means that more specific requirements regarding contamination have been included in the methodology. However, producing biochar from fossil materials is generally not sustainable and not a technology that should be supported. The inclusion of non-biogenic materials significantly reduces the quality of the biochar and prevents the establishment of value chains for the biochar.

The methodology is also still not sufficiently clear how the non-biogenic carbon is determined. Clear requirements are needed for how frequently the carbon 14 (C14) testing has to be done and which exact method for testing has to be used. Yet, this addition would not be needed if non-biogenic materials were entirely excluded.

- The revised methodology has been improved by clarifying, that if the certification body is not satisfied with the quantification, it has to withhold certification (wording changed from “may” withhold to “shall” withhold) (p. 9).
- **Re-certification:** The methodology should be more specific related to the measured values required. What type of measurements, how frequently etc. (p. 7).

4.1.1 Carbon removal sinks and GHG emission sources

- **The proposed materiality thresholds continue to be inconsistent with the principle of conservative quantification.** The methodology should be revised to include all emission sources or sinks, except where the exclusion is conservative.
- The revised methodology states that all emission sources must be assessed and included in the calculation of associated emissions even if they do not reach the

level of materiality. This is an improvement compared to the first draft of the methodology.

However, there are two potential exceptions to this principle, namely contexts in which a materiality assessment *may* be undertaken and specific emissions identified below the materiality threshold. Capital emissions (for which emissions may not be material) and input emissions (for which a materiality assessment is not required) are mentioned as falling under these exceptions. This is not aligned with the principle of conservative quantification. Moreover, there is no rationale provided why these emission sources should be treated differently from others. The selection seems rather arbitrary, as other sources could be much smaller but need to be considered. Overall, the entire materiality approach should be deleted and be made consistent with draft requirements under Article 6.4 and the Clean Development Mechanism where no omissions for materiality are allowed, and rather simplifications are implemented, such as the use of conservative default values, to ensure that emission reductions or removals are not overestimated as a result of using materiality thresholds (see our [cross-cutting findings](#) published in November 2024 for more details).

4.2 Baseline

Accounting for biomass use: The methodology continues to fail to appropriately account for the GHG impact of increasing the use of biomass to produce biochar. A key shortcoming of the methodology is that it does not identify the baseline scenario for the use of the biomass. By setting the baseline to zero, the methodology assumes that an increase of biomass use to produce biochar (as feedstock and potentially as an energy source to produce the biochar) does not lead to greater emissions or fewer removals elsewhere. This assumption is not appropriate. In the absence of the biochar activity, the additional biomass used to produce biochar would be available for other purposes and could substitute fossil fuels elsewhere (e.g. by producing electricity or heat). Such a diversion of the biomass from other uses to the biochar activity would lead to an increase in emissions elsewhere which is not accounted for in the methodology. This can lead to significant overestimation of net removals.

Any biomass used for producing biochar should only be considered to be carbon neutral where it stems from biomass residues that would otherwise not be used and decay to CO₂ in the baseline scenario or from newly established and sustainable sources of biomass. The methodology should include provisions to identify such biomass sources. Such procedures are well-established practices in international carbon crediting mechanisms (see our textual proposals further below). Alternatively, the methodology could quantify the GHG impact of diverting the biomass from other common uses (e.g. co-firing in coal-fired power plant) to the biochar activity and calculate a respective GHG penalty.

The references to the RED III (section 6.2.3) do not include any such procedures and is therefore not sufficient to quantify the GHG impact of an increased biomass use for producing biochar. One might argue that, with reference to the RED III, a zero emissions impact is also assumed under the EU ETS for any biomass use, noting that any associated losses of carbon stocks are accounted for by countries in the LULUCF sector and through the EU LULUCF

Regulation. However, in the context of the EU CRCF, assuming a baseline of zero and ignoring the GHG impacts of increasing biomass use would directly violate the objectives and quality criteria of the EU CRCF itself (i.e. quantifying removals and associated GHG emissions in a relevant, conservative, accurate, complete, consistent, transparent and comparable manner as laid down in Art. 4(7)). As a result, removals could be significantly overestimated. One CRCF unit issued for removals through biochar would not represent one tonne of net removals but a much smaller amount. It would also lead to untruthful claims being made in association with EU CRCF units, which might trigger lawsuits. In the EU ETS, no comparable untruthful claims can be made on the basis of traded credits.

Significant overestimation of removals would have both environmentally and economically adverse impacts. Environmentally, it would lead to higher net emissions within the EU if CRCF units are used to offset emissions. Economically, it would distort the market for CRCF units. It would artificially steer investments to activities that overestimate removals and away from activities for which EU CRCF units represent actual removals. Second, if EU CRCF units were used as offsets – e.g. by their inclusion in the EU ETS – this would artificially make the implementation of removals economically more attractive and distort the level playing field in comparison to reducing emissions. This could delay and hinder a transition towards climate neutrality in the EU.

In contrast to the EU CRCF, other carbon crediting programmes have addressed this matter. For example, the CDM commonly only allows biomass residues (that would otherwise not be used) or biomass from newly established plantations to be used.² Under the Article 6.4 mechanism, a draft standard was published for consultation that requires that in the case where resources have competing uses, such as for biomass, methodologies shall include procedures to identify the competing uses and estimate the emissions or removals associated with these alternative uses.³

Drawing on these well-established practices in existing carbon crediting programmes, we propose the following textual amendments to address this issue:

The operator shall demonstrate that:

- *The biomass used for producing biochar (including use as feedstock or fuel) has, prior to its use under activity, not been used for any other purposes at other sites (e.g. as feedstock or fuel) but has decomposed to CO₂; and*
- *Another use of the type of biomass (e.g. as feedstock or fuel), including the conversion to products like methane, is not economically feasible.”*

Alternatively, or in addition, the methodology could also include a procedure to calculate the GHG emissions impact of diverting biomass from other uses to the biochar activity. A conservative assumption could be that the biomass would otherwise be used for co-firing in a coal power plant.

