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Item 4 (b) (i) of the provisional agenda
Review of implementation of commitments and of other provisions of the Convention
National communications
National communications from Parties included in Annex I to the Convention

Information on national greenhouse gas inventory data from Parties included in Annex I to the Convention for the period 1990–2002, including the status of reporting. Executive summary

Note by the secretariat*

Summary

The quality and timing of submissions of greenhouse gas (GHG) inventories by Parties included in Annex I to the Convention (Annex I Parties) has further improved in 2004. All but two Annex I Parties provided an inventory in 2004, and only a few Parties made submissions that were late and/or incomplete. The total aggregate GHG emissions for Annex I Parties as a whole declined by 6.3 per cent between 1990 and 2002; total aggregate emissions for Annex I Parties with economies in transition decreased by 40 per cent; and emissions from the other Annex I Parties increased by 8.4 per cent. The Conference of the Parties and its subsidiary bodies may wish to consider the information contained in this document and provide guidance to Parties and secretariat.

* This document was submitted later than originally expected because applying all the quality control procedures established for processing reported inventory data took longer than anticipated.

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I. Introduction

A. Mandate

1. The Conference of the Parties (COP), by its decisions 9/CP.2, 3/CP.5 and 18/CP.8, requested Parties included in Annex I to the Convention (Annex I Parties) to submit national inventory data on emissions from sources and removals by sinks by 15 April of each year. Decision 19/CP.8 requested the secretariat to prepare an annual report on the greenhouse gas (GHG) inventory data submitted by Annex I Parties for consideration by the Subsidiary Body for Scientific and Technological Advice (SBSTA) and the COP.[1]

B. Scope of the note

2. This note presents the latest available data on GHG emissions and removals from 40 Annex I Parties for the period 1990–2002, including changes in estimates from previous submissions.[2] The document also shows the status of reporting of annual GHG emission inventories, highlighting the timeliness of reporting and completeness of the data reported.

3. The information in chapter II on the status of reporting is based on reports received by the time this document was finished (6 October 2004). Because of the complexity of importing data, consistency checking, consulting with Parties and re-importing data, and the need to ensure the quality of the information provided to the COP,[3] only the data received by 30 June 2004 could be included in chapters IV and V. For analytical purposes, where data are not available, the secretariat has carried forward the latest reported data. The trends identified in chapter V should thus be considered preliminary.

C. Possible action by the Conference of the Parties and the Subsidiary Body for Scientific and Technological Advice

4. The COP and SBSTA may wish to take note of the information contained in this document and provide guidance to the Parties and secretariat, as appropriate.

II. Status of reporting

5. The UNFCCC reporting guidelines on annual inventories require Annex I Parties to submit a national inventory report (NIR) and the tables of the common reporting format (CRF), covering data from the base year to two years before the year of submission.[4] As table 1 shows, 38 Annex I Parties submitted an annual inventory submission in 2004, including an NIR by 36 of them. Only two Parties (Liechtenstein and the Russian Federation) had not reported national GHG inventories in 2004 by the time this document was prepared. Twenty-six reporting Parties provided their submission by the due date of 15 April, and 26 reported complete CRF tables for all years.

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[1] For the full text of the "Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention", adopted by decision 19/CP.8, see document FCCC/CP/2002/8.

[2] More detailed data, complementing this document, will be published on the secretariat web site (FCCC/WEB/2004/3) before COP 10.

[3] The latest inventory data from the European Community, Japan (version 2), Norway (version 3), Poland (version 1) and Slovakia (version 3) are not included in the tables and figures of chapters IV and V because they were received after 30 June 2004.

[4] For the full text of the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories", including the tables of the CRF, see document FCCC/CP/2002/8.

6. In processing the annual inventory submissions, the secretariat performed data consistency checks on the information contained in the CRF tables and reported possible inconsistencies to the respective Parties within the time period stipulated in decision 19/CP.8. As a result, 23 Parties submitted a revised version of their inventory, correcting data inconsistencies.

Table 1. Timing and completeness of 2004 greenhouse gas inventory submissions from Annex I Parties

Party	Date[a]	Submission[b]	Years[c]	NIR
Australia	15 April	CRF	1990–2002	✓
Austria	15 April	CRF	1990–2002	✓
Belarus	31 March	CRF	2002	✓
Belgium	15 April	CRF	1990–2002	✓
Bulgaria	25 May	CRF	2002	✓
Canada	15 April	CRF	1990–2002	✓
Croatia	15 April	CRF	1990–2002	✓
Czech Republic	14 April	CRF	1992, 2002	✓
Denmark	15 April	CRF	1990–2002	✓
Estonia	15 April	CRF	2002	✓
European Community	7 May	CRF	1990–2002	✓
Finland	1 April	CRF	1990–2002	✓
France	26 March	CRF	1990–2002	✓
Germany	30 April	CRF	1990–2002	✓
Greece	7 April	CRF	1990–2002	✓
Hungary	13 May	CRF	2002	✓
Iceland	25 June	CRF	1990–2002	✓
Ireland	26 April	CRF	1990–2002	✓
Italy	15 April	CRF	1990–2002	✓
Japan	24 May	CRF	1990–2002	✓
Latvia	15 April	CRF	1990–2002	✓
Liechtenstein	—	—	—	—
Lithuania	14 April	CRF	1990, 1998, 2001–2002	✓
Luxembourg	28 May	CRF	1998, 2000, 2002	
Monaco	23 April	CRF	2002	✓
Netherlands	1 April	CRF	1990–2002	✓
New Zealand	15 April	CRF	1990–2002	✓
Norway	15 April	CRF	1990, 1998–2002	✓
Poland	6 October	CRF	2002	—
Portugal	14 April	CRF	1990–2002	✓
Romania	14 May	CRF	1989, 1990–2002	✓
Russian Federation	—	—	—	—
Slovakia	14 April	CRF	2001–2002	✓
Slovenia	15 April	CRF	1986, 1990–2002	✓
Spain	15 April	CRF	1990–2002	✓
Sweden	16 April	CRF	1990–2002	✓
Switzerland	14 April	CRF	1990–2002	✓
Ukraine	20 February	CRF	2001–2002	✓
United Kingdom of Great Britain and Northern Ireland	15 April	CRF	1990–2002	✓
United States of America	12 April	CRF	1990–2002	✓

[a] The annual submission due date is 15 April. Some submissions received by the date indicated in this column included only the CRF, because in some cases the NIR was submitted later.

[b] CRF indicates that for each year reported by the Party most of the CRF tables were provided. For more details on the provision of specific CRF tables and the completeness of submissions refer to the status reports of 2004 submissions available on the secretariat web site at <http://unfccc.int/national_reports/annex_i_ghg_inventories/inventory_review_reports/items/2994.php>.

[c] Indicates years for which CRF tables were submitted. Of the Parties that did not report CRF tables for all years, the following provided information for all years since the base year in the trend tables: Belarus, Bulgaria, Estonia, Hungary, Monaco, Norway, Poland and Slovakia. The Czech Republic provided such information except for 1991, 1993 and 1995.

Table 2. Reporting of greenhouse gas inventory information from Annex I Parties pursuant to decision 3/CP.5[a] since its adoption[b]

