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ANNEX 1: Key sources

1.1 Introduction

Key sources according to the *IPCC Good Practice Guidance* (IPCC, 2000) are those found in the accumulative 95% of the total annual emissions in the last reported year *or* belonging to the total trend, when ranked from contributing the largest to smallest share in annual total and in the trend. The IPCC also recommended which sources should be checked for their key source status.

For preliminary identification of key sources in the Netherlands inventory we allocated, where possible, the national emissions according to the IPCC's potential key source list. This non-combustion category of CO₂ has been added to the list for the Netherlands, with its high share of feedstock/non-energy use of fuels. A number of other potential key sources could not be clearly identified in the present dataset. However, compared with the previous submission, it was now possible to identify the possible key source CO₂ emissions from iron and steel production. The IPCC Tier 1 method consists of ranking this list of source category-gas combinations, both for the contribution, to the national total annual emissions and to the national total trend.

The grey areas at the top of the tables in this Annex are the largest sources of which the total adds up to 95% of the national total: 18 sources for annual level assessment and 20 sources for the trend assessment out of a total of 56 sources. Both lists can be combined to get an overview of sources that meet any of these two criteria. The IPCC Tier 2 method for identification of key sources requires the incorporation of the uncertainty to each of these sources before ordering the list of shares. This has been carried out using the uncertainty estimates discussed in *Section 1.3* of this Annex. The results of the Tier 1 and Tier 2 levels and trend assessment are summarised in *Table 1.6*. As could be expected, the Tier 2 level and trend assessment increases the importance of relatively very uncertain sources. Some of these sources, which are below the 95% cut-off line in the Tier 1 assessment, are shifted above this line in the Tier 2 assessment.

Table A1.1 presents the preliminary list of key sources, identified by combining the Tier 1 and Tier 2 levels and trend approach. From the table it can be concluded that in using the results of a Tier 2 key source assessment, three more sources are added to the list of 23 Tier 1 level and trend key sources:

Table A1.1. Preliminary list of key sources identified by the Tier 1 and 2 level and trend assessments

Name	Gas	T1 Level	T1 Trend	T2 Level	T2 Trend
1A Emissions from stationary combustion: Energy Industries	CO ₂	1	1	1	1
Emissions from stationary combustion: Manufacturing Industries & Constr.	CO ₂	1	1	1	1
Emissions from iron and steel industry	CO ₂	1	1	1	
Emissions from stationary combustion: Other Sectors	CO ₂	1	1	1	
Feedstock gas	CO ₂	1	1	1	
Feedstock oil	CO ₂	1	1	1	
Mobile combustion: road vehicles	CO ₂	1	1	1	1
Mobile combustion: other	CO ₂	1		1	
Mobile combustion: aircraft	CO ₂		1		
1B Fugitive emissions from oil and gas: gas production	CH ₄	1	1	1	
Fugitive emissions from oil and gas: gas distribution	CH ₄	1	1	1	
2 Emissions from nitric acid production	N ₂ O	1	1	1	
HFC Emissions from substitutes for ozone depleting substances	HFC		1		
HFC-23 emissions from HCFC-22 manufacture	HFC		1	1	1
PFC emissions from aluminium production	PFC	1	1	1	
SF ₆ emissions from SF ₆ use	SF ₆		1		
4A CH ₄ emissions from enteric fermentation in domestic cattle livestock	CH ₄	1	1	1	
4B Emissions from swine manure management	CH ₄		1	1	
4D Direct N ₂ O emissions from agricultural soils	N ₂ O	1		1	
Indirect N ₂ O emissions from nitrogen used in agriculture	N ₂ O	1		1	
6A CH ₄ emissions from solid waste disposal sites	CH ₄	1	1	1	1
7 Miscellaneous CO ₂	CO ₂	1	1	1	
Miscellaneous N ₂ O	N ₂ O		1	1	
Polluted surface water	N ₂ O	1		1	
<i>Tier 2 key sources not in Tier 1 key source list:</i>					
1A Emissions from stationary combustion: non-CO ₂	CH ₄			1	
1A Mobile combustion: water-borne navigation	CO ₂			1	
4B Emissions from cattle manure management	CH ₄			1	
Number of sources:	27	18	20	24	5

- CH₄ emissions from stationary combustion;
- CH₄ emissions from cattle manure management;
- CO₂ from mobile combustion: water-borne navigation.

Their share in the national annual total becomes more important when taking their uncertainty into account: 50%, 100% and 100%, respectively (*Table 1.7*).

The subsequent sections will provide more details on the Tier 1 and Tier 2 key source assessment.

Table A1.2. Source ranking using IPCC Tier 1 level assessment 2001 (amounts in Gg CO₂-eq.)

IPCC	Category	Gas	CO ₂ -eq 2001	Share	Cum. share
1A	Emissions from stationary combustion : Energy Industries	CO ₂	64776	29%	29%
1A	Emissions from stationary combustion : Other Sectors	CO ₂	36126	16%	46%
1A	Mobile combustion : road vehicles	CO ₂	31984	15%	60%
1A	Emissions from stationary combustion : Manufacturing Industries and Construction	CO ₂	25027	11%	72%
6A	CH ₄ emissions from solid waste disposal sites	CH ₄	8181	4%	76%
2X	Emissions from nitric acid production	N ₂ O	6564	3%	79%
1A	Emissions from iron and steel industry	CO ₂	6196	3%	81%
4A	CH ₄ emissions from enteric fermentation in domestic livestock: cattle	CH ₄	6054	3%	84%
4D	Direct N ₂ O emissions from agricultural soils	N ₂ O	5518	3%	87%
1A	Feedstock gas	CO ₂	4664	2%	89%
1A	Feedstock oil	CO ₂	3902	2%	91%
1A	Mobile combustion : other	CO ₂	2458	1%	92%
7X	Misc. CO ₂	CO ₂	1579	1%	92%
4D	Indirect N ₂ O emissions from nitrogen used in agriculture	N ₂ O	1460	1%	93%
1B	Fugitive emissions from oil and gas operations: gas production	CH ₄	1454	1%	94%
2X	PFC emissions from aluminium production	PFC	1320	1%	94%
1B	Fugitive emissions from oil and gas operations: gas distribution	CH ₄	1287	1%	95%
7X	Polluted surface water	N ₂ O	1178	1%	95%
2X	Other industrial: CO ₂	CO ₂	1124	1%	96%
1A	Mobile combustion : water-borne navigation	CO ₂	969	0%	96%
2X	Emissions from substitutes for ozone depleting substances (ODS substitutes): HFC	HFC	943	0%	97%
4B	Emissions from manure management : swine	CH ₄	848	0%	97%
4B	Emissions from manure management : cattle	CH ₄	803	0%	98%
1A	Emissions from stationary combustion : non-CO ₂	CH ₄	638	0%	98%
1A	Mobile combustion : road vehicles	N ₂ O	583	0%	98%
2X	HFC-23 emissions from HCFC-22 manufacture	HFC	450	0%	98%
2X	Emissions from cement production	CO ₂	437	0%	99%
4A	CH ₄ emissions from enteric fermentation in domestic livestock: swine	CH ₄	412	0%	99%
1A	Feedstock coal	CO ₂	408	0%	99%
2X	SF ₆ emissions from SF ₆ use	SF ₆	296	0%	99%
1A	Emissions from stationary combustion : non-CO ₂	N ₂ O	223	0%	99%
4A	CH ₄ emissions from enteric fermentation in domestic livestock: sheep	CH ₄	218	0%	99%
1A	Mobile combustion : aircraft	CO ₂	197	0%	99%
6B	Emissions from wastewater handling	N ₂ O	194	0%	99%
2X	HFC by-product emissions from HFC manufacture	HFC	192	0%	100%
4B	Emissions from manure management	N ₂ O	189	0%	100%
4B	Emissions from manure management : poultry	CH ₄	182	0%	100%
2X	PFC emissions from PFC use	PFC	136	0%	100%
7X	Misc. N ₂ O	N ₂ O	129	0%	100%
4A	CH ₄ emissions from enteric fermentation in domestic livestock: other	CH ₄	83	0%	100%
1A	Mobile combustion : road vehicles	CH ₄	81	0%	100%
1B	Fugitive emissions from oil and gas operations: other	CH ₄	79	0%	100%
7X	Misc. CH ₄	CH ₄	39	0%	100%
2X	Other industrial: CH ₄	CH ₄	30	0%	100%
1A	Mobile combustion : other	N ₂ O	29	0%	100%
4B	Emissions from manure management : other	CH ₄	23	0%	100%
6B	Emissions from wastewater handling	CH ₄	16	0%	100%
1A	Mobile combustion : other	CH ₄	7	0%	100%
			219.685		
4B	Emissions from agricultural residue burning	n-CO ₂	NO		
2	Emissions from lime consumption	CO ₂	IE		
2	PFC, HFC, SF ₆ emissions from semiconductor manufacturing (GWP)	PFC	IE		
2	Other industrial: N ₂ O	N ₂ O	IE		
6C	Emissions from waste incineration	n-CO ₂	IE		

Sources: Olivier *et al.* (2000) for emissions, Van Amstel *et al.* (2000a), IPCC (2000) and RIVM's expert judgement of uncertainties.

1.2 Tier 1 key source and uncertainty assessment

In *Tables A1.2 and A1.3* the source ranking is done according to the contribution to the 2001 annual emissions total and to the base year to 2001 trend, respectively. This results in 18 level key sources and 20 trend key sources (indicated in the grey part at the top). Although it has no relevance for identifying whether a source is a key source or not, it is interesting to note that 14 sources are found in both lists. This set forms the most robust list, since it does not include the uncertainty estimate for the emissions. However, the level and trend assessment uses the dataset for the last reported year, 2001, of which the data are preliminary and can, in some cases, change substantially when the final data become available in the next year (= subsequent submission). In *Chapter 10* on recalculations and in the recalculation *Table A7.17* in *Annex 7.2*, examples are provided for 2000.

Table A1.3. Source ranking using IPCC Tier 1 trend assessment (amounts in Gg CO₂-eq.)

IPCC	Category	Gas	CO ₂ -eq 1990	CO ₂ -eq 2001	Level assessment 90/95	Level assessment 2001	Trend assessment	% Contr. to trend	Cumulative total
1A	Emissions from stationary combustion: Energy Industries	CO ₂	51305	64776	24%	29%	5.0%	28%	28%
1A	Mobile combustion: road vehicles	CO ₂	25374	31984	12%	15%	2.4%	14%	41%
1A	HFC-23 emissions from HCFC-22 manufacture	HFC	5759	450	3%	0%	2.4%	13%	55%
1A	CH ₄ emissions from solid waste disposal sites	CH ₄	11802	8181	6%	4%	1.3%	10%	64%
6A	Emissions from stationary combustion: Manufacturing Industries and Construction	CO ₂	27711	25027	13%	11%	1.7%	9%	74%
4A	CH ₄ emissions from enteric fermentation in domestic livestock: cattle	CH ₄	7678	6054	4%	3%	0.8%	5%	78%
2X	Feedstock oil	CO ₂	2549	3902	1%	2%	0.5%	3%	81%
1A	Emissions from nitric acid production	N ₂ O	7029	6564	3%	3%	0.3%	2%	83%
2X	Fugitive emissions from oil and gas operations: gas production	CH ₄	2097	1454	1%	1%	0.3%	2%	85%
4D	Emissions from substitutes for ozone depleting substances (ODS substitutes): HFC	HFC	248	943	0%	0%	0.3%	2%	87%
1A	Misc. N ₂ O	N ₂ O	753	129	0%	0%	0.3%	2%	88%
1A	Emissions from stationary combustion: Other Sectors	CO ₂	34179	36126	16%	16%	0.2%	1%	90%
1A	PFC emissions from aluminium production	PFC	1799	1320	1%	1%	0.2%	1%	91%
1B	Misc. CO ₂	CO ₂	1189	1579	1%	1%	0.1%	1%	92%
2X	Feedstock gas	CO ₂	4805	4664	2%	2%	0.1%	1%	93%
1B	Mobile combustion: aircraft	CO ₂	492	197	0%	0%	0.1%	1%	93%
4D	Emissions from iron and steel industry	CO ₂	6255	6196	3%	3%	0.1%	1%	94%
7X	Fugitive emissions from oil and gas operations: gas distribution	CH ₄	1524	1287	1%	1%	0.1%	1%	95%
2X	Mobile combustion: road vehicles	N ₂ O	341	583	0%	0%	0.1%	1%	95%
7X	Emissions from manure management: swine	CH ₄	1033	848	0%	0%	0.1%	1%	96%
4B	Feedstock coal	CO ₂	569	408	0%	0%	0.1%	0%	96%
4B	HFC by-product emissions from HFC manufacture	HFC	12	192	0%	0%	0.1%	0%	97%
1A	Emissions from manure management: cattle	CH ₄	905	803	0%	0%	0.1%	0%	97%
7X	Emissions from wastewater handling	CH ₄	138	16	0%	0%	0.1%	0%	97%
1A	Other industrial: CO ₂	CO ₂	1181	1124	1%	1%	0.0%	0%	98%
1A	Direct N ₂ O emissions from agricultural soils	N ₂ O	5214	5518	2%	3%	0.0%	0%	98%
1A	Mobile combustion: road vehicles	CH ₄	158	81	0%	0%	0.0%	0%	98%
4A	CH ₄ emissions from enteric fermentation in domestic livestock: sheep	CH ₄	286	218	0%	0%	0.0%	0%	98%
2X	PFC emissions from PFC use	PFC	68	136	0%	0%	0.0%	0%	99%
1A	Emissions from wastewater handling	N ₂ O	126	194	0%	0%	0.0%	0%	99%
4A	Indirect N ₂ O emissions from nitrogen used in agriculture	N ₂ O	1460	1460	1%	1%	0.0%	0%	99%
2X	Fugitive emissions from oil and gas operations: other	CH ₄	133	79	0%	0%	0.0%	0%	99%
2X	Emissions from stationary combustion: non-CO ₂	CH ₄	557	638	0%	0%	0.0%	0%	99%
4B	Mobile combustion: water-borne navigation	CO ₂	877	969	0%	0%	0.0%	0%	99%
1A	Polluted surface water	N ₂ O	1178	1178	1%	1%	0.0%	0%	99%
4B	CH ₄ emissions from enteric fermentation in domestic livestock: other	CH ₄	37	83	0%	0%	0.0%	0%	99%
1A	CH ₄ emissions from enteric fermentation in domestic livestock: swine	CH ₄	438	412	0%	0%	0.0%	0%	100%
6B	Emissions from manure management: poultry	CH ₄	216	182	0%	0%	0.0%	0%	100%
1B	Other industrial: CH ₄	CH ₄	69	30	0%	0%	0.0%	0%	100%
6B	Emissions from manure management	N ₂ O	205	189	0%	0%	0.0%	0%	100%
2X	Emissions from cement production	CO ₂	400	437	0%	0%	0.0%	0%	100%
2X	Mobile combustion: other	CO ₂	2378	2458	1%	1%	0.0%	0%	100%
7X	SF ₆ emissions from SF ₆ use	SF ₆	275	296	0%	0%	0.0%	0%	100%
4A	Emissions from stationary combustion: non-CO ₂	N ₂ O	208	223	0%	0%	0.0%	0%	100%
1A	Misc. CH ₄	CH ₄	43	39	0%	0%	0.0%	0%	100%
4B	Mobile combustion: other	N ₂ O	31	29	0%	0%	0.0%	0%	100%
2X	Emissions from manure management: other	CH ₄	19	23	0%	0%	0.0%	0%	100%
1A	Mobile combustion: other	CH ₄	8	7	0%	0%	0.0%	0%	100%
			211107	219685	100%	100%	18.0%	100%	

Sources: Van Amstel *et al.* (2000a), IPCC (2000) and RIVM's expert judgement of uncertainties.

1.3 Uncertainty assessment

As described in *Section 1.7*, a Tier 1 uncertainty assessment was made to estimate the uncertainty in total national greenhouse gas emissions and in their trend. Tier 1 here means that non-Gaussian uncertainty distributions and correlations between sources have been neglected. The uncertainty estimates for activity data and emission factors as listed in *Table 1.7* were also used for a Tier 1-trend uncertainty assessment, that can be summarised as follows:

CO ₂ -eq.	±4%-points of 4% increase	N ₂ O	±11%-points of 3% decrease
CO ₂	±3%-points of 13% increase	F-gases	±10%-points of 60% decrease
CH ₄	±7%-points of 25% decrease		

Details on this calculation can be found in *Table A1.4*. It should be stressed that most uncertainty estimates are ultimately based on (collective) expert judgement and therefore also rather uncertain (usually of the order of 50%). However, the reason to make these estimates is to identify the relative most important uncertain sources. For this purpose, a reasonable order-of-magnitude estimate of the uncertainty in activity data and in emission factors is usually sufficient: uncertainty estimates are a *means* to identify and prioritise inventory improvement activities, rather than an objective in itself.

This result may be interpreted in two ways: part of the uncertainty is due to inherent lack of knowledge on the sources that can not be improved; another part, however, can be attributed to elements of the inventory of which the uncertainty could be reduced in the course of time. The latter may be a result of either dedicated research initiated by the Inventory Agency or by other researchers. When this type of uncertainty is in sources that are expected to be relevant for emission reduction policies, the effectiveness of the policy package could be in jeopardy if the unreduced emissions turn out to be much less than originally estimated.

The results of this uncertainty assessment for the list of potential key sources can also be used to refine the Tier 1 key source assessment discussed above. This is the topic of the next section.

1.4 Tier 2 key source assessment

Using the uncertainty estimate for each key source as a weighting factor, we performed the key source assessment again. This is called the Tier 2 key source assessment. The results of this assessment are presented in *Tables A1.5 and A1.6* for the contribution to the 2001 annual emissions total and to the base year to 2001 trend, respectively. Comparison with the Tier 1 assessment presented in *Tables A1.2 and A1.3* shows *more level* key sources (22 instead of 18) and *much lower trend* key sources (5 instead of 19). This is because in the Tier 2 trend contribution calculation, the contribution of the number 1 key source – CO₂ from energy industries – almost doubles, from 28% to 56%, now accounting for over half the total contribution to the trend according to the IPCC calculation rules.

With respect to Tier 2 level key sources, perhaps surprisingly, the energy industries with the highest share of 29% in the national total are number 1 when including the uncertainty estimates. As *Table A1.5* shows, five large but quite uncertain CH₄ and N₂O sources now top the list of level key sources. These are:

- Direct N₂O emissions from agricultural soils;
- N₂O emissions from nitric acid production;
- Indirect N₂O emissions from nitrogen used in agriculture;
- CH₄ emissions from solid waste disposal sites;
- N₂O emissions from polluted surface water.

The uncertainty in these emissions is estimated to be in the range of 30 to 60%, with indirect N₂O emissions and N₂O from polluted surface water having an uncertainty of a factor of 2, which is one or two orders of magnitude higher than the 4% uncertainty estimated for CO₂ from the energy industries (*Table 1.7*).

Table A1.4. Tier 1 trend uncertainty assessment 1990-2001 (for F-gases with base year 1995) with the categories of the IPCC potential key source list (without adjustment for correlations between sources)

IPCC	IPCC Source category	Gas	Base year emissions (1990/1995)	2001 Emissions	Activity data uncertainty	Emission factor uncertainty	Combined Uncertainty	Combined Uncertainty as % of total national emissions in 2001
1A	Emissions from stationary combustion : Energy Industries	CO ₂	51305	64776	3%	2%	4%	1.1%
1A	Emissions from stationary combustion : Other Sectors	CO ₂	34179	36126	3%	1%	3%	0.5%
1A	Emissions from stationary combustion : Manufacturing Industries and Construction	CO ₂	27711	25027	3%	1%	3%	0.4%
1A	Mobile combustion: road vehicles	CO ₂	25374	31984	2%	2%	3%	0.4%
1A	Emissions from iron and steel industry	CO ₂	6255	6196	3%	3%	4%	0.1%
1A	Feedstock gas	CO ₂	4805	4664	5%	10%	11%	0.2%
1A	Feedstock oil	CO ₂	2549	3902	20%	50%	54%	1.0%
1A	Mobile combustion: other	CO ₂	2378	2458	50%	2%	50%	0.6%
1A	Mobile combustion: water-borne navigation	CO ₂	877	969	100%	2%	100%	0.4%
1A	Feedstock coal	CO ₂	569	408	5%	10%	11%	0.0%
1A	Mobile combustion: aircraft	CO ₂	492	197	50%	2%	50%	0.0%
2X	Other industrial: CO ₂	CO ₂	1181	1124	20%	5%	21%	0.1%
2X	Emissions from cement production	CO ₂	400	437	5%	10%	11%	0.0%
7X	Misc. CO ₂	CO ₂	1189	1579	20%	50%	54%	0.4%
	TOTAL CO₂	CO₂	159263	179847	13%	increase		
1A	Emissions from stationary combustion: non-CO ₂	CH ₄	557	638	3%	50%	50%	0.1%
1A	Mobile combustion: road vehicles	CH ₄	158	81	5%	60%	60%	0.0%
1A	Mobile combustion: other	CH ₄	8	7	50%	100%	112%	0.0%
1B	Fugitive emissions from oil and gas operations: gas production	CH ₄	2097	1454	1%	25%	25%	0.2%
1B	Fugitive emissions from oil and gas operations: gas distribution	CH ₄	1524	1287	5%	50%	50%	0.3%
1B	Fugitive emissions from oil and gas operations: other	CH ₄	133	79	20%	50%	54%	0.0%
2X	Other industrial: CH ₄	CH ₄	69	30	10%	50%	51%	0.0%
4A	CH ₄ emissions from enteric fermentation in domestic livestock: cattle	CH ₄	7678	6054	5%	20%	21%	0.6%
4A	CH ₄ emissions from enteric fermentation in domestic livestock: swine	CH ₄	438	412	5%	50%	50%	0.1%
4A	CH ₄ emissions from enteric fermentation in domestic livestock: sheep	CH ₄	286	218	5%	30%	30%	0.0%
4A	CH ₄ emissions from enteric fermentation in domestic livestock: other	CH ₄	37	83	5%	30%	30%	0.0%
4B	Emissions from manure management : swine	CH ₄	1033	848	10%	100%	100%	0.4%
4B	Emissions from manure management : cattle	CH ₄	905	803	10%	100%	100%	0.4%
4B	Emissions from manure management : poultry	CH ₄	216	182	10%	100%	100%	0.1%
4B	Emissions from manure management : other	CH ₄	19	23	10%	100%	100%	0.0%
6A	CH ₄ emissions from solid waste disposal sites	CH ₄	11802	8181	15%	30%	34%	1.2%
6B	Emissions from wastewater handling	CH ₄	138	16	20%	25%	32%	0.0%
7X	Misc. CH ₄	CH ₄	43	39	20%	25%	32%	0.0%
	TOTAL CH₄	CH₄	27140	20434	-25%	(= decrease)		
1A	Mobile combustion: road vehicles	N ₂ O	341	583	5%	50%	50%	0.1%
1A	Emissions from stationary combustion: non-CO ₂	N ₂ O	208	223	2%	50%	50%	0.1%
1A	Mobile combustion: other	N ₂ O	31	29	50%	100%	112%	0.0%
2X	Emissions from nitric acid production	N ₂ O	7029	6564	10%	50%	51%	1.5%
4B	Emissions from manure management	N ₂ O	205	189	10%	100%	100%	0.1%
4D	Direct N ₂ O emissions from agricultural soils	N ₂ O	5214	5518	10%	60%	61%	1.5%
4D	Indirect N ₂ O emissions from nitrogen used in agriculture	N ₂ O	1460	1460	50%	200%	206%	1.4%
6B	Emissions from wastewater handling	N ₂ O	126	194	20%	50%	54%	0.0%
7X	Polluted surface water	N ₂ O	1178	1178	50%	200%	206%	1.1%
7X	Misc. N ₂ O	N ₂ O	753	129	50%	50%	71%	0.0%
	TOTAL N₂O	N₂O	16544	16067	-3%	(= decrease)		
2X	HFC-23 emissions from HCFC-22 manufacture	HFC	5759	450	15%	25%	29%	0.1%
2X	Emissions from substitutes for ozone depleting substances (ODS substitutes): HFC	HFC	248	943	10%	50%	51%	0.2%
2X	HFC by-product emissions from HFC manufacture	HFC	12	192	10%	50%	51%	0.0%
2X	PFC emissions from aluminium production	PFC	1799	1320	5%	20%	21%	0.1%
2X	PFC emissions from PFC use	PFC	68	136	5%	25%	25%	0.0%
2X	SF ₆ emissions from SF ₆ use	SF ₆	275	296	100%	25%	103%	0.1%
	TOTAL F-gases	F-gases	8160	3337	-59%	(= decrease)		
	TOTAL CO₂-eq.	GHG	211107	219685	4.1%	increase		3.7%

Table A1.4(continued). Tier 1 trend uncertainty assessment 1990-2000 (for F-gases with base year 1995) with the categories of the IPCC potential key source list (without adjustment for correlations between sources)

IPCC	IPCC Source category	Gas	Type A sensitivity	Type B sensitivity	Uncertainty in trend in national emissions introduced by emission factor uncertainty	Uncertainty in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced into the trend in total national emissions	Emission factor quality indicator
1A	Emissions from stationary combustion : Energy Industries	CO ₂	4.3%	41%	0.1%	1.7%	1.7%	p.m.
1A	Emissions from stationary combustion : Other Sectors	CO ₂	-1.5%	23%	0.0%	1.0%	1.0%	p.m.
1A	Emissions from stationary combustion : Manufacturing Industries and Construction	CO ₂	-3.9%	16%	0.0%	0.7%	0.7%	p.m.
1A	Mobile combustion: road vehicles	CO ₂	2.1%	20%	0.0%	0.6%	0.6%	p.m.
1A	Emissions from iron and steel industry	CO ₂	-0.5%	4%	0.0%	0.2%	0.2%	p.m.
1A	Feedstock gas	CO ₂	-0.5%	3%	0.0%	0.2%	0.2%	p.m.
1A	Feedstock oil	CO ₂	0.6%	2%	0.3%	0.7%	0.8%	p.m.
1A	Mobile combustion: other	CO ₂	-0.1%	2%	0.0%	1.1%	1.1%	p.m.
1A	Mobile combustion: water-borne navigation	CO ₂	0.0%	1%	0.0%	0.9%	0.9%	p.m.
1A	Feedstock coal	CO ₂	-0.1%	0%	0.0%	0.0%	0.0%	p.m.
1A	Mobile combustion: aircraft	CO ₂	-0.2%	0%	0.0%	0.1%	0.1%	p.m.
2X	Other industrial: CO ₂	CO ₂	-0.1%	1%	0.0%	0.2%	0.2%	p.m.
2X	Emissions from cement production	CO ₂	0.0%	0%	0.0%	0.0%	0.0%	p.m.
7X	Misc. CO ₂	CO ₂	0.1%	1%	0.1%	0.3%	0.3%	p.m.
	TOTAL CO₂	CO₂					3%op. in trend of 9	
1A	Emissions from stationary combustion: non-CO ₂	CH ₄	0.8%	2%	0.4%	0.1%	0.4%	p.m.
1A	Mobile combustion: road vehicles	CH ₄	-0.1%	0%	-0.1%	0.0%	0.1%	p.m.
1A	Mobile combustion: other	CH ₄	0.0%	0%	0.0%	0.0%	0.0%	p.m.
1B	Fugitive emissions from oil and gas operations: gas production	CH ₄	-0.5%	5%	-0.1%	0.1%	0.1%	p.m.
1B	Fugitive emissions from oil and gas operations: gas distribution	CH ₄	0.5%	5%	0.3%	0.3%	0.4%	p.m.
1B	Fugitive emissions from oil and gas operations: other	CH ₄	-0.1%	0%	0.0%	0.1%	0.1%	p.m.
2X	Other industrial: CH ₄	CH ₄	-0.1%	0%	0.0%	0.0%	0.0%	p.m.
4A	CH ₄ emissions from enteric fermentation in domestic livestock: cattle	CH ₄	1.0%	22%	0.2%	1.6%	1.6%	p.m.
4A	CH ₄ emissions from enteric fermentation in domestic livestock: swine	CH ₄	0.3%	2%	0.2%	0.1%	0.2%	p.m.
4A	CH ₄ emissions from enteric fermentation in domestic livestock: sheep	CH ₄	0.0%	1%	0.0%	0.1%	0.1%	p.m.
4A	CH ₄ emissions from enteric fermentation in domestic livestock: other	CH ₄	0.2%	0%	0.1%	0.0%	0.1%	p.m.
4B	Emissions from manure management : swine	CH ₄	0.3%	3%	0.3%	0.4%	0.5%	p.m.
4B	Emissions from manure management : cattle	CH ₄	0.4%	3%	0.4%	0.4%	0.6%	p.m.
4B	Emissions from manure management : poultry	CH ₄	0.1%	1%	0.1%	0.1%	0.1%	p.m.
4B	Emissions from manure management : other	CH ₄	0.0%	0%	0.0%	0.0%	0.0%	p.m.
6A	CH ₄ emissions from solid waste disposal sites	CH ₄	-2.6%	30%	-0.8%	6.4%	6.4%	p.m.
6B	Emissions from wastewater handling	CH ₄	-0.3%	0%	-0.1%	0.0%	0.1%	p.m.
7X	Misc. CH ₄	CH ₄	0.0%	0%	0.0%	0.0%	0.0%	p.m.
	TOTAL CH₄	CH₄					7%op. in trend of -2	
1A	Mobile combustion: road vehicles	N ₂ O	1.5%	4%	0.8%	0.2%	0.8%	p.m.
1A	Emissions from stationary combustion: non-CO ₂	N ₂ O	0.1%	1%	0.1%	0.0%	0.1%	p.m.
1A	Mobile combustion: other	N ₂ O	0.0%	0%	0.0%	0.1%	0.1%	p.m.
2X	Emissions from nitric acid production	N ₂ O	-1.6%	40%	-0.8%	5.6%	5.7%	p.m.
4B	Emissions from manure management	N ₂ O	-0.1%	1%	-0.1%	0.2%	0.2%	p.m.
4D	Direct N ₂ O emissions from agricultural soils	N ₂ O	2.7%	33%	1.6%	4.7%	5.0%	p.m.
4D	Indirect N ₂ O emissions from nitrogen used in agriculture	N ₂ O	0.3%	9%	0.5%	6.2%	6.3%	p.m.
6B	Emissions from wastewater handling	N ₂ O	0.4%	1%	0.2%	0.3%	0.4%	p.m.
7X	Polluted surface water	N ₂ O	0.2%	7%	0.4%	5.0%	5.1%	p.m.
7X	Misc. N ₂ O	N ₂ O	-3.6%	1%	-1.8%	0.6%	1.9%	p.m.
	TOTAL N₂O	N₂O					11 %op. in trend of -:	
2X	HFC-23 emissions from HCFC-22 manufacture	HFC	-23.2%	6%	-5.8%	1.2%	5.9%	p.m.
2X	Emissions from substitutes for ozone depleting substances (ODS substitutes): HFC	HFC	10.3%	12%	5.2%	1.6%	5.4%	p.m.
2X	HFC by-product emissions from HFC manufacture	HFC	2.3%	2%	1.1%	0.3%	1.2%	p.m.
2X	PFC emissions from aluminium production	PFC	7.1%	16%	1.4%	1.1%	1.8%	p.m.
2X	PFC emissions from PFC use	PFC	1.3%	2%	0.3%	0.1%	0.4%	p.m.
2X	SF ₆ emissions from SF ₆ use	SF ₆	2.2%	4%	0.6%	5.1%	5.2%	p.m.
	TOTAL F-gases	F-gases					10%op. in trend of -4	
	TOTAL CO₂-eq.	GHG					3% unc. In 4.1 %	

Note: Sensitivity values refer to the trend in total CO₂-equivalent emissions. The trend uncertainties per gas included in the sheet were calculated with different, gas-specific sensitivity values. For CO₂ from fossil fuel we used the CO₂ data from the IPCC Reference Approach, including feedstock data (adjusted to match the total in the National Approach), combined with transport data.

