



30 June 2023

Aggregate information on greenhouse gas emissions by sources and removals by sinks for Parties included in Annex I to the Convention

Note by the secretariat

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I. Mandate

1. The Conference of the Parties (COP), by its decision 13/CP.20, adopted the revised guidelines for the technical review of greenhouse gas (GHG) inventories from Parties included in Annex I to the Convention (Annex I Parties). As part of the process for the technical review of GHG inventories, the COP requested the secretariat to compile and tabulate aggregate information on GHG emissions by sources and removals by sinks and trends from the latest available GHG inventory submissions of Annex I Parties and to publish this information in a stand-alone document.¹
2. Pursuant to decision 22/CMP.1, annex, in conjunction with decision 4/CMP.11, the initial check and the scope of the individual review shall be conducted consistent with the initial assessment and apply the relevant provisions for the review contained in decision 13/CP.20.
3. The COP, by its decision 24/CP.19, adopted the revised “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories” (hereinafter referred to as the UNFCCC reporting guidelines) and a revised set of common reporting format (CRF) tables² to be used by Annex I Parties to report quantitative GHG inventory data.
4. Following decisions 24/CP.19 and 6/CP.27, the global warming potential (GWP) values to be used to report aggregate emissions and removals in carbon dioxide equivalent (CO₂ eq) shall be those based on the effects of GHGs over a 100-year time-horizon listed in either the Fourth or Fifth Assessment Report of the Intergovernmental Panel on Climate Change.

II. Comparison of greenhouse gas inventory information

A. Approach

5. This report contains GHG inventory information compiled in tabular format. The tables provide information on emissions by sources and removals by sinks, implied emission factors (IEFs) and activity data (AD) reported by Annex I Parties, as well as information on the methods and emission factors used, AD from international sources and other information relating to GHG inventory estimates. This information is provided for both the base year/period and for 2021.
6. The GHG inventory data are presented by sector, subsector and category as specified in the CRF tables.
7. The information in this report is derived from the CRF tables in the 2023 national GHG inventories received from 43 Annex I Parties³ as of 30 May 2023. Additionally, since Australia submitted common reporting tables⁴ along with its 2023 national GHG inventory,

¹ Decision 13/CP.20, para. 8.

² Available at <https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/reporting-requirements/use-of-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories-and-revision-of-the-unfccc>.

³ This figure includes Kazakhstan, which is an Annex I Party for the purposes of the Kyoto Protocol, but remains a Party not included in Annex I to the Convention for the purposes of the Convention.

⁴ Common reporting tables for the electronic reporting of the information in the national inventory reports of anthropogenic emissions by sources and removals by sinks of GHGs under the Paris Agreement, in accordance with decisions 18/CMA.1 and 5/CMA.3.

the data presented in this report for Australia is extracted from the CRF tables in its 2022 inventory submission.⁵

8. The GHG inventory data expressed in CO₂ eq are in accordance with the GWP values used by Parties in their submissions.

9. The following geographical areas are covered in the submissions considered in this report: Denmark, covering the mainland, Greenland and the Faroe Islands; European Union, covering its 27 member States; France, covering metropolitan France, the French Overseas Departments, the French Overseas Collectivities and New Caledonia; and the United Kingdom of Great Britain and Northern Ireland, covering United Kingdom, the Crown Dependencies, Bermuda, Cayman Islands, Falkland Islands (Malvinas) and Gibraltar.

10. The information contained in this report is intended not as an assessment of whether inventory problems exist, but rather as an indication of potential issues that need to be considered further during the individual review by the expert review team.

B. Explanatory notes to the tables

11. Blank cells in a table indicate that a Party did not report information for a given category, gas or type of AD or another parameter. Where a Party's value is very small compared with that of other Parties, it has been rounded to zero (0.00 or 0.000). Where a Party reported a zero numerical value, a zero value (0) is shown.

12. In tables where shares or contributions of categories, gases, AD or other parameters to a total are shown (e.g. the contribution of a specific fuel type to the total emissions of a combustion category) and a Party reports a notation key, zero value (0) or blank in either the numerator or denominator of the calculation, the share or contribution to the total is shown using “-”.

13. The differences in the AD between the values reported by Parties and international data sources were calculated as percentage deviations from the AD provided by the Party. A positive number indicates that the data from the international data source are higher than the data reported by the Party, while a negative number indicates that data from the international data source are lower than the data reported by the Party.

14. References to the base year pertain to 1990, except for in the case of the following Parties, which, in accordance with decisions 9/CP.2 and 11/CP.4, use base years other than 1990: Bulgaria (1988), Hungary (average of 1985–1987), Poland (1988), Romania (1989) and Slovenia (1986).

15. The column “Share of national total” in the tables indicates the contribution of that category to the Party's total national GHG emissions in terms of CO₂ eq, excluding emissions and removals from land use, land-use change and forestry but including indirect CO₂ emissions where reported.

16. Where Parties used notation keys, these have been reproduced verbatim from the CRF tables provided. The notation keys, as described in the UNFCCC reporting guidelines, are as follows:

NO	Not occurring	IE	Included elsewhere
NE	Not estimated	C	Confidential
NA	Not applicable		

⁵ Submitted on 16 September 2022.

17. The tables in this report pertaining to the energy sector indicate whether the IEFs given in the CRF tables are based on the gross calorific value (GCV) or net calorific value (NCV). Australia, Canada, Japan, New Zealand and the United States of America reported energy data on a GCV basis. Hence, the IEFs reported for those cases are about 5 per cent lower for liquid, solid and other fuels, and about 10 per cent lower for gaseous fuels, than would have been the case if the data were given on a NCV basis.

18. The following chemical formulae or abbreviations for GHGs are used in this report:

C	carbon
CH ₄	methane
CO ₂	carbon dioxide
HFCs	hydrofluorocarbons
N ₂ O	nitrous oxide
NF ₃	nitrogen trifluoride
NMVO	non-methane volatile organic compound
PFCs	perfluorocarbons
SF ₆	sulphur hexafluoride

19. To indicate the methods and emission factors used by Parties, the following abbreviations and acronyms are used (see also the footnotes to CRF Summary table 3) in this report:

<u>Methods</u>		<u>Emission factors</u>	
D	IPCC default	D	IPCC default
RA	Reference approach	CR	CORINAIR
T1	IPCC tier 1	CS	Country specific
T1a	IPCC tier 1a	PS	Plant specific
T1b	IPCC tier 1b	M	Model
T1c	IPCC tier 1c	OTH	Other
T2	IPCC tier 2		
T3	IPCC tier 3		
CR	CORINAIR		
CS	Country specific		
M	Model		
OTH	Other		

20. The following units are used in this report:

kg	kilogram (10 ³ grams)
kt	kilotonne (10 ⁹ grams)
Mg	megagram (10 ⁶ grams)
t	tonne (10 ⁶ grams)
Mt	megatonne (10 ¹² grams)
TJ	terajoule (10 ¹² joules)
PJ	petajoule (10 ¹⁵ joules)
km	kilometre
ha	hectare
kha	thousand hectares
m ³	cubic metre

21. The following abbreviations are used in this report:

AD	activity data
CO	carbon monoxide
CRF	common reporting format
CSC	carbon stock change

DOM	dead organic matter
EF	emission factor
FAO	Food and Agriculture Organization of the United Nations
GCV	gross calorific value
GHG	greenhouse gas
GWP	global warming potential
IEA	International Energy Agency
IEF	implied emission factor
LPG	liquefied petroleum gas
LULUCF	land use, land-use change and forestry
N	nitrogen
NCV	net calorific value
NIR	national inventory report
NMVOC	non-methane volatile organic compounds
NO _x	nitrogen oxides
yr	year

C. List of sectoral figures and tables with information submitted in accordance with decision 24/CP.19

1. General

<u>Figure number</u>	<u>Figure name</u>
Figure G.1	GHG emissions by gas (with LULUCF): base year and 2021
Figure G.2	GHG emissions by gas (without LULUCF): base year and 2021
Figure G.3	GHG emissions by sector (without LULUCF): base year and 2021
<u>Table number</u>	<u>Table name</u>
Table G.1	Submissions used in this report, including GWP values used

2. Energy

<u>Figure number</u>	<u>Figure name</u>
Figure 1.1	Contribution of subsectors to total GHG emissions in the Energy sector
<u>Table number</u>	<u>Table name</u>
Table 1.1	CO ₂ emissions from fuel combustion: reference approach and sectoral approach
Table 1.2	Stationary combustion: liquid fuels – CO ₂ (2021)
Table 1.3	Stationary combustion: solid fuels – CO ₂ (2021)
Table 1.4	Stationary combustion: gaseous fuels – CO ₂ (2021)
Table 1.5	Stationary combustion: other fossil fuels – CO ₂ (2021)
Table 1.6	Road transportation – CO ₂ and N ₂ O (2021)
Table 1.7	Domestic aviation and navigation – CO ₂ (2021)
Table 1.8	Domestic and international aviation – activity data (2021)
Table 1.9	Domestic and international navigation – activity data (2021)
Table 1.10	Fugitive emissions from fuels: coal mining and handling – CH ₄ (2021)
Table 1.11(a)	Fugitive emissions from fuels: oil and natural gas, including venting and flaring – CH ₄ and CO ₂ (2021)
Table 1.11(b)	Fugitive emissions from fuels: oil and natural gas – oil – CH ₄ and CO ₂ (2021)
Table 1.11(c)	Fugitive emissions from fuels: oil and natural gas – natural gas – CH ₄ and CO ₂ (2021)

Table 1.11(d)	Fugitive emissions from fuels: oil and natural gas – venting and flaring – CH ₄ and CO ₂ (2021)
Table 1.12	CO ₂ transport and storage (2021)

3. Industrial processes and product use

<u>Figure number</u>	<u>Figure name</u>
Figure 2.1	Contribution of subsectors to total GHG emissions in the Industrial processes and product use sector
<u>Table number</u>	<u>Table name</u>
Table 2.1	Mineral industry – CO ₂ (2021)
Table 2.2	Chemical industry – CO ₂ and N ₂ O (2021)
Table 2.3	Metal industry – CO ₂ (2021)
Table 2.4	HFCs, PFCs, SF ₆ and NF ₃ (2021)

4. Agriculture

<u>Figure number</u>	<u>Figure name</u>
Figure 3.1	Contribution of subsectors to total GHG emissions in the Agriculture sector
<u>Table number</u>	<u>Table name</u>
Table 3.1	Enteric fermentation – CH ₄ (2021)
Table 3.2	Manure management – CH ₄ (2021)
Table 3.3	Manure management – N ₂ O (2021)
Table 3.4	Agricultural soils – N ₂ O (2021)

5. Land use, land-use change and forestry

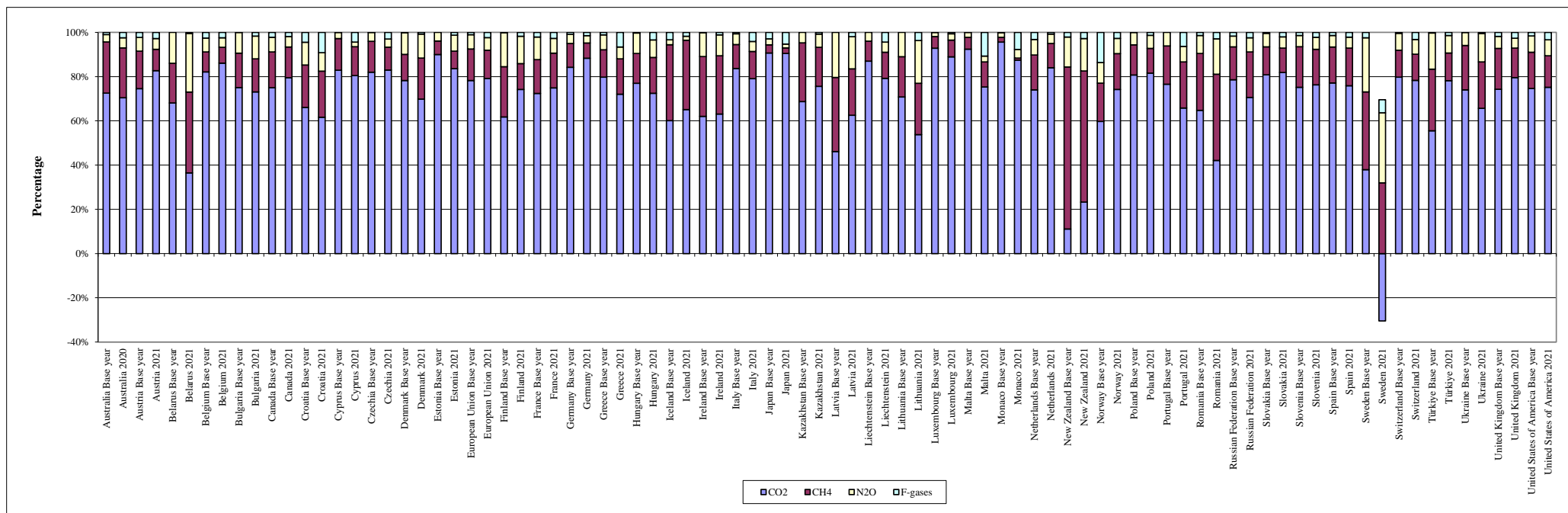
<u>Table number</u>	<u>Table name</u>
Table 4.1(a–b)	Methods and emission factors used (2021)
Table 4.2	Forest land – AD, IEFs, carbon stock changes in pools and net CO ₂ emissions/removals (2021)
Table 4.3	Cropland – AD, IEFs, carbon stock changes in pools and net CO ₂ emissions/removals (2021)
Table 4.4	Grassland – AD, IEFs, carbon stock changes in pools and net CO ₂ emissions/removals (2021)
Table 4.5	Land area (2021)

6. Waste

<u>Figure number</u>	<u>Figure name</u>
Figure 5.1	Contribution of subsectors to total GHG emissions in the Waste sector
<u>Table number</u>	<u>Table name</u>
Table 5.1(a–b)	Solid waste disposal on land, biological treatment of solid waste, incineration and open burning of waste and wastewater treatment and discharge (2021)

Figure G.1

GHG emissions by gas^a (with LULUCF): base year^b and 2021

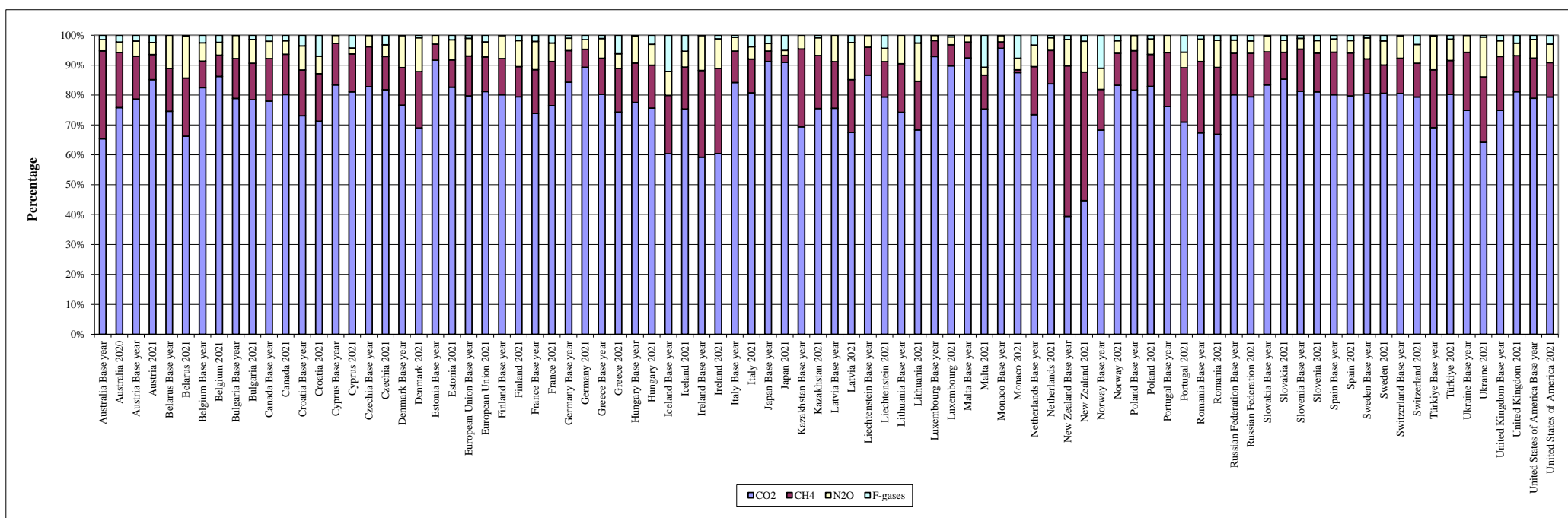


^a The national totals and emissions by CO₂ in this graph include indirect CO₂ emissions from the atmospheric oxidation of CH₄, CO and NMVOCs for the following Parties: Bulgaria, Canada, Cyprus, Czechia, Denmark, European Union, Finland, France, Japan, Latvia, Lithuania, Monaco, Netherlands, Norway, Poland, Portugal, Slovakia and Switzerland.

^b In accordance with the UNFCCC reporting guidelines on annual inventories of Annex I Parties the year 1990 should be the base year for the estimation and reporting of inventories. However, in accordance with decisions 9/CP.2, 11/CP.4, and 7/CP.12 some Parties with economies in transition use base years other than 1990: Bulgaria (1988), Croatia (1990), Hungary (average of 1985 to 1987), Poland (1988), Romania (1989) and Slovenia (1986).

Figure G.2

GHG emissions by gas^a (without LULUCF): base year^b and 2021

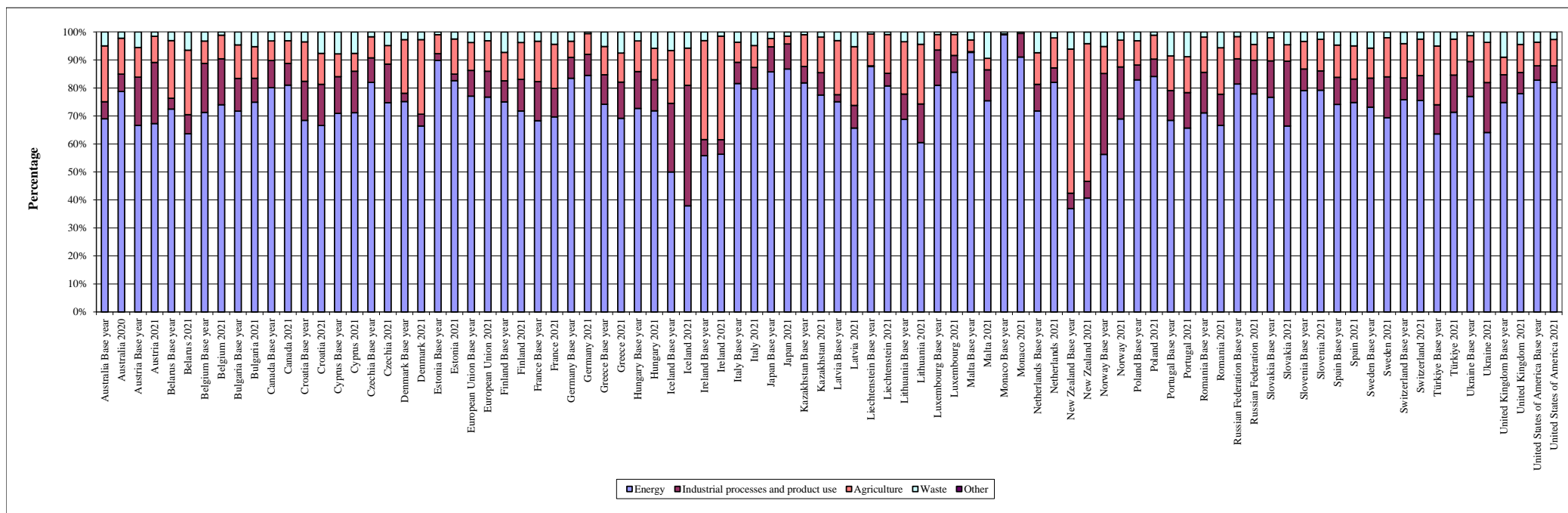


^a The national totals and emissions by CO₂ in this graph include indirect CO₂ emissions from the atmospheric oxidation of CH₄, CO and NMVOCs for the following Parties: Bulgaria, Canada, Cyprus, Czechia, Denmark, European Union, Finland, France, Japan, Latvia, Lithuania, Monaco, Netherlands, Norway, Poland, Portugal, Slovakia and Switzerland.

^b In accordance with the UNFCCC reporting guidelines on annual inventories of Annex I Parties the year 1990 should be the base year for the estimation and reporting of inventories. However, in accordance with decisions 9/CP.2, 11/CP.4, and 7/CP.12 some Parties with economies in transition use base years other than 1990: Bulgaria (1988), Croatia (1990), Hungary (average of 1985 to 1987), Poland (1988), Romania (1989) and Slovenia (1986).

Figure G.3

GHG emissions^a by sector (without LULUCF): base year^b and 2021



^a The national totals and emissions by CO₂ in this graph include indirect CO₂ emissions from the atmospheric oxidation of CH₄, CO and NMVOCs for the following Parties: Bulgaria, Canada, Cyprus, Czechia, Denmark, European Union, Finland, France, Japan, Latvia, Lithuania, Monaco, Netherlands, Norway, Poland, Portugal, Slovakia and Switzerland.

^b In accordance with the UNFCCC reporting guidelines on annual inventories of Annex I Parties the year 1990 should be the base year for the estimation and reporting of inventories. However, in accordance with decisions 9/CP.2, 11/CP.4, and 7/CP.12 some Parties with economies in transition use base years other than 1990: Bulgaria (1988), Croatia (1990), Hungary (average of 1985 to 1987), Poland (1988), Romania (1989) and Slovenia (1986).

Table G.1**Submissions used in this report, including GWP values used**

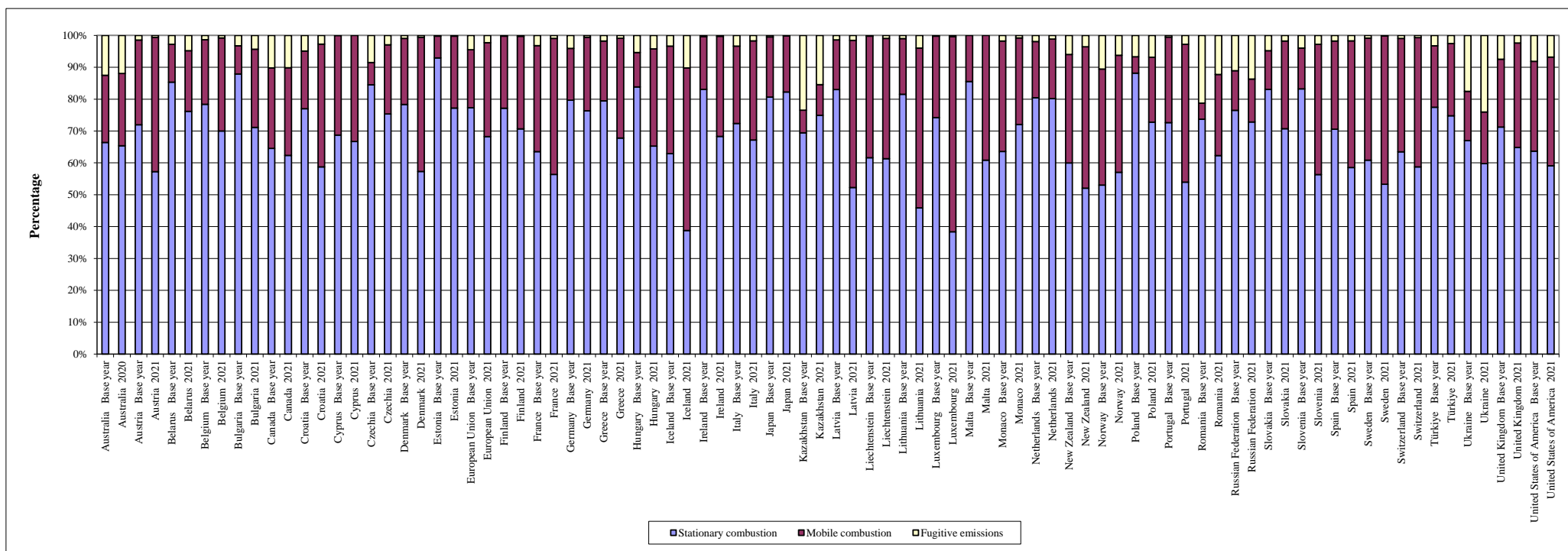
Party	Initial submission date	CRF for years	NIR	CRF submission date and version used in this report	CRF Reporter version (version used in this report)	GWP values used ^a
Australia ^b	27 May 2022	1990-2020	27 May 2022	16 September 2022 (3)	6.0.6	AR4
Austria	13 April 2023	1990-2021	13 April 2023	13 April 2023 (2)	6.0.10	AR5
Belarus	14 April 2023	1990-2021	14 April 2023	14 April 2023 (3)	6.0.10	AR4
Belgium	14 April 2023	1990-2021	14 April 2023	14 April 2023 (1)	6.0.10	AR5
Bulgaria	12 April 2023	1998-2021	12 April 2023	12 April 2023 (1)	6.0.10	AR5
Canada	14 April 2023	1990-2021	14 April 2023	14 April 2023 (2)	6.0.10	AR4
Croatia	13 April 2023	1990-2021	13 April 2023	13 April 2023 (1)	6.0.10	AR5
Cyprus	12 April 2023	1990-2021	10 May 2023	10 May 2023 (6)	6.0.10	AR5
Czechia	26 April 2023	1990-2021	13 April 2023	26 April 2023 (2)	6.0.10	AR5
Denmark	14 April 2023	1990-2021	14 April 2023	14 April 2023 (2)	6.0.10	AR5
Estonia	13 April 2023	1990-2021	13 April 2023	13 April 2023 (1)	6.0.10	AR5
European Union	15 April 2023	1990-2021	15 April 2023	15 April 2023 (1)	6.0.10	AR5
Finland	12 April 2023	1990-2021	12 April 2023	12 April 2023 (2)	6.0.10	AR5
France	25 April 2023	1990-2021	13 April 2023	25 April 2023 (1)	6.0.10	AR5
Germany	26 April 2023	1990-2021	14 April 2023	26 April 2023 (2)	6.0.10	AR5
Greece	13 April 2023	1990-2021	13 April 2023	13 April 2023 (1)	6.0.10	AR5
Hungary	15 April 2023	1985-87, 1986-2021	15 April 2023	15 April 2023 (2)	6.0.10	AR5
Iceland	15 April 2023	1990-2021	15 April 2023	15 April 2023 (1)	6.0.10	AR5
Ireland	14 April 2023	1990-2021	17 April 2023	14 April 2023 (2)	6.0.10	AR5
Italy	12 April 2023	1990-2021	14 April 2023	12 April 2023 (1)	6.0.10	AR5
Japan	21 April 2023	1990-2021	21 April 2023	21 April 2023 (4)	6.0.10	AR4
Kazakhstan	15 April 2023	1990-2021	15 April 2023	15 April 2023 (1)	6.0.10	AR4
Latvia	12 April 2023	1990-2021	12 April 2023	12 April 2023 (2)	6.0.10	AR5
Liechtenstein	13 April 2023	1990-2022	13 April 2023	13 April 2023 (6)	6.0.10	AR5
Lithuania	05 April 2023	1990-2021	07 April 2023	05 April 2023 (1)	6.0.10	AR5
Luxembourg	13 April 2023	1990-2021	13 April 2023	13 April 2023 (2)	6.0.10	AR5
Malta	30 March 2023	1990-2021	12 April 2023	30 March 2023 (2)	6.0.10	AR5
Monaco	11 April 2023	1990-2021	11 April 2023	11 April 2023 (2)	6.0.10	AR4
Netherlands	14 April 2023	1990-2021	13 April 2023	14 April 2023 (1)	6.0.10	AR5
New Zealand	13 April 2023	1990-2021	13 April 2023	25 May 2023 (3)	6.0.10	AR4
Norway	15 April 2023	1990-2021	15 April 2023	15 April 2023 (1)	6.0.10	AR5
Poland	28 March 2023	1988-2021	28 March 2023	28 March 2023 (1)	6.0.10	AR5
Portugal	03 April 2023	1990-2021	03 April 2023	03 April 2023 (1)	6.0.10	AR5
Romania	06 April 2023	1989-2021	06 April 2023	06 April 2023 (2)	6.0.10	AR5
Russian Federation	18 April 2023	1990-2021	18 April 2023	29 May 2023 (2)	6.0.10	AR4
Slovakia	13 April 2023	1990-2021	13 April 2023	13 April 2023 (4)	6.0.10	AR5
Slovenia	12 April 2023	1986-2021	14 April 2023	12 April 2023 (4)	6.0.10	AR5
Spain	14 April 2023	1990-2021	14 April 2023	14 April 2023 (2)	6.0.10	AR5
Sweden	06 April 2023	1990-2021	06 April 2023	06 April 2023 (1)	6.0.10	AR5
Switzerland	13 April 2023	1990-2021	13 April 2023	13 April 2023 (3)	6.0.10	AR5
Türkiye	14 April 2023	1990-2021	14 April 2023	14 April 2023 (1)	6.0.10	AR4
Ukraine	18 May 2023	1990-2021	18 May 2023	18 May 2023 (1)	6.0.10	AR4
United Kingdom of Great Britain and Northern Ireland	14 April 2023	1990-2021	14 April 2023	14 April 2023 (2)	6.0.10	AR5
United States of America	14 April 2023	1990-2021	14 April 2023	14 April 2023 (1)	6.0.10	AR5

^a In accordance with decisions 24/CP.19 and 6/CP.27, Parties report aggregate emissions and removals in CO₂ eq using the GWP values from the Fourth Assessment Report (AR4) or Fifth Assessment Report (AR5) of the IPCC over a 100-year time-horizon.

^b Australia submitted common reporting tables under the Paris Agreement on 13 April 2023. Hence, this report is based on the CRF tables in the Australia's 2022 national GHG inventory with information reported for year 2020 presented in the tables and figures covering year 2021.

Figure 1.1

Contribution of subsectors to total GHG emissions in the Energy sector^{a, b}



^a In accordance with the UNFCCC reporting guidelines on annual inventories of Annex I Parties the year 1990 should be the base year for the estimation and reporting of inventories. However, in accordance with decisions 9/CP.2, 11/CP.4, and 7/CP.12 some Parties with economies in transition use base years other than 1990: Bulgaria (1988), Croatia (1990), Hungary (average of 1985 to 1987), Poland (1988), Romania (1989) and Slovenia (1986).

^b Indirect CO₂ emissions are excluded from the totals in this graph.

Table 1.1**CO₂ emissions from fuel combustion: reference approach and sectoral approach^a**

	Reference approach	Sectoral approach	Difference
	(kt CO ₂)		(%)
Australia Base year	254 499	251 675	1.12
Australia 2020	361 868	361 452	0.12
Austria Base year	51 612	50 828	1.54
Austria 2021	50 692	50 849	-0.31
Belarus Base year	105 572	100 945	4.58
Belarus 2021	50 006	54 860	-8.85
Belgium Base year	91 846	101 526	-9.53
Belgium 2021	75 657	80 264	-5.74
Bulgaria Base year ^b	82 746	77 924	6.19
Bulgaria 2021	40 828	37 959	7.56
Canada Base year	412 660	411 542	0.27
Canada 2021	478 145	478 263	-0.02
Croatia Base year ^b	20 165	19 780	1.94
Croatia 2021	15 380	15 190	1.25
Cyprus Base year	4 281	3 922	9.17
Cyprus 2021	5 912	6 127	-3.50
Czechia Base year	150 037	146 641	2.32
Czechia 2021	83 928	84 267	-0.40
Denmark Base year	51 783	52 621	-1.59
Denmark 2021	27 423	29 354	-6.58
Estonia Base year	36 879	35 946	2.60
Estonia 2021	13 890	10 290	34.98
European Union Base year	3 457 177	3 522 371	-1.85
European Union 2021	2 516 860	2 552 389	-1.39
Finland Base year	52 654	52 473	0.35
Finland 2021	31 862	33 445	-4.73
France Base year	354 982	349 231	1.65
France 2021	279 428	285 211	-2.03
Germany Base year	986 673	988 066	-0.14
Germany 2021	632 884	629 640	0.52
Greece Base year	74 770	74 634	0.18
Greece 2021	50 664	52 445	-3.39
Hungary Base year ^b	74 236	74 308	-0.10
Hungary 2021	43 401	43 282	0.28
Iceland Base year	1 767	1 746	1.22
Iceland 2021	1 551	1 567	-1.00
Ireland Base year	30 853	30 148	2.34
Ireland 2021	34 309	34 376	-0.20
Italy Base year	396 623	404 532	-1.95
Italy 2021	309 761	319 646	-3.09
Japan Base year	1 070 662	1 078 663	-0.74
Japan 2021	1 017 837	1 007 257	1.05
Kazakhstan Base year	267 277	238 899	11.88
Kazakhstan 2021	215 003	219 502	-2.05
Latvia Base year	18 853	18 645	1.11
Latvia 2021	6 479	6 554	-1.14
Liechtenstein Base year	199	199	0.01
Liechtenstein 2021	148	146	1.59
Lithuania Base year	32 518	32 216	0.94
Lithuania 2021	11 879	11 406	4.15

Table 1.1**CO₂ emissions from fuel combustion: reference approach and sectoral approach^a**

	Reference approach	Sectoral approach	Difference
	(kt CO ₂)		(%)
Luxembourg Base year	10 186	10 211	-0.24
Luxembourg 2021	7 870	7 909	-0.49
Malta Base year	2 308	2 422	-4.72
Malta 2021	1 591	1 602	-0.65
Monaco Base year	97	98	-1.18
Monaco 2021	65	64	0.43
Netherlands Base year	152 974	155 341	-1.52
Netherlands 2021	135 664	133 190	1.86
New Zealand Base year	22 979	22 027	4.32
New Zealand 2021	30 621	29 718	3.04
Norway Base year	25 414	24 627	3.20
Norway 2021	33 550	30 912	8.53
Poland Base year ^b	482 016	438 906	9.82
Poland 2021	309 765	306 225	1.16
Portugal Base year	39 652	39 398	0.65
Portugal 2021	34 916	35 094	-0.51
Romania Base year ^b	183 203	172 057	6.48
Romania 2021	65 713	65 533	0.27
Russian Federation Base year	2 373 543	2 264 027	4.84
Russian Federation 2021	1 514 697	1 441 142	5.10
Slovakia Base year	52 455	53 156	-1.32
Slovakia 2021	26 455	26 399	0.21
Slovenia Base year ^b	15 367	15 295	0.47
Slovenia 2021	12 078	12 114	-0.29
Spain Base year	215 902	206 730	4.44
Spain 2021	210 391	208 495	0.91
Sweden Base year	47 369	51 023	-7.16
Sweden 2021	29 003	32 381	-10.43
Switzerland Base year	41 198	40 881	0.77
Switzerland 2021	33 720	33 598	0.36
Türkiye Base year	135 077	129 596	4.23
Türkiye 2021	399 054	385 452	3.53
Ukraine Base year	608 895	588 769	3.42
Ukraine 2021	150 200	157 483	-4.62
United Kingdom of Great Britain and Northern Ireland Base year	546 748	550 928	-0.76
United Kingdom of Great Britain and Northern Ireland 2021	323 071	323 625	-0.17
United States of America Base year	4 816 726	4 853 502	-0.76
United States of America 2021	4 832 542	4 791 746	0.85

^a Indirect CO₂ emissions are excluded from the totals in this table.

