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METHODOLOGICAL ISSUES

NATIONAL COMMUNICATIONS FROM PARTIES INCLUDED  
IN ANNEX I TO THE CONVENTION

Report on national greenhouse gas inventory data from Annex I Parties for 1990 to 2000

Note by the secretariat

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## I. INTRODUCTION

### A. Mandate

1. The Conference of the Parties (COP), by its decisions 9/CP.2 and 3/CP.5, requested Parties included in Annex I to the Convention (Annex I Parties) to submit national inventory data on emissions by sources and removals by sinks by 15 April of each year. By its decision 6/CP.3, the COP requested the secretariat to collect, process and publish, on a regular basis, information on national greenhouse gas (GHG) inventories submitted annually by Annex I Parties in accordance with decision 9/CP.2. By its decision 6/CP.5, the COP requested the secretariat to prepare documentation, including a compilation of aggregate information and trends on GHG emissions and removals, in support of the technical review of GHG inventories outlined in that decision.<sup>1</sup>

2. The Subsidiary Body for Implementation (SBI), at its sixteenth session, requested the secretariat to compile information on GHG emissions and removals for the period 1990–2000 and to make it accessible and searchable on the UNFCCC web site.

### B. Scope of the note

3. This note presents the latest available GHG data on trends in GHG emissions and removals from Annex I Parties for the period 1990–2000. More detailed GHG inventory data, complementing this document, have been published electronically on the UNFCCC web site.<sup>2</sup> The analysis that follows is based on the latest GHG inventory information from Annex I Parties<sup>3</sup> for those Parties that have already submitted inventories this year or on earlier submissions or national communications for those Parties that have not yet submitted their inventories in 2002.

4. The tables and figures included in this note summarize GHG emissions and removals data from 39 out of 40 Annex I Parties<sup>4</sup> for which data are available.<sup>5</sup> The document also contains a description of the status of reporting of annual GHG emission inventories, highlighting the timeliness of reporting and completeness of the data reported, as well as information on changes in estimates from previous submissions.

### C. Possible action by the subsidiary bodies

5. The SBI and the Subsidiary Body for Scientific and Technological Advice (SBSTA) may wish to take note of the information contained in this document as it relates to their deliberations on other issues. In particular, the SBI may wish to consider the information in this note together with that in document FCCC/SBI/2002/INF.6.

## II. STATUS OF REPORTING

6. The UNFCCC reporting guidelines on annual inventories require Parties to submit a national inventory report (NIR) along with the tables of the common reporting format (CRF), covering data from the base year or period to the last but one year before the year of submission.<sup>6</sup> As shown in table 1, 30 Annex I Parties have submitted an annual inventory submission for 2002. Of these, 22 provided their submission by the due date of 15 April, 16 Parties have reported for all years using the tables of the CRF and 17 have submitted an NIR.

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<sup>1</sup> Full texts of decisions adopted by the Conference of the Parties at its second, third and fifth sessions are contained in FCCC/CP/1996/15/Add.1, FCCC/CP/1997/Add.1 and FCCC/CP/1999/6/Add.1, respectively.

<sup>2</sup> See FCCC/WEB/2002/10.

<sup>3</sup> Based on information submitted as of 31 August 2002.

<sup>4</sup> Data for Belarus is not included as Belarus had not yet submitted an annual inventory or national communication by 31 August 2002.

<sup>5</sup> Where data were not available, the tables contain blank spaces.

<sup>6</sup> For the full text of the UNFCCC reporting guidelines on annual inventories, including the tables of the CRF, see FCCC/CP/1999/7.

**Table 1. Timing and completeness of 2002 GHG inventory submissions**

Party	Date <sup>a</sup>	Submission <sup>b</sup>	Years <sup>c</sup>	NIR
Australia	21 August	CRF	1990-2000	✓
Austria	12 April	CRF	1990-2000	✓
Belgium	12 April	CRF	1990-2000	✓
Canada	15 April	CRF	1990-2000	✓
Czech Republic	12 April	CRF	1990, 2000	
Denmark	15 April	CRF	1990-2000	✓
Estonia	26 March	CRF	2000	
European Community	15 April	Only CRF Summary and trend tables <sup>d</sup>	1990-2000	✓
Finland	9 April	CRF	1990-2000	✓
France	8 February	CRF	1990-2000	✓
Germany	17 June	Only CRF Summary and trend tables	1990-2000	
Greece	30 April	CRF	1990-2000	
Hungary	2 May	CRF	2000	✓
Iceland	29 April	CRF	2000	
Ireland	17 April	CRF	1990-2000	
Italy	15 April	CRF	2000	
Japan	23 August	CRF	1990-2000	
Latvia	15 April	CRF	1999, 2000	✓
Luxembourg	21 February	Only CRF Summary tables	2000	
Netherlands	12 April	CRF	1990-2000	✓
New Zealand	15 April	CRF	2000 <sup>e</sup>	✓
Norway	12 April	CRF	1990, 1998-2000	✓
Poland	15 April	CRF	2000	
Portugal	11 April	CRF	1990-2000	
Slovakia	17 April	CRF	2000	
Spain	12 April	CRF	1990-2000	✓
Sweden	11 April	CRF	1990-2000	✓
Switzerland	12 April	CRF	2000	
United Kingdom of Great Britain and Northern Ireland	10 April	CRF	1990-2000	✓
United States of America	8 April	CRF	1990-2000	✓

**Parties that had not submitted a 2002 submission as of 15 September 2002**

Belarus, Bulgaria, Croatia, Liechtenstein, Lithuania, Monaco, Romania, Russian Federation, Slovenia, Ukraine

<sup>a</sup> 15 April is the annual submission due date.

<sup>b</sup> CRF = For each year reported by the Party the majority of CRF tables were provided (for more details on provision of specific CRF tables and the completeness of submissions refer to the status reports of 2002 submissions available on the UNFCCC web site at <http://unfccc.int/program/mis/ghg/statrep2002.html>).

<sup>c</sup> Indicates years for which CRF tables were submitted. The UNFCCC reporting guidelines require the reporting of information on any recalculations of previously submitted estimates. In such instances, Parties should ensure consistency in the estimates over time. Of the Parties that did not report CRF tables for all years, the following provided information on recalculations of estimates: Czech Republic (for 1990 and 1996-1999), Estonia, (1990 and 1995), Latvia (1999), New Zealand (1990-1999), Norway (1990, 1998, 1999) and Switzerland (1990-1999).