Table A1.5. Source ranking using IPCC Tier 2 level assessment 2001 (amounts in Gg CO₂-eq.)

IPCC	Category	Gas	CO ₂ -eq		Uncertainty	Level *	Cumulative
			2001	Share	estimate	Uncertainty	total
4D	Direct N ₂ O emissions from agricultural soils	N ₂ O	5518	3%	61%	1.5%	3%
2X	Emissions from nitric acid production	N ₂ O	6564	3%	51%	1.5%	5%
4D	Indirect N ₂ O emissions from nitrogen used in agriculture	N ₂ O	1460	1%	206%	1.4%	6%
6A	CH ₄ emissions from solid waste disposal sites	CH ₄	8181	4%	34%	1.2%	10%
7X	Polluted surface water	N ₂ O	1178	1%	206%	1.1%	10%
1A	Emissions from stationary combustion : Energy Industries	CO ₂	64776	29%	4%	1.1%	40%
1A	Feedstock oil	CO ₂	3902	2%	54%	1.0%	42%
4A	CH ₄ emissions from enteric fermentation in domestic livestock: cattle	CH ₄	6054	3%	21%	0.6%	44%
1A	Mobile combustion: other	CO ₂	2458	1%	50%	0.6%	46%
1A	Emissions from stationary combustion : Other Sectors	CO ₂	36126	16%	3%	0.5%	62%
1A	Mobile combustion: water-borne navigation	CO ₂	969	0%	100%	0.4%	62%
1A	Mobile combustion: road vehicles	CO ₂	31984	15%	3%	0.4%	77%
4B	Emissions from manure management : swine	CH ₄	848	0%	100%	0.4%	77%
7X	Misc. CO ₂	CO ₂	1579	1%	54%	0.4%	78%
4B	Emissions from manure management : cattle	CH ₄	803	0%	100%	0.4%	78%
1A	Emissions from stationary combustion : Manufacturing Industries and Construction	CO ₂	25027	11%	3%	0.4%	90%
1B	Fugitive emissions from oil and gas operations: gas distribution	CH ₄	1287	1%	50%	0.3%	90%
1A	Feedstock gas	CO ₂	4664	2%	11%	0.2%	93%
2X	Emissions from substitutes for ozone depleting substances (ODS substitutes): HFC	HFC	943	0%	51%	0.2%	93%
1B	Fugitive emissions from oil and gas operations: gas production	CH ₄	1454	1%	25%	0.2%	94%
1A	Emissions from stationary combustion: non-CO ₂	CH ₄	638	0%	50%	0.1%	94%
2X	SF ₆ emissions from SF ₆ use	SF ₆	296	0%	103%	0.1%	94%
1A	Mobile combustion: road vehicles	N ₂ O	583	0%	50%	0.1%	94%
2X	PFC emissions from aluminium production	PFC	1320	1%	21%	0.1%	95%
1A	Emissions from iron and steel industry	CO ₂	6196	3%	4%	0.1%	98%
2X	Other industrial: CO ₂	CO ₂	1124	1%	21%	0.1%	98%
4A	CH ₄ emissions from enteric fermentation in domestic livestock: swine	CH ₄	412	0%	50%	0.1%	98%
4B	Emissions from manure management	N ₂ O	189	0%	100%	0.1%	99%
4B	Emissions from manure management : poultry	CH ₄	182	0%	100%	0.1%	99%
2X	HFC-23 emissions from HCFC-22 manufacture	HFC	450	0%	29%	0.1%	99%
1A	Emissions from stationary combustion: non-CO ₂	N ₂ O	223	0%	50%	0.1%	99%
6B	Emissions from wastewater handling	N ₂ O	194	0%	54%	0.0%	99%
1A	Mobile combustion: aircraft	CO ₂	197	0%	50%	0.0%	99%
2X	HFC by-product emissions from HFC manufacture	HFC	192	0%	51%	0.0%	99%
7X	Misc. N ₂ O	N ₂ O	129	0%	71%	0.0%	99%
4A	CH ₄ emissions from enteric fermentation in domestic livestock: sheep	CH ₄	218	0%	30%	0.0%	99%
2X	Emissions from cement production	CO ₂	437	0%	11%	0.0%	100%
1A	Mobile combustion: road vehicles	CH ₄	81	0%	60%	0.0%	100%
1A	Feedstock coal	CO ₂	408	0%	11%	0.0%	100%
1B	Fugitive emissions from oil and gas operations: other	CH ₄	79	0%	54%	0.0%	100%
2X	PFC emissions from PFC use	PFC	136	0%	25%	0.0%	100%
1A	Mobile combustion: other	N ₂ O	29	0%	112%	0.0%	100%
4A	CH ₄ emissions from enteric fermentation in domestic livestock: other	CH ₄	83	0%	30%	0.0%	100%
4B	Emissions from manure management : other	CH ₄	23	0%	100%	0.0%	100%
2X	Other industrial: CH ₄	CH ₄	30	0%	51%	0.0%	100%
7X	Misc. CH ₄	CH ₄	39	0%	32%	0.0%	100%
1A	Mobile combustion: other	CH ₄	7	0%	112%	0.0%	100%
6B	Emissions from wastewater handling	CH ₄	16	0%	32%	0.0%	100%

Table A1.6. Source ranking using IPCC Tier 2 trend assessment (in Gg CO₂-eq.)

IPCC	Category	Gas	CO ₂ -eq		Level	Level	Trend	% Contr.	Trend *	% Contr. to	Cumulative
			1990	2001	assessment	assessment					
					90/95	2001	assessment	to trend	Uncertainty	trend	total
1A	Emissions from stationary combustion : Energy Industries	CO ₂	51305	64776	24%	29%	5.0%	28%	1.4%	56%	56%
1A	Mobile combustion: road vehicles	CO ₂	25374	31984	12%	15%	2.4%	14%	0.3%	13%	69%
2X	HFC-23 emissions from HCFC-22 manufacture	HFC	5759	450	3%	0%	2.4%	13%	0.3%	13%	83%
6A	CH ₄ emissions from solid waste disposal sites	CH ₄	11802	8181	6%	4%	1.8%	10%	0.2%	7%	90%
1A	Emissions from stationary combustion : Manufacturing Industries and Construction	CO ₂	27711	25027	13%	11%	1.7%	9%	0.2%	6%	96%
4A	CH ₄ emissions from enteric fermentation in domestic livestock: cattle	CH ₄	7678	6054	4%	3%	0.8%	5%	0.0%	2%	98%
1A	Feedstock oil	CO ₂	2549	3902	1%	2%	0.5%	3%	0.0%	1%	99%
2X	Emissions from nitric acid production	N ₂ O	7029	6564	3%	3%	0.3%	2%	0.0%	0%	99%
1B	Fugitive emissions from oil and gas operations: gas production	CH ₄	2097	1454	1%	1%	0.3%	2%	0.0%	0%	99%
2X	Emissions from substitutes for ozone depleting substances (ODS substitutes): HFC	HFC	248	943	0%	0%	0.3%	2%	0.0%	0%	99%
7X	Misc. N ₂ O	N ₂ O	753	129	0%	0%	0.3%	2%	0.0%	0%	99%
1A	Emissions from stationary combustion : Other Sectors	CO ₂	34179	36126	16%	16%	0.2%	1%	0.0%	0%	100%
2X	PFC emissions from aluminium production	PFC	1799	1320	1%	1%	0.2%	1%	0.0%	0%	100%
7X	Misc. CO ₂	CO ₂	1189	1579	1%	1%	0.1%	1%	0.0%	0%	100%
1A	Feedstock gas	CO ₂	4805	4664	2%	2%	0.1%	1%	0.0%	0%	100%
1A	Mobile combustion: aircraft	CO ₂	492	197	0%	0%	0.1%	1%	0.0%	0%	100%
1A	Emissions from iron and steel industry	CO ₂	6255	6196	3%	3%	0.1%	1%	0.0%	0%	100%
1B	Fugitive emissions from oil and gas operations: gas distribution	CH ₄	1524	1287	1%	1%	0.1%	1%	0.0%	0%	100%
1A	Mobile combustion: road vehicles	N ₂ O	341	583	0%	0%	0.1%	1%	0.0%	0%	100%
4B	Emissions from manure management : swine	CH ₄	1033	848	0%	0%	0.1%	1%	0.0%	0%	100%
1A	Feedstock coal	CO ₂	569	408	0%	0%	0.1%	0%	0.0%	0%	100%
2X	HFC by-product emissions from HFC manufacture	HFC	12	192	0%	0%	0.1%	0%	0.0%	0%	100%
4B	Emissions from manure management : cattle	CH ₄	905	803	0%	0%	0.1%	0%	0.0%	0%	100%
6B	Emissions from wastewater handling	CH ₄	138	16	0%	0%	0.1%	0%	0.0%	0%	100%
2X	Other industrial: CO ₂	CO ₂	1181	1124	1%	1%	0.0%	0%	0.0%	0%	100%
4D	Direct N ₂ O emissions from agricultural soils	N ₂ O	5214	5518	2%	3%	0.0%	0%	0.0%	0%	100%
1A	Mobile combustion: road vehicles	CH ₄	158	81	0%	0%	0.0%	0%	0.0%	0%	100%
4A	CH ₄ emissions from enteric fermentation in domestic livestock: sheep	CH ₄	286	218	0%	0%	0.0%	0%	0.0%	0%	100%
2X	PFC emissions from PFC use	PFC	68	136	0%	0%	0.0%	0%	0.0%	0%	100%
6B	Emissions from wastewater handling	N ₂ O	126	194	0%	0%	0.0%	0%	0.0%	0%	100%
4D	Indirect N ₂ O emissions from nitrogen used in agriculture	N ₂ O	1460	1460	1%	1%	0.0%	0%	0.0%	0%	100%
1B	Fugitive emissions from oil and gas operations: other	CH ₄	133	79	0%	0%	0.0%	0%	0.0%	0%	100%
1A	Emissions from stationary combustion: non-CO ₂	CH ₄	557	638	0%	0%	0.0%	0%	0.0%	0%	100%
1A	Mobile combustion: water-borne navigation	CO ₂	877	969	0%	0%	0.0%	0%	0.0%	0%	100%
7X	Polluted surface water	N ₂ O	1178	1178	1%	1%	0.0%	0%	0.0%	0%	100%
4A	CH ₄ emissions from enteric fermentation in domestic livestock: other	CH ₄	37	83	0%	0%	0.0%	0%	0.0%	0%	100%
4A	CH ₄ emissions from enteric fermentation in domestic livestock: swine	CH ₄	438	412	0%	0%	0.0%	0%	0.0%	0%	100%
4B	Emissions from manure management : poultry	CH ₄	216	182	0%	0%	0.0%	0%	0.0%	0%	100%
2X	Other industrial: CH ₄	CH ₄	69	30	0%	0%	0.0%	0%	0.0%	0%	100%
4B	Emissions from manure management	N ₂ O	205	189	0%	0%	0.0%	0%	0.0%	0%	100%
2X	Emissions from cement production	CO ₂	400	437	0%	0%	0.0%	0%	0.0%	0%	100%
1A	Mobile combustion: other	CO ₂	2378	2458	1%	1%	0.0%	0%	0.0%	0%	100%
2X	SF ₆ emissions from SF ₆ use	SF ₆	275	296	0%	0%	0.0%	0%	0.0%	0%	100%
1A	Emissions from stationary combustion: non-CO ₂	N ₂ O	208	223	0%	0%	0.0%	0%	0.0%	0%	100%
7X	Misc. CH ₄	CH ₄	43	39	0%	0%	0.0%	0%	0.0%	0%	100%
1A	Mobile combustion: other	N ₂ O	31	29	0%	0%	0.0%	0%	0.0%	0%	100%
4B	Emissions from manure management : other	CH ₄	19	23	0%	0%	0.0%	0%	0.0%	0%	100%
1A	Mobile combustion: other	CH ₄	8	7	0%	0%	0.0%	0%	0.0%	0%	100%

ANNEX 2: Detailed discussion of methodology and data for estimating CO₂ emissions from fossil fuel combustion

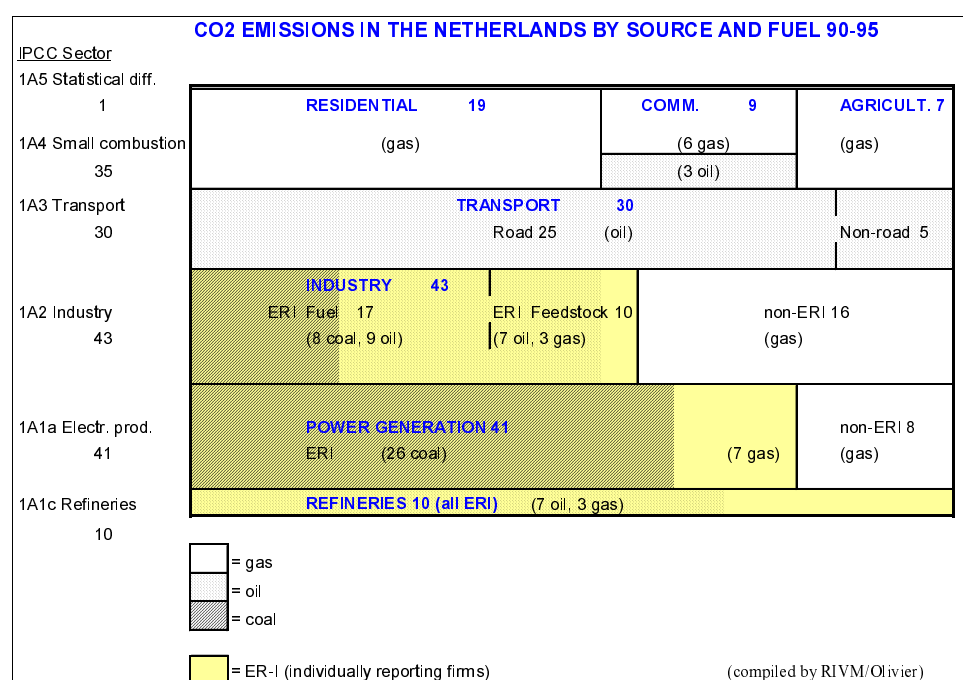
2.1 Estimation of actual final fossil-fuel related CO₂ emissions from fuel combustion (including non-energy use)

The general methodology for calculating emissions to air and water in the Netherlands' *Emission Registration* is described in Van der Most *et al.* (1998) [in Dutch]. The methodology for calculating emissions of greenhouse gases is described in more detail in Spakman *et al.* (1997) [in Dutch] of which an electronic update is available in Dutch and in English (Spakman *et al.* (2003). The description provided in this Annex aims at reflecting better the IPCC source structure (IPCC, 1997) and methodological issues raised in the *Good Practice Guidance* report

Carbon dioxide emissions are mainly caused by the combustion of fuel and are calculated on the basis of detailed energy statistics and carbon content of the energy carriers. A distinction is made between:

1. stationary combustion of fossil fuels;
2. mobile combustion sources;
3. non-energy/feedstock use of fuels;
4. waste incineration (fossil component).

Emissions from public electricity production, refineries, large industries and waste incineration are for about 75% directly reported by the individual companies in their annual environmental report (see *Figure A2.1*). This part of the PER is called 'ER-I'. For these sectors, the remainder of the emissions is calculated on the basis of calculated remaining fuel consumption (difference of national energy statistics for the sector and energy consumption reported by these large companies) and standard emission factors. In some cases this may lead to negative corrections, for example in cases where firms include fuel consumption due to cogeneration, whereas this energy consumption in national statistics is not reported under industry but under another category (local cogeneration).



*Figure A2.1. Schematic overview of CO₂ emissions from fuel combustion (Tg) (IPCC category 1A), showing the relative shares of subsectors as well as main fuel types and the total contribution of individually reporting firms (ER-I). Data are representative for the period 1990 to 1995 (source: Van Amstel *et al.*, 2000a)*

In addition, per economic subsector the total CO₂ emissions reported by these *individual companies* are compared with the amount calculated with the standard Netherlands' emission factors for CO₂ (Table A2.1). If the difference is more than 5%, then these large deviations are corrected to a maximum deviation of 5% via modification of the remaining energy consumption used for additional estimate of CO₂ emissions for non-ER-I-reporting firms within the *Target Group*. This procedure is followed because in those cases it is implicitly assumed that the submitted fuel consumption data are incorrect and because the PER is not allowed to revise individually reported emissions figures. This ensures that total CO₂ emissions per industrial sub-sector cannot deviate from the reference calculation by more than 5% (in practice, the group total may show less deviation).

For national policy purposes, emissions from *road transport* are in general calculated from transport statistics on vehicle-km. The means that for road transport CO₂ emissions are first calculated in the national approach from energy consumption derived from transport statistics in terms of vehicle-km and assumptions for fuel efficiency per vehicle-km travelled. However, since the *Revised IPCC Guidelines* ask countries to report greenhouse gas emissions from combustion on the basis of fuel consumption within the national territory, a correction was made to convert emissions related to vehicle-km to emissions related to statistics for fuel sales. Thus, next, to meet the IPCC definition for CO₂, CH₄ and N₂O emissions from this source category, the amounts of fuel consumption in the national approach are scaled, per fuel type, to match the statistics for fuel supply to fuelling stations included in the national energy balance. For more details on the actual differences between these two approaches see Section 3.2.3. (Emissions of all other compounds, including ozone precursors and SO₂, which are more directly involved in air quality, are therefore calculated using traffic activity data without subsequently correcting to match with fuel supply statistics).

Table A2.1. Default CO₂ emission factors used for calculation of sectoral emissions in the Netherlands

	Carbon content (%)	Lower Heating Value (GJ/ton)	Emission factor (gram CO ₂ /kg or /m ³)	Emission factor (kg CO ₂ /GJ)
Hard coal				
Residential	90	32.0	3300	103
Metal industry	74	27.0	2720	101
Other activities ¹	69	27.0	2540	94
Coke	84	28.5	3080	103
Petroleum cokes	99	35.2	3630	103
Brown coal	58	21.0	2130	101
Wood, fuelwood		15.5	1610	104
Residential waste		10.5	780	74
Petrol ²	86	44.0	3180	73 ³
Diesel ²	86	42.7	3130	73
Petroleum	87	43.1	3190	73
H.B.O. I	86	42.7	3130	73
H.B.O. II	86	42.7	3130	73
Heavy fuel oil (HFO)	86	41.0	3160	77
Natural gas	58	31.65	1768	56
LPG ²	82	45.2	3000	66
Coke oven gas		19.7	870	44
Refinery gas: general		38.1	1676	46
Refinery gas: other		31.65	2109	46
Blast furnace gas				200

Source: Spakman *et al.* (2003)

¹⁾ Including public power plants.

²⁾ For domestic mobile sources emission factors with 3 digits are used: 72.3 for petrol, 73.3 for diesel and 66.4 for LPG.

³⁾ Should be 72 (rounded), but all emission factors for oil products were set to one single value, except for HFO, in view of the uncertainty in the energy data. See also note 2 on mobile sources.

For the calculation of the *carbon storage* in the *IPCC Reference Approach* for CO₂, carbon storage fractions in products like plastics and bitumen were taken from an analysis of petrochemical products, half products and feedstock use (of energy carriers) by Gielen (1996). The CO₂ emissions reported under combustion by the manufacturing industries include a substantial amount of CO₂ associated with non-stored carbon in non-energy applications of gas, oil products and cokes (of the order of 10 Mton of a total of around 43 Mton). Some 18 Mton is calculated as stored (i.e. not emitted) carbon, with a fixed storage fraction per energy carrier used for non-energy purposes (*Table A2.2*). This reference calculation is also used to calculate the remainder of feedstock emissions in case total CO₂ from feedstocks reported by the chemical industry is less than the reference value. In addition, carbon dioxide emissions are calculated for fossil fuel related carbon (e.g. plastics) in incinerated waste. These account for about 1 Mton of CO₂, annually.

Table A2.2. Carbon storage fractions for energy carriers used as chemical feedstock (constant for all years)

Energy carrier	1990
Naphtha	0.82
Lubricants	0.00
Bitumen	1.00
Coal Oils and Tars (from Coking Coal)	1.00
Natural Gas	0.10
Gas/Diesel Oil	0.82
LPG	0.82
Butane	0.00
Ethane	0.00
Coal/lignite	0.00
Coke	0.00
Aromates/light oils/other oil products	0.82
Other kerosine	0.82
Residual fuel oil	0.82

Source: Gielen (1996).

Note: The fraction used for all oil products is the weighted average of fractions determined for individual oil products (Spakman *et al.*, 2003).

Fossil-based CO₂ emissions from *waste incineration* are calculated from the total amount of waste that is incinerated, split into 8 waste types, each with a specific carbon content and fraction of fossil C in total C, based on an analysis by De Jager and Blok (1993). In recent years this amounted about 2 Mton).

The fuel use related to *statistical differences* is still included as a source of CO₂ for 1991-1994, since it was assumed that the associated fuel use is real and not accounted for in individual end-use sectors. Per energy carrier, however, the difference may vary both in sign and size, as is shown in *Table 8.14. Statistics Netherlands* (CBS) has revised in the national energy balances the method for establishing the statistical difference between the apparent national energy consumption (indigenous production + import - export - bunkers ± stock change) and the bottom-up sum of all sectoral energy use. The statistical difference was eliminated for all years from 1990 onwards, except for 1991-1994, through incorporation of (formerly remaining) differences into other parts of the energy balance (see Section 3.2.5 for more details). Since the energy balances 1991-1994 have not been revised, it is not possible to provide a consistent time series for this 'source category' for the whole period 1990-2000.

Finally, for domestic environmental policy purposes a *temperature correction* of fuel use for space heating is applied, but only to CO₂ emissions from natural gas consumption. The restriction to natural gas is because this is by far the dominant fuel type for space heating (see *Figure A2.1*). A description of this method is given in *Annex 2.2*.

Estimating preliminary emissions for year ‘t-1’

The methods to calculate preliminary emissions for the year $t-1$ are different from those described above, due to absence or limited data from individual firms and incomplete energy statistics. For example, in May 2002 combustion emissions for 2001 were calculated using energy statistics for the first three quarters of 2001 supplemented by the statistics of the last quarter of 2000 as a proxy for the unavailable data for the last quarter of 2001. Details are provided in the meta-information files (TNO, 2003).

In some cases this may result in an underestimate of fuel consumption, in other cases, e.g. when the weather in the last quarters of 2000 and in 2001 were markedly different, in an under- or overestimate for the ‘*Other sectors*’. Although the total number of so-called heating degree days in 2000 and 2001 are almost equal, this is not necessarily also the case for the last quarter of these years.

However, for the subsectors basic metal industry, public power generation and refineries the 2001/2000 trend in fuel consumption could be estimated from already available data from annual environmental reports of individual companies (Koch *et al.*, 2002).

2.2 Temperature correction for CO₂ from energy consumption for space heating

A significant part of the energy consumption in the Netherlands is used for space heating. Despite the moderate sea climate, the energy consumption in cold winters is substantially higher than in mild winters, leading to a disturbance in the CO₂ trend of up to 4%. For domestic policy purposes, however, it is desirable to separate these climatic disturbances from fluctuations in CO₂ emissions due to other causes like economic developments, efficiency improvements and policy measures. Therefore, in order to enable an accurate monitoring of the effectiveness of policy instruments, the Netherlands' CO₂ emissions are corrected for outside temperature variations using a method described in Spakman *et al.* (1997) and outlined below. For other greenhouse gases, the contribution from energy consumption is much less than in the case of CO₂; the uncertainty of emission estimates for these gases is also much larger than for CO₂. Therefore no temperature correction is carried out for non-CO₂ gases. The calculation is described in detail below.

Limitation to natural gas

Nearly all the space heating in the Netherlands is done with natural gas. Thus, only natural gas consumption is corrected for outside temperature variations.

Correction formula

The temperature correction requires two multiplication factors, one for each economic sector:

- the *Heating-Degree Day (HDD) correction factor* G_T
- the *sector-specific application factor* T_S .

The total *correction factor* for gas consumption in space heating of a sector S in year T is calculated by multiplying the HDD correction factor G_T in year T by the sectoral application factor T_S . To give corrected energy consumption as:

$$\text{Gas consumption (year T, sector S)}_{\text{corrected}} = \text{Gas consumption (year T, sector S)}_{\text{uncorrected}} * G_T * T_S$$

The *Heating-Degree Day correction factor* for a specific year is defined as the ratio of the number of Heating-Degree Days (HDDs) of a 'normal' year (defined as a 30-year moving average, i.e. the HDD average of the number of HDD of the previous 30 years) to the *actual* number of HDD in the year for which the correction factor is calculated. For a relatively warm year (i.e. compared to the previous 30 years), the HDD correction factor is larger than 1. Subsequently, energy consumption and related emissions are increased to arrive at the temperature-corrected values [so-called 'addition factor' = (1- HDD correction factor) > 0]. The calculated numbers of HDDs of a 'normal' year are presented in *Table A.4.1* for the period 1970-1996.

Calculation of Heating-Degree Days

The *number of Heating-Degree Days (HDD)* daily is calculated uniformly for the Netherlands as a whole on the basis of the temperature record of one centrally located station, *De Bilt*. Thus, no regional calculations are carried out. Indoor space heating is assumed to take place when outdoor temperatures are below 18° C. The number of HDDs for a specific day is defined as the number of degrees Celsius of the mean daily temperature below the 18° C threshold. If, for example, the mean daily temperature for a specific day is 12° C, the number of HDDs for that day is 18-12 = 6. For a normal year the total number of HDD is about 3200; for a calendar year with relatively cold winter months, it is higher (e.g. 3717 in 1963) and for years with relatively warm winter months, it is lower (e.g. 2677 in 1990). The total annual

number of HDDs is calculated by EnergieNed using data on mean daily temperature provided by the *Royal Netherlands Meteorological Institute* (KNMI) (see *Table A.4.1*).

For the sake of simplicity, unweighted HDDs are used, i.e. when daily mean temperatures are the same, no correction is carried out of the observed difference in consumer behaviour of less daily fuel consumption for space heating in autumn and spring compared with daily consumption in winter months. This has the advantage that calculations can be performed on the basis of total annual, in preference to monthly, figures for both HDD and gas consumption.