	2000		2001		2002		2003		2004	
Party	CRF	NIR	CRF	NIR	CRF	NIR	CRF	NIR	CRF	NIR
Australia	✓	✓	✔	✓	✓	✓	✓	✓	✔	✓
Austria	✔	✓	✔	✓	✔	✓	✔	✓	✔	✓
Belarus					✓	✓	✓	✓	✔	✓
Belgium	✓		✓		✔	✓	✔	✓	✔	✓
Bulgaria	✔		✓	✓			✓	✓	✓	✓
Canada	✓	✓	✓	✓	✔	✓	✔	✓	✔	✓
Croatia							✓	✓	✔	✓
Czech Republic	✓		✔		✔	✓	✔	✓	✔	✓
Denmark	c	✓	✔	✓	✔	✓	✔	✓	✔	✓
Estonia	c		✔		✔		✔		✔	✓
European Community	✓	✓	c	✓	✔	✓	✔	✓	✓	✓
Finland	✔	✓	✔	✓	✔	✓	✔	✓	✔	✓
France	c	✓	✔	✓	✔	✓	✔	✓	✔	✓
Germany	c	✓	✓		c		✔	✓	✓	✓
Greece	✓	✓	✓	✓	✓	✓	✓		✔	✓
Hungary	✓		✓		✓	✓	✓	✓	✓	✓
Iceland	c		✓		✓		✓		✓	✓
Ireland	✓		✓		✓	✓	✔	✓	✓	✓
Italy	✔		✓		✔		✔	✓	✔	✓
Japan	✓		✓		✓		✓	✓	✓	✓
Latvia	✓		✔	✓	✔	✓	✔	✓	✔	✓
Liechtenstein										
Lithuania	✓								✔	✓
Luxembourg			✔		✔		✔		✓	
Monaco	c		c		c	✓	✓		✓	✓
Netherlands	✓	✓	✔	✓	✔	✓	✔	✓	✔	✓
New Zealand	✓	✓	✔	✓	✔	✓	✔	✓	✔	✓
Norway	✔	✓	✔	✓	✔	✓	✓	✓	✔	✓
Poland	c		c		✔		✔	✓	✓	
Portugal	c	✓	✔		✔		✔	✓	✔	✓
Romania					✓	✓	✔	✓	✓	✓
Russian Federation	c				c					
Slovakia	✓		✓	✓	✓		✓	✓	✔	✓
Slovenia							c	✓	✔	✓
Spain	✔		✔	✓	✔	✓	✓	✓	✔	✓
Sweden	✔		✔	✓	✔	✓	✔	✓	✓	✓
Switzerland	✔		✔		✔		✔		✔	✓
Ukraine									✔	✓
United Kingdom	✓	✓	✔	✓	✔	✓	✔	✓	✔	✓
United States	✔	✓	✔	✓	✔	✓	✔	✓	✔	✓
Total number of CRFs and NIRs submitted	24	15	29	18	31	23	35	30	38	36

[a] With decision 3/CP.5 were adopted the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories" which call for annual GHG inventory submissions to include an NIR and a CRF.

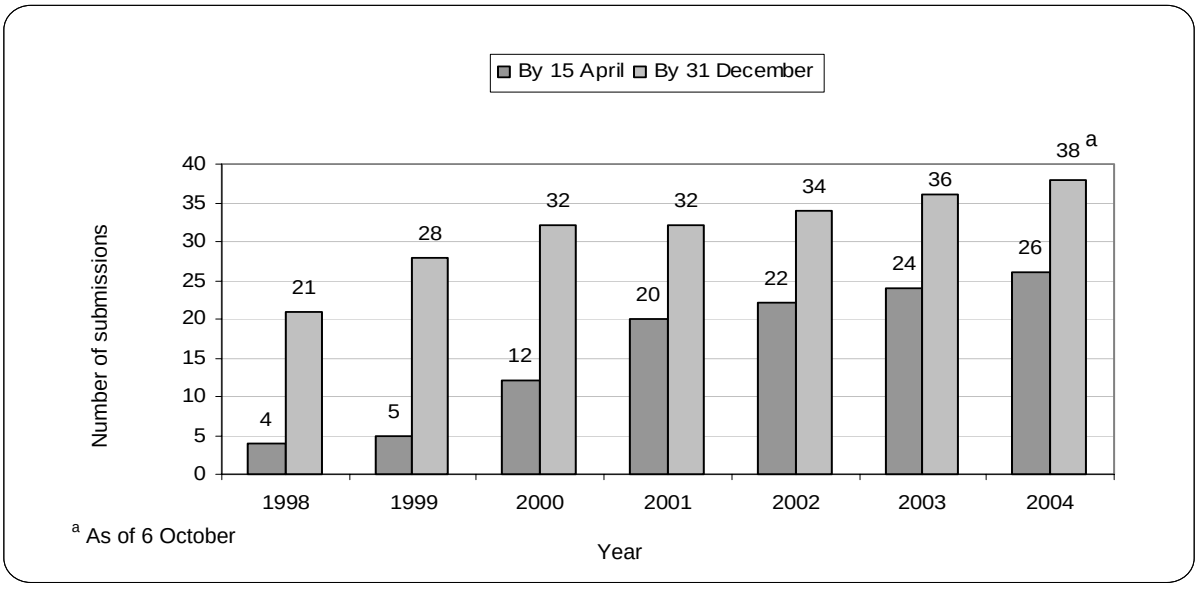
[b] Grey shading in cells indicates submissions received on or before the deadline.

[c] Tables with annual inventory information submitted using formats other than the CRF.

7. The information provided in tables 1 and 2 and in figure 1 demonstrates a steady and substantial increase since the beginning of the implementation of decision 3/CP.5 in 2000 in the number of annual inventory submissions reported in accordance with the UNFCCC reporting guidelines on annual inventories (Parties submitting a CRF rose from 24 in 2000 to 38 in 2004 and submitting an NIR from 15 to 36), adherence to deadlines (from 12 to 26 Parties meeting the deadline) and completeness in reporting (from 19 to 34 Parties which have provided inventory information for all years of the time series) . The number of Parties which have not provided base year estimates in their annual GHG inventory submission decreased from 19 to 4 (Liechtenstein, Luxembourg, Ukraine and the Russian Federation).

8. Some Parties still have some problems in reporting annual inventories in accordance with the guidelines. Only two Parties (Liechtenstein and the Russian Federation) have not submitted annual GHG inventories pursuant to decision 3/CP.5 since 2000. Of the 38 Parties that submitted inventories in 2004 three (Iceland, Luxembourg and Poland) submitted their CRF more than six weeks late and 11 (Estonia, European Community, Hungary, Iceland, Italy, Japan, Lithuania, Monaco, Portugal, Slovakia and Slovenia) were equally late in submitting their NIR. In addition, two reporting Parties (Luxembourg and Poland) had not submitted the NIR by the time this document was prepared. Some reporting Parties have not provided any information for some years of the time series (Czech Republic, Lithuania, Luxembourg and Ukraine).

Figure 1. Receipt of greenhouse gas inventory submissions from Annex I Parties, 1998–2004



III. Improvements in the quality of inventories

9. Since the initiation of the annual technical review process in 2001, there have been substantial improvements in the quality of the inventories submitted by Annex I Parties. These improvements can be seen in the increased completeness of submitted inventories, in terms of explanations supporting the estimates and in terms of the numbers of estimated inventory years, and in the large number of identified inventory problems in the review reports of each Party that have been solved since year 2001[5].

[5] Individual review reports of annual GHG inventories submitted by Annex I Parties since 2000 can be found on the secretariat web site at <http://unfccc.int/national_reports/annex_i_ghg_inventories/inventory_review_reports/items/2767.php>.

10. Almost all Annex I Parties are now submitting an NIR together with a CRF. These NIRs, which provide descriptions of the methodologies, emission factors and activity data used in producing emission estimates, have substantially improved the transparency of national inventories. All Parties are taking steps to implement the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (IPCC good practice guidance), including key source analyses, quality assurance and control, and an increasing use of higher tier methods in key sources and of country-specific data.

11. Generally, those Parties whose inventories have been reviewed earlier and/or more frequently have improved the most as they have had more time to implement the recommendations of review teams. Nonetheless, many Parties have demonstrated considerable improvement in their inventories from one year to the next, based on the results of an inventory review. However, more effort will be needed to implement the provisions of the IPCC good practice guidance and to fully meet the reporting requirements under the Convention, and in particular under the Kyoto Protocol.