Lastly, a further concern is that the methodology allows sourcing the additional biomass from outside the European Union. In this case, the risk of indirect land-

² CDM TOOL16. <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-16-v5.0.pdf>

³ Article 6.4 draft leakage standard. <https://unfccc.int/sites/default/files/resource/A6.4-MEP004-A03.pdf>

use changes and further emissions beyond the carbon included in the biomass is particularly high. Given that the EU CRCF units might be used within the EU to offset emissions, this would imply that the CRCF may ultimately only result in shift of emissions to countries outside the EU.

- **No consideration of public funding:** While biochar activities are clearly not financially viable, they may be subsidised through other public support schemes. The revised methodology does not prohibit to combine other sources of finance with EU CRCF units (any state aid received by the project must be acknowledged and described as part of the information to be included in the certificate of compliance according to section 7). If mitigation activities receive both public subsidies and CRCF units, this raises several issues that have been assessed in detail in various reports (Füssler et al. 2019; Oeko-Institut 2023).

Most importantly, the credited removal activities may not be additional as a result of double funding through public subsidies and CRCF units, for three reasons. First, if a large share of funding comes from public sources and only a small share is generated through carbon credits, this puts the additionality of the activity into question. If the funding contribution of carbon credits is very low, it is less likely that carbon credits played a decisive role in proceeding with the investment in the removal activity. The activity may thus have been implemented regardless of the minor funding contribution from carbon credits and is thus unlikely to be additional.

Second, some forms of public funding, such as contracts for difference, are designed to close funding gaps. In this case, a larger amount of funding may be provided through public funding, meaning that the activity would attract sufficient public funding even without access to carbon credits. In this case, the activity would also not be additional.

Third, on a systemic level, when blending public funding with carbon credits, the mitigation impact achieved only through the carbon credits is smaller than the total removals achieved by the credited biochar activities. In many instances, the available public funds are limited. With the available public funds, a certain amount of removals can be achieved. In this case, the contribution of carbon credits can indeed increase this amount. However, only the increase in removals due to the availability of carbon credits are additional removals and should be eligible for crediting under the CRCF. Therefore, crediting **all** removals achieved through a combination of public funding and carbon credits would lead to a large amount of non-additional removal credits.

While the combination of funding sources may not contradict European State Aid Rules, such combination may still undermine climate ambition. State Aid Rules intend to prevent distortion of competition between countries or companies. However, they were not set up for the context of combining funding from carbon crediting schemes and public funding. As outlined above, combining funding instruments may lead to less climate action than if CRCF units were only used to enable removal activities that are additional to those funded by State Aid.

Next to these additionality concerns, **allowing mitigation activities to receive public funding and EU CRCF units for the full amount of removals can lead to market distortions.** Combining public subsidies with carbon credits could artificially lower CRCF unit prices and implicitly subsidise continued fossil fuel use by the buyers of the units. This is illustrated through the following example. We

assume that the implementation of a permanent mitigation activity is associated with costs of 100 EUR per tCO₂. If no public subsidies are provided, then the CRCF units could be generated at a cost of 100 EUR per tCO₂. If the activity receives public funds corresponding to 80 EUR per tCO₂, the costs of generating CRCF units are lowered to 20 EUR per tCO₂. If the CRCF units are used for voluntary offsetting, then public subsidies lower the costs for companies or organisations to achieve their voluntary climate goals through CRCF units. This could lead to less climate action being undertaken within the organisations. The public subsidies provided would also artificially shift mitigation efforts from emission reductions towards removals. The same holds if the units were to be used in the EU ETS. In this case, public subsidies for removals would implicitly lower the costs for operators under the EU ETS to cover their emissions by ETS allowances and decrease their incentives to reduce emissions.

For these reasons, the methodology should either exclude biochar activities that are funded through other public support schemes or proportionally attribute the removals to the financial support provided. This could be done by drawing on approaches developed for the [Swedish Energy Agency](#) and the [World Bank Group](#). For example, if 40% of grant equivalents necessary to make an activity viable are provided through other public funding sources, and 60% through participation in the CRCF, only 60% of the removals or emission reductions should be issued as CRCF units.

Based on these considerations, we propose the following change to equation 1 of the methodology:

$$NCR_P = F * (CR_{baseline} - CR_{total} - GHG_{associated})$$

And

$$F = F_{CRCF} / (F_{CRCF} + F_{PUBLIC})$$

where:

F = fraction of removals that can be attributed to funding from CRCF units

F_{CRCF} = net present value of expected revenues from CRCF units

F_{PUBLIC} = net present value public funding provided to the activity, without any public funding provided through the purchase of CRCF units, expressed in grant equivalents

- The following addition could be made to the methodology:

“Where a biochar activity is not only supported through CRCF units but also public funding (e.g. grants, concessional loans, subsidies), removal units shall only be issued with respect to the funding provided through CFCF units. The share of public funding and funding through CRCF units shall be determined on the basis of grant equivalents.”

4.3 Installations producing biochar

4.3.1 Quantification of total biochar produced and identification of biochar batches

- The methodology uses the term “batch”. The revised methodology includes further guidance on the definition of a batch. Yet, other biochar certification methodologies, e.g. World Biochar Certificate, include further details in their definition of a

batch by specifying that a production batch lasts a maximum of one calendar day, including all possible interruptions and requiring a unique ID number and QR code to ensure traceability of the biomass feedstock, the conditions of production and the quality of biochar. This should be added to the methodology.

