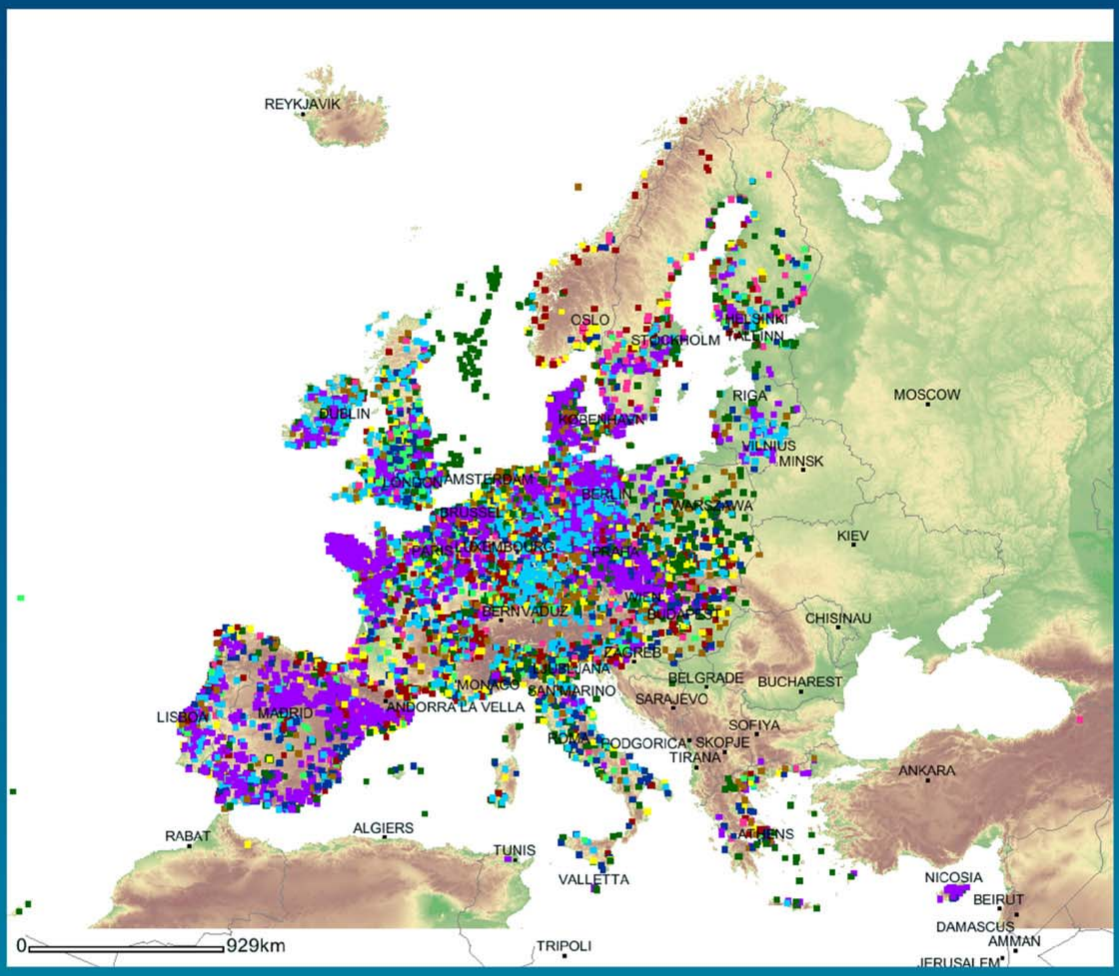
EPER

European Commission

European Pollutant Emission Register



EPER Review Report 2004

www.eper.ec.europa.eu

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Author(s):	
Tinus Pulles Jeroen Kuenen Jack Pesik	James Cadman Anne Wagner
	

Executive Summary

This is the second EPER Review report, as requested by Article 3.3 from the Decision 2000/479/EC on the implementation of a European Pollutant Emission Register (EPER) according to Article 15(3) of the EU Directive 96/61/EC on Integrated Pollution Prevention and Control (IPPC).

The report deals with two review aspects for the second data delivery, respectively:
- Evaluation of the data collection and reporting process;
- Evaluation of the completeness, the contents and the quality of the data.

In addition, this report provides
- A presentation of statistical data on the use of the website by the public;
- An evaluation of the answers made by users to a questionnaire, which had been placed on the website
- A comparison of the 2004 EPER reporting cycle with the data available from the 2001 EPER reporting cycle;
- An analysis of the emission threshold values as set in the EPER Decision with respect to the objective that EPER should include 90 % of the emissions from all IPPC activities;
- A comparison of EPER data with national inventory submissions for a number of pollutant emissions to air;

Data Collection and Reporting Process
This second EPER reporting cycle for reporting year 2004 includes both countries that used the EPER reporting process for the first time (9 Member States) and countries that already applied it for the second time (EU15, Hungary and Norway). Similar to the conclusions of the first EPER review, the reporting process seems to work generally quite well. The first time reporting countries appeared to have similar difficulties with the process as the second time reporting countries did in their first data submission. Furthermore, the second time reporting countries appear to have solved many of these problems in this second reporting cycle.

The resulting EPER web site is visited very frequently and used by many different users. The number of visits sharply increased after the publication of the second data reporting cycle on the website from about 20 000 per month before the launch to 60 000 to 70 000 per month immediately after the launch. Visitors browsed 8 to 10 pages on an average and stayed at the website for more than 16 minutes.

From an analysis of a short user questionnaire (73 respondents) a preliminary picture of the website visitors has been derived. About one third of the website visitors consider themselves as “interested citizens”, whereas about 40 % are “experts”. About one quarter of the visitors look for emissions to air and one fifth primarily is looking for emissions in a specific region or country. About one sixth of the visitors are interested in the emissions of a specific facility.

In general the respondents judged the website as meeting their needs, although a series of proposals to improve the functionality were made.

Completeness, contents and quality of data
The EPER data set now contains:

- Emission data for all twenty five pre-2007 EU Member States and Norway for the year 2004; this is for nine more countries compared to the 2001 reporting cycle, when nine of the Member States that joined the EU in May 2004 were not included. All of these "new" Member States, except Hungary, reported for the first time in this second reporting cycle;
- Data on 11 417 facilities with 27 088 emissions for the 2004 reporting year and 9 227 facilities with 23 104 emissions for the reporting year 2001;
- For 5 809 facilities emission reports for both reporting cycles are included as derived from the unique national IDs provided by the participating countries.

In comparison to the 2001 reporting cycle, the data included in the 2004 EPER reporting cycle seems to be more complete and consistent. However, for some Annex A3 activities of the EPER Decision some countries do not report any emissions. This is true for Pig and Poultry Farms (no emissions reported for Luxembourg, Hungary and Norway) and for Non-hazardous Waste Disposal (no emissions reported in Hungary, Norway, Cyprus, Malta and Slovakia). In addition only a few reports on emissions from pig and poultry farms are reported by Austria, Greece, Italy and Poland. Belgium has kept all its pig and poultry farms confidential regarding name and street address.

The present EPER database has improved considerably and is now an even larger and more comprehensive source of information on the environmental pressure caused by large and medium-sized individual facilities than before. From the comments made by the public and the number of visits it has already proved its usefulness to both the general public, NGOs, authorities, industry and other lay and professional users.

Comparison of 2004 and 2001 EPER reporting cycles
In general one could detect an increase in the number of facilities and the number of emission reports in 2004 in comparison with 2001. This is to be expected, since more countries are included.

The analysis of time series in the EPER reporting cycles is complicated by the fact that both the number of countries, the number of facilities within each country and the number of emission reports within each facility has been changed in many cases between the two reporting cycles. The strictest comparison therefore is a comparison for those facilities that reported in both cycles, using only those pollutants that were reported in both cycles. Any other comparison will be biased by additions and or omissions in one reporting cycle as compared to the other.

When comparing the emissions reported by facilities in both years only, the following is observed:

- For about one third of the pollutants the change in total emissions is less than 10 % between 2001 and 2004
- For about half of the pollutants the emissions decreased more than 10 % in 2004 as compared to 2001
- For about one sixth of the emissions an increase of more than 10 % occurred.

Emission Threshold Values
A new statistical approach has been applied to the data set to estimate the fraction of the emissions from the IPPC activities as covered by the EPER reporting cycle. This

approach estimates the distribution function for the available emissions above the emission threshold and extrapolates this to the full population of the activity, including facilities which do not have to report since they had emissions below the emission thresholds.

In general it can be concluded that the emission threshold values as set in the EPER Decision indeed ensure that 90 % of the emissions in each activity are included in the EPER reports. Reported Emissions to water in 2004 of total nitrogen, total phosphorus, tinorganics and arsenic and compounds are slightly below this 90% target.

The only exception is observed for emissions to air of NH_3, where EPER seems to cover only about half of the emissions from the full population of pig and poultry farms falling under the EPER Decision. To raise this coverage to about 90 %, the number of facilities reporting NH_3 should be increased by at least 10 000 facilities which would mean a considerable decrease in the emission threshold.

Comparison with the National Inventories

For a limited number of air pollutants a comparison can be made between the total facility level emissions reported under EPER and the sector specific national total emissions as reported to international conventions (Climate Change and Transboundary Air Pollution) or EU Directives (National Emissions Ceilings Directive and Greenhouse Gas Monitoring Mechanism). In such comparisons care must be taken to select appropriate source categories since EPER only includes emissions from major facilities, whereas the national inventories include all activities in the country.

The analyses show that the correspondence between the EPER reporting and other national emission reports is generally considered to be fair to good. For some countries and some pollutants, a number of instances have been identified which indicate there might be inconsistencies due to errors or omissions in either the EPER reporting or in the national inventories.

In the specific case of the major combustion-related pollutants (CO_2, NO_x, SO_2) the EPER data correspond quite well with the data in the national inventories. Overall, EPER emissions are 20 to 30 % below the respective national totals for the industry. The remaining difference could be partly due to the below-threshold emissions but also to industrial sectors that are not included in the list of Annex A3 source categories of the EPER Decision (e.g. Construction) but which are included within the national inventories. A final reason for the differences may be that countries did not report all facilities and emissions that should have been reported. Instances where this may potentially be the case have been noted in the pollutant-specific sections of the report.

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1 Introduction

1.1 Objectives of this report

Commission Decision 2000/479/EC of 17 July 2000 on the implementation of a European Pollutant Emission Register (EPER) [Ref 1] (hereinafter "EPER Decision") requests Member States to deliver data on emissions of about 50 pollutants by industrial facilities to air and water. This decision is based on Article 15(3) of the Council Directive 96/61/EC concerning Integrated Pollution Prevention and Control (IPPC) [Ref 2]. To facilitate the process of data delivery, the Commission has developed a "Guidance Document for EPER implementation" and a software system supporting collection, storage and dissemination of the EPER data from the Member States.

Article 3(3) of the EPER Decision obliges the Commission to publish the results of the reporting and review the reporting process within six months of the delivery dates for Member States. The first review of data for the reporting year 2001 which were submitted by Member States in June 2003 was published in June 2004. For the data delivery for the reporting year 2004, a second review report must be compiled and published. This is the review report of the second data delivery within the EPER system.

All emission data, collected through the EPER process are published on a website (http://eper.ec.europa.eu/). This website enables all stakeholders, including the general public, governmental experts, industry and non-governmental organisations (NGOs) to browse this information and to use it freely.

This Review Report provides:

- An analysis of the responses to a questionnaire, sent to the Member States after the 2nd meeting of the European PRTR Regulation Article 19 Regulatory Committee on 28 September 2006
- An overview of the website traffic following the launch of the 2004 dataset
- An evaluation of a questionnaire to be answered by users of the EPER website
- An analysis on the 2004 data set including comparisons with the 2001 data set.

The analyses in this report are based on the EPER data set as available after the second correction phase by the end of December 2006. A third correction phase is foreseen for July 2007. The data available on the website might slightly differ from the ones used in this report after this date.

1.2 Geographical scope

The EPER reporting cycle in 2004 involved more countries than the 2001 reporting cycle. Table 1-1 gives an overview of the countries participating in the 2004 EPER reporting cycle. All countries participating in the 2001 reporting cycle (the fifteen "old" EU Member States (hereinafter EU15) plus Hungary and Norway participated again in the 2004 reporting cycle. In this second reporting cycle all twenty-five EU Member States in 2006 and Norway are included in EPER reporting. Table 1-1 lists the four groups of countries as distinguished in this report.

Table 1-1 Countries covered in the 2004 EPER reporting cycle

	EU25	Other countries	First time reporting countries	Second time reporting countries
Austria	Yes			Yes
Belgium	Yes			Yes
Cyprus	Yes		Yes	
Czech Republic	Yes		Yes	
Denmark	Yes			Yes
Estonia	Yes		Yes	
Finland	Yes			Yes
France	Yes			Yes
Germany	Yes			Yes
Greece	Yes			Yes
Hungary	Yes			Yes
Ireland	Yes			Yes
Italy	Yes			Yes
Latvia	Yes		Yes	
Lithuania	Yes		Yes	
Luxembourg	Yes			Yes
Malta	Yes		Yes	
Netherlands	Yes			Yes
Norway		Yes		Yes
Poland	Yes		Yes	
Portugal	Yes			Yes
Slovakia	Yes		Yes	
Slovenia	Yes		Yes	
Spain	Yes			Yes
Sweden	Yes			Yes
United Kingdom	Yes			Yes
Number of countries	**25**	**1**	**9**	**17**

1.3 Pollutants included under EPER

The EPER Decision includes 50 pollutants, 37 of these concern emissions to air and 26 emissions to water. Table 1-2 provides an overview of these pollutants, organised in five pollutant groups. For each of these pollutants threshold values are defined. If emissions exceed these threshold values at specific facilities (see next paragraph), such emissions must be reported.

Table 1-2 Pollutants included in the EPER Decision Annex A1

Pollutants / Substances	Identification	Air	Water	Thresholds air in kg/yr	Thresholds water in kg/yr
1. Environmental Themes	**(13)**	**(11)**	**(2)**		
CH_4		x		100 000	
CO		x		500 000	
CO_2		x		100 000 000	
HFCs		x		100	
N_2O		x		10 000	
NH_3		x		10 000	
NMVOC		x		100 000	
NOx	as NO_2	x		100 000	
PFCs		x		100	
SF_6		x		50	
SO_x	as SO_2	x		150 000	
Total - Nitrogen	as N		x		50 000
Total - Phosphorus	as P		x		5 000

Pollutants / Substances	Identification	Air	Water	Thresholds air in kg/yr	Thresholds water in kg/yr
2. Metals and compounds	**(8)**	**(8)**	**(8)**		
As and compounds	total, as As	x	x	20	5
Cd and compounds	total, as Cd	x	x	10	5
Cr and compounds	total, as Cr	x	x	100	50
Cu and compounds	total, as Cu	x	x	100	50
Hg and compounds	total, as Hg	x	x	10	1
Ni and compounds	total, as Ni	x	x	50	20
Pb and compounds	total, as Pb	x	x	200	20
Zn and compounds	total, as Zn	x	x	200	100
3. Chlorinated organic substances	**(15)**	**(12)**	**(7)**		
Dichloroethane-1,2 (DCE)		x	x	1 000	10
Dichloromethane (DCM)		x	x	1 000	10
Chloro-alkanes (C10-13)			x		1
Hexachlorobenzene (HCB)		x	x	10	1
Hexachlorobutadiene (HCBD)			x		1
Hexachlorocyclohexane(HCH)		x	x	10	1
Halogenated organic compounds	as AOX		x		1 000
PCDD+PCDF (dioxins+furans)	as Teq	x		0.001	
Pentachlorophenol (PCP)		x		10	
Tetrachloroethylene (PER)		x		2 000	
Tetrachloromethane (TCM)		x		100	
Trichlorobenzenes (TCB)		x		10	
Trichloroethane-1,1,1 (TCE)		x		100	
Trichloroethylene (TRI)		x		2 000	
Trichloromethane		x		500	
4. Other organic compounds	**(7)**	**(2)**	**(6)**		
Benzene		x		1 000	
Benzene, toluene, ethylbenzene, xylenes	as BTEX		x		200
Brominated diphenylether			x		1
Organotin compounds	as total Sn		x		50
Polycyclic Aromatic Hydrocarbons		x	x	50	5
Phenols	as total C		x		20
Total organic carbon (TOC)	as total C or COD/3		x		50 000
5. Other compounds	**(7)**	**(4)**	**(3)**		
Chlorides	as total Cl		x		2 000 000
Chlorine and inorganic compounds	as HCl	x		10 000	
Cyanides	as total CN		x		50
Fluorides	as total F		x		2 000
Fluorine and inorganic compounds	as HF	x		5 000	
HCN		x		200	
PM10		x		50 000	

1.4 Activities included under EPER

Table 1-3 provides an overview of all activities included in Annex A3 of the EPER Decision. Under the EPER Decision, countries must report emissions from facilities where these activities take place if the emissions of any of the pollutants included in EPER, exceed the pollutant specific threshold values.

Table 1-3 Overview of activities included in Annex A3 of the EPER Decision

IPPC	Annex I Activities (Source Categories)	NOSE-P	NOSE-P Processes (allocation in NOSE-P Groups)	SNAP 2
1. Energy industries				
1.1	Combustion installations > 50 MW	101.01	Combustion processes > 300 MW (Whole group)	01-0301
		101.02	Combustion processes >50 and <300 MW (Whole group)	01-0301
		101.04	Combustion in gas turbines (Whole group)	01-0301
		101.05	Combustion in stationary engines (Whole group)	01-0301
1.2	Mineral oil and gas refineries	105.08	Petroleum product processing (Manufacture of fuels)	0401
1.3	Coke ovens	104.08	Coke oven furnaces (Manufacture of coke, petroleum products and nuclear fuel)	0104
1.4	Coal gasification and liquefaction plants	104.08	Other solid fuel transformation (Manufacture of coke, petroleum products and nuclear fuel)	0104
2. Production and processing of metals				
2.1/2.2/ 2.3/2.4/ 2.5/2.6	Metal industry and metal ore roasting or sintering installations; Installations for the production of ferrous and non-ferrous metals	104.12	Primary and secondary metal production or sinter plants (Metal industry involving fuel combustion)	0303
		105.12	Characteristic processes in the manufacture of metals and metal product (Metal industry)	0403
		105.01	Surface treatment of metals and plastics (General purpose manufacturing processes)	
3. Mineral Industry				
3.1/3.3/ 3.4/3.5	Installations for the production of cement clinker (>500t/d), lime (>50t/d), glass (>20t/d), mineral substances (>20t/d) or ceramic products (>75t/d)	104.11	Manufacture of plaster, asphalt, concrete, cement , glass, fibres, bricks, tiles or ceramic products (Mineral product industry involving fuel combustion)	0303
3.2	Installations for the production of asbestos or asbestos-based products	105.11	Manufacture of asbestos and asbestos-based products (Mineral products industry)	0406
4. Chemical industry and chemical installations for the production of:				
4.1	Basic organic chemicals	105.09	Manufacture of organic chemicals (Chemical industry)	0405
		107.03	Manufacture of solvent based organic products (Solvent use)	0603
4.2/4.3	Basic inorganic chemicals or fertilisers	105.09	Manufacture of inorganic chemicals or NPK fertilisers (Chemical industry)	0404
4.4/4.6	Biocides and explosives	105.09	Manufacture of pesticides or explosives (Chemical industry)	0405
4.5	Pharmaceutical products	107.03	Manufacture of pharmaceutical products (Solvent use)	0603
5. Waste management				
5.1/5.2	Installations for the disposal or recovery of hazardous waste (>10t/d) or municipal waste (>3t/h)	109.01	Incineration of hazardous or municipal waste (Waste incineration and pyrolysis)	0902
		109.06	Landfills (Solid waste disposal on land)	0904
		109.07	Physico-chemical and biological treatment of waste (Other waste management)	0910
		105.14	Regeneration/recovery of waste materials (Recycling industry)	0910
5.3/5.4	Installations for the disposal of non-hazardous waste (>50t/d) and landfills (>10t/d)	109.06	Landfills (Solid waste disposal on land)	0904
		109.07	Physico-chemical and biological treatment of waste (Other waste management)	0910

IPPC	Annex I Activities (Source Categories)	NOSE-P	NOSE-P Processes (allocation in NOSE-P Groups)	SNAP 2
6. Other Annex I activities				
6.1	Industrial plants for pulp from timber or other fibrous materials and paper or board production (>20t/d)	105.07	Manufacture of pulp, paper and paper products (Whole group)	0406
6.2	Plants for the pre-treatment of fibres or textiles (>10t/d)	105.04	Manufacture of textiles and textile products (Whole group)	0406
6.3	Plants for tanning of hides and skins (>12t/d)	105.05	Manufacture of leather and leather products (Whole group)	0406
6.4	Slaughterhouses (>50t/d), plants for the production of milk (>200t/d), other animal raw materials (>75t/d) or vegetable raw materials (>300t/d)	105.03	Manufacture of food products and beverages (Whole group)	0406
6.5	Installations for the disposal or recycling of animal carcasses and animal waste (>10t/d)	109.03	Incineration of animal carcasses and animal waste (Waste incineration and pyrolysis)	0904
		109.06	Landfills (Solid waste disposal on land)	0904
		105.14	Recycling of animal carcasses/waste (Recycling industry)	0910
6.6	Installations for poultry (>40000), pigs (>2000) or sows (>750)	110.04	Enteric fermentation (Whole group)	1004
		110.05	Manure management (Whole group)	1005
6.7	Installations for surface treatment or products using organic solvents (>200t/y)	107.01	Paint application (Solvent use)	0601
		107.02	Degreasing, dry cleaning and electronics (Solvent use)	0602
		107.03	Textile finishing or leather tanning (Solvent use)	0603
		107.04	Printing industry (Solvent use)	0604
6.8	Installations for the production of carbon or graphite	105.09	Manufacture of carbon or graphite (Chemical industry)	0404

1.5 Constraints on the Review

Data collected under the EPER Decision are subject to a number of constraints that are relevant to the interpretation of the results of the review:

- The emissions as reported in the national EPER reports refer to facilities in a country that are operating an activity above a certain capacity threshold which is listed in Annex I to the IPPC Directive/Annex A3 of the EPER Decision and that have emissions that are higher than the emission thresholds described in Annex A1 of the EPER Decision. Consequently, facilities with lower capacities or lower emissions are not included.
- Every facility is characterised by its “main activity”, but in practice will have more activities operating within the facility in many cases. A main activity could be defined as the Annex A3 activity within the facility that causes the highest environmental pressures. Those emissions which originate from activities other than the main activity are ultimately counted under the main activity. This might distort the comparison of emissions for different activities.

2 Data Collection Process

2.1 EPER Data collection and reporting process

This chapter describes the analysis of the reporting process as experienced by the Member States. EPER reporting is a stepwise process as depicted in Figure 1-1.

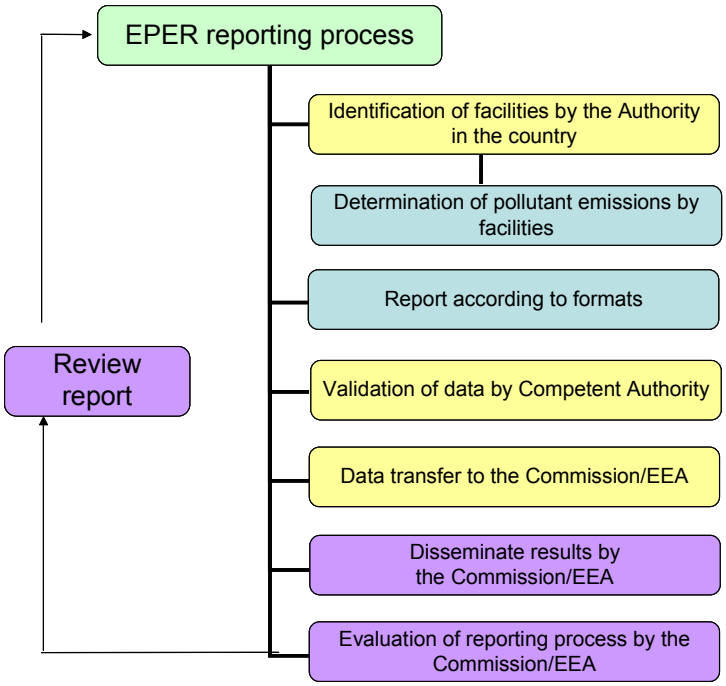

Figure 2-1 Scheme of the EPER reporting

Step 1. Identification and selection of all facilities in the country with one or more activities as mentioned in Annex I of the IPPC Directive/A3 of the EPER Decision. Activities are identified by the source categories as specified in Annex A3 of the EPER Decision.

Step 2. Determination of pollutant specific emissions by facilities from all individual facilities with Annex A3 activities for all pollutants for which the threshold values as specified in Annex A1 of the EPER Decision are exceeded.

Step 3. Reporting of the emissions for each individual facility with Annex A3 activities according to the format of Annex A2 of the EPER Decision by facilities to the relevant competent authority.

Step 4. Validation of data by competent authorities in the Member States

Step 5. Data transfer from the competent authority to the Commission/EEA

Step 6. Dissemination of all reported data by the Commission/EEA, made publicly accessible on the Internet

Step 7. Evaluation of the complete reporting process by the Commission, including the collection, quality assessment, management and dissemination of the reported data after each reporting cycle (every three years).

Based on the results and on the experiences of all parties, the Commission will recommend improvements in EPER data reporting.

The EPER Decision requests that Member States also produce national reports summarising all facility reports in the country. For reasons of harmonisation, it was made possible that national reports can be generated from the facility reports directly via the EPER website ("EU/Member State" search).

2.2 The questionnaire on reporting procedures

The review of the second EPER reporting process for 2004 data is based on a questionnaire sent out to the Member State representatives and Norway. The questionnaire was published in two versions: one for those Member States reporting only 2004 data (Cyprus, Czech Republic, Estonia, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia, see Annex A1 for a copy) and one for those countries that were reporting for the second time (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden and the United Kingdom, see Annex A2 for a copy). All countries responded.

Those countries reporting for the second time were also asked to relate their responses for 2004 data to those they made on their 2001 data to show any changes and/or progress.

The layout, style and content of the 2004 questionnaires are similar to that of the 2001 questionnaire sent out for the first review to enable comparisons between the two review periods. The questionnaires cover the following key areas:

- General and Legal Implementation
- Identification of Facilities
- Data Collection Process
- Quality Control and Assessment
- Resulting Data Sets
- Reporting Tool
- The EPER Website and
- Outlook to the European PRTR[1]

2.3 Results

2.3.1 General and Legal Status

Table 2-1 shows the implementation of EPER in national legislation for the nine countries reporting in 2004 for the first time[2]

The table shows that six of the nine Member States have transposed the EPER Decision by separate legal acts into national legislation. Two other nations state that they use existing emissions reporting legislation to enforce EPER data gathering requirements.

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[1] The European PRTR, the European Pollutant Release and Transfer Register, is the successor to EPER with 2007 being its first reporting year. "The European PRTR builds on the same principles as EPER, but goes beyond, by including reporting on more pollutants, more activities, releases to land, releases from diffuse sources and off-site transfers." The European PRTR implements the UN-ECE PRTR Protocol signed by 36 countries and the EC in Kiev in May 2003.

[2] The ten new Member States that joined in May 2004, except Hungary, which voluntarily reported for reporting year 2001.

Table 2-1 Implementation of EPER in national legislation for countries reporting EPER data for the first time[3]

Country	Legal Implementation of EPER Decision in place?	Type of Legislation	Title of Legislation	Comment
Cyprus	No			All installations in Cyprus that are included in Annex I of the IPPC Directive (96/61/EEC) are obliged to report their annual emissions to the competent authority.
Czech Republic	Yes	Act and Government Regulation	Government Regulation No. 368/2003 Coll. integrated pollution register. Act No. 76/2002 Coll. IPPC	
Estonia	Yes	Act	Ambient Air Protection Act, Waste Act, Water Act, Integrated Pollution Prevention and Control Act	
Latvia	Yes	Regulations of the Cabinet of the Ministers Nr 162	Regulations on environmental monitoring and register of pollutants	
Lithuania	Yes	The order of the Minister of Environment	The order of the Minister of Environment No 136 of 27 March 2002 on the submission procedure of pollutant emission data	
Malta	No			No Comment
Poland	No			The EPER Decision was not legally implemented as such but in Poland there were already obligations concerning the reporting of emissions to air and water.
Slovakia	Yes	Edict – national legislation	Edict Ministry of the Environment of the Slovak Republic No.391/2004 to Act No. 245/2004 concerning IPPC	
Slovenia	Yes	Regulation	Regulation on the initial measurement and operation monitoring of waste water, and on the conditions for its implementation & Regulation on the initial measurement and operation monitoring on the emissions of substances into the atmosphere from stationary sources of pollution, and on the conditions for its implementation	

Countries reporting for the second time were asked to indicate whether their legislation has changed since 2001. Three countries indicated having major changes to their legislation in place (Table 2-2).

[3] It is not mandatory for Member States to separately transpose the EPER Decision so long as they already have existing legislation in place through which the provisions of the EPER Decision are fulfilled.

Table 2-2 Differences between first and second-time reporting by EU15 Member States plus Norway and Hungary

Country	EPER related legislation in place (2001 reporting year)	Major changes to legislation (2004 reporting year)
Austria	Yes	No
Belgium	Partly	Yes, in Flanders an integrated environmental annual report has been implemented
Denmark	Yes	No
Finland	Yes	No
France	Yes	No
Germany	Yes	Yes – an amendment of the German ordinance on air-emission reporting has been made
Greece	Yes	Yes - the Circular 156722/26.10.2005 has been issued referring to the procedures related to the submission of application for environmental permit.
Ireland	No	No
Italy	Yes	No
Luxemburg	No	No
Netherlands	Yes	No
Portugal	Yes	No
Spain	Yes	No substantial changes regarding the EPER requirements: Ley 16/2002 de 1 de julio de Prevención y Control Integrados de la Contaminanción (general requirements about EPER)
Sweden	Yes	No
United Kingdom	Yes	No
Norway	Yes	No
Hungary	No	No

2.3.1.1 Identification of Facilities

The process of identifying EPER facilities as communicated by the first-time reporting countries is given in Table 2-3 and shows a pattern of responses similar to the EU15 countries, plus Norway and Hungary, that were reported in the first review reporting process (see **[Ref 3]**). Member States indicated the use of existing IPPC databases and/or lists to identify those IPPC facilities that come under the remit of EPER.

Table 2-3 Identification of Facilities

Country	How were EPER facilities identified in your country (give a short description)?
Cyprus	Department of Labour Inspection (DLI) prepared a list with all the Annex I IPPC installations in Cyprus. DLI prepared a Questionnaire that included all the data required for the EPER Report and organised four seminars to explain to representatives of the IPPC installations how to complete the Questionnaire and submit all the data required to be incorporated in the EPER Report.
Czech Republic	Facilities were identified by the IPPC database and lists of organisations and facilities from Ministry of Environment of the Czech Republic, Ministry of Agriculture of the Czech Republic and Ministry of Industry and Trade of the Czech Republic
Estonia	According to IPPC Directive and EPER Decision requirements
Latvia	Regional environmental authorities - Regional Environmental Boards (REBs) subordinated under the State Environment Service identified the IPPC facilities in their regions and issued them category A permits (IPPC facility) on polluting activities. The Latvian Environment State Bureau issued the list of category A installations based on information provided by REBs.
Lithuania	According to the order of the Minister of Environment No 136 of 27 March 2002 on the submission procedure of pollutant emission data facilities that undertake activities specified in Annex I of Council Directive 96/61/EC and the emission of pollutants exceed the threshold value of Annex A1 of Commission Decision 2000/479/EC every year have to report to the competent authorities.
Malta	All IPPC installations were given a questionnaire to fill out. Following that, all those facilities that exceeded the thresholds found in the EPER Decision were reported to the Commission
Poland	All installations that are in the IPPC database, IPPC installations identified as such during inspections, and potential IPPC installations.
Slovakia	List prepared by the Slovak Inspectorate of Environment at IPPC Department and information from the Central water register database in the Slovak Hydrometeorological Institute.
Slovenia	All installations in Slovenia (IPPC and non-IPPC) have an obligation to report their emissions yearly to the Slovenian Environmental Agency. Reported emissions from IPPC installations were compared to the EPER reporting thresholds those with emissions larger then EPER threshold were reported to EPER register.

Apart from Belgium, Greece and the Netherlands, whose reasons are given in Table 2-4, those countries reporting for the second time indicated that there were no significant changes to their approach in identifying EPER facilities.

Table 2-4 Reasons for Changing Identification Procedures

Country	Major reasons for the different approach
Belgium	NH_3 emissions for Flanders above the threshold for poultry (>40000), pigs (>2000) and sows (>750) installations were reported for the first time. Detailed information concerning the amount of animals per category and per installation became available from the Flemish Land Agency's "manure bank".
Greece	More time was allocated in identifying the IPPC installations. Hence, a thorough examination of all possible sources of information took place. The main source of information was the Ministry's databases for environmental permits for industrial installations, as well as regional authorities (also responsible for awarding permits to some IPPC installations) and professional associations for several industrial activities: principally the intensive livestock rearing and the food industry.
Netherlands	Additional inventories were used for agriculture and landfill sites and for water emissions in general.

2.3.2 Data Collection Process

2.3.2.1 Data Collection issues

The countries reporting for the second-time were asked if the data collection process and the data pathway were significantly different for 2004 data compared to the way they reported data in the first reporting cycle. Five Member States indicated that they were, namely Belgium, Denmark, Greece, Hungary and Portugal, for the reasons given below.

Belgium: Data collection and validation through an electronic, integrated reporting format. Ammonia (NH_3) emissions above threshold from poultry, pig and sow installations were reported for the first time, calculated using a model developed by Ghent University for the Flemish Environment Agency.

Denmark: Data for the industrial sector were collected using the same pathway as in the first reporting round. Data collected from the agricultural sector in the second reporting round originated from the CHR register (Central Husbandry Register) as of 31.12.2004. The information in this register is better validated in comparison with the first reporting round and is integrated with other reporting systems.

Greece: A more thorough and detailed data collection and validation procedure was followed.

Hungary: A new government decree on surface water protection prescribed the reporting of surface water data by using a new data sheet. The EPER data were collected from these incoming reports which were not available during the first reporting period.

Portugal: The time period in which EPER data were delivered changed from trimester (four months) used in for the 2001 data to the whole reporting year for the 2004 data. There was an automatic electronic process of submission of data by facility to the competent authority - Instituto do Ambiente.

Further comments were made by Spain and the United Kingdom:

Spain: Facility reports to the Autonomous Community (AC); The AC validates data emissions. Autonomous Community (AC) reports are sent to the Spanish Ministry of Environment. The Ministry revises data from AC, and if necessary sends back to the AC for updating. The National Authority sends to the Commission the EPER report. The collection of data mainly has been made using the electronic tool developed by the Ministry of Environment.

United Kingdom: In the United Kingdom it was easier to collect data for reporting year 2004 because many facilities are now regulated under IPPC.

Table 2-5 shows the route that countries reporting for the first time took to transfer data and verify it.

Table 2-5 Pathway and Validation Route

Country	Pathway	Validation
Cyprus	1,4	4
Czech Republic	1,5	4,5
Estonia	1,3,4	3,4
Latvia	1,3,4	3,4
Lithuania	1,3,4	3,4
Malta	1,4	4
Poland	1,5	3,5
Slovakia	1,4	1,4
Slovenia	1,4	1,4

1 = Facility. 2 = Local Authority. 3 = Regional Authority. 4 = National Authority. 5 = Ministry for the Environment.

It is evident that for all Member States data started at the facility which was then transferred to national authorities or the Ministry for the Environment. Data was predominantly validated by national authorities, but also by regional authorities and the Ministry for the Environment.

Table 2-6 shows the timeframe over which the facilities reported the data and the route they chose to do this: either electronically or on paper. EPER data were generally delivered by facilities to the authorities between February 2004 and June 2006. However, the reporting period varies between different countries; for example, Austria's delivery period was three months, whilst for Ireland it was fifteen months.

All 26 countries reported and delivered EPER data by the deadline of June 2006.