IV. Recalculations

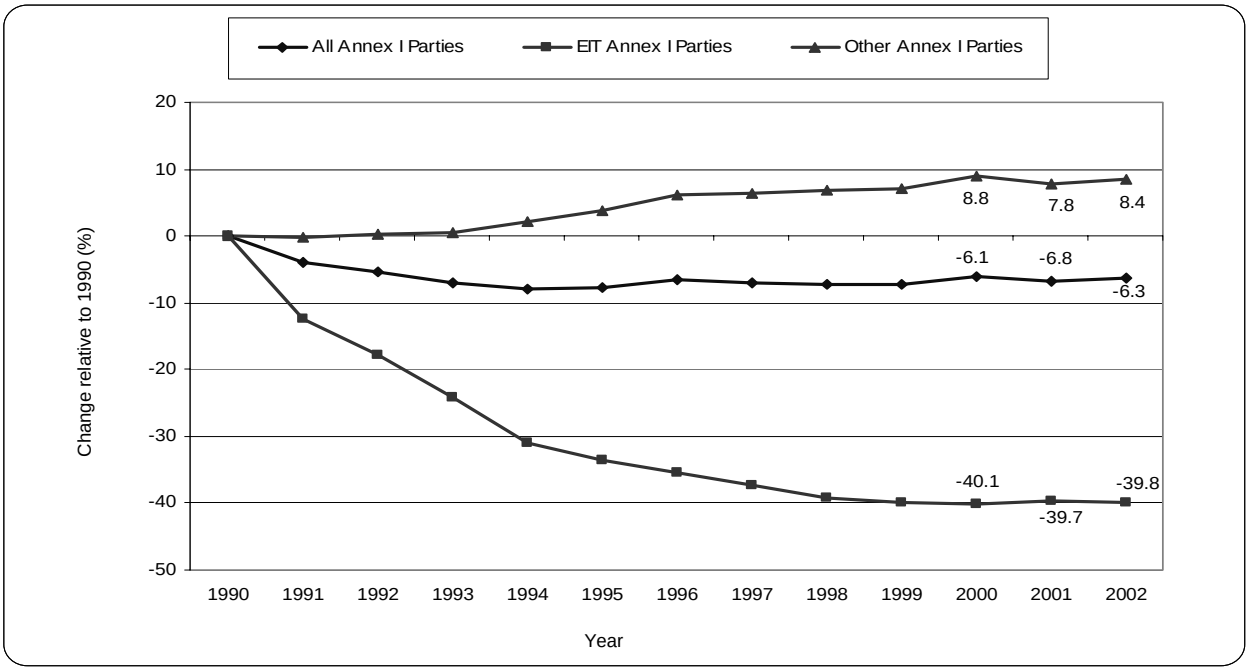
12. Recalculations, in general, reflect the efforts made by Parties to improve the quality of previous estimates when this is required. Of the 35 reporting Parties that submitted estimates for their base year, 22 reported revised estimates in 2004. The most common reasons for the changes, to the extent this information was reported, were availability of revised activity data and emission factors. In some instances, methodology changes were also reported, but only a few source categories were revised for this reason. Across Parties, recalculations varied from –13.3 to 13.5 per cent for carbon dioxide (CO_2), from –32.5 to 56.4 per cent for methane (CH_4) and from –23 to 177.8 per cent for nitrous oxide (N_2O). However, the average values from all Parties that have made recalculations are considerably lower, namely 0.68 per cent for CO_2, 0.73 per cent for CH_4 and 5.68 per cent for N_2O. Revisions to the reporting of hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) were substantial (>100 per cent) as the reporting has become more comprehensive, although four Parties' recalculations resulted in lower values for HFCs or PFCs. The changes for aggregate GHG emissions varied between –5.8 and 3.5 per cent (between –9.2 and 16.9 per cent with the inclusion of land-use change and forestry (LUCF)), but for 24 of the 35 Parties these recalculations were within ± 2 per cent.

13. In a few cases Parties have not reported recalculations in the CRF, in other cases the values of recalculations reported do not coincide with values calculated by the secretariat. In all cases, where omissions or inconsistencies were detected, the problems were highlighted in the synthesis and assessment review reports prepared for consideration by the Party, and for consideration, as needed, by the expert review teams which performed the individual technical reviews of Parties' inventories. Any problems in calculation and reporting recalculations will be highlighted, after thorough consideration, in the corresponding Party's review report which is published on the secretariat web site. As the process of consideration of recalculations is completed only with the finalization of the annual review cycle, the information given in paragraph 12 should be considered preliminary.

V. Overview of emission trends and sources

14. Total aggregate GHG emissions for Annex I Parties as a whole declined by 6.3 per cent over the period 1990–2002 (figure 2). Total aggregate emissions for the 14 Parties with economies in transition (EIT Parties) have decreased by almost 40 per cent, although seven of these Parties reported that CO_2 emissions increased from 2001 to 2002. Emissions from other Annex I Parties as a whole increased by 8.4 per cent. These aggregate estimates are based on data from the 37 Parties that submitted inventories in 2004 and on carrying forward the last reported inventory data taken from inventory submissions or national communications for those Parties where 2002 data were not reported.

Figure 2. Trends in aggregate greenhouse gas emissions, 1990–2002



Note: Data gaps due to incomplete reporting by some Annex I Parties have been filled in using simple interpolation or the latest available data. For this reason, the values presented should be considered preliminary, but this should not alter the trends presented.

15. Table 3 shows a gas-by-gas presentation of the relative increase or decrease in emissions over the period 1990–2002. Figures 3 and 4 show changes in emissions for individual Annex I Parties, and Figures 5 and 6 show trends in Annex I Parties greenhouse gas emissions by sector. Figures 3 and 4 and table 4 show that for a number of Parties the total aggregate emissions have increased over the period 1990–2002. Tables 5–8 present the trends for aggregate GHG emissions, and for emissions of specific gases.

16. Figure 5 illustrates trends in aggregate GHG emissions by sector for Annex I Parties as a whole. Transport emissions and emissions from international aviation have increased substantially (21 and 45 per cent, respectively). International marine bunker emissions have returned to 1990 levels, mainly because of a large decrease (52 per cent) in marine bunker emissions reported by the United States of America since 1998. Emissions from energy production have increased over the period despite the large decline in this sector in EIT Parties in the early 1990s. The decrease of 32 per cent in fugitive fuel emissions for Annex I Parties was also influenced by the decline in these emissions in EIT Parties, mainly the Russian Federation. In general, emissions from agriculture, waste and industrial processes declined over the period, but their rates of decline have slowed.

17. Figure 6 illustrates trends and emissions of HFCs, PFCs and SF_6 for Annex I Parties as a whole. The information provided in this figure and in table 8 indicates that, across Parties, the trend in aggregate emissions of HFCs, PFCs and SF_6 varied, with the exception of HFC emissions, which increased over the period for most Parties. Emissions of HFCs increased by more than 140 per cent between 1990 and 2002, emissions of PFCs decreased by 61 per cent, and emissions of SF_6 decreased 29 per cent, although fewer than half of the Parties individually reported lower SF_6 emissions. The reported aggregate GHG emissions of these gases expressed in CO_2 equivalent represented only 1.7 per cent of the total aggregate emissions of Annex I Parties.

Table 3. Percentage change in Annex I Party GHG emissions by gas, 1990–2002

	Decrease			Between –1% and +1%	Increase		
	>10%	**5–10%**	**1–5%**		**1–5%**	**5–10%**	**>10%**
GHG (excluding. LUCF)	BGR, BLR, CZE, DEU, EST, GBR, HRV, HUN, LTU, LUX, LVA, POL, ROM, RUS, SVK, UKR,		CHE, ECC, FRA, ISL, SWE	DNK, LIE, NLD, SVN	BEL	AUT, FIN ITA, NOR	AUS, CAN, ESP, GRC, IRL, JPN, MCO, NZL, PRT, USA
CO_2	BGR, BLR, CZE, DEU, EST, HUN, LTU, LUX, LVA, POL, ROM, RUS, SVK, UKR	GBR, HRV	CHE, SWE	ECC, LIE	DNK, FRA SVN	BEL, ISL ITA, NLD	AUS, AUT, CAN, ESP, FIN, GRC, IRL, JPN, MCO,NOR, NZL, PRT, USA
CH_4	AUT, BEL, BGR, CHE, CZE, DEU, ECC, EST, FIN, FRA, GBR, HUN, JPN, LIE, LTU, LVA, NLD, POL, ROM, RUS, SVK, SWE	BLR, HRV, ITA, LUX, SVN, UKR, USA		AUS, PRT	DNK	IRL, NOR, NZL	CAN, ESP, GRC, ISL, MCO
N_2O	AUT, BGR,BLR, CHE, CZE, DEU, EST, FIN, GBR, HRV, HUN, ISL, JPN, LIE , LTU, LVA, NLD, POL, ROM, RUS, SVK, SVN, UKR	ECC, FRA, ITA, LUX, PRT	BEL, DNK, SWE,	GRC, NOR	AUS, IRL, USA		CAN, ESP, NZL

	Decrease		Increase		
	>30%	**1–30%**	**1–30%**	**31–100%**	**>100%**
HFCs, PFCs, SF_6	BEL, HRV, ISL, NLD, NOR, ROM, SVK	AUS, CAN, GBR, NZL, SVN	AUT, DEU, ECC, RUS	ESP, FRA, HUN, SWE, USA,	CHE, DNK, FIN, GRC, IRL, ITA

