Green Transition Denmark submission on the draft certification methodologies for permanent carbon removals

Green Transition Denmark (GTD) welcomes the opportunity to provide input on the draft certification methodologies.

However, the draft methodologies on BECCS and biochar must be rejected, as their quantification formulas clearly violate the definition of Net carbon removals (NCR) in the CRCF Regulation Article 2(1) and Article 4(7) requiring conservative and accurate quantification of NCR.

Both draft methodologies grossly overstate NCR, as both disregard the significant time-delay between carbon being stored permanently and the emergence of NCR from these actions.

Basic physics on permanent carbon removals from BECCS and biochar

The CRCF Regulation correctly defines carbon removal as "…. the anthropogenic removal of carbon from the atmosphere and its durable storage in geological, terrestrial or ocean reservoirs, or in long-lasting products".

In physical terms neither BECCS nor biochar removes any CO2 directly from the atmosphere. Here and now they merely transfer carbon from existing biomass carbon pools into geological storage (BECCS) or biochar – with zero reduction of present atmospheric CO2-levels. But BECCS and biochar also transform decaying biomass carbon pools into long-lived carbon pools. This stops natural decay emissions and reduces the CO2 content of the atmosphere in future years.

Biowaste is expected to deliver most inputs to BECCS and biochar production in the EU due to intense competition for land and biomass for higher value end-uses.

Hence:

Net carbon removals from BECCS and biochar are essentially avoided emissions from biowaste decay - not direct nor immediate extraction of CO2 from the atmosphere.

Such avoided emissions only materialize gradually after permanent carbon storage takes place. In contrast, the present draft methodologies implicitly assume simultaneity between Net Carbon Removals and permanent storage.

Correct quantification of NCR - respecting basic physics

NCR over time from BECCS and biochar can be calculated in two steps:

- Avoided decay emissions can be derived from natural decay functions from the IPCC or scientific institutes - which vary between fast and slow decaying biomasses. A baseline of instant decay can be assumed for municipal waste, which will be combusted anyway for sanitary reasons and to avoid methane emissions from landfilling.
- Process losses of CO2/carbon: BECCS never achieves 100% capture of CO2-produced. The pyrolysis process requires heating, which most often is provided by combustion of parts of the pyrolysis gas.

The Attachment presents a BECCS-operation with initial biowaste input of 100 t CO2 in year 1 and a capture rate of 90%. The plant will deliver NCR of -3,3 t CO2 year 1, 6,2 t CO2 year 2, 5,8 t CO2 year 3, 3,6 t in year 10 and 0,06 t CO2 in year 70. It will take more than 100 years to deliver accumulated NCRs

of 90 tons CO2 – the amounts of NCRs for a similar BECCS-plant suggested for year 1 by the draft methodologies.

A net-present-value approach to calculation of NCRs is presented in the attachment as a possible alternative to NCRs being issued over 100 years.

Necessary amendments in the draft certification methodologies

We urge the Commission to amend the draft methodologies to reflect the important time-lag between permanent carbon storage and the emergence of Net Carbon Removals, when quantifying net removals. This ensures compliance with the CRCF Regulation, avoids over-crediting, and safeguards EU climate integrity.

Written by Erik Tang & Trine Langhede from Green Transition Denmark, September 22nd 2025.

Attachment to Green Transition Denmark's response on the consultation regarding certification methodologies for permanent carbon removals

As mentioned in the Consultation response the Net Carbon Removals (NCRs) of BECCS and biochar are easily calculated.

Table 1 illustrates the calculation of NCRs for a BECCS-plant for a single year input of wood-waste containing 100 t CO2. Only emissions or avoided emissions affecting CO2 content of the atmosphere in every year are taken into account, when calculating NCRs:

Table 1: NCR from a BECCS plant for a single years operation

Year/t CO2	1	2	3	10	70	100
Biogenic CO2 input in wood-waste	100					
Process emission at 90% capture rate	10					
Permanent CO2 storage	90					
Avoided decay emissions from wood-waste (half-life 10 years)	6,7	6,2	5,8	3,6	0,06	0,007
Net Carbon Removal	-3,3	6,2	5,8	3,6	0,06	0,007
Accumulated Net Carbon Removals	-3,3	2,9	8,7	39,8	89,20	89,9

10 t of CO2 is lost to the atmosphere during the capture process, which only captures 90 % of CO2 created by combustion. Hence, only 90 t CO2 is captured and stored (provided no transport leakages).

Avoided decay emissions per year are derived from the wood-waste input of 100 t CO2 following an exponential decay with half of the CO2 emitted over 10 years. This decay curve is suggested by the IPCC for temperate climate.

Net Carbon Removal year 1 is minus 3,3 t CO2 – as process emissions of 10 t CO2 more than outweighs avoided decay emissions of 6,7 t CO2. The permanent CO2 storage of 90 t CO2 does not affect atmospheric CO2 content directly, as the capture process extracts no CO2 from the atmosphere directly.

NCRs per year in the following years 2 – 100 matches avoided decay emissions.

In conclusion: A BECCS plant storing 90 t CO2 in year 1 will generate very close to 90 t NCR over a period of 100 years – but certainly not instantly in year 1. Accordingly, credits for the 90 NCRs should be issued for sale over 100 years – not in year 1 as implicitly allowed by the draft methodologies.

Potential discounting of future Net Carbon Removals

BECCS and biochar developers will most likely want NCRs being issued with little delay in order to finance operations.

A possible solution to this challenge could be to allow discounting of NCRs over a 100-year period as an alternative to receiving NCRs over a 100-year period. To ensure a level playing field between generating NCRs and GHG reduction measures in industry a business discount rate of at minimum 20% should be used. Similar discount rates are used by industry, when considering GHG reduction measures as an alternative to just buying ETS allowances or NCRs. In the example set out in table 1 this will produce around 17 NCRs for immediate sale while giving up sales of 73 future NCRs. Green Transition Denmark regard this as sufficiently conservative, as the BECCS transformation of carbon into stable carbon stores will ensure 90 NCRs in total.