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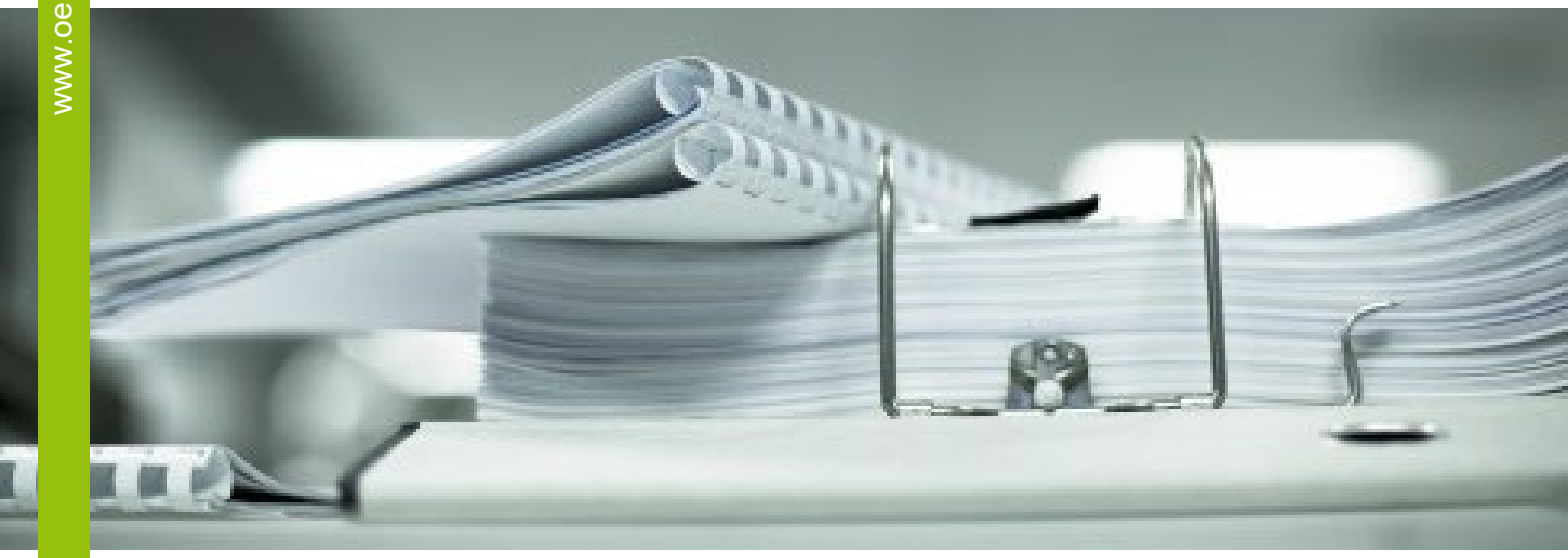

Second assessment of the draft technical specifications for certification under the EU CRCF

Permanent carbon removals through DACCS/BioCCS

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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 DACCS/BioCCS under the EU CRCF provided by the European Commission, dated 12 March 2025. The revised methodology has been improved in several areas, in particular by requiring demonstration that the biomass would also be used without EU CRCF units, requiring the establishment of a full mass balance, improving equations for quantification of removals, enhancing the guidance on factors to account for uncertainty, and providing more guidance and clarity on the monitoring of relevant parameters. 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:** An important improvement to the methodology is that operators of BioCCS activities must now demonstrate, through an investment analysis, that the biomass would be used for energy purposes regardless of the possibility to capture and store CO_2, and that CO_2 is only a by-product of the process for which the biomass is

used. However, the methodology fails to appropriately account for the GHG impact of any potential increase in biomass use for capturing the CO_2. By setting the baseline to zero, the methodology assumes that an increase of biomass use as an energy source to capture CO_2 does not lead to greater emissions or fewer removals elsewhere. This assumption is not appropriate. In the absence of the BioCCS activity, the additional biomass used to capture CO_2 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 BioCCS activity would lead to an increase in emissions elsewhere which is not accounted for in the methodology. This can lead to significant overestimation of overall 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 additional biomass used for capturing CO_2 should only be considered to be carbon neutral where it stems from biomass residues that would otherwise not be used and decay to CO_2 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 activity in order to capture CO_2 and calculate a respective GHG penalty.

