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National communications from Parties included in Annex I to the Convention

Report on national greenhouse gas inventory data from Parties included in Annex I to the Convention for the period 1990–2003

**National greenhouse gas inventory data for the period
1990–2003 and status of reporting**

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 2005. All but two Annex I Parties provided an inventory in 2005, and only a few Parties made submissions that were late and/or incomplete. The total aggregate GHG emissions without emissions/removals from land use, land-use change and forestry (LULUCF) for Annex I Parties as a whole declined by 5.9 per cent (6.5 per cent including LULUCF) between 1990 and 2003; for Annex I Parties with economies in transition emissions decreased by 39.6 per cent without LULUCF (45.2 per cent including LULUCF); and for the other Annex I Parties emissions increased by 9.2 per cent without LULUCF (12.4 per cent including LULUCF). The Subsidiary Body for Implementation and the Conference of the Parties may wish to consider the information contained in this document and provide guidance to Parties and the 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.

CONTENTS

		<i>Paragraphs</i>	<i>Page</i>
I.	INTRODUCTION.....	1–4	3
	A. Mandate.....	1	3
	B. Scope of the note.....	2–3	3
	C. Possible action by the Conference of the Parties and the Subsidiary Body for Implementation	4	3
II.	STATUS OF REPORTING	5–9	3
III.	IMPROVEMENTS IN THE QUALITY OF INVENTORIES	10–11	7
IV.	RECALCULATIONS	12	7
V.	OVERVIEW OF EMISSION TRENDS AND SOURCES.....	13–17	7

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 of Implementation (SBI) and the COP.¹

B. Scope of the note

2. This note presents the latest available data on GHG emissions and removals from 41 Annex I Parties for the period 1990–2003, 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. It contains more information on net GHG emissions as requested by the Subsidiary Body of Implementation at its twenty-first session.

3. The information in chapter II on the status of reporting is based on reports received by 23 September 2005. 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, only the data received by 30 June 2005 could be included in chapters IV and V.³ Tables 4–13 in chapter V contain blank spaces where no data were available. However, for analytical purposes (e.g. summarizing text, figures), 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 Implementation

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

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, 39 Annex I Parties submitted an annual inventory submission in 2005; 37 of them included an NIR. Only two Parties (Russian Federation and Turkey⁵) had not reported national GHG inventories in 2005 by the time this document was prepared (see table 2). Twenty-eight reporting Parties provided their submission by the due date of 15 April, and 29 reported complete CRF tables for all years.

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.

¹ FCCC/CP/2002/8.

² More detailed data will be available on the secretariat web site before COP 11 <www.ghg.unfccc.int>.

³ The latest inventory data from Australia (version 3), Croatia (version 3) and Poland (version 1) are not included in the tables and figures of chapters IV and V because they were received after 30 June 2005.

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; for an updated version including revisions to the land use, land-use change and forestry sector adopted by COP 9, see document FCCC/CP/2004/8.

⁵ Turkey became Party to the UNFCCC on 24 May 2004 and is included for first time in this annual report as an Annex I Party.

Table 1. Timing and completeness of greenhouse gas inventory submissions from Annex I Parties in 2005

Party	Date ^a	Submission ^b	Years ^c	NIR
Australia	25 May	CRF	1990–2003	✓
Austria	15 April	CRF	1990–2003	✓
Belarus	8 April	CRF	2003	✓
Belgium	14 April	CRF	1990–2003	✓
Bulgaria	26 May	CRF	1990–2003	✓
Canada	15 April	CRF-R	1990–2003	✓
Croatia	6 June	CRF	1990–2003	✓
Czech Republic	14 April	CRF	1995, 2003	✓
Denmark	15 April	CRF	1990–2003	✓
Estonia	15 April	CRF	2003	✓
European Community	15 April	CRF	1990–2003	✓
Finland	8 April	CRF	1990–2003	✓
France	7 January	CRF	1990–2003	✓
Germany	15 April	CRF	1990–2003	✓
Greece	15 April	CRF	1990–2003	✓
Hungary	15 April	CRF-R	1985–2003	✓
Iceland	23 May	CRF	1990–2003	✓
Ireland	12 April	CRF	1990–2003	✓
Italy	14 April	CRF	1990–2003	✓
Japan	26 May	CRF	1990–2003	✓
Latvia	15 April	CRF	1990–2003	✓
Liechtenstein	24 May	CRF	1990, 2003	—
Lithuania	15 April	CRF	2003	✓
Luxembourg	12 May	CRF	2003	—
Monaco	12 May	CRF	2003	✓
Netherlands	14 April	CRF	1990–2003	✓
New Zealand	15 April	CRF-R	1990–2003	✓
Norway	15 April	CRF	1990–2003	✓
Poland	18 July	CRF	2003	✓
Portugal	8 April	CRF	1990–2003	✓
Romania	11 May	CRF-R	1989–2003	✓
Russian Federation	—	—	—	—
Slovakia	14 April	CRF	2003	✓
Slovenia	15 April	CRF	1986, 1990–2003	✓
Spain	14 April	CRF	1990–2003	✓
Sweden	11 April	CRF	1990–2003	✓
Switzerland	14 April	CRF	1990–2003	✓
Turkey	—	—	—	—
Ukraine	19 May	CRF	2001–2003	✓
United Kingdom of Great Britain and Northern Ireland	15 April	CRF	1990–2003	✓
United States of America	8 April	CRF	1990–2003	✓

^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. CRF-R indicates that the Party reported using the new CRF Reporter software provided to Annex I Parties in December 2004. For more details on the provision of specific CRF tables and the completeness of submissions see status reports of 2005 submissions available on the UNFCCC web site <http://unfccc.int/national_reports/annex_i_ghg_inventories/inventory_review_reports/items/3454.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, Estonia, Monaco, Poland and Slovakia. The Czech Republic provided such information except for 1991 and 1993.

Table 2. Reporting of greenhouse gas inventory information from Annex I Parties pursuant to decisions 3/CP.5^a and 18/CP.8 since their adoption^b

Party	2000		2001		2002		2003		2004		2005	
	CRF	NIR	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	^e	✓	✓		✓		✓	✓	✓	✓	✓	✓
Romania					✓	✓	✓	✓	✓	✓	✓	✓
Russian Federation	^c				^c							
Slovakia	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓
Slovenia							^c	✓	✓	✓	✓	✓
Spain	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sweden	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Switzerland	✓		✓		✓		✓		✓	✓	✓	✓
Turkey												
Ukraine									✓	✓	✓	✓
United Kingdom	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
United States	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Total number of CRFs and NIRs submitted	24	15	29	18	31	23	35	30	38	36	39	37

^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.

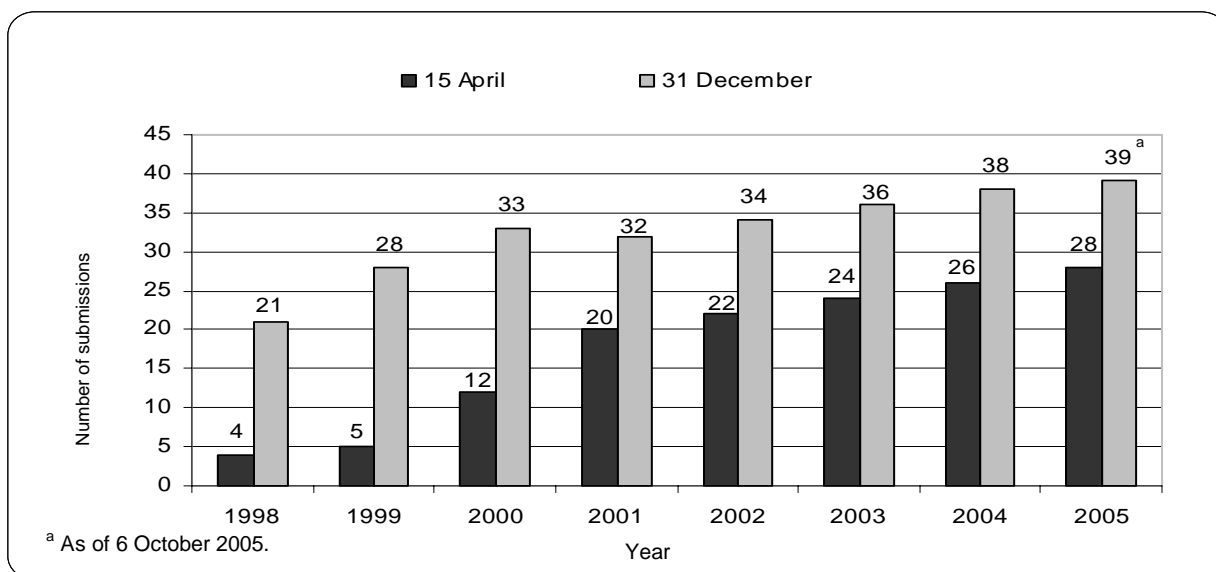
^c Tables with annual inventory information submitted using formats other than the CRF.

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 39 in 2005 and Parties submitting an NIR from 15 to 37), in adherence to deadlines (from 12 to 28 Parties meeting the deadline) and in completeness in reporting (from 19 to 29 Parties which have provided inventory information for all years of the time series including the base year). Three Parties have not provided base year estimates; of those Turkey and the Russian Federation have not provided a submission in 2005, and Luxembourg did not include any base year estimates in its submission.

8. Some Parties still have some problems in reporting annual inventories in accordance with the guidelines. Since the adoption of the CRF reporting requirements (decision 3/CP.5), only two Parties (Russian Federation and Turkey) have not submitted annual GHG inventories pursuant to decision 3/CP.5 since 2000. Of the 39 Parties that submitted inventories in 2005 two (Croatia and Poland) submitted their CRF more than six weeks late and eight (Croatia, Iceland, Italy, Japan, Monaco, Poland, Portugal and Slovenia) were equally late in submitting their NIR. In addition, four reporting Parties (Liechtenstein, Luxembourg, Russian Federation and Turkey) had not submitted the NIR by the time this document was prepared. Three reporting Parties have not provided any information for some years of the time series (Czech Republic, Lithuania and Luxembourg).

