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NATIONAL COMMUNICATIONS FROM PARTIES INCLUDED IN ANNEX I TO THE CONVENTION

GUIDELINES FOR THE PREPARATION OF NATIONAL COMMUNICATIONS

Effects of recalculations of the greenhouse gas inventories of the base and subsequent years on assigned amounts and on emission limitation and reduction commitments of Annex I Parties

Note by the secretariat

CONTENTS

I. INTRODUCTION

A. Mandate

1. The Subsidiary Body for Scientific and Technological Advice (SBSTA), at its eighth session, requested the secretariat to organize a workshop with the participation of methodological experts from the roster, as well as from other relevant organizations, to develop proposals to resolve the methodological issues identified by Parties and by the secretariat while processing greenhouse gas (GHG) inventories included in second national communications (FCCC/SBSTA/1998/6, para. 40 (d)).

B. Background

2. In response to the above mandate, as part of the work programme on methodologies, the secretariat prepared an informal paper: "Effects of recalculations of the GHG inventories of the base and subsequent years on assigned amounts and on emission limitation and reduction commitments of Annex I Parties" for consideration by the experts of the roster attending the workshop on methodological issues. The secretariat prepared this paper to promote an understanding of the possible effects of recalculations of the base and subsequent years' GHG inventories on the assigned amounts and on the emission limitation and reduction commitments of Annex I Parties under the Kyoto Protocol.

3. As requested, the secretariat organized a workshop on methodological issues related to GHG inventories, which was held in Bonn, from 9 to 11 December 1998. This paper, a revised version of the informal paper, considers comments provided by experts from the roster. It is reproduced as an official note prepared by the secretariat.

C. Scope of the note

4. This paper provides information on methodological issues related to the recalculation of GHG inventories for the base and subsequent years. Recalculation of the base year was identified by the secretariat as a relevant methodological issue while processing GHG inventory data (see documents FCCC/SBSTA/1998/7 and FCCC/SBSTA/1998/8).

5. The secretariat used the GHG inventory data from the first national communications, referred to below as NC1 and the second national communications, referred to below as NC2, to prepare this paper.[1]

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[1] Supplementary and updated inventory data submitted to the secretariat after the submission of NC2 were not considered for the purpose of this paper.

D. Possible action by the SBSTA

6. The SBSTA may wish to consider the information provided in this note and to determine the need for additional analyses. It may wish to provide guidance to the secretariat on any future analyses, including the questions it wishes the secretariat to address, such as the consideration of the issue of recalculations in the work programme on methodological issues related to Articles 5, 7 and 8 of the Kyoto Protocol (FCCC/SB/1999/2). For example, it may be interesting to assess the impact of recalculations of the base and subsequent years resulting from the use of different GHG inventory methods/data in second (NC2) and third national communications (NC3) on Parties' assigned amounts and on Parties' ability to meet their commitments. Such an assessment could consider complete sets of five-year inventory data for all Annex I Parties if possible, instead of the limited inventory data used in this note. Such analyses could be reflected in the work programme of the secretariat for the next biennium.

E. Approach

7. The approach applied in this paper assesses the effects of recalculations using actual inventory data reported by Parties. The intent is to assess whether and how changes in methods/data could affect the estimation of assigned amounts and the extent to which Parties could meet *simulated* commitments similar to those in the Kyoto Protocol. It was developed to enable potential methodological problems to be identified before the first commitment period.

8. Terms used in the Kyoto Protocol, such as assigned amounts, commitments and commitment period, were applied in this paper, for years and contexts other than those in the Protocol. The term "*simulated*" is used in the paper to denote this difference. The *simulated* assigned amounts and commitments were used in this paper only with the purpose of identifying potential methodological problems.

9. According to Article 7.4 of the Kyoto Protocol, the Conference of the Parties serving as the meeting of the Parties to the Protocol (COP/MOP) shall decide upon modalities for the accounting of assigned amounts. The term "*simulated* assigned amount" as used in this paper is intended to estimate this assigned amount in a manner similar to that described in Article 3.7 of the Kyoto Protocol, although the COP/MOP has not decided yet upon modalities for accounting.

10. Parties have a commitment under the Kyoto Protocol to limit their GHG emissions to those of an agreed assigned amount. The term "*simulated* commitment" as used in this paper is intended to represent a "what if" situation, wherein the Parties might have agreed to their Kyoto Protocol commitments for the period 1991-1994 relative to a base year of 1990. The related *simulated* assigned amount needed to establish the *simulated* commitment was also estimated for the same period 1991-1994.

II. ASSESSMENT OF THE EFFECTS OF RECALCULATION

A. Effects of recalculations on *simulated* assigned amounts

1. Recalculations

11. All Parties recalculated their GHG inventories between the NC1 and the NC2 (FCCC/SBSTA/1998/7, para. 24). The differences between the estimates were influenced by two factors. First, global warming potential (GWP) values changed between the first national communications and the second national communications. Secondly, Parties changed methods, emission factors, assumptions and activity data and added new sources. These latter changes, which are referred to in this paper as "change in methods/data", are encouraged by the Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories with a view to improving the quality and accuracy of inventories. Table 1 indicates the magnitude of changes for carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) emission base year estimates and their effect on the aggregate CO_2 equivalent emission estimates between NC1s and NC2s.[2]

12. No further changes in GWP values are expected until the end of the first commitment period under the Kyoto Protocol. It should be noted that decision 2/CP.3 of the Conference of the Parties (COP) reaffirmed that Parties should use the 1995 IPCC GWP values based on the effects of the greenhouse gases over a 100-year time horizon (FCCC/CP/1997/7/Add.1). Furthermore, Article 5.3 of the Kyoto Protocol states that this GWP shall be used for the duration of the first commitment period. However, recalculations due to changes in methods/data are expected under the current practice of preparing GHG inventories.

2. Estimation of assigned amounts

13. *Simulated* assigned amounts are presented in this paper. They were estimated in a manner similar to that described in Article 3.7 of the Kyoto Protocol[3] using the following formula:

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[2] This table is reproduced from document FCCC/SBSTA/1998/7, page 31. It gives detailed information on how the table 11 was prepared.

[3] Article 3.7 defines the assigned amount as follows: "In the first ... commitment period, from 2008 to 2012, the assigned amount for each Party included in Annex I shall be equal to the percentage inscribed for it in Annex B of its aggregate anthropogenic carbon dioxide equivalent emissions of the greenhouse gases listed in Annex A in 1990, or the base year or period determined in accordance with paragraph 5 above, multiplied by five. Those Parties included in Annex I for whom land-use change and forestry constituted a net source of greenhouse gas emissions in 1990 shall include in their 1990 emissions base year or period the aggregate anthropogenic carbon dioxide equivalents emissions by sources minus removals by sinks in 1990 from land-use change for the purposes of calculating their assigned amount".

