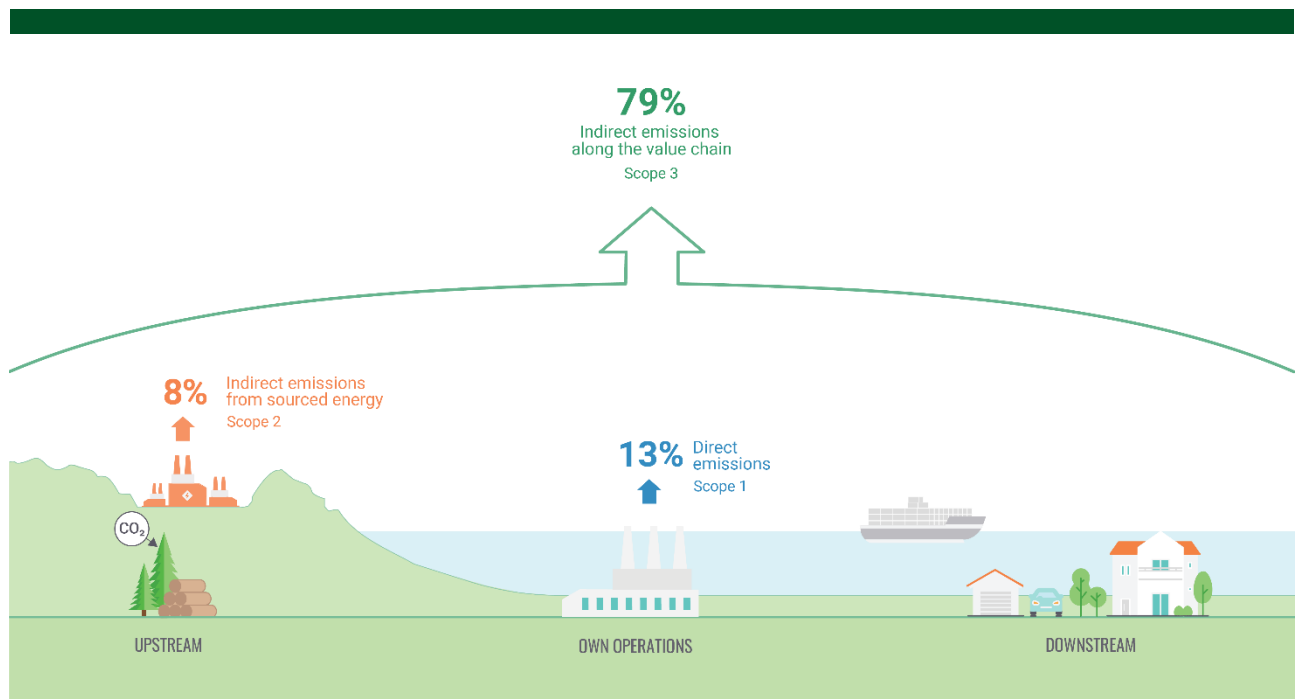


GHG protocol Scope 3 reporting - Borregaard Group 2025



ISBN NO.
978-82-8486-014-5

ISSN NO.
2703-8610

REPORT TYPE
Commissioned

CONFIDENTIALITY
Open



PROJECT TITLE

Borregaard GHG-rapportering 2025 i 2026

PROJECT NUMBER

3631

COMMISSIONED BY

Borregaard Group

REFERENCE

4500783481

INTERNAL QUALITY CONTROL

Ellen Soldal

NUMBER OF PAGES

24

KEY WORDS

GHG protocol, Scope 3, biorefinery

PHOTO FRONTPAGE

Borregaard

Scope 3 GHG Inventory Reporting

This greenhouse gas reporting has been calculated in alignment with the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard

Part 1: Descriptive information

Descriptive information	Company response
Company name	Borregaard
Description of the company	Borregaard operates one of the world's most advanced and sustainable biorefineries. Borregaard employs >1 000 man-years in plants and sales offices in 13 countries throughout Europe, Asia and the Americas.
Chosen consolidation approach (equity share, operational control or financial control)	Operational control
Description of the businesses and operations included in the company's organizational boundary	Borregaard's sales offices and Borregaard's plants in Norway, USA, Germany, the Czech Republic and UK.
The reporting period covered	01/01/2025 -12/31/2025
A list of Scope 3 activities included in the report	Category 1: Purchased goods & services; Category 2: Capital goods; Category 3: Fuel- and energy-related activities (not incl. in Scope 1 or 2); Category 4: Upstream transportation and distribution; Category 5: Waste generated in operations; Category 6: Business travel; Category 7: Employee commuting; Category 9: Downstream transportation and distribution; Category 10: Processing of sold products; Category 11: Use of sold products; Category 12: End-of-life treatment of sold products; Category 15: Investments

<p>A list of scope 1, scope 2, and Scope 3 activities excluded from the report with justification for their exclusion</p>	<p>Category 8: Upstream leased assets; Category 13: Downstream leased assets; and Category 14: Franchises are excluded because they are not relevant to Borregaard.</p>
<p>The year chosen as base year and rationale for choosing the base year</p>	<p>2020</p>
<p>Once a base year has been established, the chosen base year emissions recalculation policy. If base year emissions have been recalculated, the context for any significant emissions changes that triggered the recalculation.</p>	<p>The base year emissions have been recalculated in 2026 due to more available information regarding amount of raw materials and more specific emission factors.</p>