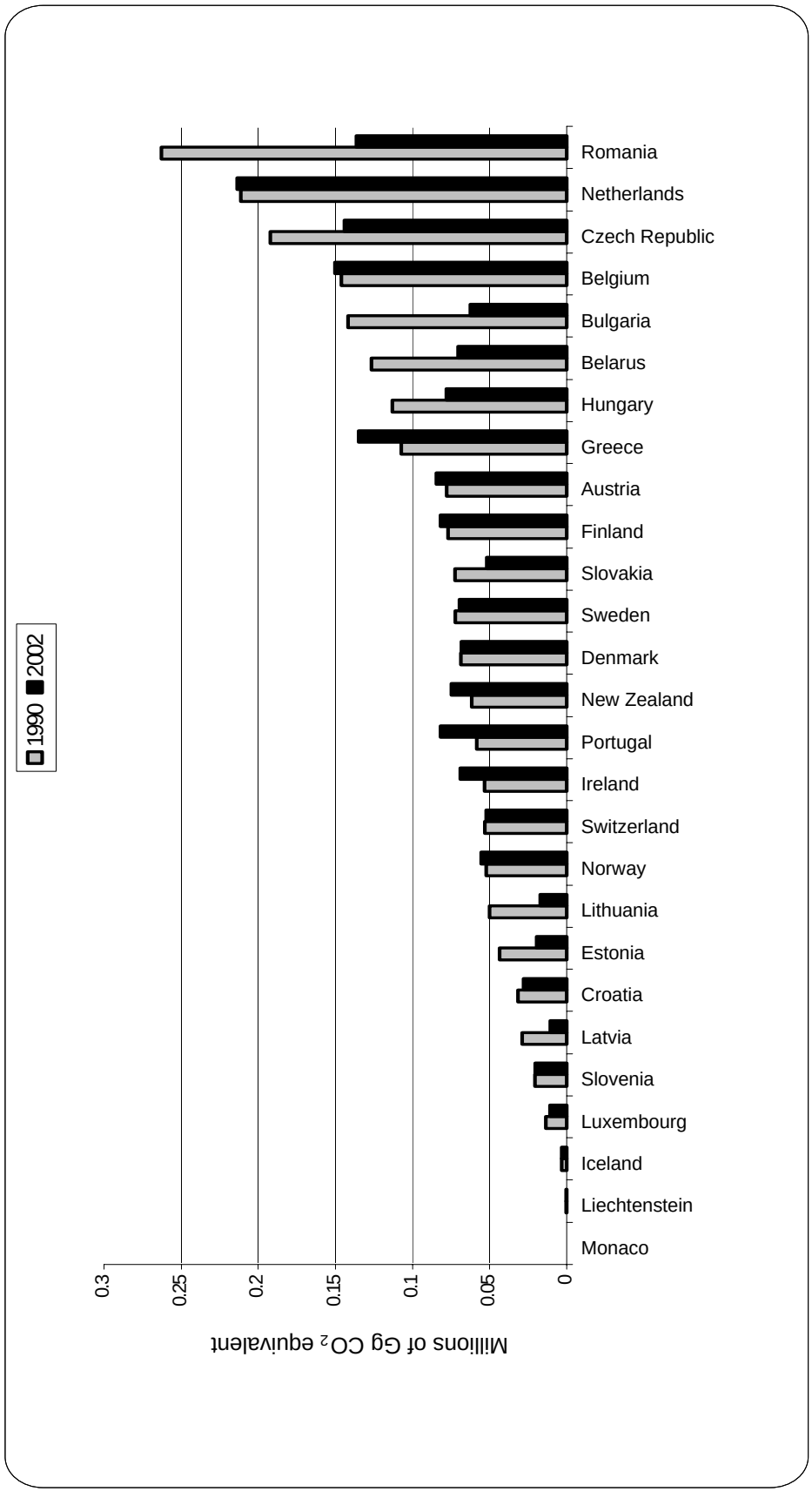
	Decrease			Increase	
	>50	**15–50%**	**1–14%**	**10–50%**	**>50%**
Net CO_2 emissions from LUCF	AUS, CAN, CHE, GBR, GRC, LVA, PRT, RUS	AUT, FIN, USA	BEL, BLR, ITA, NLD	DNK, EST, HRV, JPN, LTU, NZL, ROM, SWE, UKR	BGR, CZE, DEU, ECC, ESP, FRA, HUN, IRL, ISL, NOR, POL, SVK, SVN

Note: Changes are with respect to 2002 or the most recent year for which data were available (see tables 4–8).

AUS (Australia), AUT (Austria), BLR (Belarus), BEL (Belgium), BGR (Bulgaria), CAN (Canada), HRV (Croatia), CZE (Czech Republic), DNK (Denmark), EST (Estonia), ECC (European Community), FIN (Finland), FRA (France), DEU (Germany), GRC (Greece), HUN (Hungary), ISL (Iceland), IRL (Ireland), ITA (Italy), JPN (Japan), LVA (Latvia), LIE (Liechtenstein), LTU (Lithuania), LUX (Luxembourg), MCO (Monaco), NLD (Netherlands), NZL (New Zealand), NOR (Norway), POL (Poland), PRT (Portugal), ROM (Romania), RUS (Russian Federation), SVK (Slovakia), SVN (Slovenia), ESP (Spain), SWE (Sweden), CHE (Switzerland), UKR (Ukraine), GBR (United Kingdom of Great Britain and Northern Ireland), USA (United States of America).

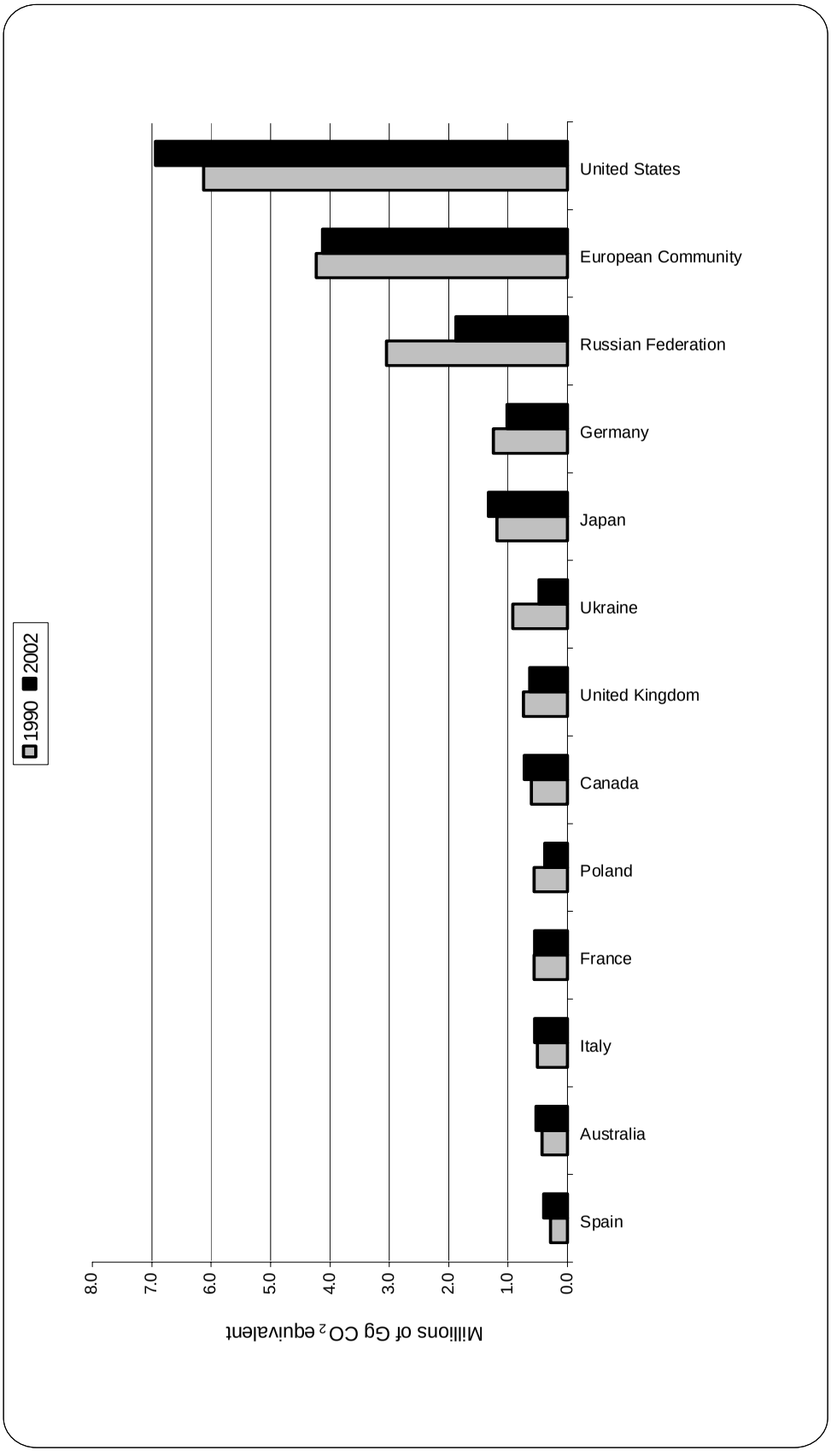
18. Table 9 shows the trend in emissions and removals from the LUCF sector as reported by Annex I Parties. Developments in this sector differ across Parties, with 13 Parties reporting a decrease in removals or an increase in emissions of more than 10 per cent over the period and 21 Parties reporting an increase in removals, or decrease in emissions, of more than 10 per cent.