Assigned amount = 5 x [CO_2 equivalent emission estimates of the base year] x [0.01] x [quantified emission limitation or reduction commitment inscribed in Annex B of the Kyoto Protocol][4]

14. The *simulated* assigned amounts were calculated as aggregate GHG emissions expressed as CO_2 equivalent for the base year using data from NC1s and NC2s of Annex I Parties. In both cases, the 1995 IPCC GWP values were used, to exclude the effect of using different GWPs. Therefore, changes in the aggregate GHG emissions in the year 1990, and correspondingly in the *simulated* assigned amounts, between the NC1 and the NC2 are a consequence only of change in methods/data. To carry out the calculations, the secretariat's database was used. Since only eight Parties provided emissions data on hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) in their NC1, these GHGs were not considered for the calculations in this paper for the sake of consistency.

15. A comparison between *simulated* assigned amounts of 28 Parties calculated using data from NC1s and NC2s is shown in table 2. The absolute values of these amounts are presented in columns A and B of the table, differences resulting from changes in methods/data between the NC1 and the NC2 are presented as Gg of aggregate GHG emissions in terms of CO_2 equivalent in column C and as percentages in column D.

16. The percentage differences between those *simulated* assigned amounts mentioned in paragraph 13 above are almost identical[5] to the differences due to changes in methods/data of the aggregate CO_2 equivalent estimates for the year 1990 between the NC1s and the NC2s (see table 1, column F). For Parties with higher or lower CO_2 equivalent estimates in their NC2 than their NC1, their assigned amount was correspondingly higher or lower. So, a change in the given value of the base year has a direct impact on the size of the assigned amount and hence the size of the assigned amount is dependent on changes in methods/data applied to the base year.

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[4] In the light of the ongoing work on methodological issues related to the estimation and reporting of emissions by sources and removals by sinks from the *land-use change and forestry* sector, this report does not provide information on emissions or removals from this sector. Also for this reason, in this report the *simulated* assigned amounts do not consider emissions from the *land-use change and forestry* sector, although Article 3.7 of the Kyoto Protocol stipulates the inclusion of these emissions in the assigned amounts of Parties for whom such emissions constituted a net source of greenhouse gases in 1990.

[5] The differences existing between the values of table 1, column F and those of table 2, column C are a consequence of a slight difference in the way of calculating the effect of change in methods/data and of rounding, except for Estonia and Finland, for which an error was detected in the corresponding calculations of table 11 in document FCCC/SBSTA/1998/7.

Table 1. Differences in GHG emission estimates for the year 1990 due to changes in methods/data used (percentage change)[a]

Party	A	B	C	D	E	F
				All GHG emission estimates (CO_2 equivalent)		
	CO_2 emission estimates	CH_4 emission estimates	N_2O emission estimates	Total change	Effect of the use of different GWPs	Effect of changes in methods/ data
Australia	-5.5	-17.1	31.4	-12.1	-4.4	-7.7
Austria	4.5	-2.6	183.2	3.4	-2.7	6.1
Bulgaria	-0.7	0.8	31.6	-2.6	-4.1	1.5
Canada	<1	3.6	-9.9	-1.9	-2.1	0.2
Czech Republic	<1	-5.8	7.5	-2.2	-1.8	-0.4
Denmark	<1	3.4	230.1	9.7	-2.5	12
Estonia	--	-67.4	-4.2	-2.4	-2.8	0.4
Finland	<1	-2.4	-18.2	-3.8	-1	2.8
France	3.2	4.2	2.8	0.8	-2.4	3.2
Germany	--	--	7.1	-1.4	-1.8	0.4
Greece	3	29.2	26	4.6	-1.7	6.3
Iceland	-1.1	-39.1	-30	-12.2	-2	-10.2
Ireland	--	1.9	-30.6	-10.8	-5.2	-5.6
Italy	<1	-40.3	36.7	-5.5	-1.8	-3.7
Japan	-2.6	14	90.8	-1.3	-0.6	-0.7
Latvia	7.8	17.2	838.8	29	-2.4	31.4
Luxembourg	16.3	0.5	14.5	14.7	-0.7	15.4
Netherlands	--	4.1	-0.6	-1.6	-2.1	0.5
New Zealand	--	-14.1	177.9	-4.5	-7.82	3.32
Norway	<1	49	--	3.9	-3.3	7.2
Portugal	11.8	257.7	33.3	34.1	-4.2	38.3
Russian Federation	<1	-1.9	151.9	-2.6	-3.1	0.5
Slovakia	3	17.9	-21.9	0.8	-2.1	2.9
Spain	<1	1.4	0.3	-2.8	-2.8	0
Sweden	-9.5	-1.5	-39.5	-12.2	-1.9	-10.3
Switzerland	--	-26.7	-26.3	-7.6	-1.8	-5.8
United Kingdom	1.2	-1.5	10.8	-1.1	-2.3	1.2
United States	<1	9.5	3.3	-0.6	-1.9	1.3

[a] Percentage deviation of the inventory of the NC2 relative to the inventory submitted in the NC1. Negative values denote that the later inventory has a lower figure. All figures rounded. Where no value is shown this indicates that the difference is zero between the emissions in the NC1 and the NC2.

Table 2. Comparison between the *simulated* assigned amounts calculated using inventory data of the year 1990 from first and second national communications

	A	B	C	D
Party	***Simulated* assigned amounts for the first commitment period (CO_2 equivalent)**		**Differences between the *simulated* assigned amounts estimated using data from NC1s and NC2s due to change in methods/data[a]**	
			B-A	**(C/A)*100**
	NC1 [Gg]	**NC2 [Gg]**	**[Gg]**	**[per cent]**
Austria	336 416	357 944	21 528	6.4
Canada	2 618 351	2 621 942	3 591	0.1
Czech Republic	887 864	883 798	-4 066	-0.5
Denmark	293 319	329 627	36 308	12.4
Estonia	208 490	187 307	-21 183	-10.2
Finland	303 655	296 912	-6 744	-2.2
France	2 217 793	2 291 108	73 315	3.3
Germany	5 514 880	5 536 270	21 390	0.4
Greece	430 330	456 467	26 137	6.1
Iceland	15 626	14 141	-1 485	-9.5
Ireland	278 521	261 561	-16 960	-6.1
Italy	2 521 513	2 447 421	-74 092	-2.9
Japan	5 645 330	5 594 175	-51 155	-0.9
Latvia	124 471	164 077	39 606	31.8
Luxembourg	55 352	63 977	8 625	15.6
Netherlands	946 795	950 369	3 574	0.4
New Zealand	362 415	380 170	17 755	4.9
Norway	233 583	248 793	15 211	6.5
Portugal	230 685	314 833	84 148	36.5
Russian Federation	14 917 480	14 993 835	76 355	0.5
Slovakia	324 415	333 482	9 067	2.8
Spain	1 387 369	1 386 583	-787	-0.1
Sweden	335 234	299 465	-35 770	-10.7
Switzerland	261 639	247 245	-14 393	-5.5
United Kingdom	3 246 386	3 287 579	41 193	1.3
United States	26 279 735	26 566 938	287 203	1.1

[a] Differences in CO_2 equivalent estimates for the year 1990 are only a consequence of change in methods/data. Both estimates were calculated using 1995 GWPs and, therefore, the effect of using different GWPs was excluded. Negative values in the difference denote that the *simulated* assigned amounts calculated using the data of the NC2 are lower than those calculated using the data of the NC1.