9. In 2005, Annex I Parties were requested to submit new inventory information on land use, land-use change and forestry (LULUCF) instead of the information on land-use change and forestry (LUCF) included in the CRF that Parties have been using and submitting since decision 3/CP.5 was adopted. The COP, by its decision 13/CP.9, decided that Annex I Parties should use the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance for Land Use, Land-Use Change and Forestry* for preparing annual inventories under the Convention, due in 2005 and beyond. By the same decision, the COP decided that Annex I Parties should use the tables of the CRF for LULUCF categories contained in annex I to that decision, for a trial period covering inventory submissions due in 2005. To facilitate the fulfilment of this reporting requirement the secretariat prepared provisional electronic spreadsheets as an interim reporting tool to be used in 2005 only. A total of 20 Annex I Parties (Australia, Austria, Belgium, Canada, Denmark, Finland, Germany, Greece, Italy, Japan, Lithuania, Monaco, Netherlands, New Zealand, Norway, Portugal, Romania, Slovakia, United Kingdom of Great Britain and Northern Ireland and United States of America) reported LULUCF inventory information using this interim reporting tool in 2005.

Figure 1. Receipt of greenhouse gas inventory submissions from Annex I Parties, 1998–2005



III. Improvements in the quality of inventories

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 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.

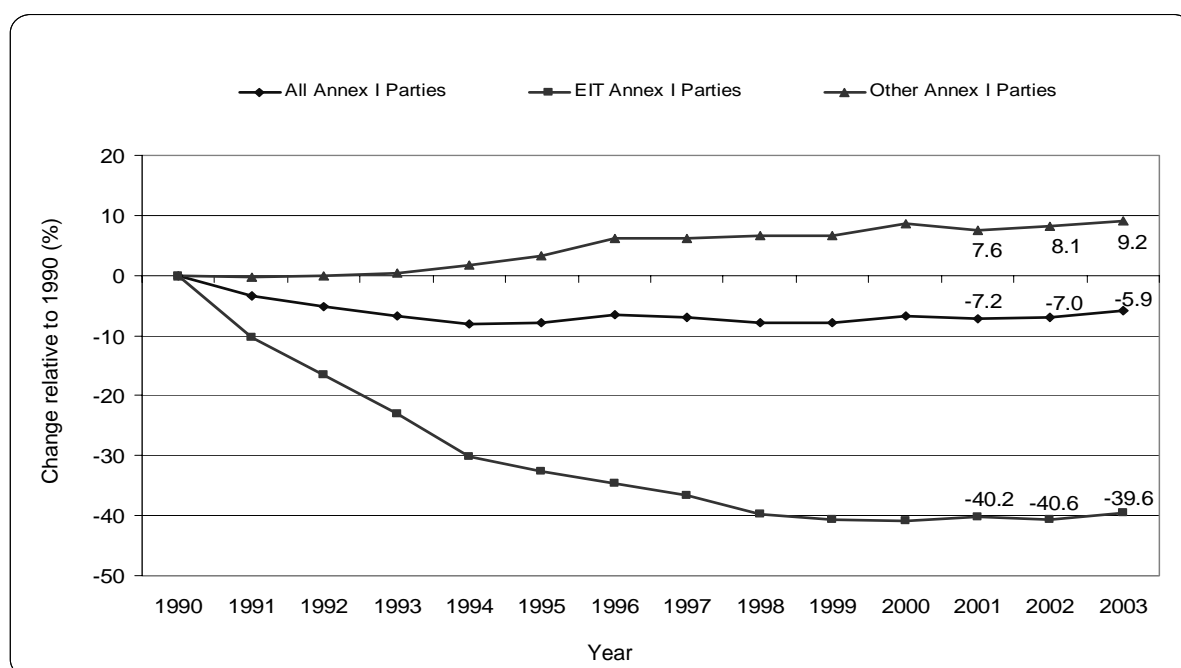
IV. Recalculations

12. Recalculations, in general, reflect the efforts made by Parties to improve the quality of previous estimates when this is required. Of the 37 reporting Parties that submitted estimates for their base year, 35 reported revised estimates in 2005. 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 33 to -16 per cent for carbon dioxide (CO₂), from 22 to -20 per cent for methane (CH₄) and from 121 to -8 per cent for nitrous oxide (N₂O). However, the median values for each gas from all Parties that have made recalculations are almost zero. Revisions to the reporting of hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆) were not as substantial as in previous years; the reporting has become more comprehensive in the past few years. Parties' recalculations resulted in lower values for SF₆ or PFCs. The changes for aggregate GHG emissions varied between 32 and -12 per cent (median value of 0.1 and mean of 1.1), but for 20 of the 37 Parties these recalculations were within ± 2 per cent.

V. Overview of emission trends and sources

13. Total aggregate GHG emissions without emissions/removals from the LULUCF sector for Annex I Parties as a whole declined by 5.9 per cent (6.5 per cent including LULUCF) over the period 1990–2003 (figure 2). Total aggregate emissions for the 14 Parties with economies in transition (EIT Parties) have decreased by 39.6 per cent (45.2 per cent including LULUCF), but eight of these Parties reported increasing CO₂ emissions in recent years (2001–2003). Emissions from other Annex I Parties as a whole increased by 9.2 per cent (12.4 per cent including LULUCF). These aggregate estimates are based on data from the 38 Parties that submitted inventories in 2005 and on carrying forward the last reported inventory data taken from inventory submissions for those Parties where 2003 data were not reported.

14. Table 3 shows a gas-by-gas presentation of the relative increase or decrease in emissions over the period 1990–2003. Figures 3 and 4 show changes in emissions for individual Annex I Parties, and Figures 5 and 6 show trends in Annex I Parties GHG emissions by sector. Figures 3 and 4 and tables 4 and 5 show that for several Parties the total aggregate emissions (with and without LULUCF) have increased over the period 1990–2003. Tables 6–13 present the trends for emissions of specific gases.

Figure 2. Trends in aggregate greenhouse gas emissions excluding LULUCF, 1990–2003

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. Figures 5 and 6 illustrate trends in aggregate GHG emissions by sector, and by subsector in the energy sector, for Annex I Parties as a whole. Transport emissions and emissions from international aviation have increased substantially (21 and 51 per cent, respectively). International marine bunker emissions have decreased by 5 per cent between 1990 and 2003, mainly because of a large decrease (57 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 27 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.

16. Figure 7 illustrates trends and emissions of HFCs, PFCs and SF₆ for Annex I Parties as a whole. The information provided in this figure and in table 10 indicates that, across Parties, the trend in aggregate emissions of HFCs, PFCs and SF₆ varied, with the exception of HFC emissions, which increased over the period for most Parties. Emissions of HFCs increased by 165 per cent between 1990 and 2003, emissions of PFCs decreased by 27 per cent, and emissions of SF₆ decreased 30 per cent, although fewer than half of the Parties individually reported lower SF₆ emissions. The reported aggregate emissions of these gases expressed in CO₂ equivalent (without LULUCF) represented only 1.7 per cent (1.9 per cent including LULUCF) of the total aggregate emissions of Annex I Parties.

17. Tables 11–13 show the trend in emissions and removals from the LULUCF sector as reported by Annex I Parties. Developments in this sector differ across Parties, with five Parties reporting a decrease in removals or an increase in emissions, in terms of CO₂ equivalents, of more than 10 per cent over the period and 26 Parties reporting an increase in removals, or decrease in emissions, of more than 10 per cent

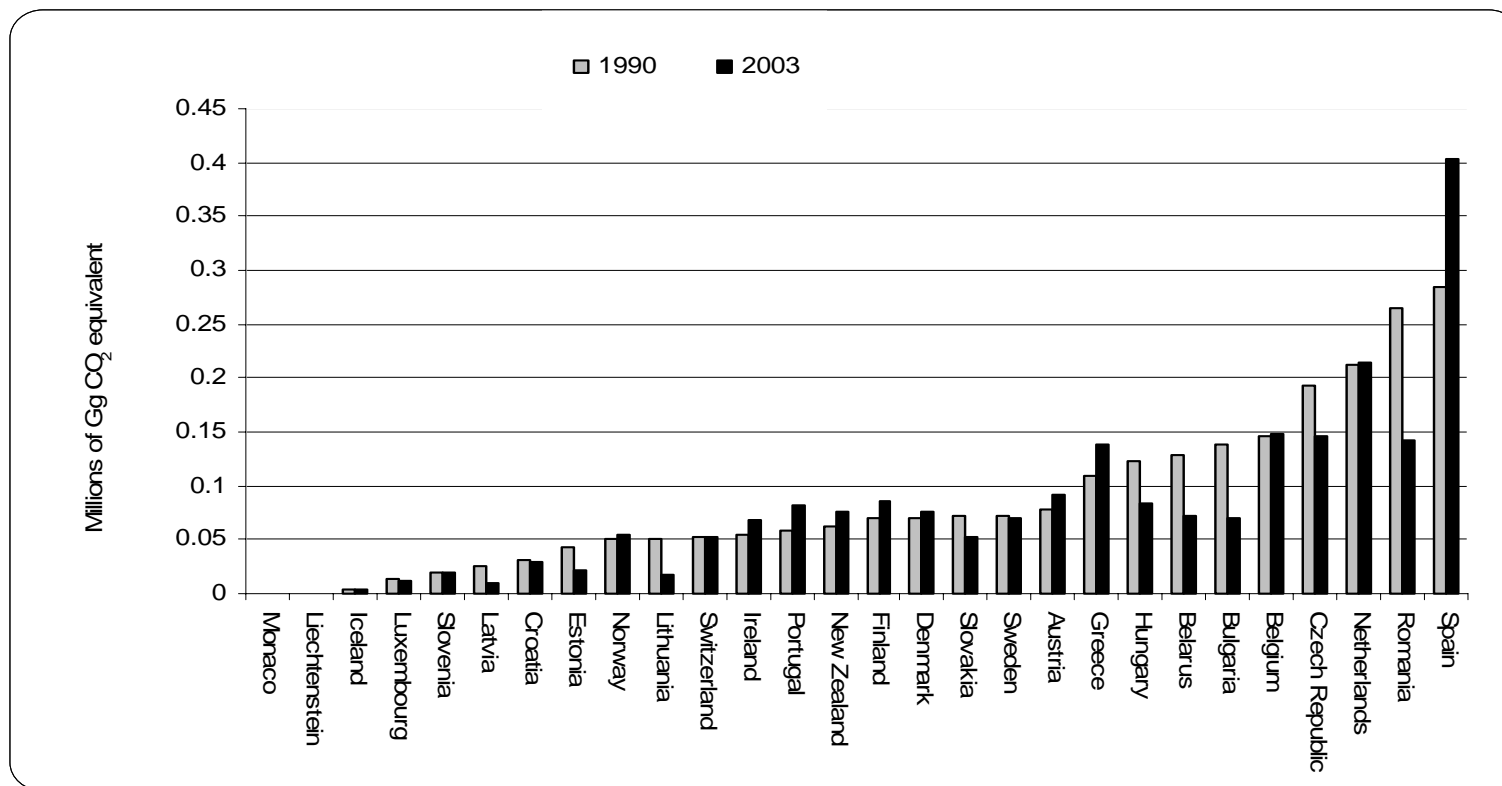
Table 3. Percentage change in Annex I Party GHG emissions by gas, 1990–2003