Figure 3. a. Total aggregate greenhouse gas emissions of individual Annex I Parties, 1990 and 2002



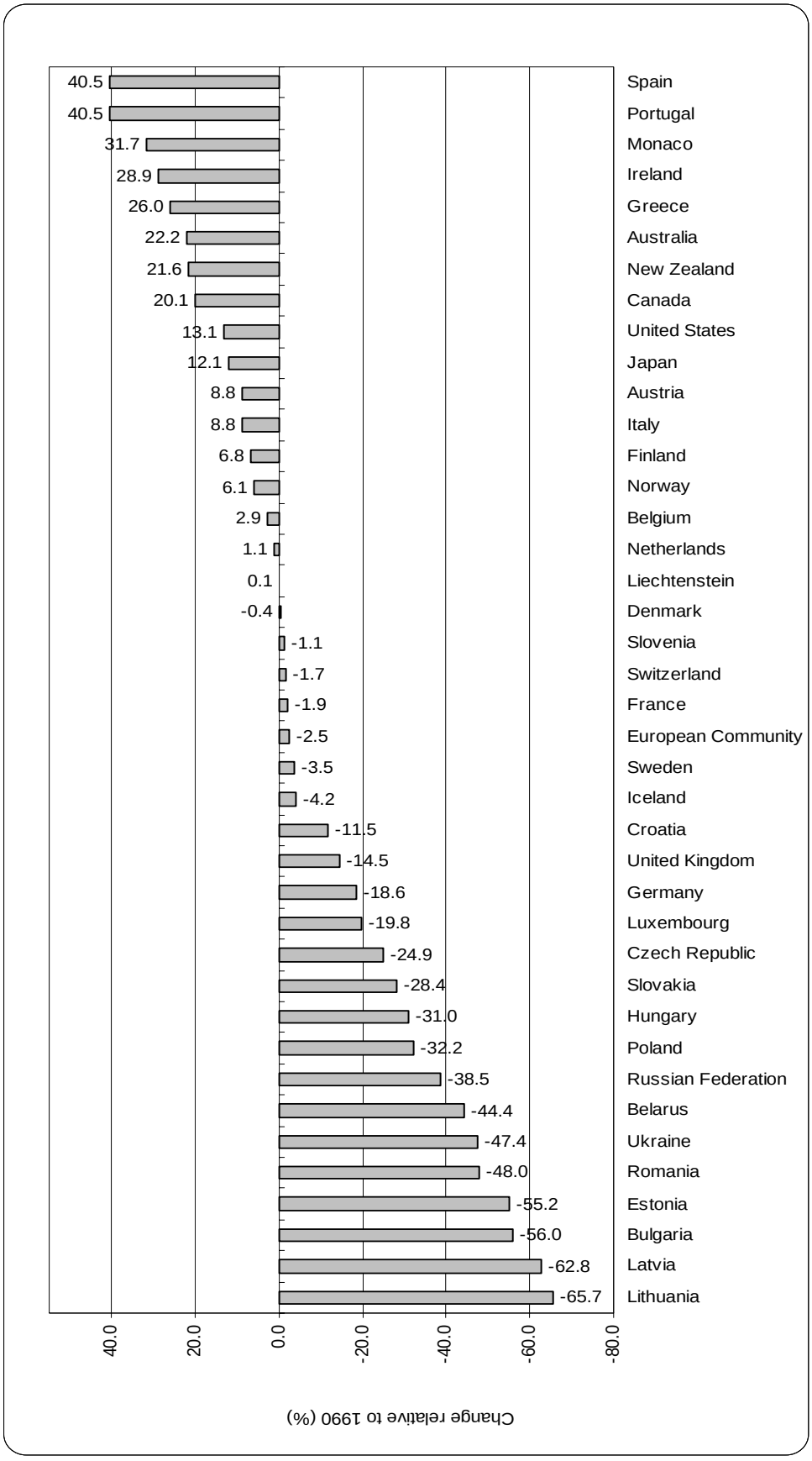
Note: The 2002 values are for 2002 or the most recent year for which data were available (see table 4).

Figure 3.b. Total aggregate greenhouse gas emissions of individual Annex I Parties, 1990 and 2002



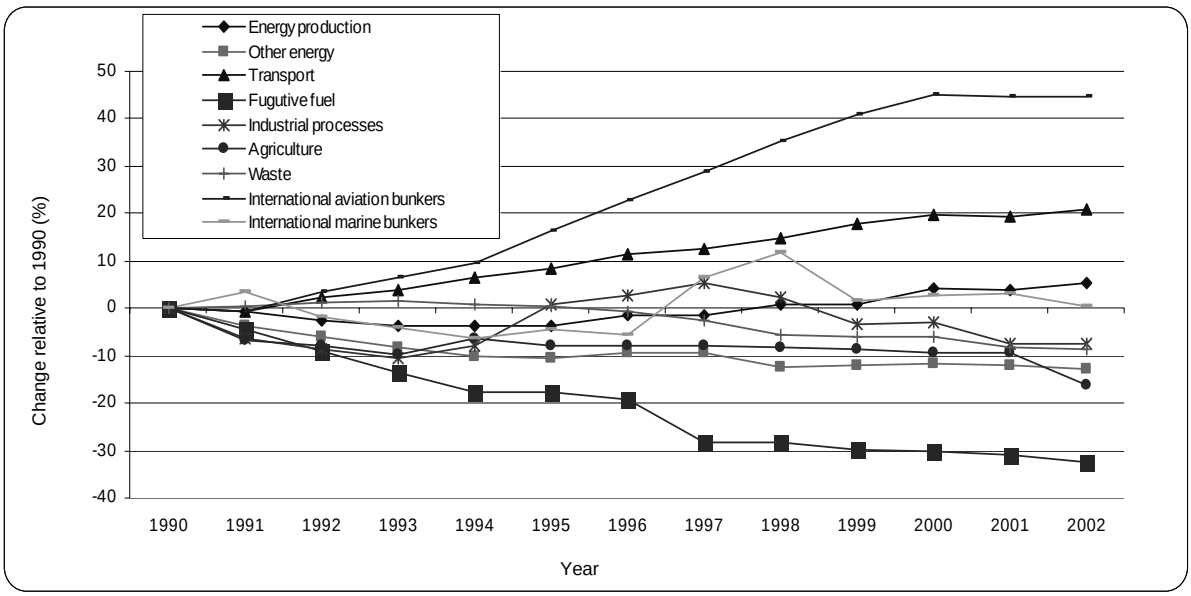
Note: The 2002 values are for 2002 or the most recent year for which data were available (see table 4).

Figure 4. Change in total aggregate greenhouse gas emissions of individual Annex I Parties, 1990–2002



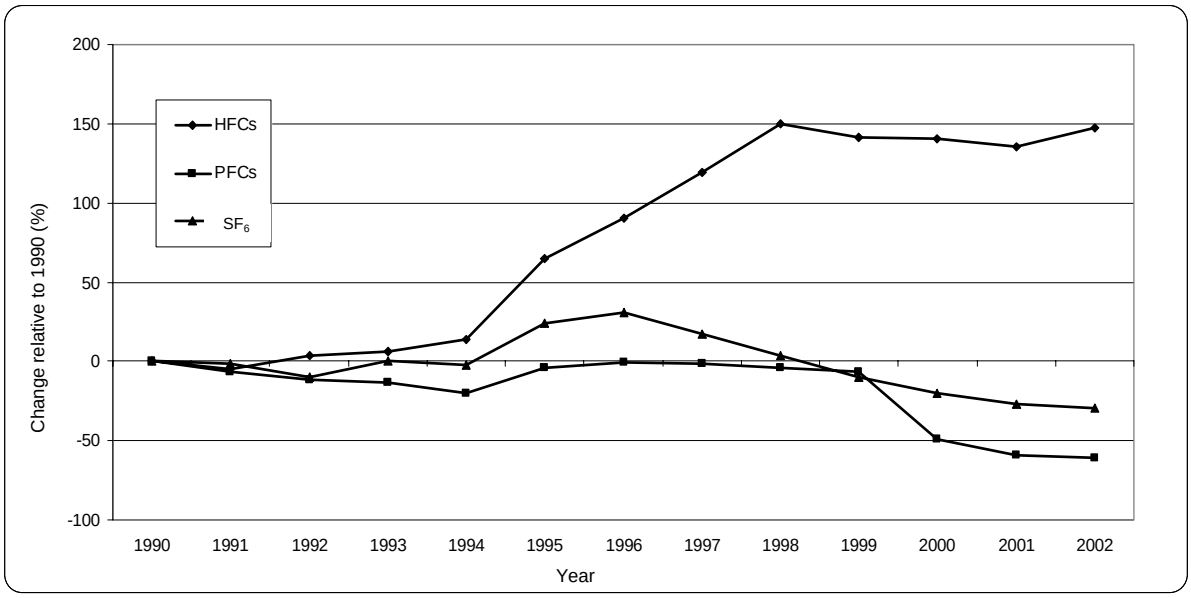
Note: The changes are with respect to 2002 or the most recent year for which data were available (see table 4).