B. Effects of recalculations on *simulated* commitments by Parties

17. *Simulated* assigned amounts, using data from NC1s and NC2s were calculated, in line with the Kyoto Protocol. It was assumed that these *simulated* assigned amounts related to the years 1991 to 1994, simply because actual inventory data from the NC1s were available only for this period.[6] To assess the extent to which a Party may go over or under its *simulated* assigned amount, the ratio between total emissions in the *simulated* commitment period and the *simulated* assigned amounts were calculated. This exercise was carried out for data from NC1s and NC2s. Comparisons allow for an assessment of the effects of recalculations of the inventory data owing to changes in methods/data between those national communications.

18. The results of this exercise are presented in table 3. Columns A and B show *simulated* assigned amounts for the *simulated* commitment period of 1991 to 1994,[7] (or 1991 to 1993[8]), expressed as CO_2 equivalent GHG emissions. The year 1990 was used as a base year when calculating the *simulated* assigned amounts. Columns A and B represent the *simulated* assigned amounts based on 1990 data in the NC1 and the NC2 respectively. Actual emission estimates from NC1s and NC2s for the same period are presented in columns C and D. A comparison of actual data with the *simulated* assigned amounts in columns E and F indicates the percentage by which Parties are under or over the *simulated* commitments. The final column shows the difference in these results. It can be observed that in most cases the difference, which reflects changes in methods/data, is lower than one percentage point.[9]

19. On the basis of the data presented in table 3, a number of figures were prepared to facilitate further understanding of effects of the recalculations on the commitments under the Kyoto Protocol. Three figures were prepared for each Party:

(a) The first figure (e.g., 1a) shows the trend of aggregate GHG emissions (CO_2, CH_4, N_2O), expressed in CO_2 equivalent, based on data from the NC1 and the NC2;

(b) The second figure (e.g., 1b) shows in absolute terms the extent by which the Party either goes over or under a *simulated* commitment, given data in either the NC1 or the NC2. It

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[6] Only 13 Parties were selected because they provided complete inventory data in their first national communications for CO_2, CH_4 and N_2O for the years 1991 to 1993/94. Data from the NC1s are used in this paper for analysing methodological problems related to recalculations.

[7] For Canada, Denmark, Estonia, Japan, the Netherlands, New Zealand, Norway, Switzerland, the United Kingdom and the United States of America, which provided inventory data until the year 1994 in their first national communications. The period 1991-1994 is considered as a *simulated* commitment period in this paper. The *simulated* assigned amounts were calculated using the formula of paragraph 6, but using four years instead of five.

[8] France, Germany, Iceland and Japan provided inventory data only until the year 1993 in their first national communications. Thus, the *simulated* commitment period and the *simulated* assigned amounts were calculated for the years 1991 to 1993.

[9] The difference between two percentages is expressed in percentage points. The resulting values can be directly compared to the quantified emission limitation or reduction commitments inscribed in Annex B of the Kyoto Protocol, such as +10 per cent for Iceland and -8 per cent for Switzerland.

shows the amount of CO_2 equivalent emissions by which the total GHG emissions of the *simulated* commitment period were higher (positive value) or lower (negative value) than the *simulated* assigned amounts. The values were calculated by subtracting columns A from C and B from D in table 3.

(c) The third figure (e.g., 1c) shows similar information, but in percentage terms. It represents the values contained in columns E and F of table 3. For example, during the *simulated* commitment period, Canada exceeded its *simulated* assigned amount by 9 per cent according to data in its NC1 (column E in table 3) and by 8.4 per cent according to data in its NC2 (column F in table 3). The percentage over or under this *simulated* commitment was altered by -0.6 percentage points in this case as a consequence of recalculations (column G in table 3).

20. In addition, figures 14 and 15 were prepared to illustrate the understanding of the results presented in table 3 which were obtained using the calculations described in paragraphs 15, 16, 17(b) and 17(c) above.

Table 3. Possible impact of recalculations on *simulated* commitments

Party	A	B	C	D	E	F	G
	***Simulated* assigned amounts for a *simulated* commitment period 1991 to 1994 (1993), (CO_2 equivalent)**		**Total GHG emission estimates for the period 1991 to 1994 (1993), (CO_2 equivalent)**		**Percentage over/under *simulated* commitments**		**Differences between percentages over/under *simulated* commitments[a]**
	NC1	**NC2**	**NC1**	**NC2**	**NC1 100* (C-A)/A**	**NC2 100* (D-B)/B**	**(F-E)**
	[Gg]	**[Gg]**	**[Gg]**	**[Gg]**	**[per cent]**	**[per cent]**	**[percentage points]**
Canada	2 094 681	2 097 554	2 283 421	2 274 230	9	8.4	-0.6
Denmark	234 655	263 701	285 604	321 162	21.7	21.8	0.1
Estonia	166 792	149 846	127 726	119 035	-23.4	-20.6	2.8
France	1 330 676	1 374 665	1 469 644	1 524 409	10.4	10.9	0.5
Germany	3 308 928	3 321 762	3 321 707	3 350 547	0.4	0.9	0.5
Iceland	9 375	8 484	8 485	7 791	-9.5	-8.2	1.3
Japan	3 387 198	3 356 505	3 673 120	3 649 804	8.4	8.7	0.3
Netherlands	757 436	760 295	860 412	858 350	13.6	12.9	-0.7
New Zealand	289 932	304 136	290 704	302 067	0.3	-0.7	-1
Norway	186 866	199 035	183 435	196 809	-1.8	-1.1	0.7
Switzerland	209 311	197 796	226 073	214 140	8.0	8.3	0.3
United Kingdom	2 597 108	2 630 063	2 737 962	2 746 151	5.4	4.4	-1.0
United States	21 023 788	21 253 550	22 867 165	23 218 753	8.8	9.2	0.4

