

CONSULTATION RESPONSE

April 2025

Draft Technical
Specifications for the
Certification of Permanent
Carbon Removals Through
Biochar



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BELLONA'S RESPONSE

Bellona welcomes this opportunity to provide input on the draft certification methodology of Permanent Carbon Removals Through Biochar.

In this round of feedback, it was very helpful to have documents with track changes provided, as this made it much easier to see where modifications had been made. Bellona also welcomes the additional requirement to assess and include all identified emissions sources in the GHG_{associated} calculation, even if materiality thresholds are not met. The explicit mention of relevant EU regulations that BCR activities must comply with is also very useful for clarity. We do still see numerous and significant issues that should be addressed in the methodology development, in particular due to the lack of consistency with the CO₂ Storage Directive (e.g. liability requirements) and the absence of a consensus in observations and studies on the environmental impacts of biochar on soils at the intended application rates. This methodology needs further work before it could be submitted in a final form that could be considered fit for purpose. In general, we believe more time is needed to discuss liability requirements for biochar and any open system CDR that may generate permanent credits in future methodology developments. This is a requirement of the CRCF regulation.

Storage monitoring requirements

One major remaining issue is the lack of consistency of the monitoring and liability requirements with those outlined in the CO₂ Storage Directive (CSD), as required in the CRCF Regulation text.

The addition of a pre-application assessment of environmental impacts (Section 5) is helpful to bring clarity to the range of issues, however there is no requirement in the draft methodology to monitor the application site after biochar has been applied. This includes environmental impacts of biochar application (e.g. moisture retention, soil nutrient status, physical characteristics, microbiota), and potential interactions with the local soil conditions such as positive or negative priming (Fang et al., 2015; Wang et al., 2016) that may lead to additional GHG losses or sinks. Biochar is in many cases an improver of soil quality, but this is not always the case due to local soil conditions and application rates.

We included some information on the impact of local soil conditions at the application site on biochar and local soil organic carbon stability in our previous written feedback on the biochar methodology. For one, biochar stability is affected by soil conditions and environmental impacts may be different depending on local conditions (Tisserant et al., 2023). Other studies (e.g. Hernandez-Soriano et al., 2016) provide evidence that biochar decomposition can be affected by pedoturbation and plant erosion and indicate that biochar interacts with the soil and can modify carbon stability. This may be a positive effect but nonetheless warrants monitoring. Likewise, the properties of the applied biochar affect the local impact of biochar application on soil microbes (Budai et al., 2016).

Multiple scientific papers call for longer-term field experiments to understand the local impacts of biochar application:

- "The meta-analysis highlighted the need to conduct long-term field experiments to provide better explanations for changes in biochar properties as it undergoes aging, its longer-term effects on soil properties, and timing of re-application of different biochars." (Singh et al., 2022)
- "Studies of biochar under different soil conditions (e.g., differing soil organic C levels and soil texture), biochar management (e.g., biochar age or longevity; feedstock type), combination with

other amendments (e.g., animal manure or inorganic fertilisers), field management (e.g., tillage or crop rotations) are lacking.” (Blanco-Canqui, 2017)

This was also mentioned in the latest ESABCC report on removals: “Biochar can offer long-term storage but remains uncertain. The stability of biochar in the soil could offer the potential for long-term carbon storage, although this is still uncertain due to a lack of large scale, long duration studies. Biochar could also create potential opportunities for environmental and food productivity in certain contexts” (p.58)

However, the requirement to only monitor biochar up until the point of application to soil or incorporation into a product is inadequate. The definition of storage site, storage complex and monitoring area as provided in the CSD is not reflected in this methodology under the monitoring requirements. “Activity boundary” would incorporate the biochar production i.e. transformation of the biologically capture CO₂ into biochar as the storage site. The storage complex could be defined for BCR as the site of application. However, the proposed storage monitoring period that covers biochar pyrolysis up until application is too narrow in scope to align with the CSD requirements and is inconsistent with the monitoring period of up to 1 year post application. According to the Guidance documents, the monitoring area refers to the “... *complex + surrounding environment in which monitoring activities for the purposes noted in Article 13 are performed*”.

The lack of a defined monitoring area leads to no provision in the methodology to align with Art. 13 (e) “... *detect significant adverse effect for the surrounding environment, including in particular on drinking water, for human populations, or for users of the surrounding biosphere*” with no requirement for a comparison between actual and modelled behaviour in the storage site (CSD, Art. 13a).

Bellona notes that under CSD Art. 14 (Reporting by the operator), that there is the option for the Competent Authority to require information that “... increas[e] the knowledge of CO₂ behaviour in the storage site”. Bellona strongly encourages this Article to be a pillar in this first methodology for BCR, from which further iterations and improvements can be made based on data from these initial projects, to assess whether assumptions on biochar permanence and the environmental impact assessment are correct.