Table A.4.1. Annual number of Heating-Degree Days (HDD), 30-year moving average for normal number of HDDs and the HDD correction factor for the period 1970-2001 based on weather statistics for De Bilt

Year	Actual number of HDD	30-year 'normal' HDD	HDD correction factor	Year	Actual number of HDD	30-year 'normal' HDD	HDD correction factor
1970	3295	3250	0.986	1986	3333	3228	0.969
1971	3133	3239	1.034	1987	3372	3219	0.955
1972	3379	3228	0.955	1988	2823	3231	1.144
1973	3234	3221	0.966	1989	2729	3219	1.179
1974	3033	3226	1.046	1990	2677	3211	1.199
1975	3083	3221	1.045	1991	3163	3198	1.011
1976	3097	3225	1.041	1992	2829	3203	1.132
1977	2997	3218	1.074	1993	3076	3177	1.033
1978	3304	3209	0.971	1994	2835	3156	1.113
1979	3476	3217	0.926	1995	2917	3140	1.076
1980	3301	3235	0.980	1996	3504	3123	0.891
1981	3244	3238	0.998	1997	2929	3135	1.070
1982	3005	3244	1.080	1998	2821	3133	1.111
1983	2999	3232	1.078	1999	2676	3118	1.165
1984	3177	3229	1.016	2000	2659	3098	1.165
1985	3487	3226	0.925	2001	2880	3076	1.068

Source: EnergieNed, 1995 (pers. comm.) and www.energiened.nl

Definition of normal Heating-Degree Days

The number of HDD for a 'normal' year T is defined as the average number of HDDs of the *previous* 30 years. This 30-year moving average has been selected in preference to a fixed reference year (e.g. the 30-year average of the period 1961-1990) to be able to account - and thus to correct - for trends in daily temperatures (i.e. caused by climatic changes).

Compared to this moving average, winters in the Netherlands have in recent years been getting milder. From 1990 to 1995 and 1997 to 2000 each winter was milder than the average of the previous 30 years, thus making the HDD correction factor >1 for these years. The winter of 1996 was relatively cold. The moving 30-year average number of HDDs decreased by 3.5%, from 3231, to 3098 between 1990 and 2000 not only as a result by the relatively mild winters of recent years shifting into the 30-year average, but also due to shifting from the moving average of cold winters, e.g. those of 1962-1963.

Fraction of energy consumption used for space heating

The application factor for a specific sector (e.g. residential dwellings or the service sector) is defined as the fraction of fuel consumption of the space heating sector. This fraction has been derived from data provided by the Ministry of Economic Affairs for 1989 and 1991. However, the application factor may change in the course of time due to the increasing number of dwellings to which insulation measures are applied and to increasing or decreasing amounts of fuel used for other applications than space heating (e.g. cooking and hot-water supply for showers and baths). In the residential sector the space heating share in total gas consumption has also been observed to decrease, from 88% in 1980 to 76% in 2000. Therefore an application factor has been calculated for this sector by EnergieNed on an annual basis and annually reported in its 'Monitoring report of gas consumption of small users' [BAK] (EnergieNed, several years) (see *Table A.4.3*). Other sectors use fixed application factors provided by the Ministry of Economic Affairs (see *Table A.4.2*) (Wieleman, 1994).

Table A.4.2. Sectoral application factors

Sector	Application factor
Agriculture	0.825
Commercial and public services	0.825
Industry (average)	0.16
Basic industry	0.10
Light industry	0.50
Energy	0.05

Source: EZ, CBS.

Table A.4.3. Application factors for dwellings for the years 1980-1985 and 1990-2001

	1980	1985	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Residential sector	0.88	0.87	0.80	0.80	0.78	0.77	0.77	0.76	0.80	0.79	0.78	0.76	0.76	0.77

Source: EnergieNed, 1995-2001

Example calculation of temperature correction in 1990

As an example in Table A.4.4 the calculation of the temperature correction of sectoral CO₂ emissions for 1990 has been summarised. In addition, Table A.4.5 presents the variation of this correction over the last ten years, showing that in this period a difference up to 10 Mton occurs between the maximum and the minimum correction.

Table A.4.4. Example of temperature correction of energy consumption and CO₂ emissions in 1990 (using an emission factor for CO₂ from natural gas of 0.056 Tg/PJ)

	A	B	C	D = B * (C-1)	E = D * A	F = 0.056 * E
Sector	Gas consumption uncorrected [PJ]	Application factor	HDD correction factor	Addition factor	Correction of gas consumption [PJ]	Correction of CO ₂ emissions [Tg]
Agriculture	129	0.825	1.199	0.164	+ 21.1	+ 1.18
Industry	430	0.16	1.199	0.032	+ 13.8	+ 0.77
Services	137	0.825	1.199	0.164	+ 22.5	+ 1.26
Energy sector	278	0.05	1.199	0.010	+ 2.8	+ 0.16
Residential	329	0.79	1.199	0.157	+ 51.7	+ 2.90
Total	1303				+ 111.9	+ 6.27

Source: Spakman *et al.* (1997). Please note that due to elimination of the statistical differences in the energy balances gas consumption figures, and thus CO₂ related temperature correction, has changed somewhat.

Table A.4.5. Temperature correction of carbon dioxide emissions per sector 1990-2000 (in Gg)

Source category	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
1A1a Energy sector	160	10	110	30	110	80	-120	60	140	210	210	90
1A2 Industry	770	50	450	120	400	290	-300	160	400	590	590	230
1A4a Commercial and public services	1000	80	900	240	800	540	-930	510	760	1000	1190	610
1A4b Residential sector	2950	180	2020	510	1670	1200	-2020	1120	1550	2290	2330	1010
1A4c Agriculture	1350	70	840	220	760	490	-880	490	670	950	960	390
Total CO₂ correction	6230	390	4320	1120	3740	2600	-4250	2340	3520	5040	5270	2320
<i>As % of uncorrected national total</i>	<i>3.9%</i>	<i>0.2%</i>	<i>2.6%</i>	<i>0.7%</i>	<i>2.2%</i>	<i>1.5%</i>	<i>-2.4%</i>	<i>1.4%</i>	<i>2.0%</i>	<i>3.0%</i>	<i>3.1%</i>	<i>1.3%</i>

Evaluation of the methodology

From *Table A.4.1* it can be observed that during the last years there has been a decreasing trend in the 30-year moving average used for the determination of the reference level of heating degree days. Other temperature correction methods sometimes use a fixed reference value for all years within a specific decade. The present temperature correction method has been evaluated with respect to parameters such as reference level, application fractions and threshold temperatures, however, final conclusions have not yet been drawn (Van Amstel *et al.*, 2000a).

ANNEX 3: Other detailed methodological descriptions for individual source or sink categories

3.1 Detailed methodological description for other sources

The general methodology for calculating emissions to air and water in the Netherlands' Emission Registration is described in Van der Most *et al.* (1998) [in Dutch]. The methodology for calculating emissions of greenhouse gases is described in more detail in Spakman *et al.* (1997) [in Dutch] of which an electronic update is available in Dutch and in English (Spakman *et al.* (2003). The description provided in this Annex aims at reflecting better the IPCC source structure (IPCC, 1997) and methodological issues discussed in the *IPCC Good Practice Guidance* report (IPCC, 2000).

Carbon dioxide emissions for non-fossil fuel sources

In the Netherlands the non-fossil, non-organic sources of CO₂ are the following:

- Gas flaring and venting at oil and gas production sites (category 1B2);
- Cement clinker production (category 2A);
- Lime production and consumption (category 2A);
- Flue gas desulphurisation (category 2G);
- Waste recycling activities (category 6D);
- Miscellaneous minor source: fireworks (category 7).

[Gas flaring and venting](#) emissions for 1990-1996 are provided through ER-I data; from 1997 emissions are calculated based on oil and gas production data and the emission factors per unit of oil and gas produced stemming from the 1996 dataset. The Netherlands imports a large part of [cement clinker used](#) for cement production. Therefore, associated CO₂ emissions are calculated based on domestic clinker production and reported through ER-I data. CO₂ from [lime production and use](#) are also included in the ER-I dataset. Emissions from [flue gas desulphurisation](#) units installed in public power plants are calculated from gypsum production and a fixed emission factor. More information on the methodologies and datasets used are provided in Spakman *et al.* (2003). Non-combustion emissions are also reported in ER-I from [waste recycling](#). Finally, CO₂ emissions from the use of [fireworks](#) are included as a minor miscellaneous source in the Netherlands inventory system, which is reported under category 7.

Methane

Methane emissions from [fuel combustion](#) are estimated using the energy statistics and emission factors from the annual *Emission Monitor* with figures provided by the Emission Registration system (PER). The largest fuel combustion subcategory is the residential sector, where emissions from cooking (including startup losses) and biofuel combustion are the largest sources. Road traffic emissions of CH₄ are calculated and reported according to the *Revised IPCC Guidelines* (i.e. initially based on vehicle-km, then calibrated to fuel supply statistics). For more details we refer to the description provided for CO₂. Fugitive methane [emissions from oil and gas](#) are estimated for onshore and offshore sites separately.

Methane from [agriculture](#) is estimated on the basis of emission factors developed in the methane background document by Van Amstel *et al.* (1993), and agricultural statistics for animal numbers and manure production from *Statistics Netherlands* (CBS). For dairy and non-dairy cattle the emission factors for enteric fermentation are based on an IPCC Tier 2 analysis made for the Netherlands cattle in 1990. For subsequent years, these emission factors are used, however, specific factors are applied to 4 and 3 subcategories within dairy and non-dairy cattle, respectively. The calculation of animal manure production and waste management systems is described in Van der Hoek (2002).

Methane emissions from [landfills](#) are calculated using a first order decomposition model (first order decay function) with annual input of the total amounts deposited and characteristics of the landfilled waste and the amount of landfill gas extracted. Parameter values used in the landfill emissions model are:

- fraction of Degradable Organic Carbon (DOC): decreases from 13% in 1990 to 12% in 2001;
- methane generation (i.e. decomposition) rate constant (k): 0.094 up to and including 1989, decreasing to 0.0693 in 1995 and constant thereafter; this corresponds to half-life times of 7.4 and 10 year, respectively;
- methane oxidation factor: 10%;
- fraction methane in landfill gas: 60%;
- fraction of DOC actually dissimilated (DOC_F): 0.58.

The change in DOC values is amongst others due to the prohibition of landfilling combustible wastes, whereas the change in k values is caused by a strong increase of the recycling of vegetable, fruit and garden waste in the early 1990s. The integration time for the emission calculation is for all years the period from 1945 to the year for which the calculation is made. A small source in the waste sector is [wastewater treatment](#). These emissions are very small because of the high fraction recovered (from 80% in 1990 to 98% at present).

A very small source identified in the Netherlands is [degassing of drinking water](#), which are reported in Sector 9. The reduced methane emissions from agricultural soils are regarded as 'natural' (non-anthropogenic) and are estimated on the basis of the methane background document (Van Amstel *et al.*, 1993). Since the IPCC methodology only considers CO₂ sinks, these reduced CH₄ emissions have been included in the 'natural emissions' total, although they act as a methane sink. Therefore, they are not reported as anthropogenic emissions under IPCC category 7. Other 'natural emissions' are methane emissions from wetlands and water.

Nitrous oxide

Nitrous oxide emissions from [fuel combustion](#) are estimated using the energy statistics and emission factors from the annual *Emission Monitor* with figures provided by the Emission Registration system (PER). The largest fuel combustion subcategory is road transport. Traffic emissions of N₂O are calculated and reported according to the *Revised IPCC Guidelines* (i.e. initially based on vehicle-km, then calibrated to fuel supply statistics); for more details we refer to the description provided for CO₂. For more details on the emission factors from road transport we refer to *Section 3.4*.

N₂O emissions from the [production of chemicals](#) include N₂O from nitric acid, acrylonitril and caprolactam production and solvents as reported by the manufacturing industry and included in the Netherlands' *Pollutant Emission Register* (PER) (Spakman *et al.*, 2003). It also includes N₂O emissions from product use comprise N₂O used as [anaesthesia](#) and as propelling agent in [aerosol cans](#).

The nitrous oxide emissions from [agriculture](#) are based on the methods described in the nitrous oxide background document by Kroeze (1994). The calculation of animal manure production and waste management systems is described in Van der Hoek (2002). Indirect N₂O emissions from atmospheric deposition are not yet estimated. Other indirect N₂O emissions are either included under '4.D Background agricultural soils' or as category 7 'Polluted surface water'. These 'background' emissions include N₂O emissions from cultivation of histosols and emissions from manure and fertiliser applications in the past. This is to reflect that agricultural soil emissions will not stop when agricultural activities are stopped. Also emissions are included from crop residues left in the field.

The latter [category 7 'Polluted surface water'](#) is a fixed value that comprises leaching and run-off from all anthropogenic activities, including human sewage. Since this figure includes more than only agriculture related emissions we do not report these under category 4.D but as a separate category '7'. N₂O emissions from human sewage are reported partly under category 6B 'Wastewater handling' and partly under category 7 as 'Polluted surface water'. For more details on the exact definition of these indirect N₂O source terms we refer to Spakman *et al.* (2003) or to Kroeze (1994).

HFCs, PFCs and SF₆

By-product HFC and PFC emissions from HCFC-22 production and primary aluminium production, respectively, are based on measured data reported by halocarbon producing companies. In addition, the halocarbon producers report handling emissions of HFCs.

Emissions from HFC and PFC consumption are calculated using Tier 2 methodologies as described by Matthijsen and Kroeze (1996).

Emissions of SF₆ are based on estimates of SF₆ consumption for the existing stock of Gas Insulated Switchgear (GIS) equipment, addition of new GIS equipment and manufacturing of GIS equipment, for semiconductor manufacture and for the production of SF₆ containing soundproof double glazed windows. The latter source has been included for 1995 onwards.

Estimating preliminary emissions for year 't-1'

The methods to calculate preliminary emissions for the year *t-1* are different from those described above, due to absence or limited data from individual firms and incomplete energy statistics. For example, in May 2002 combustion emissions for 2001 were calculated using energy statistics for the first three quarters of 2001 supplemented by the statistics of the last quarter of 2000 as a proxy for the unavailable data for the last quarter of 2001. Details are provided in the meta-information files (TNO, 2003).

In some cases this may result in an underestimate of fuel consumption, in other cases, e.g. when the weather in the last quarters of 2000 and in 2001 were markedly different, in an under- or overestimate for the 'Other sectors'. Although the total number of so-called heating-degree days in 2000 and 2001 are almost equal, this is not necessarily also the case for the last quarter of these years.

However, for the subsectors basic metal industry, public power generation and refineries the 2001/2000 trend in fuel consumption could be estimated from already available data from annual environmental reports of individual companies (Koch *et al.*, 2002).

3.2 Detailed methodological description of LUCF category 5A

For category 5A (*Changes in forest and other woody biomass stocks*) a complete forestry dataset for the whole period 1990-2000 has been compiled. The method and data sources used to estimate CO₂ removals as described in Spakman *et al.* (1997) have been refined and also completed for years not calculated so far (i.e. all years except 1990, 1994 and 1995). In this Annex the description of both methodology and data sources is provided, based on a more detailed assessment by Daamen (2002). In addition, we provide some information on LUCF studies that are still in progress.

The Netherlands' forests reported in the CRF under the header '*Temperate, other*' split into coniferous and broadleaf forest are the sum of exploited, non-exploited and other forests. In the CRF the group *non-forest trees* has been specified for trees in line, solitaires, urban parks, fruit trees (orchards) and nurseries. In the Netherlands trees are, on the average, getting older and heavier: the maturing of forests. Also, the total forest area is increasing because of forest expansion. Besides this growth, there are fellings that reduce woody livestock. The overall balance of these processes leads to a sink of carbon dioxide, which varies between 1.2 and 1.9 Tg CO₂ per year in the period 1990-2000. In the Netherlands, the carbon sink in biomass (IPCC category 5A) refers to the net growth of forests and other trees defined as volume increment minus volume of fellings. This is based on three key parameters: forest area (in ha), average annual growth by category (in m³/ha/year) and harvest by category (in m³/ha/year). No correction is made for the amount of fuelwood harvested, since this amount is implicitly included in these three variables.

For *forest area* (in ha) in the Netherlands the FAO definition of TFBRA2000 is used (ECE/FAO, 1997), with the following deviations (printed in italics):

- land with tree crown cover of more than 20% (instead of FAO definition of 10%) *and width of more than 30 m instead of 20 m*;
- including young natural stands and plantations which have yet to reach a crown density of 20% (instead of FAO definition of 10%) are included under forest;
- forest roads, cleared tracts, firebreaks and other small areas within forest are included, *however with a maximum width of 6 m*;
- windbreaks and shelterbelts of trees are included, *however only with a width of more than 30 m*;
- for determining the *wood volume of the forest stock* the Netherlands uses a *threshold of 5 cm diameter minimum* (instead of no threshold); however, this has how negligible effect on the total volume (Daamen, 2002).

We note that this is the definition of what should be reported under the *UN Framework Convention on Climate Change*. The definition of emissions/sinks to be included in the national total under the *Kyoto Protocol* is quite different and is not defined here, nor reported in the NIR.

Dataset for 1990-2000

A. Activity data and volume per hectare

For forest biomass stock an improved dataset was compiled and completed for all years 1990-2000 by Daamen (2002), in which definitions, data sources and assumptions have been documented which are used to estimate the CO₂ removal in source/sink category 5A. For the period 1990-2000 the data on carbon stock and carbon changes are based on:

- forest area (in ha);
- non-forest trees (in ha);
- average annual growth by category (in m³/ha/year);
- harvest (fellings) by category (in m³/ha/year).

The 1990-2000 data on *forest area* are taken from the following data sources:

- CBS (1985) for the total forest area in 1980;
- Dirksen *et al.* (2001) for the total forest area in 2000;

- in conjunction with the previous estimates for 1980 and 2000, the following sources were used to estimate the total forest area in 1990: CBS (1985, 1989) for forest area in 1980-1984, Daamen (1998) for forest area in 1997, and Edelenbosch (1996) for forest expansion in the period 1990-1995;
- for the years 1991-1999 a linear interpolation of the 1990 and 2000 estimates was used.

The first results of the 'Monitoring Network Functions' estimate the total forest area in 2000 at 360 kha, an increase of about 6% compared to the 341 kha estimated for 1990.

The estimates for the *other forested area* are taken from the following data sources:

- Schoonderwoerd (1991) for trees in line plantations with a maximum width of 30 m, with CBS (1985) for stem volume data;
- CBS (1985) for solitary trees;
- LEI/CBS agricultural statistics on orchards and nurseries (LEI/CBS, 2000);
- CBS (1985) for other non-forest areas, e.g. urban parks, defined as areas < 0.5 ha and/or width less than 30 m.

The area for all these categories has been assumed to be constant, except for orchards and nurseries for which annual area statistics are available. Also the stem volume is assumed to be constant for all six subcategories.

The 1990-2000 data on *stem volume*, used to determine the annual volume increment from growth, and on *fellings* are taken from the following data sources:

1. annual HOSP reports for about 280 kha forest land (high forest) with data on stem volume/growth and fellings/harvest from the HOSP project; a compilation is provided in Schoonderwoerd and Daamen (2000) and Stolp (1995);
2. HOSP reports on additional forest land (coppice, new forests planted 1984-1990, amenity plantations etc.) for about 29 kha with data on stem volume/growth from 1992 onwards and fellings/harvest from 1997 onwards ('HOSP-2') provided in Daamen (1998) (TBFRA2000);
3. remaining forest area (land covered with forest with other form of land-use, e.g. recreation, zoo, build up areas) according to the 4th forest statistics and not covered by the previous two inventories (Daamen, 1998).

For the latter category no changes in stem volume and negligible fellings/harvest are assumed. In *Table A3.1* the area of the distinguished subcategories have been summarised. More details can be found in Daamen (2002).

Table A3.1. Forest and non-forest tree area in the Netherlands 1990-2000 (kha)

Forest/tree type	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Forest land											
coniferous	190.4	192.0	192.5	193.0	193.8	194.7	195.3	194.9	195.1	195.3	196.4
broadleaved	151.0	150.9	152.3	153.7	154.8	155.8	157.1	159.4	161.1	162.8	163.6
Total forest land	341.4	342.9	344.8	346.7	348.6	350.5	352.4	354.3	356.2	358.1	360.0
Non-Forest Trees											
forests<0.5 ha, coniferous	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
forests<0.5 ha broadleaved	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
line plantations	66.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0
solitaires	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
orchards	23.9	23.8	23.6	23.4	23.3	23.1	22.8	22.6	22.3	22.0	21.8
nurseries	5.1	5.2	5.4	5.5	5.6	5.7	6.0	6.2	6.5	6.7	7.0
Total Non-Forest Trees	107.0	107.0	107.0	106.9	106.9	106.8	106.8	106.8	106.8	106.7	106.7
Total trees	448.4	449.9	451.8	453.6	455.5	457.3	459.2	461.1	463.0	464.8	466.7

Source: Daamen, 2002

B. Conversion factors

All conversion factors have been checked for replacing IPCC default values by country-specific values. It was decided to use for all variables IPCC default values, except for the conversion ratio from volume (in m³) to dry matter (tonne dm), for which the Netherlands uses more detailed figures: 0.5 and 0.6 t dm/m³ for coniferous and broadleaf forest, respectively. *Table A3.2* summarises all

conversion factors used in the calculation for source/sink category 5A. Again more details can be found in Daamen (2002).

Table A3.2. Conversion factors used to estimate CO₂ source/removal IPCC category 5A..for the Netherlands

Factor	Value/unit
Volume addition for branches, tree top and roots (D)	20% of stem volume including bark
Mass density coniferous tree (E ₁)	500 kg dm/m ³
Mass density broadleaf tree (E ₁)	600 kg dm/m ³
Carbon content (E ₂)	0.5 kg C/kg dm

Source: Spakman *et al.* (1997); Daamen (2002)

The net annual CO₂ emissions/removals can now be calculated using the formula:

$$\text{CO}_2 \text{ removal in year } t \text{ (kg/year)} = [A_t * (B_t - C_t) + (F_t - F_{t-1})] * (1+D/100) * E_1 * E_2 * 44/12$$

where:

- A = Forest Area with growth and fellings [kha]
- B = Volume increment [m³/ha/yr], about 8 m³/ha/yr
- C = Fellings [m³/ha/yr], about 6 and 3-4 m³/ha/yr for coniferous and broadleaf forests, respectively
- D = Volume addition for branches, tree top and roots [%]
- E₁ = Mass density [kg dry matter/m³]
- E₂ = Carbon content [kg carbon/kg dry matter]
- F = Change in stock of non-growing categories due to changes in area between year *t* and year *t-1*
- 44/12 = Conversion factor from C to CO₂

The first factor A (forest area with growth and fellings) refers to forests monitored in the HOSP project and the HOSP-2 forest. The remaining forest area according to the 4th forest statistics and the non-forest trees are summarised in factor F. *Table A3.3* summarises the annual growth and fellings used in the calculations.

From 2001 onwards the data source for *annual growth* and *fellings* will be based from a new source: a new monitoring network, in Dutch called 'Meetnet Functievervulling'. This sampling network will provide new data on forest area, standing volume and annual volume increment, subdivided into tree species. New data on harvest will not be available before the completion of the second four years sampling cycle (at the earliest in 2008).

LUCF studies in progress

For LUCF subcategories 5B-5E also new datasets are being compiled, of which some information is presented below. However, the results are still under discussion.

Literature has been reviewed for quantitative data on carbon stocks and CO₂ emissions from agricultural soils, forest soils and other nature soils in the Netherlands (Kuikman *et al.*, 2003). To estimate and improve the calculation of the CO₂ emissions from soils due to change of carbon stocks, the use of a computer model was recommended, that parameterises five arable crops, together comprising 84% of the area use for arable farming, and grass). For agricultural soils the data in the study are based on the main crops in the Netherlands, i.e. grassland and cropland with maize, potato, beets and grains. A special item was the organic soils in low areas that have been drained. Three databases and approaches are options to assess soil carbon stocks:

- based on the topographic soil map coupled with the soils information system;
- based on the Netherlands' soil monitoring program;
- based on the monitoring soils in forest and nature ecosystem.

In 2002 the results will be evaluated and a decision made to what extent data can be included in future editions of the Netherlands' greenhouse gas inventory.

Table A3.3. Annual growth increment and annual fellings forests in the Netherlands, 1990-2000

Annual growth increment											
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Total growth [m³/ha]	7.8	7.6	7.5	7.5	7.6	7.8	7.8	7.9	7.9	7.9	7.8
- coniferous	8.4	8.0	7.8	7.7	7.7	7.9	7.8	7.9	7.9	7.8	7.8
- broadleaf	7.0	7.1	7.1	7.3	7.5	7.7	7.8	7.9	7.9	7.9	7.9
Growth [1000 m³/yr]											
HOSP	2303	2244	2198	2211	2209	2258	2245	2237	2246	2227	2230
- coniferous	1453	1397	1356	1343	1326	1354	1332	1336	1331	1310	1310
- broadleaf	850	847	842	868	883	904	913	901	915	917	920
HOSP 2	120	125	128	137	140	146	147	188	187	185	183
- coniferous	13	13	13	13	13	13	13	17	17	17	17
- broadleaf	107	112	115	124	127	133	134	171	170	168	166
Annual fellings											
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Fellings [m³ ha/yr]	4.8	4.6	4.3	4.2	4.0	5.3	5.3	5.6	5.3	5.2	5.2
- coniferous	6.2	5.7	5.3	5.3	4.7	6.0	6.1	6.8	6.5	6.4	6.3
- broadleaf	3.0	3.0	3.0	2.9	3.1	4.3	4.1	4.2	3.9	3.7	3.7
Fellings [1000 m³/yr]											
HOSP	1452	1384	1303	1277	1197	1568	1570	1682	1591	1547	1550
- coniferous	1078	1005	929	919	823	1039	1060	1154	1110	1080	1080
- broadleaf	374	379	374	358	374	529	509	528	481	467	470
HOSP 2 *	30	33	36	42	45	48	50	51	48	48	48
- coniferous	1	1	1	2	2	3	3	4	2	2	2
- broadleaf	29	32	35	40	43	45	47	47	46	46	46

* Harvest +10%. Harvest is known for this category. The conversion from harvest to fellings (+10%) is based on the ration for HOSP forest.

Source: Daamen, 2002.

ANNEX 4: CO₂ Reference Approach and comparison with the Sectoral Approach

Comparison of CO₂ emissions in the National Approach and Reference Approach

The *IPCC Reference Approach* (RA) for CO₂ from energy combustion uses apparent consumption data per fuel type to estimate CO₂ emissions from fossil fuel use. This can be used as a means of verification of the sectoral total CO₂ emissions from fuel combustion. For the *Reference Approach*, energy statistics were provided by Statistics Netherlands (CBS); country-specific emission factors (carbon contents) and carbon storage fractions based on a study by Gielen (1996) are used (see *Annex 2, Tables A2.1 and A2.2*).

Table A4.1 presents the results of the 2003 *Reference Approach* calculation for 1990-2001 and compares them with the official national total emissions reported as fuel combustion (source category 1A). The annual difference varies between -1.6% for 1992 and +4.2% for 1997, with an average of 0.4%. The 1990-2001 trend differs by 2.7%-point: 12.9% for the *National Approach* (NA) (= sum of sectoral emissions in 1A) and 10.2% for the provisional *Reference Approach*. The *Reference Approach* data show 12% increase in emissions from liquid fuels and a 16% increase from gaseous fuels; CO₂ emissions from solid fuels decreased in this period by 3%.

Table A4.1. Comparison of CO₂ emissions: Reference Approach (RA) ¹⁾ versus National Approach (NA) (in Tg)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001 ²⁾
Reference Approach												
Liquid fuels ³⁾	52.3	51.4	52.4	53.5	54.3	54.6	55.4	54.9	55.4	56.3	56.6	58.4
Solid fuels	34.7	32.1	31.3	32.8	33.2	35.9	34.4	33.6	34.1	30.4	31.9	33.7
Gaseous fuels	72.5	80.2	77.7	80.1	77.9	79.6	88.9	83.5	82.9	80.6	81.7	83.9
Others												
Total RA	159.6	163.7	161.4	166.4	165.3	170.1	178.7	172.0	172.4	167.3	170.1	175.9
National Approach												
Liquid fuels ³⁾	45.0	27.2	28.5	29.2	29.4	48.1	48.9	46.1	45.2	38.7	39.1	40.2
Solid fuels	28.2	0.1	0.1	0.0	0.0	27.5	23.2	24.7	27.4	23.5	0.7	22.1
Gaseous fuels	66.2	20.9	18.8	19.9	18.9	74.2	81.1	71.3	72.6	72.3	72.7	78.1
Others	17.1	117.3	116.7	117.3	118.7	19.5	23.6	22.8	25.2	32.3	58.2	36.4
Total NA	156.5	165.5	164.0	166.4	167.1	169.2	176.9	165.0	170.5	166.8	170.7	176.7
Difference (%)												
Liquid fuels ³⁾	16	89	84	84	84	14	13	19	23	45	45	45
Solid fuels	23	62266	60766	79498	107201	31	48	36	24	29	4578	53
Gaseous fuels	9	284	314	302	311	7	10	17	14	11	12	7
Others	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100
Total	2.0	-1.1	-1.6	0.0	-1.1	0.5	1.0	4.2	1.2	0.3	-0.3	-0.5

¹⁾ Preliminary calculation, using provisional carbon factors for crude oil and natural gas liquids (NGL).