The references to the RED III are not sufficient to quantify the GHG impact of a potential increased biomass use for capturing CO_2. 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)). Removals could be significantly overestimated. One CRCF unit issued for BioCCS 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).

- **Electricity emission factors:** The newly proposed rules to determine the GHG intensity of electricity generation are very flexible and are very likely to lead to an underestimation of emissions from electricity use, thereby leading to an overestimation of net removals. In particular the monthly or annual temporal correlation is clearly inappropriate and may significantly underestimate the actual emissions impacts, as it allows resource reshuffling and

claiming that electricity is zero emissions while the actual emissions impact is higher. In addition, claiming zero emissions if the consuming facility operates in a mode that limits load hours below a defined level is also inappropriate. The methodology also provides flexibility to operators to pick between different approaches, depending on what is most favourable in their context. Such adverse selection has been widely observed in the carbon crediting market (see, for example, Haya et al. 2023) and is a known integrity risk. To our knowledge, none of the major carbon crediting programmes allow such rules as they are clearly inappropriate. The methodology should be revised to address these matters, in particular by requiring hourly correlation or offering default approaches that are conservative (i.e., avoid underestimation of grid emission factors).

- **Allowing for the crediting of emission reductions and double counting due to overlap with the EU ETS I and II:** The revised methodology includes a new section on the treatment of net consumption of useful heat and/or electricity at the capture facility. In principle, this section is helpful to clarify that only the net amounts of electricity or heat production and consumption shall be accounted for. However, the revised methodology seems to implicitly allow operators to get CRCF units for emission reductions for energy provided to third parties. While these may be real and actual emission reductions, it would allow operators to claim removal credits for an activity that actually generates emission reductions. This does not seem to be consistent with the scope of the EU CRCF. It may also lead to double counting with the EU ETS or the EU ETS II if the CRCF activity is a net exporter of heat or electricity. Most carbon crediting programmes and the Integrity Council for the Voluntary Carbon Market (ICVCM) require avoiding double counting due to overlap with emissions trading systems.
- **No consideration of public funding:** The revised methodology explicitly allows that other sources of finance may be combined with EU CRCF units. If DACCS or BioCCS 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 be revised to either exclude mitigation activities that receive public funding or proportionally attribute the removals 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 Definitions (section 1)

- **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 draft methodology defined CO_2e 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.

- A definition of the word 'industrial' is missing. The term is still used in the title of the methodology ('industrial capture and permanent storage') but has been deleted in the first sentence of the scope definition in section 2. The term should be deleted from the title or defined in section 1.

- 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 Scope (section 2)

- **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 the DACCS/BioCCS 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 mitigation activity (e.g., the discontinuation of the cultivation of land so that natural revegetation or succession may occur).

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."

- **Lack of provisions to avoid double counting:** The revised methodology clarifies that any operator within the chain of carbon capture, transportation and storage may claim EU CRCF units. However, the methodology lacks any provisions to avoid that two entities within this value chain may claim the same removals as EU CRCF units. Moreover, there are no provisions in place that would prevent the 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 agreements with the relevant operators within the value chain are in place or that respective attestations are provided by other potential operators to avoid such double counting. The methodology should be revised to include such provisions.

[1] https://carboncreditquality.org/

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 chain of capture, transport and storage of CO_2 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 BioCCS or DACCS 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 (section 3)

3.1 Activity period (section 3.1)

- 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 DACCS/BioCCS plant 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 Certification period (section 3.3)

- The provisions regarding the transfer of CO_2 from the capture facility to the storage facility are still unclear. We propose that crediting be based on the amount of CO_2 that is permanently stored (i.e. enters the geological reservoir). Any CO_2 captured but not yet permanently stored should not be credited. It is not appropriate to implicitly credit CO_2 that is still in the process chain.