^b In accordance with the UNFCCC reporting guidelines on annual inventories of Annex I Parties the year 1990 should be the base year for the estimation and reporting of inventories. However, in accordance with decisions 9/CP.2, 11/CP.4, and 7/CP.12 some Parties with economies in transition use base years other than 1990: Bulgaria (1988), Croatia (1990), Hungary (average of 1985 to 1987), Poland (1988), Romania (1989) and Slovenia (1986).

Table 1.2

Stationary combustion: liquid fuels - CO₂ (2021)

	Share of national total ^a	IEF in CRF based on GCV or NCV ^b	Energy industries						Manufacturing industries and construction			Other sectors						Other		
			Methods and EF used ^d		CO ₂ IEF				Methods and EF used ^d		CO ₂ IEF	Methods and EF used ^d		CO ₂ IEF				Methods and EF used ^d		CO ₂ IEF
			Methods	EF	Total	Public electricity and heat production	Petroleum refining	Manufacture of solid fuels and other energy industries	Methods	EF	Total	Methods	EF	Total	Commercial / Institutional	Residential	Agriculture / Forestry / Fishing	Methods	EF	Stationary
Australia	7.82	GCV	T2	CS, PS	68	70	59	70	T2	CS	69	T2, T3	CS	68	69	61	69	T1, T2	CS	NO
Austria	11.45	NCV	T1, T2	CS, D	75	76	75	NO	T1, T2, T3	CS, D	75	D, T1, T2, T3	CS, D	75	75	75	74	T1, T2	CS, D	NO
Belarus	7.93	NCV	T1, T2	CS, D	66	75	62	NO	T1, T2	CS, D	74	T1, T2	CS, D	73	74	65	74	T1, T2	CS, D	73
Belgium	12.98	NCV	CS, T1, T3	D, PS	67	74	67	NO	CS, M, T1, T3	CS, D, PS	75	CS, T1, T3	D	74	74	74	74	CS, T1, T3	D	NO
Bulgaria	5.18	NCV	T1, T2	CS, D	59	77	58	65	T1, T2	CS, D	82	T1, T2	CS, D	72	70	63	74	T1	D	NO
Canada	12.11	GCV	T2	CS	59	77	58	57	M, T2	CS	71	M, T2	CS	68	67	68	69	M, T2	CS	NO
Croatia	8.94	NCV	T1, T2	CS, D	67	74	67	NO	T1	D	80	T1	D	72	70	69	74			NO
Cyprus	43.77	NCV	CS, T1	CS, D	77	77	NO	NO	CS, T1	CS, D	76	T1	D	70	70	70	73	T1	D	72
Czechia	1.87	NCV	T1, T2	CS, D	57	63	55	74	T1, T2	CS, D	72	T1, T2	CS, D	73	71	66	74	T1	D	NO
Denmark	13.22	NCV	CS, T1, T2, T3	CS, D, PS	62	77	57	74	CR, M, T1, T2, T3	CS, D, PS	80	CR, M, T1, T2, T3	CS, D	74	73	73	74	CR, M, T1, T2	CS, D	NO
Estonia	3.68	NCV	T1, T2, T3	CS, D, PS	77	77	NO	IE, NO	T1, T2, T3	CS, D, PS	67	T1, T2	CS, D	73	73	67	73			NO
European Union	9.98				69	77	67	72			74			73	73	72	73			73
Finland	17.04	NCV	T3	CS, D, PS	57	72	50	NO	T3	CS, D, PS	68	T1, T2, T3	CS, D	73	74	73	73	T2	CS	70
France	11.91	NCV	T2, T3	CS, PS	67	75	58	NO	T2, T3	CS, PS	75	T1, T2	CS, D	73	73	72	74			74
Germany	9.75	NCV	CS	CS	66	76	65	74	CS, T1	CS, D	72	CS, T1, T2, T3	CS, D	73	74	73	73	CS, D, M	CS, D	74
Greece	19.51	NCV	T1, T2	D, PS	73	77	70	NO	T1, T2	CS, D, PS	82	T1, T2	CS, D	72	66	73	71	T1	D	NO
Hungary	5.53	NCV	T1, T2, T3	CS, D, PS	61	76	60	74	T1, T2, T3	CS, D, PS	75	T1, T2	CS, D	72	70	64	73	T1, T2	CS, D	77
Iceland	14.31	NCV	T2	D	74	74	NO	NO	T2	D	74	T1, T2	CS, D	74	65	67	74	T1	D	73
Ireland	12.35	NCV	T1, T3	CS, D, PS	76	78	67	73	T1, T2, T3	CS, D, PS	81	T1, T2	CS, D	72	70	72	73			IE, NO
Italy	9.75	NCV	T3	CS	69	76	68	NO	T2	CS	79	T2	CS	71	67	69	73	T2	CS	NO
Japan	15.38	GCV	T2	CS	66	69	65	70	CS, T2	CS	66	CS, T2	CS	67	68	65	70			NO
Kazakhstan	7.74	NCV	T1	D	53	8	58	74	T1	D	76	T1	D	73	72	77	72	T1	D	77
Latvia	8.43	NCV	T1, T2	CS, D	75	77	NO	75	T1, T2	CS, D, PS	72	T1, T2	CS, D	73	73	71	75	T1	D	NO
Liechtenstein	19.72	NCV	T2	CS	NA, NO		NA, NO	NO	T1, T2	CS, D	74	T1, T2	CS, D	74	74	74	73			NO
Lithuania	8.24	NCV	T1, T2, T3	CS, D, PS	66	70	66	73	T1, T2	CS, D, OTH	72	T1, T2	CS	71	71	70	72	T2	CS	NO
Luxembourg	11.41	NCV	T2	CS	74	74	NO	NO	T1, T2, T3	CS, D, PS	74	T1, T2	CS, D	74	73	74	74	T1, T2	CS, D	NO
Malta	11.15	NCV	T2	CS	74	74	NO	NO	T1	D	72	T1	D	70	72	63	74	T1	D	NO
Monaco	20.17	NCV	T1, T2	CS, D	77	77	NO	NO	T2	CS	73	T1, T2	CS, D	73	75	73	NO			NO
Netherlands	11.29	NCV	CS, T2	CS, D	66	66	66	NO	T2	CS, D	65	T1, T2	CS, D	72	72	70	72	T2	CS	NO
New Zealand	7.17	GCV	T2	CS	62	69	62	70	T2	CS	68	T2	CS	67	68	66	69			NO
Norway	13.23	NCV	T1, T2, T3	CS, PS	60	50	51	73	T1, T2, T3	CS, PS	72	T1, T2	CS, PS	73	73	72	73	T2	CS	NO
Poland	4.29	NCV	T1, T2	CS, D	71	76	68	74	T1, T2	CS, D	65	T1, T2	CS, D	72	73	65	74			IE
Portugal	12.01	NCV	T1, T2, T3	CR, D, PS	61	77	54	NO	T1, T2, T3	CR, D, PS	72	T1, T2	CS, D	69	68	65	74	T1	D	NO
Romania	8.44	NCV	T1, T2, T3	CS, D, PS	70	68	69	72	T1, T2, T3	CS, D, PS	71	T1, T2	CS, D	70	69	65	73	T1, T2	CS, D	73
Russian Federation	6.29	NCV	T1, T2	CS, D	74	76	73	74	T1, T2, T3	CS, D	74	T1, T2	CS, D	67	76	63	74	T1, T2	CS, D	74
Slovakia	4.66	NCV	T2, T3	CS, PS	73	76	73	68	T2	CS	92	T1, T2	CS	73	71	63	74	T1, T2	CS, D	63
Slovenia	7.10	NCV	T1, T2	CS, D, PS	72	72	NO	NO	T1, T2, T3	CS, D, PS	79	T1, T2	CS, D	72	71	71	74	T1	D	NO
Spain	14.36	NCV	T1, T2, T3	CS, D, OTH, PS	63	76	55	74	CR, T1, T2, T3	CR, CS, D, PS	85	CR, T1, T2, T3	CR, CS, D, OTH	72	73	70	73	CR, T1, T2	CS, D	IE, NO
Sweden	18.04	NCV	T2	CS	81	C		IE, NO	T1, T2	CS	69	T1, T2	CS	72	72	73	72			NO
Switzerland	21.05	NCV	T2, T3	CS	56	74	55		T2, T3	CS, PS	73	T1, T2, T3	CS, D	74	74	74	73	T2, T3	CS	NA, NO
Türkiye	5.11	NCV	T2, T3	CS, D, PS	64	74	62	NO	T1, T2	CS, D	93	T1, T2	CS, D	71	66	63	72			
Ukraine	0.44	NCV	T1, T2, T3	CS, D	73	75	74	69	T1, T2	CS, D	65	T1, T2	CS, D	66	69	66	64	T1	D	NA
United Kingdom of Great Britain and Northern Ireland	9.31	NCV	T1, T2	CS, D	69	76	68	75	T1, T2, T3	CS, D	72	T1, T2, T3	CS, D	73	71	72	75	T1	CS	IE, NO
United States of America	6.18	GCV	T2	CS	81	82	72	72	T2	CS	72	T2	CS, D	65	66	64	72	CS, T2	CS	23

Note: This table includes data from categories 1.A.1 Energy industries, 1.A.2 Manufacturing industries and construction, 1.A.4 Other sectors and 1.A.5 Other.

^a The national total includes indirect CO₂ emissions from the atmospheric oxidation of CH₄, CO and NMVOCs for the following Parties: Bulgaria, Canada, Cyprus, Czechia, Denmark, European Union, Finland, France, Japan, Latvia, Lithuania, Monaco, Netherlands, Norway, Poland, Portugal, Slovakia and Switzerland.^b The following Parties reported energy data on a gross calorific value (GCV) basis: Australia, Canada, Japan, New Zealand and United States of America. Hence, reported IEFs are about 5 per cent lower for liquid and solid fuels and biomass, and about 10 per cent lower for gaseous fuels than would have been the case if the data were given on a net calorific value (NCV) basis.^c Information on methods and emission factors in this table is as reported by Parties in table Summary 3 of the CRF. It may not reflect the actual method or type of emission factor used for all subcategories within the category 1.A.1 Energy industries.^d Information on methods and emission factors in this table is as reported by Parties in table Summary 3 of the CRF. It may not reflect the actual method or type of emission factor used for all subcategories within the category 1.A.2 Manufacturing industries and construction.^e Information on methods and emission factors in this table is as reported by Parties in table Summary 3 of the CRF. It may not reflect the actual method or type of emission factor used for all subcategories within the category 1.A.4 Other sectors.^f Information on methods and emission factors in this table is as reported by Parties in table Summary 3 of the CRF. It may not reflect the actual method or type of emission factor used for all subcategories within the category 1.A.5 Other.

Table 1.3

Stationary combustion: solid fuels - CO₂ (2021)

	Share of national total ^a	IEF in CRF based on GCV or NCV ^b	Energy industries						Manufacturing industries and construction			Other sectors						Other		
			Methods and EF used ^c		CO ₂ IEF				Methods and EF used ^d		CO ₂ IEF	Methods and EF used ^e		CO ₂ IEF				Methods and EF used ^f		CO ₂ IEF
			Methods	EF	Total	Public electricity and heat production	Petroleum refining	Manufacture of solid fuels and other energy industries	Methods	EF	Total	Methods	EF	Total	Commercial / Institutional	Residential	Agriculture / Forestry / Fishing	Methods	EF	Stationary
	%				(t/TJ)						(t/TJ)			(t/TJ)						(t/TJ)
Australia	28.00	GCV	T2	CS, PS	91	91	NO	77	T2	CS	82	T2, T3	CS	NO	NO	NO	NO	T1, T2	CS	NO
Austria	1.73	NCV	T1, T2	CS, D	IE, NO	NO	NO	IE, NO	T1, T2, T3	CS, D	94	D, T1, T2, T3	CS, D	95	NO	95	95	T1, T2	CS, D	NO
Belarus	2.57	NCV	T1, T2	CS, D	105	105	NO	NO	T1, T2	CS, D	97	T1, T2	CS, D	106	106	106	106	T1, T2	CS, D	106
Belgium	5.52	NCV	CS, T1, T3	D, PS	211	250	NO	40	CS, M, T1, T3	CS, D, PS	98	CS, T1, T3	D	95	95	95	95	CS, T1, T3	D	NO
Bulgaria	37.10	NCV	T1, T2	CS, D	102	102	NO	102	T1, T2	CS, D	89	T1, T2	CS, D	90	91	89	92	T1	D	NO
Canada	5.36	GCV	T2	CS	93	93	NO	NO	M, T2	CS	75	M, T2	CS	96	NO	NO	96	M, T2	CS	NO
Croatia	6.70	NCV	T1, T2	CS, D	93	93	NO	NO	T1	D	97	T1	D	99	IE, NO	99	NO			NO
Cyprus	1.83	NCV	CS, T1	CS, D	NO	NO	NO	NO	CS, T1	CS, D	93	T1	D	NO	NO	NO	NO	T1	D	NO
Czechia	37.51	NCV	T1, T2	CS, D	96	97	NO	76	T1, T2	CS, D	93	T1, T2	CS, D	94	96	94	95	T1	D	NO
Denmark	9.19	NCV	CS, T1, T2, T3	CS, D, PS	94	94	NO	NO	CR, M, T1, T2, T3	CS, D, PS	94	CR, M, T1, T2, T3	CS, D	94	NO	NO	94	CR, M, T1, T2	CS, D	
Estonia	51.00	NCV	T1, T2, T3	CS, D, PS	51	102	NO	20	T1, T2, T3	CS, D, PS	94	T1, T2	CS, D	94	94	94	94			NO
European Union	17.50				103	104	63	84			109			95	96	95	95			97
Finland	13.10	NCV	T3	CS, D, PS	120	122	NO	98	T3	CS, D, PS	88	T1, T2, T3	CS, D	92	NO	NO	92	T2	CS	NO
France	4.54	NCV	T2, T3	CS, PS	136	126	NO	204	T2, T3	CS, PS	108	T1, T2	CS, D	95	95	95	NO			NO
Germany	28.27	NCV	CS	CS	107	106	41	146	CS, T1	CS, D	141	CS, T1, T2, T3	CS, D	99	98	99	NA, NO	CS, D, M	CS, D	99
Greece	11.20	NCV	T1, T2	D, PS	130	130	NO	NO	T1, T2	CS, D, PS	92	T1, T2	CS, D	99	IE, NO	99	99	T1	D	NO
Hungary	7.26	NCV	T1, T2, T3	CS, D, PS	108	113	NO	47	T1, T2, T3	CS, D, PS	80	T1, T2	CS, D	101	100	101	97	T1, T2	CS, D	95
Iceland	-	NCV	T2	D	NO	NO	NO	NO	T2	D	NA, NO	T1, T2	CS, D	NO	NO	NO	NO	T1	D	NO
Ireland	6.00	NCV	T1, T3	CS, D, PS	93	93	NO	NO	T1, T2, T3	CS, D, PS	95	T1, T2	CS, D	97	95	97	NO			IE, NO
Italy	5.40	NCV	T3	CS	104	93	NO	180	T2	CS	55	T2	CS	NO	NO	NO	NO	T2	CS	NO
Japan	36.01	GCV	T2	CS	89	89	89	84	CS, T2	CS	93	CS, T2	CS	93	93	NO	NO			NO
Kazakhstan	39.61	NCV	T1	D	96	96	NA	NA	T1	D	97	T1	D	96	96	96	96	T1	D	2.6
Latvia	0.65	NCV	T1, T2	CS, D	97	97	NO	NO	T1, T2	CS, D, PS	97	T1, T2	CS, D	97	97	97	NO	T1	D	NO
Liechtenstein	-	NCV	T2	CS	NA, NO		NA, NO	NO	T1, T2	CS, D	NA, NO	T1, T2	CS, D	NO		NO	NO			NO
Lithuania	3.18	NCV	T1, T2, T3	CS, D, PS	95	95	NO	NO	T1, T2	CS, D, OTH	97	T1, T2	CS	95	95	95	95	T2	CS	NO
Luxembourg	1.68	NCV	T2	CS	NO	NO	NO	NO	T1, T2, T3	CS, D, PS	95	T1, T2	CS, D	98	NO	98	NO	T1, T2	CS, D	NO
Malta	-	NCV	T2	CS	NO	NO	NO	NO	T1	D	NO	T1	D	NO	NO	NO	NO	T1	D	NO
Monaco	-	NCV	T1, T2	CS, D	NO	NO	NO	NO	T2	CS	NO	T1, T2	CS, D	NO	NO	NO	NO			NO
Netherlands	13.02	NCV	CS, T2	CS, D	117	118	NO	99	T2	CS, D	50	T1, T2	CS, D	101	101	100	NO	T2	CS	NO
New Zealand	5.64	GCV	T2	CS	93	93	NO	NO	T2	CS	92	T2	CS	92	92	92	92			
Norway	0.78	NCV	T1, T2, T3	CS, PS	91	91	NO		T1, T2, T3	CS, PS	102	T1, T2	CS, PS	NO	NO	NO	NO	T2	CS	
Poland	45.44	NCV	T1, T2	CS, D	99	100	94	48	T1, T2	CS, D	103	T1, T2	CS, D	94	94	94	95			IE
Portugal	1.32	NCV	T1, T2, T3	CR, D, PS	90	90	NO	NO	T1, T2, T3	CR, D, PS	95	T1, T2	CS, D	NO	NO	NO	NO	T1	D	NO
Romania	9.87	NCV	T1, T2, T3	CS, D, PS	80	80	68	NO	T1, T2, T3	CS, D, PS	94	T1, T2	CS, D	87	79	79	106	T1, T2	CS, D	NO
Russian Federation	12.39	NCV	T1, T2	CS, D	95	95	NA	51	T1, T2, T3	CS, D	49	T1, T2	CS, D	96	95	96	96	T1, T2	CS, D	95
Slovakia	17.81	NCV	T2, T3	CS, PS	117	97	NO	179	T2	CS	136	T1, T2	CS	96	96	97	95	T1, T2	CS, D	96
Slovenia	24.16	NCV	T1, T2	CS, D, PS	101	101	NO	NO	T1, T2, T3	CS, D, PS	105	T1, T2	CS, D	96	NO	96	NO	T1	D	NO
Spain	4.81	NCV	T1, T2, T3	CS, D, OTH, PS	118	125	NO	51	CR, T1, T2, T3	CR, CS, D, PS	133	CR, T1, T2, T3	CR, CS, D, OTH	105	106	103	NO	CR, T1, T2	CS, D	IE, NO
Sweden	7.65	NCV	T2	CS	203	260	NO	89	T1, T2	CS	120	T1, T2	CS	NO	NO	NO	NO			NO
Switzerland	0.78	NCV	T2, T3	CS	NO	NO	NO	NO	T2, T3	CS, PS	95	T1, T2, T3	CS, D	93	NO	93	NO	T2, T3	CS	NA, NO
Türkiye	27.16	NCV	T2, T3	CS, D, PS	102	101	92	168	T1, T2	CS, D	98	T1, T2	CS, D	99	103	98	NO			
Ukraine	19.81	NCV	T1, T2, T3	CS, D	90	92	NA, NO	54	T1, T2	CS, D	83	T1, T2	CS, D	93	84	95	95	T1	D	NA
United Kingdom of Great Britain and Northern Ireland	2.76	NCV	T1, T2	CS, D	94	92	NO	118	T1, T2, T3	CS, D	94	T1, T2, T3	CS, D	94	94	94	NO	T1	CS	IE, NO
United States of America	15.27	GCV	T2	CS	91	91	NA, NO	91	T2	CS	91	T2	CS, D	91	91	NA, NO	NA, NO	CS, T2	CS	79

Note: This table includes data from categories 1.A.1 Energy industries, 1.A.2 Manufacturing industries and construction, 1.A.4 Other sectors and 1.A.5 Other.

^a The national total includes indirect CO₂ emissions from the atmospheric oxidation of CH₄, CO and NMVOCs for the following Parties: Bulgaria, Canada, Cyprus, Czechia, Denmark, European Union, Finland, France, Japan, Latvia, Lithuania, Monaco, Netherlands, Norway, Poland, Portugal, Slovakia and Switzerland.^b The following Parties reported energy data on a gross calorific value (GCV) basis: Australia, Canada, Japan, New Zealand and United States of America. Hence, reported IEFs are about 5 per cent lower for liquid and solid fuels and biomass, and about 10 per cent lower for gaseous fuels than would have been the case if the data were given on a net calorific value (NCV) basis.^c Information on methods and emission factors in this table is as reported by Parties in table Summary 3 of the CRF. It may not reflect the actual method or type of emission factor used for all subcategories within the category 1.A.1 Energy industries.^d Information on methods and emission factors in this table is as reported by Parties in table Summary 3 of the CRF. It may not reflect the actual method or type of emission factor used for all subcategories within the category 1.A.2 Manufacturing industries and construction.^e Information on methods and emission factors in this table is as reported by Parties in table Summary 3 of the CRF. It may not reflect the actual method or type of emission factor used for all subcategories within the category 1.A.4 Other sectors.^f Information on methods and emission factors in this table is as reported by Parties in table Summary 3 of the CRF. It may not reflect the actual method or type of emission factor used for all subcategories within the category 1.A.5 Other.

Table 1.4

Stationary combustion: gaseous fuels - CO₂ (2021)

	Share of national total ^a	IEF in CRF based on GCV or NCV ^b	Energy industries							Manufacturing industries and construction			Other sectors							Other		
			Methods and EF used ^c		CO ₂ IEF				Methods and EF used ^d		CO ₂ IEF	Methods and EF used ^e		CO ₂ IEF				Methods and EF used ^f		CO ₂ IEF		
			Methods	EF	Total	Public electricity and heat production	Petroleum refining	Manufacture of solid fuels and other energy industries	Methods	EF	Total	Methods	EF	Total	Commercial / Institutional	Residential	Agriculture / Forestry / Fishing	Methods	EF	Stationary		
																					(t/TJ)	(t/TJ)
Australia	15.03	GCV	T2	CS, PS	51	51	51	51	T2	CS	51	T2, T3	CS	51	51	51	51	T1, T2	CS	NO		
Austria	21.82	NCV	T1, T2	CS, D	56	56	56	56	T1, T2, T3	CS, D	56	D, T1, T2, T3	CS, D	56	56	56	56	T1, T2	CS, D	NO		
Belarus	36.05	NCV	T1, T2	CS, D	54	54	54	NO	T1, T2	CS, D	54	T1, T2	CS, D	54	54	54	54	T1, T2	CS, D	54		
Belgium	29.94	NCV	CS, T1, T3	D, PS	56	56	56	NO	CS, M, T1, T3	CS, D, PS	57	CS, T1, T3	D	57	57	57	57	CS, T1, T3	D	NO		
Bulgaria	9.38	NCV	T1, T2	CS, D	55	55	55	55	T1, T2	CS, D	55	T1, T2	CS, D	55	55	55	55	T1	D	NO		
Canada	31.91	GCV	T2	CS	51	50	50	51	M, T2	CS	50	M, T2	CS	50	50	50	50	M, T2	CS	NO		
Croatia	20.05	NCV	T1, T2	CS, D	56	55	56	56	T1	D	56	T1	D	56	56	56	56	T1	D	NO		
Cyprus	–	–	CS, T1	CS, D	NO	NO	NO	NO	CS, T1	CS, D	NO	T1	D	NO	NO	NO	NO	T1	D	NO		
Czechia	14.73	NCV	T1, T2	CS, D	55	55	55	55	T1, T2	CS, D	55	T1, T2	CS, D	55	55	55	55	T1	D	NO		
Denmark	10.43	NCV	CS, T1, T2, T3	CS, D, PS	56	55	55	55	CR, M, T1, T2, T3	CS, D, PS	55	CR, M, T1, T2, T3	CS, D	55	55	55	55	CR, M, T1, T2	CS, D	–		
Estonia	6.92	NCV	T1, T2, T3	CS, D, PS	55	55	NO	IE, NO	T1, T2, T3	CS, D, PS	55	T1, T2	CS, D	55	55	55	55	–	–	NO		
European Union	21.68	–	–	–	57	57	57	57	–	–	56	–	–	56	56	56	56	–	–	56		
Finland	8.33	NCV	T3	CS, D, PS	55	55	55	NO	T3	CS, D, PS	55	T1, T2, T3	CS, D	55	55	55	55	T2	CS	55		
France	19.69	NCV	T2, T3	CS, PS	56	56	56	NO	T2, T3	CS, PS	56	T1, T2	CS, D	56	56	56	56	–	–	56		
Germany	22.80	NCV	CS	CS	56	56	56	56	CS, T1	CS, D	56	CS, T1, T2, T3	CS, D	56	56	56	56	CS, D, M	CS, D	56		
Greece	15.34	NCV	T1, T2	D, PS	56	56	IE, NO	59	T1, T2	CS, D, PS	56	T1, T2	CS, D	56	56	56	56	T1	D	NO		
Hungary	31.61	NCV	T1, T2, T3	CS, D, PS	56	56	56	56	T1, T2, T3	CS, D, PS	56	T1, T2	CS, D	56	56	56	56	T1, T2	CS, D	56		
Iceland	–	NCV	T2	D	NO	NO	NO	NO	T2	D	NO	T1, T2	CS, D	NO	NO	NO	NO	T1	D	NO		
Ireland	16.35	NCV	T1, T3	CS, D, PS	56	57	10	56	T1, T2, T3	CS, D, PS	56	T1, T2	CS, D	56	56	56	56	–	–	IE, NO		
Italy	35.36	NCV	T3	CS	59	59	59	59	T2	CS	59	T2	CS	59	59	59	59	T2	CS	NO		
Japan	17.88	GCV	T2	CS	51	51	51	51	CS, T2	CS	51	CS, T2	CS	51	51	52	51	–	–	NO		
Kazakhstan	10.34	NCV	T1	D	56	56	NA	56	T1	D	44	T1	D	56	56	56	56	T1	D	56		
Latvia	20.66	NCV	T1, T2	CS, D	56	56	NO	56	T1, T2	CS, D, PS	56	T1, T2	CS, D	56	56	56	56	T1	D	NO		
Liechtenstein	29.31	NCV	T2	CS	56	56	NA, NO	NO	T1, T2	CS, D	56	T1, T2	CS, D	56	56	56	NO	–	–	NO		
Lithuania	12.05	NCV	T1, T2, T3	CS, D, PS	55	55	55	55	T1, T2	CS, D, OTH	55	T1, T2	CS	55	55	55	55	T2	CS	NO		
Luxembourg	16.92	NCV	T2	CS	57	57	NO	NO	T1, T2, T3	CS, D, PS	57	T1, T2	CS, D	57	57	57	57	T1, T2	CS, D	NO		
Malta	34.62	NCV	T2	CS	53	53	NO	NO	T1	D	NO	T1	D	NO	NO	NO	NO	T1	D	NO		
Monaco	15.48	NCV	T1, T2	CS, D	56	56	NO	NO	T2	CS	56	T1, T2	CS, D	56	56	56	56	–	–	NO		
Netherlands	38.39	NCV	CS, T2	CS, D	57	56	56	58	T2	CS, D	56	T1, T2	CS, D	56	56	56	56	T2	CS	NO		
New Zealand	7.90	GCV	T2	CS	50	49	54	53	T2	CS	54	T2	CS	54	54	54	54	–	–	–		
Norway	22.05	NCV	T1, T2, T3	CS, PS	59	58	NO	59	T1, T2, T3	CS, PS	57	T1, T2	CS, PS	56	56	56	56	T2	CS	NO		
Poland	8.66	NCV	T1, T2	CS, D	55	55	55	55	T1, T2	CS, D	55	T1, T2	CS, D	55	55	55	55	–	–	IE		
Portugal	19.50	NCV	T1, T2, T3	CR, D, PS	56	56	56	NO	T1, T2, T3	CR, D, PS	56	T1, T2	CS, D	56	56	56	56	T1	D	NO		
Romania	20.75	NCV	T1, T2, T3	CS, D, PS	56	55	56	56	T1, T2, T3	CS, D, PS	55	T1, T2	CS, D	55	55	55	55	T1, T2	CS, D	NO		
Russian Federation	35.18	NCV	T1, T2	CS, D	54	54	54	54	T1, T2, T3	CS, D	54	T1, T2	CS, D	54	54	54	54	T1, T2	CS, D	54		
Slovakia	22.25	NCV	T2, T3	CS, PS	56	56	56	56	T2	CS	56	T1, T2	CS	56	56	56	56	T1, T2	CS, D	56		
Slovenia	11.19	NCV	T1, T2	CS, D, PS	56	56	NO	56	T1, T2, T3	CS, D, PS	56	T1, T2	CS, D	56	56	56	NO	T1	D	NO		
Spain	22.79	NCV	T1, T2, T3	CS, D, OTH, PS	56	56	56	56	CR, T1, T2, T3	CR, CS, D, PS	56	CR, T1, T2, T3	CR, CS, D, OTH	56	56	56	56	CR, T1, T2	CS, D	IE, NO		
Sweden	3.07	NCV	T2	CS	56	C	C	IE, NO	T1, T2	CS	56	T1, T2	CS	56	56	56	56	–	–	NO		
Switzerland	15.77	NCV	T2, T3	CS	56	56	IE, NO	56	T2, T3	CS, PS	56	T1, T2, T3	CS, D	56	56	56	56	T2, T3	CS	NO		
Türkiye	19.87	NCV	T2, T3	CS, D, PS	55	55	55	NO	T1, T2	CS, D	55	T1, T2	CS, D	55	55	55	55	–	–	–		
Ukraine	16.56	NCV	T1, T2, T3	CS, D	56	56	56	58	T1, T2	CS, D	56	T1, T2	CS, D	56	56	56	56	T1	D	–		
United Kingdom of Great Britain and Northern Ireland	36.30	NCV	T1, T2	CS, D	57	56	56	60	T1, T2, T3	CS, D	56	T1, T2, T3	CS, D	56	56	56	56	T1	CS	IE, NO		
United States of America	26.28	GCV	T2	CS	51	50	52	52	T2	CS	52	T2	CS, D	50	50	50	52	CS, T2	CS	23		

Note: This table includes data from categories 1.A.1 Energy industries, 1.A.2 Manufacturing industries and construction, 1.A.4 Other sectors and 1.A.5 Other.

^a The national total includes indirect CO₂ emissions from the atmospheric oxidation of CH₄, CO and NMVOCs for the following Parties: Bulgaria, Canada, Cyprus, Czechia, Denmark, European Union, Finland, France, Japan, Latvia, Lithuania, Monaco, Netherlands, Norway, Poland, Portugal, Slovakia and Switzerland.

^b The following Parties reported energy data on a gross calorific value (GCV) basis: Australia, Canada, Japan, New Zealand and United States of America. Hence, reported IEFs are about 5 per cent lower for liquid and solid fuels and biomass, and about 10 per cent lower for gaseous fuels than would have been the case if the data were given on a net calorific value (NCV) basis.

^c Information on methods and emission factors in this table is as reported by Parties in table Summary 3 of the CRF. It may not reflect the actual method or type of emission factor used for all subcategories within the category 1.A.1 Energy industries.

^d Information on methods and emission factors in this table is as reported by Parties in table Summary 3 of the CRF. It may not reflect the actual method or type of emission factor used for all subcategories within the category 1.A.2 Manufacturing industries and construction.

^e Information on methods and emission factors in this table is as reported by Parties in table Summary 3 of the CRF. It may not reflect the actual method or type of emission factor used for all subcategories within the category 1.A.4 Other sectors.

^f Information on methods and emission factors in this table is as reported by Parties in table Summary 3 of the CRF. It may not reflect the actual method or type of emission factor used for all subcategories within the category 1.A.5 Other.