4.3.2 Quantification of associated GHG emissions

- **Allocation of emissions to the biochar (p. 10):** There is no plausible reason given why no emissions should be allocated to the production process if the biochar is containing a maximum of 10% of the total chemical energy. Moreover, while an allocation based on energy content may be appropriate for situations where different fuels are produced, this allocation is not appropriate for the context of biochar production where biochar is not produced for the purpose of being used as a fuel. Given that the plants should be mainly constructed for the purpose of producing biochar and the plant would not operate in the baseline scenario – noting that if the plant was constructed anyways for energy generation purposes and the biochar is a by-product, then the mitigation activity may not be additional – **a conservative and robust approach would be allocating all emissions to the biochar.**

Similar considerations apply to the allocation to co-products. The allocation of emissions to other products should only be applied, if the facility proves that these products are sold and the energy content is used by other facilities. In the revised draft methodology, such a requirement is missing. If the other products including their energy contents are wasted and released in the atmosphere, all emissions have to be allocated to the biochar produced. Otherwise, large amounts of emissions produced are excluded from the accounting. However, if the main purpose of the facility is energy generation, the facility may also be constructed in the baseline scenario.

Lastly, the emissions impact also depends on what kind of fuels the co-products are replacing if they are being used. If these co-products substitute the adoption of low emission technologies such as heat pumps, then the allocation would also underestimate the emissions impact of the construction of the plant.

Overall, the rules for allocation need revision. A conservative default approach should be to allocate all emissions to the biochar production (assuming that the plant is additional and would not be constructed anyways).

- $E_{\text{co-products}}$: the facility should continuously monitor and prove that the quantity of $E_{\text{co-products}}$ subtracted is consistent with the electricity and heat sold to a grid outside the system boundary.
- In the definition of $E_{\text{co-products}}$, the RED III and its Annexes are not properly referred to on page 11 of the revised draft methodology which makes it difficult to understand the draft methodology. In addition, the references to Annex V seem to be too complicated for the purposes of biochar facilities. The relevant provisions should be extracted and added to this methodology. For any user of the method it is very difficult to understand which parts of the complex RED III provisions in Annex V and VI are relevant, because biochar facilities will mostly not use biomass fuels, but other solid biomass feedstocks. Annex VI of the RED III Directive lists different types of biomass inputs that could also be inputs to biochar plants,

but the percentage GHG savings for heat and electricity in this Annex is not what is required for the biochar methodology. The methodology would need to show GHG emissions related to the biomass sources, not emission savings.

4.3.2.1 Emissions from the biochar facility (GHG_{facility})

- **CH₄ release:** CH₄ emissions from venting in the pyrolysis process have been replaced by CH₄ emissions “released”. The revised draft methodology now says that certified production facilities to “*must seek to make this term zero*” instead of “*should seek*” in the initial version. This should be revised to **require CH₄ emissions released to be zero** as this is technically possible (other biochar certification standards such as World Biochar Certificate clearly prohibit CH₄ venting) and already the case for the most efficiently run facilities as stated in the draft methodology. Since biochar plants do not yet exist at large scale and will be mostly newbuilt they should be state-of-the-art technology and not emit any CH₄. It should be checked whether the release of CH₄ from newbuilt production facilities would be in line with EU requirements for permitting new production facilities.

If the release of CH₄ is not prohibited, there should be a requirement of *continuous* measurement of CH₄ venting and flaring (instead of two measurements during the first certification period which will be considered as characteristic of the pyrolysis unit in case they are consistent). In the revised methodology, it has been specified, under which conditions methane emissions measurements are considered to be consistent. It should also be clarified that *in any case* of measured methane levels above trace levels a methane reduction plan must be developed and emissions must be measured again in the next certification period (and not only if the measurements were not consistent).

If measurements demonstrate the release of CH₄, the results of the continuous measurement results have to be transferred annually from the certified projects to the institutions responsible for national GHG inventories for national GHG reporting, as these will be additional sources of GHG emissions in the EU and Member States will not be able to track these emissions. This provision to allow and even promote new CH₄ sources from CH₄ releases at installations is not in line with the EU’s methane strategy.

- **GHG_{bio-storage}:** The exceptions that CH₄ emissions from biomass storage for less than four weeks and with a maximum of 30% residual moisture shall be set to zero shall be deleted. On these four weeks CH₄ emissions are likely to occur and should be accounted.
- No scientific sources of the parameter 0.0013 for the assumed monthly fractional loss of biomass is provided. This needs to be clearly justified based on available scientific evidence. The emissions will depend on the type of biomass, moisture content and temperature which is not taken into account. CH₄ emissions should be measured if storage of biomass with moisture contents of >30% is used.
- The methodology does not cover the situation that insufficient water content can cause dust formation and spontaneous combustion and the provisions related to low water content increase these risks. This should be added.

- **GHG_{combustion}**: The combustion of fossil fuels at the biochar production facility should generally be prohibited under the CRCF. Biochar facilities are not yet widespread facilities. The EU should not allow that new facilities that consume fossil fuels for decades are built for the purposes of carbon sequestration with biomass. If this is implemented, the storage of fossil CO₂ is not necessary in equation.
- **GHG_{Heat}**: The combustion of fossil fuels for heat produced outside the system boundary and consumed by the biochar production process should generally be prohibited under the CRCF.

4.3.2.2 Emissions from inputs

- The methodology should be revised to further specify examples of relevant inputs and related GHG emissions for which emissions associated with the consumption of these inputs must be considered.

4.3.2.3 CO₂ capture at the biochar production facility

- According to the draft methodology, capturing biogenic CO₂ at the production facility shall not be counted as a negative emission under the biochar methodology but may be eligible for certification under the BioCCS methodology. In this case, guidance would need to be developed to clarify how the two different certification methodologies are to be applied to avoid overlaps.