Part 2: Greenhouse gas emissions data

Scopes and categories	Metric CO ₂ e	tons
Scope 1: Direct emissions from owned/controlled operations		105 935
Scope 2: Indirect emissions from the use of purchased electricity, steam, heating, and cooling		61 539
Scope 3: Other indirect GHG emissions (upstream and downstream)		624 618
Upstream scope 3 emissions		291 796
Category 1: Purchased goods and services		185 301
Category 2: Capital goods		26 317
Category 3: Fuel- and energy-related activities (not included in scope 1 or scope 2)		15 857
Category 4: Upstream transportation and distribution		59 601
Category 5: Waste generated in operations		2 188
Category 6: Business travel		1 260
Category 7: Employee commuting		1 273
Category 8: Upstream leased assets		-
Downstream scope 3 emissions		332 822
Category 9: Downstream transportation and distribution		43 258
Category 10: Processing of sold products		281 433
Category 11: Use of sold products		0
Category 12: End-of-life treatment of sold products		8 104
Category 13: Downstream leased assets		-
Category 14: Franchises		-
Category 15: Investments		28

Part 3: Biogenic CO2 emissions data

Scopes and categories	Metric CO ₂ e	tons
Scope 1: Direct emissions from owned/controlled operations		154 171
Scope 2: Indirect emissions from the use of purchased electricity, steam, heating, and cooling		76 079
Scope 3: Other indirect GHG emissions (upstream and downstream)		995 642
Upstream scope 3 emissions		132 513
Category 1: Purchased goods and services		125 397
Category 2: Capital goods		1 806
Category 3: Fuel- and energy-related activities (not included in scope 1 or scope 2)		707
Category 4: Upstream transportation and distribution		349
Category 5: Waste generated in operations		4 225
Category 6: Business travel		14
Category 7: Employee commuting		14
Category 8: Upstream leased assets		-
Downstream scope 3 emissions		863 129
Category 9: Downstream transportation and distribution		752
Category 10: Processing of sold products		5 562
Category 11: Use of sold products		109 200
Category 12: End-of-life treatment of sold products		747 614
Category 13: Downstream leased assets		-
Category 14: Franchises		-
Category 15: Investments		1,69

Part 4: Description of methodologies and data used

Scope and category	Description of the types and sources of data used to calculate emissions	Description of the data quality of reported emissions	Description of the methodologies, allocation methods, and assumptions used to calculate emissions	Percentage of emissions calculated using data obtained from suppliers or other value chain partners
Upstream Scope 3 emissions				
Category 1: Purchased goods and services	Activity data (primary data) obtained from Borregaard and several suppliers. Secondary data obtained as cradle-to-gate emissions factors from the commercially and publicly available database ecoinvent ver. 3.11 (Wernet et al. 2016). For 22 of the purchased goods and services, carbon footprint or environmental product declaration has been obtained from the supplier.	Good	Hybrid method. For characterization of the GHG emissions and emissions of biogenic CO ₂ , the IPCC 2021 GWP100a (incl. CO ₂ uptake), v.1.03, as implemented in SimaPro v. 10.3.0.1 has been used.	58%
Category 2: Capital goods	Activity data (primary data) obtained from	Fair	Hybrid method.	0%

	<p>Borregaard. Secondary data obtained as cradle-to-gate emissions factors from the commercially and publicly available database ecoinvent ver. 3.11 (Wernet et al., 2016).</p>		<p>For characterization of the GHG emissions and emissions of biogenic CO₂, the IPCC 2021 GWP100a (incl. CO₂ uptake), v.1.03, as implemented in SimaPro v. 10.3.0.1 has been used.</p>	
<p>Category 3: Fuel- and energy-related activities (not included in scope 1 or scope 2)</p>	<p>Activity data (primary data) obtained from Borregaard. Secondary data for fuels obtained as cradle-to-gate emissions factors, not included in Scope 1 and 2, from the commercially and publicly available database ecoinvent ver. 3.11 (Wernet et al. 2016).</p>	<p>Good</p>	<p>Hybrid method. For characterization of the GHG emissions and emissions of biogenic CO₂, the IPCC 2021 GWP100a (incl. CO₂ uptake), v.1.03, as implemented in SimaPro v. 10.3.0.1 has been used.</p>	<p>0%</p>
<p>Category 4: Upstream transportation and distribution</p>	<p>Activity data, transport mode and distances (primary data) obtained from Borregaard. Secondary data (emissions factors) obtained from the commercially and</p>	<p>Good</p>	<p>Hybrid method. Assume that road transport is performed by lorry Euro V. For characterization of the GHG emissions and emissions of biogenic CO₂, the IPCC 2021</p>	<p>0%</p>

	publicly available database ecoinvent ver. 3.11 (Wernet et al. 2016).		GWP100a (incl. CO ₂ uptake), v.1.03, as implemented in SimaPro v. 10.3.0.1 has been used.	
Category 5: Waste generated in operations	Activity data (primary data) obtained from Borregaard. Secondary data obtained from the commercially and publicly available database ecoinvent ver. 3.11 (Wernet et al. 2016).	Good	Hybrid method. For characterization of the GHG emissions and emissions of biogenic CO ₂ , the IPCC 2021 GWP100a (incl. CO ₂ uptake), v.1.03, as implemented in SimaPro v. 10.3.0.1 has been used.	0%
Category 6: Business travel	Activity data (hotel nights and km travelled by each mode of transport) is obtained from Borregaard. For these activities, emissions factors are obtained from the commercially and publicly available database ecoinvent ver. 3.11 (Wernet et al. 2016).	Good	For characterization of the GHG emissions and emissions of biogenic CO ₂ , the IPCC 2021 GWP100a (incl. CO ₂ uptake), v.1.03, as implemented in SimaPro v. 10.3.0.1 has been used.	0%
Category 7: Employee commuting	Number of employees and postal address obtained	Good	Combination of distance from home of employees to	0%