Table 2-6 Timeframe and Method of Delivering EPER Data by facilities

Country	In which period were EPER data delivered by facilities to the authorities? (Reporting year 2004)		How were data delivered to the authorities (in %)?		How were data delivered to the authorities (in %)?	
			First review (reporting year 2001)		Second review (reporting year 2004)	
			Electronically	On paper	Electronically	On paper
Austria	Jan-05	Mar-05	100	0	100	0
Belgium	Jan-05	Mar-05	0	100	30	70
Denmark	Mar-05	Oct-05	0	100	53	47
Finland	Jan-05	Apr-05	95	5	100	0
France	Jan-05	Apr-05	10	90	98	2
Germany	Apr-05	Jun-05	30	70	90	10
Greece	Mar-05	Dec-05	*	*	0	100
Ireland	Mar-05	May-06	*	*	*	*
Italy	Apr-05	May-05	90	10	100	0
Luxembourg	Jan-04	Jun-05	*	*	0	100
Netherlands	Apr-05	Aug-05	0	100	89	11
Portugal	Jan-05	Apr-05	80	20	93	7
Spain	Jun-05	Sep-05	60-70	40-30	75-80	25-20
Sweden	Jan-05	Mar-05	0	100	10	90
United Kingdom	Jan-05	Feb-05	20	80	65	35
Hungary	Jan-05	Apr-05	0	100	0	100
Norway	Feb-04	Mar-04	0	100	0	100
Cyprus	Apr-05	Feb-06			0	100
Czech Republic	Jan-05	Apr-05			65	35
Estonia	Jan-05	Apr-05			100	0
Latvia	Feb-06	Apr-06			0	100
Lithuania	Jan-04	Jan-05			70	30
Malta	Aug-05	Jun-06			100	
Poland	Feb-06	Apr-06			30	70
Slovakia	Feb-05	Apr-05			50	50
Slovenia	Jan-05	Apr-05			70	30

* Not reported or recorded

The majority of facilities used electronic reporting to the authorities across all EU25 Member States plus Norway. Countries reporting for the second time have used more electronic reporting than they did during the 2001 reporting cycle (France, Germany, Netherlands, and United Kingdom). There is no significant difference between first and second-time reporting nations in terms of the medium they used to report their data: electronic or paper.

2.3.2.2 Quality Control and Assessment

Table 2-7 indicates how many times facilities had to be contacted by competent authorities in order to fully assess the quality of the received information. Competent authorities in the nine first-time reporting countries generally had to contact facilities two or three times to gather the required additional data. This is in contrast to facilities in second-time reporting countries that generally only needed to be contacted once by the competent authorities. This is more than likely due to the fact that the second-time reporting countries were well aware of what was required from their previous experiences and could thus expedite the process somewhat more quickly. It is presumed that this will also be the case for the other Member States in future emission reporting processes.

Table 2-7 Frequency of Contact with Facilities (percentage)

Country	no contact with facilities	1 time	2 or 3 times	More than 3 times
Austria	50-100	20-50	0-40	0-40
Belgium	60	20	15	5
Denmark	0	50	40	10
Finland	90	6	3	1
France	80	15	3	2
Germany	20	50	25	5
Greece	0	10	50	40
Ireland	0	17	82	1
Italy	92	8	0	0
Luxembourg	73	27	0	0
Netherlands	0	40	30	30
Portugal	28	0	72	0
Spain	40	30	25	5
Sweden	70	20	5	5
United Kingdom	50	40	10	0
Hungary	0	10	65	25
Norway	50	40	5	5
Cyprus	25	75	0	0
Czech Republic	0	15	80	5
Estonia	0	35	60	5
Latvia	25	50	20	5
Lithuania	0	35	65	0
Malta	50	0	0	50
Poland	2	70	18	10
Slovakia	5	65	30	0
Slovenia	0	30	60	10

2.3.2.3 Difficulties in data collection

The authorities in the nine countries that reported the first time indicated in their questionnaire that the major difficulties for the facilities regarding the collection, validation and reporting of the data have been:

- Lack of personnel with the right scientific background, the knowledge to collect data to determine emission values, the estimation of emission values or providing any emission values;
- As they were reporting for the first time there was often no reference data available for checking;
- No previous experience of emissions reporting, determination or estimation
- Using electronic applications (installing computer program, exporting the data);
- Facility identification (agricultural facilities mostly); geographical coordinates identification systems are different for some countries (Czech Republic, Poland) to those prescribed in the EPER Guidance Document;
- Understanding the term "estimation" (determination methodology) and being able to estimate emissions
- Calculation or estimation of some parameters (for example PM_{10} or methane emissions from landfills).

The major problems for the authorities in collecting and validating the data in these nine countries have been:

- Difficulties in getting data from pig and poultry farms and landfill facilities
- Not being able to compare data between different reporting years in a time series as such data had not been collected before;
- Incomplete data (missing data), especially PM10 data;
- Identification of the main NOSE-P code;
- Incorrect data on the emitted amounts;
- Identifying the facility's main activity and the correct reporting units.

- It is noted that the difficulties occurring for first-time reporting countries are similar to the problems that the second-time reporting countries experienced during the 2001 EPER reporting process [Ref 3].

Second-time reporting countries stated that their facilities had had the following problems:

- Determining total annual emission loads based only on a few measurements and problems with using emission factors or estimation models, especially for pig and poultry farms;
- Understanding of the chemical compounds included in EPER;
- Using the reporting tools;
- Meeting the timescale for reporting;
- Harmonisation with national laws.

Second-time reporting countries stated that their authorities had had the following problems:

- Missing / wrong data;
- Lack of resources to undertake the work such as validation;
- Changes to co-ordinates, ID-codes, facility names and activities have made extra work;
- Different determination methodologies used by facilities.

Second-time reporting countries were also asked whether there have been any major changes (improvements, rationalisation) to the data quality checking process they used in comparison to that they had used in the first reporting cycle and if so, to identify where and why these major changes occurred.

Table 2-8 Major Changes to Data Quality Assessment

Country	Identify where and why these major changes occurred
Austria	No major changes
Belgium	Yes. Data collection and validation through an electronic, integrated reporting format
Denmark	Yes. Most important change is concerning agriculture.
Finland	No major changes
France	A notification website has been set up. On this website, the operator can notify the emissions of the facility. The competent authorities carry out the validation of the notifications on the same website.
Germany	No major changes, in general the process succeeded due to the experiences of the first EPER Reporting Cycle
Greece	The Ministry contracted a consortium of companies to carry out the collection and validation of the EPER Data. The consortium communicated with the facilities in order to support them in the determination of their emissions and informed them of the procedures and obligations they had to fulfil, concerning the EPER reporting.
Ireland	All facilities reporting to EPER were contacted in writing by EPA, in advance of submission of the EPER report, to alert them to the emission figures that were intended to be reported. This resulted in companies coming forward in a few cases if there was an error in the emission figure to be reported. Additional attempts made to verify data in advance of submission of report to EPER particularly where large changes occurred in emissions between 2001 and 2004. (Facilities provide the data, electronically or on paper, in EPER format to the Irish EPA)
Italy	No major changes
Luxembourg	No major changes
Netherlands	Electronic reporting showing the historical data and other checks and balances during input and validation
Portugal	To ensure that all relevant IPPC facilities were captured in the EPER report, the competent authority (Instituto do Ambiente) estimated data not reported by operators for the first time. Data quality checks were made by highly qualified experts at the competent authority (Instituto do Ambiente)
Spain	Inspection programs by competent authorities. Inclusions of information requirements specifying methodologies of measures or calculation per each substance in IPPC permits. The BAT Spanish Guidance Documents include a new chapter of recommended measurement and/or calculation methods.
Sweden	No major changes
United Kingdom	An audit check for outlier values of releases has been implemented. This involves systematically checking the data for erroneous values at a regional and national level.
Norway	No major changes
Hungary	No major changes

Table 2-8 shows that nine of the seventeen first-time reporters have made some changes to improve their process for data validation; either via the better use of electronic data capture systems, e.g. internet sites and databases, or alterations for specific sectors.

2.3.3 Resulting data set

2.3.3.1 Facility coverage

The following data in Table 2-9 shows the estimated percentage of facilities reporting under EPER in comparison to all IPPC facilities for each Member State.

Table 2-9 Overall percentage of facilities reporting under EPER compared with all IPPC facilities in each country

Country	2004 questionnaire	2001 questionnaire
Austria	23 %	30%
Belgium	45 %	30 %
Denmark	18 %	10-15 %
Finland	36 %	33 %
France	20 %	30 %
Germany	Approx 25 %	24 %
Greece	29.2 %	26 %
Ireland	Approx 30 %	25-30 %
Italy	10 %	10 %
Luxembourg	65 %	-
Netherlands	13 %	-[1]
Portugal	48 %	28 %
Spain	43 %	28 %
Sweden	21.9 %	18 %
United Kingdom	50 %	40 %
Hungary	9.3 %	9 %
Norway	50%	50 %
Cyprus	65 %	
Czech Republic	25 %	
Estonia	Approx 20 %	
Latvia	37%	
Lithuania	42 %	
Malta	33 %	
Poland	23 %	
Slovakia	25 %	
Slovenia	47 %	

[1] 100% of the industrial facilities reported; agricultural facilities and waste disposal sites could not be reported.

In 2001 Austria initially reported 95%. As they had originally included IPPC facilities that had emissions below the EPER thresholds this value was changed to 30% to account for only those IPPC facilities that fall under the obligations of EPER.

Across Europe some 12,000 IPPC facilities out of 50,000 report to EPER, i.e. 24%.

2.3.3.2 Confidentiality

Germany and the United Kingdom were the only countries flagging confidential data in the 2001 questionnaire. In the second round of the EPER reporting process, confidentiality was requested by facilities in seven Member States, namely Belgium, Germany, Latvia, the Netherlands, Poland, Spain, and the United Kingdom. Confidential data were flagged by these countries for the following reasons:

- *Personal data of operator, such as name and address, geographical co-ordinates*

Belgium: 190 facilities, Annex A3 activity 6.6 (Installations for poultry, pigs or sows)

Germany: 17 facilities, Annex A3 activity 6.6 (Installations for poultry, pigs or sows)
Netherlands: 1 facility, Annex A3 activity 6.6 (Installations for poultry, pigs or sows)
Spain: No facility data is considered as confidential in "EPER-España" except for personal data such as telephone and fax numbers, e-mail addresses, etc.
United Kingdom: 314 sites for Annex A3 activity 6.6 (Installations for poultry, pigs or sows)

- *Economically sensitive data - emissions information that would allow competitor to gain knowledge of process*

United Kingdom: The UK stated that fifteen facilities quoted "emission information would allow competitor to gain knowledge of process" as a reason for withholding information on emissions. The number of facilities by Annex A3 Codes are as follows
  - One with Annex A3 Code 1.1 (Combustion installations > 50 MW)
  - Four facilities with Annex A3 Code 3.1 (Installations for the production of cement, clinker, lime glass, mineral substances or ceramic products)
  - Six facilities with Annex A3 Code 4.1 (Basic organic chemicals)
  - One facility (also for reasons of national security) with Annex A3 Code 4.4/4.6 (Biocides and explosives)
  - Two facilities with Annex Code 5.1 (Installations for the disposal or recovery of hazardous waste (>10t/d) or municipal waste (>3t/h))
  - One facility with Annex A3 Code 6.4 (Slaughterhouses (>50t/d), plants for the production of milk (>200t/d), other animal raw materials (>75t/d) or vegetable raw materials (>300t/d))

- *Not obligatory to submit data under national legislation*

Poland: Under Polish Law it is not obligatory to submit EPER data. Two facilities used this reason for confidentially, namely
  - One facility with Annex A3 activity 6.6 (Installations for poultry, pigs or sows)
  - One facility with Annex A3 activity (6.7 (Installations for surface treatment or products using organic solvents.)

2.3.4 Reporting and reporting tools

Table 2-10 shows that the majority of countries used the validation tool to create the XML-file for the Central Data Repository (CDR). Most countries did not experience any difficulties using the validation tool. However some countries suggested proposals on how to improve the validation tool (including the reporting format) and its use with regard to the future use under the European PRTR:

- Software issues (compatibility with other software packages)
- Simplification of the process delivery and upload to the CDR

- Completeness check of the file uploaded (validation tool should produce a list of the EPER pollutants and the number of facilities concerned to check the completeness of files)

Table 2-10 Use of the Validation Tool

Country	Did you use the validation tool to create the XML-file for the CDR?	Country	Did you use the validation tool to create the XML-file for the CDR?
Austria	Yes	Cyprus	Yes
Belgium	Yes	Czech Republic	Yes
Denmark	Yes	Estonia	Yes
Finland	Yes	Latvia	Yes
France	Yes	Lithuania	Yes
Germany	No[1]	Malta	Yes
Greece	Yes	Poland	Yes
Ireland	Yes	Slovakia	Yes
Italy	Yes	Slovenia	Yes
Luxembourg	No		
Netherlands	Yes		
Portugal	Yes		
Spain	Yes		
Sweden	No		
United Kingdom	Yes		
Hungary	Yes		
Norway	Yes		

[1] Germany used the validation tool for checking the XML-File

2.3.5 The EPER website

2.3.5.1 Website appreciation

The general impression of the website was good across all EU25 countries and Norway (Table 2-11). Austria, Denmark and Malta rated the site sufficient whereas countries like France and Slovenia were very pleased with it.

However there was one criticism that the website is trying to address different groups with very different needs and requests. On the one hand, the website does not fully accommodate the needs of the public as it is too complicated whilst on the other hand it is not sufficiently comprehensive for the scientific community or governmental experts.

Other comments were that some basic information is not sufficiently comprehensible (concerning time series and analysis of the EPER first reporting cycle to the second EPER reporting cycle) and that translations into other Member State languages would be helpful. Likewise, disaggregation of the Annex A3 activity codes would be helpful in some circumstances for understanding the data, e.g., breaking out the data from pig and poultry farms.

Table 2-11 Views on the Website

Country	How do you feel the site currently accommodates the different user groups?				
	General public	Governmental experts	Industry	Scientific Community	NGO's
Austria	Sufficiently	Sufficiently	Sufficiently	Sufficiently	Sufficiently
Belgium	Well	Well	Well	Well	Well
Denmark	Poorly	Sufficiently	Sufficiently	Sufficiently	Sufficiently
Finland	Well	Sufficiently	Well	Sufficiently	Well
France	Very well	Very Well	Very well	Very well	Very well
Germany	Poorly	Well	Well	Well	Well
Greece	Well	Well	Well	Sufficiently	Sufficiently
Ireland	Very well	Very Well	Very well	very well	Very well
Italy	Well	Well	Well	Well	Well
Luxembourg	-	Well	-	-	-
Netherlands	Sufficiently	Well	Well	Sufficiently	Well
Portugal	Well	Sufficiently	Well	Well	Well
Spain	Sufficiently	Sufficiently	Well	Well	Well
Sweden	Well	Well	Well	Well	Well
United Kingdom	Sufficiently	Well	Sufficiently	Sufficiently	Well
Norway	Well	Well	Well	Well	Well
Hungary	Very well	Sufficiently	Well	Sufficiently	Very well
Cyprus	Well	Very Well	Well	Well	Well
Czech Republic	Well	Sufficiently	Sufficiently	Sufficiently	Well
Estonia	Well	Well	Well	Well	Well
Latvia	Well	Well	Well	Well	Well
Lithuania	Well	Well	Well	Sufficiently	Well
Malta	Sufficiently	Sufficiently	Sufficiently	Sufficiently	Sufficiently
Poland	Well	Well	Well	Well	Well
Slovakia	Sufficiently	Well	Sufficiently	Sufficiently	Sufficiently
Slovenia	Very well	Very Well	Very well	Very well	Very well

2.3.5.2 Outlook and development towards European PRTR

Both first-time and second-time reporting countries had comments to make on the outlook to the European PRTR.

These included views on future improvements such as harmonising reporting software and procedures in combination with other reporting obligations at national and international levels in order to lessen the burden and frequency of reporting requirements, with clear guidance documents and templates for reporting. Information dissemination to industry was seen as important in order to get their understanding of why they are being asked for this data and thus expedite the process. Likewise, Internet fora for discussing EPER / European PRTR issues were seen as being useful.

There were calls to improve the quality and reliability of emissions factors used for calculating emissions as well as providing diffuse source pollution determination methodologies. Furthermore there was a request for guidance on how to represent reported emissions in terms of them reflecting 'true' emissions.

2.4 Conclusions on the EPER Reporting Process

In summary, most countries have implemented specific legislation to fulfil EPER reporting requirements across the EU. Three of the second-time reporting countries listed where their legislation or procedures had changed.

As with second time reporting countries, the first-time reporting countries likewise used IPPC databases and lists to identify which IPPC facilities were relevant to EPER. Three of the second time reporters stated that identification procedures had been modified due to greater resources or better information.

The data collection and transfer pathway for first-time reporting Member States was from facility to regional or national competent authorities and was then validated by the regional and national competent authorities. Three second-time reporters stated that their pathway procedures had been altered due to better reporting tools for example.

There was a broad range of timescales over which facilities were allowed to submit EPER data to their authorities, from three to fifteen months. Similarly there was a large variance in the proportion submitted electronically or on paper, up to 100% for both.

Countries reporting for the second time had fewer problems with their data collection and quality assessment than countries reporting for the first time. This shows that the original seventeen countries benefited from the experience learned during their first EPER reporting process. This leads to the assumption that first-time reporting countries might find it easier to collect and report data in the future.

Several problems were listed in relation to data collection and validation. These occurred in all reporting countries and included issues such as having the right level of technical knowledge available, having the necessary data to be able to estimate emissions for certain sectors, changes to facilities' ownership and missing data.

In comparison to the 2001 reporting cycle, the percentage of IPPC facilities reporting to EPER was generally the same or lower in 2004 for the second-time reporting countries and ranged from 18 – 65%. First-time reporting countries had a similar range of EPER/IPPC ratio of 20 – 65% of their IPPC facilities reporting to EPER. The European average is 24%.

Data passed from facility operators to the relevant authorities have only been kept confidential in a few cases where the data was deemed to be sensitive. This has included personal data (contact details and location of facilities, mainly for installations for poultry, pigs or sows), competitive economic or business data (emissions information or production capacities that would give a competitor an advantage) and legal reasons (no compulsion under national law to report EPER data).

The reporting tools were used without major difficulties across all countries; some suggestions for improvements were made to the software applications.

Several countries mentioned that the website could be improved further to meet the different needs of the various user groups, in particular the public as it was felt that the website is better suited to environmental professionals, civil servants and academics.

The outlook to the European PRTR focussed on the harmonisation of reporting procedures and better emission factors.

3 Website appreciation

3.1 Statistics of website traffic

The EPER website was launched on 23 February, 2004 at the European Environment Agency in Copenhagen. An analysis of the monthly page views since the start of the website (Figure 3-1) shows that the number of visitors has gone up dramatically in the latter months of 2006. This increase can be attributed to the fact that the 2004 emission data were made available to the public via this website on 23 November, 2006.

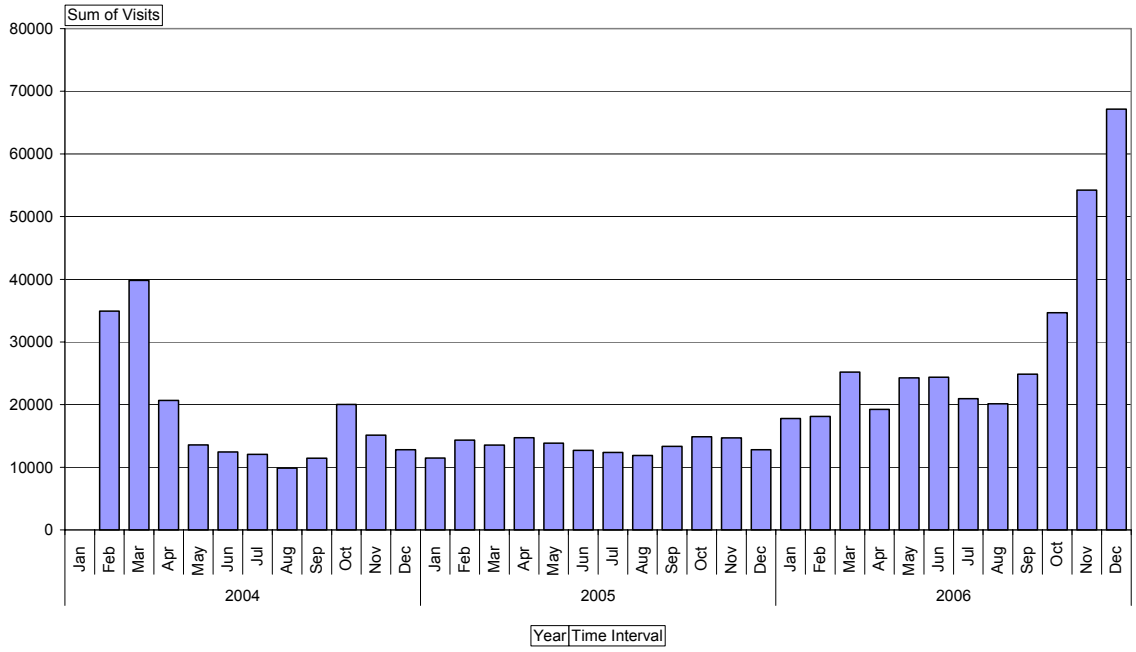


Figure 3-1 Number of monthly page visits between January 2004 and December 2006[4]

[4] For April 2006, there are only 10 days of website statistics available. The data have been extrapolated to include all 30 days in April

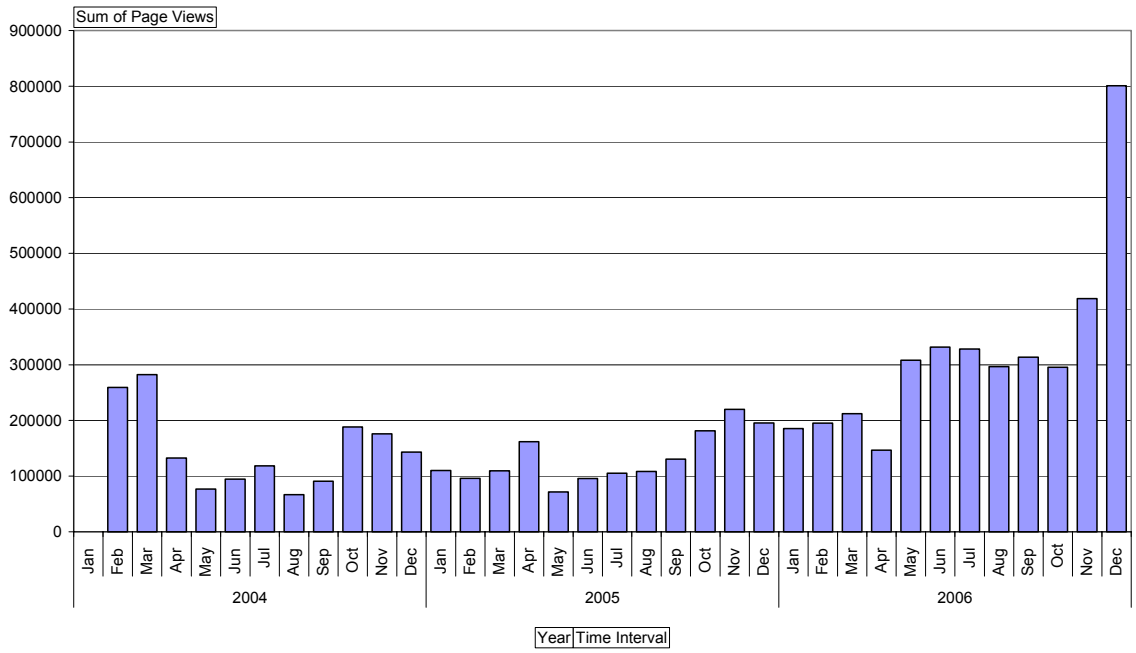


Figure 3-2 Number of page views between January 2004 and December 2006[5]

Figure 3-2 also shows a rapid increase in the number of page views in November and December 2006. It might be interesting to see if there are changes in the number of page views per visit. Figure 3.3 shows this number for each month, which is defined as the number of page views divided by the number of visits to the website in that month.

[5] For April 2006, only 10 days of website statistics are available. The data have been extrapolated to include all 30 days in April.

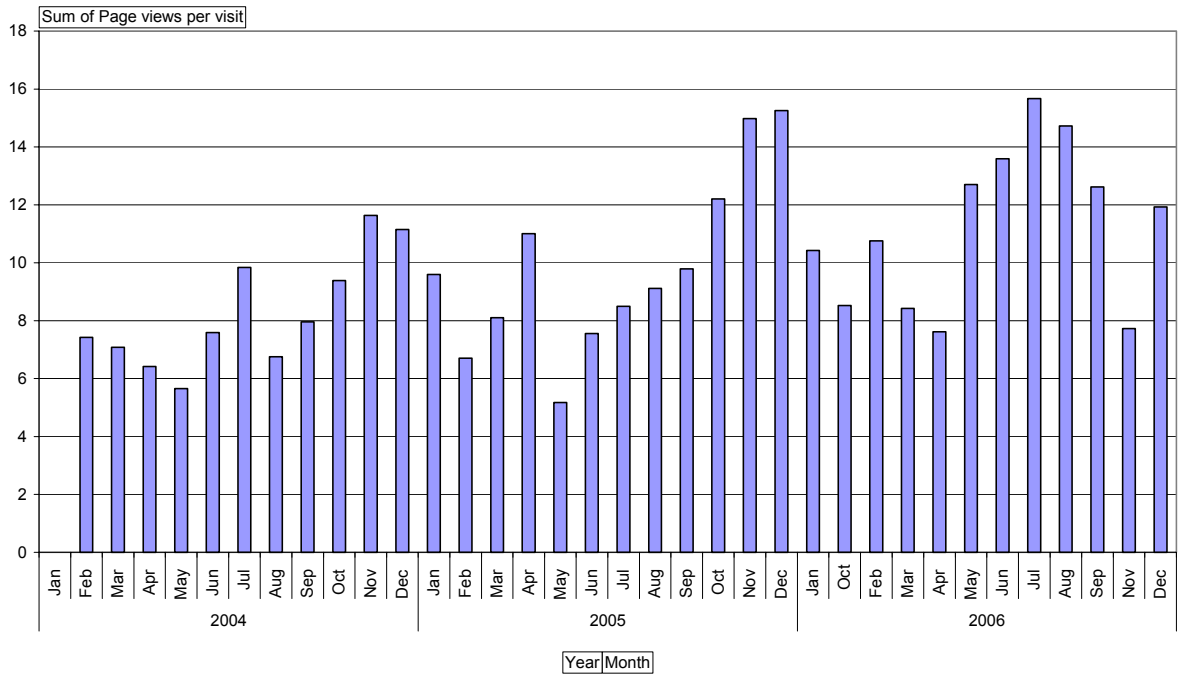


Figure 3-3 Monthly averaged number of page viewed per visit, again for the period January 2004 – December 2006.

Although there is some fluctuation in Figure 3-3, the yearly average number of page views per visit has increased from 8.0 in 2004 to 9.9 in 2005 and 11.0 in 2006. From this increase it can be concluded that not only the number of visitors is going up, but also that these visitors are requesting more information from the website.

The average visit length for a visit to the EPER website is 16 minutes and 48 seconds (average of the yearly averaged visit lengths for 2004, 2005 and 2006). The averaged median visit length, however, is much smaller: only 2 minutes and 43 seconds. This reflects the point that most of the visitors quit the website after having a short look, but a few others are staying at the website for presumably hours, collecting a lot of information.

For many visits, it is impossible to determine the country of origin of the visitor, for instance when a .com or .net domain is used. The left-hand pie-chart in figure 3.4 shows that the origin could only be determined for 31% of the visitors. This means that for a total 218 195 visits between January 2004 and December 2006, the country of origin of the visitor could be determined.

Countries providing more than 1% of visitors to the website are shown in the right-hand pie-chart in Figure 3-4. Almost all the visits are from European countries participating in EPER. The main non-European countries that visited the EPER website are the USA (1.7%) and Japan (1.4%).These countries have also established comprehensive and publicly accessible inventories.

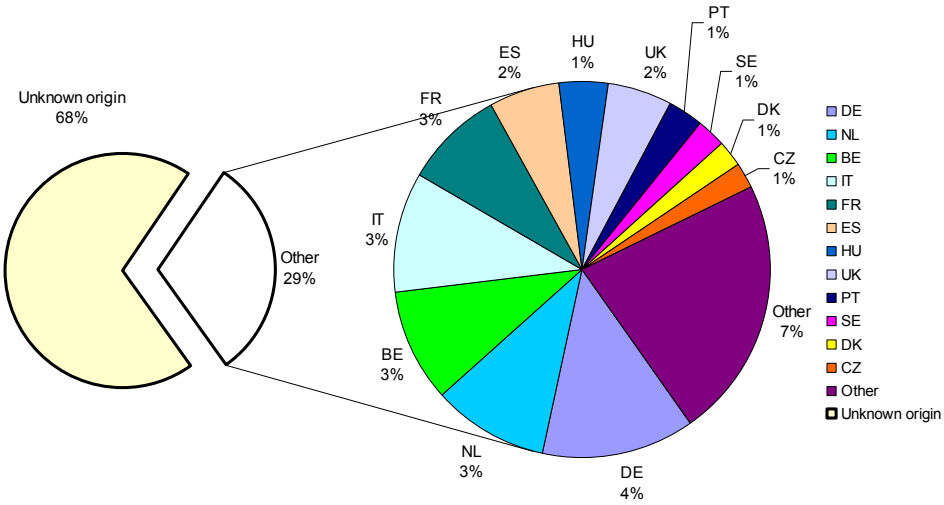


Figure 3-4 Percentage of website visitors of which the country of origin could be determined and distribution over these countries

The pie-chart shows that most visitors, where the country of origin is known, are from Germany, Italy, the Netherlands, France and Belgium.

3.2 The user questionnaire

Between 21 November 2006 and 14 February 2007, 73 surveys were completed on the EPER website. Another 226 users abandoned the survey while filling it out. On average, the survey took the user eight minutes to fill out. About 80% of the respondents used an (A)DSL internet connection or better.

There were various types of users that filled out the questionnaire. What kind of users the respondents consider themselves to be is shown in Figure 3-5.

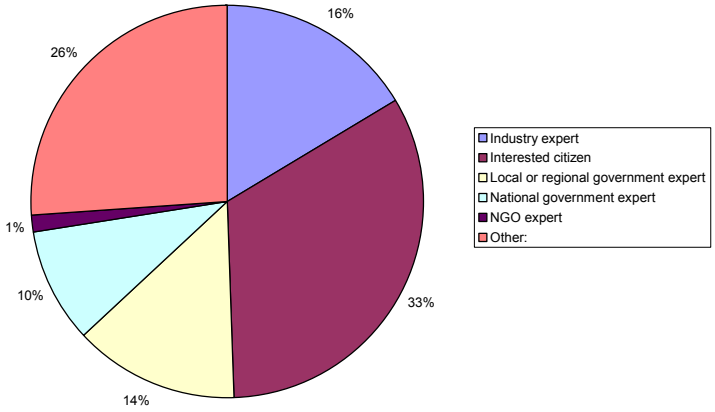


Figure 3-5 The user groups filling out the questionnaire

The results show that one third of all respondents considered themselves as an interested citizen and more than 40% of the respondents were experts.

The pie-chart in Figure 3-6 shows where the respondents learned about the EPER website. The figure shows that one third of the people found the EPER website by information from colleagues or experts, while 26% found the website through an internet search engine.

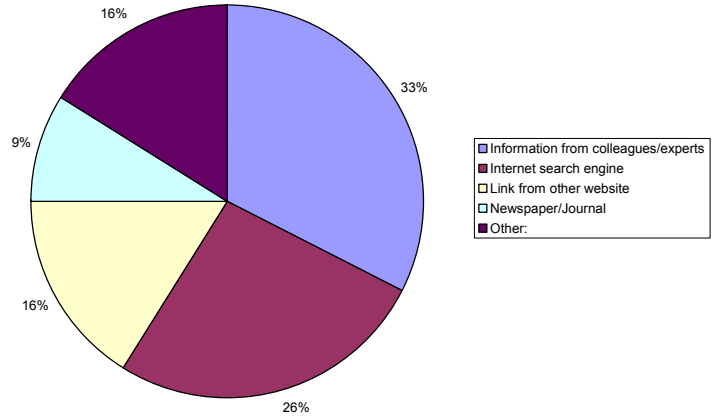


Figure 3-6 Where the respondents learned about the EPER website

The pie-chart displayed in Figure 3-7 shows the type of information that the respondents to the questionnaire were looking for. Most respondents were looking for emissions to air. Another large group of respondents (almost 20%) was looking for emissions from a specific region or country. Only 9% were looking for emissions in a specific neighbourhood, while 16% were looking for emissions from a specific facility.

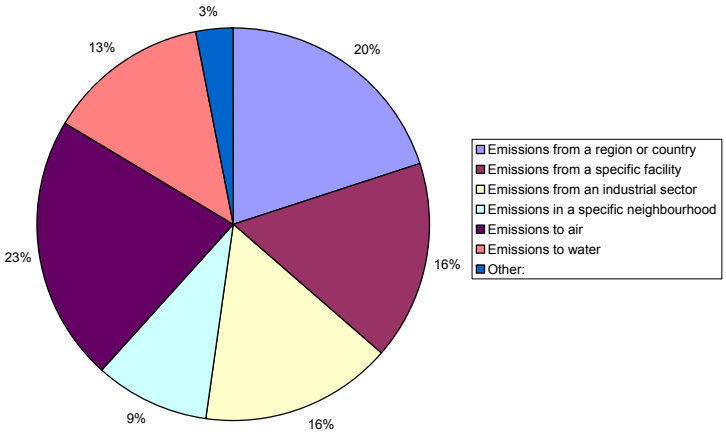


Figure 3-7 Type of information the respondents were looking for

Other questions in the questionnaire ask the respondent if the website accommodates the user's needs. It was possible for the respondent to give quality ratings from very well to very poorly. Table 3-1 gives an overview of the quality ratings given for different issues regarding the EPER website.

Table 3-1 Overview of respondents' ratings of the website

	Very well	Well	Sufficiently	Poorly	Very poorly
Availability of background information	21%	38%	27%	11%	3%
Availability of explanations	16%	40%	26%	16%	3%
Ease of finding what you're looking for	20%	33%	24%	14%	9%
Quality of the map search	16%	41%	25%	12%	6%
Clarity of graphs and tables	27%	41%	23%	6%	3%
User friendliness of pages	25%	28%	29%	15%	3%
Usefulness of information and data	26%	29%	33%	9%	4%
Site design (how does it look)	22%	41%	21%	10%	6%

In all questions, more than 75% of the respondents thought the website accommodated their needs sufficiently to very well. The lowest ratings were given for the ease of finding what you're looking for, 23% of the respondents rated the website poorly or very poorly in this case. The best ratings were given for the clarity of graphs and tables, where 91% of the respondents indicated that the clarity was sufficient to very good.

The final question in the questionnaire asks the respondents if they have any other comments or suggestions for further improvement of the EPER website. 30 of the 73 respondents filled in an answer to this question. All the answers are shown in Table 3-2.

Many respondents indicated that they appreciated the website, but would like to see its performance improved. More and better search options and additional documents about the reporting process would be welcomed. Also, the respondents' answers show that most of them are interested in the present situation and a trend/time series analysis for each country or facility.

Table 3-2 Other comments or suggestions by the respondents to the user questionnaire

Do you have any other comments or suggestions for future improvements to the website?
Site looks too simple. It is hard to find the right information when the lay-out looks like a site from the mid 90's.
There is constantly a run time error and the information does not appear.
Make the searches for pollutants work properly so that you can find out who are the worst facilities for that type of pollutant, and fix the facility search so that when you click on a facility it actually links to information on that facility.
1) providing a Google Maps interface for maps and satellite images, will be a great improvement. 2) Enriching your web with educational content, will be very welcome.
There is no legend.
It would be very useful to publish more specific guidelines, including emission factor selection and validation criteria, in order to make data really comparable.
Hmm, the site looks very interesting, but I encountered problems with the map, as I don't see the navigation toolbar. I can travel on the map, but that's all... :-(
Usefulness of the information & data I assessed very poorly because they are not complete and there are bad diagrams - not applicable to data you can see.
Additional to the emissions into the air the figures of energy consumption by type of fuel should be displayed.
Improve printability of pages Provide downloadability to Excel or similar. Indicate reporting thresholds on pages dedicated to a specific pollutant.
On satellite image belonging to location Enci BV Maastricht Nace code 26.50 name of the village Maasmechelen has to be: Kanne, gemeente Riemst, Belgium. Maasmechelen lies about 25km further north.
Keep informed about your activity in Northern Italy.
Is the industry of lead acid battery IPPC, yes or no?
Please enable download of all facility data for a specific pollutant. Are there any explanations why the number of installations concerned in France shows such an enormous decrease 2001 - 2004 (see e.g. TOC).
There is not enough information in regions within Ireland. Besides that I think it is a very useful website and a great way for the public to become aware of industries within there own area.
Include some trends and graphs with historic data.
Please more up-to-date data.
Thanks for this site. But it necessary to develop it to a better information and control of pollutants.
Depending on data, more specific definitions of industry sectors.
I need a possibility to make queries and extract emission information in an electronic platform independent format.
This is a very nice site and seems to work well. I was puzzled when I selected an area (around Warsaw) and many sites were circled on the map, but what seemed like a smaller number of sites appeared in the list. Perhaps I overlooked something. Nice job!
I couldn't really understand how to get from the map to the information about a particular facility.
I have problems with pages printing.
Is wonderful.
So far I haven't found the health/general known negative impact of each individual pollutant, but must say I just discovered this website today: will explore more, maybe that information is already there somewhere... Overall an amazing source of information, I hope you send your web address forcefully to each political figure in Europe... Thank you very much!
Speed. The server seems to be slow, not responsive. That joined to the slow Flash effects everywhere makes the map search too slow. Regards.
Cool resource I was previously unaware of! Awesome!
Download as CSV or XML is not really helpful to further work with the data. Please make clearly column markers in the CSV files like semicolon.
And the situation of 2005 and 2006?
Thank you for providing access to this important resource for citizens, activists, and researchers. It is very difficult to ascertain national differences in reporting requirements. Why, for example, does Hungary have only 96 facilities in its report? According to the text, inclusion is on the basis of volume of emissions; is it possible that only 96 facilities in Hungary exceed the reporting threshold. Regards.