4.3.3 Monitoring and reporting

- It seems incorrect that the monitoring shall occur on an annual basis. The reporting of the monitored information may be on an annual basis, but parameters such as the quantity of biomass consumed has to be monitored continuously. The monitoring frequency for such parameters should be specified in the methodology (which is currently not the case), the reporting should only prove that the guidance has been followed.
- The monitoring and reporting should not be limited to the GHG emissions, other parameters should be monitored and reported:
 - Results of analysis of PCB and PCDD/F
 - Results of analysis for polycyclic aromatic hydrocarbons (PAH)
 - Results of the analysis of heavy metals .
- The analytical methods for monitoring should be further specified by the biochar methodology, see for example analytical methods for WBC-biochar that specify sample preparation, bulk density measurement, water content measurement, organic carbon content, H/C and O/C and many more parameters. They should not be a choice for the users of the methods nor be left to certification schemes (as stated in section 6.1 and 6.5), but be defined in the certification methodology itself. If standards such as ISO, DIN etc. exist for the measurements, they have to be used. This is a key part of any methodology and a key gap in the draft biochar methodology. Flexibility to choose between many different quantification

approaches can lead to adverse selection, as has been observed with some methodologies in the voluntary carbon market.

4.4 Transport of biochar

4.4.1 Quantification of associated GHG emissions for transport

- Only one trip is allocated to the biochar (“outbound trip”), but empty trips are likely to occur which are not allocated to the biochar but increase general emissions for the country or the public. Therefore both trips should be allocated to the biochar. Section 4.6.2.5 on emission factors for transport clearly requires operators to account for empty return trips and section 4.4.4.1 should be aligned with this requirement.

4.5 Use of biochar

4.5.1 Calculation of the permanence fraction

- This section – similar to other – misses references to the methods to be used. The methods that are to be used to determine permanence fraction should build on existing standards such as ISO or DIN.
- In a workshop of the expert group on the biochar methodology it was mentioned that expertise to determine inertinite is very rare and not commonly available in qualified laboratories. The indicated method should only be used if there are at least three certified laboratories operating in each Member State to perform the analysis. A certified standard for the inertinite assessment shall be provided by the operator. The availability of the analytical capacities should be analysed by the methodological developers prior to publishing draft methodologies.
- Instead of inertinite assessment, it is preferable to use the decay function based on H/Corg ratio that is provided as a second option for permanence assessment. This method is already used in other biochar certification methods and there is a DIN/ISO standard available for the analysis. However, it is explained that the 200 year values are not directly presented in the paper and were derived by the project team. This approach has to be transparently included in an Annex to the methodology.
- It is not explained what type of temperature is indicated in table 4 (outside temperature, soil temperature?).

4.5.2 Quantification of associated GHG emissions

No comments.

4.5.3 Monitoring and reporting

- **Monitoring of carbon uptake in soils:** Monitoring ceases at the end of the year following the certification period during which biochar is demonstrated to have been applied to the land (section 5, p. 30). If monitoring is not continued thereafter, there seems to be no process to evaluate whether the assumptions made mostly from laboratory experiments are correct and no checks are foreseen regarding the degradation of biochar and the carbon contents of soils. There should be regular

assessments of the biochar degradation and the total soil carbon (for biochar added to soils) (see section 5) to:

1. Confirm the assumptions made by biochar experts with regard to permanence; and
 2. Provide the necessary data required for national GHG inventories to develop Tier 2, country-specific sequestration factors as required in the 2019 IPCC methodological supplement for biochar accounting in GHG inventories. This requires a continuous periodic measurement of the biochar degradation, but also the development of total soil carbon in the soils on which biochar is applied. If such monitoring is missing, Member States will not be able to consider the effects of biochar in the national GHG inventories and the biochar application cannot be accounted as carbon removals for the EU's GHG emission targets. This will result in a substantive disincentive to implement any incentive schemes for biochar for Member States.
- There should also be certain key parameters and properties that shall be declared on the biochar product certified e.g.:
 - Organic carbon content of biochar
 - H/C_{org} ratio
 - Biochar nutrients at least for nitrogen, phosphorus, potassium, magnesium, calcium and iron.
 - Water holding capacity
 - pH, salt content, bulk density, water content

4.6 Common principles for quantification

4.6.1 Accuracy, conservativeness and transparency

- The analytical methods for monitoring should be further specified by the biochar methodology, see for example analytical methods for WBC-biochar that specify sample preparation, bulk density measurement, water content measurement, organic carbon content, H/C and O/C and many more parameters. We recommend that it is systematically clarified for each parameter how measurements should be undertaken, what data sources may be used (e.g. lifecycle assessment tools), what monitoring frequency is appropriate, how conservativeness in the choice of the data will be ensured (e.g. where different data sources indicate a plausible range of values) and how the selection of parameters should be verified. Monitoring requirements, measurement techniques as well as calculation factors should not be a choice for the users of the methods nor be left to certification schemes (as stated in section 6.1), but be defined in the certification methodology itself. If standards such as ISO, DIN etc. exist for the measurements, they have to be used. This is common practice in certification methodologies used in the voluntary carbon market and a key gap in the draft biochar methodology. Flexibility to choose between many different quantification approaches can lead to adverse selection, as has been observed with some methodologies in the voluntary carbon market.

4.6.2 Emission factors

4.6.2.1 Electricity

- The methodology states that operators “may” always report emissions based on a “grid average emission factor for a country in which the activity is located”. This creates unclarity which other approaches (not average) or geographical boundaries (EU rather than the country) may be used. Such adverse selection has been widely observed in the carbon crediting market (see, for example, Haya et al. 2023). Therefore it is good scientific practice to either require the use of default values or offer default values that are very conservative (and thus overestimate transport emissions) while allowing operators to also use different values. The methodology should be revised respectively.

4.6.2.2 Heat

- The combustion of fossil fuels for the generation of heat for pyrolysis should generally be prohibited in the certification framework. The EU should not build additional plants that consume fossil fuels for decades for the purposes of carbon sequestration with biomass. This could lead to a lock-in into carbon intensive technologies and practices that may undermine the achievement of the EU’s climate targets. This should also apply to heat supplied from a heat network, if this is based on fossil fuels.