	<p>from Borregaard. National statistic on work travel habits assumed to be relevant for Borregaard Norway (Opinion AS, 2025). Statistics on road traffic volumes in Norway is used to calculate share of km driven by vehicles with different types of fuels (diesel 44%, gasoline 20% and electric 37%) (Statistics Norway, 2025). Within public transport, the share going by bus or train were based on statistics for Nedre Glomma (Opinion AS, 2024). Emissions factors (secondary data) obtained from the commercially and publicly available database ecoinvent ver. 3.11 (Wernet et al. 2016).</p>		<p>Borregaard Sarpsborg and national statics on work travel habits, were the basis for calculation of person km (pkm) travelled by different modes of transport: on feet (0 g CO₂-eq/pkm), bike (11 g CO₂-eq/pkm), diesel car (346 g CO₂-eq/pkm), gasoline car (372 g CO₂-eq/pkm), electric car (108 g CO₂-eq/pkm), bus (111 g CO₂-eq/pkm), and train (12 g CO₂-eq/pkm).</p> <p>For characterization of the GHG emissions and emissions of biogenic CO₂, the IPCC 2021 GWP100a (incl. CO₂ uptake), v.1.03, as implemented in SimaPro v. 10.3.0.1 has been used.</p>	
Category 8: Upstream leased assets	-	-	-	-

Part 4: Description of Scope 3 methodologies and data used (continued)

Scope and category	Description of the types and sources of data used to calculate emissions	Description of the data quality of reported emissions	Description of the methodologies, allocation methods, and assumptions used to calculate emissions	Percentage of emissions calculated using data obtained from suppliers or other value chain partners
Downstream Scope 3 emissions				
Category 9: Downstream transportation and distribution	<p>Specific transport volumes and modes of transport given by Borregaard.</p> <p>Emissions factors (secondary data) obtained from the commercially and publicly available database ecoinvent ver. 3.11 (Wernet et al. 2016).</p>	Good	<p>Hybrid method.</p> <p>For characterization of the GHG emissions and emissions of biogenic CO₂, the IPCC 2021 GWP100a (incl. CO₂ uptake), v.1.03, as implemented in SimaPro v. 10.3.0.1 has been used.</p>	0%
Category 10: Processing of sold products	<p>Data on amount of sold products obtained from Borregaard.</p> <p>Emissions factors (secondary data) obtained from EPDs and the commercially and publicly available database ecoinvent ver. 3.11 (Wernet et al. 2016).</p>	Good	<p>For several of the products, there is no processing, or the processing is marginal. The two largest products are cellulose and lignin. Lignin is mostly used in construction, and energy consumed during mixing with cement is used. For cellulose, it is assumed</p>	92%

			<p>that the sold cellulose goes into the following application areas:</p> <ul style="list-style-type: none"> • Nitrocellulose production • Viscose (casings) production • Ether production <p>Information from EPD's is used for the emission factors of processing of these.</p> <p>For mixing of fine chemicals, the energy used is obtained from Borregaard. Twigs are sold for fluting. Ecoinvent process for processing of wood chips to fluting is used for this amount.</p> <p>For characterization of the GHG emissions and emissions of biogenic CO₂, the IPCC 2021 GWP100a (incl. CO₂ uptake), v.1.03, as implemented in SimaPro v. 10.3.0.1 has been used.</p>	
Category 11: Use of sold products	Data on amounts of sold products and carbon	Good	There are no direct emissions in the use phase of all products except	100%

	content obtained from Borregaard.		ethanol, alvamiX, twigs and bark which are combusted and lead to emissions of biogenic CO ₂ . The amount of biogenic CO ₂ is calculated based on carbon content of the products multiplied with the molecular weight ratio carbon to CO ₂ .	
Category 12: End-of-life treatment of sold products	Specific information on carbon content and amount of sold products obtained from Borregaard. Sodium hypochlorite and hydrochloric acid are treated as hazardous waste at end of life. Data on the amount of sodium hypochlorite and hydrochloric acid are given by Borregaard. Emissions factors (secondary data) obtained from the commercially and publicly available database ecoinvent ver. 3.11 (Wernet et al. 2016).	Good	Hybrid. Due to biological origin, the sold products are assumed to not cause emissions of GHG in end-of-life treatment. Emissions of biogenic CO ₂ from end-of-life treatment calculated based on carbon content of sold products multiplied with the molecular weight ratio carbon to CO ₂ . For characterization of the GHG emissions and emissions of biogenic CO ₂ , the IPCC 2021 GWP100a (incl. CO ₂ uptake), v.1.03, as implemented in SimaPro v. 10.3.0.1 has been used.	>99% of biogenic CO ₂ emissions, 0% of fossil emissions

Category 13: Downstream leased assets	-	-	-	-
Category 14: Franchises	-	-	-	-
Category 15: Investments	Specific information electricity and fuel consumption obtained from Borregaard. Emissions factors (secondary data) obtained from the commercially and publicly available database ecoinvent ver. 3.11 (Wernet et al. 2016).	Good	The impacts are allocated to Borregaard in line with the equity share (41%). For characterization of the GHG emissions and emissions of biogenic CO ₂ , the IPCC 2021 GWP100a (incl. CO ₂ uptake), v.1.03, as implemented in SimaPro v. 10.3.0.1 has been used.	0%

Part 5: Greenhouse gas emissions in the base year

The base year is 2020 and was recalculated in 2026. The greenhouse gas emissions in the base year are given in the table below.