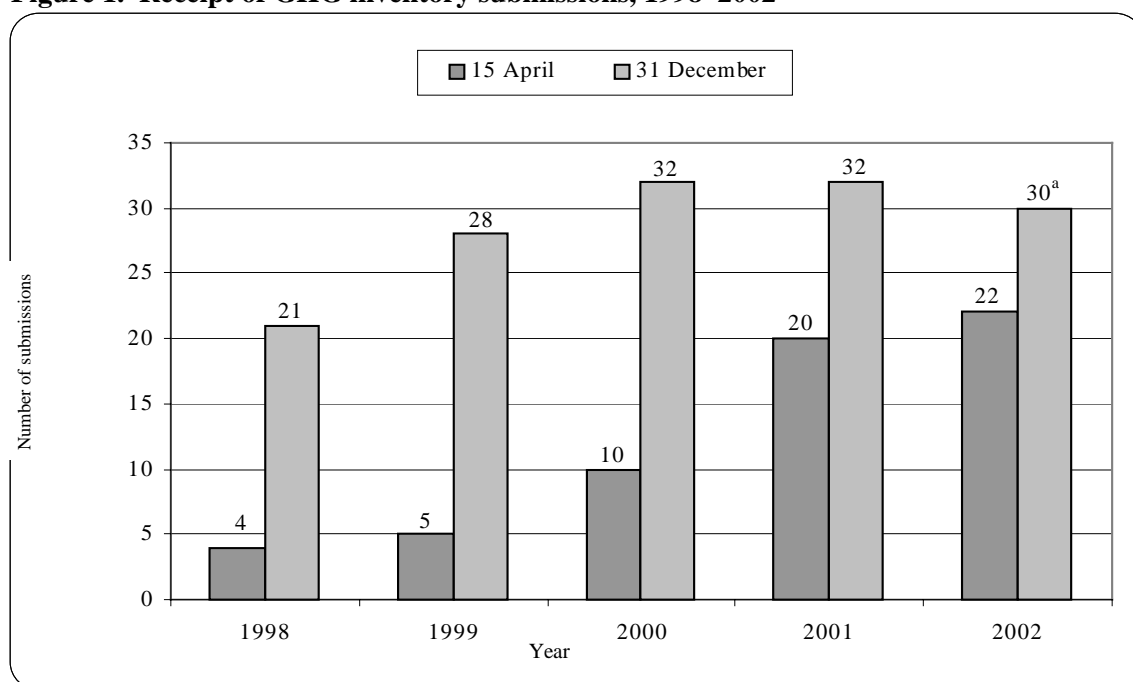
<sup>d</sup> The European Community provided estimates only in the CRF summary and trend tables. The CRF sectoral report and background data tables were reported as NE (not estimated), with information as to the completeness provided in the NIR.

<sup>e</sup> The Party provided CRF tables for years 1990-1998 in its 2000 submission and CRF tables for 1999 in its 2002 submission.

7. In processing the inventory submissions the secretariat performed data consistency checks on the information contained in the CRF tables and reported possible inconsistencies to the respective Parties. As a result, 14 Parties submitted a revised version of their inventory, correcting data inconsistencies. The resubmissions have been taken into account in this document.

8. Although there are delays in submissions and, in some instances, incomplete reporting in terms of years covered and CRF tables included in the submissions, both the timing and completeness of submissions have improved since 1998 (see figure 1 and table 2).

**Figure 1. Receipt of GHG inventory submissions, 1998–2002**

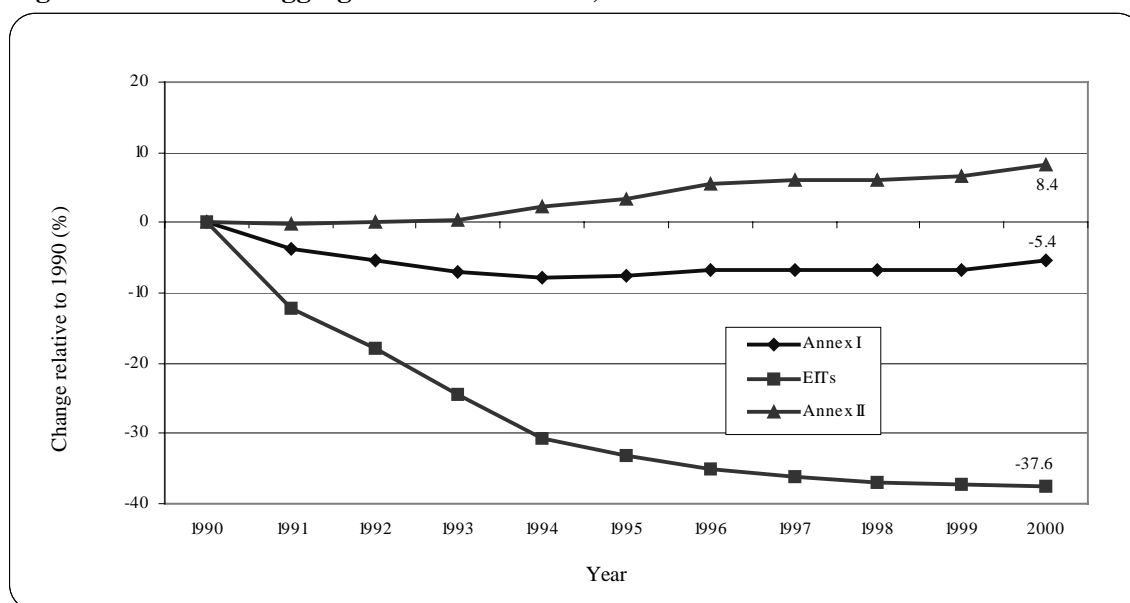


<sup>a</sup> As of 31 August.

**Table 2. GHG inventory submissions, 2000 and 2002**

	Parties	
	2000	2002
Reporting by due date	10	22
CRF submission for all required years	5	18
CRF submission for one/several years	12	12
Non-CRF submission	8	0
No submission provided	7	10

9. The most common instances of incompleteness in the CRF tables are related to the non-reporting of information requested in specific tables, most commonly related to the required use of notations keys, including explanations of the use of notation keys IE (included elsewhere) and NE (not estimated), as well as information on the degree of recalculations and the underlying reasons. In addition, some Parties do not report all the sectoral background data tables of the CRF or report partial information.

**Figure 2. Trends in aggregate GHG emissions, 1990–2000<sup>a</sup>**

<sup>a</sup> 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.

### III. OVERVIEW OF EMISSION TRENDS AND SOURCES

10. As shown in figure 2, total aggregate GHG emissions for all Annex I Parties as a whole have declined by 5 per cent over the period 1990–2000. However, for 17 of the 39 Parties reporting, emissions have increased over this period. Total aggregate emissions for Parties with economies in transition have decreased by 38 per cent and emissions from Annex II Parties as whole have increased by 8 per cent (17 of 26 Annex II Parties reported an increase in emissions).

11. Table 3 provides a gas by gas presentation of the relative increase or decrease in emissions over the period and tables 4 to 8 present the trends for aggregate GHG emissions, as well as for specific gases. Changes in emissions for individual Annex I Parties are shown in figures 3 and 4. The information presented in figures 3 and 4 and table 4 shows that for a number of Parties the emissions have increased over the period, in some instances following a slight decline initially. The information further suggests that a few Parties' emissions may have stabilized for some greenhouse gases, and for some Parties, particularly those with economies in transition, a decreasing trend in emissions was evident.

12. Figures 5 and 6 present information on trends in aggregate GHG emissions by sector and trends in emissions of HFCs, PFCs and SF<sub>6</sub>, for Annex I as a whole. With respect to emissions by sectors, transport emissions were reported as having increased substantially for most Annex I Parties. Also notable was a decrease of 25 per cent in fugitive fuel emissions for Annex I, influenced by the decline in these emissions from Parties with economies in transition. Emissions for Annex I from agriculture, waste, industrial processes and stationary combustion declined over the period, but the reported data do not indicate a continuing decline in these emissions. Aggregate emissions of HFCs, PFCs and SF<sub>6</sub> vary across Parties, with the exception of a growth in emissions of HFCs over the period for most Parties. As a whole for Annex I Parties, emissions of HFCs have increased by more than 100 per cent since 1990, emissions of PFCs are slightly lower at 5 per cent, and emissions of SF<sub>6</sub> have decreased 31 per cent.