	Decrease			Between -1% and +1%	Increase		
	>10%	5–10%	1–5%		1–5%	5–10%	>10%
GHG (including LULUCF)	BGR, BLR, CZE, DEU, EST, GBR, HRV, ISL, LTU, LUX, LVA, POL, ROM, RUS, SVK, UKR	FRA, HUN NOR, SWE	EC	BEL, CHE, NLD	AUS, DNK	ITA LIE SVN	AUT, CAN, ESP, FIN, GRC, IRL, JPN, MCO, NZL, PRT, USA
GHG (excluding LULUCF)	BGR, BLR, CZE, DEU, EST, GBR, HUN, LTU, LUX, LVA, POL, ROM, RUS, SVK, UKR	HRV, ISL	FRA, SVN, SWE	BEL, CHE EC, NLD		DNK LIE NOR	AUS, AUT, CAN, ESP, FIN, GRC, IRL, ITA, JPN, MCO, NZL, PRT, USA
CO₂ (including LULUCF)	BGR, BLR, CZE, DEU, EST, HRV, HUN, LTU, LUX, LVA, POL, ROM, RUS, SVK, SVN, UKR	GBR, ISL	FRA, SWE	CHE, EC		AUS, BEL DNK, ITA LIE, NOR	AUT, CAN, ESP, FIN, GRC, IRL, JPN, MCO, NLD, NZL, PRT, USA
CO₂ (excluding LULUCF)	BGR, BLR, CZE, DEU, EST, HUN, LTU, LUX, LVA, POL, ROM, RUS, SVK, UKR	GBR		CHE, HRV SVN, SWE	EC, FRA ISL	BEL, LIE	AUS, AUT, CAN, DNK, ESP, FIN, GRC, IRL, ITA, JPN, MCO, NLD, NOR, NZL, PRT, USA
CH₄ (including LULUCF)	AUT, BEL, BGR, BLR, CHE, CZE, DEU, EC, EST, FIN, FRA, BR, HUN, JPN, LTU, LVA, NLD, POL, ROM, RUS, SVK, SVN, SWE	HRV, ITA LUX, USA	AUS, NOR, UKR	GRC, LIE	DNK	IRL, NZL	CAN, ESP, ISL, MCO, PRT
N₂O (including LULUCF)	BGR, BLR, CZE, DEU, DNK, EC, EST, FIN, FRA, GBR, HRV, HUN, ISL, JPN, LTU, LUX, LVA, NLD, ROM, RUS, SVK, UKR	BEL, CHE GRC, SVN SWE	AUT, CAN, IRL	USA	POL	ITA, LIE NOR, PRT	AUS, ESP MCO, NZL
HFCs, PFCs, SF₆	Decrease			Increase			
	>30%	1–30%		1–30%	31–100%	>100%	
	BEL, BGR, HRV, ISL, NLD, NOR, ROM, SVK, SVN	CAN, GBR, NZL		AUS, AUT, EC, RUS	DEU, ESP, FRA SWE, USA	CHE, DNK, FIN GRC, HUN, ITA	

Note: Changes are from 1990 (or base year) to 2003 or the most recent year for which data were available (see tables 4–10).

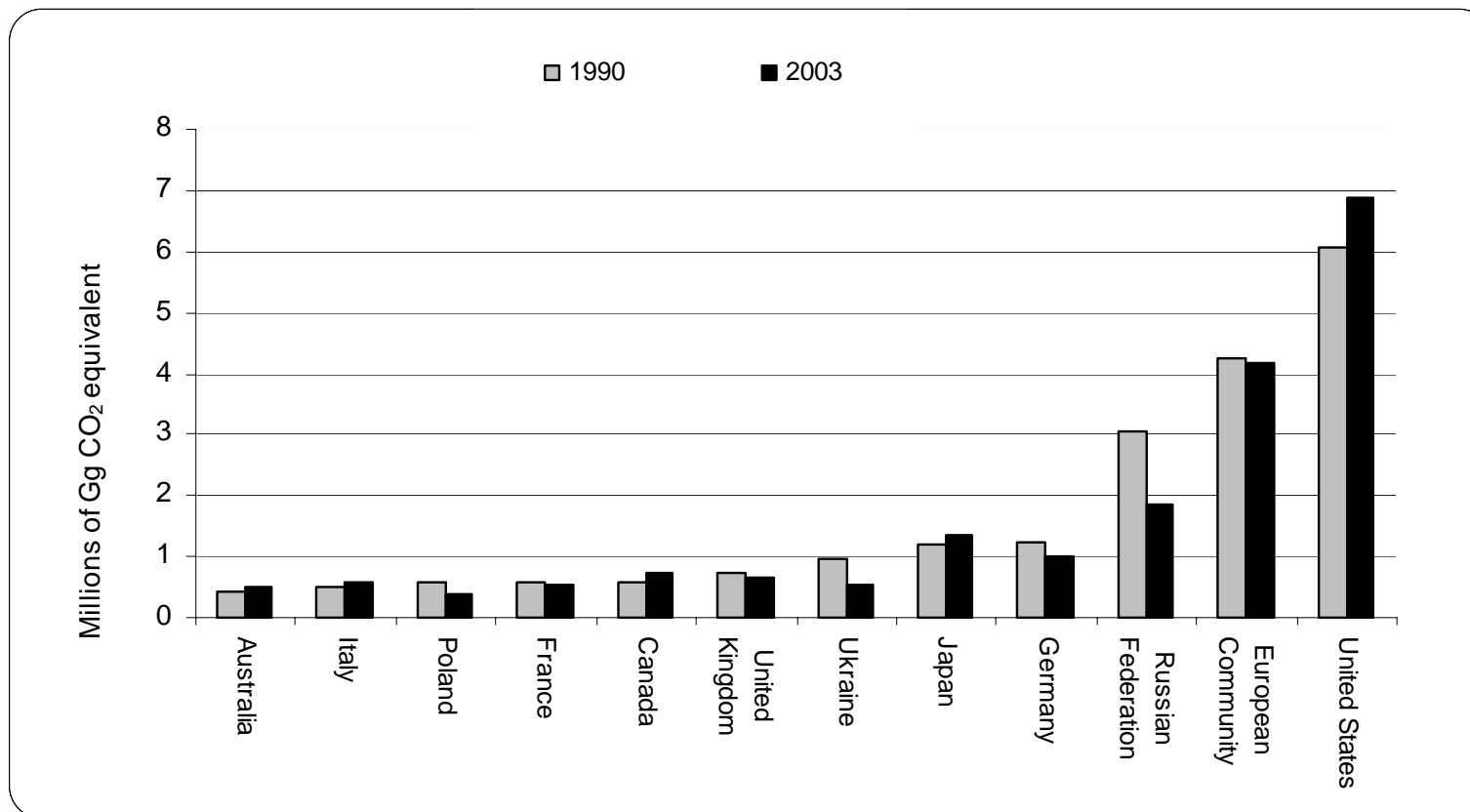
AUS (Australia), AUT (Austria), BLR (Belarus), BEL (Belgium), BGR (Bulgaria), CAN (Canada), HRV (Croatia), CZE (Czech Republic), DNK (Denmark), EST (Estonia), EC (European Community), FIN (Finland), FRA (France), DEU (Germany), GRC (Greece), HUN (Hungary), ISL (Iceland), IRL (Ireland), ITA (Italy), JPN (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).