Scopes and categories	Metric tons CO ₂ e
Scope 1: Direct emissions from owned/controlled operations	130 945
Scope 2: Indirect emissions from the use of purchased electricity, steam, heating, and cooling	65 414
Scope 3: Other indirect GHG emissions (upstream and downstream)	727 387
Upstream scope 3 emissions	336 754
Category 1: Purchased goods and services	185 301
Category 2: Capital goods	26 317
Category 3: Fuel- and energy-related activities (not included in scope 1 or scope 2)	17 559
Category 4: Upstream transportation and distribution	103 850
Category 5: Waste generated in operations	1 918
Category 6: Business travel	588
Category 7: Employee commuting	1 221
Category 8: Upstream leased assets	-
Downstream scope 3 emissions	390 634
Category 9: Downstream transportation and distribution	75 201
Category 10: Processing of sold products	290 274
Category 11: Use of sold products	0
Category 12: End-of-life treatment of sold products	8 006
Category 13: Downstream leased assets	-
Category 14: Franchises	-
Category 15: Investments	17 153

Part 6: Optional Information

Method

Name: IPCC 2021 GWP100 (incl. CO₂ uptake) V1.03

Table 1 and 2 give the characterization factors used in this reporting, fossil and biogenic, respectively. Because EPDs are used for emission factors, the characterization factor for Climate change fossil is included in the method (1 kg CO₂-eq./kg Climate change - Fossil, EN15804+A2 (CO₂-eq)).

Table 1 Characterization factors for substances contributing to emissions of fossil CO₂-equivalents. The unit is kg CO₂-eq./kg substance

Substances	Characterization factor	Unit
2-Chloroethyl vinyl ether	0	kg CO ₂ -eq / kg
3-Butenenitrile	0	kg CO ₂ -eq / kg
Allyl ether	0	kg CO ₂ -eq / kg
Allyl ethyl ether	0	kg CO ₂ -eq / kg
Crotonaldehyde	0	kg CO ₂ -eq / kg
Methylvinylketone	0	kg CO ₂ -eq / kg
(E)-Hex-2-en-1-ol	0.002	kg CO ₂ -eq / kg
(Z)-2-Hexen-1-ol	0.003	kg CO ₂ -eq / kg
(E/Z)-1-chloro-2-fluoro-ethene	0.004	kg CO ₂ -eq / kg
Perfluorobuta-1.3-diene	0.004	kg CO ₂ -eq / kg
Tetrafluoroethylene	0.004	kg CO ₂ -eq / kg
Trifluoroethylene	0.005	kg CO ₂ -eq / kg
Butane	0.006	kg CO ₂ -eq / kg
Allyl trifluoroacetate	0.007	kg CO ₂ -eq / kg
Butane. 1-chloro-	0.007	kg CO ₂ -eq / kg
Vinyl trifluoroacetate	0.008	kg CO ₂ -eq / kg
Ethene. 1.1.2-trifluoro-2-(trifluoromethoxy)-	0.01	kg CO ₂ -eq / kg
Ethyl methyl ether	0.01	kg CO ₂ -eq / kg
Propane	0.02	kg CO ₂ -eq / kg
1.1-dichloro-2.2-difluoroethene	0.021	kg CO ₂ -eq / kg
Vinylfluoride	0.024	kg CO ₂ -eq / kg
Propanal. 3.3.3-trifluoro-	0.025	kg CO ₂ -eq / kg
Trichloroethylene	0.044	kg CO ₂ -eq / kg
Trifluorobutanol	0.049	kg CO ₂ -eq / kg
Bromopropane	0.052	kg CO ₂ -eq / kg
Ethene. 1.1-difluoro-. HFC-1132a	0.052	kg CO ₂ -eq / kg
Fluoroxene	0.058	kg CO ₂ -eq / kg
1.1.1-Trifluoropropan-2-one	0.09	kg CO ₂ -eq / kg
Perfluoropropene	0.09	kg CO ₂ -eq / kg
1.1.1-Trifluorobutan-2-one	0.095	kg CO ₂ -eq / kg