²⁾ Preliminary data.

³⁾ Specification of national fuel types used in the IPCC fuel type categories:

Gasoline: jetfuel, gasoline basis; aviation gasoline; motor gasoline

Other Kerosene: petroleum

Other Oil: oil aromates; other light oils; other oil products

Other Bituminous Coal: all hard coal; lignite/brown coal

BKB and Patent Fuel: coal derivatives

Comparison of RA-NA emissions by fuel type as presented in *Table A4.1* clearly shows that there is reasonable correspondence for gaseous fuels – i.e. natural gas – and moderate correspondence for liquid fuels until 1997, with differences of the order of 10% and 15-20%, respectively. For solid fuels the differences are often much larger, in particular for 2000 where no fuel split disaggregation was possible due to missing data in the *Annual Environmental Reports* (MJVs) of the electric power companies (see *Section 1.6.1* for more details on the data quality for the inventory for 2000). In other

years the 20 to 50% of solid fuel emissions missing in the *National Approach* is due to (a) aggregated data for the iron and steel industry and (b) high interannual variation of derived fuels (coke oven gas and blast furnace gas) sold to other sectors (i.e. power plants), which are often not very transparently reported. Although about 20% of the fuel combustion in the *National Approach* is not attributable to a specific fuel type, the difference between the total national CO₂ emissions from fuel combustion with the *Reference Approach* is in general below 2.5% as discussed above.

Specific reasons for the large discrepancy of 4.2% in 1997 can not be given. However, we do note the relative weakness of data collected from large companies since 1996, as discussed in *Section 1.2*, and the substantial revisions in energy statistics, in particular for 1997, due to the elimination of statistical differences and other improvements, as discussed in *Section 5.1.1* of the previous NIR (Olivier *et al.*, 2002).

Causes of differences between the two approaches

In general, the Netherlands *Reference Approach* calculation is very sensitive for the carbon content of crude oil input figures due to the relatively high amounts of crude oil refined and oil products exported. A sensitivity analysis for four sets of carbon contents to crude oil showed that the annual average difference of sectoral and reference calculation could vary between 0.3% and 1.9% (Olivier *et al.*, 2000). Other reasons for differences in the two approaches are:

- differences in exact source and source group definitions for CO₂ emissions from fuel combustion (correction for non-energy use, methodological differences in allocating emissions as domestic or abroad);
- use of different emission factors by the individual reporting firms (ER-I), in particular for solid fuels (notably energy industries and manufacturing industry);
- use of different carbon storage fractions by the individual reporting firms;
- unclear reporting in ER-I of the fraction of organic carbon CO₂ emissions in total reported CO₂ emissions, leading to incorrect interpretations;
- possible double counting due to erroneous supplemental estimates for fossil fuel combustion in cases where ER-I data from individual companies contain only partial or no fuel use data at all related to their reported CO₂ emissions;
- limitations of the comparison approach RA versus total CO₂ reported under category 1A 'Fuel combustion' due to the split in reporting of fossil carbon related CO₂ emissions into (in principle) IPCC source sectors 1A, 1B, 2, 3 and 6.

Having said this, reporting by the Netherlands of fossil-fuel related CO₂ emissions in the source categories industrial processes (2), solvents (3) and a large part of waste (6) cannot be a reason for the differences, since these are currently all reported under fuel combustion (1A).

Moreover, we note that since the NIR 2002 for the years 1991-1994 only CO₂ emissions associated with statistical differences in coal, oil and gas consumption are included in the national total from fuel combustion, whereas for all other years the energy balance does not show statistical differences.

Error corrections

An error in the calculation of the *Reference Approach* was detected, as a result of improved quality assurance. In the previous submissions the data for 'carbon stored' from Table 1A(d) from the CRF were not correctly transported to the Table 1A(b). Because we now use the latest version of the CRF file format these errors became apparent and were removed. *Table A4.2* presents these error corrections. It shows that, apart from the year 2000, the major changes are for the years 1993 and 1994, resulting in differences of up to 2% compared to last year's calculation.

In addition, CO₂ emissions in the *National Approach* have been recalculated. For more details on error corrections in sectoral emissions, we refer to *Section 10.1.3*). Moreover, a small reallocation was made for CO₂ from fossil fuels from A1 to 6D (see *Section 8.5.4*). The effect of these recalculations on total CO₂ emissions from fossil fuel combustion reported under source category 1A are presented in *Table A4.3*, which shows changes of -0.4 and -0.9% in the base year 1990 emissions and up to -7% in more recent years.

Table A4.2. Changes in preliminary CO₂ Reference Approach results for 1990-2000 due to error corrections, adjusted non-energy use data (solids) and general update of statistics for 2000 (in Tg)

		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
NIR 2003	Liquids	52.3	51.4	52.4	53.5	54.3	54.6	55.4	54.9	55.4	56.3	56.6
	Solids	34.7	32.1	31.3	32.8	33.2	35.9	34.4	33.6	34.1	30.4	31.9
	Gaseous	72.5	80.2	77.7	80.1	77.9	79.6	88.9	83.5	82.9	80.6	81.7
	Totals	159.6	163.7	161.4	166.4	165.3	170.1	178.7	172.0	172.4	167.3	170.1
NIR 2002	Liquids	52.3	52.2	51.9	50.5	51.5	54.6	55.4	54.8	55.4	56.3	61.5
	Solids	34.7	32.1	31.3	32.8	33.2	35.9	34.4	33.6	33.5	30.4	31.3
	Gaseous	72.5	80.2	77.7	80.1	78.0	79.6	88.9	83.5	82.9	80.6	81.7
	Totals	159.6	164.5	161.0	163.4	162.6	170.1	178.7	171.9	171.8	167.3	174.5
Difference	Liquids	0.0	-0.7	0.5	3.0	2.8	0.0	0.0	0.1	0.0	0.0	-5.0
	Solids	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.5
	Gaseous	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Totals	0.0	-0.8	0.5	3.0	2.7	0.0	0.0	0.1	0.6	0.0	-4.4
Difference (%)	Liquids (%)	0.0%	-1.4%	1.0%	6.0%	5.4%	0.0%	0.0%	0.1%	0.0%	0.0%	-8.1%
	Solids (%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.8%	0.0%	1.7%
	Gaseous (%)	0.0%	0.0%	0.0%	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total (%)	0.0%	-0.5%	0.3%	1.9%	1.7%	0.0%	0.0%	0.0%	0.3%	0.0%	-2.5%

Table A4.3. Differences of CO₂ emissions from fuel combustion in the National Approach 1990-1999 due to recalculations (error corrections and reallocations between source category 1A and other categories)

National Approach (1A)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
NIR 2003	156.5	165.5	164.0	166.4	167.1	169.2	176.9	165.0	170.5	166.8
<i>Difference 2003/2002</i>	-0.4%	0.1%	0.0%	0.0%	0.0%	-0.6%	-0.1%	-0.7%	-0.6%	-1.1%
NIR 2002	157.1	165.4	164.0	166.4	167.1	170.3	177.0	166.1	171.6	168.7
<i>Difference 2001/2001</i>	-0.9%	0.5%	0.4%	0.3%	0.2%	-1.6%	-1.7%	-6.8%	-3.3%	-1.1%
NIR 2001	158.5	164.5	163.4	165.9	166.8	173.0	180.1	178.3	177.4	170.6

Reference Approach and comparison with Sectoral Approach in the NIR 2001-2003

Table A4.4 summarises the reported comparisons between *Reference Approach* and *National Approach* for the last three National Inventory Reports. This shows that recalculations and improvements in both approaches do not have the same impact for each year. For 1990 the change in differences is from -0.6% in the NIR 2001 to 2.0% in the NIR 2003; for 1995 the changes are from 0.1% to 0.5%. The largest changes are for 1997: in the NIR 2001 a difference of -0.4% was reported; in the NIR 2002 this was 3.5% and currently it is 4.2%.

Table A4.4. Effect of recalculations on the comparison of CO₂ emissions from fuel combustion in the Reference Approach versus National Approach (in Tg), NIR 2001-2003

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
NIR 2003										
Reference Approach	159.6	163.7	161.4	166.4	165.3	170.1	178.7	172.0	172.4	167.3
National Approach	156.5	165.5	164.0	166.4	167.1	169.2	176.9	165.0	170.5	166.8
<i>Difference</i>	<i>2.0%</i>	<i>-1.1%</i>	<i>-1.6%</i>	<i>0.0%</i>	<i>-1.1%</i>	<i>0.5%</i>	<i>1.0%</i>	<i>4.2%</i>	<i>1.2%</i>	<i>0.3%</i>
NIR 2002										
Reference Approach	159.6	164.5	161.0	163.4	162.6	170.1	178.7	171.9	171.8	167.3
National Approach	157.1	165.4	164.0	166.4	167.1	170.3	177.0	166.1	171.6	168.7
<i>Difference</i>	<i>1.5%</i>	<i>-0.6%</i>	<i>-1.8%</i>	<i>-1.8%</i>	<i>-2.7%</i>	<i>-0.1%</i>	<i>0.9%</i>	<i>3.5%</i>	<i>0.1%</i>	<i>-0.8%</i>
NIR 2001										
Reference Approach	157.7	164.9	161.0	163.4	162.6	173.1	180.9	177.5	176.1	167.3
National Approach	158.5	164.5	163.4	165.9	166.8	173.0	180.1	178.3	177.4	170.6
<i>Difference</i>	<i>-0.6%</i>	<i>-0.2%</i>	<i>-1.5%</i>	<i>-1.5%</i>	<i>-2.5%</i>	<i>0.1%</i>	<i>0.4%</i>	<i>-0.4%</i>	<i>-0.7%</i>	<i>-2.0%</i>

ANNEX 5: Assessment of completeness and (potential) sources and sinks of greenhouse gas emissions and removals excluded

The Netherlands greenhouse gas emission inventory presently includes *all* sources identified by the *Revised IPCC Guidelines* (IPCC, 1997) *except* for the following (see *Table A5.1*):

- Indirect N₂O emissions from *atmospheric deposition* (category 4D) are not estimated/reported;
- CO₂ emissions from *agricultural soils* (category 4D) are not estimated/reported;
- In addition, it has been observed that *CH₄ and N₂O from manure of horses* (category 4B) is missing; this is due to the fact that until now no manure production estimates from horses are being made and that no emission factors for this source category have been defined;
- CH₄ emissions from soils deceased in last 40 years due to drainage and lowering of water tables; these emissions have been included in the natural total; thus no net (i.e. positive) anthropogenic emissions, on the contrary, this acts in fact a methane sink.
- CH₄, N₂O and other non-CO₂ emissions from *international bunkers (international transport)* are not yet estimated/ reported.
- Emissions/sinks for LUCF subcategories 5A to 5E, except for the CO₂ sink in category 5A2. New datasets are being compiled but are still under discussion, so no data for these subcategories have been included in this submission.

In this submission the following minor sources are now included, which were not estimated in the NIR 2002:

- burning of candles;
- smoking of cigars.

These sources were added in view of their contribution to aerosol emissions. For these sources, methane and NMVOC emissions have been included in the CRF for all years (methane only for candle burning).

In addition, when verifying the data in the CRF files, it was found that incorrect notation keys were used for the following sources, which are now labelled 'NE' (= Not Estimated):

- NO for emissions from horse manure [4B]
- 0 (zero) for CO₂ emissions/sinks from agricultural soils [4D]
- NO for emissions from 5B to 5E

For more details on *sources reported elsewhere* ('IE') see the Completeness Table 9 for 1990 in *Annex 5* and the documentation boxes in the CRF files, which are also included in the sectoral descriptions in the Chapters 3 to 9.

A survey made to check for *unaccounted sources* of non-CO₂ emissions in the Netherlands showed that the following minor sources are not included in the present greenhouse gas inventory (DHV, 2000):

- CH₄: notably large-scale compost production from organic waste and waste-water treatment;
- N₂O: notably large-scale compost production from organic waste;
- PFCs and SF₆: some minor sources.

These sources may be included in a later stage when it has been decided to monitor them regularly. For some of these sources, for example indirect emissions of N₂O, bringing the methodology in compliance to *IPCC Good Practice Guidance* may result in adjustments of several Tg (i.e. Mton) of CO₂-eq.

Table A5.1. CRF Completeness Table 9 for 1990

Sources and sinks not reported (NE) ⁽¹⁾				
GHG	Sector ⁽²⁾	Source/sink category ⁽²⁾	Explanation	
CO ₂	5. Land-Use Change and Forestry	Agricultural Soils	Not estimated/monitored	
		Grassland Conversion	Not estimated/monitored	
		D. CO ₂ Emissions and Removal	Not estimated/monitored	
CH ₄	4. Agriculture	Agricultural Soils		Emissions deceased in last 40 years due to drainage and lowering of water tables; emissions included in natural total; thus no net (positive) anthropogenic emissions
		Various		A recent survey identified some minor sources (notably large-scale compost production from organic waste and waste water treatment); to be included when monitored regularly and when not already included in the present emission inventory.
		International bunkers	Not estimated	
N ₂ O	Various			A recent survey identified some minor sources (notably large-scale compost production from organic waste and waste water treatment); to be included when monitored regularly and when not already included in the present emission inventory.
		International bunkers	Not estimated	
HFCs				
PFCs				
	2. Industrial Processes			A recent survey identified some minor sources; to be included when monitored regularly and when not already included in the present emission inventory.
SF ₆	2. Industrial Processes			A recent survey identified some minor sources; to be included when monitored regularly and when not already included in the present emission inventory.
Sources and sinks reported elsewhere (IE) ⁽³⁾				
GHG	Source/sink category	Allocation as per IPCC Guidelines	Allocation used by the Party	Explanation
CO ₂	Specific source categories (see doc. box)	Detailed source category	Within that source category on less detailed level or under "other"	Detailed source categories not distinguishable in inventory data
	Examples: Fugitive oil & gas Industrial processes	1. B.2.a.ii Oil production 2. B.1 Ammonia production	1. B.2.b.i production/processing 2. G Other	
	Coke production	1. A.1 Energy industries	1. A.2 Manufacturing industries	Source allocated to Target Group Industry
	Off-road vehicles (agriculture)	1. A.4 Small combustion	1. A.3 Transport	Source allocated to Target Group Transport
	Off-road vehicles (construction)	1. A.2 Manufacturing Industries	1. A.3 Transport	Source allocated to Target Group Transport
	Waste combustion (fossil fuel related carbon)	1. A.1 Energy industries	6.D Waste / Other	No waste combustion in the Netherlands without energy recovery
CH ₄	Specific source categories	Detailed source category	Within that source category on less detailed level or under "other"	Detailed source categories not distinguishable in inventory data
	Examples: Fugitive oil & gas Industrial processes	1. B.2.a.ii Oil production 2. B.1 Ammonia production	1. B.2.b.i production/processing 2. B.5 Other	
N ₂ O	2. Industrial Processes	1. A.2 Manufacturing Industries	2. Industrial Processes	Detailed process emission data (minor amounts) not distinguishable in inventory data
	4.D Indirect Emissions	4. D Nitrogen leaching	4. D others Background agricultural soils	
	6.B Waste water handling	N ₂ O from human sewage	7. Polluted surface water	
HFCs				
PFCs				
SF ₆				

Note: The Dutch inventory does not always allow a distinction of the detailed IPCC categories. In these cases the emissions are placed under 'Other' in the relevant (sub)sources category. The source distribution is then 'not attributable to specific source category'.

ANNEX 6: Additional information to be considered as part of the NIR submission

The following reports should be considered as part of this NIR submission and are available at website: www.greenhousegases.nl:

Methodological description

- Spakman, J., Van Loon, M.M.J., Van der Auweraert, R.J.K., Gielen, D.J., Olivier, J.G.J. and E.A. Zonneveld, 1997: *Method for calculation of greenhouse gas emissions*. VROM-HIMH, The Hague. Report Emission Registration **no. 37b**, March 2003. Electronic update of original report No. 37 of July 1997. *Electronic version only*;
- TNO, 2003: *Meta information on PER 2002 dataset* (in Dutch). TNO, Apeldoorn.

Documentation of uncertainties used in IPCC Tier 1 uncertainty assessments and Tier 2 key source identification

- Olivier, J.G.J. and L.J. Brandes, 2003: *Estimate of annual and trend uncertainty for Dutch sources of greenhouse gas emissions using the IPCC Tier 1 approach*. RIVM, Bilthoven.

Detailed methodology and uncertainty discussion papers

- Van Amstel, A.R., J.G.J. Olivier and P.G. Ruysenaars (eds.), 2000a: *Monitoring of Greenhouse Gases in the Netherlands: Uncertainty and Priorities for Improvement*. Proceedings of a National Workshop held in Bilthoven, The Netherlands, 1 September 1999. WIMEK report/RIVM report no. 773201 003. Bilthoven, May 2000.
- Van Amstel, A.R., Swart, R.J., Krol, M.S., Beck, J.P., Bouwman, A.F. and K.W. van der Hoek, 1993: *Methane the other greenhouse gas; research and policy in the Netherlands*. RIVM, Bilthoven. Report no. 481507 001. April, 1993.
- Kroeze, C., 1994: *Nitrous oxide (N₂O). Emission inventory and options for control in the Netherlands*. RIVM, Bilthoven. Report no. 773001 004.
- Matthijsen, A.J.C.M. and C. Kroeze, 1996: *Emissions of HFCs, PFCs, FICs and SF₆ in the Netherlands in 1990, 1994, 2000, 2005, 2010 and 2020* (in Dutch). RIVM, Bilthoven. Report no. 773001 008.
- Daamen, W.P., 2002: *Forest biomass stocks (IPCC). Part 1: Calculation method Netherlands' National Inventory Reports/National Communications; Part 2: Analysis of the consequences of application of IPCC Guidelines for reporting and recommendation for calculation method Netherlands' National Inventory reports/National Communications for 1990-2000* (in Dutch). Forest Data Foundation (St. Bosdata), Wageningen.

Documentation of present Quality Assurance and Quality Control for national greenhouse gas inventory compilation and reporting

- DHV, 2002: *Quality Assurance and Quality Control for the Dutch National Inventory Report; report on phase 1*, January 2002, report no. ML-BB-20010367. DHV, Amersfoort.
- WEM/CCDM, 2002: *Project Plan Annual Emission Monitor Report 2002* (in Dutch). Ministry of VROM/VI, The Hague.
- Coenen, P.W.H.G., 2003: QA/QC activities performed on CRF 2003 datasets compiled for EU and UNFCCC. Memo TNO, Apeldoorn.
- Coenen, P.W.H.G. and J.G.J. Olivier, 2003: *Documentation of the activities within the framework of the completion of the CRF for the 2003 submission to the UNFCCC*. TNO-MEP, Apeldoorn. *In prep.*

ANNEX 7: Selection of Common Reporting Format tables

This annex shows a copy of selected sheets from the CRF data files (the electronic annexes to this national inventory report), presenting unrounded figures. The number of digits shown does not represent the uncertainty estimated for the emissions (see *Section 1.7*). Please note that all data for 2001 are preliminary.

Please note that the SF₆ emissions reported in these tables are expressed in mass units, not in CO₂-eq.; for SF₆ emissions in Gg CO₂-eq. we refer to *Table A7.23*.

Annex 7.1 CRF Summary Table 7A for the base years 1990 and 1995 and the last two years (2000 and preliminary 2001)

Annex 7.2 Recalculation tables for base years 1990 and 1995 and for 1996-2000 (CRF Tables 8.a and 8.b)

Annex 7.3 CRF Trend Tables 10 for the gases CO₂, CH₄, N₂O, F-gases; and for all gases and source categories in CO₂-eq.

Annex 7.4 Trend Tables for the precursor gases and SO₂.

7.1 IPCC Tables 7A for base years 1990 and 1995 and for 2000-2001

Table A.7.1. Emissions of greenhouse gases in the Netherlands; IPCC Table 7A; Year: 1990

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		CO ₂	CO ₂	CH ₄	N ₂ O	HFCs ⁽¹⁾		PFCs ⁽¹⁾		SF ₆		NO _x	CO	NM VOC	SO ₂
		emissions	removals			P	A	P	A	P	A				
		(Gg)				CO ₂ equivalent (Gg)				(Gg)					
Total National Emissions and Removals		159 270.22	-1 421.91	1 292.36	53.37	0.00	4 431.84	0.00	2 431.74	0.00	0.01	569.75	1 120.51	492.42	202.39
1. Energy		156 808.29		213.17	1.87							563.05	1 073.00	277.69	190.82
A. Fuel Combustion	Reference Approach ⁽²⁾	159 558.48													
	Sectoral Approach ⁽²⁾	156 500.14		34.39	1.87							562.92	1 066.90	222.71	183.21
1. Energy Industries		51 304.82		3.32	0.47							98.61	14.65	3.57	105.06
2. Manufacturing Industries and Construction		41 888.18		2.91	0.11							77.23	224.43	3.41	44.15
3. Transport		29 121.59		7.88	1.20							345.84	754.58	200.51	29.39
4. Other Sectors		34 134.78		20.26	0.09							40.89	71.85	15.07	4.57
5. Other		0.76		0.03	0.00							0.35	1.39	0.15	0.04
B. Fugitive Emissions from Fuels		308.15		178.77	0.00							0.13	6.10	54.98	7.61
1. Solid Fuels		0.00		0.00	0.00							0.00	0.00	0.00	0.00
2. Oil and Natural Gas		308.15		178.77	0.00							0.13	6.10	54.98	7.61
2. Industrial Processes		1 580.63		3.27	24.37	0.00	4 431.84	0.00	2 431.74	0.00	0.01	2.71	43.31	86.43	7.39
A. Mineral Products		1 124.07		0.21	0.00							1.28	3.52	1.04	6.31
B. Chemical Industry		0.00		3.02	24.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	33.11	0.00
C. Metal Production		0.00		0.00	0.00				2 398.10		0.00	0.00	35.11	3.15	0.00
D. Other Production ⁽³⁾	IE											0.00	0.00	10.76	0.00
E. Production of Halocarbons and SF ₆							4 431.84		0.00		0.00				
F. Consumption of Halocarbons and SF ₆						0.00	0.00	0.00	33.64	0.00	0.01				
G. Other		456.56		0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.43	4.68	38.36	1.08

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		CO ₂	CO ₂	CH ₄	N ₂ O	HFCs ⁽¹⁾		PFCs ⁽¹⁾		SF ₆		NO _x	CO	NM VOC	SO ₂
		emissions	removals			P	A	P	A	P	A				
		(Gg)				CO ₂ equivalent (Gg)				(Gg)					
3. Solvent and Other Product Use		0.00			0.73									127.12	
4. Agriculture		0.00	0.00	505.33	22.19							0.00	0.00	0.16	0.00
A. Enteric Fermentation				401.86											
B. Manure Management				103.47	0.66									0.00	
C. Rice Cultivation				NO										NO	
D. Agricultural Soils	(4) NE	(4) NE		0.00	21.53									0.16	
E. Prescribed Burning of Savannas				NO	NO							0.00	0.00	0.00	
F. Field Burning of Agricultural Residues				NO	NO							NO	NO	NO	
G. Other				NO	NO							NO	NO	NO	
5. Land-Use Change and Forestry		(5) 0.00	(5) -1 421.91	0.00	0.00							0.00	0.00	0.00	0.00
A. Changes in Forest and Other Woody Biomass Stocks	(5) 0.00	(5) -1 421.91													
B. Forest and Grassland Conversion		NE		NE	NE							NE	NE	NE	
C. Abandonment of Managed Lands	(5) NE	(5) 0.00													
D. CO ₂ Emissions and Removals from Soil	(5) NE	(5) 0.00													
E. Other	(5) NE	(5) 0.00		NE	NE							NE	NE		
6. Waste		881.09		568.55	0.40							3.91	1.93	1.02	4.17
A. Solid Waste Disposal on Land	(4) 0.00			562.00									0.00	0.91	
B. Wastewater Handling				6.55	0.40							0.00	0.00	0.00	
C. Waste Incineration	(4) 0.00			0.00	0.00							IE	IE	IE	IE
D. Other		881.09		0.00	0.00							3.91	1.93	0.11	4.17
7. Other (please specify)		0.21	0.00	2.05	3.81	0.00	0.00	0.00	0.00	0.00	0.00	0.09	2.28	0.00	0.01
Solvents and other product use		0.21		0.05	0.01							0.09	2.28		0.01
Polluted surface water					3.80										
Degassing drinkwater from ground water				2.00											

Table A.7.2. Emissions of greenhouse gases in the Netherlands; IPCC Table 7A; Year: 1995

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		CO ₂	CO ₂	CH ₄	N ₂ O	HFCs ⁽¹⁾		PFCs ⁽¹⁾		SF ₆		NO _x	CO	NM VOC	SO ₂
		emissions	removals			P	A	P	A	P	A				
		(Gg)				CO ₂ equivalent (Gg)				(Gg)					
Total National Emissions and Removals		172 401.55	-1 232.28	1 170.20	58.64	0.00	6 018.31	193.20	1 866.76	0.00	0.01	486.89	854.83	363.25	141.54
1. Energy		170 050.62		207.00	2.64							482.69	818.89	211.89	137.91
A. Fuel Combustion	Reference Approach ⁽²⁾	170 091.39													
	Sectoral Approach ⁽²⁾	169 240.60		36.68	2.64							482.10	810.94	169.06	127.69
1. Energy Industries		56 540.17		4.89	0.49							81.31	16.38	5.20	68.25
2. Manufacturing Industries and Construction		42 600.62		5.06	0.13							55.04	180.64	3.86	26.78
3. Transport		32 163.36		6.01	1.94							297.60	543.95	146.10	29.55
4. Other Sectors		37 932.51		20.46	0.09							46.56	63.31	13.15	3.00
5. Other		3.94		0.26	0.00							1.60	6.66	0.75	0.11
B. Fugitive Emissions from Fuels		810.02		170.33	0.00							0.59	7.95	42.83	10.22
1. Solid Fuels		0.00		0.00	0.00							0.00	0.00	0.00	0.00
2. Oil and Natural Gas		810.02		170.33	0.00							0.59	7.95	42.83	10.22
2. Industrial Processes		1 442.31		2.63	24.17	0.00	6 018.31	193.20	1 866.76	0.00	0.01	1.75	33.39	53.70	3.34
A. Mineral Products		1 113.90		0.10	0.00							1.31	2.45	0.45	2.77
B. Chemical Industry		0.00		2.49	24.17	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	17.89	0.00
C. Metal Production		16.53		0.00	0.00				1 799.10		0.00	0.00	30.32	2.60	0.00
D. Other Production ⁽³⁾		1E										0.00	0.00	7.33	0.00
E. Production of Halocarbons and SF ₆							5 770.76		0.00		0.00				
F. Consumption of Halocarbons and SF ₆						0.00	247.55	193.20	67.66	0.00	0.01				
G. Other		311.88		0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.62	25.44	0.57

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		CO ₂	CO ₂	CH ₄	N ₂ O	HFCs ⁽¹⁾		PFCs ⁽¹⁾		SF ₆		NO _x	CO	NM VOC	SO ₂
		emissions	removals			P	A	P	A	P	A				
		(Gg)				CO ₂ equivalent (Gg)				(Gg)					
3. Solvent and Other Product Use		0.00			0.63									96.23	
4. Agriculture		0.00	0.00	477.04	26.85							0.00	0.00	0.16	0.00
A. Enteric Fermentation				376.72											
B. Manure Management				100.32	0.74									0.00	
C. Rice Cultivation				NO										NO	
D. Agricultural Soils		⁽⁴⁾ NE	⁽⁴⁾ NE	0.00	26.11									0.16	
E. Prescribed Burning of Savannas				NO	NO							0.00	0.00	0.00	
F. Field Burning of Agricultural Residues				NO	NO							NO	NO	NO	
G. Other				NO	NO							NO	NO	NO	
5. Land-Use Change and Forestry		⁽³⁾ 0.00	⁽³⁾ -1 232.28	0.00	0.00							0.00	0.00	0.00	0.00
A. Changes in Forest and Other Woody Biomass Stocks		⁽³⁾ 0.00	⁽³⁾ -1 232.28												
B. Forest and Grassland Conversion		NE		NE	NE							NE	NE	NE	
C. Abandonment of Managed Lands		⁽³⁾ NE	⁽³⁾ 0.00												
D. CO ₂ Emissions and Removals from Soil		⁽³⁾ NE	⁽³⁾ 0.00												
E. Other		⁽³⁾ NE	⁽³⁾ 0.00	NE	NE							NE	NE		
6. Waste		908.26		481.46	0.53							2.37	0.40	1.27	0.27
A. Solid Waste Disposal on Land		⁽⁴⁾ 0.00		480.00									0.00	0.78	
B. Wastewater Handling				1.46	0.49							0.00	0.00	0.00	
C. Waste Incineration		⁽⁴⁾ 0.00		0.00	0.00							1E	1E	1E	1E
D. Other		908.26		0.00	0.04							2.37	0.40	0.49	0.27
PFC, no specific allocation due to C ---		0.35	0.00	2.06	3.82	0.00	0.00	0.00	0.00	0.00	0.00	0.08	2.15	0.00	0.02
SF ₆ , no specific allocation due to C		0.35		0.06	0.02							0.08	2.15		0.02
Polluted surface water					3.80										
Degassing drinkwater from ground water				2.00											