A number of comments were given on the website's technical performance, some respondents complained that it is slow, or that they had problems while browsing the website or downloading information in the format they prefer.

4 Completeness of data

4.1 Number of facilities

All seventeen countries (EU15 and Hungary and Norway) that reported in 2001 reported again in 2004. In addition, reports on 2004 emissions were submitted by the nine "new" Member States that did not report in the first EPER cycle. Table 4-1 provides an overview for all countries. The table also shows the numbers of individual facilities that have been reported in both reporting cycles or in one or the two reporting cycles only.

Table 4-1 Number of facilities reported by Member States in 2001 and 2004

		2001		2001 Total	2004		2004 Total
Country Group	Country	Facilities reporting in both cycles	Facilities reporting in 2001 only		Facilities reporting in both cycles	Facilities reporting in 2004 only	
EU25	Austria	120	24	144	120	16	136
	Belgium	189	92	281	189	308	497
	Denmark	107	51	158	107	130	237
	Finland	167	21	188	167	65	232
	France	709	567	1276	709	896	1605
	Germany	1185	651	1836	1185	498	1683
	Greece	54	28	82	54	54	108
	Hungary	63	23	86	63	33	96
	Ireland	130	24	154	130	53	183
	Italy	539	132	671	539	143	682
	Luxembourg	11	1	12	11	4	15
	Netherlands	116	13	129	116	270	386
	Portugal	124	34	158	124	170	294
	Spain	873	554	1427	873	1293	2166
	Sweden	163	65	228	163	66	229
	United Kingdom	1181	1216	2397	1181	500	1681
	Cyprus					70	70
	Czech Republic					339	339
	Estonia					23	23
	Latvia					30	30
	Lithuania					66	66
	Malta					4	4
	Poland					459	459
	Slovakia					103	103
	Slovenia					93	93
EU25 Total		5731	3496	9227	5731	5686	11417
Other countries	Norway	78	18	96	78	10	88

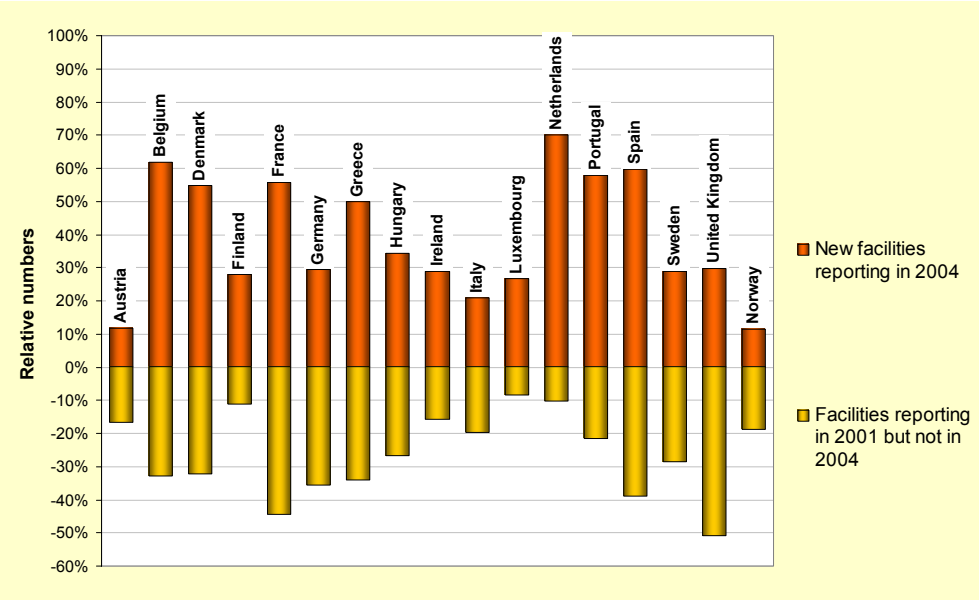


Figure 4-1 Relative change in number of facilities included in the two reporting cycles for each country reporting twice

When comparing the number of facilities in the two reporting cycles, the national IDs, provided by the Member States are used to identify the individual facilities. Figure 4-1 presents the relative changes in these numbers. From this the following is observed:

- About 38 % of the facilities that were included in the 2001 EPER reporting cycle are not included in the 2004 report
- Almost 50 % of the facilities reporting in 2004 are new as compared to the 2001 reporting cycle; 40 % are “new” facilities in the countries that reported a second time and 10 % are facilities in the countries that report for the first time in 2004.
- In Luxembourg, the Netherlands and Finland about 10 % or less of the facilities included in the 2001 EPER data set did not report in 2004.
  In the United Kingdom over 50 % of the facilities included in 2001 did not report in 2004
- For almost all countries the number of “new” facilities is considerable.

We conclude that, in terms of number of facilities, the 2004 EPER reporting seems to be more complete as compared to 2001, although problems in identification of the individual facilities might still be present.

Each facility should be uniquely identifiable. To achieve this, a number of data items are obligatory within the reporting process. Table 4-2 presents an overview showing to what extent this obligatory information has been provided. In addition the table shows the response rate for a number of voluntary data fields. The table clearly shows that the identification information was completed very well in the EPER database in both reporting years. There seems however to be a tendency to decrease the completion of the voluntary identification fields.

Table 4-2 Completeness of identification data for the facilities

	2001	2004	Obligatory
Facility ID	100.0%	100.0%	Yes
Parent Company Name	99.3%	100.0%	Yes
Facility Name	100.0%	100.0%	Yes
Address	99.9%	95.7%	Yes
City (*)		100.0%	Yes
Post Code	98.9%	94.6%	Yes
Longitude	86.1%	97.0%	Yes
Latitude	86.1%	97.0%	Yes
NACE Code	100.0%	100.0%	Yes
Contact Name	82.6%	77.4%	Yes
Production Volume	15.4%	4.7%	No
Regulatory Bodies	31.8%	14.8%	No
No Of Installations	42.6%	26.1%	No
Operating Hours	7.2%	10.0%	No
Employees	5.9%	9.9%	No
(*) The address field contained the city in 2001 reporting cycle. In the 2004 reporting cycle this information has been stored in a separate field.			

4.1.1 Number of facilities for each Annex A3 Activity

Table 4-3 shows the number of facilities for each main activity[6], as reported in 2001 and 2004. Figure 4-2 presents a graphical overview of the changes between 2001 and 2004. We observe the following:

- In general terms, the distribution of facilities over the Annex A3 activities in 2004 is similar to the one in 2001.
- Pigs, sows and poultry facilities are the most frequent main activity in 2004 (31 %) as they were in 2001, followed by combustion installations larger than 50 MW (10.7 % in 2004), Disposal of non-hazardous waste and landfills (9.4 %), Cement, lime, glass, mineral substances or ceramic products (8.7 %) and Metal industry (8.5 %).
- About two thirds of the Pig and poultry facilities, included in the 2001 reporting cycle are not included in the 2004 cycle. However, an even larger number of facilities are included in 2004 that are not included in the 2001 submission.
- The only facility reported under main activity “Production of asbestos and asbestos based products” in 2001 occurred in the United Kingdom (National ID EA-1127: FEDERAL MOGUL FRICTION PRODUCTS LTD), whereas in 2004 the Netherlands is the only country reporting a facility under this activity (National ID 10971: Ferro (Holland) B.V. (HS)).

[6] A facility might have reported more than one activity, but always indicated one of these as its “Main Activity”.

Table 4-3 Number of facilities reported per Main Activity in 2001 and 2004

		2001		2001 Total	2004		2004 Total
Code	AltDescription	Facilities reporting in both cycles	Facilities reporting in 2001 only		Facilities reporting in both cycles	Facilities reporting in 2004 only	
1.1	Combustion installations > 50 MW	730	130	860	730	504	1234
1.2	Mineral oil and gas refineries	129	25	154	129	14	143
1.3	Coke ovens	8	2	10	8	13	21
1.4	Coal gasification and liquefaction plants	11	3	14	11	5	16
2.1/2.2/2.3/2.4/2.5/2.6	Metal industry	538	265	803	538	442	980
3.1/3.3/3.4/3.5	Cement, lime, glass, mineral substances or cerami	558	127	685	558	440	998
3.2	Production of asbestos and asbestos based products		1	1		1	1
4.1	Basic organic chemicals	433	181	614	433	237	670
4.2/4.3	Basic inorganic chemicals or fertilisers	257	70	327	257	79	336
4.4/4.6	Biocides and explosives	23	12	35	23	21	44
4.5	Pharmaceutical products	98	32	130	98	51	149
5.1/5.2	Disposal/recovery of hazardous or municipal waste	209	108	317	209	213	422
5.3/5.4	Disposal of non-hazardous waste and landfills	686	226	912	686	407	1093
6.1	Pulp, paper or board production	327	80	407	327	96	423
6.2	Pretreatment of fibres or textiles	74	59	133	74	91	165
6.3	Tanning of hides and skins	12	14	26	12	5	17
6.4	Slaughterhouses, milk, animal and vegetable raw r	410	253	663	410	361	771
6.5	Disposal or recycling of animal carcasses and anim	11	14	25	11	21	32
6.6	Poultry, pigs and sows	1050	1767	2817	1050	2528	3578
6.7	Surface treatment or products using organic solver	233	143	376	233	161	394
6.8	Production of carbon or graphite	12	2	14	12	6	18
Grand Total		5809	3514	9323	5809	5696	11505

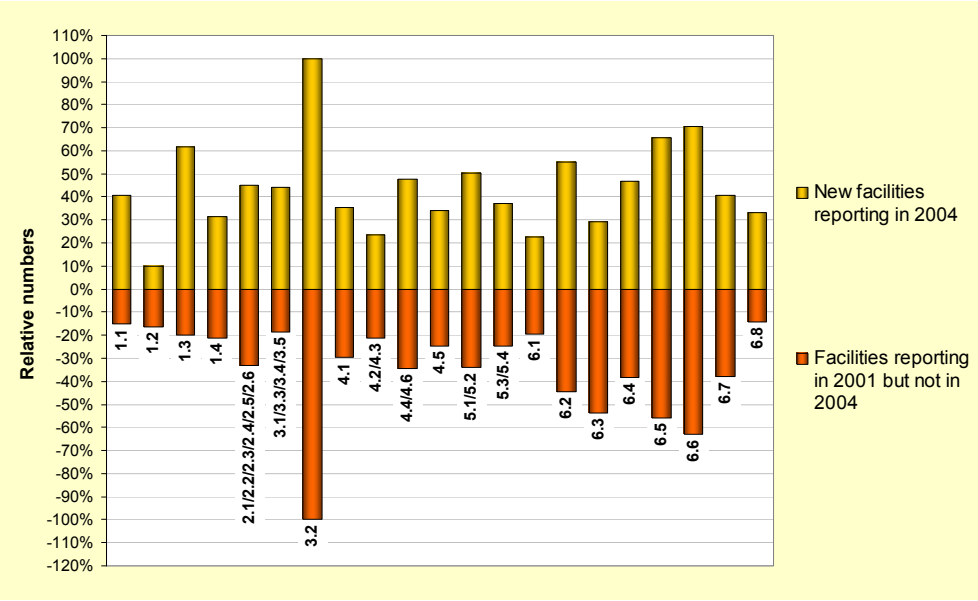


Figure 4-2 Relative change in number of facilities included in the two reporting cycles for each Annex A3 source category of the EPER Decision
For the interpretation of the codes, see Table 4-3

Table 4-4 presents the number of facilities that have been reported in both years and in 2001 or 2004 only for two specific Annex A3 activities: Pig and Poultry farms and Disposal of Non-hazardous Waste. It can be seen that

- For both activities a remarkable difference between countries can be seen. Some countries report only a very limited number of facilities, whereas other countries include a large number of facilities.

Table 4-4 Number of facilities reported under the Annex 3A activities Pig and Poultry and Disposal of Non-hazardous Waste in 2001 and 2004 (Second time reporting countries only)

			2001		2001 Total	2004		2004 Total
Code	Description	Country	Facilities reporting in both cycles	Facilities reporting in 2001 only		Facilities reporting in both cycles	Facilities reporting in 2004 only	
6.6	Poultry, pigs and sows	Austria	1		1	1		1
		Belgium					172	172
		Denmark	37	37	74	37	89	126
		Finland	1	2	3	1	23	24
		France		3	3		411	411
		Germany	258	334	592	258	167	425
		Greece					17	17
		Ireland	49	5	54	49	23	72
		Italy	1	11	12	1	9	10
		Luxembourg						
		Netherlands					102	102
		Portugal	38	1	39	38	80	118
		Spain	409	389	798	409	780	1189
		Sweden	23	23	46	23	31	54
		United Kingdom	233	961	1194	233	255	488
		Hungary		1	1			
		Norway						
		Cyprus					65	65
		Czech Republic					195	195
		Estonia					2	2
		Latvia					6	6
		Lithuania					27	27
		Malta					2	2
		Poland					19	19
		Slovakia					33	33
		Slovenia					20	20
	Poultry, pigs and sows Total		1050	1767	2817	1050	2528	3578
5.3/5.4	Disposal of non-hazardo	Austria	30	5	35	30	1	31
		Belgium	2	4	6	2	5	7
		Denmark					2	2
		Finland	12	3	15	12	3	15
		France	41	22	63	41	84	125
		Germany	226	87	313	226	28	254
		Greece					7	7
		Ireland	42	6	48	42	4	46
		Italy	65	19	84	65	29	94
		Luxembourg	2		2	2		2
		Netherlands	1		1	1	28	29
		Portugal	6	1	7	6	28	34
		Spain	34	5	39	34	73	107
		Sweden	4	4	8	4	6	10
		United Kingdom	221	70	291	221	19	240
		Hungary						
		Norway						
		Cyprus						
		Czech Republic					4	4
		Estonia					1	1
		Latvia					5	5
		Lithuania					18	18
		Malta						
		Poland					44	44
		Slovakia						
		Slovenia					18	18
	Disposal of non-hazardous waste and landfil		686	226	912	686	407	1093

- For Pig and Poultry farms
  - in the United Kingdom, Spain and Germany many of the pig and poultry farms that were reported in 2001 are no longer reported in 2004;
  - France reported only three of these farms in 2001, but more than 400 in 2004;
  - Belgium and Netherlands reported a substantial number of pig and poultry farms in 2004 for the first time;
  - Luxembourg, Hungary and Norway did not report any emissions from Pig and Poultry farms;
  - Compared to the number of inhabitants only a small number of pig and poultry farms with emissions are reported by Austria, Greece, Italy and Poland;
  - Name and street addresses of all pig and poultry farms in Belgium are kept confidential.

- For Disposal of Non-Hazardous Waste
  - No emissions are reported by Hungary, Norway, Cyprus, Malta and Slovakia.

4.2 Number of emission reports

Table 4-5 presents the number of emissions reports submitted in 2001 and 2004. A total of 27 039 emissions were reported in 2004, an increase of 17 % over the 23 109 emissions reported in 2001. About 70 % of these emissions were emissions to air, with a small increase of this fraction between 2001 and 2004.

Table 4-5 Number of emission reports submitted in 2004 and comparison with the number of emission reports in 2001

EmissionType	CountryGroup	2001	2004	Change
Air	First time reporting countries		2309	
	Second time reporting countries	15683	16824	7%
Air Sum		15683	19133	22%
Water Direct	First time reporting countries		339	
	Second time reporting countries	4743	4378	-8%
Water Direct Sum		4743	4717	-1%
Water Indirect	First time reporting countries		327	
	Second time reporting countries	2678	2911	9%
Water Indirect Sum		2678	3238	21%
Grand Total		23104	27088	17%

4.2.1 Emission reports per country

Table 4-6 shows the numbers of emission reports per country, specifying whether or not the same pollutants were reported in 2004 as compared to 2001. In this analysis comparison between both reporting cycles is at the level of number of emission reports, rather than on the level of facilities reporting as in section 4.1. Emissions are recognised as reported in the two reporting years if both the facility is reported in both years and the specific pollutant is reported by this facility in both years. This issue will be treated in more detail in chapter 5.2.3 of this report.

Table 4-6 Number of emission reports per country to air, water (direct and indirect) in 2001 and 2004.

			Air			Air Total	Water Direct			Water Direct Total	Water Indirect			Water Indirect Total
ReportYear	CountryGroup	Country	Emissions reported in 2001 only	Emissions reported in both years	Emissions reported in 2004 only		Emissions reported in 2001 only	Emissions reported in both years	Emissions reported in 2004 only		Emissions reported in 2001 only	Emissions reported in both years	Emissions reported in 2004 only	
2001	EU15	Austria	35	176		211	32	69		101	25	39		64
		Belgium	190	465		655	149	164		313	61	37		98
		Denmark	62	147		209	6	2		8	13	48		61
		Finland	89	357		446	46	144		190	5	14		19
		France	820	1168		1988	549	382		931	327	117		444
		Germany	1159	1943		3102	270	301		571	193	297		490
		Greece	36	160		196	26	19		45	6	8		14
		Ireland	29	167		196	12	3		15	12	4		16
		Italy	351	1080		1431	275	439		714	145	183		328
		Luxembourg	5	27		32	2	2		4				
		Netherlands	54	232		286	49	149		198	33	82		115
		Portugal	133	228		361	79	88		167	27	9		36
		Spain	879	1297		2176	188	160		348	170	114		284
		Sweden	123	344		467	103	299		402	3	9		12
		United Kingdom	1793	1737		3530	210	339		549	199	447		646
	EU15 Total		5758	9528		15286	1996	2560		4556	1219	1408		2627
	EU10	Hungary	73	91		164	31	19		50	37	12		49
	Other countries	Norway	56	181		237	41	97		138	1	1		2
2001 Total			5887	9800		15687	2068	2676		4744	1257	1421		2678
2004	EU15	Austria		176	23	199		69	27	96		39	21	60
		Belgium		465	456	921		164	82	246		37	42	79
		Denmark		147	143	290		2	12	14		48	40	88
		Finland		357	128	485		144	27	171		14	34	48
		France		1168	1511	2679		382	373	755		117	168	285
		Germany		1943	872	2815		301	260	561		297	321	618
		Greece		160	112	272		19	28	47		8	15	23
		Ireland		167	87	254		3	17	20		4	20	24
		Italy		1080	291	1371		439	208	647		183	135	318
		Luxembourg		27	16	43		2		2				
		Netherlands		232	328	560		149	119	268		82	180	262
		Portugal		228	269	497		88	78	166		9	67	76
		Spain		1297	1796	3093		160	138	298		114	198	312
		Sweden		344	163	507		299	70	369		9	2	11
		United Kingdom		1737	761	2498		339	175	514		447	184	631
	EU15 Total			9528	6956	16484		2560	1614	4174		1408	1427	2835
	EU10	Hungary		91	53	144		19	42	61		12	29	41
		Cyprus			110	110								
		Czech Republic			694	694			104	104			40	40
		Estonia			90	90								
		Latvia			41	41			4	4			5	5
		Lithuania			87	87			5	5			4	4
		Malta			12	12			7	7				
		Poland			946	946			225	225			126	126
		Slovakia			181	181			50	50			18	18
		Slovenia			133	133			30	30			28	28
	EU10 Total			91	2347	2438		19	467	486		12	250	262
	Other countries	Norway		181	35	216		97	42	139		1	4	5
2004 Total				9800	9338	19138		2676	2123	4799		1421	1681	3102
Grand Total			5887	19600	9338	34825	2068	5352	2123	9543	1257	2842	1681	5780

4.2.2 Emissions per main activity

Table 4-7 presents the number of emission reports for each main activity both in 2004 and in 2001.

Table 4-7 Number of emission reports per Annex A3 Activity to air, water (direct and indirect) in 2001 and 2004

			Air			Air Total	Water Direct			Water Direct Total	Water Indirect			Water Indirect Total
ReportYear	Code	Annex A3 Activity	Emissions reported in 2001 only	Emissions reported in both years	Emissions reported in 2004 only		Emissions reported in 2001 only	Emissions reported in both years	Emissions reported in 2004 only		Emissions reported in 2001 only	Emissions reported in both years	Emissions reported in 2004 only	
2001	1.1	Combustion installations > 50 MW	812	2500		3312	163	135		298	22	5		27
	1.2	Mineral oil and gas refineries	151	653		804	112	197		309	11	20		31
	1.3	Coke ovens	12	34		46	8	2		10	1	8		9
	1.4	Coal gasification and liquefaction plants	6	25		31	1	7		8	1			1
	2.1/2.2/2.3/2.4/2.5/2.6	Metal industry	651	1257		1908	327	452		779	165	206		371
	3.1/3.3/3.4/3.5	Cement, lime, glass, mineral substances or ceramic products	609	1332		1941	37	37		74	10	10		20
	3.2	Production of asbestos and asbestos based products	2			2								
	4.1	Basic organic chemicals	330	537		867	387	397		784	180	273		453
	4.2/4.3	Basic inorganic chemicals or fertilisers	178	442		620	239	399		638	61	63		124
	4.4/4.6	Biocides and explosives	17	13		30	25	15		40	7	18		25
	4.5	Pharmaceutical products	57	83		140	63	79		142	75	73		148
	5.1/5.2	Disposal/recovery of hazardous or municipal waste	235	291		526	82	76		158	118	77		195
	5.3/5.4	Disposal of non-hazardous waste and landfills	244	659		903	87	108		195	61	39		100
	6.1	Pulp, paper or board production	160	470		630	257	598		855	59	78		137
	6.2	Pretreatment of fibres or textiles	15	7		22	43	14		57	94	71		165
	6.3	Tanning of hides and skins	3	2		5	6	3		9	20	19		39
	6.4	Slaughterhouses, milk, animal and vegetable raw materials	166	173		339	122	68		190	289	402		691
	6.5	Disposal or recycling of animal carcasses and animal waste	7	5		12	6			6	7	6		13
	6.6	Pig and poultry farms	2071	1081		3152	25	38		63	3			3
	6.7	Surface treatment or products using organic solvents	153	207		360	76	46		122	73	53		126
	6.8	Production of carbon or graphite	8	29		37	2	5		7				
2001 Total			5887	9800		15687	2068	2676		4744	1257	1421		2678
2004	1.1	Combustion installations > 50 MW		2500	1999	4499		135	210	345		5	37	42
	1.2	Mineral oil and gas refineries		653	185	838		197	188	385		20	20	40
	1.3	Coke ovens		34	66	100		2	27	29		8	17	25
	1.4	Coal gasification and liquefaction plants		25	13	38		7	2	9				
	2.1/2.2/2.3/2.4/2.5/2.6	Metal industry		1257	883	2140		452	367	819		206	189	395
	3.1/3.3/3.4/3.5	Cement, lime, glass, mineral substances or ceramic products		1332	1229	2561		37	35	72		10	25	35
	3.2	Production of asbestos and asbestos based products			1	1								
	4.1	Basic organic chemicals		537	418	955		397	343	740		273	275	548
	4.2/4.3	Basic inorganic chemicals or fertilisers		442	228	670		399	186	585		63	65	128
	4.4/4.6	Biocides and explosives		13	18	31		15	32	47		18	20	38
	4.5	Pharmaceutical products		83	67	150		79	51	130		73	84	157
	5.1/5.2	Disposal/recovery of hazardous or municipal waste		291	398	689		76	108	184		77	128	205
	5.3/5.4	Disposal of non-hazardous waste and landfills		659	430	1089		108	149	257		39	118	157
	6.1	Pulp, paper or board production		470	212	682		598	230	828		78	82	160
	6.2	Pretreatment of fibres or textiles		7	16	23		14	20	34		71	135	206
	6.3	Tanning of hides and skins		2	1	3		3	1	4		19	5	24
	6.4	Slaughterhouses, milk, animal and vegetable raw materials		173	207	380		68	86	154		402	384	786
	6.5	Disposal or recycling of animal carcasses and animal waste		5	14	19			6	6		6	16	22
	6.6	Pig and poultry farms		1081	2752	3833		38	39	77			2	2
	6.7	Surface treatment or products using organic solvents		207	185	392		46	40	86		53	79	132
	6.8	Production of carbon or graphite		29	16	45		5	3	8				
2004 Total				9800	9338	19138		2676	2123	4799		1421	1681	3102

4.2.3 Emissions per Pollutant

Table 4-8, Table 4-9 and Table 4-10 provide overviews of the numbers of emissions reports per pollutant. All pollutants listed in the EPER Decision Annex A1 (see also Table 1-2) except Pentachlorophenol (PCP) have been reported.

Table 4-8 Number of emission reports to air, water (direct and indirect) in 2001 and 2004

		2001									2004								
		Emissions reported in				Emissions reported in					Emissions reported in				Emissions reported in				
Pollutant Group	Pollutant	Air	Water Direct	Water Indirect	Emissions reported in 2001 only Total	Air	Water Direct	Water Indirect	Emissions reported in both years Total	2001 Total	Air	Water Direct	Water Indirect	Emissions reported in both years Total	Air	Water Direct	Water Indirect	Emissions reported in 2004 only Total	2004 Total
1	CH4	503			503	771			771	1274	771			771	658			658	1429
	CO	165			165	327			327	492	327			327	279			279	606
	CO2	263			263	1309			1309	1572	1309			1309	676			676	1985
	HFCs	55			55	39			39	94	39			39	103			103	142
	N2O	161			161	258			258	419	258			258	232			232	490
	NH3	1850			1850	1189			1189	3039	1189			1189	2698			2698	3887
	NMVOC	265			265	526			526	791	526			526	354			354	880
	NOx	385			385	1782			1782	2167	1782			1782	895			895	2677
	PFCs	10			10	20			20	30	20			20	19			19	39
	SF6	13			13	10			10	23	10			10	13			13	23
	SOx	369			369	951			951	1320	951			951	615			615	1566
	Total - Nitrogen		132	71	203		186	87	273	476		186	87	273		138	122	260	533
	Total - Phosphorus		142	126	268		142	180	322	590		142	180	322		119	158	277	599
2	As and compounds	97	100	41	238	140	135	29	304	542	140	135	29	304	184	118	28	330	634
	Cd and compounds	126	82	28	236	141	97	15	253	489	141	97	15	253	186	94	35	315	568
	Cr and compounds	97	132	71	300	120	110	63	293	593	120	110	63	293	126	100	75	301	594
	Cu and compounds	89	141	77	307	94	215	49	358	665	94	215	49	358	124	165	87	376	734
	Hg and compounds	130	92	27	249	225	73	15	313	562	225	73	15	313	220	96	49	365	678
	Ni and compounds	169	201	121	491	313	277	155	745	1236	313	277	155	745	248	228	155	631	1376
	Pb and compounds	115	145	67	327	168	155	40	363	690	168	155	40	363	203	137	66	406	769
	Zn and compounds	130	205	97	432	226	338	97	661	1093	226	338	97	661	195	249	160	604	1265
3	Chloroalkanes (C10-13)		1	1	2			2	2	4			2	2		2	1	3	5
	Dichloroethane-1,2 (DCE)	18	18	6	42	27	20	8	55	97	27	20	8	55	20	16	10	46	101
	Dichloromethane (DCM)	75	16	15	106	73	17	13	103	209	73	17	13	103	92	24	27	143	246
	Halogenated organic compounds		60	19	79		75	13	88	167		75	13	88		57	22	79	167
	Hexachlorobenzene (HCB)	1	2		3		2		2	5		2		2	4	5	1	10	12
	Hexachlorobutadiene (HCBD)		3	1	4		2		2	6		2		2		4	1	5	7
	Hexachlorocyclohexane(HCH)		1		1		2		2	3		2		2	1	4		5	7
	PCDD+PCDF (dioxins+fura	51			51	36			36	87	36			36	62			62	98
	Tetrachloroethylene (PER)	23			23	11			11	34	11			11	22			22	33
	Tetrachloromethane (TCM)	9			9	10			10	19	10			10	13			13	23
	Trichlorobenzenes (TCB)	3			3					3					5			5	5
	Trichloroethane-1,1,1 (TCE	3			3					3					12			12	12
	Trichloroethylene (TRI)	67			67	37			37	104	37			37	55			55	92
	Trichloromethane	19			19	18			18	37	18			18	14			14	32
4	Benzene	72			72	141			141	213	141			141	102			102	243
	Benzene, toluene, ethylbenzene, xyl	29	20		49		21	34	55	104		21	34	55		18	35	53	108
	Brominated diphenylether							1	1	1			1	1			1	1	2
	Organotin - compounds		7	1	8			1	1	9			1	1		3	4	7	8
	Phenols		99	66	165		112	84	196	361		112	84	196		109	89	198	394
	Polycyclic Aromatic Hydroc	47	36	15	98	64	20	4	88	186	64	20	4	88	128	31	17	176	264
	Total organic carbon (TOC)		265	332	597		393	481	874	1471		393	481	874		200	452	652	1526
5	Chlorides		63	20	83		125	20	145	228		125	20	145		80	31	111	256
	Chlorine and inorganic com	190			190	248			248	438	248			248	188			188	436
	Cyanides		34	16	50		42	15	57	107		42	15	57		40	26	66	123
	Fluorides		62	19	81		117	15	132	213		117	15	132		86	29	115	247
	Fluorine and inorganic com	102			102	142			142	244	142			142	184			184	326
	HCN	18			18	17			17	35	17			17	29			29	46
	PM10	197			197	367			367	564	367			367	379			379	746
Grand Total		5887	2068	1257	9212	9800	2676	1421	13897	23109	9800	2676	1421	13897	9338	2123	1681	13142	27039

Table 4-9 Number of emission reports to air, water (direct and indirect) for each country in 2004

EmissionType	Pollutant	Austria	Belgium	Denmark	Finland	France	Germany	Greece	Ireland	Italy	Luxembourg	Netherlands	Portugal	Spain	Sweden	United Kingdom	Hungary	Norway	Cyprus	Czech Republic	Estonia	Latvia	Lithuania	Malta	Poland	Slovakia	Slovenia	Grand Total
Air	NH3	8	192	130	34	436	491	19	73	35		121	129	1205	84	517	3	6	65	200	3	6	30	2	38	37	23	3887
	NOx	44	107	41	105	340	431	46	28	305	6	82	55	302	72	309	38	24	5	88	10	6	11	2	168	40	12	2677
	CO2	40	69	28	68	252	375	40	24	226	6	75	29	178	42	234	23	33	5	72	10	5	2	2	131	9	7	1985
	SOx	13	63	23	65	197	233	52	17	123	2	29	35	158	45	94	23	29	5	76	10	4	10	2	224	24	10	1566
	CH4	31	25		14	149	261	5	55	72	2	45	33	145	5	483		8	7	6	2	6	27		22	4	22	1429
	NMVOC	9	67	3	23	247	112	4	2	74	2	23	26	97	40	104	2	13		8	4				8	3	9	880
	PM10	5	22	4	43	23	84	28	14	31	1	17	40	196	17	62	12	27	4	9	13	1		1	84		8	746
	CO	13	22	4	8	46	100	17	1	68	4	27	18	74	11	68	10	3		15	2	1	3		65	16	10	606
	Ni and compounds	1	33	9	18	81	72	9	7	66	1	7	24	130	26	53	1	1	4		4	2		1	5	5	1	561
	N2O	3	25	11	15	106	58	6		24		18	15	41	34	102	1	12	3	1		3	1		3	1	7	490
	Hg and compounds	7	26	13	10	83	105	7	4	24	4	12	5	35	9	40	3	5	2	36	3				4	6	2	445
	Chlorine and inorganic compounds	3	29	9	11	65	101	1		37	2	7	8	39	12	51	4	2		36	4				8	2	5	436
	Zn and compounds	4	22		16	75	42	8	1	61	5	13	13	58	25	31	4	6	2	2	4		1	1	21	4	2	421
	Pb and compounds	3	20	1	4	52	37		5	36	2	7	10	100	2	34	3	2	1	29	4				13	4	2	371
	Cd and compounds	1	23	1	8	79	37	3	7	10	1	7	9	54	3	31	2	4	1	27	3		1		12	3		327
	Fluorine and inorganic compounds	1	27	8	9	26	49	2		19	2	8	3	77	6	42	3	1		25		1			13	1	3	326
	As and compounds	2	24	3	11	43	55	3	4	22	2	3	7	41	20	25	1	3	2	33	4	1		1	4	7	3	324
	Cr and compounds	2	15		4	36	33	7	1	30		3	9	47	7	27	1		2	1	4				11	4	2	246
	Benzene	2	14	1	2	31	49	2		30		12	10	26	4	41	1			3		1	1		10	2	1	243
	Cu and compounds	1	13		6	32	29	8	1	24	1	5	10	29	2	32	1	2	2	2	3				13	2		218
	Polycyclic Aromatic Hydrocarbons	2	13		2	20	6			7		4	2	24	7	13		22		4	3	3			59		1	192
	Dichloromethane (DCM)		24		2	70	5	2	8	6		9		5		25	3			2		1			2	1		165
	HFCs		12	1	2	52	4	1	1	11		15	1	10	11	16									4		1	142
	PCDD+PCDF (dioxins+furans)	1	5			33	14			7			2	3	6	9	1	2		9					6			98
	Trichloroethylene (TRI)		4		4	45				1		1	1	3	2	21	1	1		2					2	4		92
	Dichloroethane-1,2 (DCE)	1	3			11	6			7		2			6	4	2	1		1					2	1		47
	HCN	2	6			2	12			3			1	5		4				1					9	1		46
	PFCs		2			6	4	1	1	3		2		4	1	7		7									1	39
	Tetrachloroethylene (PER)		2			15				2			1	3	2	3				3					2			33
	Trichloromethane		4			13	3					1			5	4	1			1								32
	SF6		1			8	1			6		1				3		1							1		1	23
	Tetrachloromethane (TCM)		4			3	5					3		1		3		1		2					1			23
	Trichloroethane-1,1,1 (TCE)		1			1		1				1		1		6									1			12
	Trichlorobenzenes (TCB)		1			1	1			1				1														5
	Hexachlorobenzene (HCB)		1		1								1	1														4
	Hexachlorocyclohexane(HCH)														1													1
Air Total		199	921	290	485	2679	2815	272	254	1371	43	560	497	3093	507	2498	144	216	110	694	90	41	87	12	946	181	133	19138
Water Direct	Total organic carbon (TOC)	17	27	5	43	19	86	9	1	76		43	18	50	55	68	13	28		8		2			14	7	4	593
	Zn and compounds	14	35		18	116	56	4	2	71	1	34	31	39	47	61	6	11		7		1			26	3	4	587
	Ni and compounds	8	31	1	14	110	58	6	2	73		24	9	28	42	48	6	12		6				1	18	3	5	505
	Cu and compounds	13	11	2	7	62	43	2	2	44	1	15	48	19	31	38	5	12		5				2	16	1	1	380
	Total - Nitrogen	5	11		21	53	38	3	1	40		21	9	17	30	27	6	10		11		1	2	2	12	3	1	324
	Pb and compounds	4	15	1	1	43	37	3	2	49		13	10	11	24	35	3	9		5					22		5	292
	Total - Phosphorus	5	12		17	57	19	4	3	33		24	12	8	19	16	3	10		6			2	1	6	3	1	261
	As and compounds	3	21	1	9	33	22	2		26		19	2	12	25	48	3	5		9					10	2	1	253
	Phenols	2	6	2	2	42	8	4	2	34		10	4	16	8	24	4	5		7					37	4		221
	Cr and compounds	5	10		9	29	18	3	1	40		13	3	10	17	25	4	10		3				1	6	1	2	210
	Chlorides	4	18		3	25	50		1	28		12	4	12	6	18				4					15	5		205
	Fluorides	4	23		2	29	32	2		31		12	1	20	8	16	3	7		3			1		5	2	2	203
	Cd and compounds	4	7		4	27	20	1	1	34		9	5	11	22	20	2	4		3					16	1		191
	Hg and compounds	2	8	1	4	26	16	2		26		6	3	12	11	21	2	3		10					11	3	2	169
	Halogenated organic compounds	2	4	1	15	33	24	1		1			5	12	16	3		2		6					1	5	1	132
	Cyanides	4	3		1	14	12	1		9		3		5	2	14	1	2		5					3	2	1	82
	Polycyclic Aromatic Hydrocarbons					3	5			9		3	2	7	4	3		8		1					3	3		51
	Dichloromethane (DCM)		1		1	17	7			4		3		1		6				1								41
	Benzene, toluene, ethylbenzene, xylenes		1			5			2	8		2		2		16				2						1		39
	Dichloroethane-1,2 (DCE)		2			10	6			5		2		3		3				2					2	1		36
	Hexachlorobenzene (HCB)						3			2					1	1												7
	Hexachlorobutadiene (HCBD)					1				2					1	2												6
	Hexachlorocyclohexane(HCH)					1	1			1						1									2			6
	Organotin - compounds													3														3
	Chloroalkanes (C10-13)									1								1										2
Water Direct Total		96	246	14	171	755	561	47	20	647	2	268	166	298	369	514	61	139		104		4	5	7	225	50	30	4799
Water Indirect	Total organic carbon (TOC)	25	32	44	22	19	232	9	3	80		97	25	70	4	212	22	1				2			18	5	11	933
	Total - Phosphorus	6	6	22	8	50	70	4	5	15		36	2	22	3	60	2	1		3		1	1		15	1	5	338
	Ni and compounds	2	9	1	3	19	48	1	1	29		14	7	54		104	2			1			1		14			310
	Zn and compounds	3	5	1	3	26	47	1	1	30		21	7	38	1	47	3	1		2			1		14	2	3	257
	Total - Nitrogen	4	2	14	5	32	43	1	3	20		19	6	16	3	22	2			4					8	2	3	209
	Phenols	5	4	1	1	23	33		1	18		14	8	23		21				7		1			9	1	3	173
	Cr and compounds		3		2	11	16	1		21		2	6	10		53	1	2		2		1			4	3		138
	Cu and compounds	1	2	1	2	21	18	1	1	14		11	1	21		29	2			1			1		8		1	136
	Pb and compounds	2	1	2		10	16	1	2	19		8	2	13		16	2			3					7	2		106
	Benzene, toluene, ethylbenzene, xylenes	2				11	12			11		6				20	1			2					3	1		69
	Hg and compounds		2			14	7	1	1	9		4	1	10		5	1			2					7			64
	As and compounds	1	4		1	2	14			10		8	2	3		11									1			57
	Chlorides	3	1	1		9	10	1		8		7	2	1		3				1					4			51
	Cd and compounds		1	1		6	4			10		2	2	13		5									5		1	50
	Fluorides	2	2		1	6	10	1	1	8		2		2		6	2			1								44
	Cyanides	1	2			3	10			2			3	4		9	1			4					1		1	41
	Dichloromethane (DCM)	1	1			11	10		5	3		5		1		2				1								40
	Halogenated organic compounds	2	2			9	7	1		3		2		5		1				2						1		35
	Polycyclic Aromatic Hydrocarbons						7					3	2	2		1				1					5			21
	Dichloroethane-1,2 (DCE)					3	2			5		1				2				2					3			18
	Organotin - compounds						2			1				2														5
	Chloroalkanes (C10-13)									1				2														3
	Brominated diphenylether															2												2
	Hexachlorobenzene (HCB)																			1								1
	Hexachlorobutadiene (HCBD)									1																		1
Water Indirect Total		60	79	88	48	285	618	23	24	318		262	76	312	11	631	41	5		40		5	4		126	18	28	3102
Grand Total		355	1246	392	704	3719	3994	342	298	2336	45	1090	739	3703	887	3643	246	360	110	838	90	50	96	19	1297	249	191	27039