Figure 3.a. Total aggregate greenhouse gas emissions of individual Annex I Parties, (excluding LULUCF), 1990 and 2003



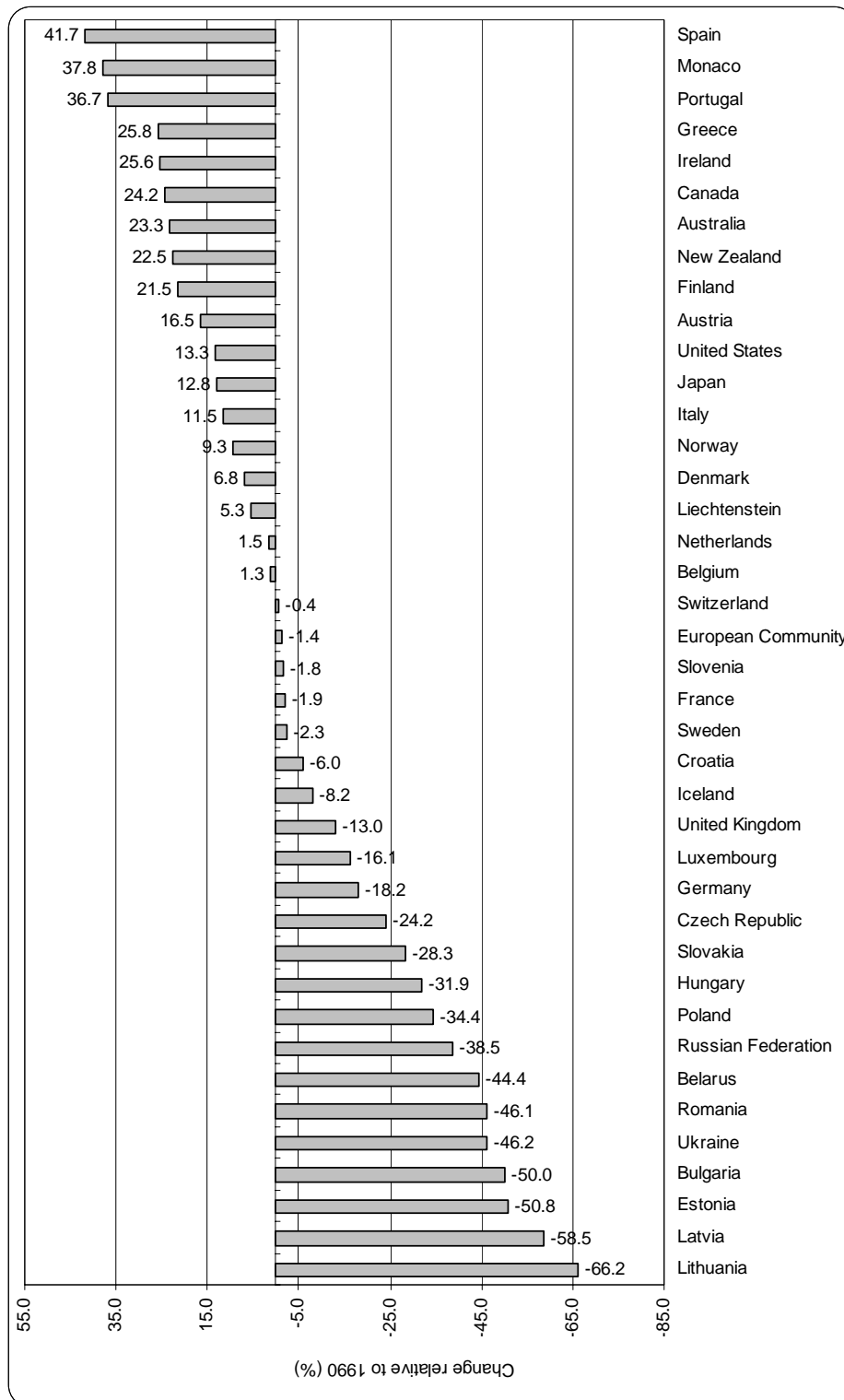
Note: The 2003 values are for 2003 or the most recent year for which data were available (see table 4). Values of these emissions including LULUCF can be seen in table 4.

Figure 3.b. Total aggregate greenhouse gas emissions of individual Annex I Parties, (excluding LULUCF), 1990 and 2003



Note: The 2003 values are for 2003 or the most recent year for which data were available (see table 4). Values of these emissions including LULUCF can be seen in table 4.

Figure 4. Change in total aggregate greenhouse gas emissions of individual Annex I Parties, (excluding LULUCF), 1990–2003



Note: The changes are with respect to 2003 or the most recent year for which data were available (see table 4). Values of these changes can be seen in table 4.

Figure 5. Trends in Annex I Party greenhouse gas emissions by sector, 1990–2003

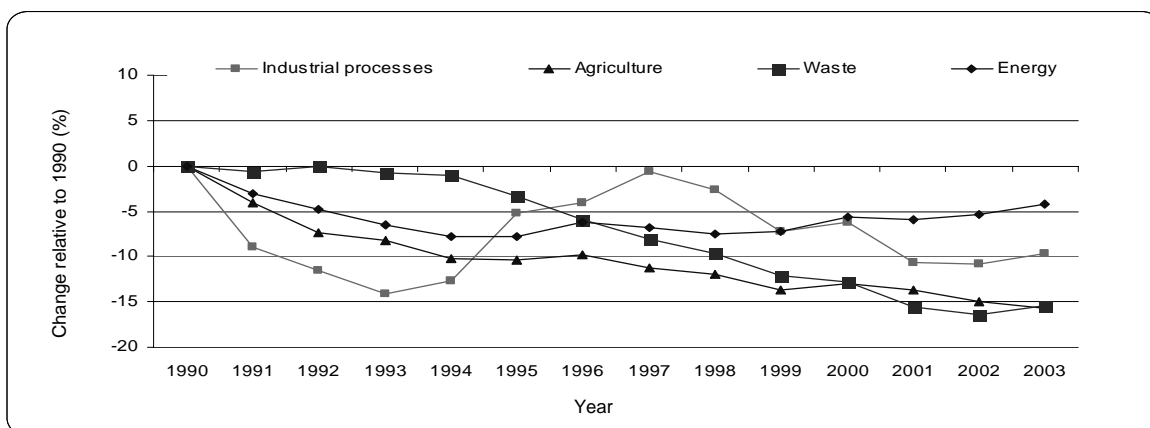


Figure 6. Trends in Annex I Party greenhouse gas emissions by subsector in the energy sector, 1990–2003

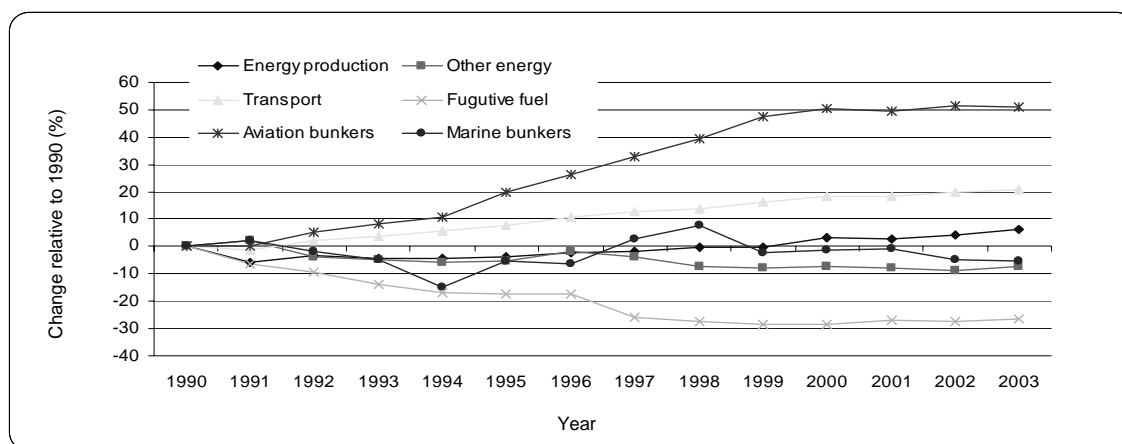
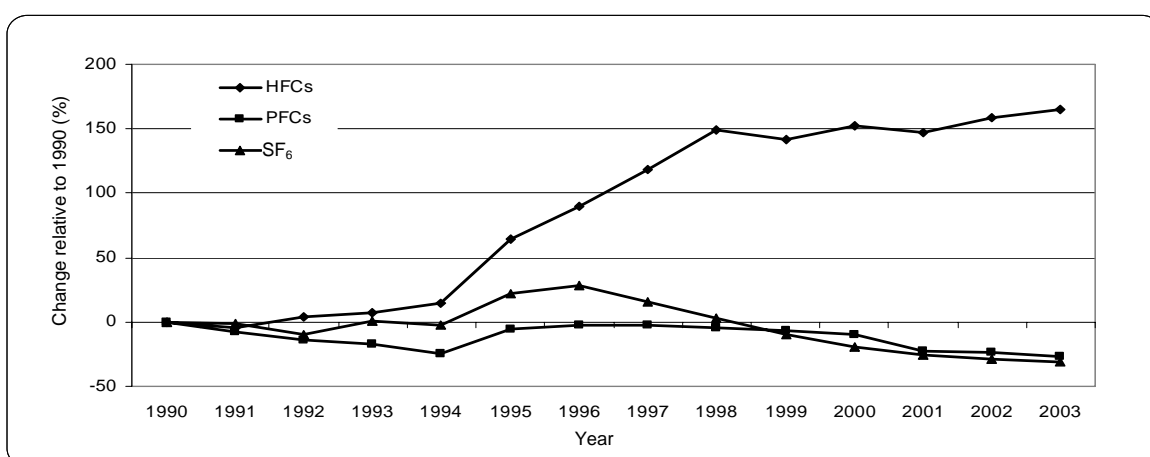


Figure 7. Trends in Annex I Party emissions of hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆), 1990–2003 (industrial processes sector)



Note for Figure 5, 6 and 7: Data gaps due to incomplete reporting by some Annex I Parties have been filled in using simple interpolation or the latest available data. As no data were reported for the transport sector by the Russian Federation, figure 6 does not include the Russian Federation. For these reasons, the values presented should be considered as preliminary, but this should not alter the trends presented.