**Table 3. Percentage change in GHG emissions by gas, 1990–2000<sup>a,b</sup>**

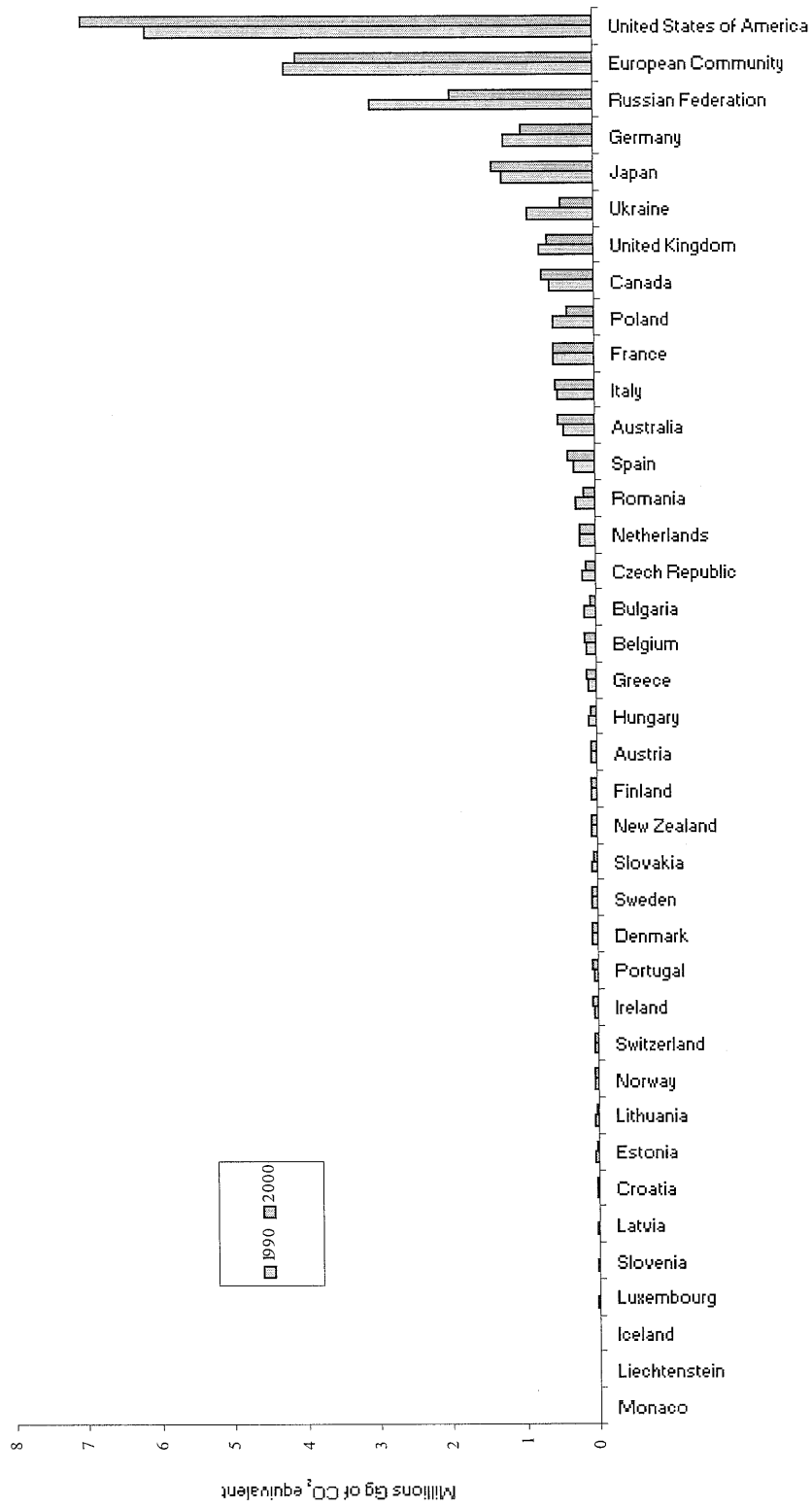
	Decrease			Between +1 % and -1%	Increase		
	>10%	10–6%	5–2%		2–5%	6–10%	>10%
<b>GHG (excluding LUCF)</b>	BGR, CZE, DEU, EST, GBR, HRV, HUN, LTU, LUX, LVA, POL, ROM, RUS, SVK, UKR		DNK EC FIN FRA SWE	CHE, LIE	AUT ITA NLD NZL	BEL ISL NOR	AUS, CAN, ESP, GRC, IRL, JPN, MCO, PRT, USA
<b>GHG (including LUCF)</b>	BGR, CZE, DEU, EST, GBR, HRV, HUN, LTU, LUX, LVA, NOR, POL, ROM, RUS, SVK, SWE, UKR		EC FRA	CHE DNK ISL	AUT NLD NZL	AUS BEL ITA JPN	CAN, ESP, FIN, GRC, IRL, MCO, PRT, USA
<b>CO<sub>2</sub> (excluding LUCF)</b>	BGR, CZE, DEU, EST, HRV, HUN, LTU, LUX, LVA, POL, RUS, SVK, UKR	GBR		CHE, DNK, EC, FIN, LIE, SWE	FRA, ITA	AUT, BEL, JPN, NLD	AUS, CAN, ESP, GRC, IRL, ISL, NOR, NZL, PRT, USA
<b>CH<sub>4</sub></b>	AUT, BGR, CZE, DEU, EC, EST, FIN, GBR, HRV, HUN, JPN, LIE, LTU, LVA, NLD, POL, ROM, RUS, SVK, SWE, UKR	CHE FRA NZL	BEL ISL ITA LUX USA	AUS DNK IRL PRT	NOR		CAN ESP GRC MCO
<b>N<sub>2</sub>O</b>	BGR, CZE, DEU, DNK, EC, EST, FIN, FRA, GBR, HRV, LTU, LUX, LVA, ROM, RUS, SVK, UKR		ISL JPN SWE	BEL CAN NOR	CHE GRC IRL ITA NLD PRT	AUT NZL POL USA	AUS ESP HUN LIE MCO
<b>HFCs, PFCs, SF<sub>6</sub></b>	<b>Decrease</b>		<b>Increase</b>				
	<b>20% or more</b>	<b>0–20%</b>	<b>5–30%</b>	<b>31–100%</b>		<b>100% or more<sup>c</sup></b>	
	AUS, HRV, ISL, NOR, NZL, SVK	GBR, NLD, RUS	AUT, CAN, USA	DEU, EC, FRA, JPN POL, SWE		BEL, BGR, CHE, CZE, DNK, ESP, FIN, GRC, HUN, IRL, ITA, LVA, PRT	

<sup>a</sup> Changes are with respect to 2000 or the most recent year for which data were available (see tables 4–8 of this document).