Table 4-10 Number of emission reports to air, water (direct and indirect) for each Annex A3 activity in 2004

EmissionType	Pollutant	1.1 Combustion installations > 50 MW	1.2 Mineral oil and gas refineries	1.3 Coke ovens	1.4 Coal gasification and liquefaction plants	2.1/2.2/2.3/2.4/2.5/2.6 Metal industry	3.1/3.3/3.4/3.5 Cement, lime, glass, mineral substances or ceramic products	3.2 Production of asbestos and asbestos based products	4.1 Basic organic chemicals	4.2/4.3 Basic inorganic chemicals or fertilisers	4.4/4.6 Biocides and explosives	4.5 Pharmaceutical products	5.1/5.2 Disposal/recovery of hazardous or municipal waste	5.3/5.4 Disposal of non-hazardous waste and landfills	6.1 Pulp, paper or board production	6.2 Pretreatment of fibres or textiles	6.3 Tanning of hides and skins	6.4 Slaughterhouses, milk and animal and vegetable raw materials	6.5 Disposal or recycling of animal carcasses and animal waste	6.6 Pig and poultry farms	6.7 Surface treatment or products using organic solvents	6.8 Production of carbon or graphite	Grand Total
Air	NH3	19	9	2		16	94		37	64		1	7	6	25	1		25	5	3576			3887
	NOx	1040	112	17	7	191	566	1	128	104	4	8	165	42	191	6		77	5		9	4	2677
	CO2	875	108	11	4	149	367		99	82	2	5	124	16	99			37	1		5	1	1985
	SOx	637	105	15	1	144	283		69	80	2	3	11	8	107	3		82	2		6	8	1566
	CH4	82	26	1	13	16	4		17	7			83	959	4			2	1	213		1	1429
	NMVOC	44	107		5	73	19		199	16	7	38	4	10	45	5	3	31	1		271	2	880
	PM10	240	37	7	1	105	219		16	29			1	5	55			20	1	6	3	1	746
	CO	114	27	9	3	140	189		34	32		1	4	10	24	1		10				8	606
	Ni and compounds	187	61	1		91	104		23	16		1	17	1	23	1		30	2		3		561
	N2O	225	41	1	2	20	2		25	44		3	37	5	33	1		8		38	4	1	490
	Hg and compounds	148	12	2		74	89		22	39			53	3	2			1					445
	Chlorine and inorganic compounds	194	13	1		37	95		13	14	1		36	5	18			8			1		436
	Zn and compounds	70	22	2		236	26		5	23	1		13		11	1		3			7	1	421
	Pb and compounds	66	3	1		145	114		7	10			18	1	4			1				1	371
	Cd and compounds	93	17	1		96	54		4	6			38	5	8			2	1		2		327
	Fluorine and inorganic compounds	122	2	1		44	143		4	8					1							1	326
	As and compounds	132	19	2		65	58		7	3			10		19	1		6			2		324
	Cr and compounds	75	17	1		92	30		5	8			9	1	3			4			1		246
	Benzene	7	64	7	2	44	49		50	3		3	4	2	2						2	4	243
	Cu and compounds	62	15	1		89	23		4	8			6	2	1			3			2	2	218
	Polycyclic Aromatic Hydrocarbons	29	12	10		78	23		10	5			4			1		6			4	10	192
	Dichloromethane (DCM)	1	2			20			56	8	1	55	4	2							16		165
	HFCs	9	3	1		10	3		46	17	4	13	4	1	2			23			6		142
	PCDD+PCDF (dioxins+furans)	12		1		43	5		2		1		27	1	4			1			1		98
	Trichloroethylene (TRI)	2				52			4	6	3	1	1			1					22		92
	Dichloroethane-1,2 (DCE)	3	3						26	6	1	5	3										47
	HCN	1		5		24	2		7	5	1					1							46
	PFCs					26			5	3	1										4		39
	Tetrachloroethylene (PER)	2	1			8			5	1	1		1		1						13		33
	Trichloromethane	2							8	8		11	3										32
	SF6	5				8			1	4		1									4		23
	Tetrachloromethane (TCM)								12	9	1										1		23
	Trichloroethane-1,1,1 (TCE)					2			2	1		1	1	4							1		12
	Trichlorobenzenes (TCB)	1							3												1		5
	Hexachlorobenzene (HCB)					2				1											1		4
	Hexachlorocyclohexane(HCH)												1										1
Air Total		4499	838	100	38	2140	2561	1	955	670	31	150	689	1089	682	23	3	380	19	3833	392	45	19138
Water Direct	Total organic carbon (TOC)	13	41	2	1	22			122	23	5	23	12	29	230	11	1	53	2	2	1		593
	Zn and compounds	46	38	3	1	140	13		87	59	3	15	18	30	80	3		9		27	14	1	587
	Ni and compounds	39	30	2	1	145	11		60	46	1	10	25	23	63	5		10			34		505
	Cu and compounds	66	17	1		66	3		43	36	3	6	9	16	50	3		3		45	13		380
	Total - Nitrogen	17	27	2		34	1		52	62	6	12	8	22	60			15	2	3	1		324
	Pb and compounds	19	20	2	1	87	14		23	38	2	3	13	22	42	1		1			4		292
	Total - Phosphorus	8	12			6	1		33	30	3	12	3	17	80	2		51	2		1		261
	As and compounds	36	28	1		50	12		31	38	2	3	7	16	25			2			2		253
	Phenols	9	63	3		26	4		49	10	3	10	7	17	10	1		2			4	3	221
	Cr and compounds	11	9	1		50	4		27	36	1	4	8	17	32	5	3				2		210
	Chlorides	21	11	2	1	14	1		51	52	2	5	14	10	14			7					205
	Fluorides	16	23			61	2		24	43	3	1	11	6	4						7	2	203
	Cd and compounds	11	14	2	1	47	4		13	24		2	11	18	40						3	1	191
	Hg and compounds	17	11	1	1	22	1		26	43		1	12	7	25	2							169
	Halogenated organic compounds	4	6	1		1			27	14	4	3	4	2	66								132
	Cyanides	4	11	3		28			16	7	3	2	3	2	2			1					82
	Polycyclic Aromatic Hydrocarbons	4	11	3		18			4	2			4	1	2	1						1	51
	Dichloromethane (DCM)	1				2			11	9	3	12	2	1									41
	Benzene, toluene, ethylbenzene, xylenes	2	13		2				13	1	1	3	4										39
	Dichloroethane-1,2 (DCE)								21	8	1	3	3										36
	Hexachlorobenzene (HCB)								3	2			1	1									7
	Hexachlorobutadiene (HCBD)	1							2	1			2										6
	Hexachlorocyclohexane(HCH)								1	1	1		2		1								6
	Organotin - compounds						1								2								3
	Chloroalkanes (C10-13)								1				1										2
Water Direct Total		345	385	29	9	819	72		740	585	47	130	184	257	828	34	4	154	6	77	86	8	4799
Water Indirect	Total organic carbon (TOC)	5	8	2		11	4		156	13	9	44	26	26	84	97	4	418	11	1	14		933
	Total - Phosphorus	2	1			3			40	7	1	14	1	4	4	6		248	2		5		338
	Ni and compounds	3	2	1		150	2		28	15	1	4	24	17	9	12		5	1		36		310
	Zn and compounds	7	3	2		75	4		31	17	2	14	24	8	15	23		14			18		257
	Total - Nitrogen	2	4	2		8			29	15	2	12	7	33	4	1	3	77	8	1	1		209
	Phenols	2	7	4		9	8		60	4	3	13	24	13	3	10	2	3			8		173
	Cr and compounds	2				53	1		15	5	1	3	6	9	1	16	14	1			11		138
	Cu and compounds	1				25	1		32	5	3	3	9	6	12	22		7			10		136
	Pb and compounds	1				17	9		14	9	2	2	19	8	7	6		2			10		106
	Benzene, toluene, ethylbenzene, xylenes	2	5	1					36	3	4	6	4	2		2					4		69
	Hg and compounds	5	1	2		6			11	8		2	15	5	4	3		1			1		64
	As and compounds	1	1	1		5	3		7	6	1		8	15	1	2		4			2		57
	Chlorides	2	1			1			28	3	3	4	5	1			1	2					51
	Cd and compounds			1		10	2		5	1		1	15	3	6	2		2			2		50
	Fluorides	2		1		6	1		11	8			7	3							5		44
	Cyanides	1	2	4		11			6	5		3	2	4	3								41
	Dichloromethane (DCM)		1			1			8	2	1	23	3								1		40
	Halogenated organic compounds	1	1	1		1			15	1	2	4			7	1		1					35
	Polycyclic Aromatic Hydrocarbons	2	3	3		2			4			1	4			1		1					21
	Dichloroethane-1,2 (DCE)								9	1	3	4	1										18
	Organotin - compounds					1			1												3		5
	Chloroalkanes (C10-13)	1							1												1		3
	Brominated diphenylether															2							2
	Hexachlorobenzene (HCB)								1														1
	Hexachlorobutadiene (HCBD)												1										1
Water Indirect Total		42	40	25		395	35		548	128	38	157	205	157	160	206	24	786	22	2	132		3102
Grand Total		4886	1263	154	47	3354	2668	1	2243	1383	116	437	1078	1503	1670	263	31	1320	47	3912	610	53	27039

5 Emissions

5.1 Emissions to air

5.1.1 Country totals

This chapter provides emissions information to air for the group 1 pollutant species, listed in the EPER Decision:

- Methane CH_4
- Carbon monoxide CO
- Carbon dioxide CO_2
- Hydrofluorocarbons HFCs
- Nitrous oxide N_2O
- Ammonia NH_3
- Non-methane volatile organic compounds NMVOCs
- Nitrogen oxides NO_x
- Perfluorcarbons PFCs
- Sulphur hexafluoride SF_6
- Sulphur oxides SO_x

The data is broken down for each pollutant alternatively by Member State / country and Annex A3 activity in order to indicate those countries and sectors that report the greatest quantities. Furthermore, comparisons have been made with 2001 data for those countries reporting for the second-time.

Table 5-1 Emissions to air of group 1 pollutants reported in each country in 2004; absolute values in kg/year

Country Group	Country	CH4	CO	CO2	HFCs	N2O	NH3	NMVOC	NOx	PFCs	SF6	SOx
EU15	Austria	27 753 000	170 357 000	29 662 000 000		943 100	291 600	4 317 000	24 579 000			12 070 000
	Belgium	11 298 000	454 712 000	56 545 000 000	412 344	11 541 000	4 269 900	37 114 000	107 601 000	44 730	140	109 765 000
	Denmark		17 789 000	24 511 000 000	29 000	344 500	2 411 600	3 698 000	45 872 000			13 207 000
	Finland	18 872 000	12 022 000	41 648 000 000	2 671	5 471 300	1 683 000	11 258 000	78 407 000			59 397 000
	France	113 113 000	1 014 840 000	143 485 000 000	316 274	25 247 100	13 106 900	115 296 000	266 862 000	283 674	27 057	360 747 000
	Germany	391 325 000	992 332 000	467 427 000 000	43 760	21 818 000	14 345 400	38 305 000	386 283 000	50 828	10 000	334 772 000
	Greece	30 837 000	68 885 000	70 015 610 000	152 000	91 100	587 500	8 138 000	150 486 000	10 600		442 223 000
	Ireland	46 234 000	766 000	20 350 800 000	165		1 777 100	299 000	46 682 000	27 400		52 128 000
	Italy	94 615 000	646 440 000	213 429 000 000	108 617	31 621 100	1 474 400	51 867 000	303 660 000	32 300	5 325	343 721 000
	Luxembourg	1 281 000	8 284 000	2 138 000 000				288 000	3 545 000			758 000
	Netherlands	101 844 000	113 152 000	91 899 000 000	86 183	21 263 400	3 978 400	14 726 000	78 115 000	15 480	51	52 245 000
	Portugal	40 308 000	372 918 000	31 311 000 000	600	2 496 100	6 733 100	17 402 000	94 578 000			125 793 000
	Spain	162 369 000	283 953 000	162 769 000 000	104 840	6 755 400	34 238 400	76 242 000	492 378 000	28 350		1 115 095 000
	Sweden	8 000 000	25 946 000	19 684 000 000	7 580	2 290 200	3 627 700	27 913 000	29 906 000	38 900		19 899 000
	United Kingdom	557 253 000	475 287 000	265 625 000 000	92 490	16 672 600	16 818 200	112 863 000	539 927 000	46 625	14 970	695 023 000
EU15 Total		1 605 102 000	4 657 683 000	1 640 499 410 000	1 356 524	146 554 900	105 343 200	519 726 000	2 648 881 000	578 887	57 543	3 736 843 000
EU10	Hungary		47 440 000	21 522 000 000		5 930 000	199 500	466 000	29 337 000			117 786 000
	Cyprus	928 000		4 758 000 000		301 500	2 140 300		9 694 000			34 400 000
	Czech Republic	2 476 000	91 300 000	80 224 000 000		2 310 000	6 255 400	3 201 000	127 146 000			161 464 000
	Estonia	523 000	12 123 000	12 932 000 000			147 600	1 778 000	13 266 000			82 713 000
	Latvia	3 365 000	1 210 000	1 804 000 000		36 400	516 100		4 206 000			2 036 000
	Lithuania	29 212 600	4 925 000	1 749 000 000		5 680 000	5 043 500		8 708 000			21 104 000
	Malta			1 962 000 000			50 000		5 330 000			17 010 000
	Poland	16 612 000	404 259 000	173 831 000 000	29 750	236 200	4 285 500	3 474 000	320 714 000		10 800	806 395 000
	Slovakia	4 295 000	142 231 000	2 493 000 000		3 950 000	1 160 600	1 284 000	42 820 000			85 835 000
	Slovenia	15 161 000	42 815 000	7 803 000 000	680	254 100	1 115 200	2 664 000	15 633 000	18 000	51	44 058 000
EU10 Total		72 572 600	746 303 000	309 078 000 000	30 430	18 698 200	20 913 700	12 867 000	576 854 000	18 000	10 851	1 372 801 000
Other countries	Norway	3 447 000	1 434 000	12 288 000 000		6 251 000	541 500	23 957 000	15 565 000	92 940	8 600	15 695 000

Group 1 pollutants are defined in the EPER Guidance Document [Ref 7] (see also Table 1-2)

From the data we can observe the following:

- It is clear from this table that larger countries report generally higher emissions as would be expected;
- All countries report emissions of CO_2, NO_x and SO_2 to air;
- Luxembourg does not report emissions of NH_3;
- Cyprus and Malta do not report emissions of CO;
- Denmark, Hungary and Malta do not report emissions of CH_4;
- Ireland, Luxembourg, Estonia and Malta do not report N_2O emissions;
- Cyprus, Latvia, Lithuania and Malta do not report NMVOC emissions;
- Emissions of HFCs, PFCs and SF_6 are reported in fifteen, twelve and nine countries respectively.

Table 5-2 Emissions to air of group 1 pollutants reported in EU15 countries, Hungary and Norway in 2001; absolute values in kg/year

Sum of SumOfMapname											
Country	CH4	CO	CO2	HFCs	N2O	NH3	NMVOC	NOx	PFCs	SF6	SOx
Austria	35 459 000	157 855 000	26 592 000 000		2 577 400	195 400	4 200 000	24 224 000			13 228 000
Belgium	14 148 000	376 108 000	55 366 000 000	3 417	14 553 500	1 096 400	45 658 000	106 193 000			105 539 000
Denmark		11 740 000	24 667 000 000	30 000		1 924 400	3 000 000	43 863 000			12 433 000
Finland	18 110 000	11 852 000	36 238 000 000	277	1 614 200	918 500	8 228 000	69 427 000			59 436 000
France	49 744 000	547 939 000	82 331 000 000	179 542	32 680 400	6 132 800	132 325 000	246 591 000	185 280	6 932	369 051 000
Germany	496 437 000	964 268 000	429 229 000 000	15 221	9 312 800	22 465 000	42 517 000	395 277 000	35 080	5 880	370 590 000
Greece		65 457 000	66 813 000 000	181 000	11 700	13 600	5 031 000	119 861 000	11 900		408 222 000
Ireland	66 299 000		23 619 000 000			1 950 500	121 000	50 958 000			91 498 000
Italy	104 950 000	571 109 000	211 720 000 000	68 933	29 588 300	1 198 200	49 144 000	331 241 000	41 702	17 297	509 126 000
Luxembourg	2 745 000	6 560 000	1 225 000 000				280 000	4 738 000			604 000
Netherlands	2 643 000	128 699 000	65 833 000 000		21 350 100	1 844 500	13 239 000	61 656 000			51 777 000
Portugal	17 121 000	125 662 000	30 731 000 000	900	1 348 000	1 261 700	5 604 000	77 681 000		116	166 147 000
Spain	78 692 000	243 850 000	148 671 000 000	275 725	6 207 700	24 051 000	64 979 000	441 141 000	30 040		1 169 999 000
Sweden	8 752 000	190 334 000	13 709 000 000	9 681	2 243 900	2 840 900	28 696 000	28 586 000	38 300	430	23 403 000
United Kingdom	687 449 000	553 663 000	256 528 000 000	214 453	16 449 200	44 925 700	144 264 000	535 166 000	30 487	32 390	948 488 000
EU15 Total	1 582 549 000	3 955 096 000	1 473 272 000 000	979 149	137 937 200	110 818 600	547 286 000	2 536 603 000	372 789	63 045	4 299 541 000
Hungary		21 969 000	23 540 000 000			295 900	512 000	39 973 000	23 700		284 785 000
Norway	2 851 000	4 624 400	11 471 000 000		5 769 200	671 500	30 456 000	17 295 360			16 917 000
Grand Total	1 585 400 000	3 981 689 400	1 508 283 000 000	979 149	143 706 400	111 786 000	578 254 000	2 593 871 360	396 489	63 045	4 601 243 000

Group 1 pollutants are defined in the EPER Guidance Document **[Ref 7]** (see also Table 1-2)

Table 5-2 shows the emissions to air of group 1 pollutants reported by the first-time reporting countries (EU15, Hungary and Norway) in 2001. In comparison to Table 5-1the total emissions for just the EU15 countries increased between 2001 and 2004 for all pollutants except for NMVOC, NH_3, SF_6 and SO_x for which emissions decreased.

Some highlights by country include:

- The United Kingdom accounted for the biggest emission source for CH_4, NH_3, NMVOC, NO_x and SF_6 emissions in 2001 and CH_4 and NO_x emissions in 2004, whilst France was the biggest NMVOC and SF_6 emitter in 2004;
- CO emissions were dominated by Germany in 2001 but France shows the highest CO emissions in 2004 by doubling their 2001 emissions;
- Spain contributes the largest amount of HFCs and SO_x in 2001 and NH_3 and SO_x emissions in 2004. Belgium was the lead HFC emitter in 2004;
- The largest emitter of N_2O switched from France in 2001 to Italy in 2004, whilst France was the largest emitter of PFCs in both 2001 and 2004;
- Germany was the largest emitter of CO_2 in 2001 and remains so in 2004.

The following figures portray the emissions graphically for seven of the eleven group 1 pollutants: CO_2, NO_x, SO_x, CO, CH_4, NMVOC and NH_3.

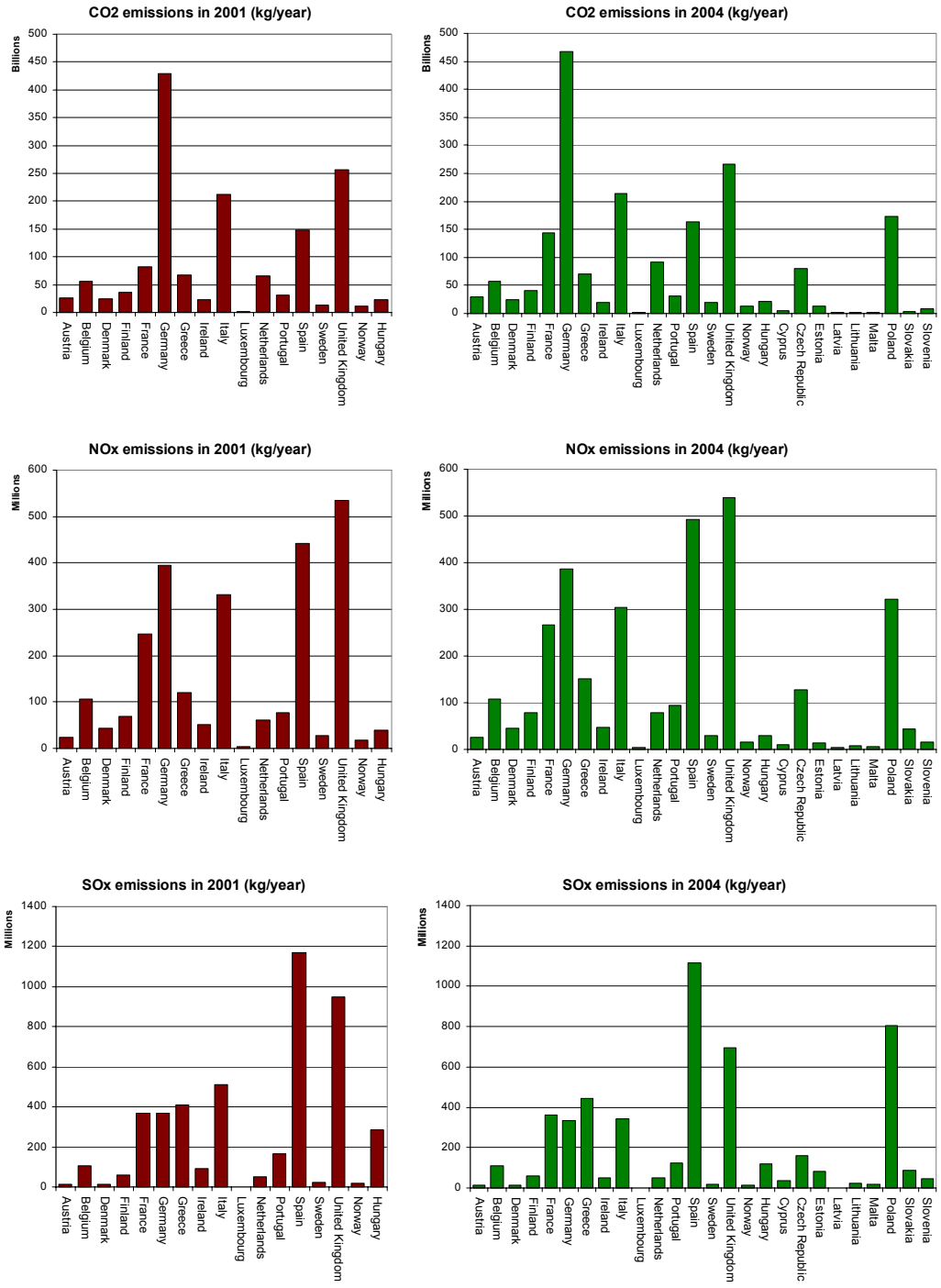


Figure 5-1 Emissions to air of group 1 pollutants reported in EU15 countries, Hungary and Norway in 2001 and all countries in 2004; absolute values.

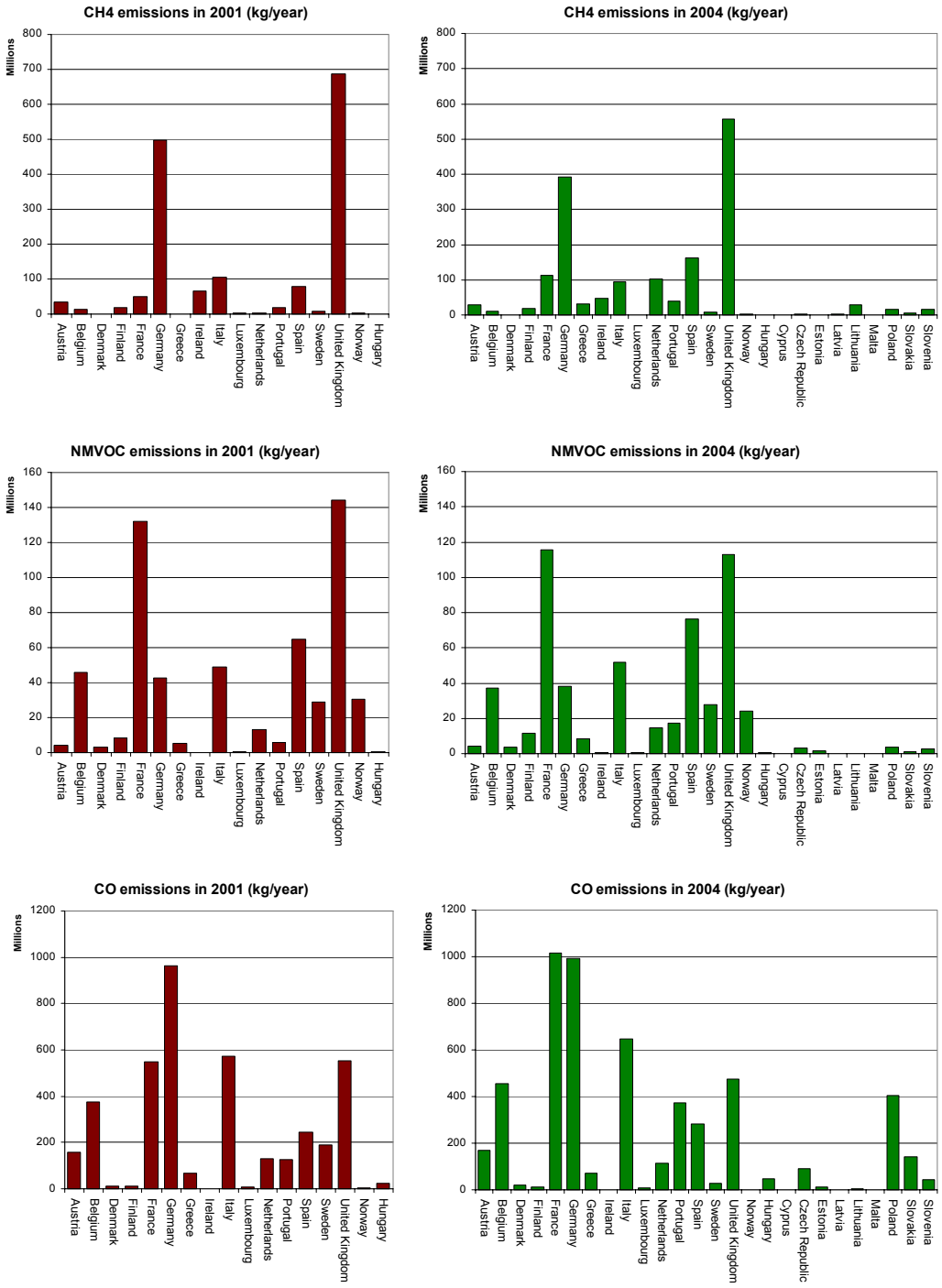


Figure 5-2 Emissions to air of group 1 pollutants reported in EU15 countries, Hungary and Norway in 2001 and all countries in 2004; absolute values (continued).

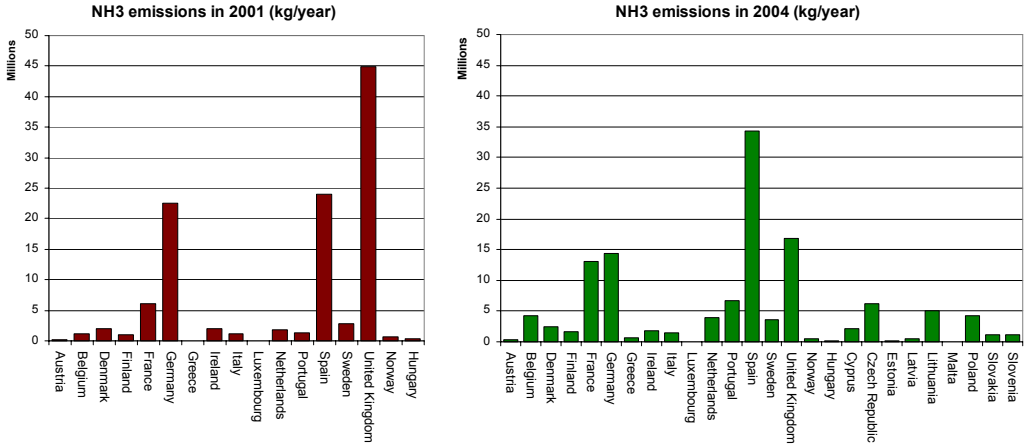


Figure 5-3 Emissions to air of group 1 pollutants reported in EU15 countries, Hungary and Norway in 2001 and all countries in 2004; absolute values (continued).

Figure 5-3 shows group 1 pollutant emissions for EU15 countries, Hungary and Norway for both reporting cycles in 2001 and 2004.

5.1.2 Sector totals

This section presents the total emissions of group 1 pollutants to air for each main activity (Table 5-3). In Table 5-4 the largest contributing activities are listed for each of these pollutants.

Table 5-3 Emissions to air of group 1 pollutants reported in each main activity in 2004 in kg/year

Code	Annex A3 Activity	CH4	CO	CO2	HFCs	N2O	NH3	NMVOC	NOx	PFCs	SF6	SOx
1.1	Combustion installations > 50 MW	24 653 000	257 138 000	1 259 324 800 000	9 233	15 247 500	1 139 200	9 084 000	1 985 526 000		824	3 771 441 000
1.2	Mineral oil and gas refineries	9 126 000	371 314 000	147 153 000 000	3 904	2 706 100	578 600	209 301 000	191 725 000			621 941 000
1.3	Coke ovens	408 000	125 750 000	11 238 000 000	5 770	54 000	30 200		13 843 000			13 264 000
1.4	Coal gasification and liquefaction plants	8 007 000	12 713 000	1 131 000 000		211 100		3 091 000	1 925 000			1 740 000
2.1/2.2/2.3/2.4/2.5/2.6	Metal industry	12 640 000	3 880 188 000	157 865 610 000	38 334	738 000	1 287 000	29 402 000	208 853 000	479 892	45 188	309 734 000
3.1/3.3/3.4/3.5	Cement, lime, glass, mineral substances or ceramic products	1 317 000	411 492 000	193 642 000 000	13 780	34 900	6 831 200	4 926 000	507 304 000			162 949 000
3.2	Production of asbestos and asbestos based products								102 000			
4.1	Basic organic chemicals	4 543 000	89 139 000	64 476 000 000	793 363	50 179 300	3 089 800	105 731 000	82 707 000	142 710	85	72 281 000
4.2/4.3	Basic inorganic chemicals or fertilisers	4 603 000	173 874 000	37 719 000 000	359 384	96 080 100	15 414 600	7 639 000	59 065 000	9 961	15 670	77 115 000
4.4/4.6	Biocides and explosives			232 000 000	8 124			3 763 000	721 000	124		950 000
4.5	Pharmaceutical products		9 690 000	661 000 000	7 577	346 600	38 000	18 143 000	2 660 000		10 800	1 344 000
5.1/5.2	Disposal/recovery of hazardous or municipal waste	115 560 000	6 658 000	43 369 000 000	2 295	844 400	236 400	561 000	61 340 000			2 492 000
5.3/5.4	Disposal of non-hazardous waste and landfills	1 456 080 000	6 712 000	7 135 000 000	1 140	1 221 300	466 200	10 134 000	17 120 000			8 320 000
6.1	Pulp, paper or board production	2 724 000	30 201 000	29 818 000 000	468	2 139 400	2 513 900	22 415 000	81 048 000			51 575 000
6.2	Pretreatment of fibres or textiles		548 000			24 300	13 700	911 000	1 409 000			662 000
6.3	Tanning of hides and skins							496 000				
6.4	Slaughterhouses, milk, animal and vegetable raw materials	325 000	12 983 000	6 696 000 000	46 801	168 500	741 500	9 424 000	22 121 000			24 529 000
6.5	Disposal or recycling of animal carcasses and animal waste	150 000		267 000 000			222 200	124 000	710 000			590 000
6.6	Pig and poultry farms	40 860 600				1 310 900	94 195 900					
6.7	Surface treatment or products using organic solvents			984 000 000	96 781	172 400		121 116 000	2 176 000	57 140	4 427	1 659 000
6.8	Production of carbon or graphite	125 000	17 020 000	154 000 000		25 300		289 000	945 000			2 753 000
Grand Total		1 681 121 600	5 405 420 000	1 961 865 410 000	1 386 954	171 504 100	126 798 400	556 550 000	3 241 300 000	689 827	76 994	5 125 339 000

Table 5-4 Largest contributing activities to the group 1 emissions to air in 2004 for all countries in kg/year

Pollutant	Code	AltDescription	Emissions in sector	ercentage of tota
CH4	5.3/5.4	Disposal of non-hazardous waste and landfills	1 456 080 000	86.6%
CO	2.1/2.2/2.3/2.4/2	Metal industry	3 880 188 000	71.8%
CO2	1.1	Combustion installations > 50 MW	1 259 324 800 000	64.2%
HFCs	4.1	Basic organic chemicals	793 363	57.2%
N2O	4.2/4.3	Basic inorganic chemicals or fertilisers	96 080 100	56.0%
NH3	6.6	Pig and poultry farms	94 195 900	74.3%
NMVOC	1.2	Mineral oil and gas refineries	209 301 000	37.6%
NOx	1.1	Combustion installations > 50 MW	1 985 526 000	61.3%
PFCs	2.1/2.2/2.3/2.4/2	Metal industry	479 892	69.6%
SF6	2.1/2.2/2.3/2.4/2	Metal industry	45 188	58.7%
SOx	1.1	Combustion installations > 50 MW	3 771 441 000	73.6%

The following can be seen from the data:

- Emissions of methane are dominated by the disposal of non-hazardous waste and landfills – almost 87 % of the total emissions reported for this pollutant;
- Almost three quarters of all ammonia emissions are due to the activities of the pig and poultry farms;
- Roughly two-thirds of the three main combustion-related pollutant emissions (CO_2, NO_x and SO_x) originate from the large combustion plants;
- The metal industry accounts for the majority of CO, PFCs and SF_6 emissions;
- The basic organic and basic inorganic chemical industries are largely responsible for the majority of the emissions of HFCs and N_2O respectively;
- Over a third of NMVOC emissions originate from oil and gas refineries. The next largest sector at 22% of the total is the surface treatment or products using organic solvents sector, see Table 5-3.