Table A.7.3. Emissions of greenhouse gases in the Netherlands; IPCC Table 7A; Year: 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		CO ₂	CO ₂	CH ₄	N ₂ O	HFCs ⁽¹⁾		PFCs ⁽¹⁾		SF ₆		NO _x	CO	NMVOC	SO ₂
		emissions	removals			P	A	P	A	P	A				
		(Gg)													
Total National Emissions and Removals		173 840.04	-1 413.26	983.22	53.74	0.00	3 874.55	243.60	1 526.44	0.01	0.01	413.18	681.18	278.28	91.56
1. Energy		172 252.02		164.67	2.68							411.56	637.50	159.55	89.12
A. Fuel Combustion	Reference Approach ⁽²⁾	170 109.51													
	Sectoral Approach ⁽²⁾	170 661.29		33.71	2.68							411.16	633.23	132.27	82.62
1. Energy Industries		61 222.17		5.96	0.49							61.55	27.18	4.51	43.73
2. Manufacturing Industries and Construction		39 676.73		3.28	0.12							36.21	101.69	1.91	13.41
3. Transport		35 212.50		4.36	2.00							268.38	436.06	112.67	23.61
4. Other Sectors		34 549.90		19.80	0.08							43.09	60.48	12.29	1.69
5. Other		0.00		0.32	0.00							1.92	7.82	0.88	0.18
B. Fugitive Emissions from Fuels		1 590.73		130.96	0.00							0.40	4.27	27.28	6.50
1. Solid Fuels		0.00		0.00	0.00							0.00	0.00	0.00	0.00
2. Oil and Natural Gas		1 590.73		130.96	0.00							0.40	4.27	27.28	6.50
2. Industrial Processes		1 237.61		1.54	22.97	0.00	3 874.55	243.60	1 526.44	0.01	0.01	1.55	41.58	39.53	2.41
A. Mineral Products		857.12		0.14	0.00							0.97	1.56	0.19	2.04
B. Chemical Industry		0.00		1.38	22.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.56	0.00
C. Metal Production		0.00		0.00	0.00				1 390.36		0.00	0.00	39.66	2.39	0.00
D. Other Production ⁽³⁾		IE										0.00	0.00	5.66	0.00
E. Production of Halocarbons and SF ₆							2 838.43		0.00		0.00				
F. Consumption of Halocarbons and SF ₆						0.00	1 036.12	243.60	136.08	0.01	0.01				
G. Other		380.48		0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.58	0.36	18.73	0.37

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		CO ₂	CO ₂	CH ₄	N ₂ O	HFCs ⁽¹⁾		PFCs ⁽¹⁾		SF ₆		NO _x	CO	NMVOC	SO ₂
		emissions	removals			P	A	P	A	P	A				
		(Gg)													
3. Solvent and Other Product Use		0.00			0.44									78.32	
4. Agriculture		0.00	0.00	410.53	23.20							0.00	0.00	0.16	0.00
A. Enteric Fermentation				319.43											
B. Manure Management				91.10	0.62									0.00	
C. Rice Cultivation				NO										NO	
D. Agricultural Soils		⁽⁴⁾ NE	⁽⁴⁾ NE	0.00	22.58									0.16	
E. Prescribed Burning of Savannas				NO	NO							0.00	0.00	0.00	
F. Field Burning of Agricultural Residues				NO	NO							NO	NO	NO	
G. Other				NO	NO							NO	NO	NO	
5. Land-Use Change and Forestry		⁽⁵⁾ 0.00	⁽⁵⁾ -1 413.26	0.00	0.00							0.00	0.00	0.00	0.00
A. Changes in Forest and Other Woody Biomass Stocks		⁽⁵⁾ 0.00	⁽⁵⁾ -1 413.26												
B. Forest and Grassland Conversion		NE		NE	NE							NE	NE	NE	
C. Abandonment of Managed Lands		⁽⁵⁾ NE	⁽⁵⁾ 0.00												
D. CO ₂ Emissions and Removals from Soil		⁽⁵⁾ NE	⁽⁵⁾ 0.00												
E. Other		⁽⁵⁾ NE	⁽⁵⁾ 0.00	NE	NE							NE	NE		
6. Waste		350.00		404.57	0.63							0.00	0.01	0.72	0.00
A. Solid Waste Disposal on Land		⁽⁴⁾ 0.00		403.79									0.00	0.66	
B. Wastewater Handling				0.78	0.63							0.00	0.00	0.00	
C. Waste Incineration		⁽⁴⁾ 0.00		0.00	0.00							IE	IE	IE	IE
D. Other		350.00		0.00	0.00							0.00	0.01	0.07	0.00
7. Other (please specify) ---		0.42	0.00	1.91	3.82	0.00	0.00	0.00	0.00	0.00	0.00	0.08	2.08	0.00	0.02
Solvents and other product use		0.42		0.02	0.02							0.08	2.08		0.02
Polluted surface water					3.80										
Degassing drinkwater from ground water				1.89											

Table A.7.4. Emissions of greenhouse gases in the Netherlands; IPCC Table 7A; Year: 2001

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		CO ₂	CO ₂	CH ₄	N ₂ O	HFCs ⁽¹⁾		PFCs ⁽¹⁾		SF ₆		NO _x	CO	NMVOC	SO ₂
		emissions	removals			P	A	P	A	P	A				
		(Gg)				CO ₂ equivalent (Gg)				(Gg)					
Total National Emissions and Removals		179 855.16	-1 413.26	973.10	51.83	0.00	1 584.20	294.00	1 456.38	0.01	0.01	410.81	661.60	271.23	88.96
I. Energy		178 380.82		168.92	2.70							409.84	620.96	155.49	87.03
A. Fuel Combustion	Reference Approach ⁽²⁾	175 904.01													
	Sectoral Approach ⁽²⁾	176 715.04		34.58	2.70							409.44	616.39	127.72	80.42
1. Energy Industries		64 775.57		6.26	0.52							66.16	28.84	4.63	44.63
2. Manufacturing Industries and Construction		40 196.92		3.39	0.12							35.41	99.83	1.89	12.64
3. Transport		35 608.22		4.19	1.98							261.12	419.47	107.96	21.32
4. Other Sectors		36 134.33		20.42	0.08							44.88	60.43	12.35	1.71
5. Other		0.00		0.32	0.00							1.87	7.81	0.88	0.12
B. Fugitive Emissions from Fuels		1 665.79		134.33	0.00							0.39	4.57	27.77	6.61
1. Solid Fuels		0.00		0.00	0.00							0.00	0.00	0.00	0.00
2. Oil and Natural Gas		1 665.79		134.33	0.00							0.39	4.57	27.77	6.61
2. Industrial Processes		1 123.89		1.42	21.17	0.00	1 584.20	294.00	1 456.38	0.01	0.01	0.90	38.66	35.72	1.92
A. Mineral Products		805.23		0.13	0.00							0.90	1.38	0.17	1.92
B. Chemical Industry		0.00		1.27	21.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.00	0.00
C. Metal Production		0.00		0.00	0.00				1 320.30		0.00	0.00	37.28	2.29	0.00
D. Other Production ⁽³⁾	IE											0.00	0.00	5.60	0.00
E. Production of Halocarbons and SF ₆							641.47		0.00		0.00				
F. Consumption of Halocarbons and SF ₆						0.00	942.73	294.00	136.08	0.01	0.01				
G. Other		318.66		0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.67	0.00

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		CO ₂	CO ₂	CH ₄	N ₂ O	HFCs (1)		PFCs(1)		SF6		NO _x	CO	NMVOC	SO ₂
		emissions	removals			P	A	P	A	P	A				
		(Gg)				CO ₂ equivalent (Gg)				(Gg)					
3. Solvent and Other Product Use		0.00			0.40									79.17	
4. Agriculture		0.00	0.00	410.59	23.12							0.00	0.00	0.16	0.00
A. Enteric Fermentation				322.21											
B. Manure Management				88.38	0.61									0.00	
C. Rice Cultivation				NO										NO	
D. Agricultural Soils	(*) NE	(*) NE		0.00	22.51									0.16	
E. Prescribed Burning of Savannas				NO	NO							0.00	0.00	0.00	
F. Field Burning of Agricultural Residues				NO	NO							NO	NO	NO	
G. Other				NO	NO							NO	NO	NO	
5. Land-Use Change and Forestry		(*) 0.00	(*) -1 413.26	0.00	0.00							0.00	0.00	0.00	0.00
A. Changes in Forest and Other Woody Biomass Stocks	(*) 0.00	(*) -1 413.26													
B. Forest and Grassland Conversion	NE		NE	NE	NE							NE	NE	NE	
C. Abandonment of Managed Lands	(*) NE	(*) 0.00													
D. CO ₂ Emissions and Removals from Soil	(*) NE	(*) 0.00													
E. Other	(*) NE	(*) 0.00		NE	NE							NE	NE		
6. Waste		350.00		390.33	0.62							0.00	0.00	0.70	0.00
A. Solid Waste Disposal on Land	(*) 0.00			389.55									0.00	0.63	
B. Wastewater Handling				0.78	0.62							0.00	0.00	0.00	
C. Waste Incineration	(*) 0.00			0.00	0.00							IE	IE	IE	IE
D. Other	350.00			0.00	0.00							0.00	0.00	0.06	0.00
7. Other (please specify)		0.44	0.00	1.85	3.82	0.00	0.00	0.00	0.00	0.00	0.00	0.07	1.98	0.00	0.02
Solvents and other product use		0.44		0.02	0.02							0.07	1.98		0.02
Polluted surface water					3.80										
Degassing drinkwater from ground water				1.83											

7.2 Recalculation and Completeness Tables for 1990 and 1995-2000

This appendix shows information from sheets from the CRF data files of 1990 and for the period 1995-2000.

In principle, all figures for 2000 have been revised, due to the provisional status in the previous submission.

Table A.7.5. CRF Recalculation Table 8.a for 1990

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		CO ₂			CH ₄			N ₂ O		
		Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾
		CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)
Total National Emissions and Removals		159 630.29	159 270.22	-0.23	27 143.04	27 139.62	-0.01	16 523.89	16 543.95	0.12
1. Energy		157 439.61	156 808.29	-0.40	4 476.81	4 476.50	-0.01	584.46	579.78	-0.80
1.A.	Fuel Combustion Activities	157 143.16	156 500.14	-0.41	722.99	722.29	-0.10	584.16	579.78	-0.75
1.A.1.	Energy Industries	51 513.19	51 304.82	-0.40	69.09	69.69	0.88	143.96	144.51	0.38
1.A.2.	Manufacturing Industries and Construction	41 889.26	41 888.18	0.00	60.94	61.06	0.19	36.69	35.60	-2.99
1.A.3.	Transport	29 085.18	29 121.59	0.13	165.29	165.39	0.06	375.91	371.28	-1.23
1.A.4.	Other Sectors	34 643.08	34 184.78	-1.32	20.28	20.26	-0.10	27.60	28.40	2.90
1.A.5.	Other	12.46	0.76	-93.92	1.78	0.68	-61.93	0.00	0.00	0.00
1.B.	Fugitive Emissions from Fuels	296.45	308.15	3.95	3 753.81	3 754.21	0.01	0.00	0.00	0.00
1.B.1.	Solid fuel	IE	IE		0.00	0.00	0.00	0.00	0.00	0.00
1.B.2.	Oil and Natural Gas	296.45	308.15	3.95	3 753.81	3 754.21	0.01	0.00	0.00	0.00
2. Industrial Processes		1 690.03	1 580.63	-6.47	68.59	68.58	0.00	7 554.02	7 554.02	0.00
2.A.	Mineral Products	1 124.37	1 124.07	-0.03	4.42	4.42	0.00	0.00	0.00	0.00
2.B.	Chemical Industry	0.00	0.00	0.00	63.49	63.49	0.00	7 554.02	7 554.02	0.00
2.C.	Metal Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.D.	Other Production	0.00	IE	-100.00						
2.G.	Other	565.67	456.56	-19.29	0.67	0.67	-0.02	0.00	0.00	0.00
3. Solvent and Other Product Use		0.21	0.00	-100.00				224.75	224.75	0.00
4. Agriculture		0.00	0.00	0.00	10 611.93	10 611.93	0.00	6 854.10	6 878.90	0.36
4.A.	Enteric Fermentation				8 439.06	8 439.06	0.00			
4.B.	Manure Management				2 172.87	2 172.87	0.00	204.60	204.60	0.00
4.C.	Rice Cultivation				0.00	0.00	0.00			
4.D.	Agricultural Soils ⁽²⁾	0.00	0.00	0.00	0.00	0.00	0.00	6 649.50	6 674.30	0.37
4.E.	Prescribed Burning of Savannas				0.00	0.00	0.00	0.00	0.00	0.00
4.F.	Field Burning of Agricultural Residues				0.00	0.00	0.00	0.00	0.00	0.00
4.G.	Other				0.00	0.00	0.00	0.00	0.00	0.00
5. Land-Use Change and Forestry (net) ⁽³⁾		-1 421.91	-1 421.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.A.	Changes in Forest and Other Woody Biomass Stocks			0.00						
5.B.	Forest and Grassland Conversion			0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.C.	Abandonment of Managed Lands			0.00						
5.D.	CO ₂ Emissions and Removals from Soil			0.00						
5.E.	Other			0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table A.7.5. CRF Recalculation Table 8.a for 1990 (continued)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		CO ₂			CH ₄			N ₂ O		
		Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾
		CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)
6. Waste		500.43	881.09	76.07	11 942.40	11 939.55	-0.02	125.57	125.53	-0.04
6.A.	Solid Waste Disposal on Land	0.00	0.00	0.00	11 804.76	11 802.00	-0.02			
6.B.	Wastewater Handling				137.55	137.55	0.00	125.53	125.53	0.00
6.C.	Waste Incineration	IE	IE		IE	IE		IE	IE	
6.D.	Other	500.43	881.09	76.07	0.08	0.00	-100.00	0.04	0.00	-100.00
7. Other (please specify) ...		0.00	0.21	100.00	43.32	43.05	-0.62	1 180.98	1 180.98	0.00
	Solvents and other product use		0.21	100.00		1.05	100.00		2.98	100.00
	Polluted surface water			0.00			0.00	1 178.00		100.00
	Degassing drinkwater from ground water			0.00		42.00	100.00			0.00
Memo Items:										
International Bunkers		39 764.52	39 764.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Multilateral Operations		0.00	NE	-100.00	0.00	0.00	0.00	0.00	0.00	0.00
CO₂ Emissions from Biomass		3 547.21	3 394.49	-4.31						
GREENHOUSE GAS SOURCE AND SINK CATEGORIES		HFCs			PFCs			SF ₆		
		Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾
		CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)
Total Actual Emissions		4 431.84	4 431.84	0.00	2 431.74	2 431.74	0.00	186.90	186.90	0.00
2.C.3.	Aluminium Production				2 398.10	2 398.10	0.00			0.00
2.E.	Production of Halocarbons and SF ₆	4 431.84	4 431.84	0.00			0.00			0.00
2.F.	Consumption of Halocarbons and SF ₆	0.00	0.00	0.00	33.64	33.64	0.00	186.90	186.90	0.00
	Other			0.00			0.00			0.00
Potential Emissions from Consumption of HFCs/PFCs and SF₆		0.00	0.00	0.00	C	C		C	C	
					Previous submission		Latest submission	Difference ⁽¹⁾		
					CO ₂ equivalent (Gg)			(%)		
Total CO ₂ Equivalent Emissions with Land-Use Change and Forestry ⁽³⁾					208 925.49			208 582.37		
Total CO ₂ Equivalent Emissions without Land-Use Change and Forestry ⁽³⁾					210 347.40			210 004.28		

Table A.7.6. CRF Recalculation Explanation Table 8.b for 1990


Specify the sector and source/sink category ⁽¹⁾ where changes in estimates have occurred:		GHG	RECALCULATION DUE TO			
			CHANGES IN:			Addition/removal/ replacement of source/sink categories
			Methods ⁽²⁾	Emission factors ⁽²⁾	Activity data ⁽²⁾	
						
ALL	ALL	All	In 2002 the source allocation for 1990, 1995, 1998, 1999 2000 and 2001 has been revised based on a new set of allocation codes in the Dutch inventory, resulting in uniformity in the allocation over the mentioned years. Furthermore the identification of biofuel is improved. All minor changes are due to this changes in allocation. Other changes are		Data adjusted	
1.A.1	Energy Industries	all	Change in source allocation (see 6 and 1.A.4)		Data adjusted	
1.A.2.	Manufacturing Industries and Construction	CH4/N2O	Change in source allocation		Data adjusted	
1.A.2.f	Manufacturing Industries and Construction	CO2	Error correction in emission		Data adjusted	
1.a.4	Other sectors	all	Change in source allocation (see 6 and 1.A.1)		Data adjusted	
1.a.5	Other	all	Change in source allocation to 1b2.		Data adjusted	
6.D	Waste / Other	all	Errors from previous submission eliminated. Emissions from combustion of fossil fuels in waste sector were identified and placed in 1a1 and 1a4. Some emissions were previous year placed in the wrong sector (1). Furthermore the identification of biomass as fuel was improved leading to less CO2 emissions		Data adjusted	
2G	Other Sectors	CO2	Error correction in emission from desulfurisation		Data adjusted	
1.A.3	Transport	All			Data adjusted	
1.B.2	Oil and Natural Gas	CO2/CH4	Change in source allocation (from 1.a.5)		data adjusted	
4D	Agricultural soils	N2O			Data adjusted	
6B	Wastewater handling	CH4/N2O	Improved calculation method		Data adjusted	
7	Other	CH4/N2O	change in source allocation from 3		Data adjusted	
3	Product use	CH4/N2O	change in source allocation to 7		Data adjusted	

Table A.7.7. CRF Recalculation Table 8.a for 1995

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO ₂			CH ₄			N ₂ O		
	Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾
	CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)
Total National Emissions and Removals	172 658.62	172 401.55	-0.15	24 570.61	24 574.14	0.01	18 173.28	18 177.71	0.02
1. Energy	171 103.09	170 050.62	-0.62	4 346.42	4 347.01	0.01	822.82	819.45	-0.41
1.A. Fuel Combustion Activities	170 300.00	169 240.60	-0.62	360.11	770.18	113.88	822.82	819.45	-0.41
1.A.1. Energy Industries	56 589.35	56 540.17	-0.09	101.64	102.60	0.94	150.44	150.75	0.20
1.A.2. Manufacturing Industries and Construction	43 083.83	42 600.62	-1.12	106.32	106.29	-0.02	39.26	39.44	0.48
1.A.3. Transport	32 129.92	32 163.36	0.10	129.88	126.22	-2.82	605.40	602.19	-0.53
1.A.4. Other Sectors	38 486.02	37 932.51	-1.44	20.49	20.46	-0.16	27.72	27.07	-2.36
1.A.5. Other	10.87	3.94	-63.73	1.78	5.48	208.55	0.00	0.00	0.00
1.B. Fugitive Emissions from Fuels	803.09	810.02	0.86	3 576.51	3 576.83	0.01	0.00	0.00	0.00
1.B.1. Solid fuel	IE	IE		0.00	0.00	0.00	0.00	0.00	0.00
1.B.2. Oil and Natural Gas	803.09	810.02	0.86	3 576.51	3 576.83	0.01	0.00	0.00	0.00
2. Industrial Processes	1 442.21	1 442.31	0.01	55.30	55.30	-0.01	7 493.18	7 493.18	0.00
2.A. Mineral Products	1 114.26	1 113.90	-0.03	2.17	2.17	0.00	0.00	0.00	0.00
2.B. Chemical Industry	0.00	0.00	0.00	52.28	52.28	0.00	7 493.18	7 493.18	0.00
2.C. Metal Production	16.53	16.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.D. Other Production	0.00	IE	-100.00						
2.G. Other	311.42	311.88	0.15	0.85	0.84	-0.51	0.00	0.00	0.00
3. Solvent and Other Product Use	0.35	0.00	-100.00				194.47	194.47	0.00
4. Agriculture	0.00	0.00	0.00	10 017.84	10 017.84	0.00	8 323.50	8 323.50	0.00
4.A. Enteric Fermentation				7 911.12	7 911.12	0.00			
PFC, n Manure Management				2 106.72	2 106.72	0.00	229.40	229.40	0.00
SF ₆ , n Rice Cultivation				0.00	0.00	0.00			
4.D. Agricultural Soils ⁽²⁾	0.00	0.00	0.00	0.00	0.00	0.00	8 094.10	8 094.10	0.00
4.E. Prescribed Burning of Savannas				0.00	0.00	0.00	0.00	0.00	0.00
4.F. Field Burning of Agricultural Residues				0.00	0.00	0.00	0.00	0.00	0.00
4.G. Other				0.00	0.00	0.00	0.00	0.00	0.00
5. Land-Use Change and Forestry (net) ⁽³⁾	-1 232.28	-1 232.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.A. Changes in Forest and Other Woody Biomass Stocks			0.00						
5.B. Forest and Grassland Conversion			0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.C. Abandonment of Managed Lands			0.00						
5.D. CO ₂ Emissions and Removals from Soil			0.00						
5.E. Other			0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table A.7.7. CRF Recalculation Table 8.a for 1995 (continued)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES			CO ₂			CH ₄			N ₂ O		
			Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾
			CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)
6. Waste			112.97	908.26	703.97	10 107.53	10 110.66	0.03	156.32	164.13	4.99
6.A.	Solid Waste Disposal on Land		0.00	0.00	0.00	10 076.76	10 080.00	0.03			
6.B.	Wastewater Handling					30.65	30.65	0.01	156.26	152.55	-2.38
6.C.	Waste Incineration	IE	IE			0.00	0.00	0.00	0.00	0.00	0.00
6.D.	Other		112.97	908.26	703.97	0.12	0.01	-92.67	0.06	11.58	18 884.42
7. Other (please specify)			0.00	0.35	100.00	43.52	43.34	-0.42	1 182.98	1 182.98	0.00
	Solvents and other product use			0.35	100.00		1.34	100.00		4.98	100.00
	Polluted surface water				0.00			0.00		1 178.00	100.00
	Degassing drinkwater from ground water				0.00		42.00	100.00			0.00
Memo Items:											
International Bunkers			44 286.00	44 286.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Multilateral Operations			0.00	NE	-100.00	0.00	0.00	0.00	0.00	0.00	0.00
CO₂ Emissions from Biomass			3 531.80	3 597.94	1.87						
GREENHOUSE GAS SOURCE AND SINK CATEGORIES			HFCs			PFCs			SF ₆		
			Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾
			CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)
Total Actual Emissions			5 978.00	6 018.31	0.67	1 866.76	1 866.76	0.00	360.89	275.32	-23.71
2.C.3.	Aluminium Production					1 799.10	1 799.10	0.00			0.00
2.E.	Production of Halocarbons and SF ₆		5 768.22	5 770.76	0.04			0.00			0.00
2F.	Consumption of Halocarbons and SF ₆		209.77	247.55	18.01	67.66	67.66	0.00	360.89	275.32	-23.71
	Other				0.00			0.00			0.00
Potential Emissions from Consumption of HFCs/PFCs and SF₆			928.40	0.00	-100.00	C	C		C	C	
						Previous submission		Latest submission	Difference ⁽¹⁾		
						CO ₂ equivalent (Gg)			(%)		
Total CO ₂ Equivalent Emissions with Land-Use Change and Forestry ⁽²⁾						222 375.87		222 081.51	-0.13		
Total CO ₂ Equivalent Emissions without Land-Use Change and Forestry ⁽³⁾						223 608.15		223 313.79	-0.13		

Table A.7.8. CRF Recalculation Explanation Table 8.b for 1995

Specify the sector and source/sink category ⁽¹⁾ where changes in estimates have occurred:		GHG	RECALCULATION DUE TO		
			CHANGES IN:		Addition/removal/ replacement of source/sink categories
			Methods ⁽²⁾	Emission factors ⁽¹⁾	

ALL	ALL	All	In 2002 the source allocation for 1990, 1995, 1998, 1999 2000 and 2001 has been revised based on a new set of allocation codes in the Dutch inventory, resulting in uniformity in the allocation over the mentioned years. Furthermore the identification of biomass was improved. In the following lines only the major changes due to the improved allocations and other changes are explained.		Data adjusted
1.A.1	Energy industries	all	Change in source allocation (see 6 and 1.A.4)		Data adjusted
1.a.4 ⁵	Other sectors	all	Change in source allocation (see 6 and 1.A.1)		Data adjusted
6.D	Waste / Other	all	Errors from previous submission eliminated. Emissions from combustion of fossil fuels in waste sector were identified and placed in 1.a1 and 1.a4. Some emissions were previous year placed in the wrong sector (1). Furthermore the identification of biomass as fuel was improved		Data adjusted
1.A.3	Transport	All	Improved accuracy		Data adjusted
1.B.2	Oil and Natural Gas	CO2/CH4	Change in source allocation (from 1.a.5)		Data adjusted
2.E	Production of Halocarbons and SF ₆	HFCs	Improved accuracy		Data adjusted
2.F	Consumption of halocarbons and SF ₆	HFCs, SF ₆	Improved accuracy		Data adjusted
6.B	Wastewater handling	CH ₄ /N ₂ O	Improved calculation method		Data adjusted
7	Other	CH ₄	change in source allocation from 3		Data adjusted
3	Product use	CH ₄	change in source allocation to 7		Data adjusted

Table A.7.9. CRF Recalculation Table 8.a for 1996

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		CO ₂			CH ₄			N ₂ O		
		Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾
		CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)
Total National Emissions and Removals		179 706.10	180 304.08	0.33	24 635.27	24 648.11	0.05	20 257.84	17 946.14	-11.41
1. Energy		178 005.69	177 862.12	-0.08	4 732.78	4 731.66	-0.02	716.06	731.56	2.16
1.A.	Fuel Combustion Activities	177 002.69	176 859.12	-0.08	777.68	776.57	-0.14	716.06	731.56	2.16
1.A.1.	Energy Industries	59 305.75	58 337.61	-1.63	119.70	119.70	0.00	3.77	3.74	-1.00
1.A.2.	Manufacturing Industries and Construction	42 239.06	42 999.94	1.80	38.30	38.38	0.23	68.84	86.34	25.42
1.A.3.	Transport	32 609.98	32 641.71	0.10	118.23	115.36	-2.42	614.02	612.09	-0.31
1.A.4.	Other Sectors	42 710.20	42 742.16	0.07	23.87	23.75	-0.48	29.35	29.32	-0.13
1.A.5.	Other	137.70	137.70	0.00	0.22	4.28	1 834.50	0.08	0.08	0.00
1.B.	Fugitive Emissions from Fuels	1 003.00	1 003.00	0.00	3 955.10	3 955.10	0.00	0.00	0.00	0.00
1.B.1.	Solid fuel	IE	IE		0.00	0.00	0.00	0.00	0.00	0.00
1.B.2.	Oil and Natural Gas	1 003.00	1 003.00	0.00	3 955.10	3 955.10	0.00	0.00	0.00	0.00
2. Industrial Processes		1 700.00	1 385.84	-18.48	120.54	119.89	-0.54	9 827.00	7 503.29	-23.65
2.A.	Mineral Products	900.00	899.16	-0.09	2.31	2.41	4.15	0.00	0.00	0.00
2.B.	Chemical Industry	0.00	0.00	0.00	109.20	109.20	0.00	9 827.00	7 503.29	-23.65
2.C.	Metal Production	0.00	0.03	100.00	6.30	6.30	0.00	0.00	0.00	0.00
2.D.	Other Production	0.00	IE	-100.00						
2.G.	Other	800.00	486.65	-39.17	2.73	1.98	-27.32	0.00	0.00	0.00
3. Solvent and Other Product Use		0.41	0.00	-100.00				202.43	202.43	0.00
4. Agriculture		0.00	0.00	0.00	9 735.08	9 735.08	0.00	8 182.45	8 182.45	0.00
4.A.	Enteric Fermentation				7 683.12	7 683.12	0.00			
4.B.	Manure Management				2 051.95	2 051.95	0.00	224.44	224.44	0.00
4.C.	Rice Cultivation				0.00	0.00	0.00			
4.D.	Agricultural Soils ⁽²⁾	0.00	0.00	0.00	0.00	0.00	0.00	7 958.01	7 958.01	0.00
4.E.	Prescribed Burning of Savannas				NO	NO		0.00	0.00	0.00
4.F.	Field Burning of Agricultural Residues				NO	NO		0.00	0.00	0.00
4.G.	Other				0.00	0.00	0.00	0.00	0.00	0.00
5. Land-Use Change and Forestry (net) ⁽³⁾		-1 397.68	-1 397.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.A.	Changes in Forest and Other Woody Biomass Stocks			0.00						
5.B.	Forest and Grassland Conversion			0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.C.	Abandonment of Managed Lands			0.00						
5.D.	CO ₂ Emissions and Removals from Soil			0.00						
5.E.	Other			0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table A.7.9. CRF Recalculation Table 8.a for 1996 (continued)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		CO ₂			CH ₄			N ₂ O		
		Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾
		CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)
6. Waste		0.00	1 055.71	100.00	10 004.87	10 019.48	0.15	151.90	148.41	-2.30
6.A.	Solid Waste Disposal on Land	0.00	0.00	0.00	9 992.90	9 992.90	0.00	0.00		
6.B.	Wastewater Handling				11.97	26.58	122.03	151.90	148.41	-2.30
6.C.	Waste Incineration	IE	IE		0.00	0.00	0.00	0.00	0.00	0.00
6.D.	Other	0.00	1 055.71	100.00	0.00	0.00	0.00	0.00	0.00	0.00
7. Other (please specify)		0.00	0.00	0.00	42.00	42.00	0.00	1 178.00	1 178.00	0.00
	Degassing			0.00	42.00	42.00	0.00	0.00	0.00	0.00
	Polluted surface water			0.00	0.00	0.00	0.00	1 178.00	1 178.00	0.00
				0.00			0.00			0.00
Memo Items:										
International Bunkers		45 445.00	45 445.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Multilateral Operations		0.00	NE	-100.00	0.00	0.00	0.00	0.00	0.00	0.00
CO₂ Emissions from Biomass		4 500.00	5 207.46	15.72						
GREENHOUSE GAS SOURCE AND SINK CATEGORIES		HFCs			PFCs			SF ₆		
		Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾
		CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)
Total Actual Emissions		7 209.41	7 675.65	6.47	2 042.11	2 042.11	0.00	364.71	284.87	-21.89
2.C.3.	Aluminium Production				1 964.30	1 964.30	0.00			0.00
2.E.	Production of Halocarbons and SF ₆	6 708.78	7 110.50	5.99			0.00			0.00
2.F.	Consumption of Halocarbons and SF ₆	500.63	565.16	12.89	77.81	77.81	0.00	364.71	284.87	-21.89
	Other			0.00			0.00			0.00
Potential Emissions from Consumption of HFCs/PFCs and SF₆		1 955.90	0.00	-100.00	C	C		C	C	
					Previous submission	Latest submission	Difference⁽¹⁾			
					CO₂ equivalent (Gg)		(%)			
	Total CO ₂ Equivalent Emissions with Land-Use Change and Forestry ⁽³⁾				232 817.76	231 502.87	-0.56			
	Total CO ₂ Equivalent Emissions without Land-Use Change and Forestry ⁽³⁾				234 215.44	232 900.54	-0.56			