4 Requirements for quantification (section 4)

4.1 Cross-cutting issues

- **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".

4.2 Quantification of permanent net carbon removal benefit (sub-section 1)

4.2.1 Segregated CO_2 stream (sub-section 1.1.1)

- **Equation does not seem to work:** The revised methodology introduces a new approach to determine the removals based on the amount of carbon injected into the reservoir. This is a welcome simplification and an appropriate approach. However, the equations and simplifications of the terms do not seem to work quite right. The methodology states, that the factor F_{lost} may be set to one as a simplification. In that case, the second term of the equation would be zero and the first term of the equation ($CO_{2injected}$) would be counted as removals. However, this term includes all origins of CO_2, including from capture from fossil fuels. The equation and the approach to consider any storage from sources other than biogenic sources or direct air capture therefore needs to be revisited.

4.2.2 Non-segregated CO2 stream (sub-section 1.1.2)

- **Use of storage, rather than capture, as the basis for quantifying removals:** The revised methodology continues to determine the amount of CO_2 permanently stored indirectly, by quantifying CO_2 capture and subtracting estimated CO_2 losses from storage and transport. As CO_2 losses from transportation and storage are associated with significant uncertainties, it would be more accurate to derive the amount of CO_2 permanently stored based on the amount of CO_2 injected at the relevant injection point(s) and, where common infrastructure is used, allocation of that amount to the different capture facilities. Under the current equations, the total credited amount could exceed the total amount injected and actually permanently stored (if CO_2 losses from storage and transport are underestimated).

4.2.3 Materiality (sub-section 1.3.1)

- **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).

4.3 Baseline (sub-section 2)

- **Accounting for biomass use:** An important improvement to the methodology is that operators of BioCCS activities must now demonstrate, through an investment analysis, that the biomass would be used for energy purposes regardless of the possibility to capture and store CO_2, and that CO_2 is only a by-product of the process for which the biomass is used. The provisions on investment analysis are rather general and we recommend that further specificity is provided to it or that a relevant tool is referenced.

  However, **the methodology fails to appropriately account for the GHG impact of any potential increase in biomass use for capturing the CO_2.** By setting the baseline to zero, the methodology assumes that an increase of biomass use as an energy source to capture CO_2 does not lead to greater emissions or fewer removals elsewhere. This assumption is not appropriate. In the absence of the BioCCS activity, the additional biomass used to capture CO_2 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 BioCCS 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 additional biomass used for capturing CO_2 should only be considered to be carbon neutral where it stems from biomass residues that would otherwise not be used and decay to CO_2 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 activity in order to capture CO_2 and calculate a respective GHG penalty.

  The references to the RED III does not include any such procedures and is therefore not sufficient to quantify the GHG impact of a potential increased biomass use for capturing CO_2. 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 BioCCS 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:

"For any additional biomass use, as determined in section #, operators shall determine the quantity of additional biomass used under the BioCCS activity for capture of CO_2. This determination should take into account all biomass types used under the BioCCS activity. A type of biomass is characterised by its physical properties, its common use and its market value (if any). Examples of types of biomass include:

- *Food and feed crops (e.g. cereals, sugar crops, oil crops)*
- *Non-food and feed crops (e.g. short rotation copies, agroforestry, other ligno-cellulosic crops)*
- *Agricultural by-products from plant production (e.g. straw, corn cobs, plant leaves)*
- *Agricultural by-products from animal production (liquid and solid manure)*
- *Roundwood*
- *Logging residues and bark*
- *Industrial wood residues and waste wood*
- *Municipal waste and sewage sludge*
- *Industrial residues (e.g. from food and feed processing)*
- *Waste and residues from other areas (e.g. from landscape management or railway line sides)*

The determination shall be made through the following steps:

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

Step 1: Operators shall describe the pre-project situation at the site where the proposed activity is implemented. This shall include a description of any existing use of biomass, including a description of any respective plants, the type and quantity of products provided (e.g. electricity and heat), the remaining lifetime of any pre-existing plants, and a detailed list of the types and quantities of biomass used during the five calendar years prior to the start of the operation of the proposed CCS activity.