4.6.2.3 Biomass

- In the revised methodology, the following requirement has been added: when biomass or biomass-derived fuel meeting the requirements of Art. 29 of the RED III is consumed for an activity, any CO₂ produced by chemical processes from the carbon atoms contained in the biomass shall be treated as having zero associated emission, but the supply chain emissions for the provision of the biomass must be accounted for, and any non-CO₂ emissions associated with biomass combustion (primarily CH₄ and N₂O) must be accounted for (p. 24). This approach does not appropriately account for the GHG impact of increasing the use of biomass. **Biomass should only be eligible to be used under the methodology where it stems from biomass residues that would otherwise not be used and decay to CO₂ in the baseline scenario, or from newly established and sustainable sources of biomass.** The methodology should include provisions to identify such biomass sources (see section 6.1). Such procedures are well-established practices in international carbon crediting mechanisms. Yet, the methodology does not identify the baseline scenario for the use of the biomass (see section 4.2). **Given that significant amounts of energy are required to produce charcoal, in practice the use of biomass for charcoal production could lead to less removals or greater emissions than alternative uses, thus not providing any GHG benefits.** In contrast to many other carbon crediting methodologies, all these effects are not accounted for in the revised methodology. It is rather assumed that any use of eligible biomass is carbon neutral. The references to the RED III are not appropriate to address these matters. The RED III directive establishes criteria for the use of biomass fuels. However, these criteria are not intended to ensure, and do not ensure, that the use of the biomass

can be considered as carbon neutral and that the biomass does not have alternative uses that provide greater GHG benefits than using it for charcoal production. **Using the RED III Directive as the basis for ignoring the GHG impacts of diverting biomass to charcoal production, as proposed in the draft methodology, is therefore inappropriate and could lead to very large overestimation of the actual removals or even calculate removals where none occur.**

- The revised methodology leaves it open to certification schemes to further specify disaggregated default values or providing guidance on the calculation for feedstocks that do not have disaggregated default values in the RED annexes for an RED-consistent calculation. It would be better to add those values to the biochar certification methodology itself to set a coherent standard and prevent adverse selection of certification schemes by operators.

4.6.2.4 Inputs

- The specifications or the calculation of emissions is not user-friendly. There should be additional tables in an annex indicating which part of the lifecycle emissions can be found in which of the documents quoted.
- The draft methodology refers to different data sources as possible sources of lifecycle emission factors for inputs to an activity that is certified under the CRCF. We welcome that, in contrast to the initial version, the revised version of the methodology acknowledges that not all operators will have access to the Ecoinvent database as a data source. Yet, permitting different data sources to be used could result in inconsistent results. Additionally, NGOs may not be able to cross-check any supplied documents if proprietary data sources like the Ecoinvent database are used. In addition, the Ecoinvent database is also not sufficiently transparent to be used for this purpose. We recommend that all required parameters for the methods have to be published in an annex to the biochar method and the commercial Ecoinvent database should be deleted as a sources.

4.6.2.5 Transport

- In the revised draft methodology, references to emission factors from the JRC report “Solid and gaseous bioenergy pathways: input values and GHG emissions” have been deleted. Instead, the methodology requires operators to calculate emissions from transport based on an assessment of the fuel consumption and consequent emissions associated with the specific vehicles/routes utilised or based on conservative default factors provided by the certification scheme.

The methodology should be clarified by **unambiguously specifying emission factors that are to be used** (disaggregated emissions per kilometre for different types of biomass feedstocks that typically have different transport distance are available in the JRC report that was referred to in the previous version of the methodology). Thus, a more disaggregate table using the same biomass categories and providing factors for different transport distances should be (re-)inserted. From such table the users should select the adequate parameters for the biomass feedstock used. It is correct that operators do not need to calculate emissions specifically for vehicles and routes utilised, but they should use specific factors for

biomass feedstock types and distance categories that are available in this document.

The methodology leaves it to the certification schemes to provide conservative default values for measuring transport emissions. This delegation of responsibility may pose some risks as oversight over certification schemes appears to be relatively limited. Moreover, we note that the degree of conservativeness has been specified for capital emissions (95% confidence), this has not been done for transport emissions. We recommend using the same degree of conservativeness for all conservative default values throughout the methodology.

4.6.3 Capital emissions

- The revised draft methodology still states that any capital emissions associated with non-biomass renewable energy generating equipment shall be excluded from the calculation. This is not appropriate as it would lead to incomplete emissions. Why should emissions associated with non-biomass renewable energy generation equipment be excluded if the equipment has been built to produce electricity for the biochar plant? **If capital emissions associated with non-biomass renewable energy generating equipment have been generated for the biochar plant they shall not be excluded.**

4.6.4 Measured data and uncertainties

- The revised draft methodology states that measurements should be undertaken in a way consistent with the requirements of Article 42 of the MRR. Yet, certification schemes may provide additional guidelines for specific types of measurement. Corresponding guidance should be included in an annex to the certification methodology instead of allowing different certification schemes to define different requirements.

4.6.4.1 Assessment of uncertainty

- The revised methodology has been significantly improved for how it counts for uncertainty, in particular that the consideration of uncertainty is not limited to measurements.
- It has been added to the revised draft methodology that certification schemes shall facilitate the consistent assessment of uncertainty by setting requirements for each type of activity and may provide more detailed instructions on the calculation of uncertainty for specific activity types. However, in all relevant parts of the methodology guidance should be provided how uncertainty is estimated based on measurements or default uncertainties should be added. In particular for the emission factors provided, it is important to add uncertainties.

4.6.5 Monitoring and reporting

- The section refers to the Implementing Regulation 2018/2066 on the monitoring and reporting of GHG emissions pursuant to the EU ETS Directive (MRR). Details regarding the monitoring plan have been added to the revised methodology. It states that the monitoring plan shall be consistent with this directive.