Table 1.5

Stationary combustion: other fossil fuels - CO₂ (2021)

	Share of national total ^a	IEF in CRF based on GCV or NCV ^b	Energy industries						Manufacturing industries and construction			Other sectors						Other		
			Methods and EF used ^c		CO ₂ IEF				Methods and EF used ^d		CO ₂ IEF	Methods and EF used ^e		CO ₂ IEF				Methods and EF used ^f		CO ₂ IEF
			Methods	EF	Total	Public electricity and heat production	Petroleum refining	Manufacture of solid fuels and other energy industries	Methods	EF	Total	Methods	EF	Total	Commercial / Institutional	Residential	Agriculture / Forestry / Fishing	Methods	EF	Stationary
Australia	0.02	GCV	T2	CS, PS	47	NO	47	NO	T2	CS	NO	T2, T3	CS	NA, NO	NO	NO	NA, NO	T1, T2	CS	NO
Austria	2.58	NCV	T1, T2	CS, D	46	46	NO	NO	T1, T2, T3	CS, D	77	D, T1, T2, T3	CS, D	74	66	75	75	T1, T2	CS, D	NO
Belarus	-	NCV	T1, T2	CS, D	NO	NO	NO	NO	T1, T2	CS, D	NO	T1, T2	CS, D	NO	NO	NO	NO	T1, T2	CS, D	NO
Belgium	2.53	NCV	CS, T1, T3	D, PS	106	106	63	NO	CS, M, T1, T3	CS, D, PS	83	CS, T1, T3	D	66	66	NO	NO	CS, T1, T3	D	NO
Bulgaria	0.48	NCV	T1, T2	CS, D	NO	NO	NO	NO	T1, T2	CS, D	86	T1, T2	CS, D	NO	NO	NO	NO	T1	D	NO
Canada	0.10	GCV	T2	CS	NO	NO	NO	NO	M, T2	CS	78	M, T2	CS	106	106	NO	NO	M, T2	CS	NO
Croatia	1.10	NCV	T1, T2	CS, D	NO	NO	NO	NO	T1	D	143	T1	D	NO	NO	NO	NO			NO
Cyprus	1.51	NCV	CS, T1	CS, D	NO	NO	NO	NO	CS, T1	CS, D	77	T1	D	33	33	NO	NO	T1	D	33
Czechia	0.68	NCV	T1, T2	CS, D	92	92	NO	NO	T1, T2	CS, D	81	T1, T2	CS, D	NO	NO	NO	NO	T1	D	NO
Denmark	3.83	NCV	CS, T1, T2, T3	CS, D, PS	92	92	NO	NO	CR, M, T1, T2, T3	CS, D, PS	89	CR, M, T1, T2, T3	CS, D	NO	NO	NO	NO	CR, M, T1, T2	CS, D	
Estonia	1.39	NCV	T1, T2, T3	CS, D, PS	190	190	NO	NO	T1, T2, T3	CS, D, PS	80	T1, T2	CS, D	NO	NO	NO	NO			NO
European Union	1.86				81	88	0.94	143			80			95	95	77	98			72
Finland	2.37	NCV	T3	CS, D, PS	74	74	NO	NO	T3	CS, D, PS	85	T1, T2, T3	CS, D	NO	NO	NO	NO	T2	CS	NO
France	2.18	NCV	T2, T3	CS, PS	121	121	50	NO	T2, T3	CS, PS	65	T1, T2	CS, D	74	75	73	74			72
Germany	2.71	NCV	CS	CS	85	85	NO	NO	CS, T1	CS, D	76	CS, T1, T2, T3	CS, D	NO	NO	NO	NO	CS, D, M	CS, D	NO
Greece	0.32	NCV	T1, T2	D, PS	NO	NO	NO	NO	T1, T2	CS, D, PS	87	T1, T2	CS, D	IE, NO	IE, NO	IE, NO	IE, NO	T1	D	NO
Hungary	1.37	NCV	T1, T2, T3	CS, D, PS	109	101	NE	NO	T1, T2, T3	CS, D, PS	76	T1, T2	CS, D	90	90	NO	NO	T1, T2	CS, D	
Iceland	0.15	NCV	T2	D	NO	NO	NO	NO	T2	D	73	T1, T2	CS, D	NO	NO	NO	NO	T1	D	NO
Ireland	1.26	NCV	T1, T3	CS, D, PS	157	157	NO	NO	T1, T2, T3	CS, D, PS	87	T1, T2	CS, D	NO	NO	NO	NO			IE, NO
Italy	1.48	NCV	T3	CS	91	91	NO	NO	T2	CS	81	T2	CS	96	96	NO	NO	T2	CS	NO
Japan	1.61	GCV	T2	CS	46	IE, NO	NO	46	CS, T2	CS	45	CS, T2	CS	33	33	NO	NO			NO
Kazakhstan	-	NCV	T1	D	NA	NA	NA	NA	T1	D	NA	T1	D	NA, NO	NA	NA	NA, NO	T1	D	NA
Latvia	1.32	NCV	T1, T2	CS, D	NO	NO	NO	NO	T1, T2	CS, D, PS	87	T1, T2	CS, D	73	73	NO	73	T1	D	NO
Liechtenstein	0.02	NCV	T2	CS	NA, NO		NA, NO	NO	T1, T2	CS, D	NA, NO	T1, T2	CS, D	69		NO	69			NO
Lithuania	2.32	NCV	T1, T2, T3	CS, D, PS	122	122	NO	NO	T1, T2	CS, D, OTH	104	T1, T2	CS	NO	NO	NO	NO	T2	CS	NO
Luxembourg	2.37	NCV	T2	CS	94	94	NO	NO	T1, T2, T3	CS, D, PS	86	T1, T2	CS, D	73	NO	NO	73	T1, T2	CS, D	NO
Malta	-	NCV	T2	CS	NO	NO	NO	NO	T1	D	NO	T1	D	NO	NO	NO	NO	T1	D	NO
Monaco	27.37	NCV	T1, T2	CS, D	73	73	NO	NO	T2	CS	75	T1, T2	CS, D	75	NO	75	NO			NO
Netherlands	1.60	NCV	CS, T2	CS, D	82	82	NO	NO	T2	CS, D	NO	T1, T2	CS, D	77	77	NO	77	T2	CS	NO
New Zealand	0.10	GCV	T2	CS	NO	NO	NO	NO	T2	CS	64	T2	CS	NO	NO	NO	NO			
Norway	2.10	NCV	T1, T2, T3	CS, PS	48	48	NO	NO	T1, T2, T3	CS, PS	62	T1, T2	CS, PS	79	79		NO	T2	CS	NO
Poland	1.28	NCV	T1, T2	CS, D	101	101	NO	143	T1, T2	CS, D	132	T1, T2	CS, D	103	103	IE, NO	NO			IE
Portugal	1.26	NCV	T1, T2, T3	CR, D, PS	105	105	NO	NO	T1, T2, T3	CR, D, PS	53	T1, T2	CS, D	NO	NO	NO	NO	T1	D	NO
Romania	0.95	NCV	T1, T2, T3	CS, D, PS	NO	NO	NO	NO	T1, T2, T3	CS, D, PS	82	T1, T2	CS, D	92	92	NO	NO	T1, T2	CS, D	NO
Russian Federation	2.51	NCV	T1, T2	CS, D	143	143	143	143	T1, T2, T3	CS, D	143	T1, T2	CS, D	143	143	143	143	T1, T2	CS, D	143
Slovakia	1.20	NCV	T2, T3	CS, PS	84	84	NO	NO	T2	CS	93	T1, T2	CS	NO	NO	NO	NO	T1, T2	CS, D	NO
Slovenia	0.78	NCV	T1, T2	CS, D, PS	92	92	NO	NO	T1, T2, T3	CS, D, PS	58	T1, T2	CS, D	NO	NO	NO	NO	T1	D	NO
Spain	0.81	NCV	T1, T2, T3	CS, D, OTH, PS	63	64	17	NO	CR, T1, T2, T3	CR, CS, D, PS	46	CR, T1, T2, T3	CR, CS, D, OTH	NO	NO	NO	NO	CR, T1, T2	CS, D	NO
Sweden	6.73	NCV	T2	CS	97	97	NO	NO	T1, T2	CS	68	T1, T2	CS	67	75	75	64			NO
Switzerland	6.31	NCV	T2, T3	CS	89	89	NO		T2, T3	CS, PS	77	T1, T2, T3	CS, D				NO	T2, T3	CS	NA, NO
Türkiye	0.34	NCV	T2, T3	CS, D, PS	94	94	NO	NO	T1, T2	CS, D	139	T1, T2	CS, D	NO	NO		NO			
Ukraine	1.23	NCV	T1, T2, T3	CS, D	73	73	NA, NO	73	T1, T2	CS, D	73	T1, T2	CS, D	73	73	73	73	T1	D	NA
United Kingdom of Great Britain and Northern Ireland	1.69	NCV	T1, T2	CS, D	62	62	NO	NO	T1, T2, T3	CS, D	52	T1, T2, T3	CS, D	NO	NO	NO	NO	T1	CS	IE, NO
United States of America	0.20	GCV	T2	CS	6.6	6.6	NO	NO	T2	CS	NO	T2	CS, D	NO	NO	NO	NO	CS, T2	CS	41

Note: This table includes data from categories 1.A.1 Energy industries, 1.A.2 Manufacturing industries and construction, 1.A.4 Other sectors and 1.A.5 Other.

^a The national total includes indirect CO₂ emissions from the atmospheric oxidation of CH₄, CO and NMVOCs for the following Parties: Bulgaria, Canada, Cyprus, Czechia, Denmark, European Union, Finland, France, Japan, Latvia, Lithuania, Monaco, Netherlands, Norway, Poland, Portugal, Slovakia and Switzerland.

^b The following Parties reported energy data on a gross calorific value (GCV) basis: Australia, Canada, Japan, New Zealand and United States of America. Hence, reported IEFs are about 5 per cent lower for liquid and solid fuels and biomass, and about 10 per cent lower for gaseous fuels than would have been the case if the data were given on a net calorific value (NCV) basis.

^c Information on methods and emission factors in this table is as reported by Parties in table Summary 3 of the CRF. It may not reflect the actual method or type of emission factor used for all subcategories within the category 1.A.1 Energy industries.

^d Information on methods and emission factors in this table is as reported by Parties in table Summary 3 of the CRF. It may not reflect the actual method or type of emission factor used for all subcategories within the category 1.A.2 Manufacturing industries and construction.

^e Information on methods and emission factors in this table is as reported by Parties in table Summary 3 of the CRF. It may not reflect the actual method or type of emission factor used for all subcategories within the category 1.A.4 Other sectors.

^f Information on methods and emission factors in this table is as reported by Parties in table Summary 3 of the CRF. It may not reflect the actual method or type of emission factor used for all subcategories within the category 1.A.5 Other.

Table 1.6**Road transportation - CO₂ and N₂O (2021)**

	CO ₂ emissions						N ₂ O emissions					
	Share of national total ^a	Methods and EF used		CO ₂ IEF			Share of national total ^a	Methods and EF used		N ₂ O IEF		
		Methods	EF	IEF in CRF based on GCV or NCV ^b	Gasoline	Diesel oil		Methods	EF	IEF in CRF based on GCV or NCV ^b	Gasoline	Diesel oil
IPCC default EF ^c				NCV	69.3 (67.5 to 73.0)	74.1 (72.6 to 74.8)				NCV	8.0 (0.96 to 24)	3.9 (1.3 to 12)
Australia	14.91	T2	CS, D	GCV	67	70	0.16	T1, T3	CS, D	GCV	3.5	1.6
Austria	27.29	T1, T2	CS, D	NCV	75	74	0.28	T3	CS	NCV	0.45	3.3
Belarus	10.51	T2	CS	NCV	72	74	0.15	T1	D	NCV	3.2	3.9
Belgium	20.47	M, T2	CS, M	NCV	72	74	0.20	M, T3	CS, M	NCV	0.49	3.1
Bulgaria	17.85	T1, T2	CR, D	NCV	72	75	0.15	T2	CR	NCV	1.5	2.4
Canada	17.10	M, T2	CS	GCV	69	70	0.19	M, T3	CS	GCV	1.7	3.9
Croatia	24.46	T1	D	NCV	69	74	0.21	T1, T3	CR, D	NCV	1.1	2.7
Cyprus	23.44	T1, T2	D, M	NCV	72	75	0.13	T1, T2	D, M	NCV	0.59	2.1
Czechia	15.49	T2	M	NCV	67	73	0.15	T3	M	NCV	0.84	2.9
Denmark	24.95	CR, M, T1, T2	CS, D	NCV	73	74	0.25	CR, M, T1, T3	CR, D, OTH	NCV	0.65	3.5
Estonia	17.88	T2	CS	NCV	70	73	0.16	T3	CS	NCV	0.71	2.8
European Union	21.31				73	74	0.20				0.74	3.1
Finland	19.61	T2	CS	NCV	72	73	0.15	T3	CR	NCV	0.68	2.3
France	28.04	T3	M	NCV	75	75	0.26	T3	M	NCV	0.89	2.9
Germany	18.69	CS, M, T1, T2, T3	CS, D	NCV	75	74	0.18	CS, M, T2, T3	CS, M	NCV	0.33	3.6
Greece	18.48	T1, T2, T3	CS, D	NCV	73	73	0.13	M, T1, T2	D, M	NCV	1.6	2.2
Hungary	21.26	T1, T2	CS, D	NCV	72	74	0.20	T1, T3	D, M	NCV	1.1	3.0
Iceland	18.27	T1, T2	CS, D	NCV	73	74	0.15	T3	D	NCV	0.51	2.8
Ireland	16.45	T2, T3	CS, M	NCV	70	73	0.16	T3	M	NCV	0.62	3.0
Italy	22.75	T2	CS, M	NCV	73	74	0.19	T3	M	NCV	0.89	2.8
Japan	13.71	T2	CS	GCV	68	69	0.10	T3	CS, D	GCV	0.95	2.9
Kazakhstan	6.16	T1	D	NCV	69	74	0.10	T1	D	NCV	3.2	5.2
Latvia	28.86	T1, T2	CS, D	NCV	71	75	0.26	T1, T3	CR, D, M	NCV	0.82	2.7
Liechtenstein	30.16	T2	CS	NCV	74	73	0.26	T2	CS, D	NCV	0.68	3.6
Lithuania	28.79	T1, T2	CS, D	NCV	70	73	0.24	T1, T3	CR, D	NCV	0.58	2.5
Luxembourg	51.74	T1, T2	CS, D	NCV	73	74	0.51	T3	M	NCV	0.38	3.0
Malta	25.94	T1	D, M	NCV	69	74	0.14	T3	M	NCV	0.71	1.9
Monaco	22.11	T2	CS	NCV	72	74	0.40	T2	CS, D	NCV	3.9	3.9
Netherlands	14.48	T1, T2	CS	NCV	72	72	0.11	T1, T2	CS	NCV	0.75	2.9
New Zealand	16.34	T2	CS	GCV	67	69	0.11	T3	CS	GCV	1.3	1.7
Norway	17.38	T2	CS	NCV	71	74	0.17	T2	CS	NCV	0.46	2.8
Poland	16.62	T2	D	NCV	72	74	0.16	T3	D	NCV	0.87	3.2
Portugal	26.85	T2	OTH	NCV	72	74	0.25	OTH, T3	CR, OTH	NCV	1.3	2.5
Romania	16.08	T1, T3	D, OTH	NCV	72	74	0.17	T1, T3	D, OTH	NCV	1.5	2.9
Russian Federation	6.87	T1, T2	CS, D	NCV	73	74	0.04	T1, T2, T3	CS, D	NCV	1.4	2.1
Slovakia	17.51	T2	CS, D	NCV	70	74	0.17	T3	CS, D	NCV	0.80	3.1
Slovenia	31.81	M	M	NCV	71	74	0.32	M	M	NCV	0.70	3.1
Spain	27.45	CR	CR, CS	NCV	75	74	0.27	CR	CR	NCV	0.90	3.3
Sweden	29.27	T2	CS	NCV	72	72	0.33	M, T1, T2	CS, D	NCV	0.33	4.9
Switzerland	29.64	T2	CS	NCV	74	73	0.25	T3	CS	NCV	0.68	3.6
Türkiye	15.01	T1, T2	CS, D	NCV	69	72	0.25	T1	D	NCV	8.0	3.9
Ukraine	7.44	T1, T2	CS, D	NCV	72	74	0.13	T1	D	NCV	5.6	3.9
United Kingdom of Great Britain and Northern Ireland	23.20	OTH, T1, T3	CS, OTH	NCV	70	74	0.20	T3	CR, CS	NCV	0.64	3.3
United States of America	22.97	CS, M, T2	CS	GCV	67	70	0.15	M, T3	CS, M	GCV	1.5	2.0

^a The national total includes indirect CO₂ emissions from the atmospheric oxidation of CH₄, CO and NMVOCs for the following Parties: Bulgaria, Canada, Cyprus, Czechia, Denmark, European Union, Finland, France, Japan, Latvia, Lithuania, Monaco, Netherlands, Norway, Poland, Portugal, Slovakia and Switzerland.

^b The following Parties reported energy data on a gross calorific value (GCV) basis: Australia, Canada, Japan, New Zealand and United States of America. Hence, reported IEFs are about 5 per cent lower for liquid and solid fuels and biomass, and about 10 per cent lower for gaseous fuels than would have been the case if the data were given on a net calorific value (NCV) basis.

^c Source of default emission factors: 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 2 Chapter 3 Mobile Combustion. CO₂ table 3.2.1; N₂O table 3.2.2.

Table 1.7**Domestic aviation and navigation - CO₂ (2021)**

	Methods and EF used		Domestic aviation			Domestic navigation		
			Share of national total ^a	CO ₂ IEF		Share of national total ^a	CO ₂ IEF	
	Methods	EF		Jet kerosene	Aviation gasoline		Residual fuel oil	Gas/diesel oil
IPCC default EF ^b				71.5 (69.8 to 74.4)	70 (67.5 to 73.0)		77.4 (75.5 to 78.8)	74.1 (72.6 to 74.8)
Australia	T2	CS	1.26	70	67	0.36	74	70
Austria	T1, T2, T3	CS, D	0.03	73	74	0.05	NO	74
Belarus	T1, T2	CS, D	0.05	72	IE	0.00	NO	74
Belgium	T1, T3	CS, D	0.01	72	72	0.35	IE	75
Bulgaria	T1, T2	D	0.03	72	69	0.01	NO	74
Canada	M, T2	CS	0.80	68	69	0.61	74	70
Croatia	T1	D	0.09	72	70	0.61	NO	74
Cyprus	T1	D	0.00	71	NO	0.03	NO	74
Czechia	T1, T2	D, M	0.01	73	70	0.01	NO	74
Denmark	CR, M, T1, T2	CS, D	0.26	72	73	1.37	78	74
Estonia	T2	CS, D	0.04	NO	71	0.14	NO	73
European Union			0.28	73	71	0.45	78	74
Finland	T1, T2	CS	0.17	73	71	0.74	78	73
France	T1, T3	CS, M	0.91	73	71	0.34	78	75
Germany	CS, M, T1, T2	CS, D, M	0.10	73	71	0.19	77	74
Greece	T1, T2, T3	CS, D	0.41	71	69	2.37	78	77
Hungary	T1, T2	CS, D	0.01	73	70	0.01	NO	74
Iceland	T1, T2	CS, D	0.44	72	70	0.37	NO	74
Ireland	M, T2, T3	CS	0.03	71	71	0.60	NO	73
Italy	T1, T2	CS	0.41	72	70	1.09	77	74
Japan	T2	CS	0.58	68	68	0.88	IE	69
Kazakhstan	T1, T2	D	0.06	7.1	69	0.00	NO	74
Latvia	T1, T2	CS, D	0.04	72	70	0.07	NO	75
Liechtenstein	T1	CS	0.03	73	NO	–	NO	NO
Lithuania	T1	CS	0.01	72	71	0.06	NO	73
Luxembourg	T1, T2	CS, D	0.01	NO	70	0.01	NO	74
Malta	T1	D	0.01	72	70	3.20	NO	74
Monaco	T1, T2	CS, D	0.63	71	NO	1.40	NO	75
Netherlands	T1, T2	CS, D	0.02	72	72	0.46	NO	72
New Zealand	T2	CS	1.06	68	66	0.26	73	NO
Norway	T1, T2	CS, D, PS	1.64	73	71	5.39	NO	74
Poland	T1	D	0.01	72	70	0.01	NO	74
Portugal	T1, T2, T3	D	0.60	72	70	0.37	77	74
Romania	T1, T2	CS, D, OTH	0.12	72	70	0.14	NO	73
Russian Federation	T1, T1b	D	0.73	72	IE	0.14	77	74
Slovakia	T1, T3	CS, D	0.00	73	69	0.01	NO	74
Slovenia	T1	D	0.01	72	70	0.00	NO	74
Spain	T1, T2, T3	CS, D	0.75	73	71	0.97	78	74
Sweden	T1, T2	CS, D	0.40	71	70	1.26	78	73
Switzerland	T2, T3	CS	0.13	73	NO	0.24	NO	73
Türkiye	T2	CS, D	0.50	71	IE	0.20	77	72
Ukraine	T1, T2, T3	CS, D, OTH	0.06	72	70	0.03	NO	74
United Kingdom of Great Britain and Northern Ireland	T2, T3	CS	0.21	72	70	1.13	76	75
United States of America	M, T2	CS	2.22	68	66	0.65	71	68

^a The national total includes indirect CO₂ emissions from the atmospheric oxidation of CH₄, CO and NMVOCs for the following Parties: Bulgaria, Canada, Cyprus, Czechia, Denmark, European Union, Finland, France, Japan, Latvia, Lithuania, Monaco, Netherlands, Norway, Poland, Portugal, Slovakia and Switzerland.

^b Source of default emission factors: 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 2 Chapter 3 Mobile Combustion. Table 3.6.4 for Jet kerosene, Aviation gasoline; table 3.5.2 for Residual oil Gas/diesel oil.

Table 1.8

Domestic and international aviation - activity data (2021)

	Domestic aviation						International aviation						Total jet kerosene and aviation gasoline		
	Jet kerosene			Aviation gasoline			Jet kerosene			Aviation gasoline					
	CRF	IEA ^{a, b, d}	Difference	CRF	IEA ^{a, c, d}	Difference	CRF	IEA ^{a, b, d}	Difference	CRF	IEA ^{a, c, d}	Difference	CRF	IEA ^{a, b, c, d}	Difference
	(TJ)		(%)	(TJ)		(%)	(TJ)		(%)	(TJ)		(%)	(TJ)		(%)
Australia	93 340	97 482	4.44	1 996	1 905	-4.57	168 935	162 018	-4.09	NO	0	–	264 271	261 405	-1.08
Austria	243	596	145.62	85	89	5.32	16 913	16 764	-0.88	NO	0	–	17 240	17 449	1.21
Belarus	701		–	IE		–	4 657		–	NO		–	5 358		–
Belgium	90	108	18.86	25	18	-30.10	63 532	61 726	-2.84	1.5	0	–	63 649	61 852	-2.82
Bulgaria	189	202	6.85	10	10	-0.01	6 861	6 861	0.00	NO	0	–	7 060	7 073	0.18
Canada	75 985	72 671	-4.36	2 018	1 912	-5.24	95 577	91 409	-4.36	29	27	-5.20	173 608	166 020	-4.37
Croatia	290	290	0.00	22	22	0.00	4 115	4 115	0.00	NO	0	–	4 427	4 427	0.00
Cyprus	4.9	67	1 255.31	NO	0	–	7 761	6 602	-14.94	NO	0	–	7 766	6 669	-14.13
Czechia	87	2 021	2 233.72	88	88	0.48	5 153	5 117	-0.69	NO	0	–	5 327	7 226	35.65
Denmark	1 637	730	-55.39	30	27	-10.17	17 478	17 687	1.19	NO	0	–	19 145	18 444	-3.66
Estonia	NO	78	–	78	0	–	1 802	1 802	0.00	NO	0	–	1 880	1 880	0.00
European Union	131 811	176 868	34.18	2 100	2 357	12.26	945 476	895 404	-5.30	295	20	-93.18	1 079 682	1 074 649	-0.47
Finland	1 052	1 032	-1.93	31	44	44.12	11 258	11 524	2.37	NO	0	–	12 341	12 600	2.10
France	51 326	50 541	-1.53	687	853	24.23	115 406	112 898	-2.17	207	0	–	167 626	164 292	-1.99
Germany	9 855	10 406	5.59	146	176	20.72	247 665	253 141	2.21	13	0	–	257 679	263 723	2.35
Greece	4 401	6 253	42.09	87	86	-1.79	35 147	29 144	-17.08	16	16	-1.79	39 651	35 499	-10.47
Hungary	35	0	–	43	44	3.1	5 146	5 117	-0.56	1.6	0	–	5 225	5 161	-1.23
Iceland	279	272	-2.49	11	11	-0.67	5 765	5 621	-2.49	NO	0	–	6 056	5 905	-2.49
Ireland	238	86	-64.09	32	0	–	18 425	18 113	-1.70	NO	0	–	18 696	18 198	-2.66
Italy	23 659	25 486	7.72	168	232	38.50	69 385	62 397	-10.07	NO	0	–	93 211	88 115	-5.47
Japan	99 885	95 821	-4.07	80	79	-0.84	174 676	167 568	-4.07	NO	0	–	274 641	263 468	-4.07
Kazakhstan	10 909	6 606	-39.44	1 637	272	-83.39	9 292	20 860	124.49	NO	0	–	21 838	27 738	27.02
Latvia	45	11	-74.5	14	11	-18.60	3 277	3 259	-0.54	NO	0	–	3 336	3 282	-1.61
Liechtenstein	0.84		–	NO		–	13		–	NO		–	14		–
Lithuania	13	13	-0.77	18	18	-2.21	2 588	2 571	-0.64	NO	0	–	2 619	2 602	-0.65
Luxembourg	NO	0	–	8.5	10	21.5	26 110	26 047	-0.24	0.95	0	–	26 120	26 057	-0.24
Malta	1	28	3 478.06	1.4	1.4	0.07	3 465	3 231	-6.76	0.40	1.4	252.62	3 467	3 262	-5.93
Monaco	6.5		–	NO		–	23		–	NO		–	29		–
Netherlands	323	319	-1.15	52	52	0.00	101 992	100 826	-1.14	NO	0	–	102 367	101 197	-1.14
New Zealand	11 669	11 227	-3.79	310	292	-5.68	13 413	12 905	-3.78	NO	0.088	–	25 391	24 425	-3.81
Norway	10 967	10 996	0.27	96	96	0.24	7 022	7 041	0.27	0.009	0	–	18 084	18 133	0.27
Poland	586	1 090	85.93	167	167	0.00	24 277	23 605	-2.77	NO	1.1	–	25 030	24 863	-0.67
Portugal	4 741	5 000	5.47	16	52	225.30	27 876	27 618	-0.93	36	0	–	32 669	32 671	0.00
Romania	1 893	1 914	1.09	63	63	0.00	3 445	3 482	1.09	NO	0	–	5 400	5 459	1.08
Russian Federation	220 000		–	IE		–	95 483		–	NO		–	315 483		–
Slovakia	16	0	–	1.5	0	–	894	946	5.79	1.9	0	–	914	946	3.51
Slovenia	3.3	0	–	20	20	1.06	372	442	18.95	NO	0	–	395	462	17.05
Spain	29 651	67 720	128.40	177	204	15.48	113 248	75 412	-33.41	17	2.0	-88.09	143 092	143 339	0.17
Sweden	2 619	2 876	9.84	34	69	103.37	13 793	14 957	8.44	NO	0	–	16 446	17 903	8.86
Switzerland	811	1 418	74.89	NO	140	–	31 847	32 296	1.41	IE	0	–	32 657	33 853	3.66
Türkiye	39 926	38 502	-3.56	IE	0	–	116 377	112 229	-3.56	NO	0	–	156 303	150 731	-3.56
Ukraine	1 224	0	–	1 432	0	–	17 494	0	–	NO	0	–	20 151	0	–
United Kingdom of Great Britain and Northern Ireland	12 022	14 758	22.76	498	42	-91.52	183 147	196 069	7.06	0.47	561	118 340.56	195 667	211 430	8.06
United States of America	2 051 709	1 966 850	-4.14	22 710	20 689	-8.90	761 190	843 074	10.76	NA	0	–	2 835 609	2 830 613	-0.18

^a Based on IEA data from the IEA (2023) World energy balances data service, www.iea.org/data-and-statistics as of 8 June 2023.^b UNFCCC has included the quantities reported in IEA for 'kerosene type jet fuel' and 'gasoline type jet fuel'.^c UNFCCC has included the quantities reported in IEA for 'aviation gasoline' and 'motor gasoline'.^d Geographical coverage of IEA data:

IEA data for Australia excludes the overseas territories. IEA data for 2020 is shown in the table for Australia.

IEA data for Denmark do not include Faroe Islands and Greenland.

IEA data for France includes Monaco and excludes the overseas territories: New Caledonia; French Polynesia; Saint Barthélemy; Saint Martin; Saint Pierre and Miquelon; and Wallis and Futuna. Energy data for the following overseas departments: Guadeloupe; French Guiana; Martinique; Mayotte; and Réunion are included for the years from 2011 onwards and excluded for earlier years.

IEA data for Italy includes San Marino and the Holy See.

IEA data for Japan includes Okinawa.

No IEA data for Liechtenstein are available. Only the oil data are included in the data for Switzerland.

IEA data for Netherlands excludes Suriname, Aruba and the other former Netherlands Antilles (Bonaire, Curaçao, Saba, Saint Eustatius and Sint Maarten).

IEA data for Portugal includes the Azores and Madeira.

No IEA data for Russian Federation and Belarus are available for 2021 as of 8 June 2023.

IEA data for Spain includes the Canary Islands.

Table 1.9

Domestic and international navigation - activity data (2021)

	Domestic Navigation						International Navigation						Total					
	Residual fuel oil			Gas / diesel oil			Residual fuel oil			Gas / diesel oil			Residual fuel oil			Gas / diesel oil		
	CRF	IEA ^{a,b}	Difference	CRF	IEA ^{a,b}	Difference	CRF	IEA ^{a,b}	Difference	CRF	IEA ^{a,b}	Difference	CRF	IEA ^{a,b}	Difference	CRF	IEA ^{a,b}	Difference
	(TJ)		(%)	(TJ)		(%)	(TJ)		(%)	(TJ)		(%)	(TJ)		(%)	(TJ)		(%)
Australia	5 402	5 364	-0.70	10 677	13 452	25.99	24 609	24 437	-0.70	4 570	4 269	-6.58	30 011	29 801	-0.70	15 247	17 722	16.23
Austria	NO	0	–	385	1 194	210.15	NO	0	–	823	808	-1.80	NO	0	–	1 208	2 002	65.72
Belarus	NO	–	–	30	–	–	NO	–	–	NO	–	–	NO	–	–	30	–	–
Belgium	IE	24	–	5 160	5 197	0.72	268 801	250 004	-6.99	63 963	63 806	-0.24	268 801	250 028	-6.98	69 122	69 003	-0.17
Bulgaria	NO	0	–	60	14	-76.82	1 052	1 052	0.00	2 471	2 494	0.92	1 052	1 052	0.00	2 531	2 508	-0.92
Canada	5 829	16 596	184.73	52 394	37 794	-27.87	26 528	6 754	-74.54	51 295	2 334	-95.45	32 357	23 350	-27.84	103 689	40 127	-61.30
Croatia	NO	0	–	2 003	2 003	0.00	177	177	0.00	820	820	0.00	177	177	0.00	2 823	2 823	0.00
Cyprus	NO	0	–	35	35	-0.41	5 677	5 715	0.68	4 873	4 852	-0.42	5 677	5 715	0.68	4 908	4 888	-0.42
Czechia	NO	0	–	173	170	-1.43	NO	0	–	NO	0	–	NO	0	–	173	170	-1.43
Denmark	2 073	825	-60.19	6 039	4 911	-18.69	3 331	4 436	33.18	15 978	15 271	-4.42	5 404	5 261	-2.65	22 017	20 182	-8.33
Estonia	NO	0	–	250	251	0.71	6 868	7 000	1.92	4 780	4 814	0.71	6 868	7 000	1.92	5 029	5 065	0.71
European Union	59 971	47 032	-21.57	126 879	102 204	-19.45	1 218 702	1 192 107	-2.18	433 241	470 305	8.55	1 278 673	1 239 140	-3.09	560 120	572 509	2.21
Finland	168	160	-4.61	2 482	2 736	10.24	7 279	7 320	0.56	4 154	4 260	2.55	7 447	7 480	0.44	6 636	6 996	5.42
France	893	411	-54.04	6 861	6 711	-2.19	38 705	35 757	-7.62	8 730	8 520	-2.41	39 598	36 168	-8.66	15 592	15 231	-2.31
Germany	392	0	–	18 955	15 251	-19.54	28 031	28 200	0.60	21 454	30 161	40.58	28 423	28 200	-0.79	40 409	45 412	12.38
Greece	12 676	12 449	-1.80	10 946	11 593	5.92	60 134	59 216	-1.53	15 770	16 338	3.60	72 810	71 665	-1.57	26 716	27 931	4.55
Hungary	NO	0	–	128	128	-0.33	NE	0	–	NE	0	–	NO	0	–	128	128	-0.33
Iceland	NO	0	–	235	234	-0.68	141	139	-0.99	1 514	1 504	-0.68	141	139	-0.99	1 749	1 737	-0.68
Ireland	NO	0	–	5 050	4 968	-1.64	282	273	-2.99	6 911	6 798	-1.64	282	273	-2.99	11 961	11 765	-1.64
Italy	23 212	13 172	-43.26	33 039	9 356	-71.68	66 860	74 639	11.63	6 187	29 773	381.22	90 073	87 810	-2.51	39 226	39 129	-0.25
Japan	IE	81 722	–	4 143	48 939	1 081.24	IE	200 753	–	790	2 137	170.49	IE	282 475	–	4 933	51 076	935.38
Kazakhstan	NO	0	–	60	263	339.40	33	0	–	34	11	-66.34	33	0	–	94	274	192.70
Latvia	NO	0	–	98	98	0.37	439	433	-1.41	8 542	8 263	-3.27	439	433	-1.41	8 640	8 361	-3.23
Liechtenstein	NO	–	–	NO	–	–	NO	–	–	NO	–	–	NO	–	–	NO	–	–
Lithuania	NO	0	–	169	166	-1.69	3 406	3 428	0.65	4 480	4 447	-0.73	3 406	3 428	0.65	4 649	4 614	-0.76
Luxembourg	NO	0	–	8.9	3.4	-61.34	NO	0	–	0.17	0	–	NO	0	–	9.1	3.4	-62.07
Malta	NO	0	–	906	938	3.57	64 911	64 911	0.00	16 284	16 284	0.00	64 911	64 911	0.00	17 190	17 223	0.19
Monaco	NO	–	–	11	–	–	NO	–	–	114	–	–	NO	–	–	125	–	–
Netherlands	NO	0	–	9 793	9 755	-0.39	378 502	369 487	-2.38	79 616	82 148	3.18	378 502	369 487	-2.38	89 409	91 903	2.79
New Zealand	2 753	909	-66.98	NO	4 084	–	1 489	1 443	-3.09	3 247	3 067	-5.56	4 242	2 352	-44.55	3 247	7 151	120.21
Norway	NO	848	–	33 570	47 745	42.23	860	848	-1.48	10 722	9 918	-7.49	860	1 695	97.04	44 292	57 663	30.19
Poland	NO	0	–	381	46	-87.81	2 573	2 547	-0.99	12 048	11 936	-0.93	2 573	2 547	-0.99	12 429	11 982	-3.60
Portugal	1 932	1 800	-6.87	777	1 167	50.15	21 524	21 518	-0.03	6 509	6 007	-7.72	23 457	23 318	-0.59	7 287	7 174	-1.55
Romania	NO	0	–	2 159	2 161	0.08	NO	0	–	1 420	1 421	0.08	NO	0	–	3 579	3 582	0.08
Russian Federation	10 997	–	–	8 605	–	–	235 147	–	–	39 106	–	–	246 144	–	–	47 712	–	–
Slovakia	NO	0	–	78	0	–	NO	0	–	230	0	–	NO	0	–	308	0	–
Slovenia	NO	0	–	0.74	0	–	3 132	3 052	-2.53	510	510	0.00	3 132	3 052	-2.53	511	510	-0.14
Spain	16 337	16 088	-1.53	20 635	21 551	4.44	185 912	183 074	-1.53	117 147	116 559	-0.50	202 249	199 162	-1.53	137 782	138 110	0.24
Sweden	2 285	2 104	-7.92	3 026	1 799	-40.53	72 732	69 867	-3.94	30 625	34 014	11.06	75 017	71 972	-4.06	33 651	35 813	6.42
Switzerland	NO	0	–	992	1 007	1.55	NO	0	–	228	143	-37.39	NO	0	–	1 220	1 150	-5.74
Türkiye	815	806	-1.07	14 576	14 329	-1.69	12 036	11 284	-6.25	13 084	12 803	-2.15	12 851	12 090	-5.92	27 660	27 132	-1.91
Ukraine	NO	0	–	1 116	74	-93.34	NO	0	–	583	0	–	NO	0	–	1 699	74	-95.62
United Kingdom of Great Britain and Northern Ireland	7 023	0	–	52 387	23 138	-55.83	57 214	23 879	-58.26	58 717	56 736	-3.37	64 238	23 879	-62.83	111 104	79 874	-28.11
United States of America	335 580	21 507	-93.59	254 382	155 959	-38.69	308 390	488 511	58.41	105 595	235 507	123.03	643 970	510 018	-20.80	359 977	391 465	8.75

^a Based on IEA data from the IEA (2023) World energy balances data service, www.iea.org/data-and-statistics as of 8 June 2023.