Perfluorobut-1-ene	0.102	kg CO ₂ -eq / kg
Pentanone. 1.1.1.2.2.4.5.5.5-nonafluoro-4-(trifluoromethyl)-3-(E)-1.2.3.3.3-Pentafluoroprop-1-ene	0.114	kg CO ₂ -eq / kg
Dodecamethylpentasiloxane	0.118	kg CO ₂ -eq / kg
1.2-dichloro-1.2-difluoroethene	0.122	kg CO ₂ -eq / kg
2-Bromopropane	0.126	kg CO ₂ -eq / kg
(Perfluorooctyl)ethylene	0.126	kg CO ₂ -eq / kg
Dodecamethylcyclohexasiloxane	0.141	kg CO ₂ -eq / kg
(Perfluorohexyl)ethylene	0.142	kg CO ₂ -eq / kg
Decamethyltetrasiloxane	0.162	kg CO ₂ -eq / kg
Propane. 2-chloro-	0.176	kg CO ₂ -eq / kg
Pentafluorobutene-1	0.181	kg CO ₂ -eq / kg
2-Methyl-3-pentanone	0.182	kg CO ₂ -eq / kg
(Perfluorobutyl)ethylene	0.2	kg CO ₂ -eq / kg
1-Pentene. 3.3.4.4.5.5.5-heptafluoro-	0.204	kg CO ₂ -eq / kg
Bromoform	0.235	kg CO ₂ -eq / kg
Trifluoropropene. HFC-1243zf	0.25	kg CO ₂ -eq / kg
1-Undecanol. 3.3.4.4.5.5.6.6.7.7.8.8.9.9.10.10.11.11.11-nonadecafluoro-	0.261	kg CO ₂ -eq / kg
Decamethylcyclopentasiloxane	0.273	kg CO ₂ -eq / kg
(Z)-1.3.3.3-Tetrafluoroprop-1-ene	0.289	kg CO ₂ -eq / kg
Octamethyltrisiloxane	0.315	kg CO ₂ -eq / kg
(Z)-1.2.3.3.3-Pentafluoroprop-1-ene	0.325	kg CO ₂ -eq / kg
1-Propene. 3.3.3-trifluoro-2-(trifluoromethyl)-	0.344	kg CO ₂ -eq / kg
Ethane	0.377	kg CO ₂ -eq / kg
Nonanol. 3.3.4.4.5.5.6.6.7.7.8.8.9.9.9-pentadecafluoro-	0.437	kg CO ₂ -eq / kg
(Z)-1-Chloro-3.3.3-trifluoroprop-1-ene	0.449	kg CO ₂ -eq / kg
Hexamethyldisiloxane	0.454	kg CO ₂ -eq / kg
Ethane. chloro-	0.476	kg CO ₂ -eq / kg
Ethane. bromo-	0.481	kg CO ₂ -eq / kg
2.3.3.3-Tetrafluoropropene	0.487	kg CO ₂ -eq / kg
Ethanol. 2-fluoro-	0.501	kg CO ₂ -eq / kg
Heptanol. 3.3.4.4.5.5.6.6.7.7.7-undecafluoro-	0.53	kg CO ₂ -eq / kg
Propanol. 3.3.3-trifluoro-1-	0.533	kg CO ₂ -eq / kg
Octamethyltetrasiloxane	0.62	kg CO ₂ -eq / kg
Carbon dioxide	0.739	kg CO ₂ -eq / kg
Carbon dioxide. fossil	1	kg CO ₂ -eq / kg
Carbon dioxide. peat oxidation	1	kg CO ₂ -eq / kg
<i>Climate change - Fossil. EN15804+A2 (CO₂-eq)</i>	1	kg CO ₂ -eq / kg
Ethane. 1.2-dibromo-	1.02	kg CO ₂ -eq / kg
Hexamethylcyclotrisiloxane	1.15	kg CO ₂ -eq / kg

Ethane. 1.2-dichloro-	1.3	kg CO ₂ -eq / kg
trans-1.3.3.3-Tetrafluoropropene	1.37	kg CO ₂ -eq / kg
Methane. dibromo-	1.51	kg CO ₂ -eq / kg
Trifluoroethyl acetate	1.58	kg CO ₂ -eq / kg
Ether. 2.2.3.3.3-Pentafluoropropyl methyl-. HFE-365mcf3	1.6	kg CO ₂ -eq / kg
Propane. 1.1.2.2-tetrafluoro-3-methoxy-	1.68	kg CO ₂ -eq / kg
Perfluorobut-2-ene	1.97	kg CO ₂ -eq / kg
HFE-263fb2	2.06	kg CO ₂ -eq / kg
(Z)-1.1.1.4.4.4-Hexafluorobut-2-ene	2.08	kg CO ₂ -eq / kg
Methane. bromo-. Halon 1001	2.43	kg CO ₂ -eq / kg
(E)-1-Chloro-3.3.3-trifluoroprop-1-ene	3.88	kg CO ₂ -eq / kg
Methane. chlorobromo-. Halon 1011	4.74	kg CO ₂ -eq / kg
Ethane. fluoro-. HFC-161	4.84	kg CO ₂ -eq / kg
Methane. monochloro-. R-40	5.54	kg CO ₂ -eq / kg
Ethanol. 2.2-difluoro-	6.18	kg CO ₂ -eq / kg
Tetrachloroethylene	6.34	kg CO ₂ -eq / kg
Propane. 1.1.1.3.3.3-hexafluoro-2-methoxy-(9Cl)	8.13	kg CO ₂ -eq / kg
1-Butene. 1.3.4.4.4-pentafluoro-3-(trifluoromethyl)-. (1E)-	8.22	kg CO ₂ -eq / kg
Methane. dichloro-. HCC-30	11.2	kg CO ₂ -eq / kg
Ether. ethyl 1.1.2.2-tetrafluoroethyl-. HFE-374pc2	12.5	kg CO ₂ -eq / kg
2-(Trifluoromethyl)-3-ethoxydodecafluorohexane	13	kg CO ₂ -eq / kg
Pentanol. 2.2.3.3.4.4.5.5-octafluorocyclo-	13.6	kg CO ₂ -eq / kg
Propanol. 2.2.3.3-tetrafluoro-1-	14.4	kg CO ₂ -eq / kg
Methyl-perfluoroheptene-ethers	15.1	kg CO ₂ -eq / kg
(E)-1.1.1.4.4.4-Hexafluorobut-2-ene	17.9	kg CO ₂ -eq / kg
Chloroform	20.6	kg CO ₂ -eq / kg
Ethane. 1.2-difluoro-. HFC-152	21.5	kg CO ₂ -eq / kg
Ether. bis(2.2.2-trifluoroethyl)-	24.4	kg CO ₂ -eq / kg
3.3.4.4-tetrafluorocyclobutene	25.6	kg CO ₂ -eq / kg
Propane. 1-ethoxy-1.1.2.3.3.3-hexafluoro-	26.4	kg CO ₂ -eq / kg
Ether. ethyl trifluoromethyl-. HFE-263m1	29.2	kg CO ₂ -eq / kg
Methane	29.8	kg CO ₂ -eq / kg
Methane. fossil	29.8	kg CO ₂ -eq / kg
Methane. peat oxidation	29.8	kg CO ₂ -eq / kg
Butanol. 2.2.3.4.4.4-hexafluoro-1-	30.5	kg CO ₂ -eq / kg
Ether. i-nonafluorobutane ethyl-. HFE569sf2 (i-HFE-7200)	34.3	kg CO ₂ -eq / kg
Propanol. pentafluoro-1-	34.3	kg CO ₂ -eq / kg
Ethanol. 2.2.2-trifluoro-	35.7	kg CO ₂ -eq / kg
Butanol. 2.2.3.3.4.4.4-heptafluoro-	36.5	kg CO ₂ -eq / kg
Halothane	45	kg CO ₂ -eq / kg
1.3.3.4.4.5.5-heptafluorocyclopentene	45.1	kg CO ₂ -eq / kg