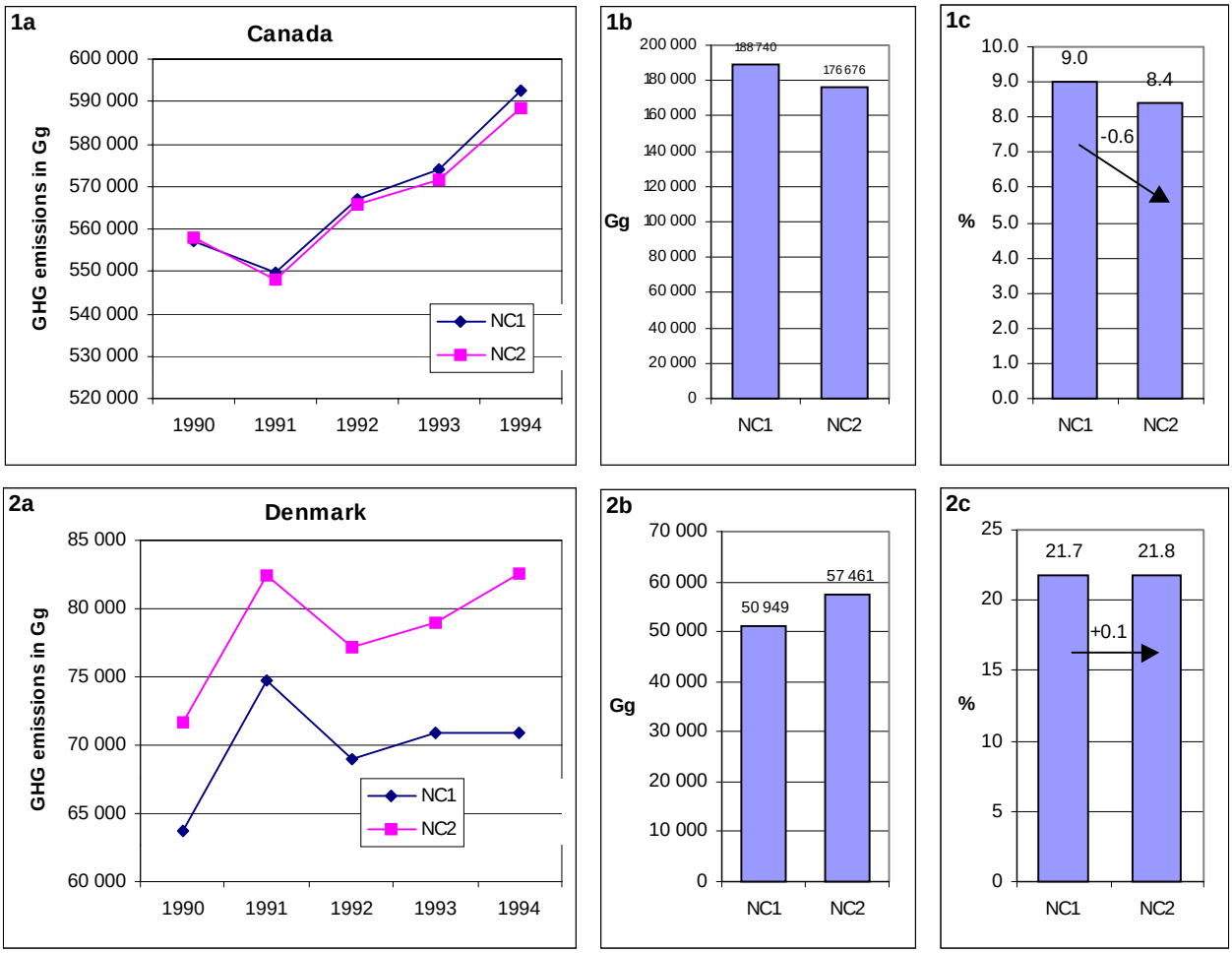
[a] The value was calculated by subtracting the values of column F (percentage over/under *simulated* commitments calculated using data from NC2) from column E (percentage over/under *simulated* commitments calculated using data from NC1). The difference between two percentages is expressed in percentage points. The resulting values can be directly compared to the quantified emission limitation or reduction commitments inscribed in Annex B of the Kyoto Protocol, such as +10 per cent for Iceland and -8 per cent for Switzerland.

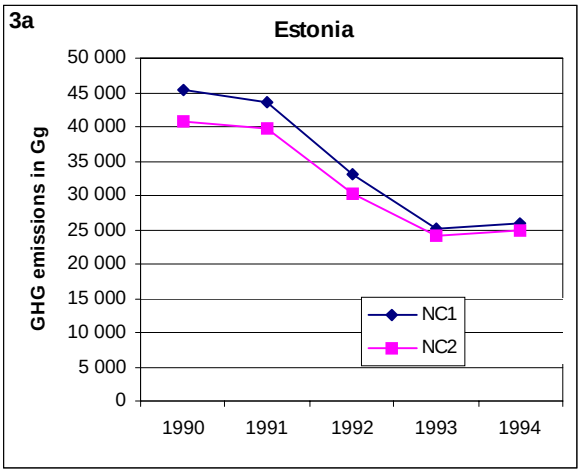
FIGURES

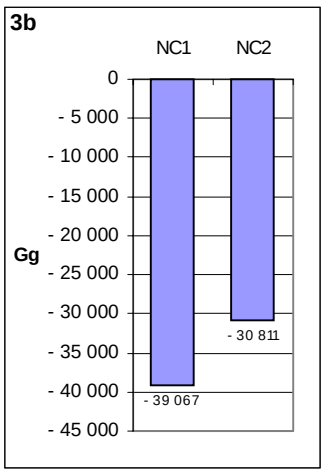
Figures a - Trends in aggregate GHG emissions expressed in CO_2 equivalent (Gg) for the years 1990 to 1994.

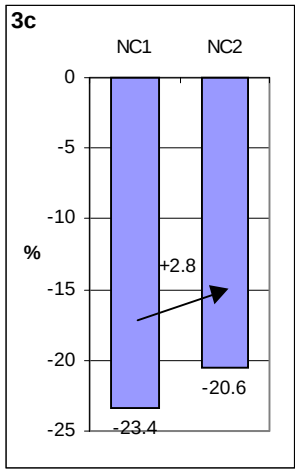
Figures b - Amount of aggregate GHG emissions by which the Party either over- or under-achieved its *simulated* commitment, given data in either the NC1 or the NC2 (CO_2 equivalent in Gg).

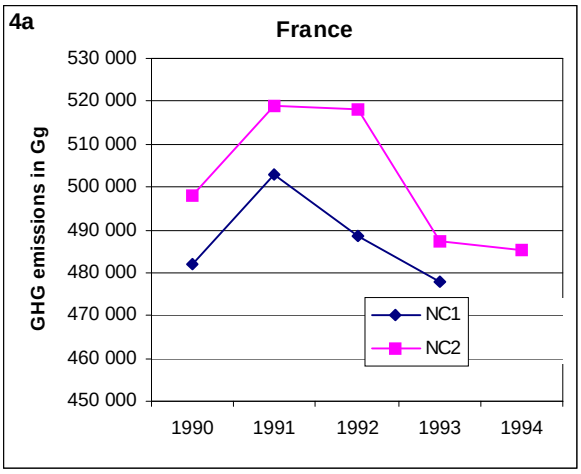
Figures c - Percentage over or under *simulated* commitments and differences between these levels (in percentage points).