Step 2: The operator shall use an investment analysis and common practice analysis to identify the most likely baseline scenario for each type of additional biomass used in the proposed activity.

Step 3: For each monitoring period, the operator shall determine which types and quantities of biomass used in the activity are "existing" and which ones are "additional".

Step 4: For any biomass types and quantities classified as "additional", except for waste streams CO_2 captured from processes other than combustion, the biomass shall only be used under the activity if the operator can demonstrate that:

- *The type of biomass used in the activity 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 CO_2; 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, as demonstrated through the determination of the baseline scenario for the biomass in accordance with the procedure above."*

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 BioCCS activity. In the case of biomass, 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-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 DACCS or BioCCS are clearly not financially viable, they may be subsidised through other public support schemes. The revised methodology explicitly allows that other sources of finance may be combined with EU CRCF units. 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 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 tCO_2. If no public subsidies are provided, then the CRCF units could be generated at a cost of 100 EUR per tCO_2. If the activity receives public funds corresponding to 80 EUR per tCO_2, the costs of generating CRCF units are lowered to 20 EUR per tCO_2. 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 mitigation 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:

"NCRP = F * (CRbaseline – CRtotal – GHGassociated)

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 text of the methodology could be amended as follows:

"Where a mitigation 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."

4.4 Transport of CO_2 (sub-section 5)

- **No determination of $GHG_{capital}$ for transport of CO_2:** The methodology considers upstream emissions associated with construction and implementation of facilities for CO_2 capture and CO_2 storage but not for the transport of CO_2. It is unclear why these emissions are not considered given that they could be more material than emissions associated with capture or injection. We note that in the beginning of sub-section 5 it is stated that "transport infrastructure is defined in Article 3(29) of Regulation (EU) 2024/1735) which may be part of one or more transport networks (as defined in Article 3(22) of Directive 2009/31/EC)." Article 3(22) of Directive 2009/31/EC) states the 'transport network' means the network of pipelines, including associated booster stations, for the transport of CO2 to the storage site." The methodology should be revised to also include $GHG_{capital}$ for transport of CO_2.

4.5 Common principles for quantification (sub-section 7)

- **Allowing for the crediting of emission reductions and double counting due to overlap with the EU ETS I and II:** The revised methodology includes a new section on the treatment of net consumption of useful heat and/or electricity at the capture facility. In principle, this section is helpful to clarify that only the net amounts of electricity or heat production and consumption shall be accounted for. However, the revised methodology seems to implicitly allow operators to get CRCF units for emission reductions for energy provided to third parties. While these may be real and actual emission reductions, it would allow operators to claim removal credits for an activity that actually generates emission reductions. This does not seem to be consistent with the scope of the EU CRCF. It may also lead to double counting with the EU ETS or the EU ETS II if the CRCF activity is

a net exporter of heat or electricity. Most carbon crediting programmes and the ICVCM require avoiding double counting due to overlap with emissions trading systems.

- **Clearer guidance on choice of parameters:** The revised methodology has improved guidance on monitoring of parameters. Still, the guidance is significantly less specific than what is well-established practice in carbon crediting programmes. 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.

- **Electricity emission factors (section 7.4.1):** The new proposed rules to determine the GHG intensity of electricity generation are very flexible and are very likely to lead to an underestimation of emissions from electricity use, thereby leading to an overestimation of net removals. In particular monthly or annual temporal correlation is clearly inappropriate and may significantly underestimate the actual emissions impacts, as it allows resource reshuffling and claiming that electricity is zero emissions while the actual emissions impact is higher. In addition, claiming zero emissions if the consuming facility operates in a mode that limits load hours below a defined level is also inappropriate. The methodology also provides flexibility to operators to pick between different approaches, depending on what is most favourable in their context. Such adverse selection has been widely observed in the carbon crediting market (see, for example, Haya et al. 2023) and is a known integrity risk. To our knowledge, none of the major carbon crediting programs allow such rules as they are clearly inappropriate. The methodology should be revised to address these matters, in particular by requiring hourly correlation or offering default approaches that are very conservative (i.e., avoid underestimation of grid emission factors).