Table 4. Total aggregate anthropogenic emissions of CO₂, CH₄, N₂O, HFCs, PFCs and SF₆, 1990 and 1997–2003, including emissions/removals from land use, land-use change and forestry

Party	Gg CO ₂ equivalent								Change from 1990 to latest reported estimate (%)
	1990	1997	1998	1999	2000	2001	2002	2003	
Australia	524 538	498 485	532 213	534 042	546 540	549 673	555 519	550 077	5
Austria	69 560	71 356	69 807	67 766	67 438	71 527	75 123	78 794	13
Belarus ^a	112 501	60 136	57 744	53 888	49 663	59 276	58 902	55 635	-51
Belgium	142 557	145 062	149 801	143 498	144 558	142 157	141 368	144 190	1
Bulgaria ^{ab}	93 515	73 836	64 449	58 630	56 723	56 970	55 221	62 111	-34
Canada	442 030	573 061	622 595	627 965	635 365	622 622	686 423	696 255	58
Croatia ^a	19 077	10 300	10 556	11 547	11 475	12 010	12 355	14 494	-24
Czech Republic ^a	189 891	153 615	144 322	136 495	142 776	142 410	137 080	141 643	-25
Denmark	70 860	81 003	76 471	73 306	71 504	70 026	68 940	74 280	5
Estonia ^a	37 174	14 407	12 889	11 473	11 301	10 018	10 960	12 670	-66
Finland	47 669	63 328	64 016	63 352	60 585	61 152	61 757	67 777	42
France ^a	534 839	527 847	541 107	520 116	520 786	515 776	498 922	504 596	-6
Germany	1 214 748	1 051 200	1 024 659	987 830	982 214	992 634	980 134	981 821	-19
Greece	106 222	118 944	124 647	122 995	129 365	128 286	128 098	132 110	24
Hungary ^{ab}	83 777	79 060	79 105	78 993	76 669	79 261	78 440	79 283	-5
Iceland ^a	3 269	3 232	3 199	3 364	3 115	2 938	2 902	2 801	-14
Ireland ^a	53 388	62 199	64 144	66 512	68 373	70 002	68 407	66 573	25
Italy	450 488	444 878	454 420	454 498	469 635	470 655	459 193	487 928	8
Japan ^a	1 103 404	1 357 525	1 306 591	1 328 402	1 336 197	1 301 359	1 329 991	1 339 130	21
Latvia ^a	6 961	382	1 259	1 299	1 414	1 138	2 196	2 342	-66
Liechtenstein ^a	250							264	5
Lithuania	45 452		14 262			13 008	12 833	10 212	-78
Luxembourg ^a	13 152		8 016	5 709	9 247	5 757	10 538	11 004	-16
Monaco	96	125	121	129	130	135	131	133	38
Netherlands	214 599	227 892	229 281	217 485	216 792	218 277	216 220	217 577	1
New Zealand	40 155	51 417	47 428	47 423	46 872	49 432	49 902	52 480	31
Norway	36 706	31 692	32 414	33 418	32 948	34 475	32 614	33 838	-8
Poland ^{ab}	529 673	386 722	373 695	358 120	343 646	328 512	319 543		-40
Portugal	65 433	70 402	74 598	82 524	79 316	80 649	84 499	88 233	35
Romania ^b	169 319	142 093	121 513	105 912	108 586	111 142	118 477	126 025	-26
Russian Federation	3 204 947	1 782 443	1 887 073	1 664 258					-48
Slovakia	69 700	52 620	50 457	49 542	46 222	46 074	45 679	46 892	-33
Slovenia ^{ab}	13 328	14 162	13 899	13 270	13 422	14 336	14 491	14 242	7
Spain ^a	274 824	305 295	312 780	337 833	349 327	345 324	362 193	362 169	32
Sweden ^a	51 918	45 455	48 919	42 625	39 977	43 473	42 943	49 055	-6
Switzerland ^a	51 173	48 009	49 361	49 830	51 406	52 545	51 492	50 469	-1
Turkey									
Ukraine ^a	939 964	477 491	416 602	405 390	406 000	428 621	433 267	471 309	-50
United Kingdom	750 641	691 440	685 535	651 906	650 762	662 489	642 224	649 568	-13
United States	5 046 059	5 747 512	5 838 752	5 926 125	6 130 768	5 980 065	6 031 568	6 072 181	20
European Community ^{ac}	4 014 578	3 871 616	3 884 277	3 796 940	3 816 770	3 839 214	3 797 537	3 872 955	-4

^a For this Party, data for emission/removals from the LUCF sector are used instead of data for the LULUCF sector; LULUCF data were not available when this document was prepared.

^b 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).

^c Emission estimates of the European Community are reported separately from those of its member States.

Table 5. Total aggregate anthropogenic emissions of CO₂, CH₄, N₂O, HFCs, PFCs and SF₆, 1990 and 1997–2003, excluding emissions/removals from land use, land-use change and forestry

Party	Gg CO ₂ equivalent								Change from 1990 to latest reported estimate
	1990	1997	1998	1999	2000	2001	2002	2003	(%)
Australia	417 893	459 102	480 192	490 525	500 971	509 196	510 390	515 230	23
Austria	78 573	83 046	82 514	80 403	81 084	84 872	86 434	91 566	17
Belarus	129 208	77 982	75 781	72 693	68 151	75 679	69 877	71 898	-44
Belgium	145 660	148 056	152 678	146 318	147 695	146 569	145 349	147 550	1
Bulgaria ^a	138 377	80 707	71 310	65 830	65 699	66 437	63 539	69 167	-50
Canada	595 861	675 282	682 209	695 645	720 169	711 992	718 932	740 214	24
Croatia	31 765	24 742	24 998	25 989	25 917	26 452	27 728	29 867	-6
Czech Republic	191 964	158 206	148 031	139 841	146 742	146 718	141 516	145 432	-24
Denmark	70 702	81 446	77 290	74 176	69 722	71 184	70 416	75 485	7
Estonia	43 491	23 514	21 411	19 580	19 666	19 436	19 524	21 387	-51
Finland	70 417	75 999	72 912	72 479	70 204	75 806	77 232	85 559	22
France	567 976	571 634	584 231	565 603	560 399	563 730	553 453	557 169	-2
Germany	1 243 692	1 083 684	1 057 391	1 021 013	1 016 636	1 027 829	1 015 351	1 017 511	-18
Greece	109 415	122 849	128 100	127 420	132 324	133 584	133 554	137 638	26
Hungary ^a	122 224	84 004	84 068	83 738	81 016	83 775	80 777	83 219	-32
Iceland	3 277	3 331	3 313	3 499	3 272	3 111	3 095	3 008	-8
Ireland	53 795	62 651	64 765	66 888	68 968	70 741	69 385	67 554	26
Italy	511 214	525 258	535 130	543 698	551 343	556 096	554 938	569 756	11
Japan	1 187 248	1 357 525	1 306 591	1 328 402	1 336 197	1 301 359	1 329 991	1 339 130	13
Latvia	25 351	12 023	11 360	10 464	9 940	10 733	10 621	10 529	-58
Liechtenstein	250							264	5
Lithuania	50 934		21 819			20 343	19 554	17 201	-66
Luxembourg	13 437		8 290	5 982	9 520	6 030	10 811	11 277	-16
Monaco	96	125	121	129	130	135	131	133	38
Netherlands	211 705	225 048	226 544	214 756	213 978	215 502	213 461	214 817	1
New Zealand	61 521	67 869	66 726	68 530	69 691	72 619	73 229	75 341	22
Norway	50 134	52 922	53 337	54 341	53 763	55 309	53 516	54 779	9
Poland ^a	564 408	427 238	403 512	401 582	386 736	382 147	370 239		-34
Portugal	59 374	70 440	75 354	82 769	80 148	81 253	85 707	81 157	37
Romania ^a	265 124	161 120	142 246	125 668	127 423	130 961	135 937	142 905	-46
Russian Federation	3 046 557	1 910 790	1 869 170	1 872 775					-39
Slovakia	72 089	54 007	52 382	51 162	48 608	51 282	50 905	51 707	-28
Slovenia ^a	20 185	19 724	19 460	18 831	18 983	19 898	20 053	19 803	-2
Spain	283 857	327 539	337 291	365 188	380 476	379 311	398 588	402 287	42
Sweden	72 210	72 743	73 250	69 930	67 283	68 284	69 484	70 554	-2
Switzerland	52 446	50 683	51 964	52 086	51 257	52 094	51 187	52 236	-0.4
Turkey									
Ukraine	978 896	542 931	480 233	468 661	467 491	488 298	490 565	527 065	-46
United Kingdom	747 979	691 213	685 905	652 426	651 527	663 452	643 694	651 090	-13
United States	6 082 511	6 671 101	6 713 257	6 745 605	6 946 841	6 800 744	6 851 636	6 893 813	13
European Community ^b	4 237 982	4 149 783	4 160 383	4 090 587	4 099 849	4 146 475	4 126 323	4 179 613	-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 CO₂ emissions, including land use, land-use change and forestry, 1990 and 1997–2003