<sup>b</sup> AUS (Australia), AUT (Austria), 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)

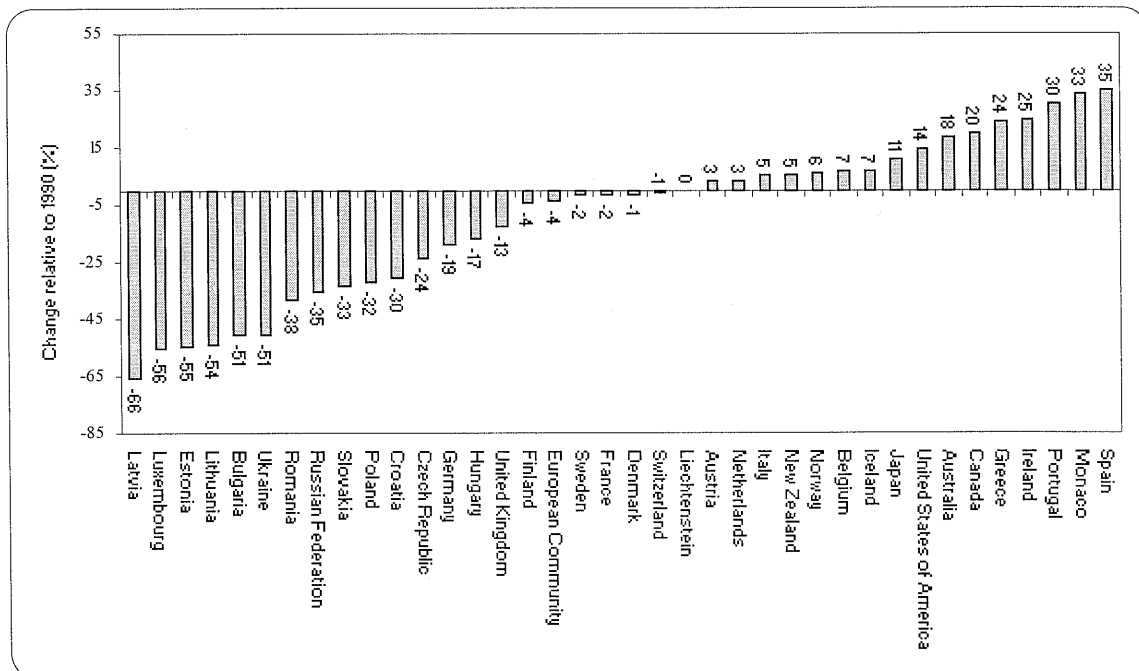
<sup>c</sup> Includes Parties that did not report emissions of these gases for 1990, but have reported emissions in later years.

Figure 3. Total aggregate GHG emissions of individual Annex I Parties, 1990 and 2000<sup>a</sup>



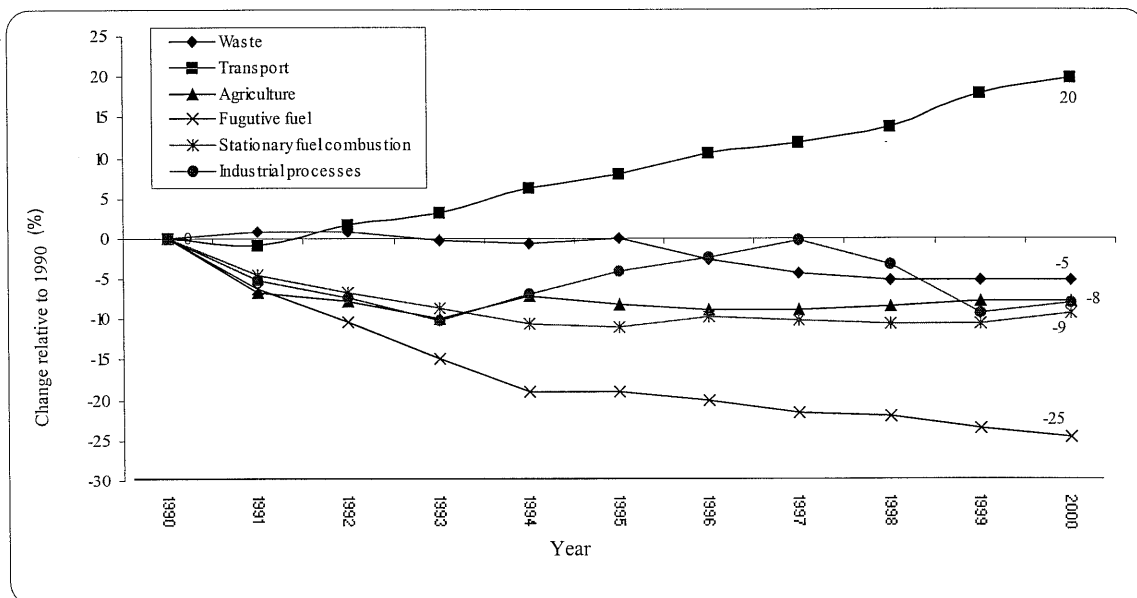
<sup>a</sup> The values are for 2000 or the most recent year for which data were available (see table 4 of this document).

**Figure 4. Total aggregate GHG emissions of individual Annex I Parties 1990–2000<sup>a</sup>**



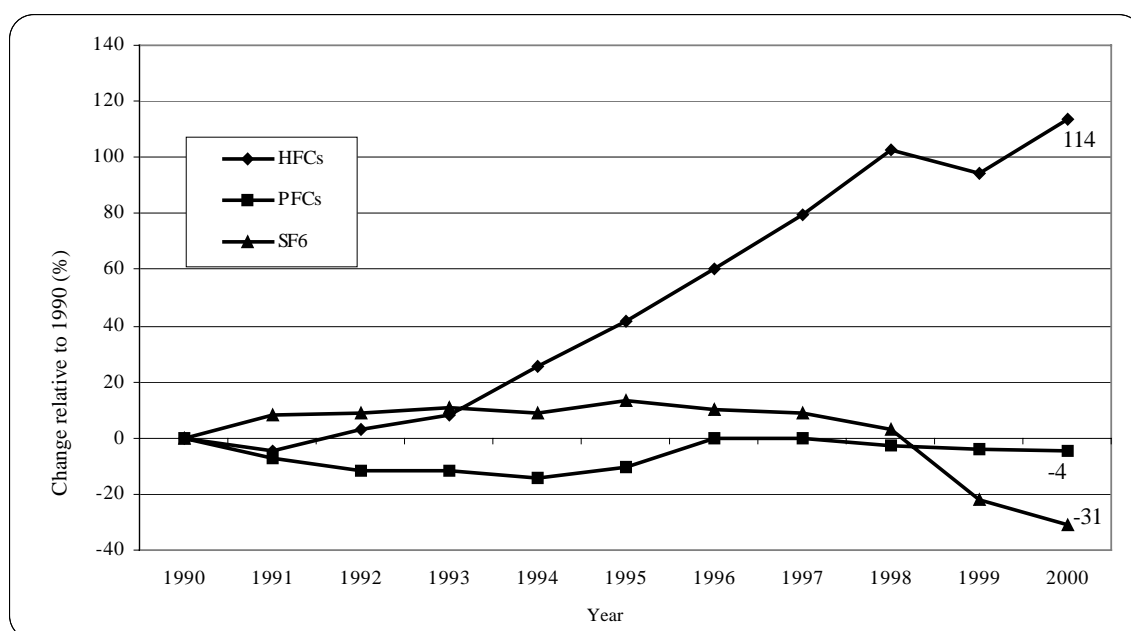
<sup>a</sup> The changes are with respect to 2000 or the most recent year for which data were available (see table 5). For Slovenia data were only available for 1990, so that the Party is not included in the figure.