Ethane. 1.2-dichloro-1-fluoro-. HCFC-141	46.6	kg CO ₂ -eq / kg
EPTE-furan	48.7	kg CO ₂ -eq / kg
Formate. 2.2.2-trifluoroethyl-	54.8	kg CO ₂ -eq / kg
1.2.2-Trichloro-1.1-difluoroethane	56.4	kg CO ₂ -eq / kg
Ethane. 1.1.2.2-tetrachloro-1-fluoro-. HCFC-121	58.3	kg CO ₂ -eq / kg
Ether. nonafluorobutane ethyl-. HFE569sf2 (HFE-7200)	60.7	kg CO ₂ -eq / kg
1.1-Dichloro-2.2-difluoroethane	70.4	kg CO ₂ -eq / kg
Propane. 1.1.1-trifluoro-. HFC-263fb	74.8	kg CO ₂ -eq / kg
Perfluorocyclopentene	78.1	kg CO ₂ -eq / kg
Methane. chlorofluoro-. HCFC-31	79.4	kg CO ₂ -eq / kg
Acetate. methyl 2.2.2-trifluoro-	82.3	kg CO ₂ -eq / kg
Ethane. 2.2-dichloro-1.1.1-trifluoro-. HCFC-123	90.4	kg CO ₂ -eq / kg
1.3.3.4.4-pentafluorocyclobutene	92.4	kg CO ₂ -eq / kg
1.1.2.2.3.3-hexafluorocyclopentane	120	kg CO ₂ -eq / kg
1.2-Dichloro-1.2-difluoroethane	122	kg CO ₂ -eq / kg
Hexafluorocyclobutene	126	kg CO ₂ -eq / kg
Methane. fluoro-. HFC-41	135	kg CO ₂ -eq / kg
Ethane. 2-chloro-1.1.2-trifluoro-1-methoxy-	136	kg CO ₂ -eq / kg
Methane. difluoro(methoxy)-	136	kg CO ₂ -eq / kg
Propane. 3.3-dichloro-1.1.1.2.2-pentafluoro-. HCFC-225ca	137	kg CO ₂ -eq / kg
Methane. dichlorofluoro-. HCFC-21	160	kg CO ₂ -eq / kg
1.1.1-Trichloroethane	161	kg CO ₂ -eq / kg
Ethane. 1.1-difluoro-. HFC-152a	164	kg CO ₂ -eq / kg
Ethane. 1.1.1-trifluoro-2-bromo-	177	kg CO ₂ -eq / kg
Propane. 1.1.1.3.3.3-hexafluoro-2-(fluoromethoxy)-	195	kg CO ₂ -eq / kg
Ethane. 1.1.1.2-tetrafluoro-2-bromo-. Halon 2401	201	kg CO ₂ -eq / kg
Ethane. 1.1.2.2-tetrafluoro-1.2-dimethoxy-	202	kg CO ₂ -eq / kg
1.1.1.3.3.3-Hexafluoropropan-2-ol	206	kg CO ₂ -eq / kg
Methane. dibromodifluoro-. Halon 1202	216	kg CO ₂ -eq / kg
Decane. 3.3.4.4.6.6.7.7.9.9.10.10-dodecafluoro-2.5.8.11-tetraoxado-	219	kg CO ₂ -eq / kg
Ethane. 1.1.2.2-tetrafluoro-1-methoxy-2-(1.1.2.2-tetrafluoro-2-methoxyethoxy)-	229	kg CO ₂ -eq / kg
1.1.2.2.3.3.4-heptafluorocyclopentane	231	kg CO ₂ -eq / kg
Ethane. 1.1.2-trichloro-1.2-difluoro-. HCFC-122a	245	kg CO ₂ -eq / kg
Propane. 1.1.2.3.3-pentafluoro-. HFC-245ea	255	kg CO ₂ -eq / kg
trans-1H.2H-Octafluorocyclopentane	258	kg CO ₂ -eq / kg
Ether. 1.1.2.3.3.3-Hexafluoropropyl methyl-. HFE-356mec3	264	kg CO ₂ -eq / kg
Formate. 1.1.1.3.3.3-hexafluoropropan-2-yl-	269	kg CO ₂ -eq / kg
Dinitrogen monoxide	273	kg CO ₂ -eq / kg
Dinitrogen monoxide. peat oxidation	273	kg CO ₂ -eq / kg