Liability remains unchanged and we do not currently have any solid proposal for a liability mechanism. In the absence of an appropriate liability mechanism of consistent stringency with the CRCF text and the CSD, we suggest that BCR should be classified as a carbon farming activity.

Biochar application monitoring

Apart from the biochar production process and pure material, the only testing required is if the amount of biochar is “plausibly consistent”. The lack of accurate quantitative measurements for the application rates is an issue. However, due to the lack of guidance on what testing will be required, such as which methods or what will be considered “plausible”, it is a potential issue for verification where multiple biochar applications may occur to the same site and would be difficult to distinguish. This is important because the effects of biochar application on biota may be transient, which could be mostly relevant for multiple applications to the same location in a short space of time where the cumulative response may differ to a single application (Zhu et al., 2025).

Until there is a robust measurement for this, multiple biochar application to the same field/location should be excluded from this methodology. Research literature indicate that methods such as “loss on ignition” could quantify the amount of biochar in soil over extended periods of time (Koide et al. 2011, Nakhli et al. 2019). These could be considered as methods to assess the amount of biochar added to a given area. Furthermore, if an area is used for biochar application, it should be excluded from carbon farming certification for soil organic carbon to avoid double counting of removals.

Scope

While biochar production and biochar storage location must be within the EU, there is no such requirement for the biomass production that will be used as feedstock. Bellona recommends that biomass feedstock production should be restricted to the EU. This would avoid transboundary accounting issues whereby the LULUCF emissions from biomass harvest from one country are not accounted for within the value chain and carbon may be leaked. This would also reduce the risk of incentivising deforestation and forest degradation outside EU borders. Furthermore, this would avoid ethical conflict between food sovereignty and biomass production in non-EU countries.

The omission of upstream emissions from biomass production in the LULUCF sector from the carbon removal value chain, whereas the end product of the biological removal (i.e. carbon stored in the biomass feedstock) is included, does not align with scientific principles of the carbon cycle. The physical removal of CO₂ from the atmosphere occurs during biomass growth and does **not** occur during the conversion of biomass feedstock via pyrolysis to biochar. The “entire carbon removal value chain” must incorporate this physical removal of CO₂ from the atmosphere in the LULUCF sector through to the biochar application and beyond to truly account for the lifecycle emissions and removals that occur, rather than the blanket zero CO₂ emissions associated with the biomass itself, if compliant with the RED. We also refer to our feedback on the DACCS/BioCCS draft methodology for more on this topic.

SPECIFIC INPUT

Under the certification period, BCR should be mentioned as the method, rather than DACCS and BioCCS as written.

Requirements for quantification:

- **Calculation of GHG_{associated}**: The draft methodology only considers the increase in direct/indirect emissions, but it is not clear why not all gross emissions (including capital emissions and input emissions) are accounted for here. This issue has been retained throughout multiple methodology iterations but in our view is not best practice. Rather, GHG_{associated} should reflect the true emissions to assess whether an activity does lead to a net removal or not. It is also unclear why a threshold of 10% of total chemical energy is suggested for biochar to be treated as a residue and to have no process emissions allocated to the biochar. This is not consistent with a conservative quantification of the removals and is unjustified.
- **Use of “expected values” rather than measured values for the certification audit.** If the audit occurs after the activity has taken place, there should be measurements available and for the relevant certification period. These should be used rather than estimates based on previous measurements.
- System boundaries are referred to e.g. in Table 1 but the definition has been removed from the glossary. This is essential information to enable accurate calculation of the sinks and sources in Table 1, within given boundaries, presumably from an LCA analysis.
- The materiality threshold of 2% still seems quite high for an individual emissions source and cannot be considered to be consistent with a conservative quantification of removals.
- The use of a standardised baseline of 0 tCO₂/yr is far too lenient, as this certification framework is primarily an accounting framework, and the baseline should accurately represent the specific project baseline. Projects must be additional, as described in the CRCF Regulation. Incentives need to be designed to accommodate first movers and avoid disincentivising biochar CDR, rather than weakening a robust accounting methodology.
- It is unclear what scientific assessment the assumed monthly fractional loss of biomass carbon from storage of 0.0013 is based on. This should be justified.
- Monitoring and reporting: While reporting on an annual basis seems reasonable, the monitoring frequency should be much higher to track the biomass consumption, biochar production, pyrolysis conditions, biochar properties, storage conditions, etc. Guidance is needed in the methodology on the minimum acceptable monitoring frequency for each parameter, that can then be reported annually.

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