**Figure 5. Trends in Annex I GHG emissions by sector, 1990–2000<sup>a</sup>**



<sup>a</sup> 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 emissions of HFCs, PFCs and SF<sub>6</sub> emissions, 1990–2000<sup>a</sup>**

<sup>a</sup> 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.

13. Table 9 presents the trend in emissions and removals from the land-use change and forestry sector as reported by Annex I Parties. The developments in this sector differ across countries, with 11 Parties reporting a decrease in removals of more than 5 per cent over the period and 19 Parties reporting an increase in removals, or decrease in emissions, of more than 5 per cent. As a whole for Annex I Parties there was a 15 per cent decrease in the level of removals.

**Table 4. Aggregate emissions of CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs and SF<sub>6</sub><sup>a</sup>, 1990 and 1995–2000, excluding CO<sub>2</sub> emissions/removals from land-use change and forestry**

Party	Gigagrams of CO <sub>2</sub> equivalent							Change from 1990 to latest reported estimate (%)
	1990	1995	1996	1997	1998	1999	2000	
Australia	425 175	444 742	454 697	465 349	484 860	491 079	502 406	18.2
Austria	77 388	78 606	79 951	81 319	79 458	79 731	79 754	3.1
Belarus								
Belgium	142 741	153 848	156 138	151 259	154 624	151 630	152 356	6.7
Bulgaria <sup>b</sup>	157 090	98 083	101 894	89 811	81 360	77 697		-50.5
Canada	607 183	657 772	671 972	681 600	689 403	703 406	726 250	19.6
Croatia	31 944	22 259						-30.3
Czech Republic	192 019	148 272	154 907	158 879	148 602	140 421	146 792	-23.6
Denmark	69 360	77 379	90 937	81 106	75 982	72 916	68 505	-1.2
Estonia	43 494	22 287	23 454	23 663	21 502	19 659	19 746	-54.6
Finland	77 093	75 168	80 536	79 377	76 833	76 131	73 958	-4.1
France	559 342	554 691	570 353	561 299	574 708	556 288	550 033	-1.7
Germany	1 222 765	1 071 177	1 084 343	1 048 155	1 026 475	993 819	991 421	-18.9
Greece	104 895	110 488	114 298	119 576	124 740	123 739	130 053	24.0
Hungary <sup>b</sup>	101 633	77 916	79 184	76 853	83 687	86 546	84 338	-17.0
Iceland	2 799	2 728	2 796	2 911	2 973	3 119	2 991	6.9
Ireland	53 700	57 594	59 195	61 823	64 091	65 868	66 993	24.8
Italy	520 571	527 178	520 443	525 111	536 715	541 216	546 905	5.1
Japan	1 246 725	1 320 666	1 334 868	1 338 668	1 303 670	1 345 422	1 357 842	11.2
Latvia	31 054	13 435	12 715	11 986	12 149	11 384	10 672	-65.6
Liechtenstein	218					218		0.1
Lithuania <sup>c</sup>	51 548				23 851			-53.7
Luxembourg	13 448	10 223				6 004	5 971	-55.6
Monaco	100	124	130	130	125	133		33.3
Netherlands	210 347	223 608	234 215	223 951	226 545	217 830	216 916	3.1
New Zealand	73 161	73 609	74 827	75 845	74 272	76 322	76 956	5.2
Norway	51 965	51 636	54 769	54 998	55 345	56 003	55 263	6.3
Poland <sup>b</sup>	564 419	417 353	437 388	427 243	403 516	401 584	386 187	-31.6
Portugal	64 948	73 299	71 672	73 800	77 780	85 605	84 700	30.4
Romania <sup>bd</sup>	264 879							-38.1
Russian Federation	3 040 332	2 068 045	1 965 346					-35.4
Slovakia	72 937	54 284	54 017	54 134	52 812	51 462	48 667	-33.3
Slovenia	19 233							
Spain	286 428	318 135	310 899	331 168	341 930	370 920	385 987	34.8
Sweden	70 573	72 771	76 421	71 393	72 544	70 508	69 356	-1.7
Switzerland	53 233	52 506	52 892	52 269	53 587	53 602	52 748	-0.9
Ukraine	919 189	538 833	499 634	466 471	454 934			-50.5
United Kingdom of Great Britain and Northern Ireland	742 492	685 474	706 699	683 752	682 597	646 514	649 106	-12.6
United States of America	6 130 724	6 481 809	6 669 758	6 748 063	6 756 190	6 829 489	7 001 225	14.2
European Community	4 215 668	4 087 764	4 164 930	4 100 168	4 120 048	4 056 333	4 067 767	-3.5

<sup>a</sup> See tables 5–8 for emissions of CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O and HFCs, PFCs and SF<sub>6</sub>.

<sup>b</sup> 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).

<sup>c</sup> Party reported only emissions of CO<sub>2</sub> and CH<sub>4</sub>, not N<sub>2</sub>O, for 1995–1997, so no aggregate emissions for these years are provided here.

<sup>d</sup> Percentage change is given with respect to 1994, the latest reported year for the Party.