Table A.7.10. CRF Recalculation Explanation Table 8.b for 1996

Specify the sector and source/sink category ⁽¹⁾ where changes in estimates have occurred:		GHG	RECALCULATION DUE TO			Addition/removal/ replacement of source/sink categories
			CHANGES IN:			
			Methods ⁽²⁾	Emission factors ⁽²⁾	Activity data ⁽²⁾	
ALL	ALL	All	In 2002 the source allocation for 1990, 1995 to 2001 has been revised based on a new set of allocation codes in the Dutch inventory, resulting in uniformity in the allocation over the mentioned years. Furthermore the identification of biomass was improved. In the following lines only the major changes due to the improved allocations and other changes are explained.		Data adjusted	
1.A.1/2	Energy	all	Change in source allocation (see also 6 and 1.A.4). Also the process emissions from industry were included in the current rapcode format. In this way the allocation of these emissions was improved and errors from previous submission were eliminated.		Data adjusted	
1.a.4/5	Other sectors	all	Change in source allocation (see 6 and 1.A.1/2)		Data adjusted	
2C	Metal Production	CO2	Change in source allocation and error correction		Data adjusted	
2G	Other	CH4, N2O	Change in source allocation and error correction		Data adjusted	
2A	Mineral Products	CO2, CH4	Change in source allocation and error correction		Data adjusted	
2B	Chemical industry	N2O	recalculation			In conformity with method other years
6.D	Waste / Other	CO2	Errors from previous submission eliminated. Emissions from combustion of fossil fuels in waste sector were identified and placed in 1a1 and 1a4. Some emissions were previous year placed in the wrong sector (1). Furthermore the identification of biomass as fuel was improved. Especially the use of biomass in MSW combustion was recalculated on the basis of waste amounts.		Data adjusted	
6b	waste water handling	all	recalculation		Data adjusted	
1.A.3	Transport	All			Data adjusted	
2.E	Production of halocarbons and SF6	HFCs			Data adjusted	
2.F	Consumption of halocarbons and SF6	HFC's, SF6			Data adjusted	
3	Product use	CH4	change in source allocation to 7		Data adjusted	

Table A.7.11. CRF Recalculation Table 8.a for 1997

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO ₂			CH ₄			N ₂ O		
	Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾
	CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)
Total National Emissions and Removals	168 973.40	168 668.75	-0.18	23 114.92	23 102.79	-0.05	21 109.39	17 786.47	-15.74
1. Energy	167 101.42	165 994.83	-0.66	3 903.78	3 903.33	-0.01	684.56	715.75	4.56
1.A. Fuel Combustion Activities	166 083.56	164 976.97	-0.67	618.20	617.75	-0.07	684.56	715.75	4.56
1.A.1. Energy Industries	58 199.71	57 180.81	-1.75	62.05	62.06	0.01	28.86	5.88	-79.61
1.A.2. Manufacturing Industries and Construction	39 010.10	38 867.78	-0.36	23.23	20.82	-10.38	8.59	64.87	655.09
1.A.3. Transport	33 046.85	33 067.42	0.06	110.76	108.63	-1.92	621.89	619.67	-0.36
1.A.4. Other Sectors	35 826.89	35 860.96	0.10	20.10	20.11	0.04	25.22	25.33	0.42
1.A.5. Other	0.00	0.00	0.00	0.00	3.93	100.00	0.00	0.00	0.00
1.B. Fugitive Emissions from Fuels	1 017.86	1 017.86	0.00	3 285.58	3 285.58	0.00	0.00	0.00	0.00
1.B.1. Solid fuel	IE	IE		0.00	0.00	0.00	0.00	0.00	0.00
1.B.2. Oil and Natural Gas	1 017.86	1 017.86	0.00	3 285.58	3 285.58	0.00	0.00	0.00	0.00
2. Industrial Processes	1 726.54	1 428.25	-17.28	57.23	55.77	-2.56	10 843.73	7 487.48	-30.95
2.A. Mineral Products	1 087.17	1 083.73	-0.32	2.94	2.91	-1.11	0.00	0.00	0.00
2.B. Chemical Industry	277.22	0.00	-100.00	51.73	51.73	0.01	10 843.63	7 487.38	-30.95
2.C. Metal Production	0.00	2.50	100.00	0.00	0.00	0.00	0.00	0.00	0.00
2.D. Other Production	0.00	IE	-100.00						
2.G. Other	362.15	342.02	-5.56	2.57	1.13	-55.88	0.10	0.10	0.00
3. Solvent and Other Product Use	0.46	0.00	-100.00				170.85	170.85	0.00
4. Agriculture	0.00	0.00	0.00	9 361.80	9 361.80	0.00	8 055.66	8 055.66	0.00
4.A. Enteric Fermentation				7 405.44	7 405.44	0.00			
4.B. Manure Management				1 956.36	1 956.36	0.00	214.83	214.83	0.00
4.C. Rice Cultivation				0.00	0.00	0.00			
4.D. Agricultural Soils ⁽²⁾	0.00	0.00	0.00	0.00	0.00	0.00	7 840.83	7 840.83	0.00
4.E. Prescribed Burning of Savannas				0.00	0.00	0.00	0.00	0.00	0.00
4.F. Field Burning of Agricultural Residues				0.00	0.00	0.00	0.00	0.00	0.00
4.G. Other				0.00	0.00	0.00	0.00	0.00	0.00
5. Land-Use Change and Forestry (net)⁽³⁾	-1 180.35	-1 180.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.A. Changes in Forest and Other Woody Biomass Stocks			0.00						
5.B. Forest and Grassland Conversion			0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.C. Abandonment of Managed Lands			0.00						
5.D. CO ₂ Emissions and Removals from Soil			0.00						
5.E. Other			0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table A.7.11. CRF Recalculation Table 8.a. for 1997 (continued)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		CO ₂			CH ₄			N ₂ O		
		Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾
		CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)
6. Waste		144.98	1 245.20	758.88	9 750.74	9 739.89	-0.11	176.59	178.73	1.21
6.A. Solid Waste Disposal on Land		0.00	0.00	0.00	9 723.28	9 723.28	0.00			
6.B. Wastewater Handling					27.21	16.62	-38.94	176.51	178.73	1.26
6.C. Waste Incineration		IE	IE		0.00	0.00	0.00	0.00	0.00	0.00
6.D. Other		144.98	1 245.20	758.88	0.25	0.00	-100.00	0.08	0.00	-100.00
7. Other (please specify)	---	0.00	0.00	0.00	41.37	42.00	1.52	1 178.00	1 178.00	0.00
Solvents and other product use				0.00	41.37	42.00	1.52	0.00	0.00	0.00
Polluted surface water				0.00			0.00	1 178.00	1 178.00	0.00
				0.00			0.00			0.00
Memo Items:										
International Bunkers		48 509.00	48 509.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Multilateral Operations		0.00	NE	-100.00	0.00	0.00	0.00	0.00	0.00	0.00
CO ₂ Emissions from Biomass		5 313.85	6 002.84	12.97						
GREENHOUSE GAS SOURCE AND SINK CATEGORIES		HFCs			PFCs			SF ₆		
		Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾
		CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)
Total Actual Emissions		8 213.84	8 306.57	1.13	2 153.98	2 153.98	0.00	385.51	311.39	-19.23
2.C.3. Aluminium Production					2 064.50	2 064.50	0.00			0.00
2.E. Production of Halocarbons and SF ₆		7 415.74	7 415.62	0.00			0.00			0.00
2.F. Consumption of Halocarbons and SF ₆		798.10	890.95	11.63	89.48	89.48	0.00	385.51	311.39	-19.23
Other		0.00		0.00			0.00			0.00
Potential Emissions from Consumption of HFCs/PFCs and SF ₆		2 159.50	0.00	-100.00	C	C		C	C	
					Previous submission	Latest submission	Difference ⁽¹⁾			
					CO ₂ equivalent (Gg)		(%)			
Total CO ₂ Equivalent Emissions with Land-Use Change and Forestry ⁽²⁾					222 770.69		219 149.14	-1.63		
Total CO ₂ Equivalent Emissions without Land-Use Change and Forestry ⁽²⁾					223 951.04		220 329.49	-1.62		

Table A.7.12. CRF Recalculation Explanation Table 8.b for 1997

Specify the sector and source/sink category ⁽¹⁾ where changes in estimates have occurred:		GHG	RECALCULATION DUE TO			Addition/removal/ replacement of source/sink categories
			CHANGES IN:			
			Methods ⁽²⁾	Emission factors ⁽²⁾	Activity data ⁽²⁾	
...						
ALL	ALL	All	In 2002 the source allocation for 1990, 1995, 1998, 1999 2000 and 2001 has been revised based on a new set of allocation codes in the Dutch inventory, resulting in uniformity in the allocation over the mentioned years. Furthermore the identification of biomass was improved. In the following lines only the major changes due to the improved allocations and other changes are explained.		Data adjusted	
1.A.1/2	Energy	all	Change in source allocation (see also 6 and 1.A.4). Also the process emissions from industry were included in the current rapcode format. In this way the allocation of these emissions was improved and errors from previous submission were eliminated.		Data adjusted	
1.a.4/5	Other sectors	all	Change in source allocation (see 6 and 1.A.1/2)		Data adjusted	
6.D	Waste / Other	all	Errors from previous submission eliminated. Emissions from combustion of fossil fuels in waste sector were identified and placed in 1a1 and 1a4. Some emissions were previous year placed in the wrong sector (1). Furthermore the identification of biomass as fuel was improved. Especially the use of biomass in MSW combustion was recalculated on the basis of waste amounts.		Data adjusted	
6b	waste water handling	all	recalculation		Data adjusted	
2	Industrial processes	all	SEE 1.a.1/2			
1.A.3	Transport	All			Data adjusted	
2A	Mineral Products	CO2, CH4	Change in source allocation and error correction		Data adjusted	
2B	Chemical industry	CO2	Change in source allocation and error correction		Data adjusted	
2C	Metal Production	CO2	Change in source allocation and error correction		Data adjusted	
2G	Industrial processes	CO2, CH4	Change in source allocation to 1A2		Data adjusted	
2.F	Consumption of halocarbons and SF6	HFCs, SF6	Data adjusted based on new analysis of activity data		Data adjusted	

A.7.13. CRF Recalculation Table 8.a for 1998

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO ₂			CH ₄			N ₂ O		
	Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾
	CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)
Total National Emissions and Removals	175 056.88	173 787.79	-0.72	22 356.58	22 356.89	0.00	17 822.36	17 629.30	-1.08
1. Energy	173 180.42	172 013.75	-0.67	3 721.75	3 725.02	0.09	828.21	821.03	-0.87
1.A. Fuel Combustion Activities	171 626.89	170 460.22	-0.68	644.09	647.36	0.51	828.21	821.03	-0.87
1.A.1. Energy Industries	60 378.90	60 195.17	-0.30	89.28	92.47	3.58	142.74	142.90	0.12
1.A.2. Manufacturing Industries and Construction	43 243.56	42 436.63	-1.87	36.85	34.75	-5.70	31.38	30.95	-1.36
1.A.3. Transport	33 983.77	33 785.26	-0.58	106.09	104.59	-1.42	629.98	623.05	-1.10
1.A.4. Other Sectors	34 009.72	34 032.22	0.07	410.18	410.54	0.09	24.08	24.08	0.02
1.A.5. Other	10.94	10.94	0.00	1.68	5.01	198.12	0.04	0.04	0.00
1.B. Fugitive Emissions from Fuels	1 553.53	1 553.53	0.00	3 077.66	3 077.66	0.00	0.00	0.00	0.00
1.B.1. Solid fuel	IE	IE		0.00	0.00	0.00	0.00	0.00	0.00
1.B.2. Oil and Natural Gas	1 553.53	1 553.53	0.00	3 077.66	3 077.66	0.00	0.00	0.00	0.00
2. Industrial Processes	1 318.99	1 318.99	0.00	50.48	50.48	0.00	7 658.23	7 471.00	-2.44
2.A. Mineral Products	1 025.40	1 025.40	0.00	2.68	2.68	0.00	0.00	0.00	0.00
2.B. Chemical Industry	0.00	0.00	0.00	46.72	46.72	0.00	7 658.23	7 471.00	-2.44
2.C. Metal Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.D. Other Production	IE	IE							
2.G. Other	293.59	293.59	0.00	1.08	1.08	0.00	0.00	0.00	0.00
3. Solvent and Other Product Use	0.46	0.00	-100.00				160.30	160.30	0.00
4. Agriculture	0.00	0.00	0.00	9 128.91	9 128.91	0.00	7 826.88	7 826.88	0.00
4.A. Enteric Fermentation	0.00			7 169.19	7 169.19	0.00			
4.B. Manure Management	0.00			1 959.72	1 959.72	0.00	208.94	208.94	0.00
4.C. Rice Cultivation	0.00			0.00	0.00	0.00			
4.D. Agricultural Soils ⁽²⁾	0.00	0.00	0.00	0.00	0.00	0.00	7 617.94	7 617.94	0.00
4.E. Prescribed Burning of Savannas	0.00			0.00	0.00	0.00	0.00	0.00	0.00
4.F. Field Burning of Agricultural Residues	0.00			0.00	0.00	0.00	0.00	0.00	0.00
4.G. Other	0.00			0.00	0.00	0.00	0.00	0.00	0.00
5. Land-Use Change and Forestry (net)⁽³⁾	-1 379.57	-1 379.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.A. Changes in Forest and Other Woody Biomass Stocks			0.00						
5.B. Forest and Grassland Conversion			0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.C. Abandonment of Managed Lands			0.00						
5.D. CO ₂ Emissions and Removals from Soil			0.00						
5.E. Other			0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table A.7.13. CRF Recalculation Table 8.a for 1998 (continued)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES			CO ₂			CH ₄			N ₂ O		
			Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾
			CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)
6. Waste			557.02	454.60	-18.39	9 414.77	9 411.80	-0.03	164.29	165.65	0.83
6.A.	Solid Waste Disposal on Land		0.00	0.00	0.00	9 335.19	9 335.19	0.00			
6.B.	Wastewater Handling					79.47	76.61	-3.60	164.23	165.65	0.86
6.C.	Waste Incineration		IE	IE		0.00	0.00	0.00	0.00	0.00	0.00
6.D.	Other		557.02	454.60	-18.39	0.10	0.00	-100.00	0.06	0.00	-100.00
7. Other (please specify) ***			0.00	0.46	100.00	40.67	40.67	0.00	1 184.44	1 184.44	0.00
	Solvents and other product use		40.67	40.67	0.00	40.67	40.67	0.00	0.00	6.44	100.00
	Polluted surface water				0.00	0.00	0.00	0.00	1 184.44	1 178.00	-0.54
					0.00			0.00			0.00
Memo Items:											
International Bunkers			49 531.00	49 531.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Multilateral Operations			0.00	NE	-100.00	0.00	0.00	0.00	0.00	0.00	0.00
CO₂ Emissions from Biomass			4 859.30	5 365.77	10.42						
GREENHOUSE GAS SOURCE AND SINK CATEGORIES			HFCs			PFCs			SF ₆		
			Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾
			CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)
Total Actual Emissions			9 200.63	9 360.42	1.74	1 727.48	1 727.52	0.00	369.11	294.58	-20.19
2.C.3.	Aluminium Production					1 624.58	1 624.62	0.00			0.00
2.E.	Production of Halocarbons and SF ₆		8 256.18	8 309.72	0.65			0.00			0.00
2.F.	Consumption of Halocarbons and SF ₆		944.46	1 050.69	11.25	102.90	102.90	0.00	369.11	294.58	-20.19
	Other				0.00			0.00			0.00
Potential Emissions from Consumption of HFCs/PFCs and SF₆			2 301.20	0.00	-100.00	C	C		C	C	
			Previous submission			Latest submission			Difference ⁽¹⁾		
			CO ₂ equivalent (Gg)			CO ₂ equivalent (Gg)			(%)		
Total CO ₂ Equivalent Emissions with Land-Use Change and Forestry ⁽³⁾			225 153.47			223 776.92			-0.61		
Total CO ₂ Equivalent Emissions without Land-Use Change and Forestry ⁽³⁾			226 533.04			225 156.49			-0.61		

Table A.7.14. CRF Recalculation Explanation Table 8.b for 1998

Specify the sector and source/sink category ⁽¹⁾ where changes in estimates have occurred:		GHG	RECALCULATION DUE TO			Addition/removal/ replacement of source/sink categories
			CHANGES IN:			
			Methods ⁽²⁾	Emission factors ⁽²⁾	Activity data ⁽²⁾	

ALL	ALL	All	In 2002 the source allocation for 1990, 1995, 1998, 1999 2000 and 2001 has been revised based on a new set of allocation codes in the Dutch inventory, resulting in uniformity in the allocation over the mentioned years.		Data adjusted	
			Furthermore the identification of biomass was improved. In the following lines only the major changes due to the improved allocations and other changes are explained.			
1.A.1/2	Energy	all	Change in source allocation (see also 6 and 1.A.4). In this way the allocation of these emissions was improved and errors from previous submission were eliminated.		Data adjusted	
6.D	Waste / Other	all	Errors from previous submission eliminated. Emissions from combustion of fossil fuels in waste sector were identified and placed in 1a1 and 1a4. Some emissions were previous year placed in the wrong sector (1). Furthermore the identification of biomass as fuel was improved. Especially the use of biomass in MSW combustion was recalculated on the basis of waste amounts.		Data adjusted	
1.A.3	Transport	All			Data adjusted	
2.E	Production of Halocarbons and SF6	HFCs			Data adjusted	
2.F	Consumption of halocarbons and SF6	HFCs, SF6			Data adjusted	
3	Product use	all	change in allocation to 7		Data adjusted	
7	Other	all	change in allocation from 3		Data adjusted	
6B	Wastewater handling	CH4/N2O	Improved calculation method		Data adjusted	

Table A.7.15. CRF Recalculation Table 8.a for 1999

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		CO ₂		Difference ⁽¹⁾	CH ₄			N ₂ O		
		Previous submission	Latest submission		Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾
		CO ₂ equivalent (Gg)			CO ₂ equivalent (Gg)		CO ₂ equivalent (Gg)		CO ₂ equivalent (Gg)	
				(%)			(%)			(%)
Total National Emissions and Removals		172 060.76	170 685.58	-0.80	21 793.43	21 786.80	-0.03	17 361.89	17 367.35	0.03
1. Energy		170 291.88	168 347.70	-1.14	3 723.96	3 726.77	0.08	820.93	815.38	-0.68
1 A.	Fuel Combustion Activities	168 724.37	166 832.15	-1.12	694.18	696.09	0.28	820.93	815.38	-0.68
1 A.1.	Energy Industries	57 910.63	56 670.61	-2.14	126.74	126.09	-0.51	141.40	141.67	0.19
1 A.2.	Manufacturing Industries and Construction	43 150.10	42 299.75	-1.97	66.16	63.97	-3.31	23.35	20.73	-11.22
1 A.3.	Transport	34 682.35	34 795.34	0.33	100.40	101.15	0.74	633.04	629.67	-0.53
1 A.4.	Other Sectors	32 981.26	33 066.42	0.26	399.22	399.64	0.11	23.14	23.31	0.72
1 A.5.	Other	0.04	0.04	0.00	1.66	5.24	214.71	0.00	0.00	0.00
1 B.	Fugitive Emissions from Fuels	1 567.50	1 515.55	-3.31	3 029.78	3 030.68	0.03	0.00	0.00	0.00
1 B.1.	Solid fuel	IE	IE		0.00	0.00	0.00	0.00	0.00	0.00
1 B.2.	Oil and Natural Gas	1 567.50	1 515.55	-3.31	3 029.78	3 030.68	0.03	0.00	0.00	0.00
2. Industrial Processes		1 315.57	1 315.45	-0.01	56.91	56.91	0.00	7 198.90	7 201.07	0.03
2 A.	Mineral Products	974.97	974.97	0.00	2.95	2.95	0.00	0.00	0.00	0.00
2 B.	Chemical Industry	0.00	0.00	0.00	53.17	53.17	0.00	7 187.48	7 189.65	0.03
2 C.	Metal Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 D.	Other Production	0.00	IE	-100.00						
2 G.	Other	340.60	340.48	-0.04	0.79	0.79	0.00	11.42	11.42	0.00
3. Solvent and Other Product Use		0.57	0.00	-100.00				155.67	155.67	0.00
4. Agriculture		0.00	0.00	0.00	8 925.21	8 925.21	0.00	7 822.85	7 822.85	0.00
4 A.	Enteric Fermentation				7 011.59	7 011.69	0.00			
4 B.	Manure Management				1 913.63	1 913.52	-0.01	202.28	202.28	0.00
4 C.	Rice Cultivation				NO	NO				
4 D.	Agricultural Soils ⁽²⁾	0.00	0.00	0.00	IE	IE		7 620.58	7 620.58	0.00
4 E.	Prescribed Burning of Savannas				NO	NO		0.00	0.00	0.00
4 F.	Field Burning of Agricultural Residues				NO	NO		0.00	0.00	0.00
4 G.	Other				0.00	0.00	0.00	0.00	0.00	0.00
5. Land-Use Change and Forestry (net) ⁽²⁾		-1 235.57	-1 235.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 A.	Changes in Forest and Other Woody Biomass Stocks			0.00						
5 B.	Forest and Grassland Conversion			0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 C.	Abandonment of Managed Lands			0.00						
5 D.	CO ₂ Emissions and Removals from Soil			0.00						
5 E.	Other			0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table A.7.15. CRF Recalculation Table 8.a for 1999 (continued)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES			CO ₂			CH ₄			N ₂ O		
			Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾
			CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)
6. Waste			452.74	1 021.86	125.71	9 046.59	9 037.01	-0.11	177.48	186.32	4.98
6 A.	Solid Waste Disposal on Land		0.00	0.00	0.00	8 993.65	8 993.65	0.00			
6 B.	Wastewater Handling		0.00	0.00		52.83	43.36	-17.94	177.42	175.36	-1.16
6 C.	Waste Incineration		IE	IE		IE	IE		IE	IE	
6 D.	Other		452.74	1 021.86	125.71	0.11	0.00	-100.00	0.06	10.95	19 642.89
7. Other (please specify)			0.00	0.57	100.00	40.76	40.90	0.33	1 186.05	1 186.05	0.00
	Solvents and other product use		0.00	0.57	100.00	40.76	0.40	-99.02	0.00	8.05	100.00
	Polluted surface water				0.00		40.50	100.00	1 186.05	1 178.00	-0.68
			0.00	0.00	0.00	0.00		0.00			0.00
Memo Items:											
International Bunkers			51 213.63	51 213.63	0.00	NE	NE		0.00	0.00	0.00
Multilateral Operations			0.00	NE	-100.00	NE	NE		0.00	0.00	0.00
CO₂ Emissions from Biomass			4 892.70	4 976.78	1.72						
GREENHOUSE GAS SOURCE AND SINK CATEGORIES			HFCs			PFCs			SF ₆		
			Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾
			CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)
Total Actual Emissions			7 240.66	7 242.83	0.03	1 444.39	1 444.39	0.00	336.27	265.03	-21.19
2.C.3.	Aluminium Production					1 326.03	1 326.03	0.00			0.00
2.E.	Production of Halocarbons and SF ₆		3 817.70	3 824.52	0.18			0.00			0.00
2.F.	Consumption of Halocarbons and SF ₆		1 008.77	1 072.42	6.31	118.36	118.36	0.00	336.27	265.03	-21.19
	Other				0.00	0.00	0.00	0.00	0.00	0.00	0.00
Potential Emissions from Consumption of HFCs/PFCs and SF₆				P	-100.00	C	C		C	C	
			Previous submission			Latest submission			Difference ⁽¹⁾		
			CO ₂ equivalent (Gg)			CO ₂ equivalent (Gg)			(%)		
Total CO ₂ Equivalent Emissions with Land-Use Change and Forestry ⁽³⁾			216 587.64			215 210.52			-0.64		
Total CO ₂ Equivalent Emissions without Land-Use Change and Forestry ⁽³⁾			217 823.21			216 446.09			-0.63		

Table A.7.16. CRF Recalculation Explanation Table 8.b for 1999

Specify the sector and source/sink category ⁽¹⁾ where changes in estimates have occurred:		GHG	RECALCULATION DUE TO			
			CHANGES IN:			Addition/removal/ replacement of source/sink categories
			Methods ⁽²⁾	Emission factors ⁽²⁾	Activity data ⁽¹⁾	
...						
ALL	ALL	All	In 2002 the source allocation for 1990, 1995, 1998, 1999 2000 and 2001 has been revised based on a new set of allocation codes in the Dutch inventory, resulting in uniformity in the allocation over the mentioned years. Furthermore the identification of biomass was improved. In the following lines only the major changes due to the improved allocations and other changes are explained.		Data adjusted	
1.A.1/2	Energy	all	Change in source allocation (see also 6 and 1.A.4). In this way the allocation of these emissions was improved and errors from previous submission were eliminated.		Data adjusted	
6.D	Waste / Other	all	Errors from previous submission eliminated. Emissions from combustion of fossil fuels in waste sector were identified and placed in 1a1 and 1a4. Some emissions were previous year placed in the wrong sector (1).		Data adjusted	
			Furthermore the identification of biomass as fuel was improved. Especially the use of biomass in MSW combustion was recalculated on the basis of waste amounts.			
1.A.3	Transport	All			Data adjusted	
2.F	Production of Halocarbons and SF ₆	HFCs			Data adjusted	
2.F	Consumption of halocarbons and SF ₆	HFCs, SF ₆			Data adjusted	
6B	Wastewater handling	CH ₄ /N ₂ O	Improved calculation method		Data adjusted	
3	Product use	all	change in allocation to 7		Data adjusted	
7	Other	all	change in allocation from 3		Data adjusted	