- Additionally, the revised draft methodology states that certification schemes may provide additional guidance specifying which elements must be included for which type of activity, specifying minimum measurement frequencies for measurements not listed in Annex VII of the MRR and specifying best practice requirements for quality assurance.
- Yet, **the analytical methods for monitoring that are specific to biochar have to be specified by the biochar methodology as they are not covered by the MRR** (see other sections on monitoring above). They should also not be defined by the certification schemes or up to the choice of the users of the methods. If standards such as ISO, DIN etc. exist for the measurements, they have to be used. This is a key part of any certification methodology and a key gap in the draft biochar methodology.
- The annual monitored GHG emissions and removals have to be transferred to national GHG inventory agencies to ensure that certified GHG removals can be reflected in national GHG inventories and the EU GHG inventory. The 2019 IPCC methodology requires a Tier 2 method with country-specific emission/ removal factors. Without such transmission, countries will not be able to report any sequestration effects of the biochar certification framework.

5 Section 5: Storage monitoring and liability

- The revised draft methodology includes contradictory information regarding the required monitoring period which should be harmonised. The first sentence in section 5 states that monitoring is only required until the biochar is applied to the land or incorporated into a product. Yet, in the third paragraph of section 5 a revision has been made to specify that no further monitoring is required after the end of the year following the certification period during which biochar is demonstrated to have been applied to the land or incorporated into a product. Thereafter, no further monitoring is required, as the risk of reversal for the permanent fraction of the carbon into the biochar is considered low (except for high temperature cement recycling processes) (p. 30).
- However **monitoring needs to continue after the end of the year following the certification period during which biochar is demonstrated to have been applied to the land:**
 - **Priming effects:** In contrast to the initial version of the methodology, the revised methodology now refers and discussing priming effects from the application of biochar on lands in section 6.3.2.1. However, the methodology provisions are not yet appropriate and need improvement.

The revised methodology states that there should be “no reason to believe that the application of biochar is expected to cause significant reductions in the storage of other soil organic carbon through ‘positive priming’ effects”. As there is considerable uncertainty about the direction of priming effects and their magnitude, it is unclear how such a general provision should be implemented and on what basis such a judgment should be made. Moreover, the methodology has only measures in place if the certification body concludes that “significant” loss of other soil organic carbon

is “likely”, or that deleterious impacts on agricultural productivity and/or soil health are “likely”. This is not a conservative approach, as any material effects may not be taken into account.

Moreover, the proposed approach does not allow to gather actual data on such priming effects which is essential to improve the understanding of the consequences of charcoal application on lands. Therefore, monitoring is required that **analyses whether priming effects of the biochar applied occur** that stimulate soil organic carbon mineralisation in the soils on which biochar is applied. As the related research seems to indicate that the direction of the priming effect (enhancement or reduction of carbon mineralisation) may depend on soil properties and biochar properties, further onsite investigations have to be conducted to avoid unaccounted emissions from enhanced SOC mineralisation. For these reasons, there has to be further monitoring after the biochar is applied to the land. The methodology should ensure that the assumed carbon storage is not significantly reduced through interactions of the biochar with the soils on which it is applied.

We propose to add to the methodology that representative measurement campaigns need to be conducted to gather further evidence related to priming after biochar has been applied to the soil. Such monitoring does not need to be implemented by the operators/farmers on whose land biochar is applied, but could be implemented by the European Soil Observatory. The EU Soil Observatory has been established to collect high-resolution, harmonised and quality-assured soil information (showing status and trends) to track and assess progress by the EU in the sustainable management of soils and restoration of degraded soils. The application of biochar should be specifically included in these data collection strategies. The certification methodology should be updated in the light of new scientific insights on priming effects. As long as the impacts of potential priming effects are unclear, provisions should be added to the methodology that a portion of calculated removals from biochar activities shall be withheld in a reserve and not issued to the respective operator. This portion shall only be issued as CRCF units once it can be scientifically proven that no release of CO₂ occurred after the biochar has been applied to the soil in order to account for such potential CO₂ release.

6 Section 6: Requirements for biochar production and use

6.1 Requirements for biochar

- Biomass sources: To enhance the user-friendliness of the biochar certification methodology a positive list with permissible biomass feedstocks for the production of biochar should be added. This positive list shall only include biomass residues and residual biomass (harvest residues from agricultural crops, prunings from perennial cultures, residues from landscape management, residues from wood processing, organic residues and waste, manure, residues from anaerobic digestion) and shall exclude wood and wood chips and annual crops only produced for the purposes of biochar production. The positive list can use elements from the RED

Directive but, it is preferable to add an Annex with a respective list to the biochar methodology as this is considerably more user-friendly and would promote the use by private entities (see our [cross-cutting findings](#) published in November 2024 for more details). The methodology should clarify that only feedstocks from this list are eligible for the production of biochar. The current requirement in the draft methodology that “any production batch of biochar in which the produced biochar accounts for [50%] or more of the total energy outputs in the co-products of the biochar production facility may only be produced from waste or residual feedstocks as defined under [the RED III]” should then be deleted (see also section 2 and section 6.1.3).

6.1.1 Biochar properties

- We strongly welcome the requirement that all biochars must comply with all relevant provisions under the EU REACH Regulation. This is a significant improvement in the revised draft methodology as it implies that biochar as a product must undergo a registration. In case of production volumes of at least 10 t/year the REACH Regulation prescribes a thorough chemical safety assessment. This implies a comprehensive assessment of health and environmental risks related to the intended uses of the biochars.

6.1.2 Biochar sampling

- We welcome that sampling is obligatory for all production batches of biochar according to the revised draft methodology.
- According to the revised draft methodology, sampling plans must be consistent with the requirements set by Article 33 of the MRR. This Article includes general requirements for sampling plans (e.g. samples must be representative) but does not provide any specific guidance for sampling of biochar. Additionally, according to the draft methodology, certification schemes must facilitate consistent sampling by setting appropriate sampling requirements, for example by reference to relevant ISO standards. Furthermore, the methodology states that certification schemes may choose to provide additional guidance which may differentiate the level of sampling required for different production contexts.