Party	Gg								Change from 1990 to latest reported estimate
	1990	1997	1998	1999	2000	2001	2002	2003	(%)
Australia	382 028	358 152	387 989	388 823	396 438	397 547	404 439	402 282	5
Austria	52 249	54 837	53 511	51 977	51 808	55 935	59 684	63 441	21
Belarus ^a	85 038	43 138	40 218	37 292	33 038	35 219	40 240	35 856	-58
Belgium	115 906	119 172	124 505	119 165	120 679	118 944	119 004	122 845	6
Bulgaria ^{ab}	93 439	54 704	47 442	43 330	40 927	42 005	40 440	46 265	-50
Canada	304 385	413 701	464 292	473 345	480 507	468 735	531 157	540 197	77
Croatia ^a	10 347	3 614	4 513	5 235	4 936	5 324	5 538	7 627	-26
Czech Republic ^a	161 862	132 718	124 511	117 692	123 886	123 633	118 556	123 276	-24
Denmark	54 378	65 215	60 756	57 883	56 216	54 865	54 180	59 549	10
Estonia ^a	31 787	11 118	9 795	8 664	8 484	7 685	8 748	10 389	-67
Finland	33 502	49 586	50 606	50 091	47 975	48 517	49 455	55 383	65
France ^a	364 260	358 149	378 294	364 955	364 727	362 199	348 053	355 082	-3
Germany	986 088	861 045	852 469	824 236	825 670	838 667	828 660	829 677	-16
Greece	80 773	90 335	95 270	93 800	100 971	101 011	100 703	104 444	29
Hungary ^{ab}	83 428	55 507	55 149	55 240	53 427	54 818	55 337	56 496	-32
Iceland ^a	2 076	2 312	2 177	2 323	2 152	2 015	2 048	1 968	-5
Ireland ^a	31 390	37 860	39 629	41 757	43 565	45 721	44 830	43 469	38
Italy	369 752	362 661	372 198	371 040	385 746	386 503	375 622	405 382	10
Japan ^a	1 038 374	1 242 028	1 195 175	1 228 371	1 238 958	1 213 606	1 247 763	1 259 426	21
Latvia ^a	201	-3 052	-2 144	-1 937	-1 785	-2 181	-1 088	-759	-478
Liechtenstein ^a	227							240	6
Lithuania	33 438		8 106			5 990	5 984	5 298	-84
Luxembourg ^a	12 455		7 401	5 137	8 628	5 187	9 923	10 397	-17
Monaco	94	121	117	124	126	131	127	129	37
Netherlands	160 893	173 028	174 901	169 664	171 684	177 128	176 686	179 621	12
New Zealand	3 944	13 975	9 754	9 392	8 183	9 792	9 680	11 834	200
Norway	20 953	19 303	19 831	20 687	20 311	21 817	20 319	22 249	6
Poland ^{ab}	44 1879	321 105	307 627	286 233	271 718	264 205	257 577		-42
Portugal	49 185	53 344	56 948	64 332	62 358	63 806	67 239	69 623	42
Romania ^b	168 535	104 723	87 673	71 930	75 519	78 687	87 930	94 510	-44
Russian Federation	2 516 947	1 397 443	1 502 073	1 297 258					-48
Slovakia	57 039	43 260	41 710	40 994	37 744	37 378	37 011	38 220	-33
Slovenia ^{ab}	13 045	10 490	10 240	9 594	9 678	10 661	10 730	10 542	-19
Spain ^a	219 372	240 311	246 320	268 543	277 097	276 474	294 686	291 644	33
Sweden ^a	35 986	29 496	33 127	27 409	25 121	28 640	28 290	34 496	-4
Switzerland ^a	43 099	40 477	41 836	42 299	43 806	44 908	43 955	42 957	-0.3
Turkey									
Ukraine ^a	699 176	284 854	236 898	232 517	232 382	233 464	235 465	257 378	-63
United Kingdom	591 416	548 656	550 792	540 439	544 517	561 282	543 806	555 927	-6
United States	3 967 502	4 649 973	4 726 164	4 851 864	5 035 792	4 917 904	4 970 274	5 013 457	26
European Community ^{ac}	3 111 222	3 008 315	3 052 898	3 009 655	3 043 750	3 085 994	3 058 037	3 138 321	1

^a For this Party, data for emission/removals from the LUCF sector are used instead of data for the LULUCF sector; LULUCF data were not available when this document was prepared.

^b 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).

^c Emission estimates of the European Community are reported separately from those of its member States.

Table 7. Total anthropogenic CO₂ emissions, excluding land use, land-use change and forestry, 1990 and 1997–2003

Party	Gg								Change from 1990 to latest reported estimate (%)
	1990	1997	1998	1999	2000	2001	2002	2003	
Australia	280 886	322 492	339 716	348 955	354 373	360 633	363 810	371 701	32
Austria	61 263	66 527	66 218	64 614	65 454	69 280	70 994	76 213	24
Belarus	102 259	61 448	58 738	56 591	52 019	52 101	51 694	52 594	-49
Belgium	119 010	122 165	127 382	121 985	123 815	123 355	122 984	126 204	6
Bulgaria ^a	98 572	61 576	54 303	50 530	49 903	51 472	48 758	53 321	-46
Canada	459 776	517 073	527 817	542 723	565 683	558 970	567 791	586 066	27
Croatia	23 035	18 055	18 955	19 677	19 378	19 766	20 911	23 000	-0.2
Czech Republic	163 990	137 357	128 268	121 093	127 902	127 996	123 048	127 124	-22
Denmark	54 220	65 658	61 575	58 753	54 434	56 023	55 656	60 754	12
Estonia	38 107	20 225	18 318	16 771	16 849	17 103	17 312	19 106	-50
Finland	56 296	62 280	59 514	59 241	57 611	63 192	64 952	73 185	30
France	396 928	403 055	422 335	411 212	405 049	410 758	403 147	408 155	3
Germany	1 015 031	893 529	885 201	857 419	860 091	873 862	863 877	865 367	-15
Greece	84 021	94 292	98 861	98 237	104 112	106 334	106 163	109 977	31
Hungary ^a	84 776	60 478	60 139	60 015	57 803	59 360	57 703	60 461	-29
Iceland	2 084	2 411	2 292	2 458	2 309	2 188	2 241	2 175	4
Ireland	31 797	38 312	40 250	42 133	44 160	46 460	45 808	44 450	40
Italy	430 636	443 122	452 984	460 272	467 548	472 005	471 402	487 282	13
Japan	1 122 277	1 242 028	1 195 175	1 228 371	1 238 958	1 213 606	1 247 763	1 259 426	12
Latvia	18 654	8 742	8 130	7 413	6 855	7 413	7 337	7 427	-60
Liechtenstein	227							240	6
Lithuania	38 920		15 663			13 326	12 704	12 287	-68
Luxembourg	12 750		7 696	5 432	8 923	5 482	10 218	10 692	-16
Monaco	94	121	117	124	126	131	127	129	37
Netherlands	157 998	170 183	172 164	166 934	168 870	174 352	173 928	176 861	12
New Zealand	25 315	30 434	29 059	30 504	31 006	32 983	33 011	34 700	37
Norway	34 414	40 566	40 774	41 626	41 144	42 664	41 239	43 219	26
Poland ^a	476 625	361 626	337 448	329 697	314 812	317 844	308 277		-35
Portugal	43 612	53 451	58 054	64 767	63 609	64 687	68 844	64 293	47
Romania ^a	184 248	123 750	108 406	91 688	94 366	98 509	105 400	111 393	-40
Russian Federation	2 362 000	1 529 000	1 505 000	1 509 000					-36
Slovakia	59 446	44 662	43 649	42 630	40 148	42 603	42 254	43 053	-28
Slovenia ^a	15 995	16 052	15 801	15 155	15 239	16 223	16 292	16 103	1
Spain	228 405	262 555	270 831	295 898	308 246	310 461	331 082	331 762	45
Sweden	56 278	56 784	57 458	54 714	52 427	53 451	54 832	55 995	-1
Switzerland	44 372	43 151	44 438	44 555	43 656	44 458	43 650	44 724	1
Turkey									
Ukraine	738 114	350 297	300 535	295 801	293 876	293 159	292 774	313 139	-58
United Kingdom	588 771	548 445	551 178	540 989	545 304	562 269	545 294	557 462	-5
United States	5 009 552	5 579 984	5 607 159	5 677 970	5 858 201	5 744 782	5 796 757	5 841 504	17
European Community ^b	3 334 938	3 287 864	3 330 534	3 304 377	3 328 296	3 394 289	3 387 885	3 447 354	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 8. Total anthropogenic CH₄ emissions, including land use, land-use change and forestry, 1990 and 1997–2003

Party	Gg CO ₂ equivalent								Change from 1990 to latest reported estimate (%)
	1990	1997	1998	1999	2000	2001	2002	2003	
Australia	114 633	112 183	113 784	113 050	115 626	115 822	113 717	110 294	-4
Austria	9 798	8 681	8 557	8 366	8 146	8 021	7 856	7 807	-20
Belarus ^a	16 665	10 649	10 712	10 554	10 251	12 841	12 781	13 062	-22
Belgium	10 788	10 526	10 397	10 078	9 798	9 231	8 792	8 487	-21
Bulgaria ^{ab}	24 925	11 303	10 448	8 903	9 038	8 320	8 482	9 366	-62
Canada	74 132	90 887	92 110	91 496	92 165	94 099	95 578	94 949	28
Croatia ^a	3 809	3 251	3 118	3 201	3 233	3 383	3 452	3 611	-5
Czech Republic ^a	16 763	12 085	11 421	10 691	10 714	10 485	10 373	10 210	-39
Denmark	5 702	6 119	6 061	5 973	5 961	6 049	5 975	5 894	3
Estonia ^a	4 363	2 866	2 664	2 451	2 403	1 969	1 898	1 968	-55
Finland	6 433	6 054	5 843	5 705	5 479	5 383	5 171	4 965	-23
France ^a	68 144	66 867	66 613	65 254	64 947	63 719	62 031	60 590	-11
Germany	132 099	97 178	91 858	88 443	82 908	79 308	76 477	75 220	-43
Greece	10 061	10 875	11 236	10 402	10 520	10 070	10 128	10 172	1
Hungary ^{ab}	13 290	10 074	10 388	10 024	10 102	10 356	9 765	9 523	-28
Iceland ^a	413	482	488	495	488	490	473	472	14
Ireland ^a	11 976	13 057	13 079	12 983	12 954	12 770	12 795	12 753	6
Italy	38 320	38 471	38 328	38 466	38 051	37 145	35 853	34 637	-10
Japan ^a	24 822	22 087	21 545	21 121	20 720	20 174	19 511	19 285	-22
Latvia ^a	3 705	2 320	2 328	2 263	2 191	2 185	2 165	1 905	-49
Liechtenstein ^a	14.9							15.2	2
Lithuania	7 938		3 732			3 173	3 557	3 600	-55
Luxembourg ^a	502		481	483	478	473	471	471	-6
Monaco	0.6	0.9	0.8	0.8	0.8	0.8	0.8	0.7	21
Netherlands	25 630	22 090	21 280	20 223	19 518	19 005	18 221	17 455	-32
New Zealand	25 284	25 563	25 659	25 884	26 166	26 524	26 565	26 645	5
Norway	5 177	5 494	5 326	5 228	5 321	5 293	5 123	5 071	-2
Poland ^{ab}	65 954	47 850	49 045	47 254	45 852	38 820	37 791		-43
Portugal	10 184	10 963	11 527	11 771	10 821	10 485	10 830	12 063	18
Romania ^b	50 892	27 539	25 551	24 448	24 395	23 559	23 009	23 781	-53
Russian Federation	550 000	302 000	309 000	290 000					-47
Slovakia	6 343	4 959	4 681	4 623	4 555	4 548	4 677	4 569	-28
Slovenia ^{ab}	2 247	1 978	1 994	2 002	2 041	1 969	2 011	1 974	-12
Spain ^a	27 847	32 922	34 071	34 412	35 416	36 297	36 715	37 062	33
Sweden ^a	6 510	6 393	6 237	6 037	5 819	5 802	5 629	5 513	-15
Switzerland ^a	4 451	3 909	3 848	3 836	3 742	3 760	3 683	3 669	-18
Turkey									
Ukraine ^a	200 993	164 864	155 637	150 683	153 272	175 159	177 578	196 302	-2
United Kingdom	77 480	61 042	57 618	53 746	49 909	46 958	44 976	40 583	-48
United States	605 345	579 490	569 102	557 280	554 173	546 814	542 480	544 955	-10
European Community ^{ac}	441 450	391 727	383 166	372 320	360 706	350 664	341 899	333 688	-24