^b Geographical coverage of IEA data:

IEA data for Australia excludes the overseas territories. IEA data for 2020 is shown in the table for Australia.

IEA data for Denmark do not include Faroe Islands and Greenland.

IEA data for France includes Monaco and excludes the overseas territories: New Caledonia; French Polynesia; Saint Barthélemy; Saint Martin; Saint Pierre and Miquelon; and Wallis and Futuna. Energy data for the following overseas departments: Guadeloupe; French Guiana; Martinique; Mayotte; and Réunion are included for the years from 2011 onwards and excluded for earlier years.

IEA data for Italy includes San Marino and the Holy See.

IEA data for Japan includes Okinawa.

No IEA data for Liechtenstein are available. Only the oil data are included in the data for Switzerland.

IEA data for Netherlands excludes Suriname, Aruba and the other former Netherlands Antilles (Bonaire, Curaçao, Saba, Saint Eustatius and Sint Maarten).

IEA data for Portugal includes the Azores and Madeira.

No IEA data for Russian Federation and Belarus are available for 2021 as of 8 June 2023.

IEA data for Spain includes the Canary Islands.

Table 1.10**Fugitive emissions from fuels: coal mining and handling - CH₄ (2021)**

	Share of national total ^a	Methods and EF used		Activity data					CH ₄ IEF			
				CRF			IEA ^{b, c}		Underground mines		Surface mines	
		Methods	EF	Underground mines	Surface mines	Total	Total	Difference	Mining activities	Post-mining activities	Mining activities	Post-mining activities
				(Mt)					(kg/t)			
IPCC default EF ^d	(%)							(%)	12.06 (6.70-16.75)	1.68 (0.60-2.68)	0.8 (0.20-1.34)	0.07 (0-0.13)
Australia	4.75	T2, T3	CS, PS	107	498	605	493	-18.52	5.7	0.37	0.66	IE, NA
Austria	-			NO	NO	NO	0	-	NO	NO	NO	NO
Belarus	-			NO	NO	NO		-	NO	NO	NO	NO
Belgium	0.04	D	D	NO	NO	NO	0	-	NO	NO	NO	NO
Bulgaria	1.63	T1, T2	CS, D	NO	28	28	28	0.00	NO	NO	0.80	0.067
Canada	0.18	CS	CS	NO	60	60	48	-20.34	NO	IE, NO	0.75	IE, NO
Croatia	-			NO	NO	NO	0	-	NO	NO	NO	NO
Cyprus	-			NO	NO	NO	0	-	NO	NO	NO	NO
Czechia	1.58	T1, T2	CS, D	2.3	29	32	31	-0.26	8.1	1.7	1.3	0.067
Denmark	-			NO	NE, NO	NE, NO	0	-	NO	NO	NE, NO	NE, NO
Estonia	-			NO	NO	NO	0	-	NO	NO	NO	NO
European Union	0.73			61	271	332	332	-0.02	7.1	1.6	0.48	0.031
Finland	-			NO	NO	NO	0	-	NO	NO	NO	NO
France	0.00	T2, T3	CS, PS	NO	NO	NO	0	-	NO	NO	NO	NO
Germany	0.01	T2, T3	CS	NO	126	126	126	0.00	NO	NA, NO	0.011	IE, NA
Greece	0.39	T1	D	NO	12	12	12	0.00	NO	NO	0.87	IE, NO
Hungary	0.05	T1, T2	CS, D	NO	5.0	5.0	5.0	0.00	NO	NO	0.001	0.000
Iceland	-			NO	NO	NO	0	-	NO	NO	NO	NO
Ireland	0.03	T1	D	NO	NO	NO	0	-	NO	NO	NO	NO
Italy	0.00	T2	D	NO	NO	NO	0	-	NO	NO	NO	NO
Japan	0.04	T1, T2, T3	CS, D	0.47	0.39	0.86	0.66	-23.37	1.8	1.7	0.80	0.067
Kazakhstan	2.28	T1	D	8.2	98	107	107	0.80	17	2.7	1.3	0.13
Latvia	-			NO	NO	NO	0	-	NO	NO	NO	NO
Liechtenstein	-			NO	NO	NO		-	NO	NO	NO	NO
Lithuania	-			NO	NO	NO	0	-	NO	NO	NO	NO
Luxembourg	-			NO	NO	NO	0	-	NO	NO	NO	NO
Malta	-						0	-				
Monaco	-			NO	NO	NO		-	NO	NO	NO	NO
Netherlands	-			NO	NO	NO	0	-	NO	NO	NO	NO
New Zealand	0.08	T1	D	NO	5.7	5.7	2.9	-50.00	NO	NO	0.40	0.034
Norway	0.16	T2	CS	0.12	0.12	0.24	0.12	-49.68	7.2	IE, NO	0.54	IE, NO
Poland	3.93	T1, T2	D	55	52	107	107	0.00	7.3	1.7	0.80	0.067
Portugal	0.03	NO	NO	NO	NO	NO	0	-	NO	NO	NO	NO
Romania	5.16	T1, T2	D	0.25	17	18	18	0.00	12	1.7	0.80	0.067
Russian Federation	3.25	T1, T2	CS, D	113	326	439		-	12	2.1	3.7	0.13
Slovakia	0.52	T2	CS	1.1	NO	1.1	1.1	-0.01	5.7	0.60	NO	NO
Slovenia	1.24	T2, T3	CS, D, PS	2.6	NO	2.6	2.6	0.00	2.0	0.67	NO	NO
Spain	0.01	CS, T2	CS	NO	NO	NO	0	-	NO	NO	NO	NO
Sweden	-			NO	NO	NO	0	-	NO	NO	NO	NO
Switzerland	-			NO	NO	NO	0	-	NO	NO	NO	NO
Türkiye	1.15	T1	D	13 477	73	13 550	86	-99.36	0.012	0.002	0.80	0.067
Ukraine	3.35	T1, T2, T3	CS, D, M	40		40	16	-61.28	11	1.2		
United Kingdom of Great Britain and Northern Ireland	0.12	T2, T3	CS	0.094	1.2	1.3	1.1	-18.55	13	1.2	0.34	IE, NO
United States of America	0.80	T2, T3	CS	200	323	523	523	0.00	9.1	0.85	0.63	0.14

^a The national total includes indirect CO₂ emissions from the atmospheric oxidation of CH₄, CO and NMVOCs for the following Parties: Bulgaria, Canada, Cyprus, Czechia, Denmark, European Union, Finland, France, Japan, Latvia, Lithuania, Monaco, Netherlands, Norway, Poland, Portugal, Slovakia and Switzerland.

^b Based on IEA data from the IEA (2023) World energy balances data service, www.iea.org/data-and-statistics as of 8 June 2023.

^c Geographical coverage of IEA data:

IEA data for Australia excludes the overseas territories. IEA data for 2020 is shown in the table for Australia.

IEA data for Denmark do not include Faroe Islands and Greenland.

IEA data for France includes Monaco and excludes the overseas territories: New Caledonia; French Polynesia; Saint Barthélemy; Saint Martin; Saint Pierre and Miquelon; and Wallis and Futuna. Energy data for the following overseas departments: Guadeloupe; French Guiana; Martinique; Mayotte; and Réunion are included for the years from 2011 onwards and excluded for earlier years.

IEA data for Italy includes San Marino and the Holy See.

IEA data for Japan includes Okinawa.

No IEA data for Liechtenstein are available. Only the oil data are included in the data for Switzerland.

IEA data for Netherlands excludes Suriname, Aruba and the other former Netherland Antilles (Bonaire, Curaçao, Saba, Saint Eustatius and Sint Maarten).

IEA data for Portugal includes the Azores and Madeira.

No IEA data for Russian Federation and Belarus are available for 2021 as of 8 June 2023.

IEA data for Spain includes the Canary Islands.

^d Source of default emission factors: 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 2 Chapter 4 Fugitive Emissions, pages 4.12 to 4.19. (Tier 1).

Table 1.11a

Fugitive emissions from fuels: oil and natural gas, including venting and flaring - CH₄ and CO₂ (2021)

	CH ₄			CO ₂		
	Share of national total ^a	Methods and EF used		Share of national total ^a	Methods and EF used	
		Methods	EF		Methods	EF
	(%)			(%)		
Australia	1.34	T1, T2	CS, D, PS	2.82	T1, T2, T3	CR, CS, D, PS
Austria	0.32	T1, T2	CS, D	0.11	T1, T2	CS, D
Belarus	3.05	CS, T1	CS, D	0.01	T1	D
Belgium	0.46	CS, D, T1	CS, D	0.09	T1, T3	D, PS
Bulgaria	0.56	T1	D	1.00	T1	D
Canada	5.47	CS	CS	2.56	CS	CS
Croatia	0.67	T1	D	1.16	CS, T1	CS, D
Cyprus	–			–		
Czechia	0.57	T1, T2	CS, D	0.00	T1, T2	CS, D
Denmark	0.13	T1, T2, T3	CS, D, OTH, PS	0.24	T1, T2, T3	CS, D, PS
Estonia	0.18	T1	D	0.00	T1	D
European Union	0.49			0.36		
Finland	0.06	CS, T1, T2	CS, D, PS	0.14	CS	CS
France	0.22	T1, T2, T3	CS, D, OTH, PS	0.42	T1, T2, T3	CS, D, PS
Germany	0.24	T1, T2, T3	CS, D	0.16	T1, T2, T3	CS, D
Greece	0.21	T1	D	0.00	T1	D
Hungary	2.66	T1, T2	CS	0.20	T1, T3	CS, D
Iceland	0.01	T1	D	0.00	T1	D
Ireland	0.13	CS, T1, T3	CS, D, PS	0.00	CS, T3	CS, PS
Italy	0.79	T1, T2	CS, D	0.40	T1, T2	CS, D
Japan	0.02	CS, T1, T2	CS, D	0.01	T1, T3	CS, D
Kazakhstan	6.28	T1	CS, D	2.82	T1	D
Latvia	1.03	T3	CS	0.00	T3	CS
Liechtenstein	0.74	T3	CS	0.00		
Lithuania	1.33	T1, T2	CS, D	1.07	T1, T2, T3	CS, D, PS
Luxembourg	0.36	CS, T1	CS, D	0.00	CS, T1	CS, D
Malta	–			–		
Monaco	0.71	T3	CS	0.00	T3	CS
Netherlands	0.25	T1, T1b, T2, T3	CS, D, PS	0.63	CS, T1, T2, T3	CS, D, PS
New Zealand	0.30	T1, T3	CS, D	0.36	T1, T2, T3	CS, D, PS
Norway	0.94	T2	CS, PS	3.19	T2	CS, PS
Poland	0.74	T1	CS, D	0.02	T1	CS, D
Portugal	0.11	CR, OTH	CR, OTH	1.62	D	D
Romania	2.37	T1	D	0.65	T1, T3	D, PS
Russian Federation	4.63	T1b, T2	CS, D	2.79	T1b, T2	CS, D
Slovakia	0.63	T1, T3	CS, PS	0.00	T1, T3	CS, PS
Slovenia	0.29	T1	D	0.00	T1	D
Spain	0.07	CS, T1, T2	CS, D	1.18	CS, T1, T2	CS, D, PS
Sweden	0.09	T1, T2, T3	CS, D, PS	0.00	T2, T3	CS, PS
Switzerland	0.46	T1, T2	CS, D	0.04	T2, T3	CS
Türkiye	0.62	T1	D	0.04	T1	D
Ukraine	11.35	T1, T2	CS, D	0.63	T1, T2	CS, D
United Kingdom of Great Britain and Northern Ireland	1.06	T1, T2, T3	CS, D, PS	0.62	T1, T2, T3	CS, D, PS
United States of America	3.78	CS	CS	0.96	CS	CS

^a The national total includes indirect CO₂ emissions from the atmospheric oxidation of CH₄, CO and NMVOCs for the following Parties: Bulgaria, Canada, Cyprus, Czechia, Denmark, European Union, Finland, France, Japan, Latvia, Lithuania, Monaco, Netherlands, Norway, Poland, Portugal, Slovakia and Switzerland.

Table 1.11b

Fugitive emissions from fuels: oil and natural gas - oil - CH₄ and CO₂ (2021)

	Oil																		
	Exploration						Production						Transport				Refining (R) / Storage (S)		
	CH ₄ IEF ^a	CO ₂ IEF ^a	Activity data		CH ₄ IEF ^a	CO ₂ IEF ^a	Activity data		CH ₄ IEF ^a	CO ₂ IEF ^a	Activity data		CH ₄ IEF ^a	CO ₂ IEF ^a	Activity data				
	kg/unit		Unit	Description	kg/unit		Unit	Description	kg/unit		Unit	Description	kg/unit		Unit	Description			
IPCC default EF ^b			10 ³ m ³	total oil production					(5.4)(PL) (25)(TT)										
Australia	0.33	3 200	t	Quantity of Oil Flared	1 604	NA, NO	PJ	Crude Oil and ORF Produced	85	NA, NO	PJ	Crude oil transport domestic	1 114	100 493	PJ	Crude Oil refined and stored			
Austria	IE	IE, NO	Mt	Mt crude oil	IE	IE, NO	Mt	Mt crude oil	5.4	0.49	Mt	1000 m3 crude oil	31 663	NA, NO	Mt	Mt crude oil Input			
Belarus	NO	NO	pcs	number of wells drilled	30 000	2 150	10 ³ m ³	PJ of oil produced	5.4	0.49	10 ³ m ³	PJ oil loaded in tankers	22	NE, NO	10 ³ m ³	PJ oil refined			
Belgium	NO	NO	PJ	Not occurring	NO	NO	PJ	Not occurring	150	14	PJ	Oil transported	83	NA, NO	PJ	Oil refined			
Bulgaria	20	4 400	103m3	Indigenous production	2 910	44 990	103m4	Indigenous production	25	2.3	103m3	Indigenous production	31	34 623	103m3	Refinery intake			
Canada	IE	IE, NO	NA	NA	2 453	3 309	10 ³ m ³	Total crude production	0.076	0.090	10 ³ m ³	Total crude production	23	5.4	TJ	Refinery energy consumption			
Croatia	194	9 102	1001 m3	total oil production	2 546	41 225	1000 m3	total oil production	5.4	0.49	1000 m3	total oil transported by pipelines	22	NA, NO	1001 m3	oil refined			
Cyprus	NO	NO	NO		NO	NO	NO		NO	NO			NO	NO	NO	Crude Oil refined (10 ³ m3)			
Czechia	NE	NE	PJ	(e.g. number of wells drilled)	4 735	7 576	PJ	(e.g. PJ of oil produced)	146	13	PJ	(e.g. PJ oil loaded in tankers)	585	NE, NO	PJ	(e.g. PJ oil refined)			
Denmark	NO	NO	dnm:m3 grl:NO fro:NO		0.59	0.043	dnm:10 ³ m3 grl:NO fro:NO		0.023	NA, NO	dnm:Mg grl:NO fro:NO		0.095	0.008	dnm:Mg grl:NO fro:NO				
Estonia	NO	NO	NA	Exploration	NO	NO	NA	Production	NO	NO	NA	Transport	NO	NO	NA	Refining/Storage			
European Union																			
Finland	NO	NO	NO		NO	NO	NO		NO	NO	NO		25	NO	kt	kt oil refined			
France	NE	NE	PJ	Oil produced	54 578	7 201	PJ	Oil produced	61	5.6	PJ	Oil loaded	5.3	951 028	PJ	Oil refined			
Germany	64	0.48	number	Number of wells drilled	0.11	0.11	t	oil produced	0.007	NA, NO	t	oil transported	0.000	4.8	t	oil refined			
Greece	NE	NE, NO			0.69	0.050	kt		27	NE, NO	kt		26	IE, NO	kt				
Hungary	IE	IE, NO	NA		1 801	130	1000 m3	conventional oil production (thousand m3)	9.4	52	1000 m3	Oil transported by pipeline (thousand m3)	22	NA, NO	1000 m3	Oil refined (thousand m3)			
Iceland	NO	NO			NO	NO			NO	NO			NO	NO					
Ireland	NE	NO	PJ		NO	NO	PJ		NO	NO	PJ		110	NO	PJ				
Italy	NO	NO	NA	Wells drilled	365	321	Gg	Oil produced	6.2	0.56	Gg	Oil transported	14	18 615	Gg	Oil refined			
Japan	IE	IE, NO			1 073 423	77 525	10 ⁶ m ³	Oil produced	70 162	4 903	10 ⁶ m ³	Oil & condensate produced	2 629	NE, NO	10 ⁶ m ³	Oil refined			
Kazakhstan	226	10 596	Kt	Oil produced	2 096	151	Kt	Oil produced	8.4	0.98	kt	Oil produced	20 752	NO	Kt	(Oil produced)			
Latvia	NO	NO	kt	Exploration	NO	NO	kt	Production	NO	NO	kt	Transport	NO	NO	kt	Refining/Storage			
Liechtenstein	NO	NO	NO	number of wells drilled	NO	NO	NO	oil produced	NO	NO	NO	oil loaded in tankers	NO	NO	NO	oil refined			
Lithuania	194	9 102	thous.m3	Oil produced	1.5	0.11	thous.m3	Oil produced, thous.m3	5.4	0.49	thous.m3	Oil transported, thous.m3	2.6	NO	thous.m3	Oil refined			
Luxembourg	NO	NO	NA	number of wells drilled	NO	NO	NA	oil produced	NO	NO	NA	oil loaded in tankers	NO	NO	NA	oil refined			
Malta	NO	NO	NO	number of wells drilled	NO	NO	NO	oil produced	NO	NO	NO	oil loaded in tankers	NO	NO	NO	oil refined			
Monaco	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO			
Netherlands	IE	IE, NO	NA		IE	IE, NO	NA		5.8	0.53	Gg	Amount of oil transported	133	443 410	PJ	Total amount of oil products			
New Zealand	0.000	0.028	number of wells drilled		0.001	0.000	m3		0.030	0.003	m3		0.022	NA, NO	m3				
Norway	IE	IE, NO	Number of wells	Exploration wells	IE	IE, NO	10 ³ m ³	Oil produced	970	NO	PJ	Oil loaded in tankers	3 183	1 813 572	PJ	Oil refined			
Poland	225	10 571	Gg	NA	64 297	4 644	PJ	Production	6.3	0.57	Gg	oil ltransported by pipeline	48	NA	Gg	oil refined			
Portugal	NO	NO	NO		NO	NO	NO		6 375 442 739	578 512	Mt		13	44 805 559 495	Mt				
Romania	5 571	261 396	PJ	oil produced	63 182	8 041	PJ	oil produced	150	14	PJ	oil refined	615	IE, NO	PJ	oil refined			
Russian Federation	194	9 102	10 ³ m3	Oil produced	1 801	130	10 ³ m3	Oil and Condensate produced	5.4	0.49	10 ³ m3	Oil transported by pipeline	22	NE, NO	10 ³ m3	Oil refined			
Slovakia	NO	NO	NO		3 600	260	kt	Production	5.4	0.49	kt	Transfer	41	NE	kt	Refining/Storage			
Slovenia	NO	NO	1000 m3	NA	0.59	0.043	1000 m3	Conventional oil produced	NA	430	1000 m3	Consumption of LPG	NO	NA, NO	1000 m3	Oil refined			
Spain	NA	NA, NO	Tg	Crude oil produced	857	68	Tg	Crude oil produced	519	47	Tg	Transport of crude oil	1 354	51 818 706	Tg	Oil refined			
Sweden	IE	IE, NA	TJ	Consumption of feedstock	NO	NO		Oil production	0.002	NE	PJ	Transported amount of oil	IE, NA	IE, NA	Mt	Consumption of crude oil			
Switzerland	NO	NO			NO	NO			1.0	NA, NO	Number	Number of refineries/pipelines	7.0	NA, NO	kt	Amount of crude oil imported/refined			
Türkiye	NO	NO	NO		3 600	260	10 ³ m ³	oil production	5.4	80	10 ³ m ³	oil transported by pipeline	41	NA, NO	10 ³ m ³	(petroleum refining)			
Ukraine	747	80 400	10 ³ m ³	Oil Produced	30 001	2 150	10 ³ m ³	oil produced	5.4	0.49	L3 Unit 10 ³ m ³	Crude oil transported by pipeline	880	NA, NE	PJ	Oil refined			
United Kingdom of Great Britain and Northern Ireland	25	3 200	t	Exploration drilling: fuel use	55	250	kt	Oil produced	0.024	0.000	t	Oil loading	0.22	NO	kt	Refinery throughput			
United States of America	1 411	113 604	10 ⁶ Bbl(oil US)	Annual Domestic Production	425 582	4 865 330	10 ⁶ Bbl(oil US)	Annual Domestic Production	1 439	205	10 ⁶ Bbl(oil US)	Refinery Feed	5 345	762 525	10 ⁶ Bbl(oil US)	Refinery Feed			

^a The units of the implied emission factors (IEF) vary from Party to Party depending on the unit of the activity data used. The unit of the IEF is kg/unit of activity data.^b Source of default emission factors: 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 2 Chapter 4 Fugitive Emissions, Table 4.2.4, Tier 1 Emission Factors in developed countries. Values converted from Gg to kg.

Table 1.11c

Fugitive emissions from fuels: oil and natural gas - natural gas - CH₄ and CO₂ (2021)

	Natural Gas																			
	Production				Processing				Transmission and Storage				Distribution				Other			
	CH ₄ IEF ^a	CO ₂ IEF ^a	Activity data		CH ₄ IEF ^a	CO ₂ IEF ^a	Activity data		CH ₄ IEF ^a	CO ₂ IEF ^a	Activity data		CH ₄ IEF ^a	CO ₂ IEF ^a	Activity data		CH ₄ IEF ^a	CO ₂ IEF ^a	Activity data	
	kg/unit		Unit	Description	kg/unit		Unit	Description	kg/unit		Unit	Description	kg/unit		Unit	Description	kg/unit		Unit	Description
IPCC default EF ^b	(380 to 2300)	(140 to 820)	10 ⁶ m ³	Gas produced	(150 to 1030)	(12 to 320)	10 ⁶ m ³	Gas produced	(66-480)(T) (25)(S)	(0.88)(T) (0.11)(S)	10 ⁶ m ³	marketable gas	1 100	51	10 ⁶ m ³	utility sales				
Australia	6 911	141	PJ	Natural gas produced	10 069	1 944	PJ	Natural gas produced	NA	NA	NA	NA	115 487	6 503	PJ	Utility sales	NA	NA	NA	Appliance count and PJs
Austria	4 432	61 069	Mm3	Mm3 natural gas	NA	275 529	Mm3	Mm3 natural gas	578	25	km	km pipeline length	47	2.0	km	km distribution network length	NO	NO	Mm3	Mm3 natural gas stored
Belarus	12 000	97	10 ⁶ m ³	PJ gas produced	158	13	10 ⁶ m ³		244	1.4	10 ⁶ m ³	Gas consumed	1 800	96	10 ⁶ m ³	Gas consumed	42	0.19	10 ⁶ m ³	Gas consumed
Belgium	NO	NO	PJ	Not occurring	NO	NO	PJ	Not occurring	6 083	NA, NO	PJ	Gas consumed	23 230	747	PJ	Gas consumed	NO	NO	PJ	Not occurring
Bulgaria	2 540	3 600	106m3	Indigenous production	570	7 210	106m3	Indigenous production	2 122	256	km	Pipeline length	230	10	km	Pipeline length	815	6.7	106m3	Natural gas consumption at energy and industrial plants
Canada	1 079	28	10 ⁶ m ³	Natural gas production	63	2.6	10 ⁶ m ³	Natural gas production	573	447	km	Transmission pipeline length	101	5.2	km	Distribution pipeline length	1.2	0.024	number	Abandoned gas wells + spills + appliances + vehicles + NG consumption
Croatia	1 341	329 967	1000000 m3	gas produced	592	3 166	1000000 m3	gas produced	480	4.1	1000000 m3	marketable gas	1 100	51	1000000 m3	utility sales	NO	NO	NO	
Cyprus	NO	NO	NO		NO	NO	NO		NO	NO	NO		NO	NO	NO		NO	NO	NO	
Czechia	38 649	15	PJ	(e.g. PJ gas produced)	NA	NA, NO	PJ		4 186	17	PJ	(e.g. PJ gas consumed)	122 867	489	PJ	(e.g. PJ gas consumed)	IE	IE, NO	PJ	(e.g. PJ gas consumed)
Denmark	380	14	dm:10 ⁶ m3 grt:NO fro:NO		NA, NO	NA, NO	dm:10 ⁶ m3 grt:NO fro:NO		90	1.1	dm:10 ⁶ m3 grt:NO fro:NO		97	0.85	dm:10 ⁶ m3 grt:NO fro:NO		NO	NO	dm:m3 grt:NO fro:NO	
Estonia	NO	NO	NA	Production	NO	NO	NA	Processing	5 735	30	PJ	Amount of the transmission of Natural Gas	38 001	1 762	PJ	Amount of natural gas distributed	NO	NO	NA	Other
European Union																				
Finland	NO	NO	NO		NO	NO	NA		3 433	NE, NO	PJ	PJ gas consumed	17 361	NE, NO	PJ	PJ gas distributed	NO	NO	NO	
France	IE	IE, NO	PJ	NO	304	5 361 447	PJ	Gas processed	6 890	70	PJ	Gas consumed	12 466	126	PJ	Gas consumed	NO	NO	PJ	NO
Germany	0.020	0.10	1000 m³	gas produced	0.024	95	1000 m³	gas produced	426	3.5	km	length of transmission pipelines	15	0.13	km	length of distribution pipelines	29	0.24	TJ	gas consumed
Greece	1 930	214	mil. m3		IE	IE, NO	mil. m3		298	0.99	mil m3		1 100	51	mil m3		IE	IE, NO		
Hungary	1 340	48	million m3	Gas production (million m3)	935	250	million m3	Sweet gas plants-raw gas feed (million m3)	2 056	1.5	km	Pipeline length	434	5.8	km	length of pipelines	NO	NO	NO	
Iceland	NO	NO			NO	NO			NO	NO			NO	NO			NO	NO		
Ireland	23	NE, NO	PJ	Production (PJ)	IE	NE, NO	PJ		1 773	39	PJ		22 527	460	PJ		NO	NO	PJ	
Italy	114	82	Mm3	Gas produced	51	320	Mm3	Gas produced	280	7.6	Mm3	Gas transported	2 602	71	Mm3	Gas distributed	NO	NO	NA	other
Japan	2 256	80	10 ⁶ m ³	Gas produced	755	235	10 ⁶ m ³	Gas produced	188	NE, NO	10 ⁶ m ³	Gas sold	9.5	NE, NO	10 ⁶ m ³	City gas sold	IE, NA	IE, NO		
Kazakhstan	49	32 134	10 ⁶ m ³	(Gas produce	1 340	48	10 ⁶ m ⁴	(Gas produced)	480	4.1	10 ⁶ m ³	(Gas transmission)	1 100	51	10 ⁶ m ³	(Gas produced)	NA	NA, NO		(Gas produced)
Latvia	NO	NO	m3	Production	NO	NO	m3	Processing	0.68	0.002	m3	Transmission and storage	0.65	0.002	m3	Distribution	0.65	0.002	m3	Other
Liechtenstein	NO	NO	NO	gas produced	NO	NO	NO	gas produced	164	1.3	km	gas consumed	46	0.36	TJ	gas consumed	NO	NO	TJ	gas produced
Lithuania	NO	NO	NO		NO	NO	NO		965 743	695	kt	Natural gas leakages	965 743	695	kt	Natural gas leakages	965 743	695	kt	Natural gas leakages
Luxembourg	NO	NO	NA	gas produced	NO	NO	NA	NO	13	0.024	TJ	gas consumed	30	1.4	TJ	gas consumed	NO	NO	NA	NO
Malta	NO	NO	NO	gas produced	NO	NO	NO	gas processed	NO	NO	NO	gas consumed	NO	NO	NO	gas consumed	NO	NO	no	gas consumed
Monaco	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.69	0.012	m	CH4	NO	NO	NO	NO
Netherlands	IE	IE, NO	mln m3	Gas produced	IE	IE, NO	NA		1 344	25	PJ	Gas transmitted	42 747	1 315	10 ³ km	Length distribution network	NO	NO	NO	
New Zealand	1 217	44	million m3		NE	NE, NO	NA		14 984	3 205	TJ		14 680	3 442	TJ		NO	NA, NO	NA	
Norway	IE	2 267	10 ⁶ m ³	Gas produced	IE	IE, NO	PJ	Gas processed	IE	IE, NO	PJ	Gas export	45 551	IE, NO	PJ	Gas consumption	232 031	IE, NO	PJ	Gas processed
Poland	2 289	82	10 ⁶ m3	Production	1 030	320	10 ⁶ m3		505	0.99	10 ⁶ m3	gas consumed	1 100	51	10 ⁶ m3	gas consumed	NO	NA, NO	NA	NA
Portugal	NO	NO	NO		NO	NO	NO		11	0.211	toe NG Transmitted		1 150	22	toe NG Distributed		NO	NO	NO	
Romania	1 340	48	106m3	gas produced	590	166	106m3	gas produced and processed	244	0.79	106m3	gas produced	1 100	51	106m3	gas supplied	61 725	NO	PJ	gas consumed
Russian Federation	213	4.3	10 ⁶ m3	Natural Gas produced	IE	IE, NO	10 ⁶ m3	Natural Gas produced	1 745	7.5	10 ⁶ m3	Marketable gas	1 100	51	10 ⁶ m3	Gas consumed	NO	NO	NA	NA
Slovakia	2 300	82	mil m3	Production/Processing	1 030	320	mil m3		30	0.88	mil m3	Transfer	1 100	51	mil m3	Distribution	25	0.11	mil m3	Storage
Slovenia	1.3	0.048	1000 m3	Gas production	NO	NO	1000 m3	NA	0.37	0.001	1000 m3	Marketable gas	1.1	0.051	1000 m3	Utility sale	NO	NO	1000 m3	NA
Spain	2 088	74	Mm3	Mm3 gas produced	150	12	Mm3	Mm3 gas produced	569	10	PJ	PJ gas (NCV)	3 393	66	PJ	PJ of gaseous fuels (natural gas,	NO	NO	NO	NO
Sweden	NO	NO		Gas produced	NO	NO		Gas produced	NA	NA	km	Length of transmission pipelines	NA	NA	km	Length of distribution pipelines	NO	NO		
Switzerland	NO	NO	PJ	Amount of natural gas produced	NO	NO			18 328 000	435 000	PJ	Losses of natural gas in transit pipeline	18 328 000	435 000	PJ	Losses of natural gas in distribution network	NO	NO	PJ	Losses of natural gas due to major accidents
Türkiye	2 300	82	10 ⁶ m ³	Natural gas production	1 030	320	10 ⁶ m ³	Natural gas production	487	0.90	10 ⁶ m ³	Natural gas transmission by pipeline	1 100	51	10 ⁶ m ³	Natural gas distribution	NO	NO	NO	
Ukraine	12 190	97	10 ⁶ m ³	Natural Gas Produced	790	250	10 ⁶ m ³	Natural Gas Processed	274 820	6 506	Mt	gas transmitted	24 455 056	579 428	10 ⁹ m ³	The volume of natural gas	243 685	1 921	PJ	Residential and Non-
United Kingdom of Great Britain and Northern Ireland	713	176	PJ	Gas produced	1 186	248 336	PJ	Gas produced	12	0.49	GWh	Natural gas supply	237	10	GWh	Natural gas supply	NO	NO	NA	
United States of America	97 330 338	264 805 574	10 ⁹ ft ³	Annual Production	14 774 311	755 997 914	NA	Annual Production	51 855 128	29 032 580	10 ⁹ ft ³	Consumption	17 858 522	529 567	10 ⁹ ft ³	Consumption	NA	NA	NA	Abandoned Wells

^a The units of the implied emission factors (IEF) vary from Party to Party depending on the unit of the activity data used. The unit of the IEF is kg/unit of activity data.^b Source of default emission factors: 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 2 Chapter 4 Fugitive Emissions. Table 4.2.4. Tier 1 Emission Factors in developed countries. Values converted from Gg to kg.