**Table 5. Total anthropogenic CO<sub>2</sub> emissions, excluding land-use change and forestry, 1990 and 1995–2000**

Party	Gigagrams							Change from 1990 to latest reported estimate (%)
	1990	1995	1996	1997	1998	1999	2000	
Australia	277 867	301 101	310 586	318 222	334 904	339 385	347 006	24.9
Austria	62 297	64 015	65 386	67 012	65 464	66 025	66 102	6.1
Belarus								
Belgium	117 966	127 647	130 367	125 579	128 607	125 639	127 040	7.7
Bulgaria <sup>a</sup>	103 856	62 332	66 825	58 742	52 277	48 440		-53.4
Canada	471 563	500 626	513 343	524 505	534 224	550 073	571 427	21.2
Croatia	23 305	16 251						-30.3
Czech Republic	163 990	128 817	132 780	137 357	128 268	121 093	127 902	-22.0
Denmark	52 635	61 001	74 514	65 161	60 006	57 245	52 852	0.4
Estonia	38 107	19 315	20 264	20 225	18 318	16 771	16 849	-55.8
Finland	62 466	62 684	68 130	66 842	64 601	64 073	62 305	-0.3
France	394 067	390 492	404 177	398 310	419 453	407 004	401 923	2.0
Germany	1 014 500	903 665	923 085	892 649	885 963	859 246	857 908	-15.4
Greece	84 336	87 644	90 163	94 668	99 419	98 626	103 727	23.0
Hungary <sup>a</sup>	83 676	59 758	60 475	58 893	57 601	60 117	59 445	-29.0
Iceland	2 065	2 228	2 313	2 388	2 411	2 494	2 444	18.4
Ireland	31 599	34 529	35 729	38 102	40 062	41 932	43 925	39.0
Italy	439 478	445 009	439 066	442 116	454 352	457 202	463 381	5.4
Japan	1 119 319	1 207 994	1 219 442	1 219 422	1 191 671	1 232 770	1 237 107	10.5
Latvia	23 527	10 145	9 550	8 619	8 287	7 545	6 847	-70.9
Liechtenstein	194					196		0.8
Lithuania	39 535	15 200	16 200	16 200	16 694			-57.8
Luxembourg	12 750	9 545				5 432	5 399	-57.7
Monaco	98	120	126	125	121	129		32.3
Netherlands	159 630	172 659	179 706	168 973	175 057	172 061	173 527	8.7
New Zealand	25 267	27 206	28 223	30 210	28 684	30 331	30 852	22.1
Norway	35 163	37 756	40 940	41 193	41 313	41 743	41 273	17.4
Poland <sup>a</sup>	476 625	348 172	372 530	361 626	337 448	329 697	314 812	-33.9
Portugal	44 109	52 688	50 986	53 102	56 894	64 062	63 150	43.2
Romania <sup>ab</sup>	194 826							35.5
Russian Federation	2 372 300	1 590 420	1 495 920					-36.9
Slovakia	59 746	44 898	45 156	45 556	44 811	43 600	41 472	-30.6
Slovenia	13 935							
Spain	227 233	254 411	242 215	261 369	270 130	295 233	306 632	34.9
Sweden	56 065	58 574	62 062	57 056	58 142	56 458	55 855	-0.4
Switzerland	44 420	43 825	44 227	43 561	44 833	44 843	43 853	-1.3
Ukraine	703 792	380 928	346 768	322 907	314 445			-55.3
United Kingdom of Great Britain and Northern Ireland	583 705	547 374	566 961	542 718	545 116	536 490	542 743	-7.0
United States of America	4 998 515	5 305 895	5 483 670	5 567 981	5 575 083	5 665 472	5 840 039	16.8
European Community	3 341 803	3 270 286	3 340 775	3 280 294	3 330 477	3 308 494	3 324 800	-0.5

<sup>a</sup> 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).

<sup>b</sup> Percentage change is given with respect to 1994, the latest reported year for the Party.

**Table 6. Total anthropogenic CH<sub>4</sub> emissions, 1990 and 1995–2000**

Party	Gigagrams							Change from 1990 to latest reported estimate (%)
	1990	1995	1996	1997	1998	1999	2000	
Australia	5 660	5 502	5 514	5 592	5 647	5 676	5 764	1.8
Austria	538	490	482	470	459	454	448	-16.8
Belarus								
Belgium	550	552	548	543	543	537	524	-4.9
Bulgaria <sup>a</sup>	1 334	888	828	704	654	483		-63.8
Canada	3 498	4 173	4 225	4 225	4 274	4 298	4 357	24.6
Croatia	182	148						-18.6
Czech Republic	798	600	600	575	544	509	510	-36.1
Denmark	278	292	297	292	287	269	274	-1.6
Estonia	208	122	133	144	131	120	118	-43.1
Finland	292	221	213	204	193	187	187	-36.0
France	3 169	3 339	3 309	3 062	3 027	2 946	2 871	-9.4
Germany	5 273	3 616	3 285	3 208	3 107	3 041	2 885	-45.3
Greece	416	452	467	472	497	496	518	24.5
Hungary <sup>a</sup>	664	792	815	790	680	683	553	-16.8
Iceland	14	14	14	14	14	14	13	-5.8
Ireland	612	634	646	655	649	634	610	-0.4
Italy	1 876	1 845	1 837	1 840	1 816	1 797	1 801	-4.0
Japan	1 273	1 203	1 173	1 129	1 094	1 075	1 049	-17.6
Latvia	196	101	95	104	125	124	121	-38.3
Liechtenstein	1					1		-13.1
Lithuania	378	299	285	302	177			-53.2
Luxembourg	24	22				23	23	-4.7
Monaco	0	0	0	0	0	0		17.8
Netherlands	1 293	1 170	1 173	1 101	1 065	1 038	983	-24.0
New Zealand	1 685	1 619	1 624	1 578	1 577	1 583	1 581	-6.2
Norway	307	328	332	334	329	326	324	5.6
Poland <sup>a</sup>	3 141	2 457	2 252	2 279	2 335	2 250	2 183	-30.5
Portugal	614	604	605	609	608	625	625	1.8
Romania <sup>ab</sup>	2 357							38.0
Russian Federation	26 500	19 064	18 544					-30.0
Slovakia	323	249	254	241	224	221	215	-33.5
Slovenia	176							
Spain	1 412	1 563	1 655	1 688	1 741	1 776	1 827	29.4
Sweden	324	316	316	311	304	294	280	-13.8
Switzerland	242	233	230	227	222	219	216	-10.7
Ukraine	9 402	7 295	7 059	6 606	6 457			-31.3
United Kingdom of Great Britain and Northern Ireland	3 645	3 028	2 960	2 852	2 724	2 589	2 427	-33.4
United States of America	31 014	31 314	30 654	30 159	29 863	29 548	29 262	-5.6
European Community	20 310	18 138	17 808	17 321	17 039	16 702	16 275	-19.9

<sup>a</sup> 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).

<sup>b</sup> Percentage change is given with respect to 1994, the latest reported year for the Party.