^a For this Party, data for emission/removals from the LUCF sector are used instead of data for the LULUCF sector; LULUCF data were not available when this document was prepared.

^b 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).

^c Emission estimates of the European Community are reported separately from those of its member States.

Table 9. Total anthropogenic N₂O emissions, including land use, land-use change and forestry, 1990 and 1997–2003

Party	Gg CO ₂ equivalent								Change from 1990 to latest reported estimate
	1990	1997	1998	1999	2000	2001	2002	2003	(%)
Australia	22 292	25 547	26 896	28 477	30 136	30 969	31 573	31 199	40
Austria	5 712	5 891	5 974	5 808	5 759	5 731	5 636	5 542	-3
Belarus ^a	10 797	6 349	6 814	6 042	6 374	11 216	5 881	6 718	-38
Belgium	12 192	13 102	13 291	13 096	12 853	12 729	12 223	11 253	-8
Bulgaria ^{ab}	14 805	7 789	6 489	6 352	6 723	6 626	6 275	6 456	-56
Canada	52 312	59 217	56 263	52 734	51 465	49 203	49 938	51 187	-2
Croatia ^a	3 983	3 344	2 908	3 102	3 284	3 254	3 316	3 230	-19
Czech Republic ^a	11 266	8 811	8 390	8 111	8 175	8 291	8 151	8 157	-28
Denmark	10 736	9 268	9 175	8 870	8 645	8 411	8 066	8 091	-25
Estonia ^a	1 024	423	430	359	414	364	314	313	-69
Finland	7 640	7 444	7 269	7 158	6 556	6 521	6 603	6 721	-12
France ^a	93 149	94 918	87 722	80 431	80 851	78 493	75 759	74 608	-20
Germany	86 388	78 971	65 834	62 018	62 199	62 481	61 767	63 694	-26
Greece	14 196	13 374	13 268	13 224	13 453	13 241	13 170	13 278	-6
Hungary ^{ab}	23 816	13 205	13 203	13 066	12 583	13 500	12 621	12 434	-48
Iceland ^a	360	355	353	373	348	342	308	302	-16
Ireland ^a	10 022	10 941	11 180	11 361	11 307	10 916	10 250	9 739	-3
Italy	39 924	42 010	41 838	42 877	42 993	43 000	43 005	42 353	6
Japan ^a	40 208	41 893	40 580	35 104	37 464	34 642	34 685	34 617	-14
Latvia ^a	3 055	1 111	1 070	965	998	1 123	1 104	1 180	-61
Liechtenstein ^a	8.2							8.6	5
Lithuania	4 077		2 424			3 844	3 292	1 314	-68
Luxembourg ^a	196		88	90	94	97	97	90	-54
Monaco	1.6	3.1	3.1	3.3	3.4	3.5	3.4	3.3	104
Netherlands	21 312	21 958	21 694	20 948	19 894	18 878	17 971	17 321	-19
New Zealand	10 399	11 583	11 660	11 884	12 279	12 790	13 173	13 500	30
Norway	5 080	4 838	5 118	5 314	5 237	5 225	5 433	5 342	5
Poland ^{ab}	21 840	16 743	15 984	23 284	23 895	23 946	22 633		4
Portugal	6 064	6 090	6 112	6 403	6 107	6 315	6 374	6 478	7
Romania ^b	29 199	9 377	7 800	9 055	8 168	8 386	7 011	7 162	-75
Russian Federation	98 000	43 000	35 000	35 000					-64
Slovakia	6 047	4 286	3 987	3 832	3 819	4 040	3 861	3 933	-35
Slovenia ^{ab}	1 659	1 442	1 461	1 513	1 532	1 523	1 544	1 503	-9
Spain ^a	24 252	24 981	25 657	26 812	28 007	26 803	26 380	27 936	15
Sweden ^a	8 871	8 811	8 835	8 377	8 255	8 206	8 158	8 210	-7
Switzerland ^a	3 344	3 200	3 193	3 173	3 186	3 156	3 148	3 079	-8
Turkey									
Ukraine ^a	39 795	27 773	24 068	22 190	20 347	19 998	20 224	17 629	-56
United Kingdom	67 893	60 834	58 105	44 973	44 862	42 626	41 046	40 423	-40
United States	381 989	396 321	407 752	382 147	401 925	385 844	380 534	376 749	-1
European Community ^{ac}	408 468	398 750	375 959	352 364	351 753	344 366	336 287	335 653	-18

^a For this Party, data for emission/removals from the LUCF sector are used instead of data for the LULUCF sector; LULUCF data were not available when this document was prepared.

^b 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).

^c Emission estimates of the European Community are reported separately from those of its member States.

Table 10. Total aggregate anthropogenic emissions of hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆), 1990 and 1997–2003

Party	Gg CO ₂ equivalent								Change from 1990 to latest reported estimate (%)
	1990	1997	1998	1999	2000	2001	2002	2003	
Australia	5 586	2 604	3 544	3 692	4 341	5 335	5 791	6 302	13
Austria	1 801	1 947	1 765	1 615	1 725	1 841	1 947	2 004	11
Belarus								0.4	
Belgium	3 671	2 263	1 608	1 159	1 228	1 253	1 350	1 606	-56
Bulgaria ^a	76	39	71	45	35	19	24	23	-69
Canada ^b	11 201	9 256	9 929	10 390	11 228	10 585	9 751	9 922	-11
Croatia ^c	939	91	18	9	23	49	49	27	-97
Czech Republic									
Denmark ^d	44	401	480	581	682	700	719	746	1,579
Estonia									
Finland	94	244	299	399	576	732	528	709	650
France	9 286	7 912	8 477	9 476	10 261	11 364	13 078	14 316	54
Germany	10 173	14 006	14 499	13 134	11 438	12 178	13 230	13 230	30
Greece	1 193	4 360	4 873	5 568	4 422	3 964	4 097	4 217	254
Hungary ^e	350	275	365	663	557	587	715	830	137
Iceland ^f	420	82	180	173	127	92	73	60	-86
Ireland		342	257	411	547	594	531	612	
Italy	2 492	1 736	2 056	2 114	2 845	4 007	4 712	5 555	123
Japan		51 517	49 290	43 806	39 055	32 937	28 031	25 802	
Latvia ^g		3	5	8	10	12	15	17	
Liechtenstein ^h								0.1	
Lithuania									
Luxembourg ⁱ			47		47	0.03	47	47	
Monaco									
Netherlands	6 764	10 816	11 406	6 651	5 695	3 266	3 341	3 180	-53
New Zealand ^j	528	296	355	262	244	325	484	501	-5
Norway	5 496	2 056	2 139	2 189	2 079	2 141	1 738	1 176	-79
Poland		1 024	1 040	1 349	2 181	1 541	1 541		
Portugal ^k		6	11	18	30	43	56	70	
Romania ^l	785	454	490	478	505	510	527	571	-27
Russian Federation	40 000	40 000	41 000	42 000					5
Slovakia ^m	271	114	80	93	103	108	130	170	-37
Slovenia ⁿ	283	253	204	161	171	182	207	223	-21
Spain	3 353	7 080	6 732	8 067	8 806	5 751	4 411	5 526	65
Sweden	551	756	720	802	782	824	866	836	52
Switzerland	279	424	485	522	672	720	706	765	174
Turkey									
Ukraine									
United Kingdom	13 851	20 907	19 021	12 748	11 475	11 623	12 396	12 636	-9
United States	91 223	121 729	135 734	134 834	138 879	129 503	138 280	137 020	50
European Community ^o	53 437	72 824	72 254	62 601	60 561	58 190	61 313	65 293	22

^a Base year (1998), PFCs only; (1997–2003) PFCs and SF₆ only.

^b 1990 PFCs and SF₆ only.

^c 1990 PFCs only; 1997–2003 HFCs only.

^d 1990 SF₆ only.

^e Base year, (1985–87) PFCs and SF₆ only.

^f PFCs only.

^g 1997–2003 HFCs and SF₆ only.

^h 2003 SF₆ only.

ⁱ 1998, 2000, 2002, 2003 HFCs and SF₆ only; 2001 HFCs only.

^j 1990 PFCs and SF₆ only.

^k 1997–2003 HFCs and SF₆ only.

^l Base year (1989) PFCs only.

^m 1990 PFCs and SF₆ only.

ⁿ Base year (1986) PFCs and SF₆ only.

^o Emission estimates of the European Community are reported separately from those of its member States.