Figure 5. Trends in Annex I Party greenhouse gas emissions by sector, 1990–2002



Note: Data gaps due to incomplete reporting by some Annex I Parties have been filled in using simple interpolation or the latest available data. For this reason, the values presented should be considered as preliminary, but this should not alter the trends presented.

Figure 6. Trends in Annex I Party emissions of hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6), 1990–2002 (industrial processes sector)



Note: Data gaps due to incomplete reporting by some Annex I Parties have been filled in using simple interpolation or the latest available data. For this reason, the values presented should be considered as preliminary, but this should not alter the trends presented.

Table 4. Total aggregate anthropogenic emissions of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6, 1990 and 1996–2002, excluding CO_2 emissions/removals from land-use change and forestry

	Gg CO_2 equivalent								Change from 1990 to latest reported estimate
Party	**1990**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**(%)**
Australia	430 513	460 343	471 768	492 069	502 791	512 946	520 117	526 042	22
Austria	77 746	82 776	82 340	82 000	80 083	80 640	84 398	84 621	9
Belarus	126 574	77 240	78 446	76 264	73 186	68 644	76 233	70 356	–44
Belgium	146 067	159 477	150 282	155 185	148 512	149 892	149 502	150 311	3
Bulgaria[a]	141 821	83 008	78 491	70 032	64 246	63 611	64 926	62 429	–56
Canada	608 704	675 374	682 467	700 498	704 542	725 045	716 202	731 209	20
Croatia	31 609	23 348	24 915	25 142	26 152	26 097	26 892	27 962	–12
Czech Republic	192 019	154 907	158 879	148 602	140 421	147 681	148 056	144 217	–25
Denmark	68 750	90 278	80 673	75 657	72 552	67 808	69 313	68 491	~0
Estonia	43 494	23 345	23 514	21 412	19 580	19 666	19 436	19 502	–55
Finland	76 770	81 723	80 669	78 136	77 461	75 040	80 575	81 963	7
France	564 233	575 839	567 956	582 089	563 850	557 620	561 209	553 410	–2
Germany	1 246 816	1 117 442	1 080 278	1 054 175	1 018 184	1 014 072	1 025 555	1 014 627	–19
Greece	107 149	116 531	122 066	127 259	126 375	133 768	134 642	134 992	26
Hungary[a]	113 074	79 184	76 853	83 687	86 546	78 011	79 279	78 002	–31
Iceland	3 322	3 204	3 388	3 406	3 579	3 352	3 212	3 181	–4
Ireland	53 418	59 249	62 031	64 128	66 257	68 252	70 018	68 875	29
Italy	509 078	517 000	523 480	535 360	540 504	544 010	554 284	553 781	9
Japan	1 187 269	1 351 952	1 357 752	1 306 736	1 328 381	1 336 723	1 302 323	1 330 793	12
Latvia	28 921	12 601	12 171	11 556	10 753	10 219	10 866	10 756	–63
Liechtenstein	218				218				~0
Lithuania	50 134	20 718	19 850	21 524			19 282	17 215	–66
Luxembourg	13 448			8 311	6 004	9 499	6 052	10 833	–19
Monaco	73	92	87	85	93	94	97	96	32
Netherlands	211 384	234 213	218 016	223 823	212 671	213 399	216 149	213 765	1
New Zealand	61 640	66 206	67 978	67 127	69 111	70 419	73 681	74 976	22
Norway	52 136	54 849	54 779	55 333	56 032	55 436	56 722	55 343	6
Poland[a]	564 419	437 388	427 243	403 516	401 584	386 186	382 791		–32
Portugal	58 362	64 830	67 702	72 483	79 692	78 327	78 646	81 982	40
Romania[a]	262 833	179 931	160 886	142 187	124 606	127 367	131 383	136 559	–48
Russian Federation	3 050 000	1 960 000	1 914 000	1 890 000	1 876 000				–38
Slovakia	72 436	54 334	54 370	52 714	51 589	48 994	52 315	51 896	–28
Slovenia[a]	20 601	19 761	20 211	19 884	19 244	19 240	20 263	20 383	–1
Spain	284 556	309 751	330 512	340 824	370 377	385 203	383 460	399 732	40
Sweden	72 140	77 171	72 724	73 446	70 042	67 502	68 263	69 601	–4
Switzerland	53 137	52 620	51 715	53 058	53 207	52 345	53 358	52 254	–2
Ukraine	919 189	499 634	466 471	454 934			478 043	483 525	–47
United Kingdom	742 639	707 785	684 404	679 401	647 951	647 709	656 209	634 858	–15
United States	6 129 118	6 687 285	6 764 431	6 790 456	6 852 506	7 038 326	6 883 890	6 934 562	13
European Community[b]	4 231 442	4 203 816	4 131 881	4 151 583	4 082 763	4 090 896	4 144 229	4 123 618	–3

[a] In accordance with decision 9/CP.2, some Parties with economies in transition use base years other than 1990: Bulgaria (1988); Hungary (1985–87); Poland (1988); Romania (1989); Slovenia (1986).

[b] Emission estimates of the European Community are reported separately from those of its member States.

Table 5. Total anthropogenic CO_2 emissions, excluding land-use change and forestry, 1990 and 1996–2002

	Gg								Change from 1990 to latest reported estimate
Party	**1990**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**(%)**
Australia	277 869	310 855	318 167	334 475	344 147	348 981	353 663	358 455	29
Austria	60 899	66 147	65 713	65 808	64 336	65 064	69 037	69 671	14
Belarus	102 471	60 885	61 448	58 738	56 591	52 019	52 155	51 694	–50
Belgium	118 326	129 605	123 266	128 663	123 804	125 599	125 543	126 585	7
Bulgaria[a]	102 519	59 743	57 910	51 603	47 888	46 690	48 914	46 755	–54
Canada	471 237	513 189	524 480	535 100	549 943	572 664	564 450	575 865	22
Croatia	22 970	16 976	18 057	18 956	19 679	19 379	20 390	21 484	–6
Czech Republic	163 990	132 780	137 357	128 268	121 093	127 902	127 996	123 048	–25
Denmark	52 661	74 529	65 189	60 228	57 437	52 850	54 499	54 164	3
Estonia	38 107	20 264	20 225	18 318	16 771	16 849	17 103	17 290	–55
Finland	62 459	68 123	66 832	64 594	64 065	62 283	67 692	69 500	11
France	396 126	408 676	402 667	423 859	411 166	406 823	411 543	406 044	3
Germany	1 015 572	923 792	892 423	884 501	857 281	860 273	874 264	864 117	–15
Greece	82 818	89 041	93 637	98 289	97 594	103 429	105 506	105 504	27
Hungary[a]	84 063	60 475	58 893	57 601	60 117	59 009	59 022	57 211	–32
Iceland	2 085	2 302	2 405	2 287	2 455	2 306	2 186	2 238	7
Ireland	31 797	35 954	38 312	40 250	42 133	44 160	46 460	45 808	44
Italy	431 156	439 644	444 180	455 797	460 075	462 076	469 515	468 961	9
Japan	1 122 277	1 234 759	1 242 028	1 195 175	1 228 371	1 238 958	1 213 754	1 247 613	11
Latvia	22 181	9 137	8 704	8 125	7 482	6 980	7 409	7 333	–67
Liechtenstein	195				196				0.5
Lithuania	38 920	15 365	14 146	15 576			11 787	11 833	–70
Luxembourg	12 750			7 696	5 432	8 923	5 482	10 218	–20
Monaco	71	88	83	81	89	90	92	92	30
Netherlands	160 578	181 572	166 228	172 421	167 261	170 718	177 063	176 654	10
New Zealand	25 254	28 020	29 980	28 685	30 421	30 912	33 041	33 770	34
Norway	34 690	40 607	40 569	40 838	41 317	40 857	42 065	40 945	18
Poland[a]	476 625	372 530	361 626	337 448	329 697	314 812	317 844		–33
Portugal	44 130	50 564	53 531	57 900	64 433	63 843	64 365	67 464	53
Romania[a]	182 447	138 655	123 864	109 007	91 800	94 577	98 759	105 641	–42
Russian Federation	2 362 000	1 495 000	1 529 000	1 505 000	1 509 000				–36
Slovakia	59 619	44 712	45 007	43 998	43 036	40 623	43 021	43 303	–27
Slovenia[a]	15 998	15 588	16 033	15 754	15 108	15 198	16 289	16 349	2
Spain	224 751	240 649	260 074	268 776	295 260	306 830	308 278	325 448	45
Sweden	55 847	60 811	56 409	57 304	54 531	52 391	53 236	54 753	–2
Switzerland	44 305	44 019	43 211	44 508	44 617	43 678	44 752	43 741	–1
Ukraine	703 792	346 768	322 907	314 445			277 272	282 714	–60
United Kingdom	584 029	567 441	543 110	545 882	537 601	542 648	556 000	537 380	–8
United States	5 002 324	5 498 549	5 577 635	5 602 500	5 676 290	5 858 982	5 731 773	5 782 363	16
European Community[b]	3 334 677	3 347 082	3 281 236	3 333 097	3 306 447	3 328 207	3 392 202	3 382 270	1