**Table 7. Total anthropogenic N<sub>2</sub>O emissions, 1990 and 1995–2000**

Party	Gigagrams							Change from 1990 to latest reported estimate (%)
	1990	1995	1996	1997	1998	1999	2000	
Australia	74.8	82.1	82.8	87.8	91.6	97.0	102.9	37.6
Austria	7.4	8.3	8.3	8.2	8.3	8.2	8.1	9.0
Belarus								
Belgium	42.6	45.4	44.0	43.7	44.8	44.6	43.3	1.6
Bulgaria <sup>a</sup>	81.4	55.2	57.1	52.6	47.4	61.2		-24.8
Canada	172.0	197.1	199.2	194.0	183.7	175.1	174.0	1.2
Croatia	12.5	9.3						-25.5
Czech Republic	36.3	21.6	29.7	28.4	27.1	26.2	26.4	-27.4
Denmark	35.0	31.9	31.4	30.1	30.2	30.1	29.3	-16.2
Estonia	3.3	1.3	1.2	1.4	1.4	1.2	1.3	-59.5
Finland	27.1	25.1	25.3	26.0	25.5	25.0	23.2	-14.6
France	293.8	287.5	292.6	295.9	270.9	252.9	248.0	-15.6
Germany	285.8	259.5	264.7	249.9	205.8	194.2	193.8	-32.2
Greece	34.3	31.9	33.3	34.3	34.3	33.6	35.5	3.6
Hungary <sup>a</sup>	12.9	4.9	5.1	4.4	35.0	36.3	41.0	217.0
Iceland	0.4	0.4	0.4	0.4	0.4	0.5	0.4	-4.6
Ireland	29.8	30.9	31.1	31.1	32.7	32.9	31.4	5.2
Italy	131.6	135.5	134.4	138.3	136.9	139.4	139.3	5.9
Japan	125.3	127.9	130.8	132.3	128.0	109.6	118.9	-5.1
Latvia	11.0	3.7	3.8	3.8	4.0	4.0	4.2	-62.3
Liechtenstein	0.0					0.0		12.5
Lithuania	13.2				11.1			-15.5
Luxembourg	0.6	0.7				0.3	0.3	-51.9
Monaco	0.0	0.0	0.0	0.0	0.0	0.0		107.7
Netherlands	53.3	58.6	65.3	68.1	57.5	56.0	54.8	2.8
New Zealand	38.4	39.0	39.0	39.1	39.0	40.2	40.8	6.4
Norway	16.5	15.6	15.6	15.4	16.2	17.0	16.6	0.5
Poland <sup>a</sup>	70.5	54.0	53.9	54.0	51.6	75.1	77.1	9.4
Portugal	25.6	25.0	25.2	25.0	25.7	26.7	26.6	4.1
Romania <sup>ab</sup>	66.3							-62.3
Russian Federation	225.7	139.0	132.0					-41.5
Slovakia	19.8	12.9	11.1	11.0	10.4	10.1	10.0	-49.8
Slovenia	5.1							
Spain	84.7	81.8	89.5	86.9	89.4	93.5	98.4	16.1
Sweden	23.1	22.2	22.9	22.8	23.7	22.9	22.3	-3.5
Switzerland	11.4	11.6	11.6	11.5	11.7	11.7	11.7	2.8
Ukraine	58.0	15.2	14.9	15.6	15.8			-72.8
United Kingdom of Great Britain and Northern Ireland	218.9	184.1	190.7	196.0	187.0	144.8	141.5	-35.4
United States of America	1 249.4	1 354.1	1 388.6	1 386.6	1 375.3	1 366.3	1 372.1	9.8
European Community	1 293.4	1 228.1	1 259.3	1 256.4	1 164.7	1 096.9	1 090.7	-15.7

<sup>a</sup> 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).

<sup>b</sup> Percentage change is given with respect to 1994, the latest reported year for the Party.

**Table 8. Aggregate emissions of hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride,<sup>a</sup> 1990 and 1995–2000**

Party	Gigagrams of CO <sub>2</sub> equivalent							Change from 1990 to latest reported estimate (%)
	1990	1995	1996	1997	1998	1999	2000	
Australia <sup>b</sup>	4 093	1 368	1 301	1 128	1 470	1 009	976	-76.2
Austria	1 485	1 736	1 886	1 884	1 791	1 626	1 735	16.9
Belarus								
Belgium <sup>c</sup>		571	624	733	735	908	900	
Bulgaria <sup>d</sup>					646	146		
Canada	8 845	8 403	8 149	8 236	8 496	8 793	9 390	6.2
Croatia <sup>d</sup>	939	8						-99.2
Czech Republic		169	322	626	523	525	890	
Denmark	43	345	440	482	577	701	818	1 800.7
Estonia								
Finland	72	45	93	185	259	378	541	651.7
France	7 639	4 947	5 987	6 966	7 705	9 018	10 924	43.0
Germany	8 930	11 132	10 232	10 692	11 460	10 496	12 851	43.9
Greece <sup>d</sup>	1 193	3 452	3 988	4 359	4 257	4 288	4 429	271.4
Hungary					953	829	582	
Iceland	309	87	56	103	151	199	145	-53.1
Ireland		179	262	342	257	411	547	
Italy	922	1 414	1 153	1 497	1 794	1 864	2 521	173.4
Japan	61 840	100 341	100 440	104 252	99 338	90 166	90 291	46.0
Latvia <sup>e</sup>						0	0	
Liechtenstein								
Lithuania								
Luxembourg								
Monaco								
Netherlands	7 050	8 206	9 616	10 753	11 309	6 614	5 771	-18.1
New Zealand	605	306	402	359	362	284	245	-59.6
Norway	5 218	2 166	2 036	2 013	2 094	2 142	2 022	-61.2
Poland		845	843	1 024	1 040	1 349	1 627	
Portugal <sup>f</sup>		158	158	158	158	158	158	
Romania								
Russian Federation <sup>d</sup>	41 565	34 191	39 082					-6.0
Slovakia	272	148	91	114	80	93	103	-62.1
Slovenia								
Spain	3 287	5 529	6 194	7 414	7 533	9 393	10 495	219.3
Sweden	524	633	625	735	692	766	713	36.0
Switzerland	215	195	247	384	466	550	733	241.5
Ukraine								
United Kingdom of Great Britain and Northern Ireland	14 379	17 433	18 466	20 371	22 319	10 789	11 525	-19.9
United States of America	93 625	98 530	111 881	116 908	127 654	119 973	121 331	29.6
European Community	46 411	55 866	59 801	66 632	70 709	57 048	63 086	35.9

<sup>a</sup> Estimates given in this table refer to actual emissions, except for the Czech Republic, which reported only potential emissions, and Japan, for which potential emissions have been given as the Party did not report actual emissions for the entire period 1990–2000.

<sup>b</sup> Estimates include emissions of PFCs only.

<sup>c</sup> Estimates include emissions of HFCs and SF<sub>6</sub> only.

<sup>d</sup> Estimates include emissions of HFCs and PFCs only.

<sup>e</sup> Estimates include emissions of SF<sub>6</sub> only.

<sup>f</sup> Estimates include emissions of PFCs and SF<sub>6</sub> only.

**Table 9. Net anthropogenic CO<sub>2</sub> emissions and removals from land-use change and forestry,<sup>a</sup> 1990 and 1995–2000**