Table 1.11d

Fugitive emissions from fuels: oil and natural gas - venting and flaring - CH₄ and CO₂ (2021)

	Venting and flaring																		
	Oil						Gas						Combined						
	Venting			Flaring			Venting			Flaring			Venting			Flaring			
	CH ₄ IEF ^a	CO ₂ IEF ^a	Activity data	CH ₄ IEF ^a	CO ₂ IEF ^a	Activity data	CH ₄ IEF ^a	Activity data	CH ₄ IEF ^a	CO ₂ IEF ^a	Activity data	CH ₄ IEF ^a	CO ₂ IEF ^a	Activity data	CH ₄ IEF ^a	CO ₂ IEF ^a	Activity data		
	kg/unit	unit	Description	kg/unit	unit	Description	kg/unit	unit	Description	kg/unit	unit	Description	kg/unit	unit	Description	kg/unit	unit	Description	
IPCC default EF ^b																			
Australia	IE	IE, NO	NA	NA	35 003	2 906 642	kt	Quantity of Oil and Gas Flared	9 632	PJ	Natural gas, crude oil and ORF produced	4 762	2 706 329	kt	Quantity of Oil and Gas Flared	NO	NA, NO	NA	NA
Austria	IE	IE, NO	NA		IE	IE, NO	NA		IE	NA		IE	IE, NO	NA		IE	IE, NO	NA	
Belarus	IE	IE, NO	10 ⁶ m ³	Oil produced	IE	IE, NO	10 ⁶ m ³	Oil consumption	IE	10 ⁶ m ³	Gas produced	IE	IE, NO	10 ⁶ m ³	Gas consumption	IE	IE, NO	10 ⁶ m ³	Flaring
Belgium	NO	IE, NO	PJ	Please refer to other sector	NO	NO	PJ	Not occurring	105	PJ	Transported gas	NO	NO	PJ	Not occurring	NO	NA	PJ	Please refer to other sector
Bulgaria	IE	IE	NA	Indigenous production	1.0	55 476	TJ	Natural gas used for hydrogen production in oil refineries	IE	NA	Indigenous production	IE	IE	106m3	Indigenous production	NO	NO	NO	NO
Canada	1 353	36 611	10 ³ m ³	Total crude production	12 275	3 399 351	10 ⁶ m ³	Associated gas flared	1 578	10 ⁶ m ³	Natural gas production	13 191	2 451 498	10 ⁶ m ³	Non-associated gas	55	1.4	number	Number of wells drilled
Croatia	25	2.3	1000 m3	oil	IE	IE, NO	1000 m3		IE	1000000 m3	gas	IE	IE, NO	1000000 m3		NO	NO	NO	NO
Cyprus	NO	NO		Fuel transported (m3)	NO	NO			NO			NO	NO			NO	NO	NO	
Czechia	235 390	48 701	PJ	(e.g. PJ oil produced)	568	919 913	PJ	(e.g. PJ gas consumption)	NO	PJ	(e.g. PJ gas produced)	NO	NO	PJ	(e.g. PJ gas consumption)	NO	NO	PJ	
Denmark	NO	NO	gr: NO fro: NO		0.018	59	gr: NO fro: NO		19	gr: NO fro: NO		0.031	55	gr: NO fro: NO		NO	NO	gr: NO fro: NO	0.23
Estonia	NO	NO	NA	Oil	NO	NO	NA	Oil	6 287	PJ	Gas	NO	NO	NA	Gas	NO	NO	NA	Combined
European Union																			
Finland	NO	NO	NO		1.0	53 016	TJ	used fuels, TJ	NO	NO		IE	IE, NO	NO		NO	NO	NO	NO
France	19 942	2 631	PJ	Oil produced	11 324	57 298 360	PJ	Gas Flared	IE	Gg	Gas produced	5 332	2 098 815	Gg	Consumption	NO	NO	PJ	Oil and Gas produced
Germany	IE	IE, NO	m3	amount vented	0.25	3 309	kt	oil refined	IE	m3	amount vented	IE	IE	t	amount flared	IE	IE, NO	m3	amount vented
Greece	844	111	kt		29	48 045	kt		182	mil m3		2.8	4 200	mil m3		NO	NO		NO
Hungary	720	95	1000 m3	Conventional oil production	374	60 603	1000 m3	Conventional oil production	6 424	million m7	Sour gas plants-raw gas	2.7	4 170	million m3	Gas production (million	IE	IE, NO	NO	IE
Iceland	NO	NO			NO	NO			NO	NO		NO	NO			NO	NO		NO
Ireland	NO	NO	PJ		NO	NO	PJ		7 269	PJ		0.001	55 483 196	PJ	Natural gas flaring	NO	NO	PJ	
Italy	524	2 061	Gg	Oil produced	122	38 926	Gg	Oil produced	NA	Mm3	Gas produced	26	4 200	Mm3	Gas produced	NO	NO	NA	Combined
Japan	720 000	95 000	10 ⁶ m ³	Oil produced	25 000	41 000 000	10 ⁶ m ³	Oil produced	IE	10 ⁶ m ³	Gas produced in relevant facilities	2.0	3 000	10 ⁶ m ³	Gas produced	IE	IE, NO		271
Kazakhstan	745	41 095	1000m ³	(Oil produced)	12 000	2 000 000	10 ⁶ m ³	(associated petroleum gas)	NO	NO	(Gas produced)	2.0	3 036	10 ⁶ m ³	(Gas produced)	NO	NO	NO	(Gas produced)
Latvia	NO	NO	kt	Oil	NO	NO	kt	Oil	0.68	m3	Gas	NO	NO	kt	Gas	NO	NO	kt	Combined
Liechtenstein	NO	NO	NO	oil produced	NO	NO	NO	gas consumed	NO	NO	gas produced	NO	NO	NO	gas consumed	NO	NO	NO	Gas/Oil Produced
Lithuania	720	95	thous.m3	Oil produced, thous.m3	25	41 000	thous.m3	Oil produced, thous.m3	NO	NO		NO	NO	NO		NO	NO	NO	
Luxembourg	NO	NO	NA	oil produced	NO	NO	NA	gas consumed	0.66	NM3	gas produced	NO	NO	NA	gas consumed	NO	NO	NA	combined oil and gas consumption
Malta	NO	NO	NO	oil produced	NO	NO	NO	gas consumed	NO	NO	gas produced	NO	NO	NO	gas consumed	NO	NO	NO	NO
Monaco	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Netherlands	IE	IE, NO	PJ	Oil production	IE	IE, NO	PJ	Oil production	IE	PJ	Gas Production	IE	IE, NO	PJ	Gas Production	6 850	681	PJ	
New Zealand	IE	IE	NA		IE	59 587	TJ		NE	TJ		IE	IE	NA		14 125	NA, NO	TJ	
Norway	IE	IE, NO	PJ	(See Venting combined)	9.4	74 273 106	PJ	Oil flared	IE	PJ	(See Venting combined)	164 360	63 111 313	PJ	Gas flared	797	IE, NO	PJ	Oil and gas produced
Poland	1 521	169	Gg	oil produced	47 619	29	Gg	oil produced	IE	NA	NA	1 213	19 651	10 ⁶ m3	gas production	NO	NA, NO	NA	NA
Portugal	NO	NO	NO		1 399	2 666 759	kt		NO	NO		NO	NO	NO		NO	NO	NO	NO
Romania	249 854	51 694	PJ	oil produced	603	976 442	PJ	oil produced	182	106m3	gas produced	0.76	1 200	106m3	gas produced	NA	NA, NO	PJ	gas and oil produced
Russian Federation	720	95	10 ³ m3	Oil and Condensate produced	15 500	2 760 000	10 ⁶ m3	Associated gas flaring	IE	10 ⁶ m3	Marketable Gas	0.10	568	10 ⁶ m3	Natural Gas production	NO	NO	NA	NA
Slovakia	720	95	kt	Conventional oil produced	25	41 000	kt	Flaring oil	34	mil m3	Venting gas	2.0	3 000	mil m3	Flaring gas	NO	NO	NA	NA
Slovenia	855	113	1000 m3	Conventional oil produced	30	48 500	1000 m3	Conventional oil produced	0.25	1000 m3	Marketable gas	0.001	1.2	1000 m3	Gas production	NO	NO	1000 m3	NA
Spain	815 402	107 588	Tg	Tg gas venting	24	4 314 690	Tg	Tg gas consumption	956 366 154	PJ	gas produced	648	116 764	Mm3	Mm3 gas consumption	NO	NO	NO	NO
Sweden	IE	IE		Venting of oil products	IE	IE, NA	TJ	Venting of oil products	0.64	m3	Venting of gas products	1.0	56 950	TJ	Venting of gas products	IE	IE		Venting of combined products
Switzerland	NO	NO					PJ		NO			NO	NO	NO	Amount of natural gas produced	NO	NO		
Turkiye	720	95	10 ³ m ³	(Oil production	219	50 102	10 ³ m ³	Oil production	47 918	10 ⁶ m ³	Natural gas production	2.0	3 000	10 ⁶ m ³	Natural gas production	NO	NO	NO	NO
Ukraine	855	113	10 ³ m ³	oil produced	30	48 500	10 ³ m ³	oil produced	IE	NA	gas transmission	2.3	3 550	10 ⁶ m ³	Natural Gas Produced	IE	IE, NA	NA	NA
United Kingdom of Great Britain and Northern Ireland	NA	NA	NA		6.1	1 480	t	Amount of gas flared	NA	NA		12.2	2 667	t	Amount of gas flared	IE	IE, NO	NA	NA
United States of America	IE	IE, NA	NA	Production	IE	IE, NA	NA	Production	IE	NA	Production	IE	IE, NA	NA	Production	IE	IE, NA	NA	10 ⁹ ft ³

^a The units of the implied emission factors (IEF) vary from Party to Party depending on the unit of the activity data used. The unit of the IEF is kg/unit of activity data.^b Source of default emission factors: 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 2 Chapter 4 Fugitive Emissions. Table 4.2.4. Tier 1 Emission Factors in developed countries. Values converted from Gg to kg.

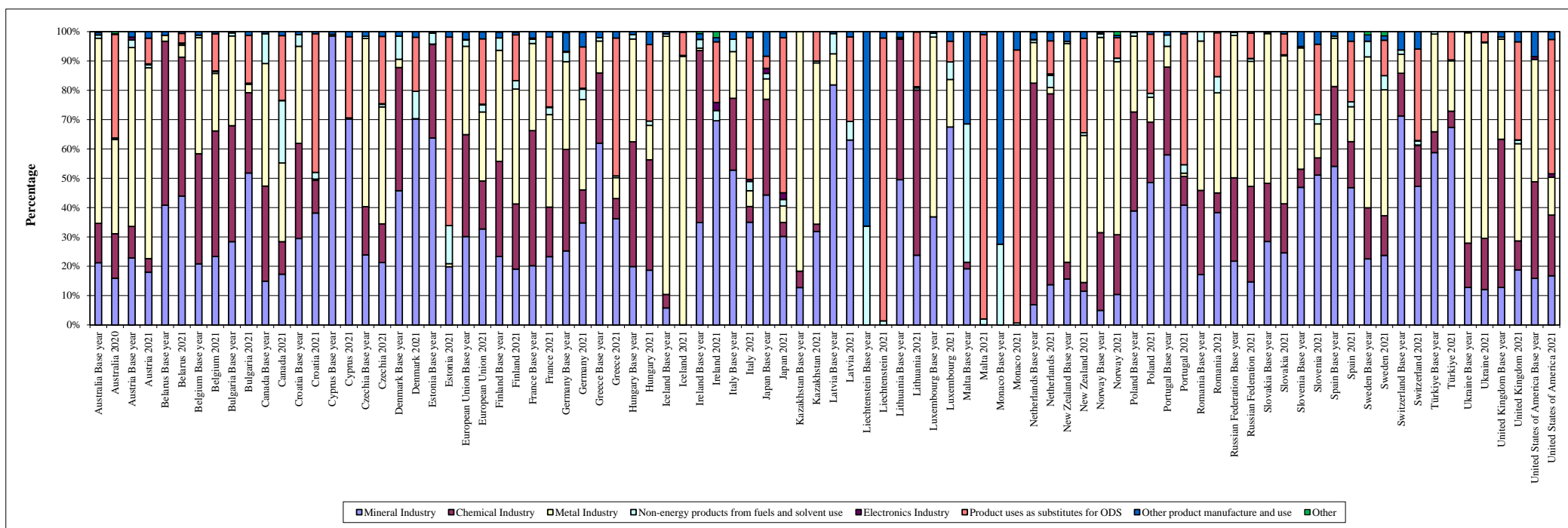
Table 1.12**CO₂ transport and storage (2021)**

	Transport of CO ₂		Injection and storage		Other	
	CO ₂ IEF	Activity data	CO ₂ IEF	Activity data	CO ₂ IEF	Activity data
	kg/kt	(kt)	kg/kt	(kt)	kg/kt	(kt)
IPCC default EF^a	(0.00014 to 0.014 Gg/year/km)	10 ³ m ³	n.a.	10 ³ m ³	n.a.	10 ³ m ³
Australia	NO	2 720	2 287	5 428	NO	NO
Austria	NO	NO	NO	NO	NO	NO
Belarus	NO	NO	NO	NO	NO	NO
Belgium	NO	NO	NO	NO	NO	NO
Bulgaria	NO	NO	NO	NO	NO	NO
Canada	137	4 413	5.8	7 194	NA	NA
Croatia	NO	NO	NO	NO	NO	NO
Cyprus	NO	NO	NO	NO		
Czechia	NO	NO	NO	NO	NO	NO
Denmark	NO	NO	NO	NO	NO	NO
Estonia	NO	NO	NO	NO	NO	NO
European Union	IE, NA, NO	IE, NA, NO	NA, NO	NA, NO	NO	NO
Finland	IE, NA	IE, NA	NA	NA	NO	NO
France	NO	NO	NA, NO	NO	NO	NO
Germany	NA	NO	NA	NO	NO	NO
Greece	NO	NO	NO	NO	NO	NO
Hungary	NO	NO	NO	NO	NO	NO
Iceland	NO	NO	IE	IE		
Ireland	NO	NO	NO	NO	NO	NO
Italy	NO	NO	NO	NO	NO	NO
Japan	NO	NO	NE, NO	NO	NO	NO
Kazakhstan	NO	NO	NA	NA	NO	NO
Latvia	NO	NO	NO	NO	NO	NO
Liechtenstein	NO	NA, NO	NO	NO	NO	NO
Lithuania	NO	NO	NO	NO	NO	NO
Luxembourg	NO	NO	NO	NO	NO	NO
Malta	NO	NO	NO	NO	NO	NO
Monaco	NO	NO	NO	NO	NO	NO
Netherlands	NO	NO	NO	NO	NO	NO
New Zealand	NO	NO	NO	NO	NO	NO
Norway	NE, NO	NO	116	26 511		
Poland	NO	NO	NO	NO	NO	NO
Portugal	NO	NO	NO	NO	NO	NO
Romania	NO	NO	NO	NO	NO	NO
Russian Federation	NO	NO				
Slovakia	NO	NO	NO	NO	NO	NO
Slovenia	NO	NO	NO	NO	NO	NO
Spain	NO	NO	NO	NO	NO	NO
Sweden	NO	NO	NO	NO		
Switzerland	NO	NO	NO	NO	NO	NO
Türkiye	NA, NO	NA, NO	NE	NE		
Ukraine	NO	NO	NO	NO	NO	NO
United Kingdom of Great Britain and Northern Ireland	NO	NO	NO	NO	NO	NO
United States of America	IE	IE	IE	IE	IE, NA	IE

^a Source of default emission factors: 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 2 Chapter 5 Carbon Dioxide Transport, Injection and Geological Storage. Table 5.2. Tier 1 Emission Factors for pipeline transport of CO₂ from a CO₂ capture site to the final storage site.

Figure 2.1

Contribution of subsectors to total GHG emissions in the Industrial processes and product use sector^{a, b}



^a In accordance with the UNFCCC reporting guidelines on annual inventories of Annex I Parties the year 1990 should be the base year for the estimation and reporting of inventories. However, in accordance with decisions 9/CP.2, 11/CP.4, and 7/CP.12 some Parties with economies in transition use base years other than 1990: Bulgaria (1988), Croatia (1990), Hungary (average of 1985 to 1987), Poland (1988), Romania (1989) and Slovenia (1986).

^b Indirect CO₂ emissions are excluded from the totals in this graph.

Table 2.1**Mineral industry - CO₂ (2021)**

	Methods and EF used		Share of national total ^a	Cement production			Lime production		Glass production	
				Activity data		CO ₂ IEF	Share of national total ^a	CO ₂ IEF	Share of national total ^a	CO ₂ IEF
	Methods	EF		Description ^b	Value					
			(%)			(kt)	(t/t)	(%)	(t/t)	(%)
IPCC default EF ^c								0.59-0.86		0.2
Australia	T2	CS	0.53	Clinker Production	5 246	0.54	0.20	0.68	–	IE, NO
Austria	T1, T3	D, PS	2.44	Cement clinker	3 663	0.52	0.85	0.69	0.05	0.070
Belarus	T1, T2	CS, D	2.43	Used clincer production data	4 275	0.52	0.38	0.75	0.11	0.14
Belgium	T3	CS, PS	2.40	Clinker Production	4 872	0.55	1.10	0.77	0.14	0.10
Bulgaria	T1, T2	CS, D, PS	1.96		1 989	0.53	0.47	0.78	0.19	0.13
Canada	T1, T2, T3	CS, D	1.10	clinker production	13 802	0.53	0.20	0.81	0.01	0.42
Croatia	T2, T3	PS	4.93	clinker production	2 406	0.50	0.50	0.80	0.12	0.43
Cyprus	CS, T1	CS, D	10.13	Clinker production	1 664	0.53	0.05	0.73	–	NO
Czechia	T3	PS	1.64	clinker production	3 673	0.53	0.56	0.70	0.12	0.12
Denmark	CS, T1, T2, T3	CS, D, PS	2.65	Production of Clinker	2 202	0.55	0.11	0.77	0.02	0.054
Estonia	T1, T2, T3	D, PS	–	Clinker production	NO	NO	0.37	0.73	0.09	0.14
European Union			2.09		136 666	0.53	0.51	0.73	0.12	NE
Finland	T1, T3	CS, D, PS	1.30	Produced clinker	1 220	0.51	0.65	0.79	0.00	0.40
France	T1, T2, T3	CS, D, PS	1.54	Clinker consumption	12 242	0.53	0.55	0.66	0.12	0.15
Germany	T1, T2	CS, D	1.79	produced clinker	25 736	0.53	0.60	0.75	0.12	0.12
Greece	CS, T1	CS, D, PS	4.09	clinker production	6 117	0.52	0.25	0.85	0.02	0.14
Hungary	T2, T3	CS, D, PS	1.56	Clinker production (kt)	C	C	0.17	0.76	0.06	0.12
Iceland	T3	PS	–	clinker production	NO	NO	–	NO	–	NO
Ireland	T3	PS	3.39	clinker production	3 851	0.55	0.24	0.75	–	NO
Italy	T2	CS, PS	1.90	Clinker production	15 162	0.52	0.48	0.76	0.15	0.095
Japan	CS, T2	CS	2.09	Production of clinker	47 338	0.52	0.42	0.43	0.01	0.000
Kazakhstan	T1, T2	CS, D	1.14	clinker production	7 296	0.53	0.21	0.77	0.01	0.10
Latvia	T1, T2, T3	D, PS	5.02	(produced clinker)	1 056	0.51	–	NA, NO	0.01	C
Liechtenstein	NA	NA	–	Production	NO	NO	–	NO	–	NO
Lithuania	T1, T2	CS, D, PS	3.12	Clinker production	1 180	0.54	0.01	0.78	0.04	0.15
Luxembourg	CS, T2	CS, PS	3.73	clinker production	717	0.49	–	NO	0.33	0.14
Malta	NA	NA	–	not occurring	NO	NO	–	NO	–	NO
Monaco	NA	NA	–	NO	NO	NO	–	NO	–	NO
Netherlands	CS, T1, T2, T3	D, PS	–	clinker production	NO	NO	0.11	0.44	0.04	0.041
New Zealand	CS, T1	CS, D	0.48	Clinker produced	C	C	0.13	0.78	–	NA
Norway	T1, T3	CS, D, PS	1.42	Production quantity	1 361	0.51	0.42	0.76	0.02	0.47
Poland	T1, T2	CS, D	1.84	Clinker production	13 996	0.53	0.36	0.74	0.16	0.16
Portugal	T1, T3	OTH, PS	3.73		4 205	0.50	0.68	0.68	0.28	0.089
Romania	CS, OTH, T2, T3	CS, D, PS	3.43	clinker production	7 725	0.51	0.51	0.75	0.06	0.14
Russian Federation	T1, T2	CS, D	1.03	Clinker production	41 955	0.53	0.41	0.77	0.09	0.15
Slovakia	T2, T3	PS	3.52	Cement clinker	2 938	0.49	1.31	0.78	0.05	0.42
Slovenia	T2, T3	D, PS	2.91	Clinker produced	916	0.51	0.42	0.75	0.09	0.14
Spain	T1, T2, T3	CS, D, PS	2.93	Clinker production	16 732	0.51	0.52	0.69	0.16	0.095
Sweden	T3	CS, D, PS	2.63	Production of clinker	2 405	0.52	0.78	0.75	0.03	NA
Switzerland	CR, T2, T3	CS, D, OTH,	3.83	clinker production	3 227	0.54	0.12	C	0.01	0.028
Türkiye	T1, T2	CS, D	7.84	Clinker Production	84 025	0.53	0.49	0.70	0.14	0.17
Ukraine	T1, T2, T3	CS, D	1.33	clinker production	8 175	0.53	0.72	0.78	0.09	0.19
United Kingdom of Great Britain and Northern Ireland	T1, T3	CS	0.98	Clinker production	7 367	0.57	0.25	0.45	0.08	0.18
United States of America	T1, T2, T3	D	0.65	Clinker Production	79 400	0.52	0.19	0.75	0.03	0.43

^a The national total includes indirect CO₂ emissions from the atmospheric oxidation of CH₄, CO and NMVOCs for the following Parties: Bulgaria, Canada, Cyprus, Czechia, Denmark, European Union, Finland, France, Japan, Latvia, Lithuania, Monaco, Netherlands, Norway, Poland, Portugal, Slovakia and Switzerland.

^b The CRF requests Parties to specify the activity data used (e.g. cement or clinker) for estimating the emissions from cement production. The descriptions included in this column are as reported in the CRF by Parties.

^c Source of default emission factors: 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 3 Chapter 2 Mineral Industry Emissions. Lime production table 2.4; glass production section 2.4.1.2.

Table 2.2**Chemical industry - CO₂ and N₂O (2021)**

	CO ₂					N ₂ O						
	Methods and EF used		Ammonia production			Methods and EF used		Nitric acid production			Adipic acid production	
	Methods	EF	Share of national total ^a	Activity data (production)	CO ₂ IEF	Methods	EF	Share of national total ^a	Activity data (production)	N ₂ O IEF	Share of national total ^a	N ₂ O IEF
			(%)	(kt)	(t/t)			(%)	(kt)	(t/t)	(%)	(t/t)
IPCC default EF ^b					1.666 to 3.273					0.002 to 0.009		0.3
Australia	T2, T3	CS, D	0.40	1 816	1.3	T3	CS	0.37	1 815	0.004	–	NO
Austria	T1, T2, T3	D, PS	0.65	528	1.2	T3	PS	0.05	520	0.000	–	NO
Belarus	T1, T2	CS, D, PS	1.89	C	C	T1, T2	D	0.71	438	0.005	–	NO
Belgium	T3	D, PS	0.78	830	1.2	T3	PS	0.22	2 208	0.000	–	NO
Bulgaria	T2	CS, PS	1.10	C	C	T3	PS	0.12	C	C	–	NO
Canada	T1, T2, T3	CS, D, OTH, PS	0.38	4 376	1.3	T1, T2, T3	CS, PS	0.03	849	0.001	–	NO
Croatia	T3	PS	1.50	288	2.1	T3	PS	0.15	160	0.001	–	NO
Cyprus			–	NO	NO			–	NO	NO	–	NO
Czechia	T1, T2, T3	CS, D, PS	0.59	214	3.3	CS, T3	CS, PS	0.09	602	0.001	–	NO
Denmark	T2	PS	–	NO	NO			–	NO	NO	–	NO
Estonia			–	NO	NO			–	NO	NO	–	NO
European Union			0.56	13 691	1.8			0.07	NE	NE	0.00	NE
Finland	CS, T2, T3	CS, PS	–	NO	NO	T3	PS	0.46	654	0.001	–	NO
France	T1, T2, T3	CS, D, PS	0.29	916	1.6	T2, T3	CS, D, PS	0.06	1 688	0.001	0.00	C
Germany	T1, T2, T3	CS, D, PS	0.53	2 892	1.8	T3	PS	0.05	2 480	0.001	0.01	C
Greece	T1, T1a	CS	0.25	115	1.7	CS	CS	0.01	176	0.000	–	NO
Hungary	T3	PS	1.87	22 201	0.056	T3	PS	0.05	847	0.000	–	NO
Iceland			–	NO	NO			–	NO	NO	–	NO
Ireland			–	NO	NO			–	NO	NO	–	NO
Italy	D, T2, T3	CR, PS	0.15	532	2.0	T3	D, PS	0.01	402	0.000	0.01	0.002
Japan	CS, T1, T2, T3	CS, D	0.03	867	0.35	CS, T1, T2	CS, PS	0.02	248	0.003	0.00	
Kazakhstan	T2	CS	0.13	260	1.6	T1	D	0.07	334	0.002	–	NO
Latvia			–	NO	NO			–	NO	NO	–	NO
Liechtenstein			–	NO	NO			–	NO	NO	–	NO
Lithuania	T3	CS	6.96	870	2.1	T3	PS	0.68	949	0.001	–	NO
Luxembourg			–	NO	NO			–	NO	NO	–	NO
Malta			–	NO	NO			–	NO	NO	–	NO
Monaco			–	NO	NO			–	NO	NO	–	
Netherlands	CS, T1, T3	CS, D	1.27	C	C	T1, T2	CS, PS	0.11	C	C	–	NO
New Zealand	T1, T2	CS, D	0.02	130	1.4			–	NO	NO	–	NO
Norway	T2	CS, D, PS	1.11	348	2.0	CS, T2, T3	PS	0.10	2 022	0.000	–	NO
Poland	T1, T2	CS, D	0.92	2 598	1.7	T2	CS	0.11	2 460	0.001	–	NA, NO
Portugal	NO	NO	–	NO	NO	T3	PS	0.06	C	C	–	NO
Romania	T1, T3	D, PS	0.66	C	C	T3	PS	0.07	C	C	–	NO
Russian Federation	T1, T1a, T2, T3	CS, D	1.50	19 857	2.0	T1	D	0.29	10 324	0.002	–	NO
Slovakia	T2, T3	CS, PS	1.86	581	1.6	T3	D, PS	0.14	636	0.000	–	NO
Slovenia	T2, T3	CS, D	–	NO	NO			–	NO	NO	–	NO
Spain	T1, T3	D, PS	0.10	C	C	T1, T3	D, PS	0.04	666	0.001	–	NO
Sweden	T1, T3	D, PS	–	NO	NO	T2, T3	CS, PS	0.02	280	0.000	–	NO
Switzerland	T2	PS	–	C	C	T2	PS	–	NO	NO	–	NO
Türkiye	T1, T2	CS, D	0.26	C	C	T1	D	0.36	1 349	0.005	–	NO
Ukraine	T1, T3	CS, D	1.05	2 369	2.1	T2	CS, D	0.74	1 795	0.005	–	NO
United Kingdom of Great Britain and Northern Ireland	CS, T1, T3	CS, D	0.27	771	1.5	T1, T3	CS, D	0.01	903	0.000	–	NO
United States of America	CS, T1	CS, D, OTH	0.19	15 420	1.3	CS, T1	CS, D	0.12	7 800	0.004	0.10	C

^a The national total includes indirect CO₂ emissions from the atmospheric oxidation of CH₄, CO and NMVOCs for the following Parties: Bulgaria, Canada, Cyprus, Czechia, Denmark, European Union, Finland, France, Japan, Latvia, Lithuania, Monaco, Netherlands, Norway, Poland, Portugal, Slovakia and Switzerland.

^b Source of default emission factors: 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 3 Chapter 3 Chemical Industry Emissions. Ammonia table 3.1; nitric acid table 3.3; adipic acid table 3.4.

Table 2.3

Metal industry - CO₂ (2021)

	Methods and EF used		Iron and steel ^a					Aluminium production		
	Methods	EF	Share of national total ^b	Steel		Pig iron		Share of national total ^b	Activity Data (production)	CO ₂ IEF
				Activity Data (production)	CO ₂ IEF	Activity Data (production)	CO ₂ IEF			
			(%)	(kt)	t/t	(kt)	t/t	(%)	(kt)	t/t
IPCC default EF ^c					1.46 (BOF) 0.08 (EAF) 1.72 (OHF)		1.35			1.6 (Prebake) 1.7 (Soderberg)
Australia	T2, T3	CS	–	C	IE, NO	NO	NO	0.44	1 576	1.5
Austria	T1, T3	CS, D, PS	14.19	7 195	1.5	6 131	IE, NO	0.01	C	C
Belarus	T1	D	0.22	2 474	0.080	NO	NO	–	NO	NO
Belgium	CS, T3	PS	3.13	6 910	0.49	4 199	IE, NA	–	NO	NO
Bulgaria	T2	CS, PS	0.02	618	0.017	NO	NO	–	C	NO
Canada	T2, T3	CS, PS	1.19	13 232	0.086	7 916	0.86	0.76	3 136	1.6
Croatia	T3	PS	0.06	185	0.077	NO	NO	–	NO	NO
Cyprus			–	NO	NO	NO	NO	–	NO	NO
Czechia	CS, T1, T2	CS, D, PS	5.39	4 801	IE, NA	3 885	IE, NA	–	NO	NO
Denmark	T1	D	–	NO	NO	NO	NO	–	NO	NO
Estonia	T3	PS	–	NO	NO	NO	NO	–	NO	NO
European Union			1.94	NE	NE	NE	NE	0.08	NE	NE
Finland	CS, T2, T3	CS	4.34	4 279	0.49	NO	IE, NO	–	NO	NO
France	T1, T2, T3	CS, D, PS	2.65	13 542	0.82	IE	IE	0.16	C	C
Germany	T1, T2, T3	CS, D	2.16	40 241	0.41	26 187	IE	0.09	509	1.4
Greece	CS, T1	CS, D, PS	0.11	1 606	0.052	NO	NO	0.39	184	1.6
Hungary	T3	PS	1.31	1 110	0.087	621	1.9	–	NO	NO
Iceland	T1, T3	PS	–	NO	NO	NO	NO	27.29	839	1.5
Ireland			–	NO	NO	NO	NO	–	NO	NO
Italy	T2	CR, CS, PS	0.34	24 412	0.044	4 111	0.084	–	NO	NO
Japan	T1, T2	CS, OTH	0.47	52	3.7	11 537	0.46	–	NO	NA, NO
Kazakhstan	T1, T2, T3	CS, D	3.12	4 522	0.11	3 195	1.6	0.13	262	1.6
Latvia			–	NO	NO	NO	NO	–	NO	NO
Liechtenstein			–	NO	NO	NO	NO	–	NO	NO
Lithuania	T2	D	0.00	NO	NO	NO	NO	–	NO	NO
Luxembourg	CS, T1, T2	CS, PS	0.96	2 078	0.043	NO	NO	–	NO	NO
Malta			–	NO	NO	NO	NO	–	NO	NO
Monaco			–	NO	NO	NO	NO	–	NO	NO
Netherlands	T1a, T2	D, PS	0.05	6 821	0.012	NA	IE, NO	0.05	88	0.94
New Zealand	T2, T3	CS	2.24	C	C	NA	NA, NO	0.71	333	1.6
Norway	T2, T3	CS, PS	0.07	621	0.052	NO	NO	4.41	1 419	1.5
Poland	T1, T2	CS, D	0.39	IE	IE	3 587	0.14	–	NO	NA, NO
Portugal	T1, T3	D, PS	0.11	1 953	0.033	NO	NO	–	NO	NO
Romania	D, T3	CS, D, PS	3.48	3 468	1.2	C	IE, NO	0.29	202	1.7
Russian Federation	T1, T2, T3	CS, D, PS	4.55	77 777	0.11	53 785	1.4	0.30	C	C
Slovakia	T1, T2, T3	D, PS	10.36	4 560	0.94	32	IE, NO	0.63	164	1.6
Slovenia	T1, T2, T3	D, PS	0.36	683	0.085	NO	NA, NO	0.35	38	1.5
Spain	T1, T2, T3	CS, D, PS	0.65	14 151	0.046	C	C	0.12	C	C
Sweden	T3	PS	4.89	1 855	0.089	2 992	0.64	0.36	116	1.5
Switzerland	CR, T2, T3	CS, D, PS	0.02	1 294	0.006	NO	NO	–	NO	NO
Türkiye	T1, T2, T3	CS, D, PS	2.11	40 622	0.23	C	IE, NO	0.02	C	C
Ukraine	T1, T3	CS, D	11.23	21 366	0.13	21 165	1.4	–	NO	NO
United Kingdom of Great Britain and Northern Ireland	T1, T2	CS	2.47	7 255	0.016	5 750	1.6	0.01	38	1.5
United States of America	T1, T2, T3	CS, D, OTH	0.66	57 307	0.096	22 246	0.32	0.02	880	1.8

^a The national total includes indirect CO₂ emissions from the atmospheric oxidation of CH₄, CO and NMVOCs for the following Parties: Bulgaria, Canada, Cyprus, Czechia, Denmark, European Union, Finland, France, Japan, Latvia, Lithuania, Monaco, Netherlands, Norway, Poland, Portugal, Slovakia and Switzerland.