In our view, sampling requirements for biochar that go beyond the general requirements laid down in the MRR should be defined in the methodology itself. We recommend including corresponding guidance in an annex to the certification methodology instead of allowing different certification schemes to define different requirements. It is common practice of certification programmes in the voluntary carbon market to define measuring/sampling standards in the certification methodology. Additionally, it is not user friendly to have different requirements for sampling under different certification schemes and this can lead to adverse selection. Sampling requirements should be unambiguously defined in the methodology itself.

- This section states that “a certification body or certification scheme may require analysis of retention samples if this is deemed necessary to establish a representative characterisation of a production batch, or to confirm that measurements taken are representative.” (p. 31) This sentence should be deleted as the newly inserted section 6.1.2.1 requires the biochar producer to take retention samples.

6.1.3 Sustainability requirements for biochar production and biomass feedstocks

- Item (i): The revised draft methodology states that the activity shall comply with the criteria set out in Appendix A to Annex I (Annex 1 does not exist) to Commission Delegated Regulation 2021/2139. This Regulation establishes technical screening criteria for determining the conditions under which an economic activity qualifies as contributing substantially to climate change mitigation or climate change adaptation and for determining whether that economic activity causes no significant harm to any of the other environmental objectives. This Regulation includes the principle of “do no significant harm” (DNSH). Appendix A to Annex I lists generic criteria for DNSH to climate change adaptation. It is not entirely clear to us how this appendix is applicable in the context of biochar and how compliance with the DNSH principle would be demonstrated by operators.
- **Item (iii):** A circular bioeconomy is part of the EU’s Circular Economy Action Plan and the EU has developed guidance on cascading use of biomass⁴. These principles inter alia require keeping carbon-storing biomass in its material form for as long as possible, take sustainable mobilised biomass as a starting point and promoting the highest economic added value. We currently do not see the cascading principles for circular biomass sufficiently reflected in the methodology. According to section 6.1.3. item (iii), any potential risks to the circular economy objectives from the activity shall be evaluated and addressed, but this is not further specified. **The cascading principles for biomass should be reflected with additional guidance related to different biomass feedstocks that can potentially be used for biochar production** (see section 6.1). For biomass feedstocks such as wood other long-term uses are preferable (e.g. construction, furniture, replacement of fossil-based products) compared to a direct production of biochar from wood. There are not sufficient biomass sources in the EU to comply with current needs for the different purposes and biochar may add to this competition. Therefore, it is essential to incorporate more specific elements in the methodology that safeguard cascading use of biomass as foreseen in the EU’s circular economy strategy. Agricultural crops should primarily be used for food supply and not for energy production or biochar production.
- **Item (vi):** The revised methodology states that *“All biomass/biomass-derived fuel that is [used] as a feedstock for biochar production by the activity and any additional biomass/biomass derived fuel consumed to produce energy for the activity shall comply with the sustainability requirements detailed in Article 29 of the RED III as further specified in the following subparagraphs.”*
 - The new concept of “biomass/biomass-derived fuels” that shall comply with RED Art 29 criteria is unclear. No definition of this concept is available in the draft methodology; only a definition of ‘biomass’ is included (which makes a reference to the biomass definition in the RED). It should be noted that RED Art 29 sustainability and energy savings criteria apply to “biofuels, bioliquids and biomass fuels” (all defined under RED). Yet, under the

⁴ European Commission: Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, Guidance on cascading use of biomass with selected good practice examples on woody biomass, Publications Office, 2018, <https://data.europa.eu/doi/10.2873/68553>

RED, they do not apply to 'biomass'. As commented in Section 1 above on definitions, we suggest adding a definition for 'biomass-derived fuels' that encompasses 'biofuels', 'bioliquids' and 'biomass fuels' as defined in the RED.

- A reference to the energy saving criteria of the RED is missing, this is relevant for all biomass-derived fuel used in the biochar production process.
- We suggest editing the requirements as follows:
 - The CRCF methodology reference to RED Art 29 criteria should be limited to biomass used to produce energy, i.e. 'biomass-derived fuels' (and not to biomass in general): "All biomass-derived fuel that is used to produce energy for the biochar production process shall comply with the sustainability criteria detailed in Article 29 (2)-(7) of [the RED III] for biofuels, bioliquids and biomass fuels. Additionally, all biomass-derived fuel shall comply with the energy saving criteria detailed in Article 29 (10) of [the RED III]."
 - By referring to 'biomass-derived fuel' (defined as explained above) it is clarified that biomass used for non-energy purposes (and as a source of captured CO₂) should not be subject to RED criteria (e.g. fermentation in breweries etc.) as RED sustainability and energy savings criteria cannot apply in such a context. Sustainability criteria for biomass that is used as feedstock for the biochar production should be defined separately by clarifying that **all** biomass that is used as feedstock for biochar production by the activity should come from biomass residues and residual biomass (see section 6.1).
- **Item (viii):** It should be specified that all biomass used for the production of biochar must come from waste or residual feedstocks (and not only "any production batch of biochar in which the produced biochar accounts for [50%] or more of the total energy outputs in the co-products of the biochar production facility" as currently specified in the methodology) (see also section 2 and section 6.1).
- It also has to be specified which biochar parameters have to be declared when the product is sold.
- It should also be specified that the biomass used must not contain any paint residues, solvents or other potentially toxic impurities.
- For the eight cancerogenic PAHs (The eight cancerogenic compounds within 16 EPA PAH = 8 EFSA PAH are Benzo[a]pyrene, Benzo[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Dibenzo[a,h]anthracene, Indeno[1,2,3-cd]pyrene, Benzo[ghi]perylene), an additional limit shall be set. The WBC limit value of 1 mg for the sum of EFSA PAHs kg⁻¹ shall be applied. Limits for these substances have been included in section 6.3.3 in the revised draft methodology which applies to biochar applied to soil and in section 6.4.1 which applies to biochar incorporated in products. Limits should be added for biochar used in livestock feed (section 6.3.4.1) as well.

