

Calculation Method for CO2 Emissions from Woody Biomass Combustion

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CO2 emissions from the combustion of woody biomass are sometimes explained as “carbon neutral because it only releases what plants have absorbed from the atmosphere during their growth,” but it increases the concentration of carbon in the atmosphere for at least several decades. This factsheet explains the GHG Protocol, the global standard for calculating greenhouse gas (GHG) emissions, and the Science Based Targets Initiative (an initiative for achieving corporate net zero targets based on the scientific evidence) which stipulates the reporting method of biogenic CO2 emissions from combustion.

Calculation of Emissions under the SBTi Corporate Net Zero Emissions Standard

The [SBTi Corporate Net Zero Standard](#) provides guidance, requirements, and recommendations for companies to set net zero goals through SBTi, with a focus on accelerating companies worldwide to halve emissions by 2030 and achieve net zero emissions by 2050. It says “companies should commit to net-zero, which includes setting validated near-term and long-term science-based targets consistent with limiting temperature rise to 1.5°C.”

The SBTi Corporate Net Zero Standard, Section 4.2.2, “Calculate emissions that are reported separately from the GHG inventory,” states that “To meet SBTi criteria, companies that use bioenergy must report direct CO2 emissions from biomass combustion, processing, and distribution, as well as the land-use emissions and removals associated with bioenergy feedstock. These emissions are reported separately from the company’s GHG inventory, in line with Greenhouse Gas Protocol guidance,” and C11 “Bioenergy accounting” states that “CO2 emissions from the combustion, processing and distribution phase of bioenergy and the land use emissions and removals associated with bioenergy feedstocks, shall be reported alongside a company’s GHG inventory” and must include CO2 emissions from biomass combustion.

Calculating Emissions under the GHG Protocol

The Greenhouse Gas Protocol (GHG Protocol) is a global standard for calculating greenhouse gas emissions at the company level. As a minimum reporting requirement for the company’s published GHG emissions report, it is mandatory to report not only GHG inventory emissions, but also CO2 emissions from the combustion of biogenic biomass energy associated with woody biomass power generation projects as supplemental information, and “Emissions data for direct CO2 emissions from biologically sequestered carbon (e.g., CO2 from burning biomass/biofuels).”

Excerpt from [GHG Protocol Scope 2 Guidance](#):

6.12 Treatment of Biofuel Emissions (p. 57) says that biomass “still produces GHG emissions and should not be treated with a ‘zero’ emission factor” and that “the CO2 portion of the

biofuel combustion shall be reported outside the scopes. In practice, this means that any market-based method data that includes biofuels should report the CO₂ portion of the biofuel combustion separately from the scopes."

7.2 "Recommended Disclosures" (p. 61), "Biogenic Emissions" says that "Companies should separately report the biogenic CO₂ emissions from electricity use (e.g. from biomass combustion in the electricity value chain) separately from the scopes."

The GHG Protocol (Scope 3) Corporate Value Chain Accounting and Reporting Standard also specifies that biogenic CO₂ emissions should be reported for each Scope 3 category.

In addition, the final draft of the GHG Protocol "[Land Sector and Removals Guidance](#)," which is currently under consideration for implementation, states in [5.4.2 Scope 2 Emissions](#) (p. 79) that "Companies should separately account for fossil and biogenic emissions by determining the grid-average emission factors for fossil CO₂ emissions vs biogenic CO₂ emissions of purchased electricity, steam, heating, and cooling sourced from an electric grid or other distribution system. Companies should report each portion separately (fossil and biogenic), following the accounting and reporting requirements." It is likely that biogenic CO₂ emissions will be counted.

Thus, the GHG Protocol requires reporting of biogenic CO₂ emissions from combustion. And not only CO₂ emissions from combustion, but also emissions from land use associated with bioenergy feedstocks are required to be calculated and reported in the SBTi and the Land Sector and Removals Guidance of the new GHG Protocol.

Methodology and conditions for calculating removals

Reporting of removals (CO₂ transfers from the atmosphere) in land use associated with bioenergy feedstocks is required by SBTi, but is not required by the GHG Protocol's Land Sector and Removals Guidance, and is optional. Below are excerpts regarding removals.

SBTi requires reporting of removals, meaning CO₂ absorption from the atmosphere, in land use sectors related to energy feedstocks, but "removals that are not directly associated with bioenergy feedstock production are not accepted to count as progress towards SBTs or to net emissions in a company's GHG inventory." In other words, removals directly related to the production of wood as a raw material can be counted in the reporting year, but removals not directly related to the production cannot.

In addition, the proposed "Land Sector and Removals Guidance" in the above GHG Protocol limits the calculation of removals to cases where the reporting company is involved, and removals in Scope 1 (transferring CO₂ from the atmosphere) can be counted only if both the sink and the pool (which stores CO₂ and carbon) are owned and controlled by the reporting company. Even if owned, if they are not managed or only managed but not owned, they cannot be accounted for in Scope 1. For Scope 3 removals (absorption), a removal is counted if it is the result of the activities of the reporting company. Reporting on these removals is optional, not mandatory. If you want to account for and report removals in your GHG inventory, the following requirements must be met (p.22):

- Ongoing storage monitoring of the relevant carbon pool(s), as specified through a monitoring plan, to demonstrate that the carbon remains stored or to detect losses of the stored carbon.
- Traceability of carbon storage; traceability throughout the full CO₂ removals pathway
- Use of primary data; the net carbon stock changes are accounted for using empirical data from the reporting company's control sites and value chain
- Quantification of statistically significant uncertainties
- Reversal calculation if removals are lost or can no longer be monitored.

It is then necessary to calculate and report GHG emissions and removals separately for each scope and gas type, and for removals, it is necessary to calculate and report GHG emissions over the life cycle of the entire value chain for all relevant scopes 1, 2, and 3. Thus, there are various hurdles to accounting for removals, and as a result, the amount of removals will be largely limited. In effect, the use of bioenergy feedstock will be accounted for as net GHG emissions.