^b In addition to data reported here, CO₂ emission estimates from different Metal industry sub-categories were reported by Austria, Belgium, Bulgaria, Canada, Czechia, Denmark, Estonia, European Union, France, Germany, Greece, Hungary, Iceland, Italy, Kazakhstan, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye, Ukraine, United Kingdom, and United States of America.

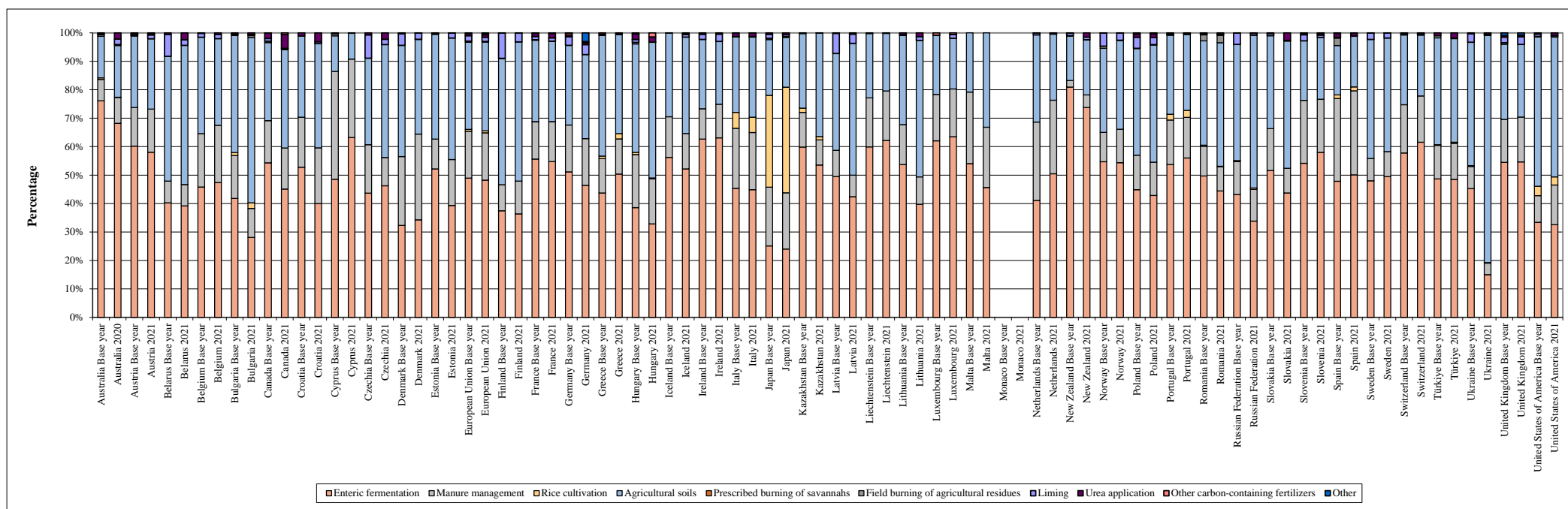
^c Source of default emission factors: 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 3 Chapter 4 Metal Industry Emissions. Iron and steel table 4.1; Aluminium table 4.10.

Table 2.4
HFCs, PFCs, SF₆ and NF₃ (2021)

	Metal industry						Electronic industry						Product uses as substitutes for ODS				Other product manufacture and use			
	HFCs		PFCs		SF ₆		PFCs		SF ₆		NF ₃		HFCs		PFCs		HFCs		PFCs	
	Methods	EF	Methods	EF	Methods	EF	Methods	EF	Methods	EF	Methods	EF	Methods	EF	Methods	EF	Methods	EF	Methods	EF
IPCC default EF																				
Australia													M	CS, D						
Austria					T2	D	T3	PS	T3	PS	T3	PS	T2	D						
Belarus																				
Belgium							T2, T3	D, PS	T2, T3	D, PS	T2, T3	D, PS	T2	CS, D, PS	T2	CS, D, PS			NO	NO
Bulgaria									NO	NO	NO	NO	T2	D	NO	NO	NO	NO	NO	NO
Canada			T3	PS	T3	PS	T1, T2	D, PS	T2	CS, D, PS	T2	D	T1, T2	CS, D	T1, T2	D			T1	D
Croatia													CS, T1, T1a, T2	CS, D, PS						
Cyprus													CS, T2	CS, D						
Czechia							T2	D	T2	D	T2	D	D, T1, T2	CS, D	D, T2	CS, D				
Denmark													T1, T2	D						
Estonia													T2	CS						
European Union																				
Finland													T2	CS, D	T2	D				
France			T2, T3	CS, PS			T2	CS	T2	CS	T2	CS	T1, T2	CS, D, PS			T2	OTH	T2	CS, D
Germany	D	D	T3	CS	D	D	CS	PS	CS	PS	CS	PS	CS, T2	CS, D	T2	CS, D	CS	CS		CS
Greece			T3	PS									CS, T2, T3	D	T2	D				
Hungary													T1, T2	CS, D	T2	D			NO	NO
Iceland			T2	D									T1a, T2	D	T2	D				
Ireland							T2	CS	T2	CS	T2	CS	T2	CS						
Italy							T2	CS	T2	CS	T2	CS	T2	CS, D						
Japan		CS			T2	OTH	T2	CS, D	T2	CS, D	T2	CS, D	CS	CS, D	CS	CS	T1	D	CS, T1	CS, D
Kazakhstan			T1	D									T2	D						
Latvia													T1a, T2	CS, D, OTH						
Liechtenstein							CS	CS	CS	CS	CS	CS	CS	CS	CS	CS				
Lithuania									T3	PS			T1a, T1b, T2	CS, D, PS						
Luxembourg													T1, T2	CS, M, PS			T3	PS		
Malta																				
Monaco													CS, T2	CS, D, OTH	T2					
Netherlands			T2	CS			T2	CS					T2	CS						
New Zealand			T2	D									T1a, T2	CS, D	CS, T2	CS			T1	D
Norway									T2	CS			T2	D	T1, T2	CS, D				
Poland									NO	NO	NO	NO	T1a, T1b, T2	D	T2	D				
Portugal	NO	NO	NO	NO	NO	NO							T2	D	T2	D				
Romania			T2	D, PS									T2	CS, D	T2	D				
Russian Federation			T2, T3	D, PS			T2	D	T2	D	T2	D	T1, T2	CS, D	T1	D				
Slovakia			T2	PS									T1a, T2	CS, D	T2					
Slovenia			T3	D, PS									T1, T2	CS, D	NO	NO				
Spain			T2	D									T1a, T2	CS, D	T1a, T2	CS, D				
Sweden	T2	D	T3	D									T1, T2	CS, D, PS						
Switzerland							T2	D	T2	D	T2	D	T1a, T2	CS, D	T2	CS	T1a, T3	D, PS	T1a, T3	D, PS
Türkiye			T3	PS	T2	PS														
Ukraine													T1a, T2	CS, D						
United Kingdom of Great Britain and Northern Ireland	T2	PS	T2	PS	T2	PS					T2	D	CS, T1a, T2	CS, OTH					T2, T3	CS, D
United States of America	M, T3	CS, M			M, T3	CS, M	M, T2	CS, M	M, T2	CS, M	M, T2	CS, M	M, T2	CS, M						

Figure 3.1

Contribution of subsectors to total GHG emissions in the Agriculture sector^{a, b}



^a In accordance with the UNFCCC reporting guidelines on annual inventories of Annex I Parties the year 1990 should be the base year for the estimation and reporting of inventories. However, in accordance with decisions 9/CP.2, 11/CP.4, and 7/CP.12 some Parties with economies in transition use base years other than 1990: Bulgaria (1988), Croatia (1990), Hungary (average of 1985 to 1987), Poland (1988), Romania (1989) and Slovenia (1986).

^b Indirect CO₂ emissions are excluded from the totals in this graph.

Table 3.1
Enteric fermentation - CH₄ (2021)

	Share of national total ^a	Methods and EF used		Activity data (population size)			Cattle						Sheep				Swine				
							Option A		Mature dairy cattle	Option B		Option C	Activity data (population size)			CH ₄ IEF	Activity data (population size)			CH ₄ IEF	
		Dairy cattle	Non-dairy cattle	Other mature cattle	Growing cattle	Other	CRF	FAO ^b		Difference	CRF										FAO ^b
		(%)	Methods	EF	CRF (thousands of head)	FAO ^b (thousands of head)	Difference (%)	CH ₄ IEF (kg/head/yr)						CRF (thousands of head)	FAO ^b (thousands of head)	Difference (%)	(kg/head/yr)	CRF (thousands of head)	FAO ^b (thousands of head)	Difference (%)	(kg/head/yr)
IPCC default EF ^{c,d}						46-128	27-60							5-8						1.0-1.5	
Australia	8.76	CS, T1, T2	CS, D	24 771	23 503	-5.12						56	66 670	63 529	-4.71	6.7	2 283	2 258	-1.11	1.6	
Austria	5.41	T1, T2	CS, D	1 870	1 870	0.00	130	54					402	402	0.00	8.0	2 479	2 786	12.36	0.97	
Belarus	9.02	T1, T2	CS, D	4 265	4 236	-0.68	118	54					87	84	-3.66	8.0	2 845	2 551	-10.32	1.5	
Belgium	4.02	T1, T2	CS, D	2 321	2 310	-0.45	126	46					135		—	8.0	6 238	6 042	-3.13	1.5	
Bulgaria	3.17	T1, T2	CS, D	579	611	5.54		109		77	53		1 254	1 200	-4.32	7.6	643	695	7.97	1.5	
Canada	3.64	T1, T2	CS, D	12 080	11 058	-8.46	145	71					933	791	-15.19	8.0	14 137	14 030	-0.76	1.5	
Croatia	4.41	T1, T2, T3	CS, D	428	428	0.10			129		61	52	654	654	-0.05	8.0	971	972	0.07	1.5	
Cyprus	4.06	T1, T2	CS, D	88	85	-3.83	128	57					312		—	8.0	361	361	0.03	1.5	
Czechia	3.05	T1, T2	CS, D	1 406	1 359	-3.34	147	69					183	183	-0.17	8.0	1 518	1 493	-1.64	1.5	
Denmark	9.12	T1, T2	CS, D, OTH	1 490	1 480	-0.69	161	40					294		—	7.8	13 168	13 152	-0.13	1.1	
Estonia	4.94	T1, T2	CS, D, OTH	251	251	0.00			157		87	33	75		—	8.0	308	308	0.00	1.1	
European Union	5.26			80 233	75 655	-5.71	133	48					63 793	59 342	-6.98	9.0	137 829	141 656	2.78	1.1	
Finland	4.79	CS, OTH, T1, T2	CS, D, OTH	844	830	-1.67	160	57					131	131	0.01	8.6	1 094	1 094	-0.01	0.98	
France	8.65	T2, T3	CS	17 424	17 330	-0.54	127	53					6 885	6 995	1.59	13	12 921	12 941	0.15	0.75	
Germany	3.44	T1, T2, T3	CS, D	11 040	11 040	0.00	141	49					1 795	1 508	-15.97	6.4	19 729	23 762	20.45	1.2	
Greece	5.23	T1, T2	CS, D	518	564	8.89	129	62					8 945	7 253	-18.91	9.5	692	733	5.97	1.5	
Hungary	3.68	T1, T2	CS, D	925	910	-1.58	134	55					937	887	-5.32	8.0	2 837	2 726	-3.92	1.5	
Iceland	6.94	T1, T2, T3	CS, D, OTH	81	81	0.00			114		70	38	613	385	-37.12	8.2	38	26	-32.26	1.5	
Ireland	23.33	CS, T1, T2	CS, D	7 286	6 649	-8.74	121	48					5 330	3 991	-25.13	9.5	1 704	1 714	0.57	1.2	
Italy	3.51	T1, T2	CS, D	5 871	6 280	6.97	140	45					6 728	6 728	0.00	7.6	8 408	8 408	0.00	1.5	
Japan	0.66	CS, T1	CS, D	3 985	3 961	-0.61	100	60					20	15	-23.48	8.0	8 950	9 290	3.80	1.4	
Kazakhstan	6.79	T1, T2	CS, D	9 035	8 192	-9.33	102	52					20 448	18 595	-9.06	7.1	970	776	-20.00	1.0	
Latvia	8.89	T1, T2	CS, D, OTH	394	393	-0.01			151		83	30	90	90	0.04	8.0	327	327	0.01	1.5	
Liechtenstein	8.63	T2	CS	63		—			139		107	43	4.2		—	8.8	1.6		—	1.1	
Lithuania	8.48	T1, T2	CS, D, OTH	640	629	-1.83	132	69					152	137	-10.18	10	578	574	-0.66	1.4	
Luxembourg	4.72	T1, T2	CS, D	189	187	-0.78							82	13	10	-25.99	7.3	69	78	12.96	1.5
Malta	1.88	T1, T2	CS, D	14	14	0.03							78	13	13	0.00	11	40	40	0.00	1.5
Monaco	—	NA	NA	NO		—	NO	NO					NO		—	NO	NO		—	NO	
Netherlands	5.41	T1, T2, T3	CS, D	3 732	3 705	-0.72			136		78	34	916	729	-20.46	8.0	11 372	10 872	-4.40	1.5	
New Zealand	36.26	T1, T2	CS, D	10 150	10 150	0.00	87	60					25 733	25 733	0.00	12	249	249	0.00	1.1	
Norway	5.20	T1, T2	CS, D	837	901	7.68			150		86	58	1 289	2 265	75.65	11	768	773	0.67	1.5	
Poland	3.65	T1, T2	CS, D	6 401	6 379	-0.35							78	289	265	-8.24	8.0	11 033	10 242	-7.17	1.5
Portugal	7.19	T1, T2	CS, D	1 666	1 641	-1.50	136	58					2 289	2 238	-2.22	9.9	2 246	2 221	-1.10	1.1	
Romania	7.38	T1, T2	CS, D	1 809	1 827	1.01	130	66					10 087	10 087	0.00	10	3 620	3 620	0.00	1.4	
Russian Federation	1.90	CS, T1, T2	CS, D	18 446	18 027	-2.27	97	57					20 953	19 785	-5.57	8.0	26 548	25 850	-2.63	1.2	
Slovakia	2.57	T1, T2	CS, D	434	434	0.00	128	59					291	291	0.00	11	453	453	0.00	1.5	
Slovenia	6.53	T1, T2	CS, D	483	483	0.00						75	87	119	36.37	8.0	216	216	0.00	1.5	
Spain	5.96	CS, T1, T2, T3	CS, D	6 750	6 576	-2.57	118	57					15 081	15 081	0.00	7.6	33 437	34 454	3.04	0.80	
Sweden	6.91	CS, T1	CS, D	1 453	1 390	-4.36	148	50					523	349	-33.37	8.0	1 440	1 373	-4.68	1.5	
Switzerland	8.02	T2, T3	CS, M	1 514	1 514	0.01			141		107	36	398	349	-12.36	8.8	1 470	1 368	-6.94	1.0	
Türkiye	6.19	T1, T2	CS, D	17 851	17 851	0.00	84	47					45 178	45 178	0.00	5.1	1.4	1.4	0.00	1.0	
Ukraine	2.15	T1, T2	CS, D	2 966	2 874	-3.11			114		69	46	822	621	-24.47	8.8	5 996	5 876	-1.99	1.5	
United Kingdom of Great Britain and Northern Ireland	5.48	T1, T3	CS, D	9 445	9 603	1.68	124	55					33 641	32 957	-2.03	5.0	5 323	5 323	0.00	1.5	
United States of America	3.07	M, T1, T2	CS, D, M	99 353	93 790	-5.60						68	5 170	5 170	0.00	9.0	74 100	74 146	0.06	1.5	

^a The national total includes indirect CO₂ emissions from the atmospheric oxidation of CH₄, CO and NMVOCs for the following Parties: Bulgaria, Canada, Cyprus, Czechia, Denmark, European Union, Finland, France, Japan, Latvia, Lithuania, Monaco, Netherlands, Norway, Poland, Portugal, Slovakia and Switzerland.

^b Source of international statistics: FAOSTAT data, downloaded on 15 June 2023 from <http://www.fao.org/faostat/en/#data/QA>. FAO data for 2020 is shown in the table for Australia.

^c Source of default emission factors: 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 Chapter 10: Emissions from Livestock and Manure Management. Dairy and Other cattle table 10.11; Sheep and Swine table 10.10.

^d For dairy and other cattle, 2006 IPCC default emission factors (in kg CH₄/head/year) are provided by regions as shown below (see footnote c for source reference).

	Western Europe	Eastern Europe	Oceania	Latin America	Asia	Africa and Middle East	Indian Subcontinent
Dairy cattle	117	99	90	72	68	46	58
Other cattle	57	58	60	56	47	31	27

Table 3.2

Manure management - CH₄ (2021)

	Share of national total ^a	Methods and EF used		Cattle						Sheep	Swine
				Option A		Option B			Option C		
		Methods	EF	Dairy cattle	Non-dairy cattle	Mature dairy cattle	Other mature cattle	Growing cattle	Other		
	(%)			CH ₄ IEF (kg/head/yr)							
IPCC default EF ^b				1-112	0 to 26					0.10 to 0.37	0 to 45
Australia	1.06	CS, T2, T3	CS, D						5.8	0.34	23
Austria	0.80	T2	CS, D	17	6.8					0.31	1.3
Belarus	0.69	T1, T2	CS, D	5.8	2.2					0.19	3.1
Belgium	1.19	T1, T2	CS, D	26	2.8					0.19	4.4
Bulgaria	0.68	T1, T2	CS, D			23	15	10		0.22	4.2
Canada	0.58	T1, T2	CS, D	39	3.6					0.28	4.9
Croatia	1.72	T2	CS, D			40	12	12		0.22	6.5
Cyprus	0.97	T1, T2	D	21	7.4					0.28	4.2
Czechia	0.32	T1, T2	CS, D	12	3.7					0.19	2.0
Denmark	6.70	CS, T1, T2	CS, D	57	17					0.44	4.5
Estonia	1.49	T1, T2	CS, D			34	19.5	8.3		0.19	5.9
European Union	1.29			21	5.3					0.45	5.3
Finland	1.03	T2	CS	32	6.6					0.25	3.2
France	1.50	T2	CS	16	4.8					0.39	7.0
Germany	0.91	T2	CS, D	23	7.7					0.28	4.7
Greece	0.94	T1, T2	CS, D	13	3.6					1.0	17
Hungary	1.18	T1, T2	CS, D	33	10					0.29	3.6
Iceland	1.39	T1, T2	CS, D			39	2.9	7.9		0.65	6.0
Ireland	3.33	T1, T2	CS, D	13	6.0					0.06	8.1
Italy	1.15	T1, T2	CS, D	25	11					0.24	8.2
Japan	0.21	CS, T1	CS, D	60	2.5					0.28	0.73
Kazakhstan	0.26	T1, T2	CS, D	4.6	0.99					0.10	4.0
Latvia	0.98	T1, T2	CS, D			18	2.0	1.1		0.19	2.3
Liechtenstein	1.66	T2	D			29	19	5.7		1.2	4.6
Lithuania	1.28	T1, T2	CS, D	13	8.8					0.41	2.7
Luxembourg	0.88	T1, T2	CS, D						14	0.15	4.9
Malta	0.31	T1, T2	CS, D						7.8	0.19	0.50
Monaco	–	NA	NA	NO	NO					NO	NO
Netherlands	2.37	T1, T2	CS, D			38	6.8	8.1		0.19	5.4
New Zealand	2.05	T1, T2	CS, D	8.7	0.83					0.14	5.9
Norway	0.83	T1, T2	CS, D			31	13	5.5		0.54	2.6
Poland	0.35	T1, T2	CS, D						4.1	0.19	1.3
Portugal	1.48	T1, T2	CS, D	26	1.9					0.33	7.4
Romania	0.62	T1, T2	CS, D	7.1	2.5					0.29	2.8
Russian Federation	0.27	CS, T1, T2	CS, D	4.1	2.9					0.19	5.8
Slovakia	0.21	T1, T2	CS, D	8.6	2.0					0.39	2.3
Slovenia	1.65	T1, T2	CS, D						16	0.24	3.9
Spain	2.88	T1, T2	CS, D	44	2.6					0.59	6.7
Sweden	0.62	T1, T2	CS, D	9.4	3.8					0.19	1.4
Switzerland	1.37	T2, T3	CS, M			20	10	3.6		1.1	4.0
Türkiye	0.71	T1	D	20	1.0					0.13	3.9
Ukraine	0.30	CS, T1, T2	CS, D			4.2	2.8	1.3		0.24	3.0
United Kingdom of Great Britain and Northern Ireland	1.00	T1, T2	CS, D	38	6.9					0.13	4.0
United States of America	1.04	M, T1, T2	CS, D, M						14	0.37	12

^a The national total includes indirect CO₂ emissions from the atmospheric oxidation of CH₄, CO and NMVOCs for the following Parties: Bulgaria, Canada, Cyprus, Czechia, Denmark, European Union, Finland, France, Japan, Latvia, Lithuania, Monaco, Netherlands, Norway, Poland, Portugal, Slovakia and Switzerland.

^b Source of default emission factors: 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 Chapter 10 Emissions from Livestock and Manure Management. Dairy, Other cattle and Swine table 10.14; Sheep table 10.15. Default emission factors are provided according to climate regions (cool, temperate, warm), as shown below.

Default IPCC emission factors according to climate regions^b

	Dairy cattle			Other cattle			Swine		
	cool	temperate	warm	cool	temperate	warm	cool	temperate	warm
North America	48-58	63-98	105-112	1	2	2	10-23	13-39	22-45
Western Europe	21-29	34-75	83-92	6-8	10-21	24-26	6-12	9-27	19-33
Eastern Europe	11-15	20-37	42-46	6-8	9-19	21-23	3-5	4-12	10-17
Oceania	23-26	27-30	31	1	2	2	11-22	13-24	13-24
Latin America	1	1	2	1	1	1	1	1	2
Africa	1	1	1	0	1	1	0-1	1	1-2
Middle East	2	2	2-3	1	1	1	1-2	2-5	5-6
Asia	9-12	13-26	28-31	1	1	1	2	3-6	6-7
Indian Subcontinent	5	5	5-6	2	2	2	2-3	3-5	6
	Sheep								
	cool	temperate	warm						
Developed countries	0.19	0.28	0.37						
Developing countries	0.10	0.15	0.20						

Table 3.3

Manure management - N₂O (2021)

	N excretion rates						Share of national total ^a	Methods and EF used		N ₂ O IEF				
	Option A		Option B			Option C				Dairy cattle	Non-dairy cattle	Sheep	Swine	Other livestock
	Dairy cattle	Non-dairy cattle	Mature dairy cattle	Other mature cattle	Growing cattle	Other								
	(kg N / head / year)						(%)	Methods	EF	(kg N ₂ O/head/yr)				
IPCC default EF ^b	0.35 to 0.70	0.31 to 0.79												
Australia						47	0.12	CS, T2, T3	D			NA	0.081	0.004
Austria	107	51					0.61	T2	D	0.80	0.47	0.067	0.086	0.003
Belarus	70	42					1.04	T1	D	0.45	0.25	0.073	0.076	0.005
Belgium	122	53					0.51	T2	D	0.73	0.54	0.018	0.030	0.001
Bulgaria			98	65	53		0.48	T1, T2	D			0.040	0.008	0.016
Canada	123	48					0.59	T1, T2	D	0.93	0.71	0.043	0.012	0.015
Croatia			96	63	22		0.44	T2	CS, D			0.021	0.010	0.004
Cyprus	96	39					0.80	T1	D	0.72	0.29	0.16	0.009	0.015
Czechia	117	59					0.33	T2	CS, D	0.62	0.32	0.038	0.048	0.004
Denmark	157	42					1.31	T1, T2	CS, D	0.96	0.37	0.031	0.069	0.003
Estonia			140	75	29		0.53	T1, T2	CS, D			0.061	0.006	0.005
European Union	118	53					0.52			0.62	0.26	0.030	0.047	0.004
Finland	138	56					0.50	T2	D	0.89	0.44	0.060	0.033	0.007
France	116	60					0.70	T2	CS, D	0.69	0.30	0.046	0.009	0.002
Germany	122	44					0.31	T2	CS, D	0.61	0.33	0.029	0.055	0.002
Greece	116	53					0.34	D	D	0.84	0.27	0.012	0.11	0.003
Hungary	131	53					0.60	T1, T2	CS, D	1.2	0.49	0.069	0.053	0.004
Iceland			94	66	35		0.27	CR, M, T1	CS, D			0.019	NO	0.004
Ireland	110	57					1.03	T2, T3	CS, D	0.13	0.16	0.013	0.026	0.003
Italy	111	52					0.43	T2	CS, D	0.64	0.32	0.013	0.092	0.005
Japan	78	43					0.33	CS, T1	CS, D	1.6	0.89	IE	0.46	0.003
Kazakhstan	61	43					0.85	T1, T2	CS, D	0.67	0.48	0.047	0.63	0.029
Latvia			120	63	20		0.61	T1, T2	D			0.074	0.045	0.004
Liechtenstein			113	85	36		0.76	NA	NA			0.077	0.031	0.009
Lithuania	112	44					0.77	T1, T2	D	0.63	0.28	0.046	0.011	0.004
Luxembourg						70	0.36	T2	CS			0.028	0.036	0.024
Malta						85	0.56	T1, T2	CS, D			0.055	0.043	0.079
Monaco	NO	NO					–	NA	NA	NO	NO	NO	NO	NO
Netherlands			142	81	37		0.40	T1	CS			0.006	0.027	0.004
New Zealand	107	77					0.14	T1	CS	NO	NO	NO	0.15	0.001
Norway			135	93	46		0.30	T2	CS, D			0.023	0.011	0.003
Poland						76	0.64	T1, T2	CS, D			0.044	0.086	0.002
Portugal	119	56					0.36	T2	CS, D	0.46	0.041	0.006	0.006	0.004
Romania	83	46					0.81	T2	D	0.33	0.18	0.061	0.10	0.003
Russian Federation	114	27					0.35	T1	CS, D	0.75	0.14	0.076	0.026	0.007
Slovakia	119	41					0.30	T1, T2	CS	0.77	0.24	0.088	0.069	0.002
Slovenia						57	0.45	T1, T2	CS, D			0.054	0.028	0.002
Spain	113	57					0.63	T1, T2	D	0.59	0.14	0.021	0.030	0.007
Sweden	138	42					0.60	CS, T2	CS, D	0.77	0.25	0.029	0.063	0.008
Switzerland			111	85	33		0.75	CS, T3	D			0.076	0.023	0.003
Türkiye	83	38					0.91	T1	D	0.55	0.25	0.067	NO	0.004
Ukraine			73	56	29		0.28	CS, T1, T2	CS, D			0.018	0.088	0.002
United Kingdom of Great Britain and Northern Ireland	119	44					0.58	T2	CS, D	0.53	0.56	0.003	0.16	0.007
United States of America						62	0.27	M, T1, T2	CS, D, M			0.20	0.091	0.003

^a The national total includes indirect CO₂ emissions from the atmospheric oxidation of CH₄, CO and NMVOCs for the following Parties: Bulgaria, Canada, Cyprus, Czechia, Denmark, European Union, Finland, France, Japan, Latvia, Lithuania, Monaco, Netherlands, Norway, Poland, Portugal, Slovakia and Switzerland.

^b Source of default N excretion rates: 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 Chapter 10 Emissions from Livestock and Manure Management, table 10.19, page 10.59. Default values are provided by regions as shown below. The unit of the IPCC defaults is kg N (1000 kg animal mass)⁻¹ day⁻¹.

IPCC defaults:

	North America	Western Europe	Eastern Europe	Oceania	Latin America	Africa	Middle East	Asia
Dairy cattle	0.44	0.48	0.35	0.44	0.48	0.60	0.70	0.47
Non-dairy cattle	0.31	0.33	0.35	0.50	0.36	0.63	0.79	0.34
Sheep	0.42	0.85	0.90	1.13	1.17	1.17	1.17	1.17
Swine	0.50	0.68	0.74	0.73	1.64	1.64	1.64	0.50
Poultry	0.83	0.83	0.82	0.82	0.82	0.82	0.82	0.82

Table 3.4
Agriculture soils - N₂O (2021)

	Methods and EF used		Direct N ₂ O emissions from managed soils								Indirect N ₂ O emissions from managed soils				
			Share of national total ^a	Inorganic N fertilizers		Organic N fertilizers	Urine and dung deposited by grazing animals	Crop residue	Loss/gain of soil organic matter	Cultivation of organic soils	Share of national total ^a	Atmospheric deposition		Nitrogen leaching and run-off	
				Activity data	N ₂ O IEF							Activity data	N ₂ O IEF	Activity data	N ₂ O IEF
	Methods	EF	Use of synthetic fertilizers	N ₂ O IEF					Activity data	N ₂ O IEF	Activity data				
			(%)	(kg N / year)	(kg N ₂ O-N / kg N)					(%)	(kg N / year)	(kg N ₂ O-N / kg N)	(kg N / year)	(kg N ₂ O-N / kg N)	
IPCC default EF					0.01 (0.003-0.03) ^b							0.01 (0.002-0.05) ^c		0.0075 (0.0005-0.025) ^c	
Australia	CS, T1, T2	CS, D	1.75	1 513 790 387	0.003	0.009	0.004	0.010	2.0	14	0.59	499 606 183	0.003	479 987 587	0.011
Austria	CS, T1, T2	D	1.93	111 079 645	0.010	0.010	0.017	0.010	0.010	8.2	0.37	29 888 403	0.010	51 786 845	0.008
Belarus	T1	D	9.66	428 000 000	0.010	0.010	0.020	0.010	0.010	8.0	1.60	83 936 699	0.010	307 168 501	0.008
Belgium	T1	D	2.04	149 784 472	0.010	0.010	0.019	0.010	0.010	8.0	0.55	34 812 818	0.010	147 865 028	0.008
Bulgaria	T1	D	5.16	342 890 000	0.010	0.010	0.013	0.010	0.010	8.0	1.41	34 424 084	0.010	198 057 322	0.008
Canada	T1, T2	CS, D	2.21	2 970 000 000	0.007	0.008	0.001	0.006	0.014	8.0	0.59	285 927 176	0.007	843 695 727	0.008
Croatia	T1	D	3.07	102 190 000	0.010	0.010	0.011	0.010	0.010	8.0	0.97	17 089 455	0.010	53 259 976	0.008
Cyprus	T1, T2	CS, D	0.39	6 735 000	0.003	0.003	NO	0.010	0.010	NO	0.20	4 056 256	0.010	27 242	0.002
Czechia	T1, T2	CS, D	2.00	309 646 000	0.010	0.010	0.019	0.010	NO	NO	0.61	50 660 808	0.010	166 617 686	0.008
Denmark	CS, T1, T2	CS, D	7.37	228 807 838	0.010	0.010	0.004	0.010	0.010	7.4	1.49	126 160 774 177 432	0.000	153 278 393	0.008
Estonia	T1	D	4.35	46 767 000	0.010	0.010	0.017	0.010	NO	8.0	1.02	8 891 591	0.010	29 294 295	0.008
European Union			2.72	9 844 834 600	0.009	0.008	0.009	0.008	0.004	6.9	0.68	1 798 385 320	0.010	4 790 926 400	0.008
Finland	T1, T2, T3	CS, D	5.91	145 807 000	0.010	0.010	0.017	0.010	0.010	9.9	0.53	9 458 418	0.010	46 342 625	0.011
France	T1, T2	CS, D	3.52	1 977 723 997	0.010	0.006	0.004	0.006	NO	3.4	0.94	301 030 478	0.008	653 527 265	0.011
Germany	T1, T2	CS, D	1.64	1 301 012 667	0.006	0.007	0.019	0.006	0.010	6.2	0.55	255 387 510	0.010	987 776 723	0.007
Greece	T1	D	2.66	182 650 500	0.010	0.010	0.010	0.010	NE	8.0	0.95	68 066 735	0.010	144 460 396	0.008
Hungary	T1, T2	D	4.97	456 321 840	0.010	0.010	0.016	0.010	0.010	NO	0.38	37 500 136	0.010	29 144 728	0.008
Iceland	T1	CS, D	3.83	12 245 000	0.010	0.010	0.011	0.010	NO	0.55	0.68	2 207 752	0.010	7 205 382	0.008
Ireland	T1	CS, D	6.96	399 164 000	0.012	0.006	0.008	0.006	0.006	4.3	1.20	51 218 307	0.014	96 986 518	0.011
Italy	D, T1	CS, D	1.73	538 893 000	0.010	0.010	0.011	0.010	NA	8.0	0.48	130 679 838	0.010	469 267 287	0.008
Japan	CS, T2	CS, D	0.28	374 702 711	0.006	0.006	0.004	0.006	0.004	1.8	0.20	134 687 250	0.014	283 116 251	0.011
Kazakhstan	T1, T2	CS, D	4.10	81 018 370	0.009	0.010	0.014	0.010	0.010	NO	0.52	175 644 558	0.010	267 431 197	0.008
Latvia	T1	CS, D	8.27	84 600 000	0.010	0.010	0.019	0.010	NO	4.0	1.46	13 247 588	0.010	32 444 832	0.008
Liechtenstein	T1b	D	2.13	168 543	0.010	0.010	0.018	0.010	NO	8.0	0.69	78 980	0.026	126 848	0.007
Lithuania	T1, T2	D	8.45	175 000 000	0.010	0.010	0.019	0.010	NO	8.0	1.78	21 202 189	0.010	87 387 689	0.008
Luxembourg	T1, T2	CS, D	1.10	12 704 561	0.009	0.009	0.009	0.009	0.009	NO	0.22	2 976 633	0.014	6 775 936	0.001
Malta	T1	D	1.02	2 054 448	0.010	0.010	NO	0.010	0.010	NO	0.34	727 603	0.005	1 258 196	0.011
Monaco			–	NO	NO	NO	NO	NO	NO	NO	–	NO	NO	NO	NO
Netherlands	T1, T1b, T2	CS, D	2.18	236 356 392	0.010	0.007	0.031	0.011	NO	4.4	0.31	43 048 807	0.012	96 856 774	0.008
New Zealand	T1, T2	CS, D	7.69	441 000 000	0.007	0.004	0.005	0.010	0.010	8.0	1.83	182 511 761	0.010	157 875 243	0.008
Norway	T1	CS, D	2.56	107 282 273	0.010	0.010	0.016	0.010	NO	12	0.42	14 009 786	0.011	45 440 667	0.007
Poland	T1	CS, D	2.84	1 038 000 000	0.010	0.010	0.019	0.010	0.010	8.0	0.66	201 817 501	0.010	581 947 851	0.008
Portugal	T1, T2	CS, D	2.75	91 320 161	0.010	0.010	0.018	0.010	IE	NO	0.69	21 165 624	0.013	59 331 600	0.011
Romania	T1	D	5.50	538 610 000	0.010	0.010	0.013	0.009	NO	8.0	1.71	138 180 350	0.010	447 872 971	0.008
Russian Federation	CS, T1, T2	CS, D	2.58	2 094 297 382	0.014	0.010	0.018	0.010	0.010	8.0	0.44	542 900 791	0.010	1 990 847 653	0.008
Slovakia	T1, T2	CS, D	2.35	127 494 597	0.010	0.010	0.016	0.010	0.010	NE	0.29	19 463 419	0.010	12 467 812	0.008
Slovenia	T1, T2	D	1.85	29 143 000	0.010	0.010	0.017	0.010	0.010	8.0	0.60	8 294 570	0.010	20 073 615	0.008
Spain	CS, T1, T2	D	1.59	1 022 192 680	0.007	0.005	0.003	0.005	NA	NO	0.53	238 441 819	0.010	170 619 927	0.007
Sweden	CS, T1, T2	CS, D	5.05	195 036 000	0.010	0.010	0.017	0.010	NO	13	0.52	20 005 860	0.010	53 274 950	0.008
Switzerland	T1, T3	CS, D	1.89	45 369 806	0.010	0.010	0.006	0.010	0.010	8.0	0.90	21 984 344	0.026	36 148 791	0.011
Türkiye	T1	D	4.12	1 787 348 430	0.010	0.010	0.013	0.010	NO	8.0	0.54	594 149 874	0.010	68 528 202	0.008
Ukraine	CS, T1, T2	D	9.10	1 999 174 940	0.010	0.010	0.019	0.010	0.010	8.0	2.38	336 602 541	0.010	1 767 779 924	0.008
United Kingdom of Great Britain and Northern Ireland	T1, T2	CS, D	2.06	996 711 784	0.007	0.007	0.003	0.010	0.010	12	0.50	120 376 101	0.014	467 175 174	0.008
United States of America	OTH, T1	D, OTH	4.18	11 076 033 741	0.014	0.012	0.009	0.009	0.010	9.9	0.46	2 689 335 109	0.010	5 804 300 666	0.008

^a The national total includes indirect CO₂ emissions from the atmospheric oxidation of CH₄, CO and NMVOCs for the following Parties: Bulgaria, Canada, Cyprus, Czechia, Denmark, European Union, Finland, France, Japan, Latvia, Lithuania, Monaco, Netherlands, Norway, Poland, Portugal, Slovakia and Switzerland.