[a] In accordance with decision 9/CP.2, some Parties with economies in transition use base years other than 1990: Bulgaria (1988); Hungary (1985–87); Poland (1988); Romania (1989); Slovenia (1986).

[b] Emission estimates of the European Community are reported separately from those of its member States.

Table 6. Total anthropogenic CH_4 emissions, 1990 and 1996–2002

	Gg								Change from 1990 to latest reported estimate
Party	**1990**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**(%)**
Australia	5 807	5 645	5 752	5 833	5 805	5 929	5 931	5 918	2
Austria	446	410	397	391	382	371	365	355	–20
Belarus	666	508	507	510	503	488	612	609	–9
Belgium	519	510	507	501	486	468	447	435	–16
Bulgaria[a]	1 164	716	610	560	481	484	446	446	–62
Canada	3 500	4 272	4 230	4 499	4 352	4 348	4 409	4 475	28
Croatia	182	150	154	148	151	153	160	163	–10
Czech Republic	798	600	575	544	509	510	499	494	–38
Denmark	259	288	281	280	274	273	276	268	4
Estonia	208	128	136	127	117	114	94	90	–57
Finland	302	288	284	274	269	258	256	244	–19
France	3 306	3 305	3 145	3 124	3 078	3 067	3 013	2 941	–11
Germany	6 743	5 073	4 907	4 647	4 479	4 208	4 039	3 965	–41
Greece	428	479	485	515	516	544	534	545	27
Hungary[a]	624	815	790	680	683	471	485	466	–25
Iceland	22	23	24	25	25	26	26	25	14
Ireland	567	608	617	618	614	609	598	609	8
Italy	1 771	1 737	1 741	1 715	1 691	1 691	1 684	1 635	–8
Japan	1 181	1 090	1 050	1 024	1 005	986	961	930	–21
Latvia	174	112	110	111	108	104	109	108	–38
Liechtenstein	0.8				0.7				–13
Lithuania	340	247	264	178			151	169	–50
Luxembourg	24			23	23	23		22	–6
Monaco	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	30
Netherlands	1 302	1 182	1 106	1 068	1 020	968	949	891	–32
New Zealand	1 218	1 251	1 246	1 256	1 263	1 285	1 310	1 313	8
Norway	307	332	335	331	329	334	333	327	7
Poland[a]	3 141	2 252	2 279	2 335	2 250	2 183	1 849		–41
Portugal	402	401	401	419	429	409	392	398	–1
Romania[a]	2 464	1 534	1 363	1 274	1 226	1 225	1 195	1 158	–53
Russian Federation	26 190	18 476	14 381	14 714	13 810				–47
Slovakia	310	253	240	222	220	214	213	220	–29
Slovenia[a]	121	112	113	113	112	112	108	109	–10
Spain	1 440	1 686	1 735	1 794	1 813	1 870	1 920	1 959	36
Sweden	317	314	310	302	292	281	279	271	–15
Switzerland	238	221	214	212	211	208	208	203	–15
Ukraine	9 402	7 059	6 606	6 457			8 786	8 815	–6
United Kingdom	3 662	2 988	2 837	2 686	2 504	2 323	2 192	2 098	–43
United States	30 603	30 333	29 944	29 530	29 193	29 259	28 815	28 482	–7
European Community[b]	21 476	19 281	18 762	18 340	17 850	17 338	16 965	16 638	–23

[a] In accordance with decision 9/CP.2, some Parties with economies in transition use base years other than 1990: Bulgaria (1988); Hungary (1985–87); Poland (1988); Romania (1989); Slovenia (1986).

[b] Emission estimates of the European Community are reported separately from those of its member States.

Table 7. Total anthropogenic N_2O emissions, 1990 and 1996–2002

	Gg								Change from 1990 to latest reported estimate
Party	**1990**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**(%)**
Australia	77	86	91	95	101	108	111	114	48
Austria	19	20	21	20	20	20	19	19	–4
Belarus	33	18	20	22	19	21	36	19	–42
Belgium	43	47	45	46	43	42	42	42	–2
Bulgaria[a]	48	26	25	21	20	22	21	20	–58
Canada	173	203	195	202	179	173	166	171	–1
Croatia	13	10	11	9.9	11	11	10.0	9.7	–23
Czech Republic	36	30	28	27	26	26	27	26	–28
Denmark	34	30	30	29	28	28	27	26	–25
Estonia	3.3	1.2	1.4	1.4	1.2	1.3	1.2	1.0	–69
Finland	25	24	25	24	24	22	22	22	–13
France	288	293	294	272	253	246	243	234	–19
Germany	262	242	234	192	180	180	181	180	–31
Greece	46	43	45	45	44	47	45	45	–1
Hungary[a]	50	5.1	4.4	35	36	28	31	34	–33
Iceland	1.1	1.1	1.1	1.1	1.2	1.1	1.1	1.0	–13
Ireland	31	33	34	34	35	35	34	31	2
Italy	123	127	131	130	133	134	137	136	10
Japan	130	135	136	132	113	122	113	114	–12
Latvia	10	3.6	3.7	3.6	3.3	3.4	3.8	3.7	–63
Liechtenstein	0.02				0.024				19
Lithuania	13			7.2			12	5.8	–56
Luxembourg	0.6			0.3	0.3	0.3	0.3	0.3	–51
Monaco	0.005	0.009	0.01	0.01	0.01	0.01	0.01	0.01	109
Netherlands	53	57	57	57	56	53	51	49	–7
New Zealand	33	37	37	38	38	40	41	42	28
Norway	18	17	17	18	18	18	18	19	5
Poland[a]	70	54	54	52	75	77	77		10
Portugal	19	19	19	19	20	19	19	20	5
Romania[a]	90	28	26	19	21	21	23	20	–78
Russian Federation	316	132	139	113	113				–64
Slovakia	19	14	14	13	12	12	13	12	–36
Slovenia[a]	5.8	5.0	5.0	5.0	5.2	4.9	4.9	5.0	–14
Spain	85	89	87	89	94	98	94	93	9
Sweden	29	29	29	29	28	27	27	27	–8
Switzerland	12	12	12	12	12	12	12	11	–0.1
Ukraine	58	15	16	16			52	51	–13
United Kingdom	219	190	196	187	145	145	137	132	–40
United States	1 268	1 409	1 407	1 394	1 382	1 374	1 346	1 341	6
European Community[b]	1 266	1 235	1 237	1 163	1 091	1 083	1 080	1 057	–17

[a] In accordance with decision 9/CP.2, some Parties with economies in transition use base years other than 1990: Bulgaria (1988); Hungary (1985–87); Poland (1988); Romania (1989); Slovenia (1986).

[b] Emission estimates of the European Community are reported separately from those of its member States.