6.2 Requirements for the biochar production process

- According to the draft methodology, the minimum temperature for the biochar production process is set at 350°C. However, **for the pyrolysis of animal by-products such as manure and manure containing biogas digestates, pyrolysis conditions must exceed 500 °C for 3 minutes at minimum to eliminate biological hazards and micropollutants** (see requirements in European Biochar Certificate methodology).
 - During the pyrolysis process, aromatic carbon, carbonates, and a multitude of diverse volatile organic compounds (VOCs) are formed. The latter constitutes a large part of the pyrolysis gas that partially condensates on biochar surfaces and pores. These condensed pyrolysis gas compounds are substantial constituents of biochar materials, are essential for certain biochar functions and thus necessary for the characterization of biochar. However, a quantitative determination of VOCs cannot be carried out at a reasonable cost. For an independent estimation of the true pyrolysis temperature, which can deviate from the temperature measured at the reactor for various reasons, the weight loss of volatile compounds of biochar is determined by gradually increasing the temperature in the absence of air using the thermogravimetric analysis (TGA). The TGA diagram can thus be used to determine both the absolute VOC content and the maximum temperature to which the biochar was exposed during pyrolysis. The total VOC content and its temperature-dependent degassing are considered as a criterion for the evaluation of the pyrolysis process. For this reason, it is considered sufficient that the TGA analysis only needs to be carried out in the first control year of a pyrolysis unit and should be reported in the first control year (see European Biochar Certificate methodology).
- The methodology should prohibit additional GHG emissions from the biochar production process. The use of fossil fuels for the heating of the pyrolysis reactor has to be prohibited. If the pyrolysis reactor is electrically heated, electricity from renewable energy sources has to be used. The current requirement related to the energy conversion efficiency (equation 23) is far too complicated.
- The pyrolysis gases produced during pyrolysis must be recovered or burned. It should be prohibited that they escape into the atmosphere. This requirement should be added.
- Excess/ waste heat from the plant should be used to at least 70% (e.g. for drying biomass, district heating) and a solution for efficient waste heat recovery has to be implemented.

6.3 Requirements for the application of biochar to soils

6.3.1 Eligible forms of soil application

6.3.2 Application to soils

- We welcome that more stringent criteria for applying biochar to soils have been included in the revised draft methodology.

- The draft methodology requires operators to demonstrate that
 - the local agricultural context has been considered
 - that it is reasonable to expect that the application of biochar will have no overall negative effect on agricultural production or soil health
 - and that there should be no reason to believe that the application of biochar is expected to cause significant reductions in the storage of other soil organic carbon through ‘positive priming’ effects.
- It is left to certification schemes to decide whether the above points have been fulfilled. Additionally, they may provide additional guidance relating to the assessment of the impact of biochar use on agricultural productivity and/or ecosystem function including soil health monitoring requirements. It should be added to the methodology that requirements set by certification schemes related to potential soil organic carbon losses or effects on soil health should be periodically reviewed (e.g. every five years) and updated based on the most recent scientific insights (see also section 5).

6.3.3 Limit values on heavy metals and organic contaminants for biochar applied to soil

- We welcome the introduction on limit values on heavy metals and organic contaminants for biochar applied to soils.

6.3.4 Requirements for biochar incorporated into a matrix prior to soil application

6.3.4.1 Biochar used in livestock feed

- We welcome the addition of limits to potentially harmful substances for biochar used in livestock feed.

6.4 Requirements for the incorporation of biochar in products

6.4.1 Limit values on heavy metals and organic contaminants for biochar [applied to soil] incorporated in products

- The heading of this section refers to soils and should be revised.
- We welcome the addition of limits to potentially harmful substances for biochar used in products.

7 Section 7: Information to be included in the certificate of compliance

- **Information to be made available on CRCF units:** The information to be included in certificates and publicly available background information should be amended to include

- Reports prepared for certification and recertification that describe how the activity meets all requirements under the CRCF and relevant delegated acts,
- Reports prepared by the third-party auditors,
- For any re-certification a full calculation of removals or emission reductions that should be made available in an electronic format that allows users to reproduce the calculation (e.g. MS Excel),
- Information on the project locations should be made available through KML files or in similar electronic formats.

References

- Füssler, J.; Kansy, T.; Spalding-Fecher, R. (2019): Discussion Paper Blending climate finance and carbon market mechanisms. Options for the attribution of mitigation outcomes: World Bank. Online available at [https://cpf.wbcarbonfinance.org/sites/cpf_new/files/Documents/Blending climate finance and carbon market mechanisms_FI-NAL%28Clean%29_March.2019.pdf](https://cpf.wbcarbonfinance.org/sites/cpf_new/files/Documents/Blending%20climate%20finance%20and%20carbon%20market%20mechanisms_FI-NAL%28Clean%29_March.2019.pdf).
- Haya, B. K.; Alford-Jones, K.; Anderegg, W. R. L.; Beymer-Farris, B.; Blanchard, L.; Bomfim, B.; Chin, D.; Evans, S.; Hogan, M.; Holm, J. A.; McAfee Kathleen; So, I.; West, T. A. P. et al. (2023): Quality Assessment of REDD+ Carbon Credit Projects, Berkeley Carbon Trading Project, 2023. Online available at <https://gspp.berkeley.edu/research-and-impact/centers/cepp/projects/berkeley-carbon-trading-project/REDD+>, last accessed on 18 Mar 2024.
- ICVCM (2023): Core Carbon Principles, Assessment Framework and Assessment Procedure, The Integrity Council for the Voluntary Carbon Market. Online available at <https://icvcm.org/>.
- Oeko-Institut (2023): Schneider, L.; Haase, I. Carbon crediting and official development assistance (ODA) – A summary of key issues (Working Paper, 5/2023). Oeko-Institut. Berlin, 2023. Online available at <https://www.oeko.de/fileadmin/oekodoc/WP-Carbon-crediting-and-ODA.pdf>.

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