Table 11. Net anthropogenic CO₂ emissions and removals from land use, land-use change and forestry, 1990 and 1997–2003

Party	Gg								Change from 1990 to latest reported estimate
	1990	1997	1998	1999	2000	2001	2002	2003	(%)
Australia	101 142	35 659	48 274	39 868	42 065	36 914	40 629	30 582	70
Austria	-9 013	-11 690	-12 707	-12 637	-13 646	-13 345	-11 311	-12 773	42
Belarus ^a	-17 221	-18 310	-18 520	-19 298	-18 981	-16 882	-11 453	-16 739	-3
Belgium	-3 103	-2 993	-2 877	-2 820	-3 137	-4 412	-3 980	-3 359	8
Bulgaria ^{ab}	-5 133	-6 872	-6 860	-7 200	-8 976	-9 467	-8 318	-7 056	37
Canada	-155 391	-103 372	-63 525	-69 378	-85 176	-90 235	-36 634	-45 869	-70
Croatia ^a	-12 688	-14 442	-14 442	-14 442	-14 442	-14 442	-15 373	-15 373	21
Czech Republic ^a	-2 128	-4 639	-3 757	-3 401	-4 016	-4 363	-4 492	-3 848	81
Denmark	158	-443	-819	-870	1 782	-1 158	-1 476	-1 204	861
Estonia ^a	-6 320	-9 107	-8 522	-8 107	-8 365	-9 417	-8 564	-8 717	38
Finland	-22 794	-12 694	-8 908	-9 149	-9 636	-14 676	-15 498	-17 802	-22
France ^a	-32 668	-44 905	-44 041	-46 257	-40 322	-48 559	-55 094	-53 073	62
Germany	-28 944	-32 484	-32 732	-33 182	-34 422	-35 195	-35 217	-35 690	23
Greece	-3 248	-3 957	-3 591	-4 436	-3 142	-5 324	-5 460	-5 533	70
Hungary ^{ab}	-1 348	-4 971	-4 990	-4 776	-4 377	-4 542	-2 366	-3 965	194
Iceland ^a	-8	-99	-114	-135	-156	-173	-193	-208	2 509
Ireland ^a	-407	-452	-621	-376	-595	-739	-978	-981	141
Italy	-60 884	-80 461	-80 786	-89 231	-81 802	-85 502	-95 780	-81 900	35
Japan ^{ac}	-83 903								15
Latvia ^a	-18 453	-11 794	-10 274	-9 350	-8 640	-9 594	-8 425	-8 187	-56
Liechtenstein ^a									
Lithuania	-5 482		-7 558			-7 335	-6 721	-6 989	27
Luxembourg ^a	-295		-295	-295	-295	-295	-295	-295	0
Monaco									
Netherlands	2 894	2 844	2 736	2 730	2 814	2 775	2 759	2 761	5
New Zealand	-21 370	-16 459	-19 305	-21 112	-22 823	-23 191	-23 331	-22 866	7
Norway	-13 461	-21 262	-20 943	-20 939	-20 833	-20 848	-20 920	-20 970	56
Poland ^{ab}	-34 746	-40 521	-29 821	-43 464	-43 094	-53 639	-50 700		46
Portugal	5 573	-107	-1 106	-435	-1 251	-881	-1 606	5 330	4
Romania ^b	-15 713	-19 027	-20 733	-19 758	-18 847	-19 822	-17 470	-16 882	7
Russian Federation	154 947	-131 557	-2 927	-211 742					237
Slovakia	-2 407	-1 402	-1 939	-1 636	-2 403	-5 225	-5 243	-4 833	101
Slovenia ^{ab}	-2 950	-5 561	-5 561	-5 561	-5 561	-5 561	-5 561	-5 561	88
Spain ^a	-9 033	-22 244	-24 511	-27 355	-31 149	-33 987	-36 395	-40 118	344
Sweden ^a	-20 292	-27 288	-24 331	-27 305	-27 306	-24 811	-26 541	-21 499	6
Switzerland ^a	-1 273	-2 674	-2 602	-2 256	149	450	305	-1 766	39
Turkey									
Ukraine ^a	-38 938	-65 443	-63 637	-63 284	-61 495	-59 695	-57 308	-55 761	43
United Kingdom	2 645	211	-385	-550	-787	-986	-1 489	-1 536	158
United States	-1 042 050	-930 011	-880 995	-826 106	-822 409	-826 879	-826 483	-828 046	-21
European Community ^{ad}	-223 716	-279 549	-277 636	-294 722	-284 545	-308 295	-329 847	-309 033	38

Note: In this table negative values in Gg CO₂ indicate net removals of CO₂ from the land use, 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 For this Party, data for emission/removals from the LUCF sector are used instead of data for the LULUCF sector; LULUCF data were not available when this document was prepared.

^b 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).

^c The change reported for Japan is in relation to the latest value reported by this Party (1995) that is not included in this table. The value is -96,705 Gg.

^d Emission estimates of the European Community are reported separately from those of its member States.

Table 12. Anthropogenic CH₄ emissions and removals from land use, land-use change and forestry, 1990 and 1997–2003

Party	Gg CO ₂ equivalent								Change from 1990 to latest reported estimate
	1990	1997	1998	1999	2000	2001	2002	2003	(%)
Australia	4 322	2 925	2 944	2 866	2 753	2 798	3 536	3 351	-22
Austria									
Belarus ^a	502	455	470	481	481	470	469	466	-7
Belgium									
Bulgaria ^{ab}									
Canada	833	569	1 830	827	214	428	1 913	902	8
Croatia ^a									
Czech Republic ^a	54	47	47	54	50	54	56	58	7
Denmark									
Estonia ^a	3	0.1	0.1						-97
Finland	16	10	3	8	3	10	10	8	-49
France ^a	-486	1 100	898	751	689	586	543	480	-199
Germany									
Greece	50	47	125	10	166	23	3	4	-91
Hungary ^{ab}	8	24	24	25	27	26	26	26	239
Iceland ^a									
Ireland ^a									
Italy	143	74	86	42	87	55	31	65	-55
Japan ^a	53								
Latvia ^a	58	139	157	167	103				78
Liechtenstein ^a									
Lithuania									
Luxembourg ^a									
Monaco									
Netherlands									
New Zealand	4	8	6	5	4	4	4	4	-4
Norway	18	16	5	2	3	0.1	4	14	-20
Poland ^{ab}	11	5	4	2	4	4	4		-61
Portugal	441	64	318	172	380	251	361	1 585	260
Romania ^b	0.2	0.2	0.3	1	8	2	8	2	725
Russian Federation	3 127	2 900	18 908	2 915					-7
Slovakia	15	11	11	13	14	14	14	15	4
Slovenia ^{ab}	-0.003								
Spain ^a									
Sweden ^a									
Switzerland ^a									
Turkey									
Ukraine ^a	6	2	6	12	3	16	10	5	-11
United Kingdom	15	14	15	27	20	21	16	13	-14
United States									
European Community ^{ac}	179	1 308	1 445	1 010	1 347	945	965	2 156	1 105

Note: In this table negative values in Gg CO₂ equivalent indicate net removals from the land use, 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 For this Party, data for emission/removals from the LUCF sector are used instead of data for the LULUCF sector; LULUCF data were not available when this document was prepared.

^b 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).

^c Emission estimates of the European Community are reported separately from those of its member States.

Table 13. Anthropogenic N₂O emissions and removals from land use, land-use change and forestry, 1990 and 1997–2003

Party	Gg CO ₂ equivalent								Change from 1990 to latest reported estimate (%)
	1990	1997	1998	1999	2000	2001	2002	2003	
Australia	1 180	798	803	782	751	764	965	914	-23
Austria									
Belarus ^a	12	9	12	12	12	9	9	9	-25
Belgium									
Bulgaria ^{ab}	-0.004								
Canada	727	582	2 080	869	157	436	2 212	1 007	39
Croatia ^a									
Czech Republic ^a	0.6	0.5	0.5	0.6	0.6	0.6	0.6	0.7	7
Denmark									
Estonia ^a									
Finland	29	14	9	15	14	12	13	12	-58
France ^a	17	18	19	19	19	19	19	19	13
Germany									
Greece	5	5	13	1	17	2	0.3	0.5	-91
Hungary ^{ab}	0.8	2.5	3.1	5.1	2.7	2.6	2.6	2.6	239
Iceland ^a									
Ireland ^a									
Italy	15	8	-11	-11	7	6	3	7	-55
Japan ^a	5								
Latvia ^a	6	14	16	17	10				78
Liechtenstein ^a									
Lithuania									
Luxembourg ^a	11		22	22	22	22	22	22	106
Monaco									
Netherlands									
New Zealand	0.03	0.05	0.04	0.04	0.03	0.03	0.03	0.03	-4
Norway	16	16	15	15	14	14	14	15	-6
Poland ^{ab}									
Portugal	45	6	32	17	39	25	37	161	260
Romania ^b	0.04	0.03	0.06	0.17	2	0.5	2	0.4	791
Russian Federation	316	310	1 922	310					-2
Slovakia	3	3	3	3	3	3	3	3	
Slovenia ^{ab}	0.004								
Spain ^a									
Sweden ^a									
Switzerland ^a									
Turkey									
Ukraine ^a	1	0.2	1	1	0.3	2	1	1	-11
United Kingdom	2	1	1	3	2	2	2	1	-14
United States	5 599	6 423	6 490	6 626	6 336	6 199	6 414	6 414	15
European Community ^{ac}	133	74	85	65	119	88	95	219	65

Note: In this table negative values in Gg CO₂ equivalent indicate removals from the land use, land-use change and forestry sector. In the change column negative values indicate a decrease in emissions relative to 1990 and positive values indicate an increase in emissions.

^a For this Party, data for emission/removals from the LUCF sector are used instead of data for the LULUCF sector; LULUCF data were not available when this document was prepared.

^b 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).

^c Emission estimates of the European Community are reported separately from those of its member States.