^b Source of default emission factors: 2006 IPCC Guidelines for National Greenhouse Gas Inventories, table 11.1, page 11.11. IEFs for N-fixing crops and crop residues are shown in the unit kg N₂O-N/kg N. The unit of the IPCC default emission factor is also kg N₂O-N/kg N.

^c For cultivation of histosols (drained/managed organic soils), the two default values refer to temperate. The values in parenthesis indicate the range as presented in 2006 IPCC Guidelines for National Greenhouse Gas Inventories, table 11.1, page 11.11.

^d For cultivation of histosols (drained/managed organic soils), the two default values refer to temperate tropical. The values in parenthesis indicate the range as presented in 2006 IPCC Guidelines for National Greenhouse Gas Inventories, table 11.1, page 11.11.

^e Source of default emission factor: 2006 IPCC Guidelines for National Greenhouse Gas Inventories, table 11.3, page 11.24.

Table 4.1a

Methods and emission factors used (2021)

	Forest Land						Cropland						Grassland					
	CO ₂		CH ₄		N ₂ O		CO ₂		CH ₄		N ₂ O		CO ₂		CH ₄		N ₂ O	
	Method	EF	Method	EF	Method	EF	Method	EF	Method	EF	Method	EF	Method	EF	Method	EF	Method	EF
Australia	T2, T3	CS, M	T2, T3	CS	T2, T3	CS	T2, T3	CS, D, M	T2	CS	T2	CS	T2, T3	CS, D, M	T2, T3	CS	T2, T3	CS
Austria	T2, T3	CS	T1	D	T1, T2	CS, D	T2, T3	CS			T2	CS, D	T1, T2, T3	CS	T1	D		
Belarus	T1, T2	CS, D	T1	CS, D	T1	CS, D	T1	D										
Belgium	CS, T1, T2	CS			T1	D	CS, T1, T2	CS			T1	D	CS, T1, T2	CS			T1	D
Bulgaria	T1, T2	CS, D	T1	D	T1	D	T1, T2	CS, D			T1	D	T1, T2, T3	CS, D				
Canada	M, T1, T3	CS, D, M	T1, T2	CS, D	T1, T2	CS, D	M, T1, T2, T3	CS, D, M	T2	CS	M, T2	CS			T1	D	T1	D
Croatia	T1, T2	CS, D	T1	D	T1	D	T1, T2	CS, D	T1	D	T1, T2	CS, D	T1	CS, D	T1	D	T1	D
Cyprus	T1, T2	CS, D	T1	OTH	T1	OTH	T1, T2	CS, D			T1	D	T1, T2	CS, D				
Czechia	T2, T3	CS, D	T2	CS, D	T2	CS, D	T1, T2, T3	CS, D			T1, T2	CS, D	T1, T2, T3	CS, D				
Denmark					T1	D					T1	D	T1, T2	CS, D	T1	D	T1	D
Estonia	T1, T2	CS, D, OTH	T1, T2	D	T1, T2	D	T1, T2	CS, D, OTH			T1	D	T1, T2	CS, D, OTH	T2	D	T2	D
European Union																		
Finland	T2, T3	CS	T1, T2	CS, D	T1, T2	CS, D	T2, T3	CS, D			T1	CS, D	T2, T3	CS, D	T1, T2	D	T1, T2	D
France	T1, T2	CS, D	T1, T2	CR, D	T1, T2	CR, D	T1, T2	CS, D	T1, T2	D	T1, T2	D	T1, T2	CS, D	T1, T2	D	T1, T2	D
Germany	T2, T3	CS, D	T2	CS, D	T2	CS, D	T2, T3	CS, D	T2	CS, D	T2	CS, D	T2, T3	CS, D	T2	CS, D	T2	CS, D
Greece	T1, T2	CS, D	T1	D	T1	D	T1, T2	CS, D			T1	D	T1, T2	CS, D	T1	D	T1	D
Hungary	T1, T2	CS, D	T1, T2	CS, D	T1, T2	CS, D	T1, T2	CS, D	T2	D	T1, T2	D	T1, T2	CS, D	T1	D	T1	D
Iceland	T1, T2, T3	CS, D, OTH	T1	CS, D	T1, T2	CS, D	D, T1, T2, T3	CS, D, OTH	T1	D			T1, T2, T3	CS, D, OTH	T1, T2	CS, D	T1, T2	CS, D
Ireland	CS, T1, T2, T3	CS	D, T1	CS, D	D, T1	CS, D	CS, D	D	D, T1	D	D, T1	D	D, T1, T2, T3	CS, D	D, T1	D	D, T1, T2	D
Italy	T1, T2, T3	CS, D	T2	CS, D	T2	CS, D	T1, T2	CS, D	T1	D	T1	D	T1, T2, T3	CS, D	T1	CS	T1	CS
Japan	T1, T2, T3	CS, D	T1	D	T1, T2	CS, D	T1, T2, T3	CS, D	T1	CS, D	T1, T2	CS, D	T1, T2, T3	CS, D	T1	CS, D	T1, T2	CS, D
Kazakhstan	T1, T2	CS, D	T1, T2	CS, D	T1, T2	CS, D	T2	CS					T1, T2	CS, D	T1, T2	CS, D	T1, T2	CS, D
Latvia	T1, T2	CS, D	T1, T2	CS, D	T1, T2	D	T2, T3	CS	T1	D	T1	CS	T1, T2, T3	CS, D	T1, T2	CS, D	T1	D
Liechtenstein	T2	CS					T2	CS			T2	CS	T2	CS			T2	CS
Lithuania	T1, T2	CS, D	T1, T2	D	T1, T2	D	T1, T2	CS, D	T1	D	T1, T2	D	T1, T2	CS, D	T1	D	T1, T2	CS, D
Luxembourg	T1, T3	CS, D					T1	CS, D			T1	D	T1	CS, D			T1	D
Malta	T1	D, OTH					T1	D, OTH			T1	D	T1	D, OTH			T1	D
Monaco																		
Netherlands	T1, T2	CS, D	T1	CS, D	T1	CS, D	CS, T1, T3	CS, D	T1	CS	T2	CS, D	CS, T1, T2	CS, D	CS, T1	CS, D	CS, T2	CS, D
New Zealand	T1, T2, T3	CS, D	T1, T2	CS, D	T1, T2	CS, D	T1, T2, T3	CS, D			T1, T2	CS, D	T1, T2, T3	CS, D	T1, T2	CS, D	T1, T2	CS, D
Norway	T1, T3	CS, D	T1	D	T1	D	T1, T2, T3	CS, D	T1	D	T1	D	T1, T2, T3	CS, D	T1	D	T1	D
Poland	T2	CS, D	D, T2	CS, D	D, T1, T2	CS, D	T1, T2	D			T1	D	D, T1	CS, D	D, T1	CS, D	D, T1	CS, D
Portugal	CS, D, T1, T2	CS, D	CS, D	D	CS, D	D	D, T1, T2	CS, D	CS, D	D	CS, D	D	D, T1, T2	CS, D	CS, D	D	CS, D	D
Romania	T1, T2	CS, D	T1	D	T1	D	T1, T2	CS, D			T1	D	T1, T2	CS, D			T1	D
Russian Federation	CS, T2, T3	CS, D	T1, T2	CS, D	T1, T2	CS, D	CS, T1	CS, D	T1	D			CS, T1, T3	CS	T1	D	T1	D
Slovakia	T1, T2, T3	CS, D	T2	CS, D	T2	CS, D	T1, T2	CS, D			T2	CS, D	T2	CS			T2	CS, D
Slovenia	CS, D, T1, T2, T3	CS, D	D, T1	D	D, T1	D	CS, D, T1, T2	CS, D			D, T1	D	D, T1, T2, T3	CS, D			D, T1	D
Spain	T1, T2	CS, D	T1, T2	D	T1, T2	D	T1, T2	CS, D	T1	D	T1	D	T1, T2	CS, D	T1, T2	D	T1, T2	D
Sweden	T2, T3	CS	T1	CS, D	T1	CS, D	T2, T3	CS	T1	CS	T1	D	T2, T3	CS	T1	CS		
Switzerland	T2, T3	CS, M	T1	D	T1	D	T2, T3	CS, M			T1	D	T2, T3	CS, M	T1	D	T1	D
Türkiye	T2, T3	CS, D	T1	D	T1	D	T1, T2	CS, D			T1	D	T1, T2	CS, D			T1	D
Ukraine	CS, T1, T2	CS, D	CS, T1	D	CS, T1	D	CS, T1, T3	CS, D	CS, T1	D	CS, T1	D	CS, T1, T3	CS, D	T1	D	T1	D
United Kingdom of Great Britain and Northern Ireland	CS, D, T1, T2, T3	CS, D	D, T1	CS, D	D, T1, T2	CS, D	CS, D, T1, T3	CS, D	D, T2	CS, D	D	CS, D	CS, D, T1, T3	CS, D	D, T2	CS, D	D	CS, D
United States of America	T2, T3	CS	T2	D	T1, T2	D	OTH, T2	CS, OTH					OTH, T2	CS, OTH	OTH	OTH	OTH	OTH

Table 4.1b

Methods and emission factors used (2021)

	Wetlands						Settlements						Other Land						Harvested Wood Products	
	CO ₂		CH ₄		N ₂ O		CO ₂		CH ₄		N ₂ O		CO ₂		CH ₄		N ₂ O		CO ₂	
	Method	EF	Method	EF	Method	EF	Method	EF	Method	EF	Method	EF	Method	EF	Method	EF	Method	EF	Method	EF
Australia	T2, T3	CS, D, M	T2, T3	CS, D	T3	CS	T2, T3	CS, M	CS	CS	CS, T2	CS							T2, T3	D, M
Austria	T2, T3	CS					T2, T3	CS			T2, T3	CS	T2, T3	CS					T2, T3	CS, D
Belarus	T1	D			T1	D	D	D											T2	D
Belgium	CS, T1	CS			T1	D	CS, T1	CS			T1	D							T2	D
Bulgaria	T1	D			T1	D	T1, T2	CS, D			T1	D							T2	D
Canada	M, T2, T3	CS, M	M, T2	CS	M, T2	CS, D	M, T2, T3	CS, M	T2	CS	T2	CS							M, T3	CS
Croatia	T1	D			T1	D	T1, T2	CS, D			T1	D							T2	D
Cyprus	T1	CS, D					T1, T2	CS, D			T1	D							T2	D
Czechia	T1, T2, T3	CS, D					T2, T3	CS											T1, T2	D
Denmark			T1	D	T1	D					T1	D							T1	D
Estonia	T2	CS, D, OTH	T2	CS	T2	CS	T1, T2	CS, D, OTH			T1	D	T1, T2	CS, D, OTH			T1	D	T2	CS, D
European Union																				
Finland	T1, T2, T3	CS, D	T1, T2	CS, D	T2	CS	T2, T3	CS			T1	D							T2	CS, D
France	T1, T2	CS, D	T1, T2	D	T1, T2	D	T1, T2	CS, D	T1, T2	D	T1, T2	D	T1, T2	CS, D	T1, T2	D	T1, T2	D	T3	CS
Germany	T2, T3	CS, D	T2	CS, D	T2	CS, D	T2, T3	CS, D	T2	CS, D	T2	CS, D							CS, T2	D
Greece					T1	D	T1, T2	CS, D			T1	D	T1, T2	CS, D			T1	D	T2	D
Hungary	T1	D			T1	D	T1, T2	CS, D			T1	D							T2	D
Iceland	T1, T2	CS, D	RA, T1, T2	CS, D			T1, T2, T3	CS, OTH			CS	D								
Ireland	D, T1, T2, T3	CS, D	D, T2	CS, D	D, T2	CS, D	D, T1, T3	CS, D, OTH			T1	D	T1, T3	CS			T1	D	T2	D
Italy							T1	D			T1	D							T2	CS
Japan	T1, T2	CS, D					T2	CS, D			T2	CS	T2	CS, D			T2	CS, D	T2, T3	CS, D
Kazakhstan																				
Latvia	T1, T2	CS, D	T1, T2	CS, D	T2	CS	T1, T2	CS, D			T1	D							T2	CS
Liechtenstein	T2	CS			T2	CS					T2	CS	T2	CS			T2	CS	T2	CS
Lithuania	T1	D			T1	D	T1, T2	CS, D			T1, T2	CS, D	T1, T2	CS, D			T1, T2	CS, D	T1, T2	D
Luxembourg	T1	CS, D			T1	D	T1	CS, D			T1	D							T1	CS
Malta	T1	D, OTH					T1	D, OTH			T1	D	T1	D, OTH			T1	D		
Monaco							T1, T2	D			T1	D								
Netherlands	T1, T2	CS, D			T2	CS, D	CS, T1, T2	CS, D			T2	CS, D	CS, T1, T2	CS, D			T1, T2	CS, D	T1	D
New Zealand	T1, T2	CS, D			T1, T2	CS, D	T1, T2	CS, D			T1, T2	CS, D	T1, T2	CS, D			T1, T2	CS, D	T2	CS, D
Norway	T1, T2, T3	CS, D	T1	D	T1	D	T1, T2, T3	CS, D			T1	D							T2	D
Poland	T1	D					T1, T2	CS, D			T1	D							T2	D
Portugal	D, T1, T2	CS, D	CS, D	D	CS, D	D											D	D	D, T1, T2	CS, D
Romania	T1, T2	CS, D			T1	D	T1, T2	CS, D			T1	D	T1, T2, T3	CS, D			T1	D	T2	D
Russian Federation	T1	CS, D	T1	CS, D	T1	D	CS, T1	CS			T1	D	T1	CS			T1	D	T1	D
Slovakia							T1, T2	CS, D			T2	CS, D	T1, T2	CS, D			T2	CS, D	T2	CS, D
Slovenia	D, T1, T2	CS, D					D, T2	CS, D			D, T1	D	D, T2	CS, D			D, T1	D	D, T1	D
Spain	T1, T2	CS, D	T1	D	T1	D	T1, T2	CS, D			T1	D	T1, T2	CS, D			T1	D	T2	D
Sweden	T2, T3	CS	T1	CS	T1	CS	T2, T3	CS			T1	D	T2, T3	CS					T3	D
Switzerland	T2	CS	T2	D	T1	D	T2	CS			T1	D	T2	CS			T1	D	T2	D
Türkiye	T1, T2	CS, D			T1	D	T1	D					T1	D					T2, T3	CS, D
Ukraine	T1	D	T1	D	T1	D	T1	CS, D			T1	D	T1	CS, D			T1	D	T1	D
United Kingdom of Great Britain and Northern Ireland	D, T1, T2, T3	CS, D	T1, T2	CS, D	T1, T2	CS, D	CS, D, T1, T3	CS, D	D	CS	D	CS, D							CS, T3	CS
United States of America	T1, T2	CS, D	T1	D	T1	D	CS, OTH, T2, T3	CS, OTH			T1, T2	D							T3	CS

Table 4.2

Forest land - AD, IEFs, carbon stock changes in pools and net CO₂ emissions/removals (2021)^{a, b}

	Forest land remaining forest land							Land converted to forest land						
	IEF (t C/ha)													
	CSC ^c in living biomass/area ^d			Net CSC ^c in dead wood/area	Net CSC ^c in litter/area	Net CSC ^c in soils/area ^{e, f}		CSC ^c in living biomass/area ^d			Net CSC ^c in dead wood/area	Net CSC ^c in litter/area	Net CSC ^c in soils/area ^{e, f}	
	Gains	Losses	Net Change			Mineral soils	Organic soils	Gains	Losses	Net Change			Mineral soils	Organic soils
IPCC default EF														
Australia	0.078	-0.032	0.045	0.016	0.007	0.026	IE, NA	0.68	IE, NO	0.68	0.066	0.011	-0.13	0.000
Austria	2.4	-2.2	0.21	0.023	IE, NA	0.39	NO	1.5	-0.42	1.1	0.058	1.2	0.64	NO
Belarus	1.8	-0.50	1.3	0.030	0.046	0.26	NE	NE	NE	NE	NE	NE	NE, NO	NE
Belgium	0.68	NO	0.68	NA	NA	NA	NO	2.1	-0.000	2.1	0.061	0.24	1.2	NO
Bulgaria	0.50	IE, NE	0.50	0.079	NA	NA	NO	1.0	-0.15	0.88	NA, NE, NO	0.42	-0.63	NO
Canada	2.6	-2.4	0.16	0.10	-0.13	0.032	IE, NA	2.8	-1.4	1.3	0.18	0.39	-0.065	IE, NO
Croatia	1.7	-1.1	0.66	NA	NA	NA	NO	1.2	-0.031	1.2	0.016	0.23	-0.25	NO
Cyprus	0.33	-0.15	0.18	NA	NA	NA	NO	1.3	-0.45	0.81	3.2	0.21	0.15	NO
Czechia	2.8	-4.2	-1.5	0.081	0.19	0.020	NO	2.5	NO	2.5	0.038	0.33	0.27	NO
Denmark	0.65	IE, NA	0.65	0.055	0.27	NA	-1.3	2.7	-0.32	2.4	0.010	0.50	0.15	-1.3
Estonia	IE	-0.21	-0.21	0.016	NA	0.15	-0.33	1.4	IE	1.4	0.006	0.30	-0.005	-0.68
European Union	1.2	-0.85	0.35	0.038	-0.001	0.081	-0.45	1.7	-0.75	0.98	0.057	0.23	0.36	-1.0
Finland	1.7	-1.5	0.18	IE	IE	0.072	-0.37	1.2	-0.22	1.0	NA	IE, NA	0.033	-1.2
France	1.4	-1.2	0.20	-0.011	0.000	0.002	NO	1.3	-0.48	0.86	0.063	0.42	0.50	NO
Germany	0.71	IE	0.71	0.095	-0.012	0.35	-2.9	1.0	-1.8	-0.80	0.003	0.47	0.48	-2.9
Greece	0.19	IE, NO	0.19	NE, NO	NE, NO	NA, NO	NA, NO	0.35	-0.14	0.21	NE, NO	NE, NO	0.012	NO
Hungary	0.73	IE, NO	0.73	0.027	NE	NE	-2.6	1.5	-0.20	1.3	0.043	0.28	0.28	IE, NO
Iceland	0.39	IE	0.39	IE, NO	NA	NA	-0.37	1.4	-0.026	1.4	0.005	0.14	0.41	-0.37
Ireland	7.8	-8.0	-0.22	0.053	0.28	-0.052	-1.6	6.5	-4.3	2.3	0.56	0.53	0.025	-1.6
Italy	2.4	-1.7	0.76	0.007	0.012	NA, NO	NO	2.7	-1.8	0.84	0.007	0.012	0.23	NO
Japan	0.62	IE, NA	0.62	-0.016	0.002	0.019	NO	3.0	IE, NA, NO	3.0	0.16	0.33	0.83	NO
Kazakhstan	0.15	IE	0.15	0.023	0.019	0.13	NO	NA	NA	NA	NA	NA	NA	NA
Latvia	2.9	-2.7	0.14	0.060	NA	NA	-0.52	0.22	IE, NA	0.22	0.037	0.081	NA	-0.52
Liechtenstein	2.4	-1.8	0.57	0.026	-0.043	NO	NO	1.3	-1.3	0.005	NO	NO	NO	NO
Lithuania	0.61	IE	0.61	0.13	NA	NE	IE	1.7	IE	1.7	NO	0.10	0.56	IE
Luxembourg	3.1	-1.4	1.8	0.11	NE	NO	NO	3.1	-0.033	3.1	0.34	0.96	1.2	NO
Malta	0.001	NA	0.001	NA	NA	NA	NO	0.68	NO	0.68	NO	3.8	NO	NO
Monaco	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Netherlands	2.8	-1.6	1.2	0.065	0.14	NA	-0.99	4.0	-0.47	3.5	NE	NE	-0.043	-1.0
New Zealand	1.6	-1.4	0.23	0.12	-0.007	0.000	-0.17	4.2	-0.95	3.3	0.34	0.24	-0.61	-0.68
Norway	1.1	-0.74	0.33	0.022	0.11	0.003	-0.49	1.0	-0.42	0.59	1.2	1.9	0.068	-0.55
Poland	0.43	IE	0.43	0.14	NO	0.088	-0.68	0.73	-0.071	0.66	NA, NO	NA, NO	0.27	-0.68
Portugal	3.5	-3.3	0.24	IE	-0.002	-0.027	NO	4.6	-3.5	1.1	IE	0.079	0.76	NO
Romania	1.7	-0.80	0.88	0.11	0.039	0.063	-2.6	1.7	IE, NO	1.7	0.063	IE, NO	2.0	NO
Russian Federation	0.32	-0.11	0.21	0.017	0.006	0.027	-0.71	0.024	-0.000	0.023	0.005	0.000	0.003	NA, NO
Slovakia	2.5	-1.7	0.74	0.080	NO	NO	NO	1.5	NO	1.5	0.080	0.42	1.1	NO
Slovenia	0.63	IE	0.63	0.010	NA	NA	NO	2.8	-1.5	1.3	0.18	0.15	0.10	NO
Spain	0.53	IE	0.53	NA	NA	NA	NO	1.1	IE	1.1	0.054	0.13	0.37	NO
Sweden	0.23	IE	0.23	0.069	-0.041	0.18	-0.35	0.48	IE	0.48	0.040	0.35	-0.045	-0.38
Switzerland	2.9	-2.4	0.43	0.037	0.058	0.000	-0.078	1.4	-0.93	0.50	0.16	0.69	1.2	-0.078
Türkiye	1.1	-0.59	0.52	NO	NO	NO	NO	0.27	-0.006	0.27	NO	0.19	0.79	NO
Ukraine	1.6	-0.73	0.84	NA	NA	NA	-0.68	0.48	-0.004	0.48	NA	0.052	0.83	NO
United Kingdom of Great Britain and Northern Ireland	4.8	-4.0	0.79	0.30	0.040	0.40	0.008	1.0	-0.20	0.81	0.029	0.027	-0.82	-2.1
United States of America	0.48	IE	0.48	0.099	-0.002	0.004	-0.034	17	IE	17	3.0	5.1	0.29	IE

^a The signs for estimates of gains in carbon stocks are positive (+) and of losses in carbon stocks are negative (-).^b Where Parties directly estimate emissions and removals rather than carbon stock changes, they may use notation keys only in the stock change columns.^c CSC = carbon stock change.^d Carbon stock gains and losses should be listed separately except in cases where, due to the methods used, it is technically impossible to separate information on gains and losses.^e When Parties cannot estimate carbon stock changes for organic and mineral soil separately, these should be reported under mineral soils.^f Parties who wish to do so may report annual on-site CO₂-C emissions/removals and off-site CO₂-C emissions from drained and rewetted organic soils here.

Table 4.3

Cropland - AD, IEFs, carbon stock changes in pools and net CO₂ emissions/removals (2021)^{a, b}

	Cropland remaining cropland						Land converted to cropland					
	IEF (t C/ha)											
	CSC ^c in living biomass/area ^{d, e}			Net CSC ^c in DOM ^f /area ^g	Net CSC ^c in soils/area ^{h, i}		CSC ^c in living biomass/area ^{d, e}			Net CSC ^c in DOM ^f /area ^g	Net CSC ^c in soils/area ^{h, i}	
	Gains	Losses	Net Change		Mineral soils	Organic soils	Gains	Losses	Net Change		Mineral soils	Organic soils
IPCC default EF												
Australia	0.002	IE	0.002	NA	-0.008	IE	0.001	IE, NA, NO	0.001	-0.026	-0.17	-12
Austria	0.031	-0.038	-0.007	NO	-0.003	NO	0.32	-0.37	-0.049	-0.042	-0.98	NO
Belarus	0.037	-0.057	-0.019	NA, NO	NA	-5.0	NE	NE	NE	NA, NE	NE, NO	-5.0
Belgium	0.001	-0.000	0.000	NO	-0.014	-10	NO	-0.046	-0.046	-0.003	-1.3	NO
Bulgaria	0.017	-0.023	-0.006	NA	0.052	-7.9	0.091	-0.13	-0.043	NA, NE, NO	-0.57	NO
Canada	0.008	-0.008	-0.000	-0.009	0.14	-5.0	NE, NO	-1.4	-1.4	-2.1	2.0	IE, NE, NO
Croatia	0.057	-0.056	0.002	NO	-0.011	-10	0.12	-0.018	0.10	NO	-0.92	NO
Cyprus	0.88	-0.73	0.15	NA	0.001	NO	0.31	-0.36	-0.055	-0.95	-0.25	NO
Czechia	0.001	NO	0.001	NO	0.001	NO	0.007	-0.35	-0.34	-0.015	-0.26	NO
Denmark	0.008	-0.062	-0.054	NA	0.057	-7.5	0.62	-0.65	-0.032	-0.22	-0.080	-5.0
Estonia	IE	-0.001	-0.001	NE	0.024	-5.0	NO	-0.047	-0.047	-0.10	-0.90	-5.0
European Union	0.084	-0.067	0.017	0.000	0.033	-6.8	0.27	-0.34	-0.072	-0.025	-0.12	-6.3
Finland	0.000	-0.000	0.000	IE	-0.13	-6.5	0.17	-1.3	-1.1	-0.004	-0.50	-6.8
France	0.068	-0.073	-0.005	0.000	0.022	IE	0.12	-0.44	-0.32	-0.058	-0.57	NO
Germany	0.014	-0.015	-0.001	IE, NA, NO	-0.001	-9.7	0.42	-0.65	-0.24	-0.000	-0.65	-9.5
Greece	0.086	-0.016	0.069	NO	0.070	-10	NO	-0.035	-0.035	-0.004	-0.71	NO
Hungary	0.007	-0.009	-0.002	NO	0.004	NO	0.12	-0.22	-0.10	-0.076	-0.38	NO
Iceland	NA	NA	NA	NA	0.15	-7.9	0.11	-0.77	-0.67	IE, NO	0.10	-7.9
Ireland	0.16	-0.093	0.070	NO	0.029	NO	NO	NO	NO	NO	NO	NO
Italy	0.063	-0.11	-0.047	NO	0.080	-10	NO	NO	NO	NO	-1.7	NO
Japan	IE	-0.014	-0.014	NA	-0.21	-1.9	0.16	-1.7	-1.6	-0.34	IE	-2.7
Kazakhstan	0.009	-0.015	-0.006	IE	-0.40	NO	NA	NA	NA	NA	NA	NA
Latvia	0.014	-0.011	0.003	-0.001	NA	-4.8	IE, NA, NE, NO	-0.018	-0.018	-0.10	-0.006	-4.8
Liechtenstein	NO	NO	NO	NO	NO	-9.5	0.34	-0.32	0.024	-0.005	-0.25	-9.5
Lithuania	0.041	-0.048	-0.006	NA	0.29	IE	IE, NE, NO	-0.12	-0.12	-0.056	-0.23	IE, NO
Luxembourg	0.019	-0.034	-0.015	NO	0.001	NO	0.19	-0.24	-0.053	-0.003	-0.50	NO
Malta	0.035	NA, NO	0.035	NA, NE	-0.006	NO	0.007	NO	0.007	NE, NO	0.095	NO
Monaco	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Netherlands	NA	NA	NA	NA	-0.17	-3.8	0.53	-0.74	-0.21	-0.012	-0.56	-3.9
New Zealand	0.029	0	0.029	0	-0.000	-9.9	0.43	-0.072	0.36	-0.000	-0.79	-9.9
Norway	0.001	-0.001	-0.001	NO	0.016	-7.9	0.24	-1.3	-1.1	-3.2	-0.67	-7.9
Poland	0.034	IE	0.034	NA	-0.008	-5.0	NO	NO	NO	NO	-0.089	-5.0
Portugal	1.9	-1.7	0.26	NO	0.011	NO	3.2	-2.3	0.85	-0.046	-1.2	NO
Romania	0.10	-0.068	0.036	NA	0.25	-10	0.33	-0.16	0.16	-0.000	0.64	NO
Russian Federation	0.013	NO	0.013	NO	NO	-5.9	NO	-0.12	-0.12	-0.19	-1.6	NO
Slovakia	0.21	-0.005	0.21	NA	0.015	NE, NO	NO	-0.003	-0.003	NA, NO	-0.61	NO
Slovenia	0.094	-0.096	-0.002	-0.000	0.002	-10	0.23	-0.28	-0.056	0.029	-0.57	NO
Spain	0.040	IE	0.040	NA	0.031	NO	0.038	-0.43	-0.39	-0.053	-0.72	NO
Sweden	0.023	IE	0.023	0.002	0.14	-6.2	0.26	-0.091	0.17	-0.26	-0.21	-6.2
Switzerland	0.13	NO	0.13	NA	-0.020	-9.5	0.14	-0.021	0.12	-0.002	-0.24	-9.0
Türkiye	0.001	IE	0.001	NO	0.000	-0.010	0.16	-0.44	-0.28	-0.090	-0.24	NO
Ukraine	0.044	-0.037	0.007	NA	-0.37	-5.0	NA, NO	-0.34	-0.34	NA, NO	0.84	NO
United Kingdom of Great Britain and Northern Ireland	0.000	-0.000	-0.000	NO	-0.34	-5.7	0.074	IE, NO	0.074	IE, NO	-1.2	-5.1
United States of America	NE	NE	NE	NE	0.095	-14	IE, NE	-0.74	-0.74	-0.29	-0.068	-15

^a The signs for estimates of gains in carbon stocks are positive (+) and of losses in carbon stocks are negative (-).^b Where Parties directly estimate emissions and removals rather than carbon stock changes, they may use notation keys only in the stock change columns.^c CSC = carbon stock change.^d Carbon stock gains and losses should be listed separately except in cases where, due to the methods used, it is technically impossible to separate information on gains and losses.^e For category cropland remaining cropland this column only includes changes in perennial woody biomass.^f DOM = dead organic matter.^g No reporting on DOM pools is required for category cropland remaining cropland.^h When Parties cannot estimate carbon stock changes for organic and mineral soil separately, these should be reported under mineral soils.ⁱ Parties who wish to do so may report annual on-site CO₂-C emissions/removals and off-site CO₂-C emissions from drained and rewetted organic soils here.