Table 5-5 compares the data by pollutant for just the second-time reporting countries across the two reporting years to show where changes have occurred in emissions amounts.

Table 5-5 Largest contributing activities to the group 1 emissions to air in 2001 and 2004 for EU15 countries, Hungary and Norway in kg/year

Pollutant	Main contributingAnnex A3 activity	2001		2004		% change 2001 to 2004
		Emission (kg/year)	% of Total	Emission (kg/year)	% of Total	
CH4	Disposal of non-hazardous waste a	1 434 259 000	90.5%	1 393 112 000	86.6%	-3.0%
CO	Metal industry	2 816 434 400	70.7%	3 391 793 000	72.1%	17.0%
CO2	Combustion installations > 50 MW	976 246 000 000	64.7%	1 030 678 800 000	61.6%	5.3%
HFCs	Basic organic chemicals	390 055	39.8%	773 173	57.0%	49.6%
N2O	Basic inorganic chemicals or fertilisers	61 326 400	42.7%	86 450 100	54.5%	29.1%
NH3	Pig and poultry farms	84 856 800	75.9%	78 624 300	74.1%	-7.9%
NMVOC	Mineral oil and gas refineries	238 710 000	41.3%	207 438 000	38.1%	-15.1%
NOx	Combustion installations > 50 MW	1 502 925 000	57.9%	1 576 382 000	58.5%	4.7%
PFCs	Metal industry	328 869	82.9%	461 892	68.8%	28.8%
SF6	Metal industry	51 000	80.9%	45 137	68.2%	-13.0%
SOx	Combustion installations > 50 MW	3 205 716 000	69.7%	2 684 231 000	69.4%	-19.4%

- The comparative data shows quite clearly those emissions of CH_4, NH_3, NMVOC, SF_6 and SO_x in the second-time reporting countries from the largest contributing activities have decreased between 2001 and 2004 in the range of 3 – 20%.
- NO_x and CO_2 increased over the same time period by approximately 5% for the largest contributing activities. The emissions of CO, N_2O and PFCs have however increased significantly by 17%, 29% and 29% respectively whereas the emissions of HFCs increased by 50% between 2001 and 2004.

5.1.3 Largest emitters to air

Table 5-6 through Table 5-10 list the five highest emissions reported by individual facilities for the different pollutant groups.

Table 5-6 Facilities with the highest emissions to air of group 1 pollutants in 2004

Pollutant	NatID	Facility Name	Country	Emission	Total
CH4					
	DE_06-15-th06	HMD Halle-Lochau	Germany	36 600 000	2.2%
	GR_EL5401287	LANDFILL OF TAGARADES THESSALONIKI	Greece	23 900 000	1.4%
	ES_1516	CENTRO ELIMINACION RESIDUOS DE ZARAGOZA	Spain	18 500 000	1.1%
	UK_EA-1201	Gerrards Cross Waste Disposal Ltd	United Kingdom	15 100 000	0.9%
	UK_EA-2900	Waste Management Ltd	United Kingdom	14 600 000	0.9%
CH4 Sum					6.5%
CO					
	FR_062.01729	SOLLAC Lorraine	France	897 000 000	16.6%
	IT_16073001	ILVA S.P.A. - ILVA S.P.A. Stabilimento di Taranto	Italy	446 000 000	8.3%
	PT_100003680	Refinaria do Porto	Portugal	313 000 000	5.8%
	BE_vl00069475000114	Sidmar nv	Belgium	212 000 000	3.9%
	DE_06-05-21/0209686/0/000	ThyssenKrupp Stahl AG- Werk Du-Schwelgern	Germany	177 000 000	3.3%
CO Sum					37.8%
CO2					
	PL_05E000016	BOT Elektrownia Belchatów S.A.	Poland	31 400 000 000	1.6%
	DE_06-05-30/0326774/0/000	RWE Rheinbraun AG	Germany	27 600 000 000	1.4%
	DE_06-12-40710010000	VEAG Kraftwerk Jänschwalde	Germany	24 900 000 000	1.3%
	DE_06-05-23/0081105/0/000	RWE Power AG Kraftwerk Frimmersdorf	Germany	21 900 000 000	1.1%
	UK_EA-67	AES DRAX POWER LTD	United Kingdom	20 500 000 000	1.0%
CO2 Sum					6.4%
HFCs					
	BE_vl00302990000147	BUBBLE AND FOAM INDUSTRIES	Belgium	339 000	24.4%
	GR_EL5401097	PHOSPHORIC FERTILIZERS INDUSTRY S.A. THESSALONIKI FACT(	Greece	152 000	11.0%
	FR_061.03685	ATOFINA	France	83 000	6.0%
	FR_066.01578	RHODIA ORGANIQUE	France	78 900	5.7%
	NL_10079	DU PONT DE NEMOURS NED. BV	Netherlands	72 300	5.2%
HFCs Sum					52.3%
N2O					
	IT_01003004	RADICI CHIMICI S.P.A. - RADICI CHIMICA SPA	Italy	24 000 000	14.0%
	DE_06-07-8290552 (154001100)	BASF AG	Germany	14 000 000	8.2%
	NL_51105	YARA Sluiskil BV	Netherlands	10 400 000	6.1%
	NL_62	DSM LIMBURG BV	Netherlands	7 340 000	4.3%
	BE_vl00112120000187	BASF Antwerpen nv	Belgium	6 630 000	3.9%
N2O Sum					36.4%
NH3					
	FR_062.00307	NOVACARB - Usine de La Madeleine	France	1 450 000	1.1%
	UK_EA-1567	KEMIRA GROWHOW UK LTD	United Kingdom	1 330 000	1.0%
	LT_000000060	AB "Kaisiadoriu paukstynas"	Lithuania	924 000	0.7%
	PL_16Z000445	Zaklady Chemiczne POLICE SA	Poland	888 000	0.7%
	DE_06-15-4158144	SKW Stickstoffwerke Piesteritz GmbH	Germany	727 000	0.6%
NH3 Sum					4.2%
NMVOC					
	UK_Scotland-153	BP EXPLORATION OPERATING COMPANY LIMITED	United Kingdom	16 700 000	3.0%
	NO_A25004	STATOIL. Mongstad	Norway	13 800 000	2.5%
	UK_EA-992	DUPONT SABANCI POLYESTER (UK) LTD	United Kingdom	7 160 000	1.3%
	ES_3701	PETROLEOS DEL NORTE, PETRONOR, S.A. (PETRONOR)	Spain	7 120 000	1.3%
	UK_Scotland-52	BP OIL GRANGEMOUTH REFINERY LTD	United Kingdom	6 380 000	1.1%
NMVOC Sum					9.2%
NOx					
	UK_EA-67	AES DRAX POWER LTD	United Kingdom	57 700 000	1.8%
	PL_05E000016	BOT Elektrownia Belchatów S.A.	Poland	40 100 000	1.2%
	ES_3535	UPT COMPOSTILLA	Spain	36 400 000	1.1%
	ES_3530	Unidad de Producción Térmica Teruel	Spain	31 400 000	1.0%
	IT_16073001	ILVA S.P.A. - ILVA S.P.A. Stabilimento di Taranto	Italy	27 800 000	0.9%
NOx Sum					6.0%
PFCs					
	FR_068.02504	Aluminium Pechiney Lannemezan	France	172 000	24.9%
	FR_066.01578	RHODIA ORGANIQUE	France	82 800	12.0%
	BE_vl01851258000121	3M Belgium NV	Belgium	42 900	6.2%
	SE_2281-103	Kubikenborg Aluminium AB	Sweden	38 900	5.6%
	NO_A40007	HYDRO ALUMINIUM AS KARMØY	Norway	34 900	5.1%
PFCs Sum					53.9%
SF6					
	UK_EA-1739	MAGNESIUM ELEKTRON LTD	United Kingdom	14 200	18.4%
	PL_07W000057	Drwalewskie Zaklady Przemyslu Bioweterynaryjnego BIOWET Drwalew	Poland	10 800	14.0%
	DE_06-08-7047053	Solvay Fluor u. Derivate GmbH	Germany	10 000	13.0%
	FR_068.02551	Péchiney Electrométallurgie (Usine de MARIGNAC)	France	9 930	12.9%
	NO_A21037	NORSK HYDRO PRODUKSJON. Porsgrunn Ind - Magnesiumfabrikken	Norway	8 600	11.2%
SF6 Sum					69.5%
SOx					
	ES_3536	CENTRAL TERMICA AS PONTES	Spain	312 000 000	6.1%
	GR_EL1201188	PPC S.A., SES MEGALOPOLIS, UNITS I,II,III	Greece	209 000 000	4.1%
	ES_3530	Unidad de Producción Térmica Teruel	Spain	163 000 000	3.2%
	PL_05E000016	BOT Elektrownia Belchatów S.A.	Poland	140 000 000	2.7%
	PL_15P000483	ZE PAK S.A. Elektrownia PatnówA.	Poland	88 400 000	1.7%
SOx Sum					17.8%

Table 5-7 Facilities with the highest emissions to air of group 2 pollutants in 2004

Pollutant	NatID	Facility Name	Country	Emission	Total
As and compounds					
	SK_57002803	U.S.Steel s.r.o.	Slovakia	30 200	36.6%
	EE_10579981b	Narva Elektrijaamad AS, Eesti Elektrijaam	Estonia	7 300	8.8%
	ES_1482	Refinería la Rábida	Spain	3 030	3.7%
	DE_06-01-61020199408	YARA Brunsbüttel GmbH	Germany	2 840	3.4%
	EE_10579981a	Narva Elektrijaamad AS, Balti Elektrijaam	Estonia	2 000	2.4%
As and compounds Sum					54.9%
Cd and compounds					
	CZ_6aa48ed9146e227a1e579ac	Mittal Steel Ostrava a.s.	Czech Republic	9 200	30.4%
	PL_12S000241	MITTAL STEEL POLAND S.A. Oddzial w Dabrowie Górniczej	Poland	1 320	4.4%
	SK_57002803	U.S.Steel s.r.o.	Slovakia	864	2.9%
	NL_23301	CORUS STAAL BV	Netherlands	690	2.3%
	NL_56121	Thermphos International B.V.	Netherlands	666	2.2%
Cd and compounds Sum					42.1%
Cr and compounds					
	FI_2110	Outokumpu Chrome Oy, Outokumpu Stainless Oy, Tornion tehtaat	Finland	9 720	5.9%
	DE_06-05-42/0045338/0/000	ThyssenKrupp Nirosta GmbH Stahlwerk Bochum	Germany	7 880	4.8%
	UK_EA-1055	ELEMENTIS CHROMIUM LLP	United Kingdom	7 780	4.7%
	DE_06-10-0033945	Saarstahl, Werk Völklingen	Germany	7 140	4.3%
	EE_10579981b	Narva Elektrijaamad AS, Eesti Elektrijaam	Estonia	6 420	3.9%
Cr and compounds Sum					23.7%
Cu and compounds					
	ES_3421	FÁBRICA DE HUELVA	Spain	17 900	11.2%
	PL_12S000241	MITTAL STEEL POLAND S.A. Oddzial w Dabrowie Górniczej	Poland	10 300	6.4%
	DE_06-02-B2C100A00	Norddeutsche Affinerie AG	Germany	8 500	5.3%
	DE_06-05-44/0877505/0/000	Norddeutsche Affinerie AG - Hüttenwerke Kayser -	Germany	8 430	5.3%
	PL_01D000168	Huta Miedzi "Glogów" w Glogowie.	Poland	8 140	5.1%
Cu and compounds Sum					33.3%
Hg and compounds					
	IT_16073001	ILVA S.P.A. - ILVA S.P.A. Stabilimento di Taranto	Italy	1 140	3.5%
	UK_EA-1451	INEOS CHLOR LTD	United Kingdom	1 010	3.1%
	SK_37021405	Duslo a.s.	Slovakia	834	2.6%
	AT_1036310456	voestalpine Standort Linz:voestalpine Stahl GmbH,voestalpine Gießerei	Austria	663	2.1%
	CZ_6aa48ed9146e227a1e579ac	Mittal Steel Ostrava a.s.	Czech Republic	660	2.0%
Hg and compounds Sum					13.3%
Ni and compounds					
	FR_063.01207	TOTAL FRANCE (Raffinerie de Donges)	France	20 900	5.1%
	CY_2	Dhekelia Power Station	Cyprus	18 400	4.5%
	ES_1528	REPSOL PETRÓLEO, S.A.	Spain	12 400	3.0%
	ES_1527	REPSOL YPF Refino y Logistica Complejo Industrial de Tarragona	Spain	12 100	2.9%
	DE_06-15-1112007	RKB Raffinerie-Kraftwerks Betriebs GmbH	Germany	9 090	2.2%
Ni and compounds Sum					17.7%
Pb and compounds					
	IT_16073001	ILVA S.P.A. - ILVA S.P.A. Stabilimento di Taranto	Italy	61 100	7.8%
	PL_12S000241	MITTAL STEEL POLAND S.A. Oddzial w Dabrowie Górniczej	Poland	48 200	6.2%
	DE_06-05-21/0209686/0/000	ThyssenKrupp Stahl AG- Werk Du-Schwelgern	Germany	36 600	4.7%
	BE_vl00069475000114	Sidmar nv	Belgium	34 500	4.4%
	HU_03501	DUNAFERR Dunai Vasmu Zrt.	Hungary	25 800	3.3%
Pb and compounds Sum					26.4%
Zn and compounds					
	AT_1036310456	voestalpine Standort Linz:voestalpine Stahl GmbH,voestalpine Gießerei	Austria	87 000	6.3%
	ES_3675	GSB ACERO, S.A. (GSB ACERO S.A. - AZKOITIA)	Spain	45 400	3.3%
	BE_W011	DUFERCO LA LOUVIERE SA	Belgium	42 100	3.1%
	BE_vl00069475000114	Sidmar nv	Belgium	34 700	2.5%
	EE_10579981b	Narva Elektrijaamad AS, Eesti Elektrijaam	Estonia	32 900	2.4%
Zn and compounds Sum					17.6%

Table 5-8 Facilities with the highest emissions to air of group 3 pollutants in 2004

Pollutant	NatID	Facility Name	Country	Emission	Total
Dichloroethane-1,2 (DCE)					
	FR_064.00825	ATOFINA	France	358 000	16.2%
	FR_064.00942	ATOFINA LAVERA	France	288 000	13.0%
	HU_10020	BorsodChem Rt.	Hungary	244 000	11.1%
	UK_EA-1451	INEOS CHLOR LTD	United Kingdom	224 000	10.1%
	DE_06-03-28173428000	European Vinyls Corporation (Deutschland) GmbH	Germany	176 000	8.0%
Dichloroethane-1,2 (DCE) Sum					58.4%
Dichloromethane (DCM)					
	UK_EA-651	CARPENTER LTD	United Kingdom	426 000	10.7%
	UK_EA-1206	GLAXO OPERATIONS UK LTD	United Kingdom	269 000	6.8%
	FR_070.00949	Specitubes Samer	France	235 000	5.9%
	UK_EA-2187	RECICEL MANUFACTURING	United Kingdom	234 000	5.9%
	FR_061.03084	RHODIA Intermédiaires - établissement de Roussillon	France	225 000	5.7%
Dichloromethane (DCM) Sum					35.0%
Hexachlorobenzene (HCB)					
	PT_100005519	Halla Climate Control Portugal - Ar Condicionado, Lda	Portugal	24	31.2%
	BE_W011	DUFERCO LA LOUVIERE SA	Belgium	21	27.6%
	FI_1375	Kemira Oyj, Kokkolan tehtaat	Finland	17	22.0%
	ES_4168	MIVISA ENVASES	Spain	15	19.2%
Hexachlorobenzene (HCB) Sum					100.0%
Hexachlorocyclohexane(HCH)					
	SE_0580-124-02	Gärstadverket	Sweden	256	100.0%
Hexachlorocyclohexane(HCH) Sum					100.0%
PCDD+PCDF (dioxins+furans)					
	CZ_f1fdd0a4fe7206c5fc180a0ec	Sídlo firny	Czech Republic	0	16.8%
	ES_1946	COGENERACIÓN DE NAVIA (COGENASA)	Spain	0	14.7%
	PL_06K000440	Zaklady Azotowe w Tarnowie-Mocicach S.A.	Poland	0	14.0%
	IT_16073001	ILVA S.P.A. - ILVA S.P.A. Stabilimento di Taranto	Italy	0	5.3%
	FR_100.00974	CIDEME (UIOM Gien-Chateauneuf)	France	0	3.4%
PCDD+PCDF (dioxins+furans) Sum					54.1%
Tetrachloroethylene (PER)					
	FR_063.00949	AIRBUS NANTES	France	270 000	22.7%
	BE_W113	SONACA SA	Belgium	238 000	20.0%
	UK_NI-P0135/06A	Bombardier Aerospace, Belfast	United Kingdom	154 000	12.9%
	UK_EA-1451	INEOS CHLOR LTD	United Kingdom	84 000	7.1%
	FR_067.00760	BEHR France	France	55 400	4.7%
Tetrachloroethylene (PER) Sum					67.4%
Tetrachloromethane (TCM)					
	FR_064.00825	ATOFINA	France	27 000	48.8%
	UK_EA-1451	INEOS CHLOR LTD	United Kingdom	8 300	15.0%
	FR_064.00942	ATOFINA LAVERA	France	8 170	14.8%
	FR_059.02685	SOLVAY ELECTROLYSE FRANCE	France	3 300	6.0%
	BE_vl01787164000134	VOPAK TERMINAL ACS	Belgium	1 340	2.4%
Tetrachloromethane (TCM) Sum					87.0%
Trichlorobenzenes (TCB)					
	FR_067.00678	RHODIA Organique (Site de Mulhouse Dornach)	France	110	39.6%
	IT_08039000	ENIPOWER S.P.A. - EniPower Stabilimento di Ravenna	Italy	92	33.0%
	BE_vl01787164000134	VOPAK TERMINAL ACS	Belgium	40	14.4%
	DE_06-05-30/9047369/0/000	Lanxess Deutschland GmbH	Germany	22	7.8%
	ES_4168	MIVISA ENVASES	Spain	15	5.3%
Trichlorobenzenes (TCB) Sum					100.0%
Trichloroethane-1,1,1 (TCE)					
	UK_EA-2773	U K Waste Management Ltd	United Kingdom	106 000	44.4%
	FR_064.00825	ATOFINA	France	101 000	42.3%
	UK_EA-1451	INEOS CHLOR LTD	United Kingdom	28 000	11.7%
	UK_Scotland-109	North Lanarkshire Council	United Kingdom	1 950	0.8%
	BE_W062	TECHSPACE AERO SA	Belgium	550	0.2%
Trichloroethane-1,1,1 (TCE) Sum					99.4%
Trichloroethylene (TRI)					
	FR_060.00274	VALEO MATERIAUX DE FRICTION	France	251 000	12.9%
	UK_EA-247	BA TUBES LTD	United Kingdom	225 000	11.6%
	UK_EA-1451	INEOS CHLOR LTD	United Kingdom	185 000	9.5%
	FR_063.01295	PECHINEY AVIATUBE	France	93 000	4.8%
	UK_EA-2533	SPECIAL METALS WIGGIN LTD	United Kingdom	82 700	4.3%
Trichloroethylene (TRI) Sum					43.1%
Trichloromethane					
	FR_064.00942	ATOFINA LAVERA	France	98 400	35.4%
	FR_067.00433	ALBEMARLE PPC	France	43 600	15.7%
	FR_070.00882	Synthexim	France	32 900	11.8%
	UK_EA-1451	INEOS CHLOR LTD	United Kingdom	18 000	6.5%
	FR_054.01115	SYNKEM	France	16 000	5.8%
Trichloromethane Sum					75.2%

Table 5-9 Facilities with the highest emissions to air of group 4 pollutants in 2004

Pollutant	NatID	Facility Name	Country	Emission	Total
Benzene					
	FR_062.01074	HBL	France	328 000	6.6%
	UK_EA-754	CONOCOPHILLIPS (UK) LTD	United Kingdom	319 000	6.4%
	SE_1484-1115	Skandinaviska Raffinaderi AB, SCANRAFF	Sweden	225 000	4.5%
	UK_Scotland-53	BP CHEMICALS LTD	United Kingdom	224 000	4.5%
	SK_57002803	U.S.Steel s.r.o.	Slovakia	211 000	4.2%
Benzene Sum					26.3%
Polycyclic Aromatic Hydrocarbons					
	NL_10928	Aluminium & Chemie Rotterdam B.V.	Netherlands	68 500	12.6%
	PL_15P000003	Aluminium Konin - Impexmetal S.A.	Poland	36 700	6.7%
	NO_A40007	HYDRO ALUMINIUM AS KARMØY	Norway	33 000	6.1%
	PL_07W000110	Fabryka Samochodów Osobowych Spólka Akcyjna - Zaklad Zeran w W	Poland	31 500	5.8%
	PL_11G000400	Wytwórnia Konstrukcji Stalowych "Mostostal - Chojnice" Spólka Akcyjna	Poland	26 900	4.9%
Polycyclic Aromatic Hydrocarbons Sum					36.2%

Table 5-10 Facilities with the highest emissions to air of group 5 pollutants in 2004

Pollutant	NatID	Facility Name	Country	Emission	Total
Chlorine and inorganic compounds					
	UK_EA-1048	EDF ENERGY (COTTAM POWER) LTD	United Kingdom	4 320 000	8.9%
	UK_EA-445	BRITISH ENERGY PLC	United Kingdom	2 820 000	5.8%
	UK_EA-1561	KEADBY GENERATION LTD	United Kingdom	2 230 000	4.6%
	UK_EA-2314	RUGELEY POWER LTD	United Kingdom	1 780 000	3.7%
	UK_EA-3048	EDF ENERGY (WEST BURTON POWER) LTD	United Kingdom	1 690 000	3.5%
Chlorine and inorganic compounds Sum					26.5%
Fluorine and inorganic compounds					
	IT_16073001	ILVA S.P.A. - ILVA S.P.A. Stabilimento di Taranto	Italy	434 000	3.1%
	SI_15	Talum d.d. Kidricevo	Slovenia	420 000	3.0%
	UK_EA-2318	RWE NPOWER PLC	United Kingdom	357 000	2.6%
	ES_3537	UPT ALMERÍA	Spain	340 000	2.5%
	UK_EA-2330	RWE NPOWER PLC	United Kingdom	335 000	2.4%
Fluorine and inorganic compounds Sum					13.6%
HCN					
	SK_57002803	U.S.Steel s.r.o.	Slovakia	304 000	54.7%
	FR_062.01074	HBL	France	52 900	9.5%
	UK_EA-2416	SEVALCO LTD	United Kingdom	46 000	8.3%
	UK_EA-1716	LUCITE INTERNATIONAL UK LTD	United Kingdom	39 500	7.1%
	BE_W005	COCKERILL SAMBRE SA (COKE FONTE)	Belgium	22 200	4.0%
HCN Sum					83.6%
PM10					
	GR_EL5800876	PPC S.A., SES AG. DIMITRIOU	Greece	19 900 000	8.2%
	GR_EL1201188	PPC S.A., SES MEGALOPOLIS, UNITS I,II,III	Greece	6 550 000	2.7%
	EE_10579981a	Narva Elektrijaamad AS, Balti Elektrijaam	Estonia	4 660 000	1.9%
	GR_EL5800949	PPC S.A., SES KARDIAS	Greece	4 560 000	1.9%
	GR_EL5800902	PPC S.A., SES PTOLEMAIDAS	Greece	4 050 000	1.7%
PM10 Sum					16.4%
Grand Total					140.1%

5.2 Emissions to water, direct and indirect

5.2.1 Country totals

This section presents the total emissions of group 1 pollutants to water for each country (Table 5-11). Please be aware that the “Indirect” emissions to water are in fact transfers of polluted water via sewerage systems to off-site wastewater treatment plants. These totals therefore represent the total amount of each pollutant discharged at each facility via sewerage systems, which subsequently get treated at urban wastewater treatment plant prior to discharge to surface waters at significantly reduced pollutant load levels.

Table 5-11 Releases to water of group 1 pollutants reported in each country in 2004 in kg/year.

		Total - Nitrogen		Total - Phosphorus	
CountryGroup	Country	Water Direct	Water Indirect	Water Direct	Water Indirect
EU15	Austria	1 470 200	788 900	64 170	97 850
	Belgium	1 656 500	197 500	529 560	54 460
	Denmark		1 381 400		345 750
	Finland	2 523 200	668 600	145 130	122 240
	France	11 195 000	4 638 000	1 075 700	1 079 600
	Germany	8 143 440	7 365 780	313 710	2 134 646
	Greece	1 054 000	8 140 000	243 000	113 970
	Ireland	882	340 000	22 410	35 090
	Italy	8 392 600	2 388 900	537 240	138 643
	Netherlands	2 884 218	2 262 061	215 944	1 123 967
	Portugal	10 434 800	764 400	476 970	16 710
	Spain	5 980 100	1 754 600	106 690	310 990
	Sweden	4 422 300	242 000	308 910	37 700
	United Kingdom	13 187 800	6 306 810	1 551 450	1 189 290
EU15 Total		71 345 040	37 238 951	5 590 884	6 800 906
EU10	Hungary	1 337 900	461 000	61 900	20 310
	Czech Republic	2 842 000	720 000	59 700	84 300
	Latvia	56 300			5 720
	Lithuania	174 300		27 600	5 700
	Malta	5 373 900		9 720	
	Poland	2 698 600	550 546	95 200	144 801
	Slovakia	846 000	173 200	23 370	10 500
	Slovenia	95 000	184 500	13 000	32 520
EU10 Total		13 424 000	2 089 246	290 490	303 851
Other countries	Norway	2 389 100		210 550	13 400

The totals indicate discharges to sewer systems, not the totals emitted to the environment (see the text for further explanation)

The following is to be noted:

- Luxembourg, Cyprus and Estonia do not report any emissions of Total Nitrogen or Total Phosphorus to water.
- The United Kingdom discharges the greatest amount of total nitrogen and total phosphorus directly into water.
- Poland discharges the greatest amount of total nitrogen and total phosphorus indirectly to water.

5.2.2 Sector totals

This section presents the discharges to water of group 1 pollutants as reported by the main activities. Table 5-12 provides the total direct and indirect discharges of total Nitrogen and total Phosphorous to water in 2004.

Table 5-12 Discharges to water of group 1 pollutants reported in each main activity in 2004 (direct and indirect) in kg/year

		Total - Nitrogen		Total - Nitrogen Total	Total - Phosphorus		Total - Phosphorus Total
Code	Annex A3 Activity	Water Direct	Water Indirect		Water Direct	Water Indirect	
1.1	Combustion installations > 50 MW	9 013 600	58 264	9 071 864	94 620	10 513	105 133
1.2	Mineral oil and gas refineries	2 840 200	839 300	3 679 500	182 910	8 370	191 280
1.3	Coke ovens	304 000	181 300	485 300			
2.1/2.2/2.3/2.4	Metal industry	12 230 440	3 293 900	15 524 340	66 040	27 880	93 920
3.1/3.3/3.4/3.5	Cement, lime, glass, mineral substances or ceramic products	137 000		137 000	10 000		10 000
4.1	Basic organic chemicals	14 668 080	5 433 600	20 101 680	948 016	1 717 082	2 665 098
4.2/4.3	Basic inorganic chemicals or fertilisers	18 941 400	3 021 687	21 963 087	1 131 580	217 896	1 349 476
4.4/4.6	Biocides and explosives	747 000	341 600	1 088 600	29 610	23 600	53 210
4.5	Pharmaceutical products	2 688 500	2 825 400	5 513 900	552 520	624 300	1 176 820
5.1/5.2	Disposal/recovery of hazardous or municipal waste	1 863 238	2 024 100	3 887 338	120 300	7 130	127 430
5.3/5.4	Disposal of non-hazardous waste and landfills	3 755 000	12 037 100	15 792 100	420 500	103 250	523 750
6.1	Pulp, paper or board production	7 131 500	482 100	7 613 600	1 286 640	39 190	1 325 830
6.2	Pretreatment of fibres or textiles		59 900	59 900	18 660	86 430	105 090
6.3	Tanning of hides and skins		536 000	536 000			
6.4	Slaughterhouses, milk, animal and vegetable raw materials	2 954 900	7 324 746	10 279 646	1 018 328	4 093 016	5 111 344
6.5	Disposal or recycling of animal carcasses and animal waste	9 260 882	678 200	9 939 082	204 500	83 900	288 400
6.6	Pig and poultry farms	566 500	56 000	622 500			
6.7	Surface treatment or products using organic solvents	55 900	135 000	190 900	7 700	75 600	83 300
Grand Total		87 158 140	39 328 197	126 486 337	6 091 924	7 118 157	13 210 081

It can be seen from the table that:

- The activity ‘Slaughterhouses, milk, animal and vegetable raw materials’ is by far the largest contributing activity to emissions of total phosphorous indirectly to water, 58%; the dominant activity for indirect emissions of total nitrogen to water is “Disposal of non-hazardous waste and landfills” with 31 % (see also Table 5-13).
- The activities ‘Basic inorganic chemicals or fertilizers’ and ‘Pulp, paper or board production’ are the main contributing activities of emissions directly to water of total nitrogen and total phosphorous, at 22 and 21% respectively.

Table 5-13 Largest contributing activities to the group 1 discharges to water in 2004 (direct and indirect) in kg/year

Emissions Type	Pollutant	Description	Emission for 2004, kg/year	% of Total
Water Direct	Total - Nitrogen	Basic inorganic chemicals or fertilisers	18 941 400	21.7%
	Total - Phosphorus	Pulp, paper or board production	1 286 640	21.1%
Water Indirect	Total - Nitrogen	Disposal of non-hazardous waste and landfills	12 037 100	30.6%
	Total - Phosphorus	Slaughterhouses, milk, animal and vegetable raw materials	4 093 016	57.5%

Table 5-14 compares the data for emissions to water (direct and indirect) across the two reporting years for the main contributing activities for those countries relevant.

Table 5-14 Largest contributing activities to the group 1 discharges to water in 2001 and 2004 (direct and indirect) in kg/year

ReportYear	Emission Type	Pollutant	Code	Annex A3 Activity	Total
2001	Water Direct	Total - Nitrogen	4.2/4.3	Basic inorganic chemicals or fertilisers	25 736 200
		Total - Phosphorus	4.2/4.3	Basic inorganic chemicals or fertilisers	1 842 810
	Water Indirect	Total - Nitrogen	6.4	Slaughterhouses, milk, animal and vegetable raw materials	7 802 300
		Total - Phosphorus	6.4	Slaughterhouses, milk, animal and vegetable raw materials	3 945 330
2004	Water Direct	Total - Nitrogen	4.2/4.3	Basic inorganic chemicals or fertilisers	18 941 400
		Total - Phosphorus	6.1	Pulp, paper or board production	1 286 640
	Water Indirect	Total - Nitrogen	5.3/5.4	Disposal of non-hazardous waste and landfills	12 037 100
		Total - Phosphorus	6.4	Slaughterhouses, milk, animal and vegetable raw materials	4 093 016

- 'Basic inorganic chemicals or fertilisers' is the largest contributing activity of direct emissions to water of total nitrogen in both reporting periods and is also the main activity source of total phosphorous emissions directly to water in 2001 whilst for 2004 this has changed to 'Pulp, paper or board production'.
- The 'Slaughterhouses, milk, animal and vegetable raw materials' activities was the largest contributors of indirect emissions of both nitrogen and phosphorous to water in 2004, whereas in 2001 Disposal of non-hazardous waste and landfills was the largest contributor to total nitrogen emissions.

5.2.3 Largest direct emitters to water

Table 5-15 through Table 5-19 present the five largest direct emissions to water reported by individual facilities for the different pollutant groups.