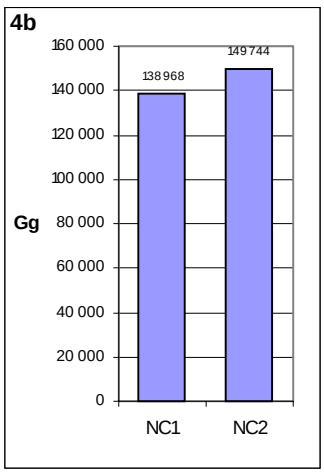


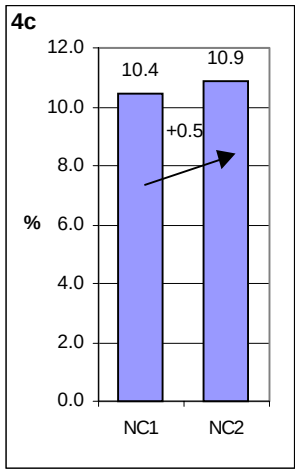

3a
Estonia
GHG emissions in Gg
50 000
45 000
40 000
35 000
30 000
25 000
20 000
15 000
10 000
5 000
0
1990
1991
1992
1993
1994
NC1
NC2

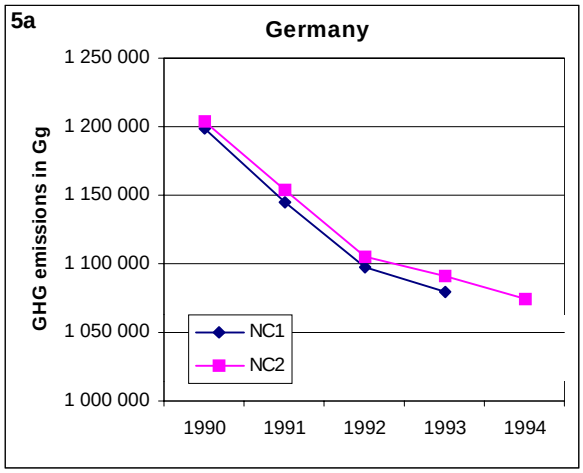

3b
NC1
NC2
Gg
0
- 5 000
- 10 000
- 15 000
- 20 000
- 25 000
- 30 000
- 35 000
- 40 000
- 45 000
- 39 067
- 30 811

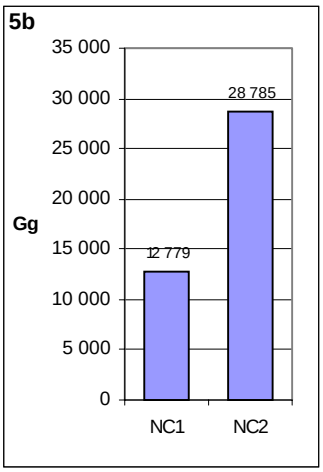

3c
NC1
NC2
%
0
-5
-10
-15
-20
-25
+2.8
-20.6
-23.4

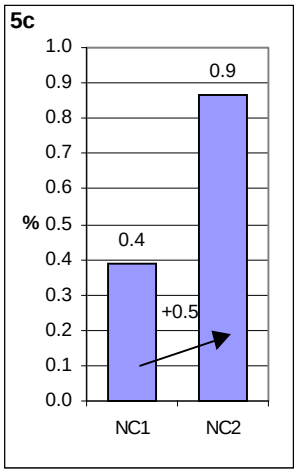

4a
France
GHG emissions in Gg
530 000
520 000
510 000
500 000
490 000
480 000
470 000
460 000
450 000
1990
1991
1992
1993
1994
NC1
NC2

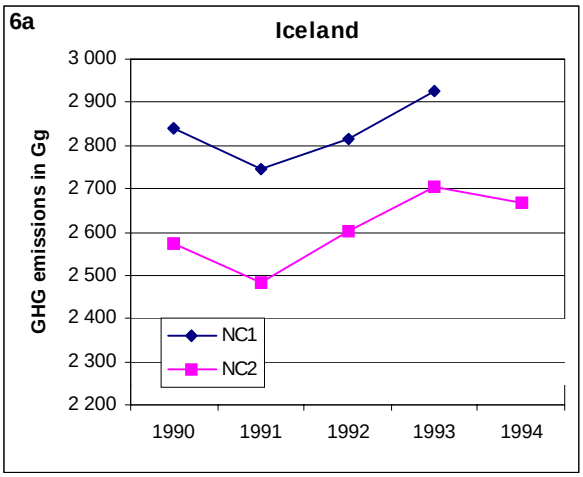

4b
Gg
160 000
140 000
120 000
100 000
80 000
60 000
40 000
20 000
0
138 968
149 744
NC1
NC2

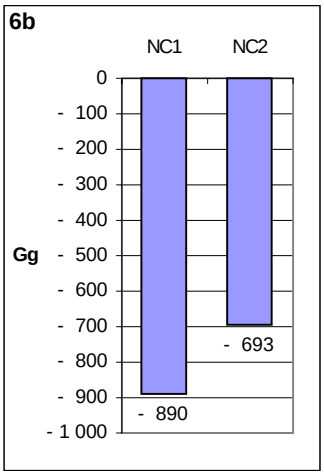

4c
%
12.0
10.0
8.0
6.0
4.0
2.0
0.0
10.4
10.9
+0.5
NC1
NC2

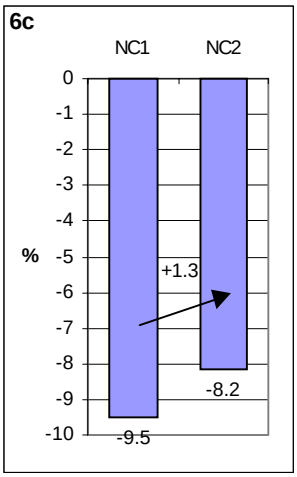

5a
Germany
GHG emissions in Gg
1 250 000
1 200 000
1 150 000
1 100 000
1 050 000
1 000 000
1990
1991
1992
1993
1994
NC1
NC2

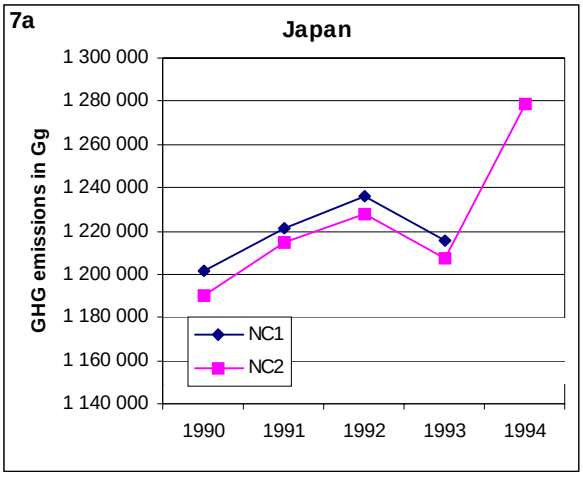

5b
Gg
35 000
30 000
25 000
20 000
15 000
10 000
5 000
0
12 779
28 785
NC1
NC2

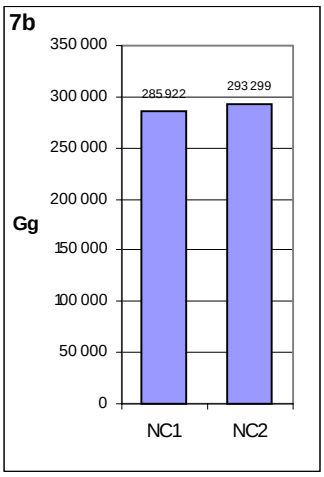

5c
%
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.4
0.9
+0.5
NC1
NC2

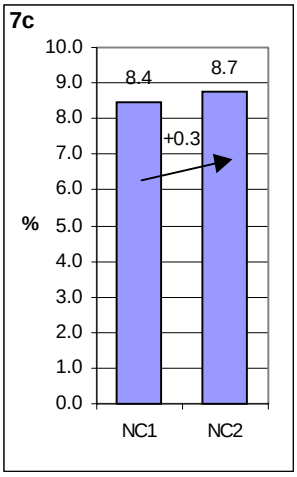

6a
Iceland
GHG emissions in Gg
3 000
2 900
2 800
2 700
2 600
2 500
2 400
2 300
2 200
1990
1991
1992
1993
1994
NC1
NC2