Ether. 1.1.2.3.3.3-Hexafluoropropyl methyl-. HFE-356pcc3	277	kg CO ₂ -eq / kg
Propane. 1.1.1.2.3-pentafluoro-. HFC-245eb	325	kg CO ₂ -eq / kg
Ether. 1.1.2.2-Tetrafluoroethyl methyl-. HFE-254cb2	328	kg CO ₂ -eq / kg
Ethane. 1.1-dichloro-1.2-difluoro-. HCFC-132c	342	kg CO ₂ -eq / kg
Ethane. 1.1.2-trifluoro-. HFC-143	364	kg CO ₂ -eq / kg
Methane. bromodifluoro-. Halon 1201	380	kg CO ₂ -eq / kg
Ethane. 2-chloro-1.1.1-trifluoro-. HCFC-133a	388	kg CO ₂ -eq / kg
Methyl perfluoroisopropyl ether	392	kg CO ₂ -eq / kg
Ethane. 1.2-dichloro-1.1.2-trifluoro-. HCFC-123a	395	kg CO ₂ -eq / kg
1.1.1.2.2.3.4.5.5.5-decafluoro-3-methoxy-4-(trifluoromethyl)pentane	405	kg CO ₂ -eq / kg
1-Propanol. i-3.3.3-trifluoro-2.2-bis(trifluoromethyl)-. i-HFE-7100	437	kg CO ₂ -eq / kg
Butane. 1.1.1.2.2.3.3.4.4-nonafluoro-4-methoxy-	460	kg CO ₂ -eq / kg
Ether. 1.1.2.3.3.3-Hexafluoropropyl methyl-. HFE-356pcf3	484	kg CO ₂ -eq / kg
Ethane. 1-chloro-2.2.2-trifluoro-(difluoromethoxy)-. HCFE-235da2	539	kg CO ₂ -eq / kg
1-Propanol. n-3.3.3-trifluoro-2.2-bis(trifluoromethyl)-. n-HFE-7100	544	kg CO ₂ -eq / kg
Propane. 1.3-dichloro-1.1.2.2.3-pentafluoro-. HCFC-225cb	568	kg CO ₂ -eq / kg
Ether. 1.1.2.2-Tetrafluoroethyl 2.2.2-trifluoroethyl-. HFE-347mcc3	576	kg CO ₂ -eq / kg
Ethane. 2-chloro-1.1.1.2-tetrafluoro-. HCFC-124	597	kg CO ₂ -eq / kg
Formate. perfluoroethyl-	597	kg CO ₂ -eq / kg
Propane. 2.2-difluoro-. HFC-272ca	599	kg CO ₂ -eq / kg
Ether. 1.1.1-trifluoromethyl methyl-. HFE-143a	616	kg CO ₂ -eq / kg
Ether. 2-chloro-1.1.2-trifluoroethyl difluoromethyl-. HCFE-235ca2 (enflurane)	654	kg CO ₂ -eq / kg
Ether. difluoromethyl 2.2.2-trifluoroethyl-. HFE-245cb2	747	kg CO ₂ -eq / kg
Methane. difluoro-. HFC-32	771	kg CO ₂ -eq / kg
Propane. 1.1.2.2.3-pentafluoro-. HFC-245ca	787	kg CO ₂ -eq / kg
Ether. 1.1.2.3.3.3-Hexafluoropropyl methyl-. HFE-356pcf2	831	kg CO ₂ -eq / kg
Ethane. 1.1-dichloro-1-fluoro-. HCFC-141b	860	kg CO ₂ -eq / kg
Ether. difluoromethyl 2.2.2-trifluoroethyl-. HFE-245fa2	878	kg CO ₂ -eq / kg
Butane. 1.1.1.3.3-pentafluoro-. HFC-365mfc	914	kg CO ₂ -eq / kg
Ether. difluoromethyl 2.2.2-trifluoroethyl-. HFE-245fa1	934	kg CO ₂ -eq / kg
Propane. 1.1.1.3.3-pentafluoro-. HFC-245fa	962	kg CO ₂ -eq / kg
Ether. 1.1.2.2-Tetrafluoroethyl 2.2.2-trifluoroethyl-. HFE-347mcf2	963	kg CO ₂ -eq / kg
Ether. 1.1.2.2-Tetrafluoroethyl 2.2.2-trifluoroethyl-. HFE-347pcf2	980	kg CO ₂ -eq / kg
HFE-338mcf2	1040	kg CO ₂ -eq / kg
Ether. 1.2.2-trifluoroethyl trifluoromethyl-. HFE-236fa	1100	kg CO ₂ -eq / kg