Table 4.4

Grassland - AD, IEFs, carbon stock changes in pools and net CO₂ emissions/removals (2021)^{a, b}

	Grassland remaining grassland						Land converted to grassland					
	IEF (t C/ha)											
	CSC ^c in living biomass/area ^d			Net CSC ^c in DOM ^e /area ^f	Net CSC ^c in soils/area ^{g, h}		CSC ^c in living biomass/area ^d			Net CSC ^c in DOM ^e /area ^f	Net CSC ^c in soils/area ^{g, h}	
	Gains	Losses	Net Change		Mineral soils	Organic soils	Gains	Losses	Net Change		Mineral soils	Organic soils
IPCC default EF												
Australia	0.014	-0.008	0.006	0.001	-0.000	IE, NA	0.001	-0.35	-0.35	-0.14	-0.22	-8.7
Austria	NA	NA	NA	NO	0.001	-6.4	0.19	-1.1	-0.89	-0.40	0.92	NO
Belarus	NA	NA	NA	NA	NA	IE	NE	NE	NE	NE	NE, NO	IE, NE
Belgium	NO	NO	NO	NO	-0.10	-1.9	NO	-1.2	-1.2	-0.11	1.0	NO
Bulgaria	0.022	-0.021	0.000	NA, NE	-0.007	-6.1	0.031	NO	0.031	NA, NO	0.65	NO
Canada	NA, NO	NA, NO	NA, NO	NA, NO	NE, NO	NE, NO	NO	NO	NO	NO	NO	NO
Croatia	NO	NO	NO	NO	NO	-2.5	0.048	-0.075	-0.027	NO	1.0	NO
Cyprus	0.048	-0.002	0.046	NA	NA	NO	0.046	-1.2	-1.2	-1.8	0.077	NO
Czechia	NO	NO	NO	NO	0.092	NO	0.11	-0.077	0.037	-0.005	0.44	NO
Denmark	0.10	-0.15	-0.046	NA	IE, NA	-5.7	19	-27	-8.1	-0.29	0.24	-9.8
Estonia	NO	NO	NO	NO	NA	-0.045	0.17	-0.44	-0.27	-0.15	0.83	-0.25
European Union	0.17	-0.16	0.007	0.002	0.026	-4.3	0.22	-0.34	-0.12	-0.029	0.51	-4.7
Finland	0.22	-0.040	0.18	NE	NA	-3.5	0.13	-0.26	-0.13	NA, NE	0.14	-3.5
France	0.28	-0.25	0.025	-0.000	0.030	IE	0.14	-0.55	-0.41	-0.10	0.63	NO
Germany	0.57	-0.70	-0.13	IE, NO	0.007	-7.6	0.80	-0.79	0.012	-0.013	0.77	-7.9
Greece	NO	-0.000	-0.000	NO	NO	NO	NO	-0.016	-0.016	-0.000	0.71	NO
Hungary	NA	NA	NA	NA	0.033	NO	0.060	-0.91	-0.85	-0.14	0.045	NO
Iceland	0.001	IE, NA	0.001	0.000	0.000	-5.7	0.063	IE, NA, NO	0.063	0.001	0.51	-5.7
Ireland	NO	NO	NO	NO	0.11	-6.4	NO	NO	NO	NO	-0.30	-3.9
Italy	0.45	-0.43	0.019	0.004	0.009	2.5	0.001	NO	0.001	NO	1.2	NO
Japan	NA	NA	NA	NA	-0.071	-0.14	0.38	-2.0	-1.6	-0.38	IE, NO	-0.19
Kazakhstan	0.008	NO	0.008	0.006	0.027	NO	NA	NA	NA	NA	NA	NA
Latvia	0.16	-0.19	-0.033	0.17	NA	-4.4	0.062	-0.084	-0.023	-0.098	NA, NO	-2.1
Liechtenstein	0.068	-0.066	0.002	NO	0.022	-7.7	0.35	-1.1	-0.78	-0.28	0.25	-9.5
Lithuania	NA	NA	NA	NA	NE	IE	0.044	IE, NE, NO	0.044	0.038	0.32	IE, NO
Luxembourg	NA	NA	NA	NA	NO	NO	0.41	-0.38	0.036	-0.009	0.60	NO
Malta	NE, NO	NE, NO	NE, NO	NE, NO	NE, NO	NO	0.79	NO	0.79	NE, NO	-0.059	NO
Monaco	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Netherlands	0.039	-0.032	0.007	NA	0.29	-4.4	0.64	-0.59	0.044	-0.072	0.59	-4.1
New Zealand	0.007	-0.004	0.003	-0.000	-0.001	-2.2	0.12	-2.4	-2.3	-0.27	0.57	-1.8
Norway	0.014	-0.004	0.009	NO	-0.001	-3.6	1.0	-2.4	-1.4	-2.1	0.086	-3.6
Poland	NO	NO	NO	NO	0.001	-0.25	0.19	IE, NO	0.19	NO	0.81	-0.25
Portugal	0.85	-0.38	0.47	0.000	0.000	NO	1.3	-0.75	0.60	-0.022	0.40	NO
Romania	0.014	-0.001	0.013	NA	0.35	-2.5	0.14	-0.27	-0.13	-0.001	0.16	NO
Russian Federation	NA	NA	NA	NA	NA, NO	-5.8	0.002	NA, NO	0.002	0.047	0.42	-7.8
Slovakia	NO	NO	NO	NO	NA	NO	0.001	-0.077	-0.076	-0.010	0.67	NO
Slovenia	0.35	-0.077	0.27	0.058	-0.002	NO	0.077	-0.65	-0.57	-0.12	0.49	NO
Spain	NE	NE	NE	NA	0.001	NO	0.001	-0.11	-0.11	0.003	0.67	NO
Sweden	0.16	IE	0.16	0.069	0.19	-1.4	0.072	-0.66	-0.59	-0.28	0.13	-4.1
Switzerland	0.061	-0.012	0.049	NA	-0.044	-9.1	0.14	-0.85	-0.71	-0.20	0.37	-8.9
Türkiye	NA	NA	NA	NA	NA	-0.003	0.006	-2.3	-2.3	-0.27	-0.089	NO
Ukraine	NA, NO	NA, NO	NA, NO	NA, NO	0.005	-0.25	NA	NA	NA	NA	0.64	NO
United Kingdom of Great Britain and Northern Ireland	0.002	-0.003	-0.001	NO	0.13	-0.50	0.001	-0.11	-0.11	-0.014	0.69	-3.7
United States of America	IE	-0.002	-0.002	-0.003	0.001	-3.5	0.025	-0.20	-0.17	-0.043	0.58	-2.9

^a The signs for estimates of gains in carbon stocks are positive (+) and of losses in carbon stocks are negative (-).^b Where Parties directly estimate emissions and removals rather than carbon stock changes, they may use notation keys only in the stock change columns.^c CSC = carbon stock change.^d Carbon stock gains and losses should be listed separately except in cases where, due to the methods used, it is technically impossible to separate information on gains and losses.^e DOM = dead organic matter.^f No reporting on DOM pools is required for category grassland remaining grassland.^g When Parties cannot estimate carbon stock changes for organic and mineral soil separately, these should be reported under mineral soils.^h Parties who wish to do so may report annual on-site CO₂-C emissions/removals and off-site CO₂-C emissions from drained and rewetted organic soils here.

Table 4.5

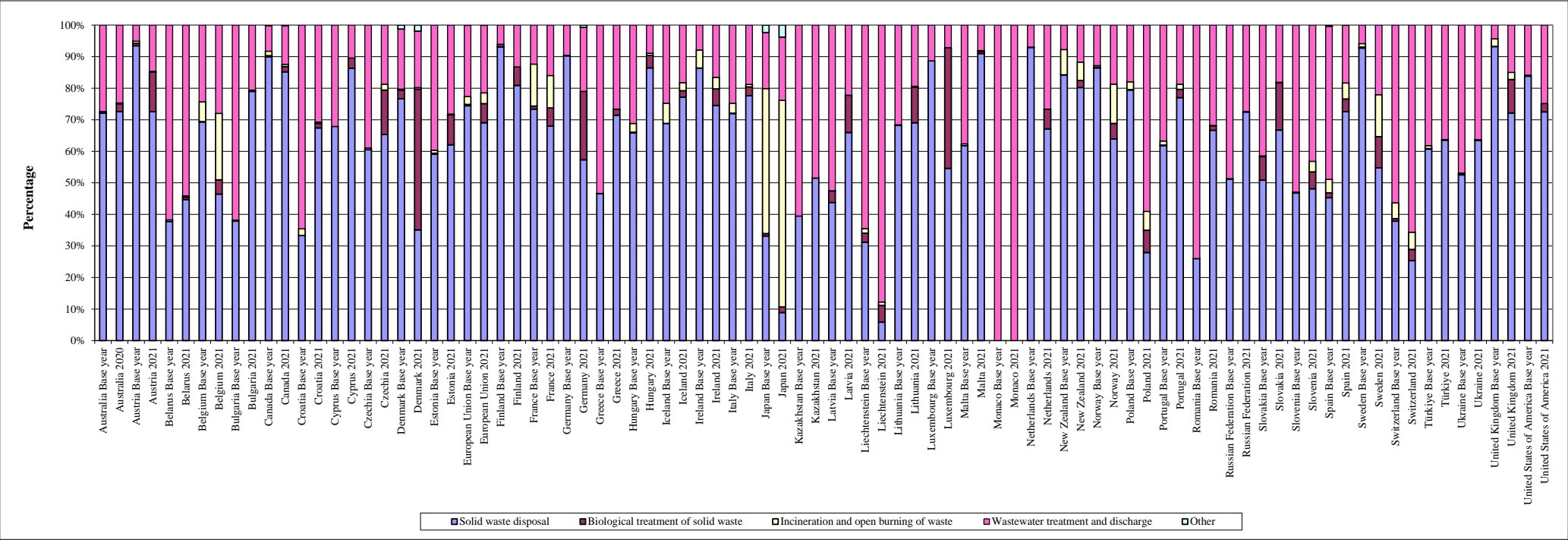
Land Area (2021)

Area (kha)	CRF						Total	FAO ^a	difference	FAO ^a	difference
	Forest land	Cropland	Grassland	Wetlands	Settlements	Other land		Total country area	%	Forest	%
Australia	147 876	40 005	519 780	734	507	60 692	769 594	774 122	0.59	134 005	-9.38
Austria	4 020	1 391	1 510	154	580	732	8 387	8 388	0.01	3 899	-3.00
Belarus	9 933	5 719	2 457	154	958	481	19 702	20 761	5.38	8 768	-11.74
Belgium	707	965	622	56	703	NO	3 053	3 053	0.01	689	-2.53
Bulgaria	3 920	3 691	2 553	232	538	165	11 100	11 100	0.00	3 893	-0.69
Canada	225 499	46 268	7 207	493	1 031	NE, NO	280 497	987 975	252.22	346 928	53.85
Croatia	2 402	1 523	1 153	75	288	218	5 659	8 807	55.62	1 939	-19.27
Cyprus	159	249	129	4.1	58	2.9	602	925	53.70	173	8.53
Czechia	2 679	3 170	1 029	169	841	IE, NA, NO	7 887	7 887	0.00	2 677	-0.06
Denmark	646	2 779	521	134	550	216 423	221 054	4 292	-98.06	628	-2.75
Estonia	2 447	977	277	36	355	44	4 136	4 534	9.62	2 438	-0.37
European Union	167 846	121 005	73 249	23 400	28 181	9 336	423 017	425 435	0.57	159 231	-5.13
Finland	21 846	2 508	240	6 423	1 517	1 310	33 843	33 846	0.01	22 409	2.58
France	27 765	22 549	10 082	743	4 537	872	66 548	54 909	-17.49	17 253	-37.86
Germany	11 003	12 545	6 744	812	4 648	37	35 790	35 759	-0.09	11 419	3.78
Greece	3 484	3 020	5 505	301	613	275	13 198	13 196	-0.02	3 902	11.98
Hungary	2 182	5 254	1 249	269	634	2.9	9 590	9 303	-3.00	2 053	-5.91
Iceland	147	147	5 892	896	42	3 114	10 238	10 300	0.61	51	-64.95
Ireland	781	746	4 211	1 226	126	20	7 110	7 028	-1.15	782	0.13
Italy	9 486	9 028	8 046	515	2 319	655	30 049	30 207	0.52	9 566	0.84
Japan	24 971	4 037	903	1 350	3 897	2 629	37 788	37 797	0.03	24 935	-0.14
Kazakhstan	19 334	35 567	189 112	8 775	2 307	17 397	272 491	272 490	0.00	3 455	-82.13
Latvia	3 271	1 548	925	397	313	5.4	6 459	6 459	0.00	3 411	4.28
Liechtenstein	6.3	1.6	4.9	0.37	1.9	1.0	16	16	-0.34	6.7	6.71
Lithuania	2 231	2 039	1 504	361	385	8.8	6 529	6 529	0.01	2 201	-1.33
Luxembourg	93	59	75	1.3	30	0.024	259	259	0.15	89	-4.72
Malta	1.4	12	8.8	0.007	8.9	0.84	32	32	1.43	0.46	-66.14
Monaco	NO	NO	NO	NO	0.21	NO	0.21	7.5	3 495.01	–	–
Netherlands	363	828	1 466	824	634	38	4 154	4 154	0.00	370	1.70
New Zealand	10 017	477	14 538	758	238	897	26 925	26 771	-0.57	9 893	-1.24
Norway	12 129	936	11 473	3 755	712	3 373	32 378	62 450	92.88	12 180	0.42
Poland	9 450	13 816	4 205	1 365	2 355	80	31 272	31 271	0.00	9 483	0.35
Portugal	4 340	2 324	1 856	186	496	18	9 221	9 223	0.02	3 312	-23.69
Romania	6 991	7 941	5 868	1 022	1 546	472	23 839	23 840	0.00	6 929	-0.88
Russian Federation	896 983	92 324	122 588	226 816	14 298	359 511	1 712 519	1 709 825	-0.16	815 312	-9.11
Slovakia	2 029	1 524	849	94	240	167	4 904	4 903	-0.01	1 926	-5.06
Slovenia	1 204	246	406	15	122	32	2 025	2 048	1.12	1 238	2.78
Spain	17 191	17 495	13 048	601	1 874	413	50 622	50 597	-0.05	18 572	8.03
Sweden	28 171	2 804	507	7 409	1 931	4 311	45 133	52 886	17.18	27 980	-0.68
Switzerland	1 268	379	1 385	188	339	570	4 129	4 129	0.00	1 269	0.11
Türkiye	23 058	27 193	24 150	1 978	946	1 766	79 091	78 535	-0.70	22 220	-3.63
Ukraine	10 693	34 997	7 478	3 398	2 905	884	60 355	60 355	0.00	9 690	-9.38
United Kingdom of Great Britain and Northern Ireland	3 636	4 782	14 123	977	1 824	421	25 763	24 361	-5.44	3 190	-12.26
United States of America	281 026	161 900	286 444	2 988	6 468	NA, NE	738 825	983 151	33.07	309 795	10.24

^a Source of international statistics: FAOSTAT data, downloaded on 16 June 2023. At the time of the download data for 2021 was not available, therefore, data for 2020 is shown in the table.

Figure 5.1

Contribution of subsectors to total GHG emissions in the Waste sector^{a, b}



^a In accordance with the UNFCCC reporting guidelines on annual inventories of Annex I Parties the year 1990 should be the base year for the estimation and reporting of inventories. However, in accordance with decisions 9/CP.2, 11/CP.4, and 7/CP.12 some Parties with economies in transition use base years other than 1990: Bulgaria (1988), Croatia (1990), Hungary (average of 1985 to 1987), Poland (1988), Romania (1989) and Slovenia (1986).

^b Indirect CO₂ emissions are excluded from the totals in this graph.

Table 5.1a

Solid waste disposal on land, biological treatment of solid waste, incineration and open burning of waste and wastewater treatment and discharge (2021)

	Solid waste disposal							Biological treatment of solid waste											
	CH ₄						CH ₄						N ₂ O						
	Methods and EF used		Share of national total ^a	Emissions per capita ^b	CH ₄ IEF			Methods and EF used		Share of national total ^a	Emissions per capita ^b	IEF		Methods and EF used		Share of national total ^a	Emissions per capita ^b	IEF	
	Methods	EF			Managed	Unmanaged	Uncategorized	Methods	EF			Composting	Anaerobic digestion	Methods	EF			Composting	Anaerobic digestion
			(%)	(kg CO ₂ eq.)	(t/t)	(t/t)	(t/t)			(%)	(kg CO ₂ eq.)	g/kg	g/kg			(%)	(kg CO ₂ eq.)	g/kg	g/kg
IPCC default EF																			
Australia	T2, T3	D	1.61	331	0.019	NO	NO	T1	CS	0.02	4.4	0.75	NE, NO	T1	CS	0.03	6.8	0.096	NE, NO
Austria	T2	CS, D	1.13	98	0.16	NO	NO	T1, T2	CS, D	0.10	8.9	1.8	107	T2	CS	0.10	8.2	0.25	NA, NO
Belarus	T1	D	2.90	0.29	IE, NE	IE, NE	0.034	T1	D	0.03	0.003	4.0	NE, NO	T1	D	0.02	0.002	0.30	NE, NO
Belgium	T2	D	0.52	50	0.019	NO	NO	T1	CS	0.02	2.2	1.3	IE, NO	T1	CS	0.03	2.7	0.17	IE, NO
Bulgaria	T2	CS, D	4.15	327	0.032	0.32	NO	T1	D	0.01	0.49	10	2.0	T1	D	0.00	0.27	0.60	NE
Canada	CS	CS	2.67	469	0.041	0.034	NO	T3	PS	0.03	4.6	1.5	IE, NA	T3	PS	0.03	4.7	0.13	NA
Croatia	T2	CS	5.18	326	0.031	0.023	NO	T1	D	0.08	5.0	10	2.0	T1	D	0.03	1.8	0.60	NA, NE
Cyprus	T2	D	6.59	632	0.016	NO	NO	T1	D	0.16	15	4.2	2.0	T1	D	0.09	8.5	0.25	NE, NO
Czechia	T1	D	3.13	355	0.043	NO	NO	CS, D, T1	CS, D	0.62	70	4.0	IE, NE	T1	D	0.06	6.3	0.24	IE, NO
Denmark	CS, T2	CS, D	0.97	74	0.006	0.027	NO	T1, T2	CS, D	1.09	83	NE, NO	1 000	T1, T2	CS, D	0.14	11	NE, NO	NA, NO
Estonia	T2	D	1.56	0.15	0.099	NO	NO	T1	D	0.15	0.014	10	NE, NO	T1	D	0.09	0.008	0.60	NE, NO
European Union			2.17	1.1	0.025	0.89	NA, NO			0.14	0.069	3.6	119			0.05	0.026	0.23	0.020
Finland	T2	CS, D	3.07	265	0.021	NO	NO	T1	D	0.15	13	5.8	0.99	T1	D	0.07	6.1	0.35	NA
France	T2	CS, D	2.98	0.18	0.031	0.017	NO	T2	CS	0.20	0.012	5.4	2.0	T2	CS	0.05	0.003	0.16	NA
Germany	T2	CS	0.34	31	0.11	NO	NO	T2	CS	0.10	9.5	1.4	41	T2	CS	0.02	2.2	0.049	0.040
Greece	T2	CS, D	5.40	386	0.022	0.34	NO	D	D	0.12	8.7	10	NE	D	D	0.02	1.3	0.60	NO
Hungary	T2	D	5.02	332	0.019	NO	NO	D, T1	D	0.17	11	10	166	T1	D	0.06	4.0	0.60	NA, NO
Iceland	T2	CS, D	4.44	562	0.052	0.019	NO	T1, T3	CS, D, PS	0.08	10	10	24	T1	D	0.04	4.8	0.60	NA, NO
Ireland	T2	CS, D	1.13	140	0.092	IE	NO	T1	D	0.05	6.6	10	2.0	T1	D	0.03	3.2	0.60	NO
Italy	T2	CS	3.75	266	0.065	NO	NO	D	CS, D	0.03	2.1	1.6	2.0	D	D	0.10	7.3	0.60	NA, NO
Japan	T3	CS	0.13	12	0.17	NO	0.084	T2	CS	0.01	0.59	2.8	NE	T2	CS	0.02	1.9	0.78	NO
Kazakhstan	M	M	0.95	165	0.023	0.030	NO	NA	NA	–	–	NO	NO	NA	NA	–	–	NO	NO
Latvia	T2	CS, D	3.47	197	0.019	NO	NO	D	D	0.45	25	10	11	D	D	0.18	10	0.60	NO
Liechtenstein	T2	CS	0.05	2.5	NO	NO	NO	CS	CS	0.03	1.5	1.0	NO	CS	CS	0.02	0.71	0.050	NO
Lithuania	T2	D	3.04	222	0.084	NO	NO	T1, T2	D	0.39	29	10	540	T1	D	0.10	7.6	0.60	NO
Luxembourg	T1	D	0.51	65	0.16	IE	NO	T1	D	0.31	39	10	NA	T1	D	0.05	6.9	0.60	NE
Malta	M, T2	M	8.57	351	0.025	NA	NO	T1	D	0.06	2.5	NO	0.80	NA	NA	–	–	NO	NA
Monaco	NA	NA	–	–	NO	NO	NO	NA	NA	–	–	NO	NO	NA	NA	–	–	NO	NO
Netherlands	T2	CS	1.41	134	0.043	NA, NO	NO	T1	CS	0.08	7.8	0.81	28	T1	CS	0.05	4.7	0.081	0.046
New Zealand	T2	CS, D	3.36	503	0.015	0.011	NO	T1	D	0.05	8.2	4.0	NO	T1	D	0.04	5.9	0.24	NO
Norway	T2	D	1.88	171	1.6	NO	NO	T1	D	0.11	10	4.0	0.78	T1	D	0.03	2.8	0.24	NO
Poland	T2	CS, D	0.33	34	0.001	NO	NO	T1	D	0.05	5.6	6.7	IE, NA	T1	D	0.03	3.2	0.40	NA, NO
Portugal	T2	CS, D	6.82	373	0.036	NO	NA, NO	T1	D	0.16	8.5	10	2.0	T1	D	0.08	4.2	0.60	NO
Romania	T2	CS, D	3.77	227	0.017	NO	NA	T1	D	0.06	3.7	10	NE, NO	T1	D	0.02	1.2	0.60	NA, NO
Russian Federation	T3	CS, D	3.25	479	0.038	NO	NO	T1	D	0.00	0.64	10	NO	T1	D	0.00	0.46	0.60	NO
Slovakia	T2	CS	3.05	231	0.038	NO	NO	T1	D	0.47	36	10	0.80	T1	D	0.22	17	0.60	NA
Slovenia	T2	CS, D	1.28	98	0.067	NO	NO	T1	D	0.09	7.0	10	NE	T1	D	0.05	4.0	0.60	NE
Spain	T2	CS, D, OTH	3.59	219	0.032	NO	NO	T1	D	0.13	8.1	10	90	T1	D	0.07	4.2	0.60	NE, NO
Sweden	T2	CS, D	1.14	52	0.042	NO	NO	T1, T2	CS, D	0.16	7.4	11	143	T1	D	0.05	2.1	0.69	NA, NO
Switzerland	T2	CS, D	0.64	33	NO	NO	NO	T2	CS	0.07	3.7	1.8	0.17	T2	CS	0.02	0.99	0.092	NO
Türkiye	T2	CS, D	1.65	111	0.003	0.052	NO	T1	D	0.00	0.17	4.0	NO	T1	D	0.00	0.12	0.24	NO
Ukraine	T3	CS, D	2.35	175	0.017	0.025	NO	T1	D	0.00	0.21	4.0	NA	T1	D	0.00	0.19	0.30	NA
United Kingdom of Great Britain and Northern Ireland	T2	CS	3.21	205	0.011	NO	NO	T1	D	0.32	20	10	1.1	T1	D	0.15	9.8	0.60	NO
United States of America	CS	CS	1.93	365	0.020	NO	NO	D, T1	D	0.04	8.2	4.0	0.80	T1	D	0.03	5.4	0.30	IE, NO

^a The national total includes indirect CO₂ emissions from the atmospheric oxidation of CH₄, CO and NMVOCs for the following Parties: Bulgaria, Canada, Cyprus, Czechia, Denmark, European Union, Finland, France, Japan, Latvia, Lithuania, Monaco, Netherlands, Norway, Poland, Portugal, Slovakia and Switzerland.^b Calculated using population data from CRF Table 5.D. World Bank population data was used for Netherlands as it was not presented in CRF Table 5.D.

Table 5.1b

Solid waste disposal on land, biological treatment of solid waste, incineration and open burning of waste and wastewater treatment and discharge (2021)

Activity data	Incineration and open burning of waste							Wastewater treatment and discharge												
	Population (million)		Methods and EF used		CO ₂		IEF		Methods and EF used		CH ₄		CH ₄ IEF		Methods and EF used		N ₂ O		N ₂ O IEF	
					Share of national total ^b	Emissions per capita ^c	Waste incineration	Open burning of waste			Share of national total ^b	Emissions per capita ^c	Domestic	Industrial			Share of national total ^b	Emissions per capita ^c	Domestic	Industrial
	CRF	World Bank ^d	Methods	EF	(%)	(kg CO ₂ eq.)	kg/t	kg/t	Methods	EF	(%)	(kg CO ₂ eq.)	kg/kg	kg/kg	Methods	EF	(%)	(kg CO ₂ eq.)	kg N ₂ O-N/kg N	kg N ₂ O-N/kg N
IPCC default EF ^d																			0.005	
Australia	26	26	T2	CS	0.01	1.2	1 443	NO	T2, T3	CS, D	0.46	95	0.076	0.081	CS	D	0.08	17	0.007	IE
Austria	9.0	9.0	T1, T2	CS, D	0.00	0.23	2 052	NO	CS, T2	CS, D	0.03	2.8	0.16	NA	CS, D	CS, D	0.20	17	0.032	0.005
Belarus	9 303	9.3	T1	D	0.03	0.003	1 760	NO	T1	D	3.33	0.33	0.19	0.081	T1	D	0.19	0.018	0.005	NE
Belgium	12	12	T1, T3	PS	0.24	23	4 671	NO	CR, T1	CR, D	0.23	22	NE	IE, NA, NE	D	D	0.08	8.2	0.005	NA
Bulgaria	6.8	6.9	T1	D	0.01	0.84	1 155	NO	T2	D	0.86	68	0.054	0.041	T1	D	0.22	18	0.005	NA
Canada	38	38	T2, T3	D, OTH	0.01	2.0	240	NE, NO	CS, T3	CS, D, PS	0.16	28	0.13	NE	CS, D, T3	D, PS	0.22	39	0.025	NE
Croatia	3.9	3.9	NA	NA	–	–	NO	NO	T1	D	2.04	129	0.25	0.002	T1	D	0.32	20	0.005	NA
Cyprus	0.90	1.2	NA	NA	–	–	NO	NO	T1	D	0.63	60	0.035	0.080	OTH, T1	D, OTH	0.17	16	0.005	NE
Czechia	10	11	T1	CS, D	0.08	9.2	1 064	176	CS, T1	CS, D	0.75	85	0.14	0.015	CS, D	CS, D	0.15	16	0.005	NE
Denmark	5.9	5.9	T1	CS	0.01	0.58	355	154	CS, T1	CS, D	0.20	16	0.086	IE, NA, NO	CS, T1	CS, D	0.29	22	0.009	0.15
Estonia	1 330	1.3	T1, T2	D	0.00	0.000	2 845	335	T1	D	0.49	0.046	0.070	0.20	T1	D	0.22	0.021	0.005	NO
European Union	69 440	447			0.08	0.039	802	3.3			0.49	0.25	0.12	0.026			0.18	0.090	0.006	0.026
Finland	5.5	5.5	NA	NA	–	–	IE, NO	NE, NO	CS, T2	CS, D	0.37	32	0.043	0.001	CS, T1	D	0.14	12	0.005	0.005
France	68 329	68	T1, T2	CS, D	0.40	0.025	4 987	19	T1	D	0.62	0.038	0.099	0.52	T1	D	0.08	0.005	0.002	NA
Germany	83	83	T1	CS	–	–	NO	NO	CS, D, T2	CS, D	0.07	6.5	0.18	0.001	CS, D, T2	CS, D	0.05	4.5	0.007	IE
Greece	11	11	D	CS, D	0.00	0.31	508	NO	CS, D	CS, D	1.68	120	0.023	0.20	D	CS	0.33	24	0.005	NE
Hungary	9.7	9.7	T2	CS, D	0.04	2.5	1 457	NO	T1	D	0.40	26	0.13	0.013	CS	D	0.12	7.7	0.006	NE
Iceland	0.37	0.37	T1, T2	D	0.14	18	507	NO	T1	CS, D	0.93	117	0.10	0.023	T1	D	0.12	15	0.005	IE
Ireland	5.0	5.0	T1	D	0.06	6.8	2 933	1 340	T1, T2	CS, D	0.10	12	0.051	IE, NO	T1	D	0.15	19	0.005	IE
Italy	59	59	D, T1	CS, D	0.02	1.5	697	5.8	D, T1	D	0.64	46	0.16	0.25	D, T1	CR, D	0.27	19	0.005	0.25
Japan	126	126	CS	CS	0.89	82	539	124	CS, D	CS, D	0.13	12	NA	NA	CS, D	CS, D	0.17	16	NA	0.005
Kazakhstan	20	19	T1	D	0.00	0.005	NO	NO	T1, T2	CS, D	0.79	136	0.18	0.075	T1	D	0.11	19	0.005	NO
Latvia	1.9	1.9	D	D	0.00	0.017	1 650	NE	T1, T2	CS, PS	0.90	51	0.080	0.013	D	D	0.27	15	0.005	0.005
Liechtenstein	0.039	0.039	CS	CS	0.01	0.26	NO	248	CS	CS	0.49	23	NA	IE, NO	D	D	0.31	14	NA	IE, NO
Lithuania	2.8	2.8	T1	D	0.01	0.88	942	NO	T1, T2	D	0.65	47	0.049	IE, NA	T1	D	0.20	15	0.005	NA
Luxembourg	0.74	0.64	NA	NA	–	–	IE, NO	NO	T1	CS	0.02	3.0	0.16	NO	T1	CS, PS	0.04	5.5	0.006	0.010
Malta	0.52	0.52	T1	D	0.02	0.84	77	NO	D	CS	0.39	16	0.017	IE, NO	D	D	0.37	15	0.003	IE
Monaco	0.039	0.037	T1	D	–	–	IE, NO	NO	T3	D	0.02	0.32	0.000	IE	T1	D	0.53	9.9	0.005	IE
Netherlands	–	18	CS	CS	–	–	IE, NA	NO	T1, T2	CS, D	0.13	13	0.051	0.17	T2	D	0.42	41	IE	0.016
New Zealand	5.1	5.1	T1	D	0.12	18	226	186	T1, T2	CS	0.33	50	0.032	0.024	T1, T2	CS, D	0.16	24	0.005	0.009
Norway	5.4	5.4	D	OTH	0.35	32	533	NE, NO	T1	CS, D	0.46	42	0.073	0.025	CS, T1	CS, D	0.09	8.3	0.005	IE
Poland	38	38	T1	D	0.07	7.2	1 300	NA	T1, T2	CS, D	0.52	55	0.16	0.033	T2	D	0.17	18	0.005	NA
Portugal	10	10	T1, T2	CS, D	0.07	3.6	1 240	NO	T2	CS, D	1.36	74	0.11	0.018	D	CS, D	0.30	16	0.004	IE
Romania	19	19	D	D	0.00	0.23	115	NO	D	D	1.47	88	0.14	0.015	D	D	0.33	20	0.005	NE
Russian Federation	146	143	NA	NA	–	–	IE, NO	NE, NO	T1, T2, T3	CS, D	1.10	162	0.21	0.074	T1	CS, D	0.13	19	0.005	NO
Slovakia	5.4	5.4	T2	CS, D	0.00	0.31	604	NO	T1, T2	D	0.72	55	0.30	0.025	T1, T2	D	0.10	7.9	0.005	0.005
Slovenia	2.1	2.1	T1	D	0.09	6.8	2 280	NO	T1	CS, D	0.94	72	0.095	0.003	T1	D	0.21	16	0.005	NA
Spain	47	47	NA	NA	–	–	IE, NO	NO	T1, T2	CS, D	0.61	38	0.061	0.010	D	D	0.29	18	0.005	IE
Sweden	10	10	T3	PS	0.27	12	874	NE	T2	CS	0.07	3.2	0.20	NE	T1	CS, D	0.39	18	0.020	0.005
Switzerland	8.7	8.7	T1, T2	CS	0.02	1.0	77	NO	T2	CS, D	0.48	25	0.13	IE	D	D	1.18	61	0.059	IE
Türkiye	84	85	T2	CS, D	0.00	0.043	IE, NO	190	T2	CS	0.53	35	0.075	0.013	T1	D	0.42	28	0.005	IE
Ukraine	44	44	T1, T2	D	0.00	0.12	42	NE	T2	CS, D	1.02	76	0.11	0.029	CS, T1	CS, D	0.32	24	0.010	0.004
United Kingdom of Great Britain and Northern Ireland	67	67	T1, T2	CS, D	0.08	5.0	929	215	CS, T1	CS, D	0.46	29	0.29	0.037	CS, T1	CS, D	0.21	13	0.005	NE
United States of America	336	332	NA	NA	–	–	IE	NA	CS, D, T2	CS, D	0.33	63	0.13	0.050	CS, D, T2	CS, D	0.33	62	0.059	0.033

^a Source of population data: World Bank <https://data.worldbank.org/indicator/SP.POP.TOTL>, downloaded on 19 June 2023.^b The national total includes indirect CO₂ emissions from the atmospheric oxidation of CH₄, CO and NMVOCs for the following Parties: Bulgaria, Canada, Cyprus, Czechia, Denmark, European Union, Finland, France, Japan, Latvia, Lithuania, Monaco, Netherlands, Norway, Poland, Portugal, Slovakia and Switzerland.^c Calculated using population data from CRF Table 5.D. World Bank population data was used for Netherlands as it was not presented in CRF Table 5.D.^d Source of default emission factors: 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 5 Chapter 6 Wastewater Treatment and Discharge, page 6.28.