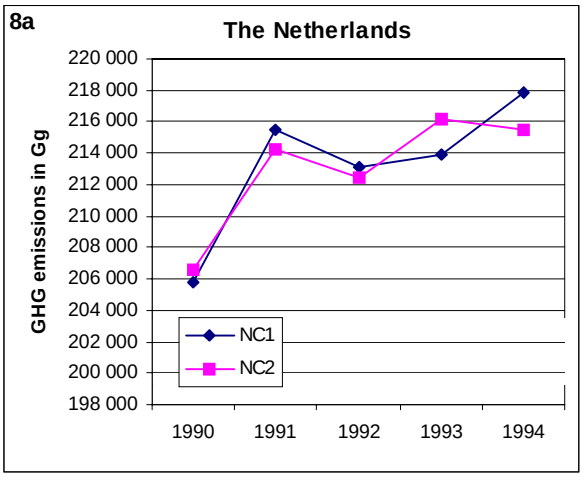

6b
NC1
NC2
Gg
0
- 100
- 200
- 300
- 400
- 500
- 600
- 700
- 800
- 900
- 1 000
- 890
- 693

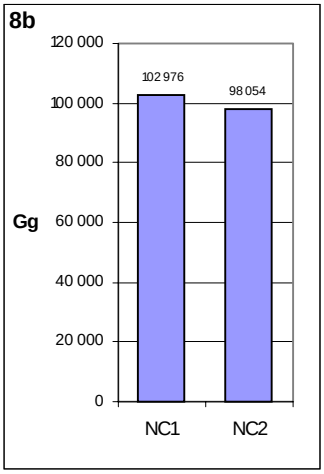

6c
NC1
NC2
%
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
+1.3
-8.2
-9.5

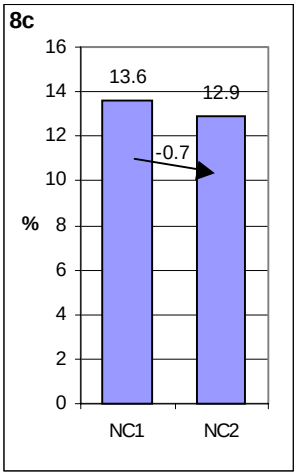

7a
Japan
GHG emissions in Gg
1 300 000
1 280 000
1 260 000
1 240 000
1 220 000
1 200 000
1 180 000
1 160 000
1 140 000
1990
1991
1992
1993
1994
NC1
NC2

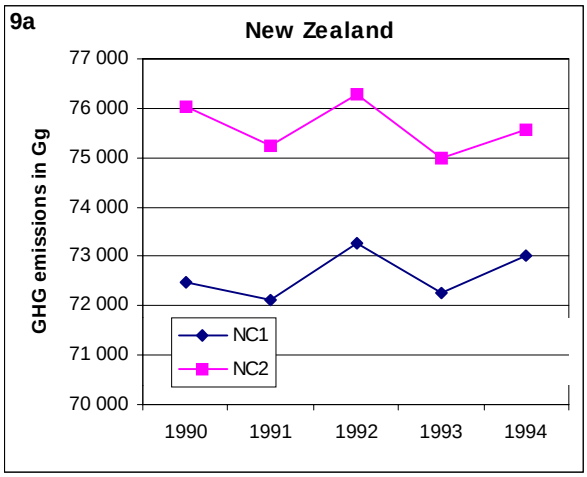

7b
Gg
350 000
300 000
250 000
200 000
150 000
100 000
50 000
0
285 922
293 299
NC1
NC2

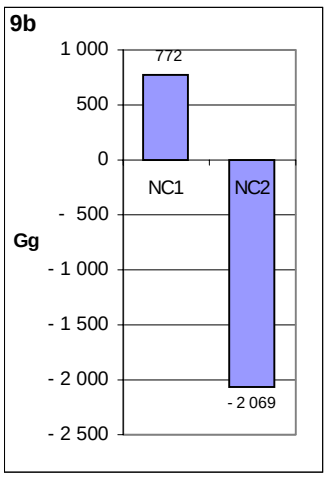

7c
%
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
8.4
8.7
+0.3
NC1
NC2

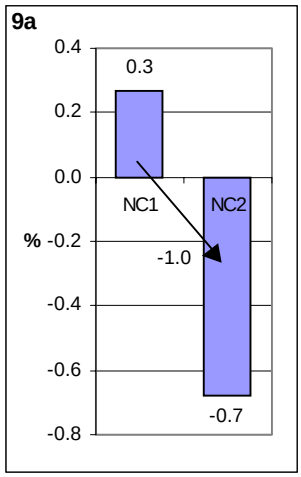

8a
The Netherlands
GHG emissions in Gg
220 000
218 000
216 000
214 000
212 000
210 000
208 000
206 000
204 000
202 000
200 000
198 000
1990
1991
1992
1993
1994
NC1
NC2

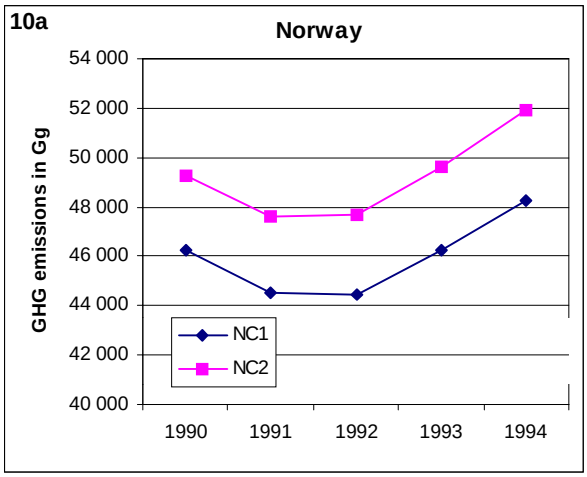

8b
Gg
120 000
100 000
80 000
60 000
40 000
20 000
0
102 976
98 054
NC1
NC2

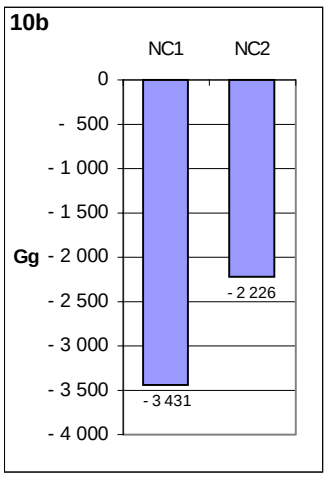

8c
%
16
14
12
10
8
6
4
2
0
13.6
12.9
-0.7
NC1
NC2

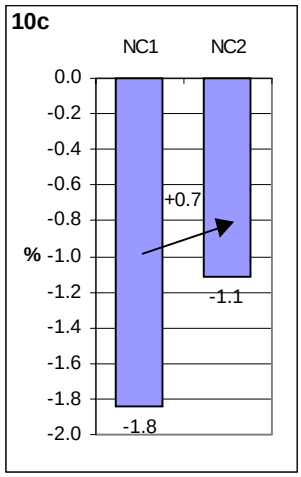

9a
New Zealand
GHG emissions in Gg
77 000
76 000
75 000
74 000
73 000
72 000
71 000
70 000
1990
1991
1992
1993
1994
NC1
NC2