Ethane. 1.1.2.2-tetrafluoro-. HFC-134	1260	kg CO ₂ -eq / kg
Ether. 1.2.2-trifluoroethyl trifluoromethyl-. HFE-236ea2	1260	kg CO ₂ -eq / kg
Propane. 1.1.1.2.2.3-hexafluoro-. HFC-236cb	1350	kg CO ₂ -eq / kg
Propane. 1.1.1.2.3.3-hexafluoro-. HFC-236ea	1500	kg CO ₂ -eq / kg
Ethane. 1.1.1.2-tetrafluoro-. HFC-134a	1526	kg CO ₂ -eq / kg
Pentane. 2.3-dihydroperfluoro-. HFC-4310mee	1600	kg CO ₂ -eq / kg
Methane. bromochlorodifluoro-. Halon 1211	1930	kg CO ₂ -eq / kg
Methane. chlorodifluoro-. HCFC-22	1960	kg CO ₂ -eq / kg
Ethane. 1-chloro-1.1.2.2-tetrafluoro-. HCFC-124a	2070	kg CO ₂ -eq / kg
Ethane. 1.2-dibromotetrafluoro-. Halon 2402	2170	kg CO ₂ -eq / kg
Methane. tetrachloro-. CFC-10	2200	kg CO ₂ -eq / kg
Ethane. 1-chloro-1.1-difluoro-. HCFC-142b	2300	kg CO ₂ -eq / kg
Ether. difluoromethyl 1.2.2.2-tetrafluoroethyl-. HFE-236ea2 (desflurane)	2590	kg CO ₂ -eq / kg
Heptafluoroisobutyronitrile	2750	kg CO ₂ -eq / kg
Butane. 1.1.1.2.2.3.3.4.4-nonafluoro-. HFC-329p	2890	kg CO ₂ -eq / kg
Propane. 1.1.1.2.2.3.3-heptafluoro-. HFC-227ca	2980	kg CO ₂ -eq / kg
Propane. 1.1.1.3.3.3-Hexafluoro-2-(difluoromethoxy)	3040	kg CO ₂ -eq / kg
HFE-43-10pccc124 (H-Galden1040x)	3220	kg CO ₂ -eq / kg
HFE-338pcc13 (HG-01)	3320	kg CO ₂ -eq / kg
2.2-Difluoro-1.2.2.2-tetrachloroethane	3550	kg CO ₂ -eq / kg
Propane. 1.1.1.2.3.3.3-heptafluoro-. HFC-227ea	3600	kg CO ₂ -eq / kg
Ethane. pentafluoro-. HFC-125	3740	kg CO ₂ -eq / kg
HFE-329mcc2	3770	kg CO ₂ -eq / kg
1.1.1-Trichloro-2.2.2-trifluoroethane	3930	kg CO ₂ -eq / kg
(E)-1.2-Dichlorohexafluorocyclobutane	4230	kg CO ₂ -eq / kg
Decane. 1.1.....15.15-eicosafluoro-2.5.8.11.14-Pentaoxapenta-	4380	kg CO ₂ -eq / kg
Propane. 1.1.1.2.3.3-hexafluoro-3-(trifluoromethoxy)-. HFE-329me3	4390	kg CO ₂ -eq / kg
Propane. 1.1.1.2.2-pentafluoro-. HFC-245cb	4550	kg CO ₂ -eq / kg
Ethane. 1.1.2.2-tetrachloro-1.2-difluoro-. CFC-112	4620	kg CO ₂ -eq / kg
Sulfuryl fluoride	4630	kg CO ₂ -eq / kg
HG-03	5350	kg CO ₂ -eq / kg
(Z)-1.2-Dichlorohexafluorocyclobutane	5660	kg CO ₂ -eq / kg
HG-02	5730	kg CO ₂ -eq / kg
Ethane. 1.1.1-trifluoro-. HFC-143a	5810	kg CO ₂ -eq / kg
HFE-236ca12 (HG-10)	6060	kg CO ₂ -eq / kg
Methane. trichlorofluoro-. CFC-11	6226	kg CO ₂ -eq / kg
Ethane. 1.1.2-trichloro-1.2.2-trifluoro-. CFC-113	6520	kg CO ₂ -eq / kg
Ether. di(difluoromethyl). HFE-134	6630	kg CO ₂ -eq / kg
Propane. 1.1.1.2.2.3.3-heptafluoro-3-(1.2.2.2-tetrafluoroethoxy)-	6630	kg CO ₂ -eq / kg

Perfluorodecalin (trans)	7120	kg CO ₂ -eq / kg
Methane. bromotrifluoro-. Halon 1301	7200	kg CO ₂ -eq / kg
Perfluorotripentylamine	7260	kg CO ₂ -eq / kg
Methane. tetrafluoro-. CFC-14	7380	kg CO ₂ -eq / kg
1.1-Dichloro-1.2.2.2-tetrafluoroethane	7420	kg CO ₂ -eq / kg
PFC-9-1-18	7480	kg CO ₂ -eq / kg
HFE-227EA	7520	kg CO ₂ -eq / kg
cis-Perfluorodecalin	7800	kg CO ₂ -eq / kg
Octa deca fluoro octane	8260	kg CO ₂ -eq / kg
Perfluoroheptane	8410	kg CO ₂ -eq / kg
Heptacosafuorotributylamine	8490	kg CO ₂ -eq / kg
Hexane. perfluoro-	8620	kg CO ₂ -eq / kg
Propane. 1.1.1.3.3.3-hexafluoro-. HCFC-236fa	8690	kg CO ₂ -eq / kg
Perfluorotripropylamine	9030	kg CO ₂ -eq / kg
Pentane. perfluoro-	9220	kg CO ₂ -eq / kg
Propane. perfluoro-	9290	kg CO ₂ -eq / kg
Ethane. 1.2-dichloro-1.1.2.2-tetrafluoro-. CFC-114	9430	kg CO ₂ -eq / kg
Ethane. chloropentafluoro-. CFC-115	9600	kg CO ₂ -eq / kg
Butane. perfluoro-	10000	kg CO ₂ -eq / kg
Butane. perfluorocyclo-. PFC-318	10200	kg CO ₂ -eq / kg
Pentadecafluorotriethylamine	10300	kg CO ₂ -eq / kg
PFPME	10300	kg CO ₂ -eq / kg
Ethane. hexafluoro-. HFC-116	12400	kg CO ₂ -eq / kg
Methane. dichlorodifluoro-. CFC-12	12500	kg CO ₂ -eq / kg
Octafluorotetrahydrofuran	13900	kg CO ₂ -eq / kg
Ether. pentafluoromethyl-. HFE-125	14300	kg CO ₂ -eq / kg
Methane. trifluoro-. HFC-23	14600	kg CO ₂ -eq / kg
Methane. chlorotrifluoro-. CFC-13	16200	kg CO ₂ -eq / kg
Nitrogen fluoride	17400	kg CO ₂ -eq / kg
Trifluoromethylsulfur pentafluoride	18500	kg CO ₂ -eq / kg
Sulfur hexafluoride	24300	kg CO ₂ -eq / kg

Table 2 Characterization factors for substances contributing to emissions of biogenic CO₂ equivalents. The unit is kg CO₂-eq./kg substance

Substances	Characterization factor	Unit
Carbon dioxide. biogenic	1	kg CO ₂ -eq / kg
Methane. biogenic	29.8	kg CO ₂ -eq / kg

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