Table 5-15 Facilities with the highest direct emissions to water of group 1 pollutants in 2004

Pollutant	NatID	Facility Name	Country	Emission	Total
Total - Nitrogen					
	PT_100005799	Avilafões- Aviários de Lafões Lda	Portugal	9 260 000	10.6%
	MT_PS1	Marsa Power Station	Malta	5 300 000	6.1%
	ES_3486	ARCELOR ESPAÑA - PLANTA SIDERÚRGICA DE AVILÉS Y GIJÓN	Spain	2 340 000	2.7%
	IT_16073001	ILVA S.P.A. - ILVA S.P.A. Stabilimento di Taranto	Italy	2 150 000	2.5%
	DE_06-07-8290552 (154001100)	BASF AG	Germany	1 820 000	2.1%
Total - Nitrogen Sum					23.9%
Total - Phosphorus					
	UK_Scotland-14	DIAGEO DISTILLING PLC	United Kingdom	454 000	7.5%
	BE_W047	PRAYON SA	Belgium	377 000	6.2%
	UK_Scotland-210	Smithkline Beecham plc	United Kingdom	341 000	5.6%
	UK_Scotland-53	BP CHEMICALS LTD	United Kingdom	292 000	4.8%
	PT_100005799	Avilafões- Aviários de Lafões Lda	Portugal	195 000	3.2%
Total - Phosphorus Sum					27.2%

Table 5-16 Facilities with the highest direct emissions to water of group 2 pollutants in 2004

Pollutant	NatID	Facility Name	Country	Emission	Total
As and compounds					
	PL_01D000166	Huta Miedzi S.A. Legnica	Poland	2 860	8.8%
	ES_3421	FÁBRICA DE HUELVA	Spain	2 600	8.0%
	FR_067.00551	Mines de Potasse d'Alsace (MDPA) - Mine Amélie	France	2 400	7.3%
	GR_EL0600252	LARCO S.A.	Greece	1 550	4.7%
	PL_06K000453	Zaklady Górniczo-Hutnicze "Boleslaw" S.A	Poland	1 320	4.0%
As and compounds Sum					32.9%
Cd and compounds					
	PL_06K000453	Zaklady Górniczo-Hutnicze "Boleslaw" S.A	Poland	1 350	14.2%
	PL_16Z000445	Zaklady Chemiczne POLICE SA	Poland	1 130	11.9%
	IT_07010010	ILVA S.P.A. - ILVA S.P.A. STABILIMENTO DI GENOVA CORNIGLIANO	Italy	788	8.3%
	IT_16073001	ILVA S.P.A. - ILVA S.P.A. Stabilimento di Taranto	Italy	384	4.0%
	ES_3551	Fábrica de Zinc Electrolítico	Spain	317	3.3%
Cd and compounds Sum					41.8%
Cr and compounds					
	FR_064.00001	ALUMINIUM PECHINEY USINE DE GARDANNE	France	590 000	77.6%
	IT_16073001	ILVA S.P.A. - ILVA S.P.A. Stabilimento di Taranto	Italy	26 200	3.4%
	FR_070.00922	TIOXIDE EUROPE S.A.S	France	20 000	2.6%
	FR_058.00301	MILLENNIUM CHEMICAL SAS	France	5 800	0.8%
	GR_EL0600252	LARCO S.A.	Greece	5 360	0.7%
Cr and compounds Sum					85.2%
Cu and compounds					
	DE_06-07-8290552 (154001100)	BASF AG	Germany	13 600	7.6%
	IT_16073001	ILVA S.P.A. - ILVA S.P.A. Stabilimento di Taranto	Italy	12 200	6.8%
	FR_061.05221	OSIRIS GIE	France	7 300	4.1%
	NO_A61093	Borregaard Ind. Ltd.. Cellulosesektor	Norway	7 270	4.1%
	SE_0181-81-003	IGELSTAVERKET	Sweden	6 500	3.6%
Cu and compounds Sum					26.2%
Hg and compounds					
	PL_16Z000445	Zaklady Chemiczne POLICE SA	Poland	877	18.2%
	IT_16073001	ILVA S.P.A. - ILVA S.P.A. Stabilimento di Taranto	Italy	640	13.3%
	SK_47010307	Novácke chemické závody a.s.	Slovakia	481	10.0%
	IT_06032003	GRUPPO LUCCHINI - Elettra GLT S.p.A. - Centrale di Servola	Italy	450	9.3%
	AT_1010310102	Agrolinz Melamin GmbH	Austria	216	4.5%
Hg and compounds Sum					55.3%
Ni and compounds					
	GR_EL0600252	LARCO S.A.	Greece	32 100	18.4%
	IT_10055002	THYSSENKRUPP ACCIAI SPECIALI TERNI SPA CON UNICO SOCIO	Italy	7 420	4.3%
	IT_19089001	ISAB ENERGY S.R.L. - ISAB ENERGY Impianto IGCC	Italy	5 990	3.4%
	IT_05023016	AGSM VERONA S.P.A. - Depuratore Città di Verona	Italy	5 910	3.4%
	UK_EA-282	BASF PLC	United Kingdom	5 890	3.4%
Ni and compounds Sum					32.8%
Pb and compounds					
	FR_064.00001	ALUMINIUM PECHINEY USINE DE GARDANNE	France	21 000	16.3%
	PL_06K000453	Zaklady Górniczo-Hutnicze "Boleslaw" S.A	Poland	18 900	14.7%
	PT_100004092	Fábrica de Pasta de Setúbal	Portugal	8 270	6.4%
	PL_16Z000445	Zaklady Chemiczne POLICE SA	Poland	6 220	4.8%
	UK_EA-209	ASSOCIATED OCTEL CO LTD	United Kingdom	6 020	4.7%
Pb and compounds Sum					46.9%
Zn and compounds					
	PL_06K000453	Zaklady Górniczo-Hutnicze "Boleslaw" S.A	Poland	143 000	12.0%
	CZ_78762adbef198e17667d97f6	Lovochemie, a.s., Lovosice	Czech Republic	99 000	8.3%
	IT_19085000	RAFFINERIA DI GELA SPA - RAFFINERIA DI GELA SPA	Italy	66 900	5.6%
	IT_16073001	ILVA S.P.A. - ILVA S.P.A. Stabilimento di Taranto	Italy	57 900	4.8%
	PT_100003961	Minas da Panasqueira	Portugal	45 500	3.8%
Zn and compounds Sum					34.5%

Table 5-17 Facilities with the highest direct emissions to water of group 3 pollutants in 2004

Pollutant	NatID	Facility Name	Country	Emission	Total
Chloroalkanes (C10-13)					
	NO_A61067	Hydro Polymers as Rafnes	Norway	11	58.5%
	IT_08039024	ECOLOGIA AMBIENTE SRL - CENTRO ECOLOGICO	Italy	8	41.5%
Chloroalkanes (C10-13) Sum					100.0%
Dichloroethane-1,2 (DCE)					
	SK_47010307	Novácke chemické závody a.s.	Slovakia	6 800	42.2%
	DE_06-05-30/9046797/0/000	Bayer Industry Services GmbH & Co. OHG	Germany	1 490	9.2%
	PL_01D000268	PCC Rokita SA	Poland	1 340	8.3%
	FR_064.00825	ATOFINA	France	1 200	7.4%
	PL_02C000005	Anwil S.A.	Poland	684	4.2%
Dichloroethane-1,2 (DCE) Sum					71.4%
Dichloromethane (DCM)					
	UK_EA-1206	GLAXO OPERATIONS UK LTD	United Kingdom	15 800	32.4%
	FR_061.05221	OSIRIS GIE	France	11 000	22.5%
	FR_061.03084	RHODIA Intermédiaires - établissement de Roussillon	France	8 800	18.0%
	CZ_d38c0d6d0221510001e4ff37	IVAX Pharmaceuticals s.r.o.	Czech Republic	2 850	5.8%
	FR_064.00913	SOLVAY SPECIALITES FRANCE	France	1 900	3.9%
Dichloromethane (DCM) Sum					82.6%
Halogenated organic compounds					
	SI_22	VIPAP VIDEM KRŠKO d.d.	Slovenia	260 000	7.4%
	SE_2284-108	M-Real Sverige AB, Husums fabrik	Sweden	215 000	6.1%
	FI_1254	STORA ENSO OYJ, IMATRAN TEHTAAT	Finland	185 000	5.2%
	FI_1592	UPM-Kymmene Oyj, Kaukaan tehtaat	Finland	128 000	3.6%
	NO_A61093	Borregaard Ind. Ltd.. Cellulosesektor	Norway	124 000	3.5%
Halogenated organic compounds Sum					25.9%
Hexachlorobenzene (HCB)					
	IT_05027002	SYNDIAL S.p.A. - Attvità diversificate - STABILIMENTO DI PORTO MAI	Italy	4	25.5%
	DE_06-06-00438010412	AllessaChemie GmbH, Werksteil Cassella	Germany	3	20.6%
	UK_EA-1451	INEOS CHLOR LTD	United Kingdom	2	14.5%
	DE_06-05-62/0152577/0/000	INFRACOR GMBH	Germany	2	13.1%
	IT_08039024	ECOLOGIA AMBIENTE SRL - CENTRO ECOLOGICO	Italy	2	10.3%
Hexachlorobenzene (HCB) Sum					84.0%
Hexachlorobutadiene (HCBD)					
	FR_064.00825	ATOFINA	France	38	63.9%
	SE_2480-137-06	DÅVA KRAFTVÄRMEVERK	Sweden	9	15.8%
	IT_05027005	SERVIZI PORTO MARGHERA S.C A R.L. - Stabilimento di Porto Margh	Italy	6	10.4%
	UK_EA-1451	INEOS CHLOR LTD	United Kingdom	3	4.2%
	UK_EA-2076	PFIZER LTD	United Kingdom	2	3.1%
Hexachlorobutadiene (HCBD) Sum					97.5%
Hexachlorocyclohexane(HCH)					
	FR_064.00825	ATOFINA	France	13	43.9%
	DE_06-06-00002650433	Merck KGaA	Germany	6	19.2%
	UK_EA-1244	GROVEHURST ENERGY LTD	United Kingdom	4	14.9%
	PL_12S000441	Zaklady Chemiczne "Organika-Azot" SA	Poland	4	12.9%
	IT_08039024	ECOLOGIA AMBIENTE SRL - CENTRO ECOLOGICO	Italy	2	5.1%
Hexachlorocyclohexane(HCH) Sum					95.9%

Table 5-18 Facilities with the highest direct emissions to water of group 4 pollutants in 2004

Pollutant	NatID	Facility Name	Country	Emission	Total
Benzene, toluene, ethylbenzene, xylenes					
	UK_EA-1374	HUNTSMAN PETROCHEMICALS (UK) LTD	United Kingdom	25 500	27.5%
	FR_052.02690	ATOFINA Mont	France	10 000	10.8%
	UK_Scotland-53	BP CHEMICALS LTD	United Kingdom	8 000	8.6%
	ES_3626	GENERAL QUIMICA, S.A. (GENERAL QUIMICA S.A.)	Spain	7 700	8.3%
	UK_Scotland-52	BP OIL GRANGEMOUTH REFINERY LTD	United Kingdom	7 290	7.9%
Benzene, toluene, ethylbenzene, xylenes Sum					63.2%
Organotin - compounds					
	ES_3523	PAPELERA DE BESAYA	Spain	270	61.5%
	ES_3643	GUARDIAN LLODIO UNO, S.L. (GUARDIAN LLODIO UNO, S.L.)	Spain	106	24.1%
	ES_1032	Kimberly-Clark,S.L.	Spain	63	14.4%
Organotin - compounds Sum					100.0%
Phenols					
	ES_3486	ARCELOR ESPAÑA - PLANTA SIDERÚRGICA DE AVILÉS Y GIJÓN	Spain	221 000	42.2%
	UK_EA-2502	SOLUTIA UK LTD	United Kingdom	87 000	16.6%
	UK_EA-1089	ESSO PETROLEUM CO LTD	United Kingdom	19 300	3.7%
	PL_05E000354	Sanockie Przedsiebiorstwo Gospodarki Komunalnej Sp.z o.o.	Poland	19 200	3.7%
	IT_16073001	ILVA S.P.A. - ILVA S.P.A. Stabilimento di Taranto	Italy	15 200	2.9%
Phenols Sum					69.1%
Polycyclic Aromatic Hydrocarbons					
	PL_03L000438	Zaklady Azotowe "Pulawy" S.A. w Pulawach	Poland	8 320	32.9%
	PT_100005135	Riler - Industria Têxtil,Lda	Portugal	3 370	13.3%
	PL_09R000343	Rafineria Nafty GLIMAR S.A.	Poland	2 780	11.0%
	IT_16073001	ILVA S.P.A. - ILVA S.P.A. Stabilimento di Taranto	Italy	2 560	10.1%
	NO_A31032	ELKEM ALUMINIUM ANS. Lista	Norway	2 500	9.9%
Polycyclic Aromatic Hydrocarbons Sum					77.1%
Total organic carbon (TOC)					
	NO_A61093	Borregaard Ind. Ltd.. Cellulosesektor	Norway	18 600 000	5.0%
	UK_Scotland-14	DIAGEO DISTILLING PLC	United Kingdom	12 500 000	3.4%
	UK_EA-2566	St. Regis Paper Company Limited	United Kingdom	11 100 000	3.0%
	SE_2284-108	M-Real Sverige AB, Husums fabrik	Sweden	9 400 000	2.5%
	FI_1254	STORA ENSO OYJ, IMATRAN TEHTAAT	Finland	7 820 000	2.1%
Total organic carbon (TOC) Sum					16.1%

Table 5-19 Facilities with the highest direct emissions to water of group 5 pollutants in 2004

Pollutant	NatID	Facility Name	Country	Emission	Total
Chlorides					
	DE_06-03-03027358000	Dow Deutschland GmbH & Co. OHG	Germany	1 530 000 000	12.0%
	ES_3182	SOLVAY QUIMICA (Fábrica de Torrelavega)	Spain	1 030 000 000	8.1%
	IT_09049001	SOLVAY CHIMICA ITALIA S.P.A. - SOLVAY CHIMICA ITALIA S.p.A.	Italy	939 000 000	7.4%
	UK_EA-595	BRUNNER MOND (UK) LTD	United Kingdom	622 000 000	4.9%
	UK_EA-592	BRUNNER MOND (UK) LTD	United Kingdom	598 000 000	4.7%
Chlorides Sum					37.0%
Cyanides					
	ES_3486	ARCELOR ESPAÑA - PLANTA SIDERÚRGICA DE AVILÉS Y GIJÓN	Spain	287 000	67.9%
	IT_16073001	ILVA S.P.A. - ILVA S.P.A. Stabilimento di Taranto	Italy	32 000	7.6%
	FR_067.00538	RHODIA P.I. CHALAMPE	France	16 000	3.8%
	NL_23301	CORUS STAAL BV	Netherlands	15 800	3.7%
	UK_EA-595	BRUNNER MOND (UK) LTD	United Kingdom	8 800	2.1%
Cyanides Sum					85.0%
Fluorides					
	SE_1982-103	Fagersta Stainless AB	Sweden	2 400 000	17.8%
	BE_W047	PRAYON SA	Belgium	1 400 000	10.4%
	FR_061.03685	ATOFINA	France	1 200 000	8.9%
	NO_A33073	Outokumpu Norzink AS	Norway	1 170 000	8.7%
	NL_10079	DU PONT DE NEMOURS NED. BV	Netherlands	1 150 000	8.5%
Fluorides Sum					54.2%

6 Emission Time Series

Comparing 2001 and 2004 emissions as reported in EPER is complicated by a number of observations, already provided above (section 4.2):

- The 2004 EPER reporting cycle involves nine countries that did not participate in the 2001 reporting cycle
- For those countries that participated in both reporting cycles three different groups of facilities could occur:
  - Facilities that have reported emissions in both years
  - Facilities that reported in 2001, but not in 2004
  - Facilities that did not report in 2001 but report in 2004
- Emission reports from facilities that participated in both reporting cycles could be again differentiated into three different groups:
  - Emissions of pollutants reported in both years
  - Emissions of pollutants reported in 2001 but not in 2004
  - Emissions of pollutants reported in 2004, but not in 2001

These facts complicate the time series analyses. In Figure 6-1 examples of the influence of these complications for two air pollutant emissions (CO_2 and Dioxins / Furans) and one water pollutant (Total Organic Carbon) are shown.

For CO_2:

- The total reported emissions in all countries increase significantly from about 1 500 billion kg in 2001 to almost 2 000 billion kg in 2004 (left upper graph in Figure 6-1). The dark blue part of the 2004 column however shows that the larger part of this increase is due to facilities that report in 2004 for the first time.
- A number of facilities that were included in the 2001 reporting cycle, reported CO_2 emissions in 2004, but did not do so in 2001 (light blue part of the 2004 columns). If these emissions are excluded from the analysis, CO_2 emissions seem to go down by about 80 billion kg.
- The light green part of the 2001 columns indicate CO_2 emissions from facilities in 2001 that do not report the same pollutant in 2004. This might be caused by these emissions to have decreased below the threshold for CO_2. This is only a very small part in the case of CO_2.
- The dark green part of the 2001 columns indicate facilities that reported in EPER in 2001, but are not included in the 2004 EPER reporting cycle. These facilities might have either closed down or all emissions occurring from these facilities might have decreased below threshold levels.
- Finally, the red parts of both columns compare the same facilities that reported the specific pollutant in both cycles.

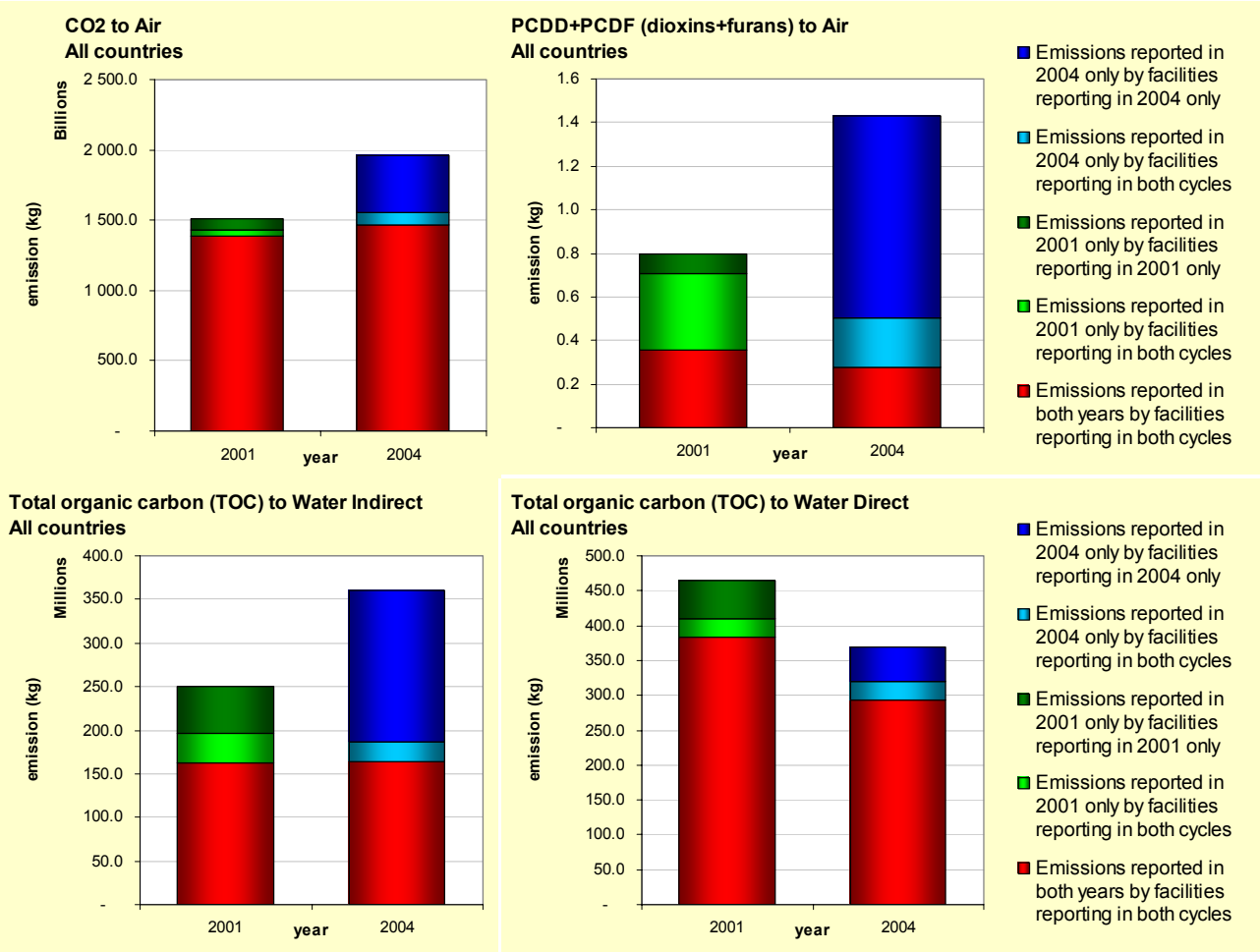


Figure 6-1 Complications in time series of emissions to air for (CO_2 and Dioxins / Furans, top) and indirect and direct emissions to water (total organic carbon, bottom)

The same phenomena are shown for PCDD + PCDF (dioxins and furans) and direct and indirect emissions to water for Total Organic Carbon.

In summary: direct comparisons of total emissions reported in both EPER reporting cycles can be quite tricky. The clearest comparison will be obtained by only including facilities that reported the same pollutant in both cycles (red columns in Figure 6-1). However, this neglects the effects of emissions that are above the emission threshold in one year and below it in the other. Since these threshold effects will influence the totals in opposite directions, one might expect that the aggregated emission comparison is not distorted too much.

Table 6-1 presents an overview of the changes in emissions between 2004 and 2001 for those facilities that were included in both reporting cycles **and** reported emissions for the pollutant in both years (red columns in Figure 6-1). Quite large changes have occurred between both reporting years. For 26 pollutants the change is less than 10% (either an increase or a decrease): 12 for air, 6 for Water Direct and 8 for water indirect (Table 6-2). For 38 pollutants (15 air, 13 water direct and 10 water indirect) an increase of more than 10 % is reported, whereas for 14 pollutants (5 to air, 4 to water direct, 5 for water indirect) decreases of 10 % or more are observed.

Table 6-1 Direct comparison of emissions reported in 2001 and 2004 (pollutants reported by facilities in both years only; i.e. red columns in Figure 6-1)

EmissionType	PollutantGr	Mapname	2001	2004	Change
Air	1	CO2	1 391 265 000 000.00	1 470 564 800 000.00	5.7%
		SOx	4 192 064 000.00	3 633 627 000.00	-13.3%
		CO	2 887 142 000.00	3 081 912 000.00	6.7%
		NOx	2 397 897 000.00	2 398 394 000.00	0.0%
		CH4	1 293 473 000.00	1 086 570 000.00	-16.0%
		NMVOC	479 135 000.00	429 127 000.00	-10.4%
		N2O	132 317 500.00	131 945 900.00	-0.3%
		NH3	53 256 400.00	50 544 700.00	-5.1%
		HFCs	873 697.00	584 272.00	-33.1%
		PFCs	291 437.00	382 390.00	31.2%
		SF6	57 565.20	33 492.20	-41.8%
	2	Zn and compounds	1 402 760.00	947 396.00	-32.5%
		Pb and compounds	478 173.00	470 274.00	-1.7%
		Ni and compounds	391 699.00	247 668.80	-36.8%
		Cr and compounds	125 593.00	105 037.00	-16.4%
		Cu and compounds	80 991.00	90 908.60	12.2%
		As and compounds	20 769.20	19 123.60	-7.9%
		Hg and compounds	18 773.10	19 178.20	2.2%
		Cd and compounds	15 414.30	11 798.20	-23.5%
	3	Dichloromethane (DCM)	3 957 960.00	2 614 760.00	-33.9%
		Dichloroethane-1,2 (DCE)	2 362 300.00	1 795 800.00	-24.0%
		Trichloroethylene (TRI)	969 410.00	726 120.00	-25.1%
		Tetrachloroethylene (PER)	308 770.00	286 370.00	-7.3%
		Trichloromethane	140 891.00	213 470.00	51.5%
		Tetrachloromethane (TCM)	94 331.00	46 290.00	-50.9%
		PCDD+PCDF (dioxins+furans)	0.35	0.27	-22.5%
	4	Benzene	3 150 075.00	3 301 570.00	4.8%
		Polycyclic Aromatic Hydrocarbons	139 170.20	157 559.10	13.2%
	5	PM10	134 299 302.00	145 262 300.00	8.2%
		Chlorine and inorganic compounds	46 238 900.00	37 013 000.00	-20.0%
		Fluorine and inorganic compounds	8 385 880.00	7 869 190.00	-6.2%
		HCN	120 391.00	160 668.00	33.5%
Water Direct	1	Total - Nitrogen	52 923 100.00	45 271 500.00	-14.5%
		Total - Phosphorus	4 430 910.00	3 898 881.00	-12.0%
	2	Cr and compounds	884 773.80	718 100.40	-18.8%
		Zn and compounds	681 095.30	765 003.30	12.3%
		Cu and compounds	145 984.40	123 233.50	-15.6%
		Ni and compounds	121 226.30	93 676.40	-22.7%
		Pb and compounds	69 556.70	75 342.40	8.3%
		As and compounds	16 967.09	16 864.36	-0.6%
		Cd and compounds	6 902.45	4 456.14	-35.4%
		Hg and compounds	1 455.64	2 370.44	62.8%
	3	Halogenated organic compounds	2 902 020.00	2 857 720.00	-1.5%
		Dichloromethane (DCM)	95 611.40	42 558.10	-55.5%
		Dichloroethane-1,2 (DCE)	14 546.10	4 591.70	-68.4%
		Hexachlorobutadiene (HCBD)	16.97	40.52	138.8%
		Hexachlorocyclohexane(HCH)	20.60	18.70	-9.2%
		Hexachlorobenzene (HCB)	7.88	3.41	-56.7%
	4	Total organic carbon (TOC)	383 886 640.00	294 136 908.00	-23.4%
		Phenols	268 409.96	226 024.78	-15.8%
		Benzene, toluene, ethylbenzene, xylenes	92 424.00	66 239.70	-28.3%
		Polycyclic Aromatic Hydrocarbons	12 847.40	9 372.40	-27.0%
	5	Chlorides	7 934 592 000.00	8 088 321 000.00	1.9%
		Fluorides	9 889 770.00	10 316 435.00	4.3%
		Cyanides	222 010.30	401 740.90	81.0%
Water Indirect	1	Total - Nitrogen	19 870 660.00	17 192 197.00	-13.5%
		Total - Phosphorus	3 636 102.00	3 604 162.00	-0.9%
	2	Cr and compounds	162 508.00	165 384.00	1.8%
		Zn and compounds	95 966.60	80 428.62	-16.2%
		Ni and compounds	15 026.80	11 867.37	-21.0%
		Cu and compounds	14 826.80	11 334.00	-23.6%
		Pb and compounds	13 181.60	4 928.57	-62.6%
		As and compounds	888.54	947.72	6.7%
		Cd and compounds	1 349.96	204.87	-84.8%
		Hg and compounds	79.06	167.23	111.5%
	3	Halogenated organic compounds	145 030.00	138 980.00	-4.2%
		Dichloromethane (DCM)	4 064.80	13 494.64	232.0%
		Dichloroethane-1,2 (DCE)	4 065.70	1 576.00	-61.2%
		Chloroalkanes (C10-13)	16.70	14.40	-13.8%
	4	Total organic carbon (TOC)	163 051 950.00	163 812 670.00	0.5%
		Phenols	614 574.80	770 919.30	25.4%
		Benzene, toluene, ethylbenzene, xylenes	158 594.00	222 596.00	40.4%
		Brominated diphenylether	1 400.00	270.00	-80.7%
		Polycyclic Aromatic Hydrocarbons	359.00	1 027.60	186.2%
		Organotin - compounds	135.00	118.00	-12.6%
	5	Chlorides	171 206 400.00	174 180 000.00	1.7%
		Fluorides	293 320.00	270 790.00	-7.7%
		Cyanides	77 766.60	82 482.80	6.1%

Table 6-2 Number of pollutants with changes in the ranges as indicated

Change between:	Air	Water Direct	Water indirect	Total
-100% and -50%	1	3	4	8
-50% and -25%	6	3	0	9
-25% and -10%	8	7	6	21
-10% and 10%	12	6	8	26
10% and 25%	2	1	0	3
25% and 50%	2	0	2	4
50% and 100%	1	2	0	3
more than 100%	0	1	3	4
Total number of pollutants	**32**	**23**	**23**	**78**

7 Emission Threshold Analysis

7.1 Background

The EPER Review 2001 included a first attempt at an analysis of the threshold levels set in the EPER Decision. The levels were set such that about 90% of the emissions in a certain Annex A3 activity are included in the EPER data on individual facilities. This section includes an approach for a more detailed analysis.

7.2 Method

7.2.1 Introduction

The difficulty in assessing whether or not 90 % of the emissions from a certain EPER Annex A3 source category of the EPER Decision are included in the EPER report is that by definition we do not know what emissions are below the emission thresholds and hence are not reported. Some information could probably be derived from a comparison with the national total emissions by sector as reported to the NEC Directive, the LRTAP Convention, the EU Monitoring Mechanism and the UNFCCC Convention. This section tries to assess the question above using the emissions reported in the second EPER reporting cycle.
Since no information on unreported emissions can be used, the only approach is a statistical one. The idea is to estimate the distribution function of emissions of a certain pollutant within all EPER facilities or a subset thereof (one or more Annex A3 source categories of the EPER Decision). If such a distribution function is known, the total emissions for the pollutant can be estimated by integrating this distribution function. In principle several distribution functions could be used. Table 7-1 lists some possibilities and the associated advantages and disadvantages.

Table 7-1 Possible distribution functions for emissions of a pollutant from EPER facilities

Distribution function	Advantages	Disadvantages
Normal	Simple mathematics Default in almost all simple statistics	At higher values of the standard deviation negative values become probable
Log-normal	Negative values are impossible	No analytical integration available Difficult to work with the cumulative distribution
Weibull	Can mimic almost any distribution function Applicable to any monotonically increasing data set Can be analytically integrated	Not very commonly used

The Weibull distribution function is widely used due to its versatility [Ref 5]. It can be used with data that would "increase monotonically" when x goes to infinity. A sorted list of emissions from individual facilities is such a monotonically increasing data set. The advantage of using the Weibull distribution is the fact that inversion can be performed analytically, allowing an analytical curve fitting procedure. This is not the

case for normal or log-normal distributions. We therefore use the Weibull distribution function.

7.2.2 Procedure

For a specific pollutant all facility emissions are sorted from largest to smallest and the cumulative emissions are calculated as a function of the number of facilities included, producing an observed cumulative frequency distribution curve for the emissions over all facilities included in the EPER database (squares in the graph below).

Using the shareware software tool "CurveExpert 1.3" [Ref 6], the data points are then fitted with a Weibull probability distribution. Since this function is a cumulative function, the limit value of this distribution for $N \rightarrow \infty$ is assumed to represent the total emission for all facilities.

In short: the reported emissions are fitted with a (cumulative) Weibull distribution function. This fitted distribution function is then extrapolated to infinity to include all smaller emissions. This will lead to the "correct" total emission of all facilities if

- All facilities with emissions above a certain threshold are included in the reported emissions
- The cumulative distribution can be approximated well by the cumulative Weibull function
- The cumulative Weibull distribution still holds for the emissions below threshold

7.2.3 Curve fitting

The cumulative Weibull function can be expressed as:

$$y = a \times (1 - e^{-b*x^c})$$

with the variables:

- x: a number of facilities
- y: the total emission in the x largest facilities

and the parameters:

- a: the total emission in all facilities
- b and c: the shape parameters of the Weibull function

Figure 7-1 presents some examples of the curve fits for selected emissions to air (CO_2, NO_x, and NH_3) and water (Total Nitrogen) for the years 2001 and 2004. In each of the graphs, the values of the parameters are given in the legend to the graph. The total emissions (parameter *a*) for both 2001 and 2004 are represented by the dashed lines. Please note that the x-axis scale is logarithmic.

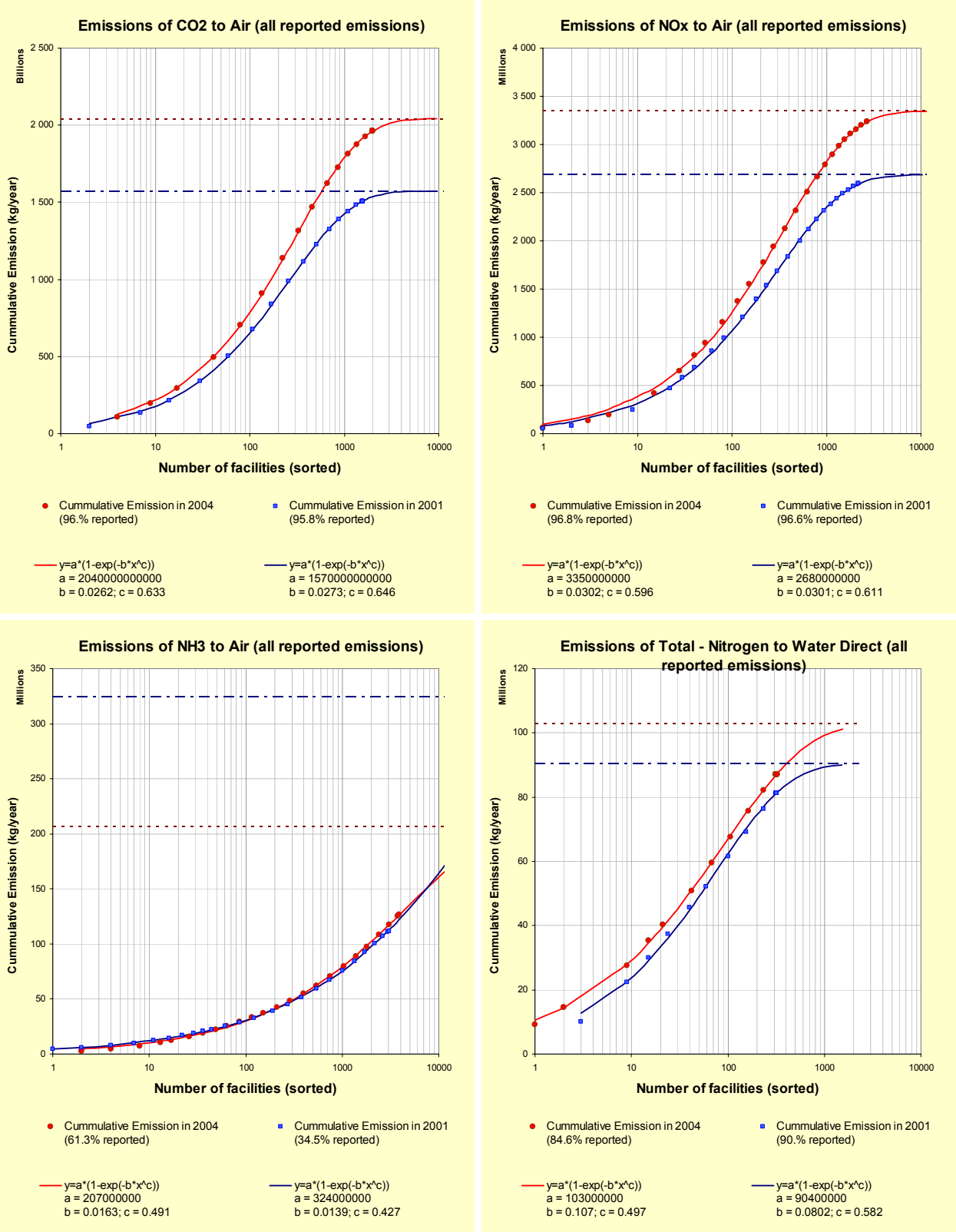


Figure 7-1 Curve fitting: cumulative Weibull function fitted to cumulative emissions (kg/year) of CO_2, NO_x and NH_3 to air and total discharge of Total Nitrogen to water

The curve fitting exercise shows that:

- For all pollutants shown in Figure 7-1 the curve fit is very good.
- For CO_2 and NO_x the values of the shape parameters (b and c) are very similar in both reporting years. For NH_3 and Total Nitrogen the values are more different, but still reasonably similar.
- The similarity between the 2001 and 2004 curve fits for Total Nitrogen discharges to water appears to be the worst one. This could be caused by some exceptionally high emission records in the database.

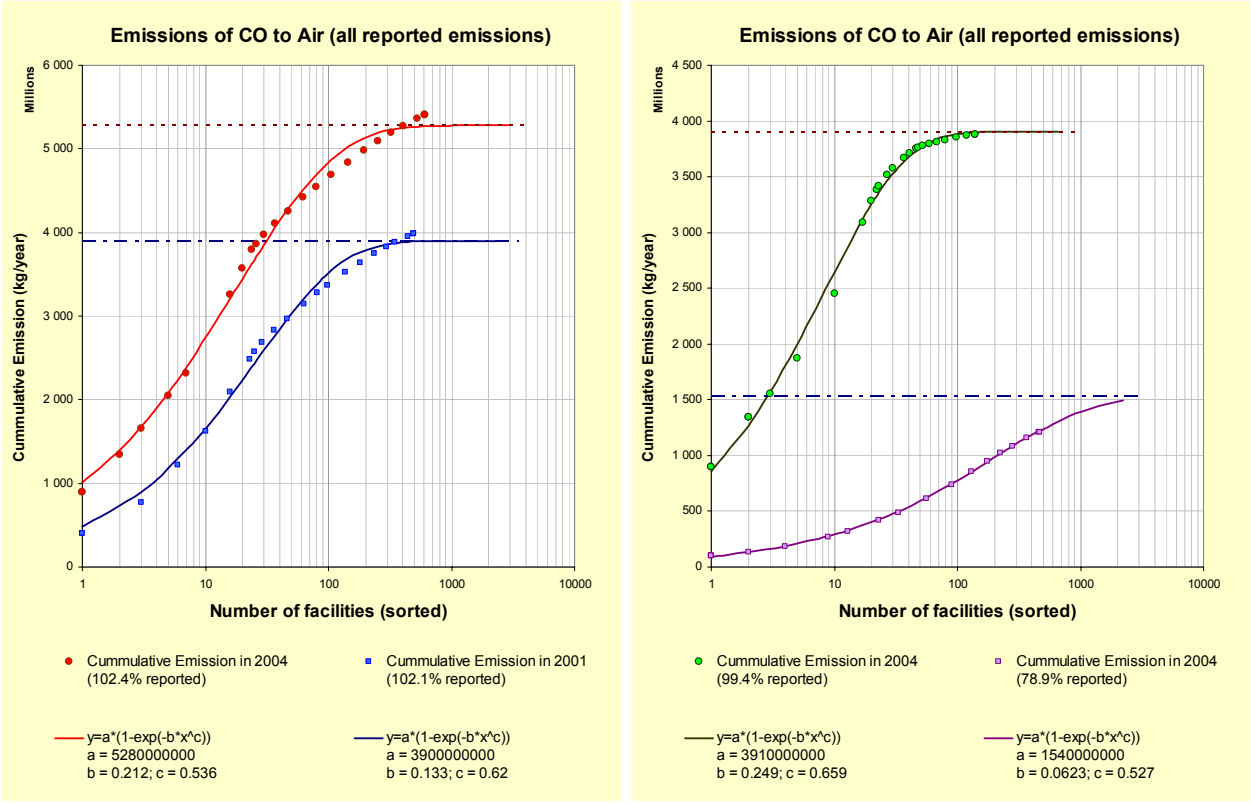


Figure 7-2 Curve fitting: cumulative Weibull function fitted to cumulative emissions of CO to air for all facilities in 2004 and 2001 (left) and for the metal industry and other activities in 2004 (right).

In some cases, however, the above approach might be too simple. A first example of this is presented in Figure 7-2 for the emissions of CO to air. In this case the cumulative Weibull distribution does not fit well to the reported emissions distribution in 2001 and 2004 (Figure 7-2, left graph): the Weibull distribution reaches its maximum with a few hundred facilities, whereas the reported data still continue to include significant emission amounts when more and more facilities are included.

A possible explanation of this phenomenon is presented for 2004 in the right graph of Figure 7-2. When we fit a cumulative Weibull distribution function to the CO emissions from the major contributing activity "Metal Industry" and all other facilities separately, the goodness of fit seems to be quite reasonable in both subgroups[7]. The two Weibull

[7] For this analysis, one facility in Portugal (Refinaria do Porto) was excluded, since it emitted more than 20 % of all non-metal industry CO emissions in the dataset. This Mineral Oil and Gas Refinery also emitted more than 85 % of the total CO emissions from this activity (143 facilities, see Table 4-3)

functions and the reported emissions, however, behave quite differently. The CO emissions of about 20 to 30 of the about 115 Metal Industry facilities already contribute to more than 90 % of the CO emissions in this activity. On the other hand, the CO emissions from about 500 facilities in the 2004 dataset extrapolate to a value that suggests that almost 80 % of the emissions are included.