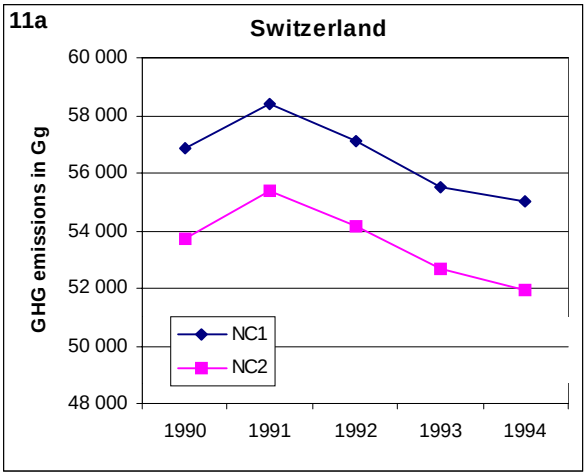

9b
Gg
1 000
500
0
- 500
- 1 000
- 1 500
- 2 000
- 2 500
772
- 2 069
NC1
NC2

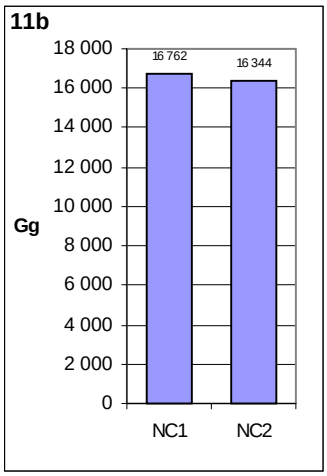

9a
%
0.4
0.2
0.0
-0.2
-0.4
-0.6
-0.8
0.3
-1.0
-0.7
NC1
NC2

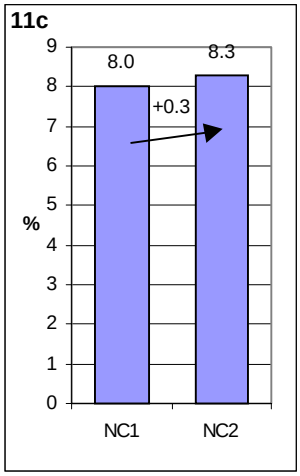

10a
Norway
GHG emissions in Gg
54 000
52 000
50 000
48 000
46 000
44 000
42 000
40 000
1990
1991
1992
1993
1994
NC1
NC2

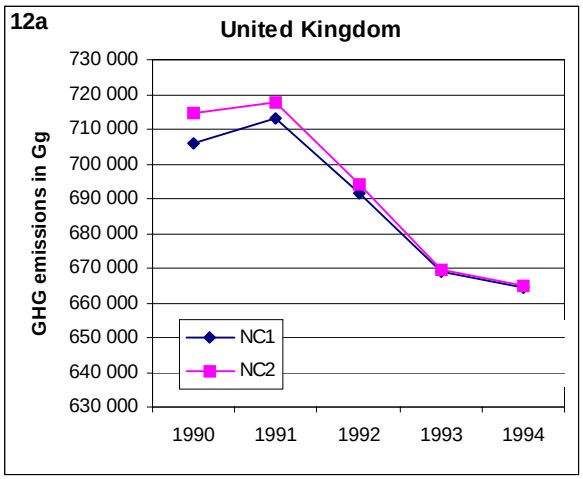

10b
NC1
NC2
Gg
0
- 500
- 1 000
- 1 500
- 2 000
- 2 500
- 3 000
- 3 500
- 4 000
- 3 431
- 2 226

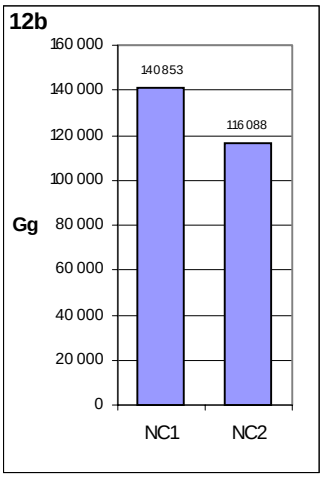

10c
NC1
NC2
%
0.0
-0.2
-0.4
-0.6
-0.8
-1.0
-1.2
-1.4
-1.6
-1.8
-2.0
+0.7
-1.1
-1.8

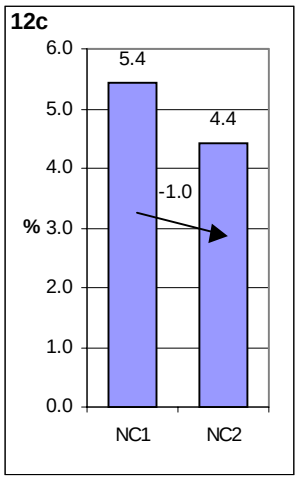

11a
Switzerland
GHG emissions in Gg
60 000
58 000
56 000
54 000
52 000
50 000
48 000
1990
1991
1992
1993
1994
NC1
NC2

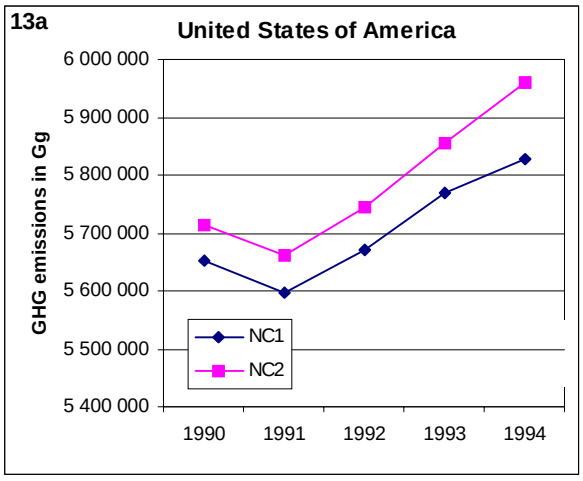

11b
Gg
18 000
16 000
14 000
12 000
10 000
8 000
6 000
4 000
2 000
0
16 762
16 344
NC1
NC2