Table A.7.17. CRF Recalculation Table 8.a for 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO ₂			CH ₄			N ₂ O		
	Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾
	CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)
Total National Emissions and Removals	172 114.08	172 426.78	0.18	20 637.77	20 647.53	0.05	16 979.69	16 659.01	-1.89
1. Energy	171 714.18	172 252.02	0.31	3 443.17	3 458.07	0.43	797.97	830.86	4.12
1.A. Fuel Combustion Activities	170 142.30	170 661.29	0.31	687.55	707.85	2.95	797.97	830.86	4.12
1.A.1. Energy Industries	59 084.78	61 222.17	3.62	124.74	125.11	0.29	131.75	150.71	14.40
1.A.2. Manufacturing Industries and Construction	43 002.78	39 676.73	-7.73	67.05	68.88	2.73	22.33	36.72	64.46
1.A.3. Transport	35 119.57	35 212.50	0.26	93.85	91.47	-2.53	621.06	619.03	-0.33
1.A.4. Other Sectors	32 935.13	34 549.90	4.90	19.06	19.80	3.87	22.83	24.40	6.88
1.A.5. Other	0.04	0.00	-100.00	1.66	6.66	300.39	0.00	0.00	0.00
1.B. Fugitive Emissions from Fuels	1 571.88	1 590.73	1.20	2 755.61	2 750.22	-0.20	0.00	0.00	0.00
1.B.1. Solid fuel	IE	IE		0.00	0.00	0.00	0.00	0.00	0.00
1.B.2. Oil and Natural Gas	1 571.88	1 590.73	1.20	2 755.61	2 750.22	-0.20	0.00	0.00	0.00
2. Industrial Processes	1 360.00	1 237.61	-9.00	58.79	32.35	-44.98	7 118.84	7 120.46	0.02
2.A. Mineral Products	981.30	857.12	-12.65	2.82	3.04	7.75	0.00	0.00	0.00
2.B. Chemical Industry	0.00	0.00	0.00	55.88	28.89	-48.30	7 118.84	7 120.46	0.02
2.C. Metal Production	21.50	0.00	-100.00	0.07	0.00	-100.00	0.00	0.00	0.00
2.D. Other Production	0.00	IE	-100.00						
2.G. Other	357.20	380.48	6.52	0.01	0.41	4 850.44	0.00	0.00	0.00
3. Solvent and Other Product Use	0.42	0.00	-100.00				154.55	137.66	-10.93
4. Agriculture	0.00	0.00	0.00	8 563.38	8 621.13	0.67	7 546.95	7 192.00	-4.70
4.A. Enteric Fermentation				6 708.03	6 708.03	0.00			
4.B. Manure Management				1 855.35	1 913.10	3.11	195.30	192.20	-1.59
4.C. Rice Cultivation				NO	NO				
4.D. Agricultural Soils ⁽²⁾	0.00	0.00	0.00	IE	IE		7 351.65	6 999.80	-4.79
4.E. Prescribed Burning of Savannas				NO	NO		NO	NO	
4.F. Field Burning of Agricultural Residues				NO	NO		NO	NO	
4.G. Other				0.00	0.00	0.00	0.00	0.00	0.00
5. Land-Use Change and Forestry (net) ⁽³⁾	-1 413.26	-1 413.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.A. Changes in Forest and Other Woody Biomass Stocks			0.00						
5.B. Forest and Grassland Conversion			0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.C. Abandonment of Managed Lands			0.00						
5.D. CO ₂ Emissions and Removals from Soil			0.00						
5.E. Other			0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table A.7.17. CRF Recalculation Table 8.a for 2000 (continued)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		CO ₂			CH ₄			N ₂ O		
		Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾
		CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)
6. Waste		452.74	350.00	-22.69	8 532.61	8 495.88	-0.43	177.48	194.13	9.38
6 A. Solid Waste Disposal on Land		0.00	0.00	0.00	8 479.67	8 479.59	0.00			
6 B. Wastewater Handling					52.83	16.29	-69.17	177.42	194.13	9.42
6 C. Waste Incineration		IE	IE		IE	IE		IE	IE	
6 D. Other		452.74	350.00	-22.69	0.11	0.00	-99.33	0.06	0.00	-100.00
7. Other (please specify) ***		0.00	0.42	100.00	39.82	40.11	0.72	1 183.90	1 183.90	0.00
Solvents and other product use			0.42	100.00		0.50	100.00		5.90	100.00
Polluted surface water				0.00			-100.00		1 178.00	100.00
Degassing drinkwater from ground water				0.00		39.61	100.00			0.00
Memo Items:										
International Bunkers		53 500.11	53 500.11	0.00	0.00	39.61	100.00	0.00	0.00	0.00
Multilateral Operations		0.00	0.00	0.00	NE	NE		NE	NE	
CO₂ Emissions from Biomass		4 988.57	4 988.57	0.00						
GREENHOUSE GAS SOURCE AND SINK CATEGORIES		HFCs			PFCs			SF ₆		
		Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾	Previous submission	Latest submission	Difference ⁽¹⁾
		CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)	CO ₂ equivalent (Gg)		(%)
Total Actual Emissions		3 912.77	3 874.55	-0.98	1 526.44	1 526.44	0.00	326.95	268.65	-17.83
2 C.3. Aluminium Production					1 390.36	1 390.36	0.00			0.00
2 E. Production of Halocarbons and SF ₆		2 833.86	2 838.43	0.16			0.00			0.00
2 F. Consumption of Halocarbons and SF ₆		1 078.91	1 036.12	-3.97	136.08	136.08	0.00	326.95	268.65	-17.83
Other				0.00			0.00			0.00
Potential Emissions from Consumption of HFCs/PFCs and SF₆		2 942.40	0.00	-100.00	C	C		C	C	
					Previous submission		Latest submission	Difference ⁽¹⁾		
					CO ₂ equivalent (Gg)			(%)		
Total CO ₂ Equivalent Emissions with Land-Use Change and Forestry ⁽²⁾					215 497.70		215 402.96	-0.04		
Total CO ₂ Equivalent Emissions without Land-Use Change and Forestry ⁽³⁾					216 910.96		216 816.22	-0.04		

Table A.7.18. CRF Recalculation Explanation Table 8.b for 2000

Specify the sector and source/sink category ⁽¹⁾ where changes in estimates have occurred:		GHG	RECALCULATION DUE TO			Addition/removal/ replacement of source/sink categories
			CHANGES IN:			
			Methods ⁽²⁾	Emission factors ⁽²⁾	Activity data ⁽²⁾	
...						
All	All	All	The provisional data for 2000 are now finalised. The final figures were linked to the final source codes (RAPCODES). In this process the allocation of emissions changes considerable.		Final figures are used now	
1,2,3	All Energy and Industrial sources	All	Especially in these categories the allocation is changed in the finalisation process.		Final figures are used now	
2.E	Production of Halocarbons and SF6	HFCs			Data adjusted	
2.F	Consumption of halocarbons and SF6	HFCs, SF6			Data adjusted	
4D	Agricultural soils	N2O	Recalculation based on final data		Data adjusted	
6B	Wastewater handling	CH4/N2O	Improved calculationmethod		Data adjusted	

7.3 CRF Trend Tables 10 for greenhouse gases

This appendix shows a copy of sheets from the CRF data files, presenting unrounded figures. The number of digits shown does not represent the uncertainty estimated for the emissions (see *Section 1.7*).

Please note that all data for 2000 are preliminary.

Sheets are presented for, respectively:

- CO₂
- CH₄
- N₂O
- HFCs, PFCs and SF₆
- All gases and source categories in CO₂-eq.

Table A.7.19. Emissions of greenhouse gases in the Netherlands; *CRF Trend Table 10: CO₂*

	Base year(1)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
GREENHOUSE GAS SOURCE AND SINK CATEGORIES													
(Gg)													
1. Energy	156 808	156 808	165 921	164 363	166 724	167 330	170 051	177 862	165 995	172 014	168 348	172 252	178 381
A. Fuel Combustion (Sectoral Approach)	156 500	156 500	165 461	163 993	166 374	167 140	169 241	176 859	164 977	170 460	166 832	170 661	176 715
1. Energy Industries	51 305	51 305	52 190	54 130	53 800	55 980	56 540	58 338	57 181	60 195	56 671	61 222	64 776
2. Manufacturing Industries and Construction	41 888	41 888	42 660	42 510	39 920	40 950	42 601	43 000	38 868	42 437	42 300	39 677	40 197
3. Transport	29 122	29 122	29 151	30 393	30 944	31 184	32 163	32 642	33 067	33 785	34 795	35 212	35 608
4. Other Sectors	34 185	34 185	40 390	37 330	40 060	38 466	37 933	42 742	35 861	34 032	33 066	34 550	36 134
5. Other	1	1	1 070	-370	1 650	560	4	138	0	11	0	0	0
B. Fugitive Emissions from Fuels	308	308	460	370	350	190	810	1 003	1 018	1 554	1 516	1 591	1 666
1. Solid Fuels	0	0	0	0	0	0	0	0	0	0	0	0	0
2. Oil and Natural Gas	308	308	460	370	350	190	810	1 003	1 018	1 554	1 516	1 591	1 666
2. Industrial Processes	1 581	1 581	1 500	1 270	1 210	1 440	1 442	1 386	1 428	1 319	1 315	1 238	1 124
A. Mineral Products	1 124	1 124	700	750	1 050	1 050	1 114	899	1 084	1 025	975	857	805
B. Chemical Industry	0	0	0	0	0	0	0	0	0	0	0	0	0
C. Metal Production	0	0	0	0	0	0	17	0	3	0	0	0	0
D. Other Production	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
E. Production of Halocarbons and SF ₆													
F. Consumption of Halocarbons and SF ₆													
G. Other	457	457	800	520	160	390	312	487	342	294	340	380	319
3. Solvent and Other Product Use	0	0	100	100	0	0	0	0	0	0	0	0	0
4. Agriculture	0	0	0	0	0	0	0	0	0	0	0	0	0
A. Enteric Fermentation	0	0	0	0	0	0	0	0	0	0	0	0	0
B. Manure Management	0	0	0	0	0	0	0	0	0	0	0	0	0
C. Rice Cultivation	0	0	0	0	0	0	0	0	0	0	0	0	0
D. Agricultural Soils (2)	0	0	0	0	0	0	0	0	0	0	0	0	0
E. Prescribed Burning of Savannas	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
F. Field Burning of Agricultural Residues	0	0	0	0	0	0	0	0	0	0	0	0	0
G. Other	0	0	0	0	0	0	0	0	0	0	0	0	0
5. Land-Use Change and Forestry (3)	-1 422	-1 422	-1 528	-1 487	-1 806	-1 929	-1 232	-1 398	-1 180	-1 380	-1 236	-1 413	-1 413
A. Changes in Forest and Other Woody Biomass Stocks	-1 422	-1 422	-1 528	-1 487	-1 806	-1 929	-1 232	-1 398	-1 180	-1 380	-1 236	-1 413	-1 413
B. Forest and Grassland Conversion	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
C. Abandonment of Managed Lands	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
D. CO ₂ Emissions and Removals from Soil	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
E. Other	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
6. Waste	881	881	0	0	0	0	908	1 056	1 245	455	1 022	350	350
A. Solid Waste Disposal on Land	0	0	0	0	0	0	0	0	0	0	0	0	0
B. Waste-water Handling	0	0	0	0	0	0	0	0	0	0	0	0	0
C. Waste Incineration	0	0	0	0	0	0	0	0	0	0	0	0	0
D. Other	881	881	0	0	0	0	908	1 056	1 245	455	1 022	350	350
7. Other (please specify) ---	0	0	0	0	0	0	0	0	0	0	1	0	0
Solvent and other product use	0	0	0	0	0	0	0	0	0	0	1	0	0
Polluted surface water	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Emissions/Removals with LUCF (4)	157 848	157 848	165 993	164 246	166 129	166 841	171 169	178 906	167 488	172 408	169 450	172 427	178 442
Total Emissions without LUCF(4)	159 270	159 270	167 521	165 733	167 934	168 770	172 402	180 304	168 669	173 788	170 686	173 840	179 855
Memo Items:													
International Bunkers	39 765	39 765	41 290	42 400	44 280	42 860	44 286	45 445	48 509	49 531	51 214	53 496	57 546
Aviation	4 497	4 497	4 960	5 910	6 500	6 720	7 665	8 249	8 979	9 709	10 070	10 067	9 864
Marine	35 267	35 267	36 330	36 490	37 780	36 140	36 621	37 196	39 530	39 822	41 143	43 429	47 682
Multilateral Operations	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
CO₂ Emissions from Biomass	3 394	3 394	2 700	2 600	3 300	3 500	3 598	6 248	6 003	5 366	4 977	5 182	5 144

Table A.7.20. Emissions of greenhouse gases in the Netherlands; CRF Trend Table 10: CH₄

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year(1)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
	(Gg)												
Total Emissions	1 292.36	1 292.36	1 308.52	1 253.09	1 225.94	1 202.86	1 170.20	1 173.72	1 100.11	1 064.61	1 037.47	983.22	973.16
1. Energy	213.17	213.17	223.80	199.02	192.41	202.17	207.00	225.32	185.87	177.38	177.47	164.67	168.92
A. Fuel Combustion (Sectoral Approach)	34.39	34.39	35.70	35.92	34.41	33.67	36.68	36.98	29.42	30.83	33.15	33.71	34.58
1. Energy Industries	3.32	3.32	3.20	3.80	3.40	3.70	4.89	5.70	2.96	4.40	6.00	5.96	6.26
2. Manufacturing Industries and Construction	2.91	2.91	3.50	4.90	3.20	2.60	5.06	1.83	0.99	1.65	3.05	3.28	3.39
3. Transport	7.88	7.88	6.90	6.72	6.40	6.15	6.01	5.49	5.17	4.98	4.82	4.36	4.19
4. Other Sectors	20.26	20.26	22.11	20.51	21.41	21.23	20.46	23.75	20.11	19.55	19.03	19.80	20.42
5. Other	0.03	0.03	0.00	0.00	0.00	0.00	0.26	0.20	0.19	0.24	0.25	0.32	0.32
B. Fugitive Emissions from Fuels	178.77	178.77	188.10	163.10	158.00	168.50	170.33	188.34	156.46	146.56	144.32	130.96	134.33
1. Solid Fuels	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Oil and Natural Gas	178.77	178.77	188.10	163.10	158.00	168.50	170.33	188.34	156.46	146.56	144.32	130.96	134.33
2. Industrial Processes	3.27	3.27	3.50	3.70	4.90	5.30	2.63	5.71	2.66	2.40	2.71	1.54	1.42
A. Mineral Products	0.21	0.21	0.00	0.00	0.00	0.00	0.10	0.11	0.14	0.13	0.14	0.14	0.13
B. Chemical Industry	3.02	3.02	0.00	0.00	0.00	0.00	2.49	5.20	2.46	2.22	2.53	1.38	1.27
C. Metal Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.00
D. Other Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E. Production of Halocarbons and SF ₆													
F. Consumption of Halocarbons and SF ₆													
G. Other	0.03	0.03	3.50	3.70	4.90	5.30	0.04	0.09	0.05	0.05	0.04	0.02	0.02
3. Solvent and Other Product Use	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4. Agriculture	505.33	505.33	517.09	505.78	497.83	483.13	477.04	463.58	445.80	434.71	425.01	410.53	410.59
A. Enteric Fermentation	401.86	401.86	411.63	401.22	392.69	381.67	376.72	365.86	352.64	341.39	333.89	319.43	322.21
B. Manure Management	103.47	103.47	105.46	104.56	105.14	101.46	100.32	97.71	93.16	93.32	91.12	91.10	88.38
C. Rice Cultivation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
D. Agricultural Soils	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E. Prescribed Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agricultural Residues	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A. Changes in Forest and Other Woody Biomass Stocks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B. Forest and Grassland Conversion	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
C. Abandonment of Managed Lands	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D. CO ₂ Emissions and Removals from Soil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E. Other	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
6. Waste	568.55	568.55	562.13	542.59	528.80	509.96	481.46	477.12	463.80	448.18	430.33	404.57	390.33
A. Solid Waste Disposal on Land	562.00	562.00	556.15	540.21	522.49	504.86	480.00	475.85	463.01	444.53	428.27	403.79	389.55
B. Waste-water Handling	6.55	6.55	5.98	2.38	6.31	5.10	1.46	1.27	0.79	3.65	2.06	0.78	0.78
C. Waste Incineration	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D. Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7. Other (please specify)	2.05	2.05	2.00	2.00	2.00	2.30	2.06	2.00	1.98	1.94	1.95	1.91	1.91
Solvents and other product use	0.05	0.05	0.00	0.00	0.00	0.30	0.06	0.00	0.01	0.03	0.02	0.02	0.02
Polluted surface water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Degassing drinkwater from ground water	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.97	1.91	1.93	1.89	1.83
Memo Items:													
International Bunkers	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Aviation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Marine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Multilateral Operations	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO₂ Emissions from Biomass													

Table A.7.21. Emissions of greenhouse gases in the Netherlands; *CRF Trend Table 10: N₂O*

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year(1)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
		(Gg)											
Total Emissions	53.37	53.37	54.21	57.90	60.20	59.07	58.64	57.89	57.38	56.87	56.02	53.74	51.83
1. Energy	1.87	1.87	2.05	2.25	2.40	2.64	2.64	2.36	2.31	2.65	2.63	2.68	2.70
A. Fuel Combustion (Sectoral Approach)	1.87	1.87	2.05	2.25	2.40	2.24	2.64	2.36	2.31	2.65	2.63	2.68	2.70
1. Energy Industries	0.47	0.47	0.50	0.50	0.50	0.20	0.49	0.01	0.02	0.46	0.46	0.49	0.52
2. Manufacturing Industries and Construction	0.11	0.11	0.10	0.10	0.10	0.10	0.13	0.28	0.21	0.10	0.07	0.12	0.12
3. Transport	1.20	1.20	1.35	1.55	1.70	1.80	1.94	1.97	2.00	2.01	2.03	2.00	1.98
4. Other Sectors	0.09	0.09	0.10	0.10	0.10	0.14	0.09	0.09	0.08	0.08	0.08	0.08	0.08
5. Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B. Fugitive Emissions from Fuels	0.00	0.00	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1. Solid Fuels	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Oil and Natural Gas	0.00	0.00	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Industrial Processes	24.37	24.37	24.70	24.91	26.70	25.50	24.17	24.20	24.15	24.10	23.23	22.97	21.17
A. Mineral Products	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B. Chemical Industry	24.37	24.37	24.70	24.91	26.70	25.50	24.17	24.20	24.15	24.10	23.19	22.97	21.17
C. Metal Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D. Other Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E. Production of Halocarbons and SF ₆													
F. Consumption of Halocarbons and SF ₆													
G. Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00
3. Solvent and Other Product Use	0.73	0.73	0.58	0.58	0.60	0.60	0.63	0.65	0.55	0.52	0.50	0.44	0.40
4. Agriculture	22.19	22.19	22.68	25.91	26.23	26.07	26.85	26.40	25.99	25.25	25.24	23.20	23.12
A. Enteric Fermentation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B. Manure Management	0.66	0.66	0.70	0.70	0.80	0.80	0.74	0.72	0.69	0.67	0.65	0.62	0.61
C. Rice Cultivation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D. Agricultural Soils	21.53	21.53	21.98	25.21	25.43	25.27	26.11	25.67	25.29	24.57	24.58	22.58	22.51
E. Prescribed Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agricultural Residues	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
G. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A. Changes in Forest and Other Woody Biomass Stocks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B. Forest and Grassland Conversion	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
C. Abandonment of Managed Lands	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D. CO ₂ Emissions and Removals from Soil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E. Other	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
6. Waste	0.40	0.40	0.40	0.45	0.47	0.47	0.53	0.48	0.58	0.53	0.60	0.63	0.62
A. Solid Waste Disposal on Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B. Waste-water Handling	0.40	0.40	0.40	0.45	0.47	0.47	0.49	0.48	0.58	0.53	0.57	0.63	0.62
C. Waste Incineration	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D. Other	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.04	0.00	0.00
7. Other (please specify)	3.81	3.81	3.80	3.80	3.80	3.80	3.82	3.80	3.80	3.82	3.83	3.82	3.82
Solvent and other product use	0.01	0.01	0.00	0.00	0.00	0.00	0.02	0.00		0.02	0.03	0.02	0.02
Polluted surface water	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80
Memo Items:													
International Bunkers	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Aviation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Marine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Multilateral Operations	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO₂ Emissions from Biomass													

Table A.7.22. Emissions of greenhouse gases in the Netherlands; **CRF Trend Table 10: HFCs, PFCs and SF₆**Note: The emissions of individual compounds (not shaded) are reported here in mass units, not in CO₂-eq.

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year(1)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Chemical	GWP
	(Gg)													HFCs	
Emissions of HFCs(5) - CO ₂ equivalent (Gg)	6 018.31	4 431.84	3 451.56	4 447.33	4 998.04	6 486.69	6 018.31	7 675.65	8 306.57	9 360.42	4 896.94	3 874.55	1 584.20		
HFC-23	492.21	378.79	295.01	377.99	422.80	536.57	492.21	588.62	573.39	665.86	294.02	206.91	38.44	HFC-23	11700
HFC-32	2.40	0.00	0.00	0.00	0.00	0.00	2.40	0.00	3.00	1.00	0.00	0.60	12.43	HFC-32	650
HFC-41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	HFC-41	150
HFC-43-10mee	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	HFC-43-10mee	1300
HFC-125	3.83	0.00	0.00	0.00	0.00	0.00	3.83	8.98	15.52	36.32	45.60	61.52	78.61	HFC-125	2800
HFC-134	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	HFC-134	1000
HFC-134a	181.48	0.00	0.00	18.01	12.16	92.99	181.48	434.57	687.30	710.14	745.70	629.36	492.21	HFC-134a	1300
HFC-152a	17.86	0.00	0.00	9.93	28.79	24.00	17.86	25.00	0.00	0.00	0.00	21.93	6.51	HFC-152a	140
HFC-143	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	HFC-143	300
HFC-143a	1.70	0.00	0.00	0.00	2.64	6.28	1.70	34.72	12.64	35.80	36.50	77.89	46.47	HFC-143a	3800
HFC-227ea	0.00													HFC-227ea	2900
HFC-236fa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	HFC-236fa	6300
HFC-245ca	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	HFC-245ca	560
HFC Unspecified	0.75	0.00	0.00	0.00	7.14	20.26	0.75	21.12	203.67	136.08	73.69	54.64	29.64	HFC Unspecified	3000
Emissions of PFCs(5) - CO ₂ equivalent (Gg)	1 866.76	2 431.74	2 436.78	2 098.69	2 118.36	1 890.43	1 866.76	2 042.11	2 153.98	1 727.52	1 444.39	1 526.44	1 456.38	PFCs	
CF ₄	223.00	301.00	301.00	258.00	260.00	228.00	223.00	247.00	261.00	195.16	153.90	160.40	155.00	CF ₄	6500
C ₂ F ₆	38.00	48.00	48.00	41.00	41.00	38.00	38.00	39.00	40.00	38.70	35.40	37.80	34.00	C ₂ F ₆	9200
C ₃ F ₈														C ₃ F ₈	7000
C ₄ F ₁₀														C ₄ F ₁₀	7000
c-C ₄ F ₈														c-C ₄ F ₈	8700
C ₅ F ₁₂														C ₅ F ₁₂	7500
C ₆ F ₁₄														C ₆ F ₁₄	7400
PFC unspecified	8.06	4.01	4.61	5.30	6.09	7.00	8.06	9.26	10.65	12.25	14.09	16.20	16.20	PFC unspecified	8400
Emissions of SF ₆ (5) - CO ₂ equivalent (Gg)	275.32	186.90	100.38	106.36	109.94	147.94	275.32	284.87	311.39	294.58	265.03	268.65	296.09	SF ₆	
SF ₆	11.52	7.82	4.20	4.45	4.60	6.19	11.52	11.92	13.03	12.33	11.09	11.24	12.39	SF ₆	23900

Table A.7.23. Emissions of greenhouse gases in the Netherlands; CRF Trend Table 10: All gases and source categories in CO₂-eq

GREENHOUSE GAS EMISSIONS	Base year(1)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
CO ₂ equivalent (Gg)													
Net CO ₂ emissions/removals	157 848	157 848	165 993	164 246	166 129	166 841	171 169	178 906	167 488	172 408	169 450	172 427	178 442
CO ₂ emissions (without LUCF) ⁽⁴⁾	159 270	159 270	167 521	165 733	167 934	168 770	172 402	180 304	168 669	173 788	170 686	173 840	179 855
CH ₄	27 140	27 140	27 479	26 315	25 745	25 260	24 574	24 648	23 102	22 357	21 787	20 648	20 436
N ₂ O	16 544	16 544	16 807	17 950	18 663	18 313	18 178	17 946	17 786	17 629	17 367	16 659	16 066
HFCs	6 018	4 432	3 452	4 447	4 998	6 487	6 018	7 676	8 307	9 360	4 897	3 875	1 584
PFCs	1 867	2 432	2 437	2 099	2 118	1 890	1 867	2 042	2 154	1 728	1 444	1 526	1 456
SF ₆	275	187	100	106	110	148	275	285	311	295	265	269	296
Total (with net CO₂ emissions/removals)	209 692	208 582	216 268	215 163	217 763	218 939	222 082	231 503	219 149	223 777	215 211	215 403	218 281
Total (without CO₂ from LUCF) ⁽⁵⁾⁽⁶⁾	211 114	210 004	217 795	216 651	219 569	220 869	223 314	232 901	220 330	225 156	216 446	216 816	219 694
GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year ⁽¹⁾	1 990	1 991	1 992	1 993	1 994	1 995	1 996	1 997	1 998	1 999	2 000	2 001
CO ₂ equivalent (Gg)													
1. Energy	161 865	161 865	171 257	169 241	171 510	172 393	175 217	183 325	170 614	176 560	172 890	176 541	182 764
2. Industrial Processes	17 364	16 254	15 219	15 721	16 816	17 981	17 151	19 012	19 743	20 223	15 180	14 060	11 054
3. Solvent and Other Product Use	225	225	279	281	186	186	194	202	171	160	156	138	122
4. Agriculture	17 491	17 491	17 890	18 653	18 586	18 227	18 341	17 918	17 417	16 956	16 748	15 813	15 790
5. Land-Use Change and Forestry ⁽⁷⁾	-1 422	-1 422	-1 528	-1 487	-1 806	-1 929	-1 232	-1 398	-1 180	-1 380	-1 236	-1 413	-1 413
6. Waste	12 946	12 946	11 930	11 534	11 251	10 855	11 183	11 224	11 164	10 032	10 245	9 040	8 740
7. Other	1 224	1 224	1 220	1 220	1 220	1 226	1 227	1 220	1 220	1 226	1 228	1 224	1 224

7.4 Trend Tables for precursor gases and SO₂

This appendix shows information from sheets from the CRF data files, presented in trend table format and presenting unrounded figures. The number of digits shown does not represent the uncertainty estimated for the emissions (see Section 2.4).

Please note that all data for 2001 are preliminary.

Sheets are presented for, respectively:

- NO_x
- CO
- NMVOC
- SO₂

In addition the trends in NO_x, CO, NMVOC and SO₂ for the period 1990-2001 are presented in graph format:

- A.7.28. Shares and trends in NO_x emissions per IPCC sector 1990-2001.
- A.7.29. Shares and trends in CO emissions per IPCC sector 1990-2001.
- A.7.30. Shares and trends in NMVOC emissions per IPCC sector 1990-2001.
- A.7.31. Shares and trends in SO₂ emissions per IPCC sector 1990-2001.