A second example is provided in Figure 7-3 where the analyses of the EPER reported NH_3 emissions are differentiated between the pig and poultry facilities and all other. In this example, the analysis suggests that indeed more than 90 % of the NH_3 emissions from other activities reporting NH_3 than Pig and Poultry are included in the EPER report. The coverage of the Pig and Poultry farms however seems to be in the order of 40 to 50 % of the extrapolated emissions for all facilties.

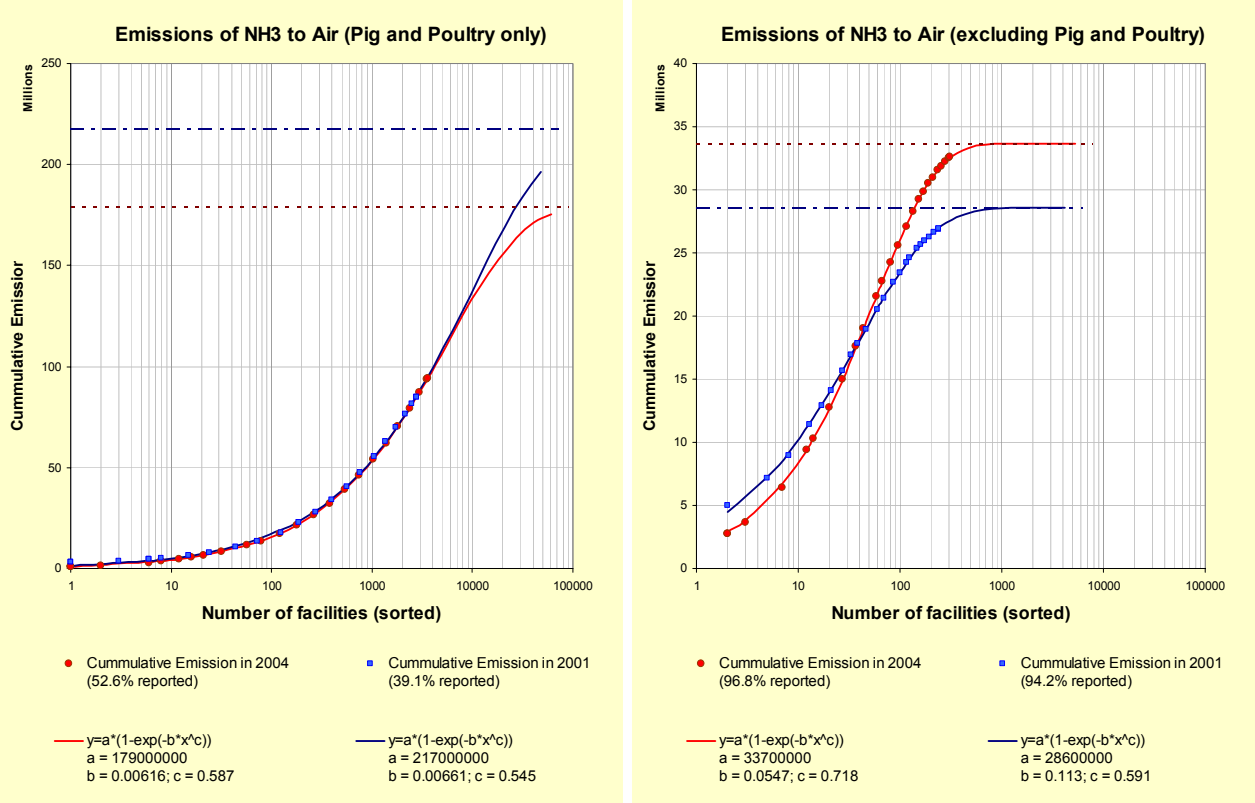


Figure 7-3 Curve fitting: cumulative Weibull function fitted to cumulative emissions of NH_3 to air for Pig and Poultry facilities only (left) and for all other Annexs 3 activities (right)

A closer look at the Pig and Poultry facilities only, suggests that to include about 90 % of the NH_3 emissions 10 000 to 20 000 facilities should be included in EPER instead of the 2793 in 2001 or the 3576 in 2004. The estimated number of pig and poultry farms falling under the IPPC Directive is about 16,000 in 2004.

We can conclude that in cases where the emissions of a certain pollutant are dominated by one activity but significant contributions from other activities occur, the curve fitting procedure, performed on all activities together, might lead to invalid or confusing results. In such cases however, running the analyses for the dominant activity and the other activities separately might still lead to understandable and valid results.

7.3 Results

Table 7-2 presents the results of the threshold analysis as described in the previous section. The following is observed:

- In some cases the estimated coverage of EPER appears to be above 100 %. This is never more than a few percent. In practice this is obviously not possible, so we conclude that this is an indication of the uncertainties in the method.
- Over all, it appears that for the majority of pollutants EPER seems to include 90 % or more of the emissions caused by the activities included in Annex A3 of the EPER Decision. So generally, the values of the thresholds seem to be set at the right level to ensure sufficient coverage in EPER.
- For air emissions the threshold values ensure that more than 90 % of the emissions are included in the EPER reports for all but two pollutants:
  - the emissions of NH_3 are only covered for about 60 % by EPER facilities in 2004 (35 % in 2001)
  - the emissions of Arsenic are covered for about 87 % by EPER facilities

  The higher coverage of NH_3 emissions in 2004 is an indication of a better reporting in the second reporting cycle. Nevertheless the coverage is significantly below 90 %. Extrapolation of the Weibull curve in Figure 7-1 for NH_3 suggests that in the order of 50 000 facilities in Europe should be included to reach the 90 % coverage for this pollutant. This would mean that about 80 % of all facilities in EPER would be included because of their contribution to the NH_3 emissions.

  For Arsenic, the coverage is close to 90 %. Given the intrinsic uncertainties in this approach, we conclude that the distance to the target of 90 % coverage is close enough to not proposing a change to the threshold for this pollutant. Furthermore, the 2004 data set contains one Arsenic emission that is by far the largest one in the database (national ID SK_57002803, U.S.Steel s.r.o., Slovakia) reporting more than 36% of all Arsenic emissions in the 2004 data set. A Weibull analysis neglecting this one source shows coverage of 92 % in 2004.
- The picture for direct emissions to water is similar. For most pollutants the coverage of EPER seems to be sufficient. Only for the “bulk pollutants” total nitrogen and total phosphorous the coverage is slightly below the 90 %. The same is valid for organotin compounds.

Table 7-2 Threshold analysis results (emissions in kg); Percentages in red flag values below 90 %

		EPER reported emissions		Extrapolated totals		EPER coverage	
Pollutant	Air/water	2001	2004	2001	2004	2001	2004
CH4	Air	1 585 400 000	1 681 121 600	1 670 000 000	1 780 000 000	95%	94%
CO	Air	3 981 689 400	5 405 420 000	3 900 000 000	5 280 000 000	102%	102%
CO2	Air	1 508 283 000 000	1 961 865 410 000	1 570 000 000 000	2 040 000 000 000	96%	96%
HFCs	Air	979 149	1 386 954	964 000	1 380 000	102%	101%
N2O	Air	143 706 400	171 504 100	141 000 000	167 000 000	102%	103%
NH3	Air	111 786 000	126 798 400	324 000 000	207 000 000	**35%**	**61%**
of which NH3 (Pig and Poultry only)	Air	84 856 800	94 195 900	217 000 000	179 000 000	**39%**	**53%**
and NH3 (other activities)	Air	26 929 200	32 602 500	28 600 000	33 700 000	94%	97%
NMVOC	Air	578 254 000	556 550 000	646 000 000	599 000 000	**89%**	93%
NOx	Air	2 593 871 360	3 241 300 000	2 680 000 000	3 350 000 000	97%	97%
PFCs	Air	396 489	689 827	443 000	762 000	**89%**	91%
SF6	Air	63 045	76 994	63 900	77 300	99%	100%
SOx	Air	4 601 243 000	5 125 339 000	4 590 000 000	5 180 000 000	100%	99%
As and compounds	Air	31 273	82 592	32 200	94 300	97%	**88%**
Cr and compounds	Air	168 351	164 632	183 000	173 000	92%	95%
Cu and compounds	Air	137 193	159 860	142 000	171 000	96%	94%
Hg and compounds	Air	24 423	32 280	26 900	35 200	91%	92%
Ni and compounds	Air	475 497	411 889	474 000	417 000	100%	99%
Pb and compounds	Air	625 386	780 399	630 000	806 000	99%	97%
Zn and compounds	Air	1 765 242	1 377 328	1 800 000	1 400 000	98%	99%
Dichloroethane-1,2 (DCE)	Air	3 077 560	2 207 920	3 070 000	2 180 000	100%	101%
PCDD+PCDF (dioxins+furans)	Air	0.80	1.43	0.82	1.52	98%	94%
Tetrachloroethylene (PER)	Air	754 850	1 189 720	755 000	1 210 000	100%	98%
Tetrachloromethane (TCM)	Air	109 054	55 304	117 000	54 300	93%	102%
Trichloroethylene (TRI)	Air	2 007 030	1 939 960	2 120 000	2 020 000	95%	96%
Trichloromethane	Air	237 134	277 659	251 000	276 000	94%	101%
Benzene	Air	3 966 515	4 965 350	3 970 000	4 980 000	100%	100%
Polycyclic Aromatic Hydrocarbons	Air	211 979	543 779	211 000	540 000	100%	101%
Chlorine and inorganic compounds	Air	59 248 200	48 362 200	62 300 000	49 700 000	95%	97%
Fluorine and inorganic compounds	Air	12 296 410	13 854 350	12 400 000	14 100 000	99%	99%
HCN	Air	137 068	555 682	132 000	556 000	104%	100%
PM10	Air	169 798 255	242 694 700	184 000 000	268 000 000	92%	91%
Total - Nitrogen	Water Direct	81 307 500	87 158 140	90 400 000	103 000 000	**90%**	**85%**
Total - Phosphorus	Water Direct	7 041 368	6 091 924	7 930 000	7 630 000	**89%**	**80%**
As and compounds	Water Direct	24 335	32 653	25 400	32 900	96%	99%
Cd and compounds	Water Direct	13 466	9 502	14 300	10 200	94%	93%
Cr and compounds	Water Direct	997 667	759 903	1 020 000	798 000	98%	95%
Cu and compounds	Water Direct	204 442	178 594	216 000	184 000	94%	97%
Hg and compounds	Water Direct	2 156	4 815	2 150	4 800	100%	100%
Ni and compounds	Water Direct	167 649	174 576	173 000	180 000	97%	97%
Pb and compounds	Water Direct	113 180	128 851	114 000	128 000	99%	101%
Zn and compounds	Water Direct	1 003 028	1 195 077	1 010 000	1 200 000	99%	100%
Dichloroethane-1,2 (DCE)	Water Direct	18 798	16 122	18 800	16 700	100%	96%
Dichloromethane (DCM)	Water Direct	100 471	48 835	101 000	48 200	99%	101%
Halogenated organic compounds	Water Direct	3 569 851	3 527 441	3 580 000	3 540 000	100%	100%
Hexachlorobutadiene (HCBD)	Water Direct	28	59	29	63	96%	95%
Benzene, toluene, ethylbenzene, xylenes	Water Direct	147 199	92 605	156 000	93 700	94%	99%
Organotin - compounds	Water Direct	2 810	439	3 940	590	**71%**	**74%**
Phenols	Water Direct	369 702	523 113	373 000	525 000	99%	100%
Polycyclic Aromatic Hydrocarbons	Water Direct	21 617	25 322	21 500	25 200	100%	100%
Chlorides	Water Direct	16 976 342 000	12 765 493 000	17 000 000 000	12 700 000 000	100%	101%
Cyanides	Water Direct	304 946	422 832	307 000	428 000	99%	99%
Fluorides	Water Direct	11 147 520	13 502 885	11 100 000	13 300 000	100%	102%

7.4 Discussion and Conclusions

This chapter provides a further elaboration of the preliminary threshold analysis as presented in the first EPER review report by applying a more rigorous statistical analysis. It is shown that the so-called Weibull probability distribution function fits well with the EPER data, although some peculiarities need further analysis and thought.

This observation allows for a more reliable conclusion on the extent to which the pollutant dependent threshold as presently set in the EPER Decision indeed ensures that about 90 % of the emissions of all IPPC facilities in Europe are included in the EPER reports.

The statistical analysis as described in this chapter assumes that the data are a representative sample of all emissions for each pollutant above the threshold value. Even in the situation that the database is not complete and a number of facilities that should have reported emissions have not done so the analysis will still be valid, provided that these missing data are randomly distributed in terms of size. Although in such a case the total values of the emissions might be underestimated, the conclusion of the coverage of EPER with respect to the total emissions (as expressed in a percentage) will still be correct. Chapter 8 will compare the absolute levels of the emissions reported in EPER with independent data as compiled in national inventories for selected pollutants.
In general it is concluded that the threshold values as set in the EPER Decision indeed ensure that 90 % of the emissions in each activity are included in the EPER reports.

The only exception is observed for emissions to air of NH_3, where EPER seems to cover about half of the emissions from the full population of pig and poultry farms (see the differentisated analysis in Figure 7-3). To raise this coverage to about 90 %, the number of facilities reporting NH_3 to be included should be about 10 000 to 20 000 as estimated from the extrapolation of the Weibull distribution function. This number would also include facilities below the capacity thresholds of the IPPC Directive[8]. This analysis however should be interpreted with caution, since some countries did not report any pig and poultry farms and some report only a very limited number of such facilities. This could imply that the facilities that did not report are not necessarily the smallest ones. The extrapolated total emissions from the Pig and Poultry farms would be in the order of magnitude of 200 ktonnes in 2004. The NEC Baseline estimates the total emissions from this activity 426 ktonnes (including Bulgaria and Romania, but excluding Norway). Part of the difference could be explained by the fact that some countries did not report any emisisons from Pig and Poultry facilities in EPER (Luxembourg, Hungary and Norway). In addition only a few reports on emissions from pig and poultry farms are reported by Austria, Greece, Italy and Poland. Further analyses are needed to assess whether these facts can fully explain these differences.

The analysis also shows that the coverage of the direct emissions to water generally complies with the 90 % inclusion criterion. In the case of Total Nitrogen, Total Phosphorous and Organotin Compounds, the coverage is lower. In each of these cases the number of facilities reporting the pollutant should be increased by about a factor of two to reach the intended coverage. But, given the shape of the Weibull function one would expect that this decrease of threshold values could be a factor of 2 or even less.

[8] The estimated number of pig and poultry farms falling under the IPPC Directive is about 16,000

8 Comparing EPER data for reporting year 2004 with national totals for selected greenhouse gases and air pollutants

8.1 Introduction[9]

This chapter provides an analysis that compares the emissions to air as reported in the second reporting cycle of EPER with data as reported under other international air emission reporting requirements.

8.2 Sources of data for comparison with EPER

Countries report emissions data separately under the NEC Directive [Ref 8], CLRTAP [Ref 9] and UNFCCC [Ref 10], EU Monitoring Mechanism [Ref 10]. There are therefore three data sources available that can be used to place EPER data into context. The reporting formats are different for each reporting obligation. The reporting obligations and data for comparisons are listed below:

Table 8-1 Overview of relevant national air emission reporting obligations

Organisation	Legal obligation	Reporting requirements	Reporting format	Countries reporting	Most recent report
CLRTAP	1979 Convention on Long-range Transboundary Air Pollution	Emission of SO_x (as SO_2), NO_x (as NO_2), NH_3, NMVOCs, CO, heavy metals (HMs), persistent organic pollutants (POPs), and particulate matter (PM)	Nomenclature for reporting – NFR	EU 25 + Norway	EEA (2006): Annual European Community LRTAP Convention Emission Inventory 1990-2004, EEA Technical report Nr 8 / 2006
UNFCCC	1992 United Nations Framework Convention on Climate Change	Emission of CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NO_x, CO, NMVOC, SO_2	Common reporting format - CRF	EU25 except Malta + Norway	National submissions to UNFCCC in 2006, including for the EU The European Community's initial report under the Kyoto Protocol (2006)
EC	Council Decision 280/2004/EC concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol.	Emission of CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NO_x, CO, NMVOC, SO_2	Common reporting format - CRF	EU 25	EEA (2006): Annual European Community greenhouse gas inventory 1990-2004 and inventory report 2006, EEA Technical report No. 6/2006.

[9] This chapter was prepared by the European Environment Agency (EEA) and its European Topic Centre for Air and Climate Change (ETC/ACC). The lead author was Tinus Pulles (ETC). Assisting author was Martin Adams (ETC). The EEA project manager was Eva Goossens.

The comparison is based on reported air emission data for 2004 - being the nominal reporting year for the second EPER reporting cycle (published on the internet in November 2006). Data on national totals are based on the 2006 submissions reported for the year 2004 under

- EU Monitoring Mechanism for EU25 greenhouse gases CO_2, CH_4 and N_2O
- UNFCCC for Norway greenhouse gases CO2, CH4 and N2O and
- CLRTAP for the air pollutants NOx, SO2, CO, NMVOC and NH_3.

The comparisons were carried out using the combined gap filled data set developed by the ETC-ACC for EEA assessment purposes[10].

This chapter also includes a comparison of CO_2 emissions included in EPER with the emissions reported under the European Emission Trading Scheme (ETS). The data for this comparison are downloaded from the ETS Community Independent Transaction Log (CITL) of the European Commission as of 10 November 2006 ETS [Ref 12].

8.3 Linking EPER data and national reports in NFR and CRF

To enable a comparison of the EPER data with national emission inventories, the source categories used in the national emissions reporting and the EPER Decision Annex A3 activities need to be linked. This is not trivial since both systems use a different philosophy to identify the entries in the system. The national emission inventories use source categories defined by the reporting formats of the conventions, whereas the EPER system identifies individual facilities. Each individual facility might therefore include several processes or installations that are reported in national inventories within different source categories.

Table 8-2 shows the relationships between the sector classifications of EPER (EPER Decision Annex A3) and the CRF/NFR of the UNFCCC/CLRTAP that have been used. Five main sector categories are addressed: energy industries, industry, agriculture, waste and other.

Due to this complicated situation, the comparison can only be performed at a rather highly aggregated level. Table 8-2 shows the aggregation of sectors used by EEA for air emission assessments. Since the EPER combustion facilities cannot be classified according to the same economic sectors as in the EEA dataset, a more aggregated sector has been used in this report. The resulting “Industrial Stationary Combustion” sector combines two EEA sectors (energy industries, manufacturing industries) into one. The other EEA sectors “Other transport”, “Road transport” and “Other (non energy)” are not used in this chapter.

[10] These data are available at http://dataservice.eea.europa.eu/dataservice/metadetails.asp?id=983

Table 8-2 Aggregation of sectors used by EEA for air emission assessments and correspondence to EPER classification

EEA Sector	**Description**	**NFR and CRF sectors**	**For comparison with EPER**
Energy Industries	All combustion processes in the energy industries (power plants, refineries and other energy transformations).	1.A.1	Industrial Stationary Combustion
Industry (Energy)	Combustion in industry	1.A.2	Industrial Stationary Combustion
Other Transport	Emission from other transport modes	1.A.3, except 1.A.3.b ([A])	
Road Transport	All road transport emissions, both tail pipe, brake and tyre wear and road abrasion	1.A.3.b	
Other (Energy)	Non-industrial combustion	1.A.4, 1.A.5 ([B])	
Fugitive Emissions	Fugitive emissions from the energy sector (as above and including fossil fuel production and pipeline transports)	1.B	Industrial Stationary Combustion
Industry (Processes)	Emission from industrial processes	2	Industrial Processes
Other (Non Energy)	All other sources, not included in the above	3, 7	
Agriculture	All non-combustion emissions from agriculture	4 ([C])	Agriculture
Waste	Incineration and land filling	6	Waste

([A]) In NFR this sector includes emissions from all the NFR 1.A.3 sectors (except 1.A.3.b) and 1.A.4.b.ii, 1.A.4.c, 1.A.4.c.ii, 1.A.4.c.iii and 1.A.5.b. In CRF it only includes all CRF 1.A.3 sectors (except 1.A.3.b).

([B]) In NFR this sector includes emissions from NFR sectors 1A4a, 1A4b, 1A4b(i), 1A4c(i) and 1A5a. In CRF it only includes CRF sectors 1.A.4 and 1.A.5.

([C]) In NFR the Agriculture sector includes NFR sector 5B. In CRF it only includes CRF sector 4.

Table 8-3 presents the classification of the detailed Annex A3 source categories of the EPER Decision to the aggregated sectors used for the comparison. Since for EPER, industrial facilities emissions from combustion processes and from industrial processes are combined into one emission report in many cases, (which is then attributed within EPER to either the large combustion plants or a specific industrial process) we define an additional aggregate called “Industry” that consists of the combination of Industrial Stationary Combustion and Industrial Processes.

Table 8-3 Aggregation used to compare EPER with National Inventory data

EPER classification	For comparison with national inventories
1.1 Combustion installations > 50 MW	Industrial Stationary Combustion
1.2 Mineral oil and gas refineries	Industrial Stationary Combustion
1.3 Coke ovens	Industrial Stationary Combustion
1.4 Coal gasification and liquefaction plants	Industrial Stationary Combustion
2.1/2.2/2.3/2.4/2.5/2.6 Metal industry and metal or roasting or sintering installations; Installations for the production of ferrous and non-ferrous metals	Industrial Processes
3.1/3.3/3.4/3.5 Installations for the production of cement clinker (>500t/d), lime (>50t/d), glass (>20t/d), mineral substances (>20t/d) or ceramic products (>75t/d)	Industrial Processes
4.1 Basic organic chemicals	Industrial Processes
4.2/4.3 Basic inorganic chemicals or fertilisers	Industrial Processes
4.4/4.6 Biocides and explosives	Industrial Processes
4.5 Pharmaceutical products	Industrial Processes
5.1/5.2 Installations for the disposal or recovery of hazardous waste (>10t/d) or municipal waste (>3t/h)	Waste
5.3/5.4 Installations for the disposal of non-hazardous waste (>50t/d) and landfills (>10t/d)	Waste
6.1 Industrial plants for pulp from timber or other fibrous materials and paper or board production (>20t/d)	Industrial Processes
6.2 Plants for the pre-treatment of fibres or textiles (>10t/d)	Industrial Processes
6.3 Plants for tanning of hides and skins (>12t/d)	Industrial Processes
6.4 Slaughterhouses (>50t/d), plants for the production of milk (>200t/d), other animal raw materials (>75t/d) or vegetable raw materials (>300t/d)	Industrial Processes
6.5 Installations for the disposal or recycling of animal carcasses and animal waste (>10t/d)	Waste
6.6 Installations for poultry (>40000), pigs (>2000) or sows (>750)	Agriculture
6.7 Installations for surface treatment or products using organic solvents (>200t/y)	Industrial Processes
6.8 Installations for the production of carbon or graphite	Industrial processes

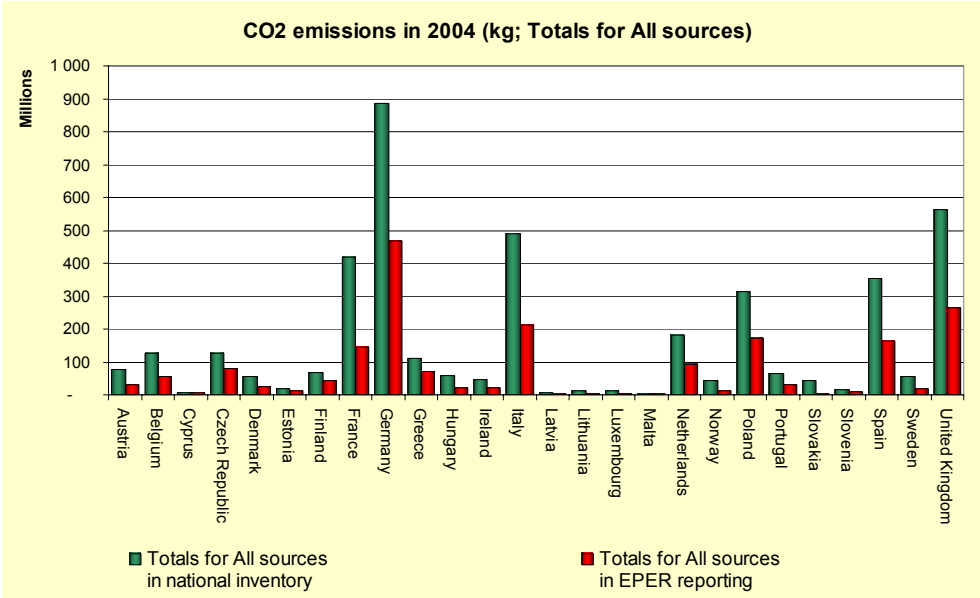
In the following section, emissions of a number of air pollutants as reported both in national emission inventories for 2004 and in the EPER 2004 reports are used to provide an estimate of the coverage of the EPER.

8.4 Assessment of completeness of the EPER data at EC level

8.4.1 CO_2 emissions

8.4.1.1 Comparison of EPER with UNFCCC and EU Monitoring Mechanism data

Figure 8-1 shows the comparison of CO_2 emissions for all sources and all facilities included in the national inventories and the EPER reports respectively. For all countries included (i.e. EU25 & Norway) the total percentage of CO_2 emissions accounted for in the EPER reporting is 48 % of the emissions as reported to UNFCCC in the national inventories. For individual countries the total percentage of CO_2 emissions accounted for is on average 45% (minimum 6 %, maximum 79 %, standard deviation 10 %).



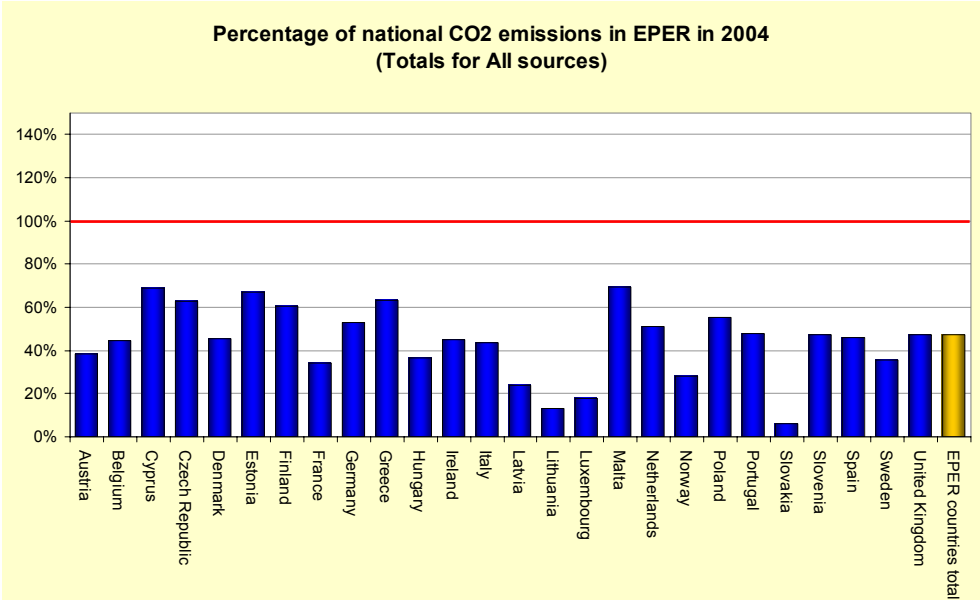


Figure 8-1 Comparison between national total emissions of CO_2 as reported to EU MM / UNFCCC and the total CO_2 emissions included in EPER for 2004

Since the national inventories include emissions from both below threshold facilities and diffuse sources, one would expect that EPER indeed covers only part of the national total emissions of CO_2 (as for other pollutants). For example, EPER does not include emissions from transport and residential combustion (heating, cooking etc.), two important sources of CO_2. In order to correct for this issue a comparison was made concentrating on Industrial Stationary Combustion only, a sector for which better agreement between the national inventory data for this sector and the data in EPER could be expected because the sector will include mainly large combustion facilities of which data should be included in both EPER and national inventories. Figure 8-2 shows this comparison for CO_2 emissions. For these sources, EPER includes about 65 % of all CO_2 emissions reported in national inventories. For individual countries the averaged value is 57 % (minimum 7 %, maximum 92 %, standard deviation 24 %).

In many cases, EPER reports for industrial facilities include both combustion and process emissions, and so the separation between combustion and process activities in EPER will not necessarily be consistent with the split between the combustion and industrial processes source categories in the national inventories. Figure 8-3 therefore presents the comparison for all industry. Using this approach EPER includes 79 % of the national total CO_2 emissions from industry for all countries. For individual countries the emissions accounted for is subsequently 72 % (minimum 8 %, maximum 100 %, standard deviation 21 %).

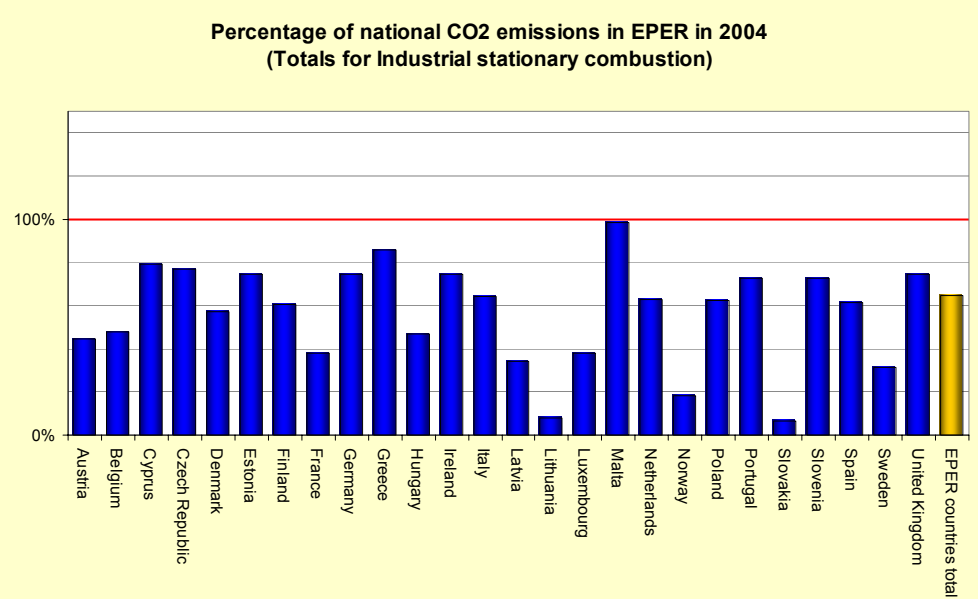


Figure 8-2 Comparison between national emissions of CO_2 from industrial stationary combustion as reported to EU MM / UNFCCC and the CO_2 emissions included in EPER for 2004 for large combustion facilities

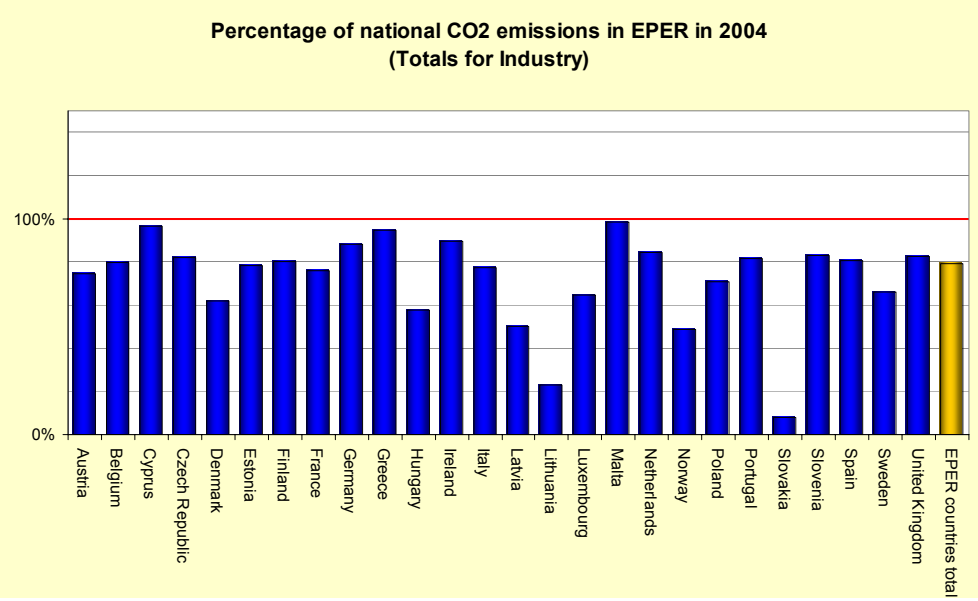


Figure 8-3 Comparison between national emissions of CO_2 from all industry as reported to EU MM / UNFCCC and the CO_2 emissions included in EPER for 2004 for all industrial activities

The results shown in Figure 8-1, Figure 8-2 and Figure 8-3 show that performing the analysis for relevant source categories and Annex A3 source categories is complicated by differences in source classifications used in EPER compared with national inventories. However, a careful aggregation can be used to make the comparison between these two emission reporting obligations possible.

When aggregating to all industrial sources, there is on average still 21 % of the industrial CO_2 emissions reported in national inventories which are not covered in EPER. There can be three different reasons for this:

- A certain fraction of the facilities are below the EPER reporting thresholds (emission threshold in Annex A1 and capacity threshold in Annex A3 of the EPER Decision) and therefore do not need to be reported
- The national emission inventory is not consistent with the facility data as collected in the framework of the EPER reporting; this might be caused by
  - differences in the source stratification as used in EPER ("main EPER Decision Annex A3 activity") and national inventories ("source categories")
  - the different data sources: national greenhouse gas inventories are typically compiled on the basis of national fuel statistics, whereas EPER data are based on facility reports
- The EPER reports, especially for the first time reporting countries, might be incomplete and a number of larger facilities included in the national inventory might not be included in the EPER reports.

Based on the threshold analysis performed in chapter 7, one would expect that the first explanation could cover in the order of 5 to 10 % of the gap between the two reports. For most countries the second explanation could possibly add another 10 % to the gap. For some countries however (Slovakia: 8 %, Lithuania: 23 % of the emission accounted for respectively) the coverage of EPER seems to be considerable below the averaged value and at least part of the difference could be explained by omission of some sources in the EPER report. In some other countries (e.g. Norway: 49 %, Latvia: 50 %) the

fraction included in EPER is relatively low but could probably be explained by a more than average share of smaller facilities in the national industry. A further analysis on these issues would need additional information.

The evaluation of the EU ETS for 2005 has shown that a relative high percentage of the ETS emissions for Slovakia and Latvia is covered by installations with a rated thermal input between 20 and 50 MW being respectively 43.5 and 23.0% of the total CO_2 emissions included in the EU ETS compared to an average of 2.9% for EU25. (source: EEA Technical report 4/2007). Therefore the emissions of these installations might not be included in EPER due to the facility capacity threshold of 50 MW.

8.4.1.2 Comparison of EPER CO_2 emissions with the European Emission Trading Scheme

Table 8-4 presents a comparison between the emissions included in EPER for the year 2004 and the verified ETS CO_2 emissions for MS from 2005. Although a strict comparison is not possible (different years, differences between the facility level in EPER and the installation level in ETS[11], different capacity thresholds[12], emission threshold in EPER)), it is clear that the total emissions included in both data sets for each country are quite close.

[11] One EPER facility will in most cases consist of several ETS installations

[12] The EPER capacity threshold (including an add-up rule) is 50MW where for ETS installations it is 20 MW (the ETS installations between 20 and 50 MW amount to 34% of all ETS installations and cover only 2,9% of all the CO_2 emissions included in the ETS - source: EEA Technical Report No 4/2007)

Table 8-4 Comparison of CO_2 emissions, included in EPER 2004 with verified emissions in the Emissions Trading Scheme (emissions in ktonnes)

		EPER		ETS	
		Number of facilities	Emission	Number of installations	Verified Emissions
EU15	Austria	40	29 662	197	33 373
	Belgium	69	56 545	310	55 354
	Denmark	28	24 511	377	26 469
	Finland	68	41 648	538	33 074
	France	252	143 485	1 078	131 258
	Germany	375	467 427	1 826	469 348
	Greece	40	70 016	134	71 250
	Ireland	24	20 351	106	22 367
	Italy	226	213 429	914	224 766
	Luxembourg	6	2 138	15	2 603
	Netherlands	75	91 899	207	80 351
	Portugal	29	31 311	244	36 426
	Spain	178	162 769	783	182 538
	Sweden	42	19 684	683	19 315
	United Kingdom	234	265 625	732	237 377
EU15 Total		**1 686**	**1 640 499**	**8 144**	**1 625 870**
EU10	Hungary	23	21 522	229	25 954
	Cyprus	5	4 758	-	-
	Czech Republic	72	80 224	387	82 386
	Estonia	10	12 932	42	12 622
	Latvia	5	1 804	91	2 854
	Lithuania	2	1 749	93	6 604
	Malta	2	1 962	-	-
	Poland	131	173 831	493	115 995
	Slovakia	9	2 493	175	25 232
	Slovenia	7	7 803	94	8 704
EU10 Total		**266**	**309 078**	**1 604**	**280 351**
EU25 Total		**1 952**	**1 949 577**	**9 748**	**1 906 221**

ETS data downloaded from the ETS Community Independent Transaction Log (CITL) of the European Commission as of 18 April 2007.(http://ec.europa.eu/environment/ets/)

8.4.2 NO_x emissions

A similar analysis for NO_x as given in the previous section for CO_2 is presented in Figure 8-4 for all emissions from the aggregated Industry sectors. The resulting overall picture is similar, although the differences between individual countries are larger.