Party	Gigagrams							Change from 1990 to latest reported estimate (%)
	1990	1995	1996	1997	1998	1999	2000	
Australia	78 124	35 164	32 377	33 918	34 786	32 914	32 846	-58.0
Austria	-9 215	-7 254	-5 385	-7 633	-7 633	-7 633	-7 633	-17.2
Belarus								
Belgium	-1 600	-1 911	-1 889	-1 867	-1 845	-1 823	-1 823	13.9
Bulgaria <sup>b</sup>	-4 657	-7 520	-7 190	-5 852	-6 233	-6 608		41.9
Canada	-61 498	-17 646	-23 620	-19 056	-26 883	-10 681	-16 489	-73.2
Croatia	-6 505	-6 505						0.0
Czech Republic	-2 128	-5 454	-4 486	-4 639	-3 757	-3 401	-4 016	88.7
Denmark	-916	-931	-941	-951	-964	-976	-995	8.6
Estonia	-6 320	-7 782	-9 607	-9 107	-8 522	-8 107	-8 365	32.4
Finland	-23 798	-14 687	-21 032	-12 637	-9 713	-10 821	-11 953	-49.8
France	-56 232	-62 795	-65 459	-68 851	-68 426	-69 727	-63 247	12.5
Germany	-33 719	-33 430	-33 430	-33 430	-33 430	-33 430	-16 826	-50.1
Greece	1 441	-366	-75	-400	2 538	66	3 840	166.5
Hungary <sup>b</sup>	-3 097	-4 797	-3 931	-4 205	-4 411	-4 500	-4 011	29.5
Iceland	-5	-56	-66	-80	-94	-112	-131	2,318.7
Ireland	-89	-13	47	-85	-195	-141	-33	-63.4
Italy	-23 532	-19 598	-20 222	-17 764	-17 426	-17 717	-16 444	-30.1
Japan	-83 903	-96 705						15.3
Latvia	-10 826	-10 484	-10 496	-10 508	-10 508	-5 229	-4 243	-60.8
Liechtenstein								
Lithuania	-8 848	2 800	2 800	2 800	-7 712			-12.8
Luxembourg	-295	-295				-295	-295	0.0
Monaco								
Netherlands	-1 422	-1 232	-1 398	-1 180	-1 380	-1 236	-1 413	-0.6
New Zealand	-21 845	-16 404	-16 697	-18 279	-20 984	-22 764	-23 515	7.6
Norway	-9 765	-13 640	-17 611	-16 499	-17 588	-17 767	-18 743	91.9
Poland <sup>b</sup>	-34 746	-42 880	-42 616	-40 521	-29 821	-43 464	-43 094	24.0
Portugal	-3 751	-4 169	-4 179	-4 188	-4 198	-4 207	-4 216	12.4
Romania <sup>bc</sup>	-2 925							125.3
Russian Federation	-392 000	-840 000	-840 000					114.3
Slovakia	-2 427	-2 683	-2 427	-1 411	-1 936	-1 651	-2 443	0.7
Slovenia	-2 293							
Spain	-29 252	-29 252	-29 252	-29 252	-29 252	-29 252	-29 252	0.0
Sweden	-20 292	-21 293	-22 269	-27 288	-24 331	-27 305	-27 306	34.6
Switzerland	-3 188	-4 310	-4 460	-4 636	-4 570	-4 226	-1 821	-42.9
Ukraine	-52 107	-52 940	-66 151	-68 806	-68 708			31.9
United Kingdom of Great Britain and Northern Ireland	8 791	4 687	4 969	4 773	4 995	4 828	3 354	-61.8
United States of America	-1 097 747	-1 110 016	-1 108 066	-887 531	-885 883	-896 392	-902 495	-17.8
European Community	-199 004	-198 149	-206 919	-207 107	-197 973	-206 134	-180 681	-9.2

<sup>a</sup> In this table negative values in gigagrams indicate net removal of CO<sub>2</sub> from the *land-use change and forestry* sector. In the percentage change column negative values indicate a decrease in removals in relation to the year 1990 and positive values indicate an increase in removals, except for Australia and the United Kingdom of Great Britain and Northern Ireland where the negative values indicate less emissions.

<sup>b</sup> 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).

<sup>c</sup> Percentage change is given with respect to 1994, the latest reported year for the Party.

#### IV. RECALCULATIONS AND REVISIONS

14. Of the 28 Parties that submitted estimates for their base year, 26 reported revised estimates.<sup>7</sup> Table 10 provides, for each of the 28 Parties, percentage changes in the estimates in the most recent submission and in the previous submission that contained a base year estimate. The most common reasons for the changes, to the extent this information was reported, were revised activity data and emissions factors. In some instances, methodology changes were also reported, but such revisions usually concerned very few source categories. Due to the nature of the underlying changes and sources concerned, the degree of recalculation by gas varies across Parties. Although for individual Parties and specific gases the recalculations varied from –30 per cent to 97 per cent, the changes for aggregate GHG emissions were between –6 per cent and 16 per cent, with 20 of the 26 recalculations by Parties being between  $\pm 2$  per cent.

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<sup>7</sup> In accordance with the *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, it is considered good practice to recalculate historical emissions when methods are changed or refined, when new source categories are included in the national inventory, or when errors in the estimates are identified and corrected, and in order to assess emission trends it is important that the entire time series of emissions be calculated using the changed or refined methods.



**Table 10. Percentage changes in 1990 (or base year) GHG emissions from previous inventory submission**

Parties which revised 1990 (base year) inventories <sup>a</sup>	Aggregate GHG	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	HFCs	PFCs	SF <sub>6</sub>	Reasons <sup>b</sup>
Australia*	-0.05	2.14	1.13	1.28		-15.13		Methods, emission factors, activity data, addition/removal of source
Austria*	0.58	0.27	0.08	13.51	0	0	0	
Belgium*	5.71	3.95	-10.08	37.49				
Canada*	0	0	0	0	0	0	0	
Czech Republic*	1.18	-0.83	2.54	41.05				Methods
Denmark*	-0.85	-0.79	-0.12	-1.60			0	Methods, activity data
Estonia*	6.81	-12.32	97.49	43.55				
Finland	0.00	0.00	0.00	0.00	0	0	0	
France*	1.13	3.67	1.95	-3.97	-0.01	-0.12	0	Methods, emission factors, activity data, addition/removal of source
Germany	1.27	0	5.34	33.79	-25.2	0	0	
Greece*	-0.36	0.21	-7.53	2.43	0	-29.89		Emission factors, activity data, addition/removal of source
Iceland	-4.76	-3.67	0	-31.9	0	0	0	
Ireland*	-5.56	23.29	-24.54	0.89				Methods, emission factors, activity data, addition/removal of source
Italy	0.41	0.39	-2.03	2.68	0	0	68.3	
Japan*	0.79	-0.49	-12.33	86.92	0	0	0	Methods, emission factors, activity data, addition/removal of source
Latvia	0.09	0.01	0.83	-0.09				
Liechtenstein	-16.05	-6.46	-18.0	-80.0				
Netherlands*	-2.53	-0.96	-0.02	-16.37	-13.84	0	29.26	Methods, emission factors, activity data, addition/removal of source
New Zealand*	0.13	-0.52	0.51	0.42		0	0	Methods, emission factors, activity data
Norway*	-0.12	0.33	-1.42	-0.95	0	0	-0.30	Emission factors, activity data, addition/removal of source
Poland	0.17	0	-0.01	0.64	>100	>100	>100	
Portugal*	0.47	0.54	0.17	4.04				Addition/removal of source
Slovakia	0.56	0.23	0.16	4.37		0	0	
Spain*	-6.34	0.60	-14.66	-36.32	-16.95	0.00	-28.31	Methods, emission factors, activity data, addition/removal of source
Sweden*	1.44	2.85	0.00	0.15	0.00	0.00	0.00	Activity data
Switzerland*	-0.01	-0.01	-0.01	0.03		>100	>100	Methods, emission factors, activity data, addition/removal of source
United Kingdom of Great Britain and Northern Ireland*	0.08	0.04	-0.70	1.38	0	0	0	Methods, emission factors, activity data, addition/removal of source
United States of America*	1.53	1.24	1.06	-2.41	0.78	-7.65	42.84	Methods, emission factors, activity data, addition/removal of source

<sup>a</sup> Information in this table is based on values reported by Parties in table 8 of the CRF (recalculation table) or, in absence of table 8, on the basis of comparisons with data previously submitted. An asterisk(\*) indicates those Parties that provided table 8 in their submission.

<sup>b</sup> The information here is based on that provided in table 8(b) of the CRF. In table 8b explanations for recalculations are given under one of the following headings, which are abbreviated in this table: changes in methods, changes in emission factors, changes in activity data, and addition/removal/replacement of source/sink categories.

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