Table 8. Total aggregate anthropogenic emissions of hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6), 1990 and 1996–2002

	Gg CO_2 equivalent								Change from 1990 to latest reported estimate
Party	**1990**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**(%)**
Australia[a]	5 065	1 817	1 964	2 712	2 680	3 190	3 901	4 252	–16
Austria	1 485	1 886	1 884	1 791	1 626	1 735	1 735	1 735	17
Belarus									
Belgium	3 671	4 725	2 292	1 642	1 264	1 449	1 541	1 707	–53
Bulgaria		46	37	69	44	34	17	23	
Canada[b]	10 257	9 526	8 819	8 326	7 588	7 579	7 681	8 461	–18
Croatia	939	60	91	18	9.1	23	49	49	–95
Czech Republic		322	626	523	525	890	1 283	1 322	
Denmark	44	392	401	480	581	682	700	716	1 510
Estonia									
Finland	94	150	244	299	399	576	732	528	459
France	9 280	6 980	7 953	8 412	9 576	10 178	11 184	13 125	41
Germany	10 102	13 850	14 006	14 499	12 941	11 438	12 178	12 815	27
Greece[c]	1 193	3 988	4 359	4 257	4 288	4 429	3 936	4 087	243
Hungary	346			952	829	456	540	598	73
Iceland	425	59	125	249	238	165	151	113	–73
Ireland	179	262	342	257	411	547	594	531	197
Italy	2 492	1 531	2 199	3 227	3 712	4 937	6 807	8 280	232
Japan		52 593	51 512	49 218	43 807	39 292	33 251	28 260	
Latvia[d]		0.008	0.012	0.014	0.017	0.021	0.024	0.028	
Liechtenstein									
Lithuania	35			14			14	35	0
Luxembourg[e]				47		47	0.03	47	
Monaco							0.7	0.2	
Netherlands	7 066	10 002	10 816	11 427	6 710	5 792	3 345	3 116	–56
New Zealand	528	419	296	372	282	244	325	484	–8
Norway	5 480	2 036	2 013	2 094	2 143	2 022	2 100	1 707	–69
Poland		843	1 024	1 040	1 349	1 627	2 181		
Portugal[f]		5.0	5.9	11	18	30	43	56	
Romania[g]	785	398	453	489	477	503	508	525	–33
Russian Federation	40 000	36 000	40 000	41 000	42 000				5
Slovakia	272	91	114	80	93	103	108	130	–52
Slovenia[h]	283	291	253	204	161	171	182	207	–27
Spain	3 287	6 057	7 032	6 699	8 045	8 787	5 729	4 392	34
Sweden	527	639	750	701	772	721	740	780	48
Switzerland	279	281	398	459	507	629	677	692	149
Ukraine							1.5	1.6	
United Kingdom	13 851	18 535	20 907	19 021	12 748	11 475	11 623	12 396	–11
United States	90 942	114 861	121 660	135 699	134 807	139 082	129 720	138 231	52
European Community[i]	53 318	69 047	73 236	72 768	63 138	62 823	60 934	64 310	21

[a] 1990 to 1994 emissions of HFCs and PFCs, 1996 to 2000 HFCs, PFCs and SF_6.
[b] 1990 to 1991 emissions of PFCs only, 1995 to 2002 HFCs only.
[c] Emissions of HFCs and PFCs only.
[d] Emissions of SF_6 only.
[e] Emissions of HFCs and SF_6, except 2001 (HFCs only).
[f] Emissions of HFCs and SF_6, except 1995 (SF_6 only).
[g] Emissions of PFCs only.
[h] 1990 to 1994 emissions of HFCs and SF_6, 1996 to 2000 HFCs, PFCs and SF_6..
[i] Emission estimates of the European Community are reported separately from those of its member States.

Table 9. Net anthropogenic CO_2 emissions and removals from land-use change and forestry, 1990 and 1996–2002

	Gg								Change from 1990 to latest reported estimate
Party	**1990**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**(%)**
Australia	85 370	33 454	30 322	38 278	25 446	16 672	7 547	13 113	–85
Austria	–9 215	–5 385	–7 633	–7 633	–7 633	–7 633	–7 633	–7 633	–17
Belarus	–12 720	–18 155	–18 310	–18 520	–19 298	–18 981	–16 882	–11 453	–10
Belgium	–1 893	–1 850	–1 843	–1 836	–1 829	–1 822	–1 814	–1 814	–4
Bulgaria[a]	–4 657	–7 190	–5 852	–6 233	–6 608	–8 976	–9 467	–8 318	79
Canada	–154 179	–85 022	–106 256	31 792	–48 986	–73 610	–78 575	–20 645	–87
Croatia	–6 505	–8 069	–8 069	–8 069	–8 069	–8 069	–8 069	–9 000	38
Czech Republic	–2 128	–4 486	–4 639	–3 757	–3 401	–4 016	–4 363	–4 492	111
Denmark	–2 832	–3 064	–3 153	–3 313	–3 311	–653	–3 539	–3 813	35
Estonia	–6 320	–9 607	–9 107	–8 522	–8 107	–8 365	–9 417	–8 564	36
Finland	–23 798	–21 032	–12 637	–9 713	–10 821	–11 953	–16 851	–18 010	–24
France	–31 645	–41 241	–44 810	–43 847	–46 067	–37 913	–49 858	–54 865	73
Germany	7 515	5 687	5 751	5 925	5 901	14 097	13 809	13 906	85
Greece	1 474	–72	–404	2 830	19	4 170	–1 295	–1 892	–228
Hungary[a]	–1 348	–3 931	–4 205	–4 411	–4 500	–4 377	–4 542	–2 359	75
Iceland	–5.9	–66	–81	–94	–112	–131	–145	–163	2 638
Ireland	–66	–4.1	–31	–161	–122	–47	–629	–978	1 389
Italy	–23 532	–20 222	–17 764	–17 426	–17 712	–16 945	–18 301	–20 385	–13
Japan	–83 903								15[c]
Latvia	–18 701	–14 939	–11 724	–10 102	–9 095	–8 585	–9 560	–8 329	–55
Liechtenstein									
Lithuania	–5 482			–7 558			–7 335	–6 721	23
Luxembourg	–295			–295	–295	–295	–295	–295	0
Monaco								0.0	
Netherlands	–1 422	–1 398	–1 180	–1 380	–1 236	–1 413	–1 413	–1 413	–1
New Zealand	–21 764	–15 484	–17 168	–20 201	–21 990	–23 643	–23 974	–24 171	11
Norway	–9 538	–17 431	–16 322	–17 431	–17 612	–18 609	–18 831	–19 920	109
Poland [a]	–34 746	–42 616	–40 521	–29 821	–43 464	–43 094	–53 639		54
Portugal	5 573	–19	–107	–1 106	–435	–1 251	–881	–1 606	–129
Romania[a]	–12 440	–17 349	–17 658	–19 519	–18 412	–17 685	–18 541	–15 972	28
Russian Federation	154 947	–173 929	–131 557	–2 927	–211 742				–237
Slovakia	–2 427	–2 428	–1 411	–1 936	–1 651	–2 443	–5 265	–5 278	117
Slovenia[a]	–2 950	–5 561	–5 561	–5 561	–5 561	–5 561	–5 561	–5 561	88
Spain	–9 456	–18 785	–21 606	–23 871	–26 758	–31 746	–31 477	–35 301	273
Sweden	–20 292	–22 269	–27 288	–24 331	–27 305	–27 306	–24 811	–26 541	31
Switzerland	–1 293	–2 527	–2 694	–2 622	–2 276	130	430	285	–122
Ukraine	–52 107	–66 151	–68 806	–68 708					32
United Kingdom	9 050	5 228	5 032	5 286	5 019	3 639	3 474	1 903	–79
United States	–957 866	–1 055 222	–820 955	–705 786	–675 753	–690 150	–689 747	–690 723	–28
European Community[b]	–101 059	–124 722	–127 836	–121 283	–132 408	–117 367	–141 546	–158 741	57

Note: In this table negative values in Gg indicate net removals of CO_2 from the land-use change and forestry sector. In the change column negative values indicate a decrease in removals or an increase in emissions relative to 1990 and positive values indicate an increase in removals, or a decrease in emissions.

[a] In accordance with decision 9/CP.2, some Parties with economies in transition use base years other than 1990: Bulgaria (1988); Hungary (1985-87); Poland (1988); Romania (1989); Slovenia (1986).

[b] Emission estimates of the European Community are reported separately from those of its member States.

[c] The latest report estimate is for 1995 (–96,705 Gg).

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