Table A.7.24. Emissions of greenhouse gases in the Netherlands; CRF Trend Table 10: NO_x

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
		(Gg)											
Total National Emissions and Removals		569.75	551.40	539.00	518.90	493.20	486.89	474.09	444.81	428.15	429.71	413.18	410.81
1. Energy		563.05	537.90	525.90	505.10	482.40	482.69	470.33	441.00	426.97	428.09	411.56	409.84
A. Fuel Combustion	Reference Approach ⁽²⁾												
	Sectoral Approach ⁽²⁾	562.92	536.70	524.60	504.10	481.90	482.10	469.84	439.75	426.16	425.18	411.16	409.44
1. Energy Industries		98.61	95.60	95.90	91.80	81.40	81.31	71.39	62.40	58.19	65.82	61.55	66.16
2. Manufacturing Industries and Construction		77.23	60.40	61.40	54.60	54.40	55.04	61.41	51.11	48.57	40.20	36.21	35.41
3. Transport		345.84	336.20	325.50	311.80	304.40	297.60	292.88	288.94	282.47	275.69	268.38	261.12
4. Other Sectors		40.89	44.50	41.80	45.90	41.70	46.56	43.77	36.94	36.31	41.94	43.09	44.88
5. Other		0.35	0.00	0.00	0.00	0.00	1.60	0.39	0.37	0.62	1.53	1.92	1.87
B. Fugitive Emissions from Fuels		0.13	1.20	1.30	1.00	0.50	0.59	0.49	1.25	0.81	2.91	0.40	0.39
1. Solid Fuels		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Oil and Natural Gas		0.13	1.20	1.30	1.00	0.50	0.59	0.49	1.25	0.81	2.91	0.40	0.39
2. Industrial Processes		2.71	13.10	12.70	13.40	10.40	1.75	2.28	2.30	1.06	0.68	1.55	0.90
A. Mineral Products		1.28	0.00	0.00	0.00	0.00	1.31	1.16	1.23	0.99	0.62	0.97	0.90
B. Chemical Industry		0.00	0.00	0.00	0.00	0.00	0.12	0.07	0.03	0.00	0.00	0.00	0.00
C. Metal Production		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
D. Other Production ⁽³⁾		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E. Production of Halocarbons and SF ₆													
F. Consumption of Halocarbons and SF ₆													
G. Other		1.43	13.10	12.70	13.40	10.40	0.31	1.04	1.04	0.07	0.06	0.58	0.00
3. Solvent and Other Product Use		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4. Agriculture		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A. Enteric Fermentation		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B. Manure Management		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Rice Cultivation		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D. Agricultural Soils		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E. Prescribed Burning of Savannas		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F. Field Burning of Agricultural Residues		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
G. Other		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A. Changes in Forest and Other Woody Biomass Stocks		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B. Forest and Grassland Conversion		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
C. Abandonment of Managed Lands		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D. CO ₂ Emissions and Removals from Soil		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E. Other		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
6. Waste		3.91	0.30	0.30	0.30	0.30	2.37	1.41	1.42	0.04	0.85	0.00	0.00
A. Solid Waste Disposal on Land		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B. Wastewater Handling		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Waste Incineration		IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
D. Other		3.91	0.30	0.30	0.30	0.30	2.37	1.41	1.42	0.04	0.85	0.00	0.00
7. Other (please specify)		0.09	0.10	0.10	0.10	0.10	0.08	0.08	0.08	0.08	0.08	0.08	0.07
Solvents and other product use		0.09	0.10	0.10	0.10	0.10	0.08	0.08	0.08	0.08	0.08	0.08	0.07
Polluted surface water		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Degassing drinkwater from ground water		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Memo Items: ⁽⁷⁾													
International Bunkers		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aviation		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Marine		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Multilateral Operations		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
CO₂ Emissions from Biomass													

Table A.7.25. Emissions of greenhouse gases in the Netherlands; CRF Trend Table 10: CO

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
		(Gg)											
Total National Emissions and Removals		1 120.51	1 022.50	966.30	948.60	905.10	854.83	866.61	785.65	740.54	704.22	681.18	661.60
1. Energy		1 073.00	891.30	861.60	846.10	799.90	818.89	829.24	745.52	698.18	666.19	637.50	620.96
A. Fuel Combustion	Reference Approach ⁽¹⁾												
	Sectoral Approach ⁽²⁾	1 066.90	883.10	855.90	840.10	792.30	810.94	821.14	738.34	691.95	661.68	633.23	616.39
1. Energy Industries		14.65	18.90	16.40	15.40	17.00	16.38	44.99	20.33	22.17	27.38	27.18	28.84
2. Manufacturing Industries and Construction		224.43	108.30	114.80	139.10	114.30	180.64	168.05	138.47	121.46	112.74	101.69	99.83
3. Transport		754.58	658.40	626.40	582.30	559.90	543.95	540.89	515.83	483.87	459.89	436.06	419.47
4. Other Sectors		71.85	97.50	98.30	103.30	101.10	63.31	65.62	62.17	61.84	55.26	60.48	60.43
5. Other		1.39	0.00	0.00	0.00	0.00	6.66	1.59	1.54	2.61	6.41	7.82	7.81
B. Fugitive Emissions from Fuels		6.10	8.20	5.70	6.00	7.60	7.95	8.10	7.18	6.23	4.52	4.27	4.57
1. Solid Fuels		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Oil and Natural Gas		6.10	8.20	5.70	6.00	7.60	7.95	8.10	7.18	6.23	4.52	4.27	4.57
2. Industrial Processes		43.31	127.40	101.10	99.10	101.70	33.39	34.92	37.49	40.31	35.61	41.58	38.66
A. Mineral Products		3.52	0.00	0.00	0.00	0.00	2.45	1.01	1.63	1.51	1.69	1.56	1.38
B. Chemical Industry		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Metal Production		35.11	0.00	0.00	0.00	0.00	30.32	33.03	34.96	38.74	31.95	39.66	37.28
D. Other Production ⁽³⁾		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E. Production of Halocarbons and SF ₆		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F. Consumption of Halocarbons and SF ₆		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G. Other		4.68	127.40	101.10	99.10	101.70	0.62	0.88	0.91	0.07	1.98	0.36	0.00
3. Solvent and Other Product Use		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4. Agriculture		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A. Enteric Fermentation		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B. Manure Management		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Rice Cultivation		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D. Agricultural Soils		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E. Prescribed Burning of Savannas		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F. Field Burning of Agricultural Residues		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
G. Other		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A. Changes in Forest and Other Woody Biomass Stocks		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B. Forest and Grassland Conversion		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
C. Abandonment of Managed Lands		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D. CO ₂ Emissions and Removals from Soil		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E. Other		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
6. Waste		1.93	1.40	1.40	1.40	1.40	0.40	0.55	0.50	0.01	0.31	0.01	0.00
A. Solid Waste Disposal on Land		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B. Wastewater Handling		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Waste Incineration		1E	1E	1E	1E	1E	1E	1E	1E	1E	1E	1E	1E
D. Other		1.93	1.40	1.40	1.40	1.40	0.40	0.55	0.50	0.01	0.31	0.01	0.00
7. Other (please specify)		2.28	2.40	2.20	2.00	2.10	2.15	1.90	2.14	2.04	2.11	2.08	1.98
Solvents and other product use		2.28	2.40	2.20	2.00	2.10	2.15	1.90	2.14	2.04	2.11	2.08	1.98
Polluted surface water		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Degassing drinkwater from ground water		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Memo Items: ⁽⁴⁾													
International Bunkers		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aviation		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Marine		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Multilateral Operations		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
CO₂ Emissions from Biomass													

Table A.7.26. Emissions of greenhouse gases in the Netherlands; *CRF Trend Table 10: NMVOC*

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
		(Gg)											
Total National Emissions and Removals		492.42	460.60	436.20	403.20	387.70	363.25	306.33	271.09	301.60	291.13	278.28	271.23
1. Energy		277.69	247.60	237.60	223.00	216.80	211.89	202.98	182.66	173.13	167.31	159.55	155.49
A. Fuel Combustion	Reference Approach ⁽²⁾												
	Sectoral Approach ⁽²⁾	222.71	200.20	194.20	181.10	174.50	169.06	160.86	146.01	141.51	137.20	132.27	127.72
1. Energy Industries		3.57	4.10	4.30	3.60	3.90	5.20	6.90	2.70	3.14	4.40	4.51	4.63
2. Manufacturing Industries and Construction		3.41	4.30	5.80	2.90	2.60	3.86	2.37	1.69	3.11	1.64	1.91	1.89
3. Transport		200.51	180.30	172.40	162.00	156.50	146.10	137.56	129.03	122.18	118.62	112.67	107.96
4. Other Sectors		15.07	11.50	11.70	12.60	11.50	13.15	13.85	12.41	12.79	11.80	12.29	12.35
5. Other		0.15	0.00	0.00	0.00	0.00	0.75	0.18	0.17	0.29	0.72	0.88	0.88
B. Fugitive Emissions from Fuels		54.98	47.40	43.40	41.90	42.30	42.83	42.12	36.65	31.61	30.11	27.28	27.77
1. Solid Fuels		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Oil and Natural Gas		54.98	47.40	43.40	41.90	42.30	42.83	42.12	36.65	31.61	30.11	27.28	27.77
2. Industrial Processes		86.43	120.90	115.40	100.00	88.20	53.70	29.57	25.76	47.44	39.36	39.53	35.72
A. Mineral Products		1.04	0.00	0.00	0.00	0.00	0.45	0.44	0.41	0.27	0.23	0.19	0.17
B. Chemical Industry		33.11	0.00	0.00	0.00	0.00	17.89	18.02	16.13	14.82	13.33	12.56	12.00
C. Metal Production		3.15	0.00	0.00	0.00	0.00	2.60	2.19	2.32	2.36	2.72	2.39	2.29
D. Other Production ⁽³⁾		10.76	0.00	0.00	0.00	0.00	7.33	2.45	1.61	6.50	5.48	5.66	5.60
E. Production of Halocarbons and SF ₆		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F. Consumption of Halocarbons and SF ₆		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G. Other		38.36	120.90	115.40	100.00	88.20	25.44	6.47	5.28	23.48	17.60	18.73	15.67
3. Solvent and Other Product Use		127.12	91.70	82.80	79.80	82.30	96.23	72.30	61.44	79.79	83.55	78.32	79.17
4. Agriculture		0.16	0.20	0.20	0.20	0.20	0.16	0.16	0.16	0.16	0.16	0.16	0.16
A. Enteric Fermentation		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B. Manure Management		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Rice Cultivation		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
D. Agricultural Soils		0.16	0.20	0.20	0.20	0.20	0.16	0.16	0.16	0.16	0.16	0.16	0.16
E. Prescribed Burning of Savannas		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F. Field Burning of Agricultural Residues		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
G. Other		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
5. Land-Use Change and Forestry		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A. Changes in Forest and Other Woody Biomass Stocks		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B. Forest and Grassland Conversion		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
C. Abandonment of Managed Lands		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D. CO ₂ Emissions and Removals from Soil		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E. Other		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6. Waste		1.02	0.20	0.20	0.20	0.20	1.27	1.33	1.07	1.08	0.75	0.72	0.70
A. Solid Waste Disposal on Land		0.91	0.00	0.00	0.00	0.00	0.78	0.80	0.78	0.75	0.70	0.66	0.63
B. Wastewater Handling		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Waste Incineration		IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
D. Other		0.11	0.20	0.20	0.20	0.20	0.49	0.53	0.30	0.33	0.05	0.07	0.06
7. Other (please specify)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Solvents and other product use		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Polluted surface water		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Degassing drinkwater from ground water		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Memo Items: ⁽⁴⁾													
International Bunkers		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aviation		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Marine		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Multilateral Operations		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
CO₂ Emissions from Biomass													

Table A.2.27. Emissions of greenhouse gases in the Netherlands; *CRF Trend Table 10: SO₂*

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
		(Gg)											
Total National Emissions and Removals		202.39	163.50	157.20	150.40	136.50	141.54	133.69	115.91	108.03	103.25	91.56	88.96
1. Energy		190.82	140.90	138.30	133.60	120.10	137.91	130.15	112.73	105.29	100.78	89.12	87.03
A. Fuel Combustion	Reference Approach ⁽²⁾												
	Sectoral Approach ⁽²⁾	183.21	131.20	126.70	122.10	109.50	127.69	119.56	102.65	97.44	91.72	82.62	80.42
1. Energy Industries		105.06	88.60	81.10	77.40	66.20	68.25	63.92	55.46	52.80	50.61	43.73	44.63
2. Manufacturing Industries and Construction		44.15	17.50	20.00	17.60	16.20	26.78	27.13	22.84	19.20	15.30	13.41	12.64
3. Transport		29.39	21.00	21.40	21.30	21.70	29.55	26.58	22.79	23.45	23.60	23.61	21.32
4. Other Sectors		4.57	4.10	4.20	5.80	5.40	3.00	1.87	1.54	1.90	2.11	1.69	1.71
5. Other		0.04	0.00	0.00	0.00	0.00	0.11	0.07	0.03	0.08	0.11	0.18	0.12
B. Fugitive Emissions from Fuels		7.61	9.70	11.60	11.50	10.60	10.22	10.59	10.08	7.84	9.06	6.50	6.61
1. Solid Fuels		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Oil and Natural Gas		7.61	9.70	11.60	11.50	10.60	10.22	10.59	10.08	7.84	9.06	6.50	6.61
2. Industrial Processes		7.39	22.40	18.80	16.70	16.20	3.34	3.36	3.06	2.71	2.43	2.41	1.92
A. Mineral Products		6.31	0.00	0.00	0.00	0.00	2.77	2.75	2.46	2.24	2.42	2.04	1.92
B. Chemical Industry		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Metal Production		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D. Other Production ⁽³⁾		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
E. Production of Halocarbons and SF ₆		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F. Consumption of Halocarbons and SF ₆		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G. Other		1.08	22.40	18.80	16.70	16.20	0.57	0.61	0.60	0.47	0.01	0.37	0.00
3. Solvent and Other Product Use		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4. Agriculture		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A. Enteric Fermentation		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B. Manure Management		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Rice Cultivation		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D. Agricultural Soils		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E. Prescribed Burning of Savannas		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F. Field Burning of Agricultural Residues		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G. Other		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5. Land-Use Change and Forestry		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A. Changes in Forest and Other Woody Biomass Stocks		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B. Forest and Grassland Conversion		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Abandonment of Managed Lands		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D. CO ₂ Emissions and Removals from Soil		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E. Other		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6. Waste		4.17	0.00	0.00	0.00	0.00	0.27	0.16	0.10	0.01	0.02	0.00	0.00
A. Solid Waste Disposal on Land		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B. Wastewater Handling		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Waste Incineration		IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
D. Other		4.17	0.00	0.00	0.00	0.00	0.27	0.16	0.10	0.01	0.02	0.00	0.00
7. Other (please specify)		0.01	0.20	0.10	0.10	0.20	0.02	0.02	0.02	0.02	0.03	0.02	0.02
Solvents and other product use		0.01	0.20	0.10	0.10	0.20	0.02	0.02	0.02	0.02	0.03	0.02	0.02
Polluted surface water		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Degassing drinkwater from ground water		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Memo Items: ⁽⁷⁾													
International Bunkers		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aviation		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Marine		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Multilateral Operations		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
CO₂ Emissions from Biomass													

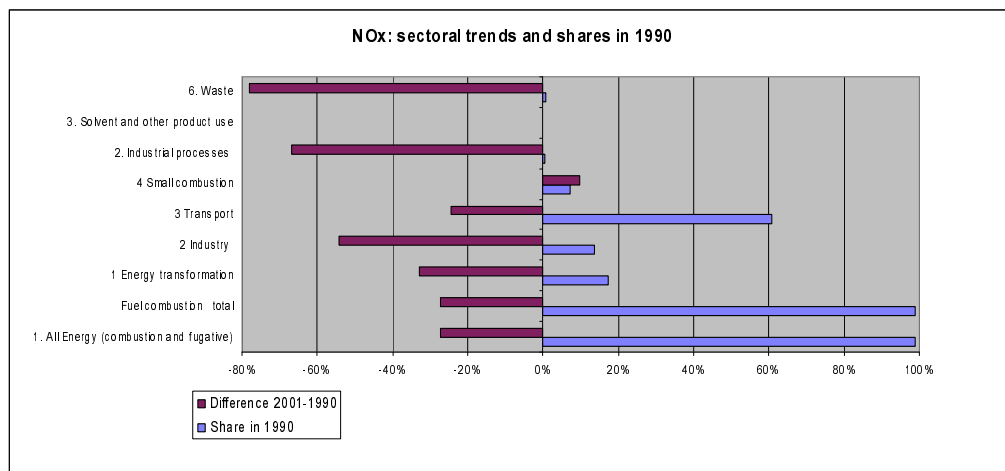


Figure A.7.28. Shares and trends in NO_x emissions per IPCC sector 1990-2001

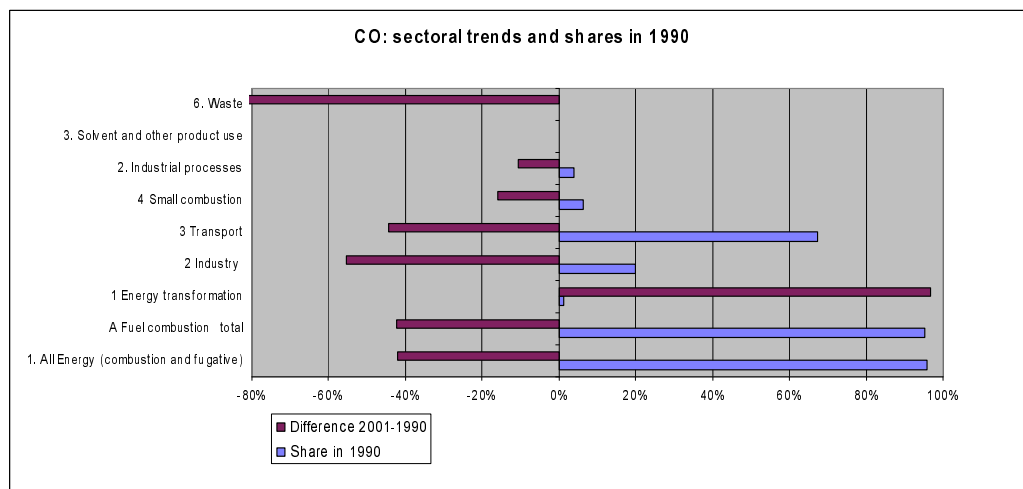


Figure A.7.29. Shares and trends in CO emissions per IPCC sector 1990-2001

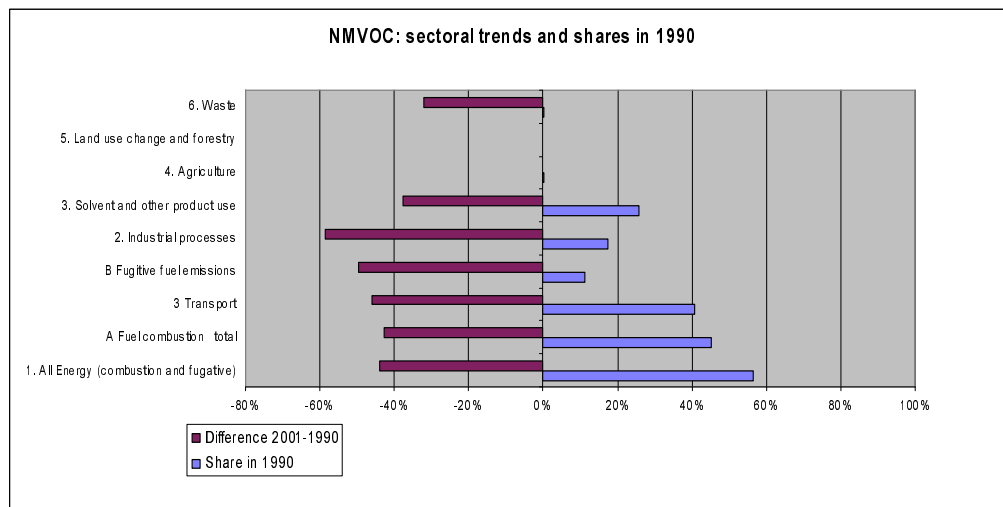


Figure A.7.30. Shares and trends in NMVOC emissions per IPCC sector 1990-2001

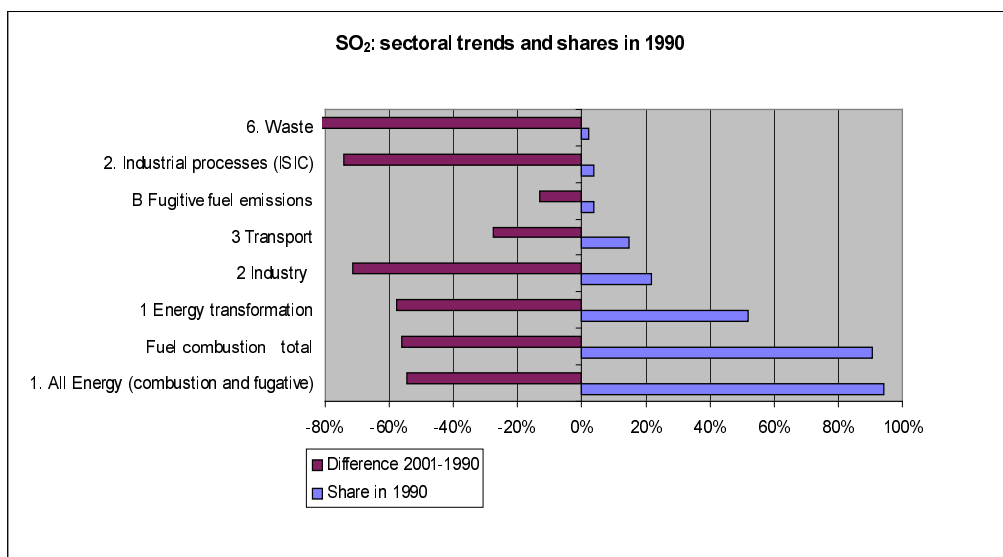


Figure A.7.31. Shares and trends in SO₂ emissions per IPCC sector 1990-2001

ANNEX 8: Chemical compounds, Units, Global Warming Potentials, Other conversion factors and Internet links

Chemical compounds

CF ₄	Perfluoromethane (tetrafluoromethane)
C ₂ F ₆	Perfluoroethane (hexafluoroethane)
CH ₄	Methane
CO	Carbon monoxide
CO ₂	Carbon dioxide
HCFCs	Hydrochlorofluorocarbons
HFCs	Hydrofluorocarbons
HNO ₃	Nitric Acid
NH ₃	Ammonia
NO _x	Nitrogen oxide (NO and NO ₂), expressed as NO ₂
N ₂ O	Nitrous oxide
NMVOC	Non-Methane Volatile Organic Compounds
PFCs	Perfluorocarbons
SF ₆	Sulphur hexafluoride
SO ₂	Sulphur dioxide
VOC	Volatile Organic Compounds (may include or exclude methane)

Global Warming Potentials for selected greenhouse gases ¹⁾

Gas	Atmospheric lifetime	20-year GWP	100-year GWP	500-year GWP
CO ₂	variable (50-200)	1	1	1
CH ₄ ²⁾	12±3	56	21	6.5
N ₂ O	120	280	310	170
<u>HFCs ³⁾:</u>				
HFC-23	264	9100	11700	9800
HFC-32	5.6	2100	650	200
HFC-125	32.6	4600	2800	920
HFC-134a	10.6	3400	1300	420
HFC-143a	48.3	5000	3800	1400
HFC-152a	1.5	460	140	42
<i>HFC-227ea</i>	<i>36.5</i>	<i>4300</i>	<i>2900</i>	<i>950</i>
<i>HFC-236fa</i>	<i>209</i>	<i>5100</i>	<i>6300</i>	<i>4700</i>
<i>HFC-245ca</i>	<i>6.6</i>	<i>1800</i>	<i>560</i>	<i>170</i>
<u>PFCs ³⁾:</u>				
CF ₄	50000	4400	6500	10000
C ₂ F ₆	10000	6200	9200	14000
<i>C₃F₈</i>	<i>2600</i>	<i>4800</i>	<i>7000</i>	<i>10100</i>
<i>C₄F₁₀</i>	<i>2600</i>	<i>4800</i>	<i>7000</i>	<i>10100</i>
<i>C₆F₁₄</i>	<i>3200</i>	<i>5000</i>	<i>7400</i>	<i>10700</i>
SF ₆	3200	16300	23900	34900

Source: Second Assessment Report, IPCC (1996)

¹⁾ GWP's calculated with a 100-year time horizon (indicated in the shaded column) are used in this report, in compliance with the UNFCCC Guidelines for reporting (UNFCCC, 1999). Gases indicated in italics are not emitted in the Netherlands.

²⁾ The GWP of methane includes the direct effects and the indirect effects due to the production of tropospheric ozone and stratospheric water vapour; the indirect effect due to the production of CO₂ is not included.

³⁾ The average GWP-100 of emissions reported as 'HFC unspecified' and 'PFC unspecified' is 3000 and 8400, respectively.

Units

MJ	Mega Joule (10^6 Joule)
GJ	Giga Joule (10^9 Joule)
TJ	Tera Joule (10^{12} Joule)
PJ	Peta Joule (10^{15} Joule)
Mg	Mega gramme (10^6 gramme)
Gg	Giga gramme (10^9 gramme)
Tg	Tera gramme (10^{12} gramme)
Pg	Peta gramme (10^{15} gramme)
ton	metric ton (= 1 000 kilogramme = 1 Mg)
kton	kiloton (= 1 000 metric ton = 1 Gg)
Mton	Megaton (= 1 000 000 metric ton = 1 Tg)
ha	hectare (= 10^4 m ²)
kha	kilo hectare (= 1 000 hectare = 10^7 m ² = 10 km ²)
mln	million (= 10^6)
mld	milliard (= 10^9)

Other conversion factors for emissions

From element basis to full molecular mass:

C → CO ₂ :	x 44/12 = 3.67
C → CH ₄ :	x 16/12 = 1.33
C → CO :	x 28/12 = 2.33
N → N ₂ O :	x 44/28 = 1.57
N → NO :	x 30/14 = 2.14
N → NO ₂ :	x 46/14 = 3.29
N → NH ₃ :	x 17/14 = 1.21
N → HNO ₃ :	x 63/14 = 4.50
S → SO ₂ :	x 64/32 = 2.00

From full molecular mass to element basis:

CO ₂ → C :	x 12/44 = 0.27
CH ₄ → C :	x 12/16 = 0.75
CO → C :	x 12/28 = 0.43
N ₂ O → N :	x 28/44 = 0.64
NO → N :	x 14/30 = 0.47
NO ₂ → N :	x 14/46 = 0.30
NH ₃ → N :	x 14/17 = 0.82
HNO ₃ → N :	x 14/63 = 0.22
SO ₂ → S :	x 32/64 = 0.50

Internet links to UNFCCC and IPCC Guidelines used for this report

[UNFCCC guidelines on reporting and review](#)

(Present guidelines; FCCC/CP/1999/7 of 16 February 2000)

[Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, part I: UNFCCC reporting guidelines on annual inventories](#)

(New guidelines into effect for reporting NIR 2004; FCCC/SBSTA/2002/L.5/Add.1 of 12 June 2002)

[Revised IPCC 1996 Guidelines for National Greenhouse Gas Inventories](#) (IPCC, 1997)

[IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories](#) (IPCC, 2000)

ANNEX 9: List of abbreviations

AD	Activity Data
BAK	Monitoring report of gas consumption of small users
BEES	Order governing combustion plant emissions requirements (1992) (in Dutch: ' <i>Besluit Emissie-Eisen Stookinstallaties</i> ')
BEK	Monitoring report of electricity consumption of small users
BOD	Biological Oxygen Demand
C	Confidential (notation key in CRF)
CS	Country-Specific (notation key in CRF)
cap	capita (person)
CBS	Statistics Netherlands
CCDM	Co-ordination Committee for Monitoring of Target Groups
CDM	Clean Development Mechanism (one of three so-called mechanisms of the Kyoto Protocol)
CLRTAP	Convention on Long-range Transboundary Air Pollution (UN-ECE)
CORINAIR	CORe INventory AIR emissions
CRF	Common Reporting Format (of emission data files, annexed to a NIR)
CRT	Continuous Regeneration Trap
DLO	Legal name of Wageningen University and Research Centre (Wageningen UR)
dm	dry matter
DOC	Degradable Organic Carbon
EC-LNV	National Reference Centre for Agriculture
ECE	Economic Commission for Europe (UN)
EEA	European Environment Agency
EF	Emission Factor
EGR	Exhaust Gas Recirculation
EIT	Economies-In-Transition (country group comprising the former SU and Eastern Europe)
EMEP	European programme for Monitoring and Evaluation of long-range transmission of air Pollutants
ENINA	Task Group Energy, Industry and Waste Handling
EPA	US Environmental Protection Agency
ER	Emission Registration
ER-I	Emission Registration-Individual firms
ET	Emissions Trading
ETC/ACC	European Topic Centre on Air and Climate Change
EU	European Union
EZ	Ministry of Economic Affairs
FAO	Food and Agricultural Organisation (UN)
F-gases	Group of fluorinated compounds comprising HFCs, PFCs and SF ₆
FOI	Facilitating Organisation for Industry
GIS	Gas Insulated Switchgear
GWP	Global Warming Potential
HBO	Heating oil
HDD	Heating-Degree Day
HFO	Heavy Fuel Oil
HOSP	Timber Production Statistics and Forecast (in Dutch: ' <i>Hout Oogst Statistiek en Prognose oogstbaar hout</i> ')
IE	Included Elsewhere (notation key in CRF)
IEF	Implied Emission Factor
IPCC	Intergovernmental Panel on Climate Change
KNMI	Royal Netherlands Meteorological Institute
LEI	Agricultural Economics Institute
LHV	Lower Heating Value

LNV	Ministry of Agriculture, Nature Conservation and Fishery
LPG	Liquefied Petroleum Gas
LTO	Landing and Take-Off
LUCF	Land Use Change and Forestry
LULUCF	Land Use, Land Use Change and Forestry
MCF	Methane Conversion Factor
MEP	TNO Environment, Energy and Process Innovation
MJV	Annual Environmental Report
MSW	Municipal Solid Waste
MW	Mega Watt
NA	Not Available; Not Applicable (notation key in CRF); also: National Approach
NB	Nota Bene
ND	No Data
NE	Not Estimated (notation key in CRF)
NEAT	Non-Energy CO ₂ emissions Accounting Tables (model of NEU-CO ₂ Group)
NEH	Netherlands Energy Statistics
NIR	National Inventory Report (annual greenhouse gas inventory report to the UNFCCC)
NLR	National Aerospace Laboratory
NOGEP	Netherlands Oil and Gas Exploration and Production Association
NOP-MLK	Dutch National research Programme on Global Air Pollution and Climate Change
OECD	Organisation for Economic Cooperation and Development
PER	Pollutant Emission Register
RA	Reference Approach (vs. Sectoral or National Approach)
QA	Quality Assurance
QC	Quality Control
RIVM	National Institute for Public Health and the Environment
RIZA	National Institute of Water Management and Waste Treatment
ROB	Reduction Programme non-CO ₂ Greenhouse Gases
SA	Sectoral Approach; also: National Approach (vs. Reference Approach)
SCR	Selective Catalytic Reduction
SBSTA	Subsidiary Body for Scientific and Technological Advice (of Parties to the UNFCCC)
SWDS	Solid Waste Disposal Site
TNO	Netherlands Organisation for Applied Scientific Research
TPBFRA	Temperate and Boreal Forest Resources Assessment (ECE-FAO)
UN	United Nations
UNEP	United Nations Environment Programme
UNFCCC	United Nation's Framework Convention on Climate Change
VI	VROM Inspectorate
VROM	Ministry of Housing, Spatial Planning and the Environment
V&W	Ministry of Transport, Public Works and Water Management
WEB	Working Group Emission Monitoring of Greenhouse Gases
WEM	Working Group Emission Monitoring
WUR	Wageningen University and Research Centre (or: Wageningen UR)
WWTP	Waste Water Treatment Plant