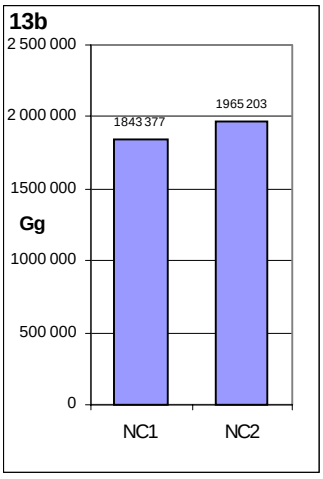

11c
%
9
8
7
6
5
4
3
2
1
0
8.0
8.3
+0.3
NC1
NC2

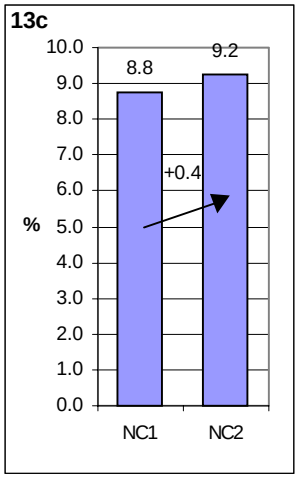

12a
United Kingdom
GHG emissions in Gg
730 000
720 000
710 000
700 000
690 000
680 000
670 000
660 000
650 000
640 000
630 000
NC1
NC2
1990
1991
1992
1993
1994


12b
160 000
140 000
120 000
100 000
Gg
80 000
60 000
40 000
20 000
0
140853
116088
NC1
NC2


12c
6.0
5.0
4.0
%
3.0
2.0
1.0
0.0
5.4
4.4
-1.0
NC1
NC2


13a
United States of America
GHG emissions in Gg
6 000 000
5 900 000
5 800 000
5 700 000
5 600 000
5 500 000
5 400 000
NC1
NC2
1990
1991
1992
1993
1994


13b
2 500 000
2 000 000
1500 000
Gg
1000 000
500 000
0
1843377
1965203
NC1
NC2


13c
10.0
9.0
8.0
7.0
6.0
%
5.0
4.0
3.0
2.0
1.0
0.0
8.8
9.2
+0.4
NC1
NC2

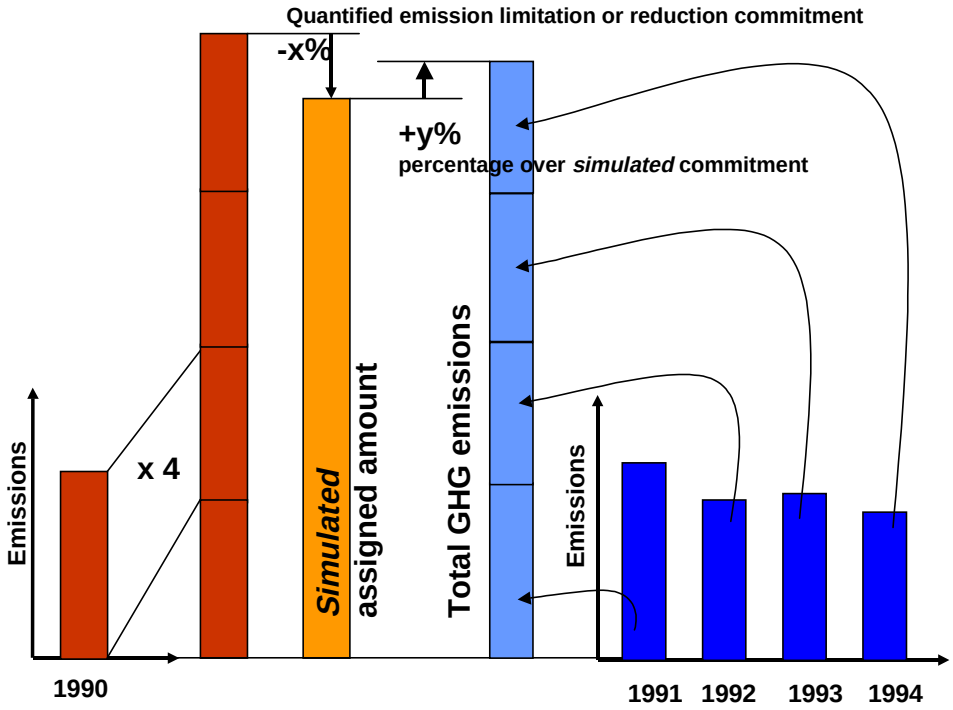


Figure 14: Illustration of the calculation of the *simulated* assigned amount and of the percentage by which Parties are under or over the *simulated* commitments.

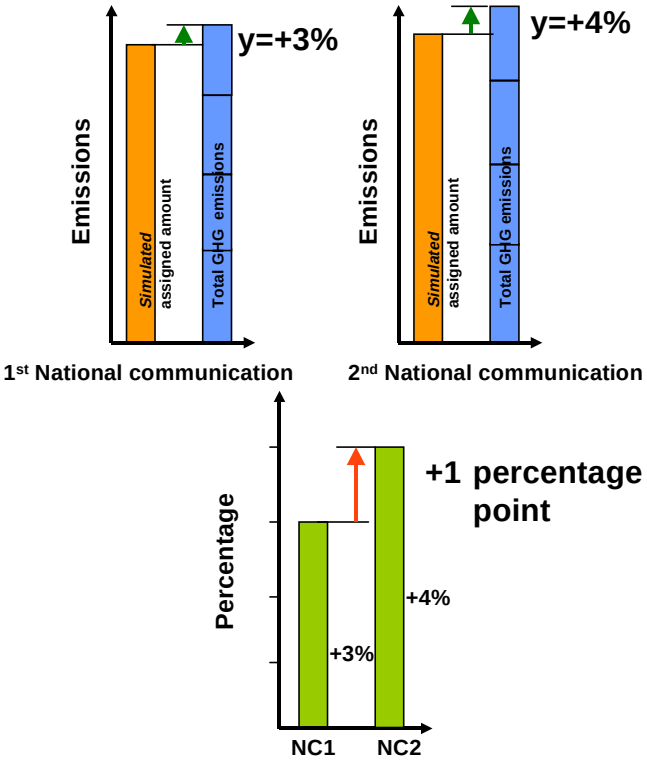


Figure 15: Illustration of the difference by which Parties are under or over the *simulated* commitments as a consequence of using data from the NC1 and the NC2

III. CONCLUSIONS

21. Base year inventory data can change significantly as a result of recalculations due to new methods/data. Since the assigned amounts under the Kyoto Protocol in mass units are calculated using base year inventory data, these too can change significantly.

22. For thirteen Parties, a *simulated* assigned amount for a *simulated* commitment period was estimated using 1990 inventory data in NC1s and as recalculated in NC2s. The assigned amounts were then compared to the actual inventory data for the period 1991-1994 as reported in NC1s and NC2s. Furthermore, the extent by which Parties either go over or under *simulated* commitments for this *simulated* commitment period was estimated in relative terms to the assigned amounts.[10] The results indicate that for thirteen Parties, changes in methods would cause these Parties to go over or under their *simulated* commitments by +2.9 to -1.0 additional percentage points.

23. The results seem to indicate that the absolute changes in assigned amounts used in the assessment of Parties' commitments may be significant, given a change in methods/data in the inventory. The overall effect of changes in methods, if applied consistently to emission estimates during a commitment period, may be less significant. Nevertheless, such changes in methods may need to be considered by Parties, as even small changes may affect a Party's ability to meet its commitments.

- - - - -

[10] These values can be directly compared to the quantified emission limitation or reduction commitments inscribed in Annex B of the Kyoto Protocol, such as +10 per cent for Iceland and -8 per cent for Switzerland.