- **Estimation of transport emissions (section 7.4.5):** The methodology has been revised and now better addresses transport emissions. The previous version of the methodology allowed operators to “adopt different emission and conversion factors” if a parameter is “not suitable for their activity”. This flexibility could lead to adverse selection of emission factors, depending on which value is more favourable in the context of the certified activity. The revised version of the methodology requires measuring transport emissions or using conservative default values. This is generally appropriate. The methodology leaves it to the certification schemes to provide such values. 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.

- **Consideration of uncertainty and conservativeness.** 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. The provisions are generally appropriate.

5 Storage monitoring and liability (section 5)

- **Further clarity needed as section 5 only considers Directive 2009/31/EC and Directive 2003/87/EC:** Directive 2009/31/EC refers directly to Directive 2004/35/EC, "in particular concerning the injection phase, the closure of the storage site and the period after transfer of legal obligations to the competent authority, should be dealt with at national level." **For clarification, the methodology should also require compliance with Directive 2004/35/EC.**

- **Clearer provisions needed with regard to granted storing permits:** Directive 2009/31/EC states that "a storage permit is given for a specific storage site" where the operator is authorised to carry out storage activities. It is not clear yet how potential changes in spatial extent of a storage site over time will affect the effectiveness of storage permits (and thus the accounting of carbon removals). For example, an operator (Equinor) has obtained an operation license for the Northern Lights project to carry out storage activities in the Aurora storage complex. It is expected that after a few decades after storage activity has ceased, the CO_2 will migrate, eventually exceeding the limits of the current storage permit. As a result, the storage site, and thus the storage complex would have to be expanded and monitoring activities would have to be adapted accordingly. The methodology should include clearer provisions for the entire process chain of the storage activity, including long-term monitoring activities. Methodologies should require a clear plan to grant storage permits that lays out how a storage site, and therefore a storage complex will be extended in the long-run and how this will be monitored.

- **The methodology lacks clarity concerning the liability provisions in Article 18, 1 (b) of Directive 2009/31/EC:** …a "minimum period" for handover of responsibility to a governmental authority of a Member State shall not be shorter than 20 years after site closure. The methodology should address whether a minimum period of 20 years is enough to properly quantify and certify carbon removals with permanent storage. Neither the Directive 2009/31/EC nor its the guidance documents provide scientific background justifying 20 years as minimum period.

6 Sustainability requirements (section 6)

- **Item (vi)**: The revised methodology states that "*All biomass/biomass-derived fuel that is used to generate the CO_2 captured 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 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 BioCCS process, either as feedstock or as energy source.
- We suggest editing the requirement 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 generate the CO_2 captured by the activity and any additional biomass-derived fuel consumed to produce energy for capturing CO_2 as part of a BioCCS 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]."

- **Item (vii):** The revised reference to RED Art. 3 principles is limited to those activities that generate energy which classifies as renewable energy under the RED.
  - The reference should be expanded: Under the CRCF, RED Art. 3 principles should be applicable to *all* biomass used to produce energy, including 'biomass-derived fuels' (i.e. it should not matter whether the biomass is considered "renewable" under RED or not!).
  - Item vii (b): It should be clarified that CRCF obligations with respect to RED Art 3(3) cover both cascading use (para 1 of RED Art 3(3)) and the list of priorities (para 2 of RED Art 3(3)).
  - Item vii (c): the present wording would allow the use of listed feedstock types (of RED Art 3(3c)(a)) for CRCF certificates provided that no financial support under the RED is received from EU Member States. Feedstocks identified in RED Art 3(3c) should be excluded to be used as biomass-derived fuels for BioCCS activities generating CRCF units.

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