For all countries participating in the EPER, 79 % of the industrial emissions of NO_x as reported to the LRTAP Convention are included in the EPER reports. The averaged value for all countries is 73 % (minimum 24 %, maximum 130 %, standard deviation 23 %). However for Greece (130 %) and Cyprus (106 %) the emissions included in the EPER facility reports are higher than the emissions reported in the national inventory. For Norway EPER covers no more than 23 % of the emissions that are reported for industrial combustion and industrial processes in the national inventory.

The explanations for the differences in NO_x emissions between EPER and the national inventory are similar to the ones that apply to CO_2. Since NO_x emission factors are generally less precise than CO_2 emission factors, one might expect that national inventories, based on fuel statistics and such emission factors and EPER facility reports, when based on measurements, differ more than in the case of CO_2. This could explain the higher variability between countries for NO_x as shown in Figure 8-4 compared to the analysis for CO_2 shown in Figure 8-3.

If we compare the results of individual countries for NO_x with the results for CO_2, it appears that Slovakia and Lithuania are no longer the exceptions with respect to having a relatively low percentage of EPER emissions accounted for as compared to the national inventory. The ratio between CO_2 and NO_x as reported under EPER in Slovakia and Lithuania appear to be similar to those of other countries. For all countries the total CO_2 emission from industrial sources in EPER are about a factor of 600 higher than the NO_x emissions from the same sources. In the national inventories this ratio is about 60 for Slovakia, 200 for Lithuania and 400 to 1000 for all other countries. This suggests that there might be a potential problem in either the CO_2 or the NO_x emissions as reported by Slovakia and Lithuania in the national inventories.

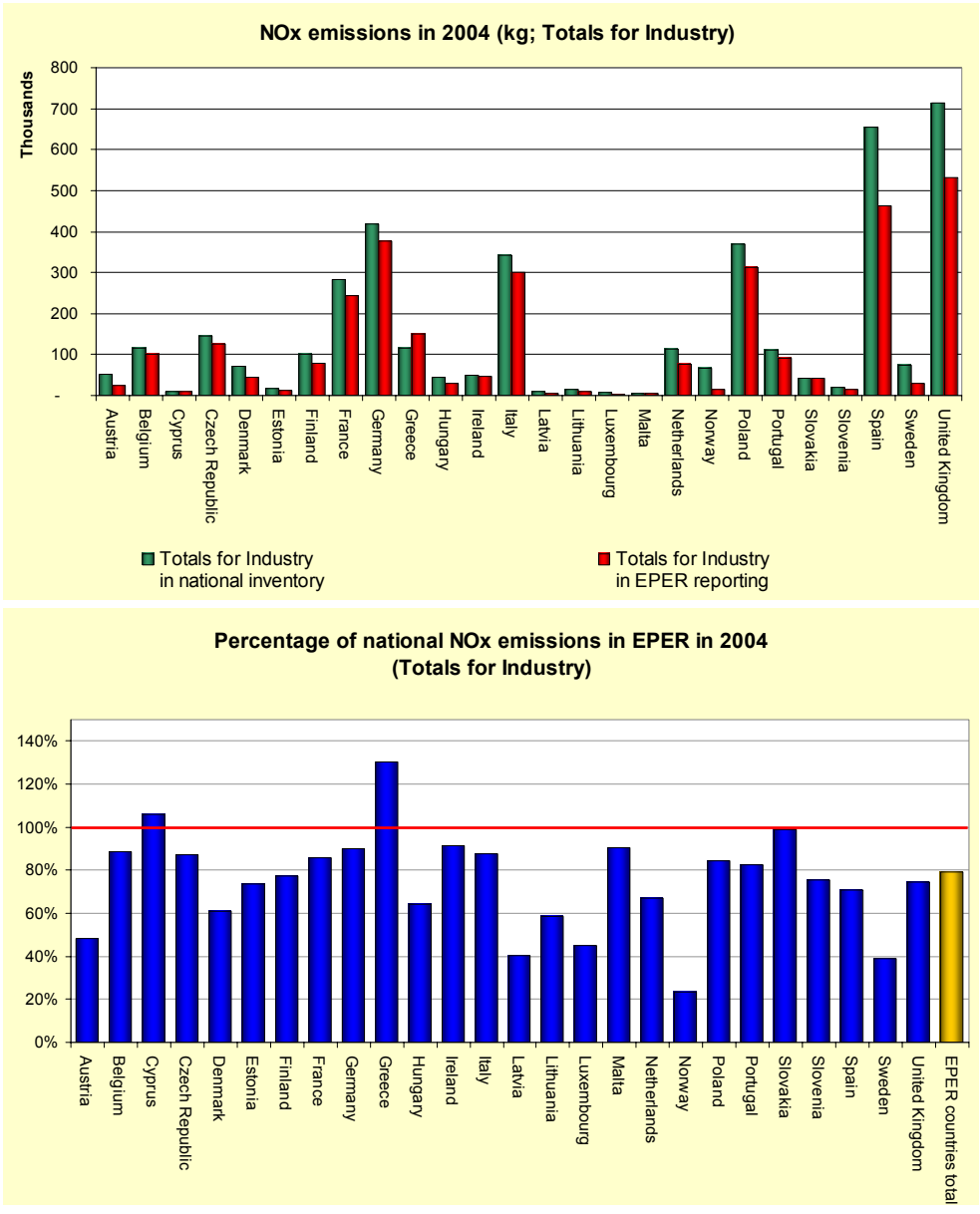


Figure 8-4 NO_x emissions from all industry included in EPER, compared to the national emission inventories reported to LRTAP; absolute values (above) and percentages (below)

8.4.3 SO_x emissions

Figure 8-5 presents the results for the comparison between EPER and national inventories for industrial emissions of SO_2. The resulting picture again is similar to that for CO_2 and NO_x. EPER includes 75 % of the industrial SO_2 emissions reported to the LRTAP Convention. The averaged level of the national emissions accounted for in EPER for the individual countries amounts to 72 % for this pollutant (minimum 50 %, maximum 144 %, standard deviation 18 %).

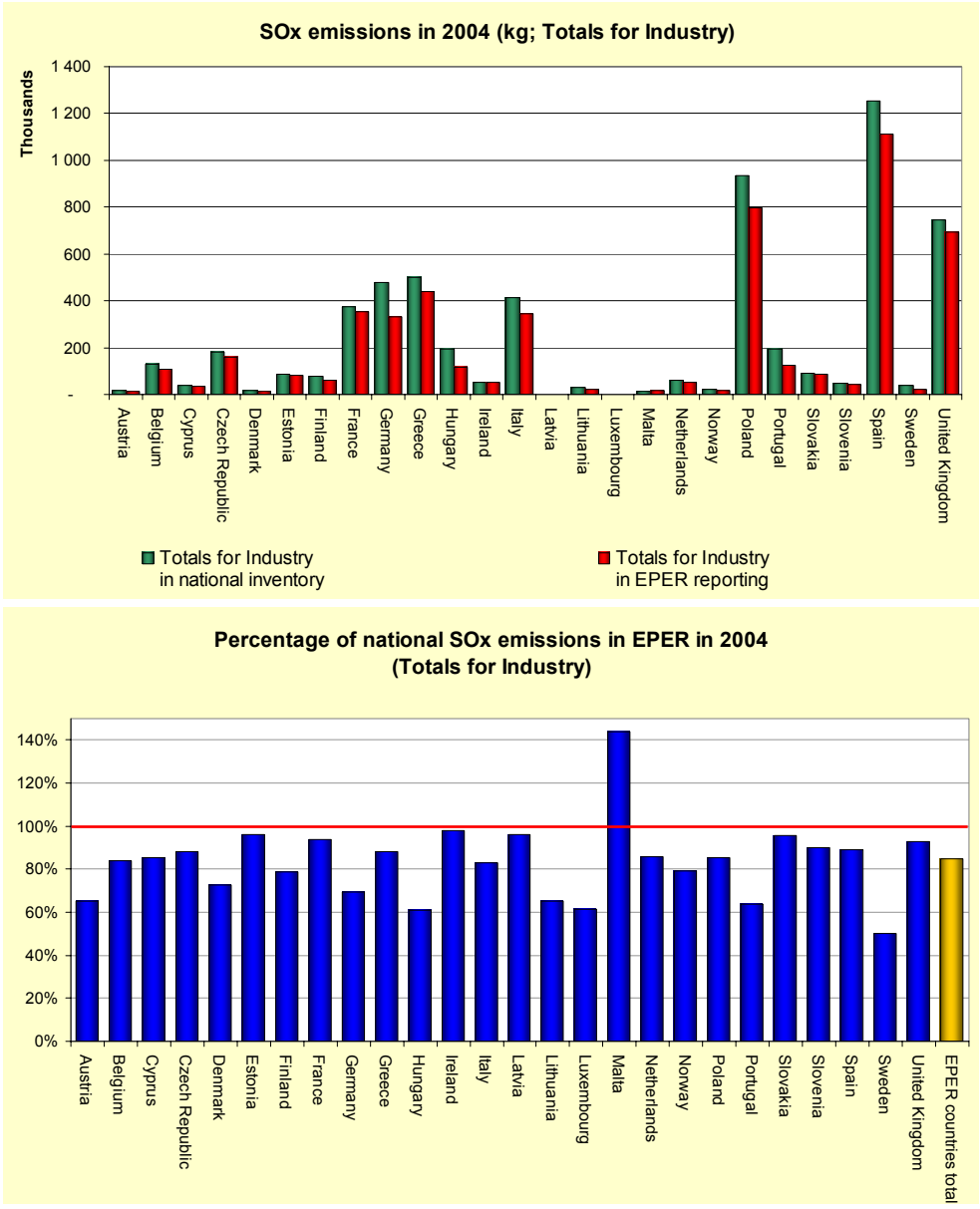


Figure 8-5 SO_2 emissions from all industry included in EPER, compared to the national emission inventories reported to LRTAP; absolute values (above) and percentages (below)

For eleven countries EPER includes over 80 % of the industrial emissions in the national inventories. For four countries (Hungary, Latvia[13], Portugal, Sweden) the national inventory's industrial emissions are more than twice the emissions reported in EPER. Additional information is again needed to assess how this can be better understood.

[13] Latvia explained that the inconsistency is due to use of a too low a sulphur content for the four EPER facilities in the national inventory. Latvia plans to correct this error in the national inventory in the next submission.

8.4.4 CO emissions

The comparison of EPER and the national inventories for industrial emissions of CO is presented in Figure 8-6. It is clearly seen that for Slovenia, Poland and Portugal the total CO emissions reported in EPER for industrial sources exceeds the totals as reported in the national inventories by a factor of 16 (Slovenia, off scale in the graph), 4.5 and 3.5 respectively. This can basically only be explained by the assumption that these emissions are underestimated in the national inventories for these countries or that the facilities themselves have significantly over-estimated emissions.

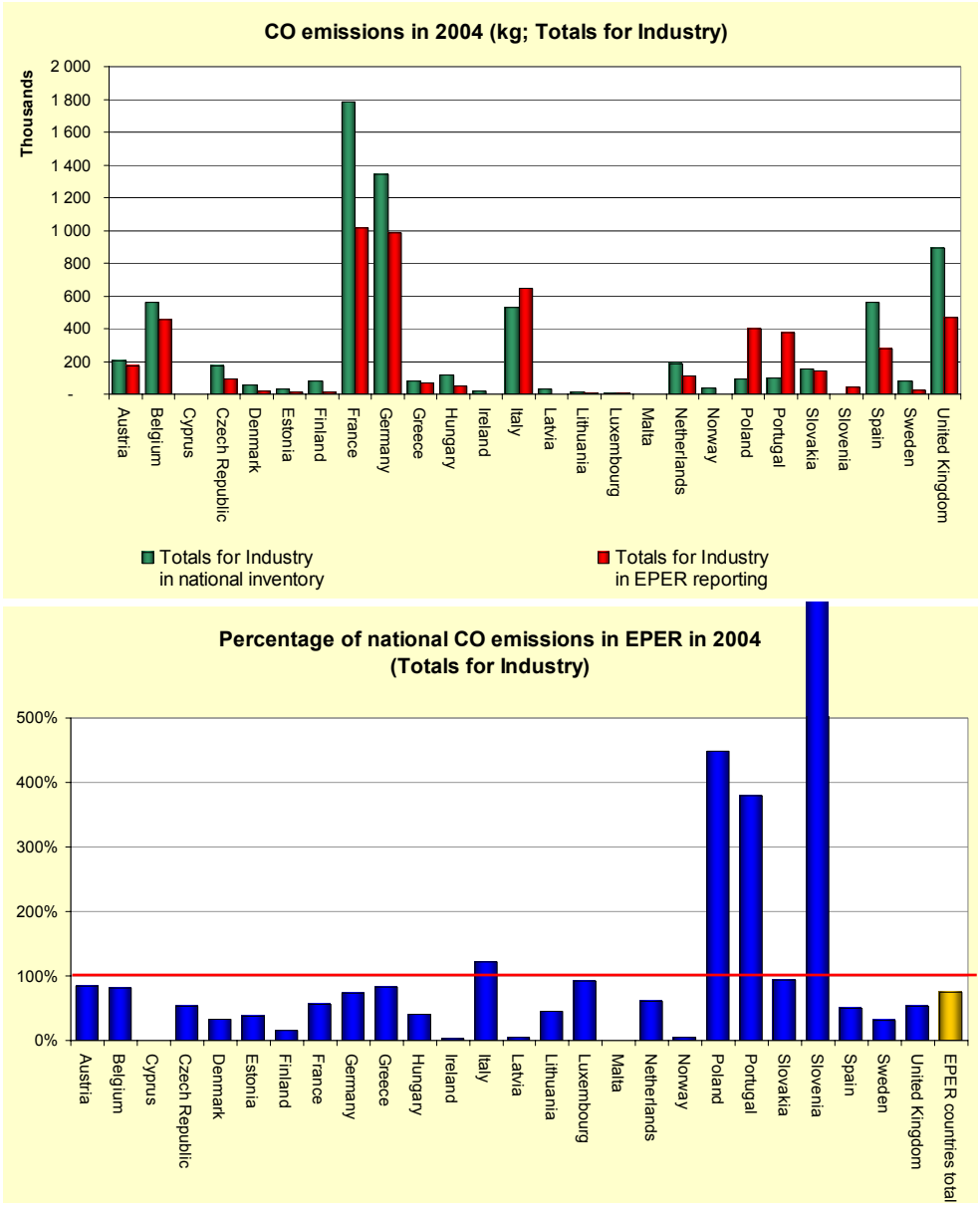


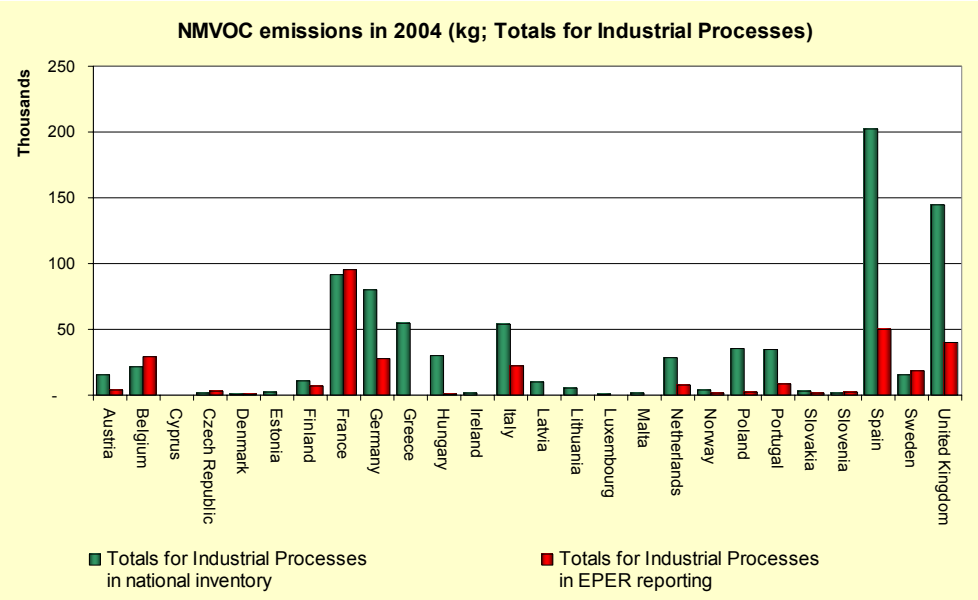
Figure 8-6 CO emissions from all industry included in EPER, compared to the national emission inventories reported to LRTAP; absolute values (above) and percentages (below)

Also Italy reports more emissions in EPER in comparison to industrial emissions in the national inventory. For Ireland, Latvia and Norway the CO emissions reported in EPER amount to only 4 % of the industrial CO emissions reported in their national inventories.
On average, for all countries included in EPER the total emissions of CO from industrial sources is about three quarters of the total CO emissions as reported in the national inventories, although this picture is distorted as for some countries very big discrepancies exist between the data reported under the EPER Decision and under LRTAP.

8.4.5 NMVOC emissions

For NMVOC emissions the comparison between EPER and national inventories reported to EMEP/LRTAP has only been done for industrial process emissions in Figure 8-7. Overall, EPER covers about 40 % of the NMVOC emissions from industrial processes as reported in the national inventories, but large variations between countries occur. The emissions as included in Slovakia, Czech Republic and Belgium[14] are significantly higher than the ones reported in the national inventories.

[14] For Belgium this can be attributed to the fact that the industrial NMVOC process emissions reported to EMEP/LRTAP are not only included in the IPCC class 2 (Industrial Processes), but are also partly allocated in the classes 1B2 (mainly refineries) and 3 (solvent and other product use).Taking into account all Belgian NMVOC process emissions, 40 % is covered by EPER.



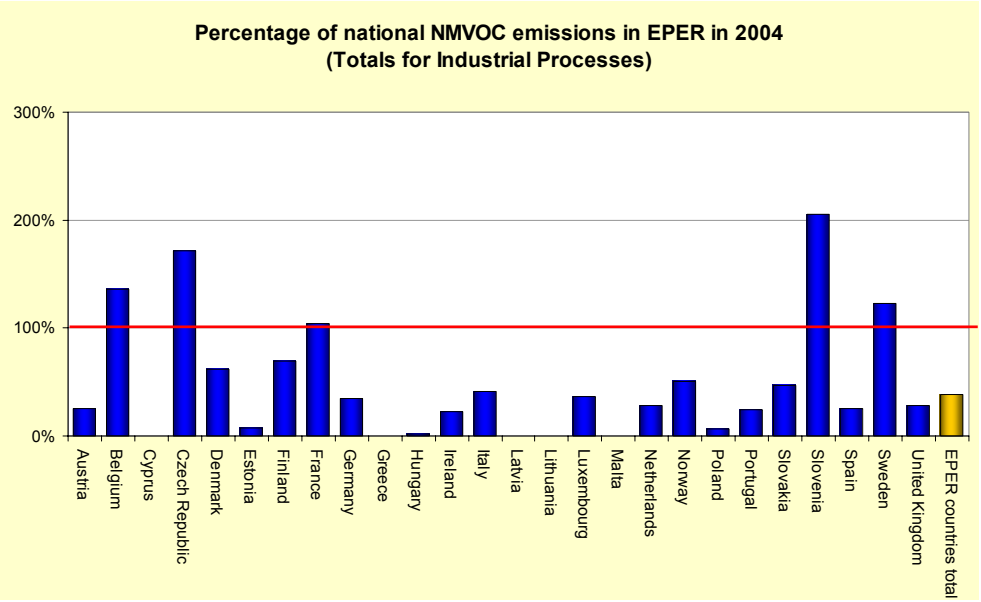
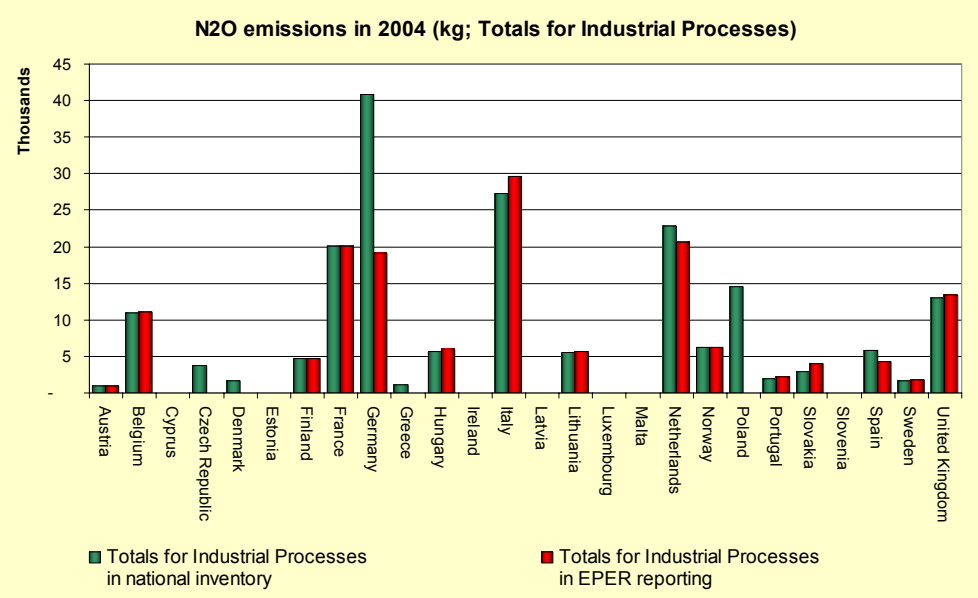


Figure 8-7 NMVOC emissions from industrial processes included in, compared to the national emission inventories reported to LRTAP. Absolute values (above) and percentages (below)

8.4.6 *N_2O emissions*

For N_2O from industrial processes, six out of 26 countries (Cyprus, Estonia, Ireland, Latvia, Luxembourg and Malta) do not report any N_2O emissions from industrial processes, neither in the national inventories nor in the EPER reporting process (Figure 8-8). For 12 countries the differences between the emission reports are considered to be very close (i.e. a 1 % or less difference: Austria, Belgium, Finland, France, Latvia and Norway), close (1 to 5 % difference: Hungary, United Kingdom) or similar (5 to 10 %: Italy, Netherlands, Sweden). Poland[15], Czech Republic and Denmark did not report any N_2O emissions from industrial processes to EPER, while such emissions are reported in the national inventories.

[15] Poland indicated that none of the Polish facilities reported N2O emissions above the threshold.



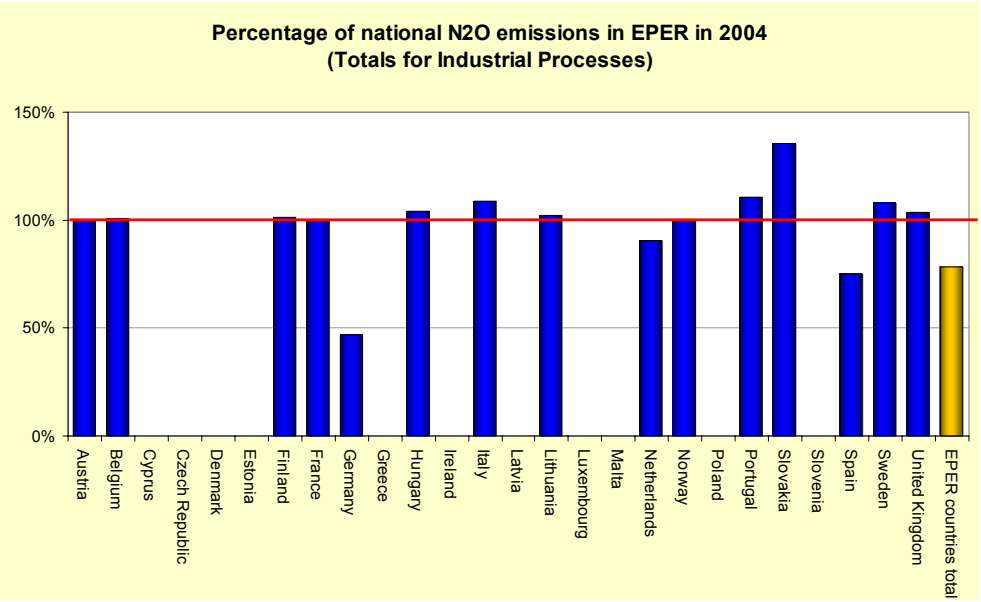
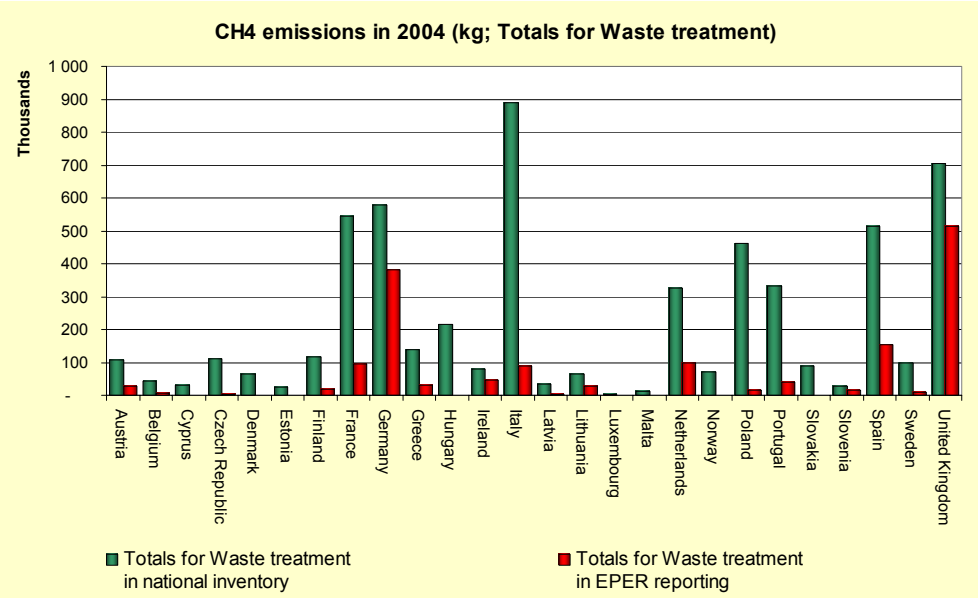


Figure 8-8 N_2O emissions from agricultural sources included in, compared to the national emission inventories reported to EU-MM/UNFCCC. Absolute values (above) and percentages (below)

8.4.7 *CH_4 emissions*

The comparison for CH_4 from waste treatment, the major activity in EPER from which methane emissions are reported, is given in Figure 8-9. The extent to which CH_4 as reported in the national inventories is covered by EPER varies significantly between countries. For all countries however, the EPER emissions are below the national reported values. As in other cases the reason for this might be that a number of waste treatment facilities might emit below threshold or EPER reporting might still not be complete or the national inventory data might be overestimated. The result of the threshold analysis for CH_4 in chapter 7 suggests however that below threshold facilities in this source category do not contribute much. If this is true, the explanation should be that about three times as many waste disposal sites should report under EPER as actually did in 2004, or the national estimates of CH_4 emissions from landfills is too

high, as compared with the emission data from individual facilities as reported to EPER, or (obviously) both.



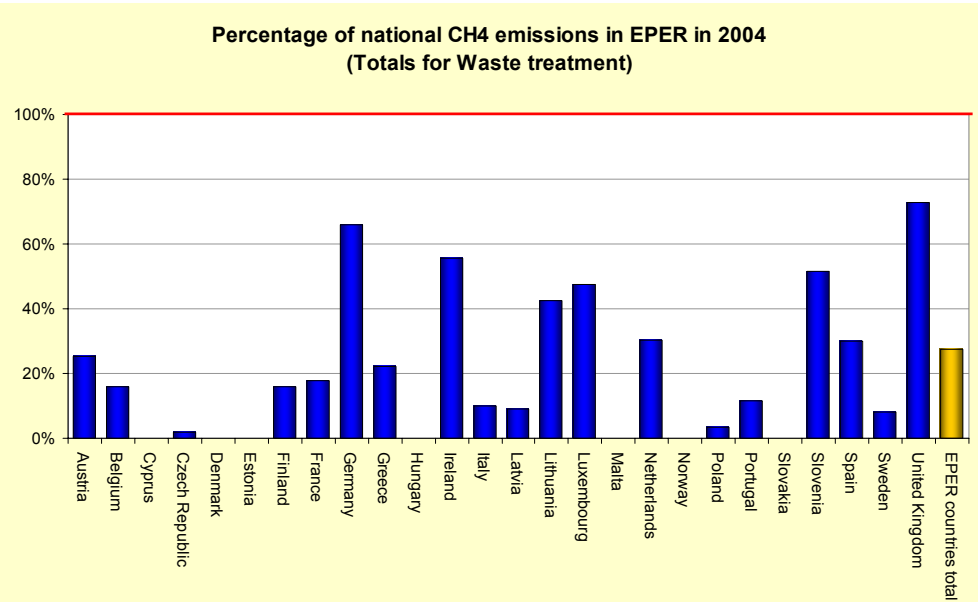
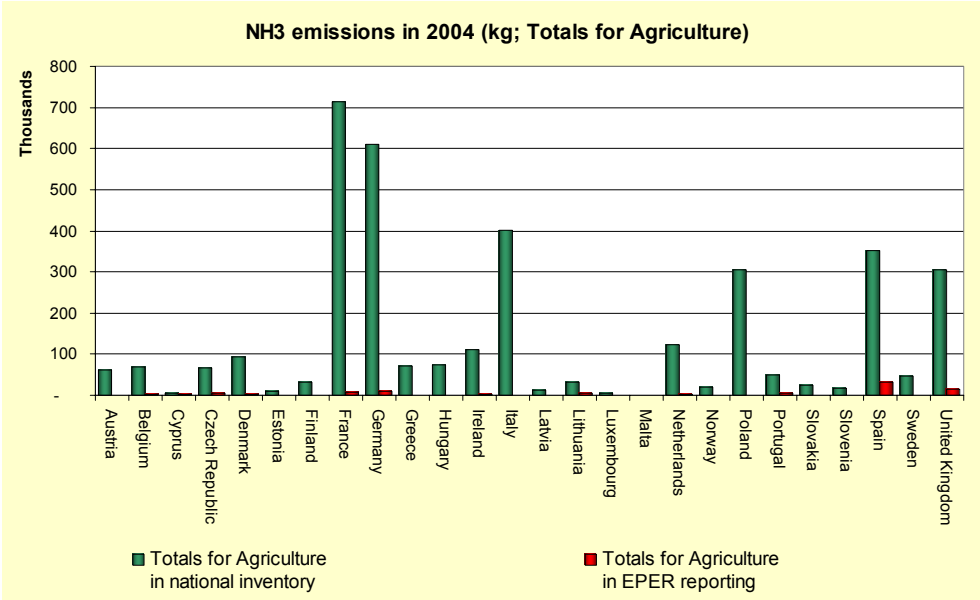


Figure 8-9 CH_4 emissions from waste treatment included in EPER, compared to the national emission inventories reported to EU-MM/UNFCCC. Absolute values (above) and percentages (below)

8.4.8 *NH_3 emissions*

As is shown in Figure 8-10, EPER covers only a small percentage of the NH_3 emissions from agriculture as reported in the national inventories. Cyprus is the only exception, where 40 % of the emissions in the national inventory are covered by EPER. One of the main reasons for this is that NH_3 emissions also occur from other agricultural activities that are not covered within the scope of the EPER reporting. Specifically, EPER only includes emissions from installations for poultry (>40 000 animals), pigs (>2 000) or sows (>750). Other agricultural activities which lead to significant NH_3 emissions and which are included within the aggregated 'agricultural' sector in the EEA dataset used

in this work but not EPER include for example fertiliser application, and manure management from livestock other than those included under EPER (cattle, sheep etc).



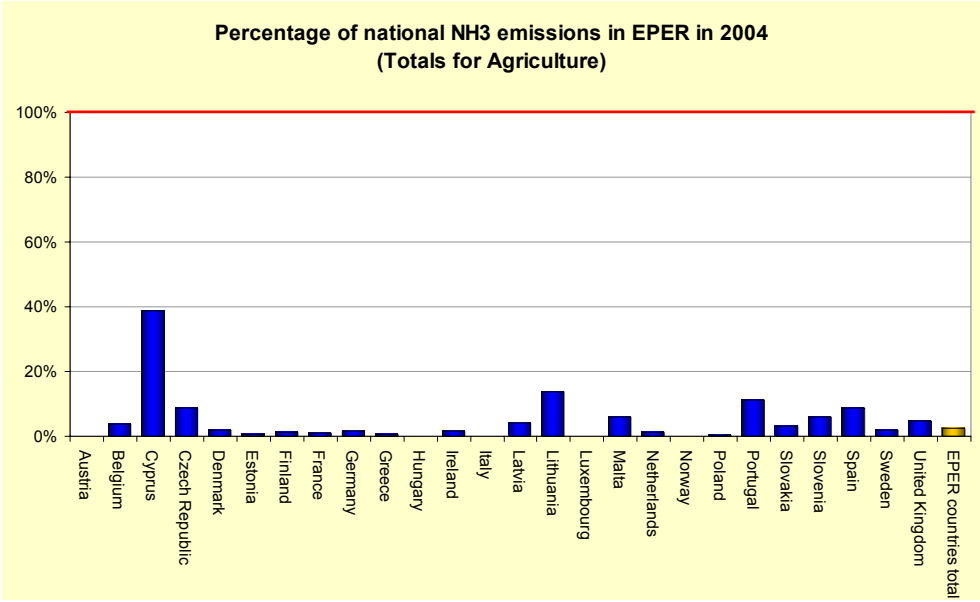


Figure 8-10 NH_3 emissions from agricultural sources included in EPER, compared to the national emission inventories reported to LRTAP. Absolute values (above) and percentages (below)

In recognition that there are additional important sources reported under the aggregated 'agriculture' national emission inventory sector by countries, but which are not in EPER, an additional specific analysis was performed for two sectors for which a closer correlation between the EPER and national inventory emissions could be expected (and hence potentially allow a more informative comparison). The analysis compared NH_3 emissions as included in EPER for the Pig and Poultry Farms with the corresponding detailed data for manure management (poultry and swine) emissions (NFR sector codes 4B8 and 4B9) from the national inventories reported by countries to the LRTAP Convention for the year 2004.

The results of this comparison are shown in Figure 8-11. As was observed for the analysis performed above at a more aggregated 'agriculture' sector level, even when looking at these more comparable sectors relating to poultry pigs and sows, there are significant variations between the EPER and national inventory emissions. The level of emissions included in EPER compared to emissions for swine and poultry manure management reported in national inventories ranged from 0.1% (Austria) to 68% (Cyprus) with an average of 12 %.

As with other sectors, it is important to note that some of the emissions included in national inventories will not be reported in EPER due to individual facilities not exceeding the thresholds for which reporting is required under EPER [in the case of poultry (>40000 animals), pigs (>2000) or sows (>750)]. Nevertheless the differences between the percentages of emissions accounted for between the countries are large. Large differences do occur throughout the Member States and Norway with respect to farming practices (e.g. size of facilities). Countries will naturally have different percentages of facilities exceeding the EPER threshold within their farming sectors.

Some differences occur between the definition in EPER Annex A3 and the LRTAP NFR 4B8 + 4B9 source categories. NFR includes emissions of NH_3 from all stages of the manure management including spreading on land. However manure deposited in fields by grazing animals should be included in another category. For EPER, facilities that do not treat manure on-site, the emissions from spreading on land are not included. For certain countries this might be an explanation for some big discrepancies

However, the large differences may also indicate that reporting to EPER is potentially somewhat incomplete for this sector. For example, Austria reports emissions from only one Pig and Poultry Farms facility (19 tons), yet has reported the 10th highest emissions (of the countries assessed) for swine and poultry manure management NH_3 emissions in its national inventory (14,000 tons). Similarly, Hungary reports over 33,000 tons of NH_3 emissions for swine and poultry in its national inventory but does not report any emissions to EPER in the Pig and Poultry Farms.

Further investigations in collaboration with national authorities would therefore be needed on a country-by-country basis to properly assess the reasons for the large apparent differences in the level of reporting noted for some countries.

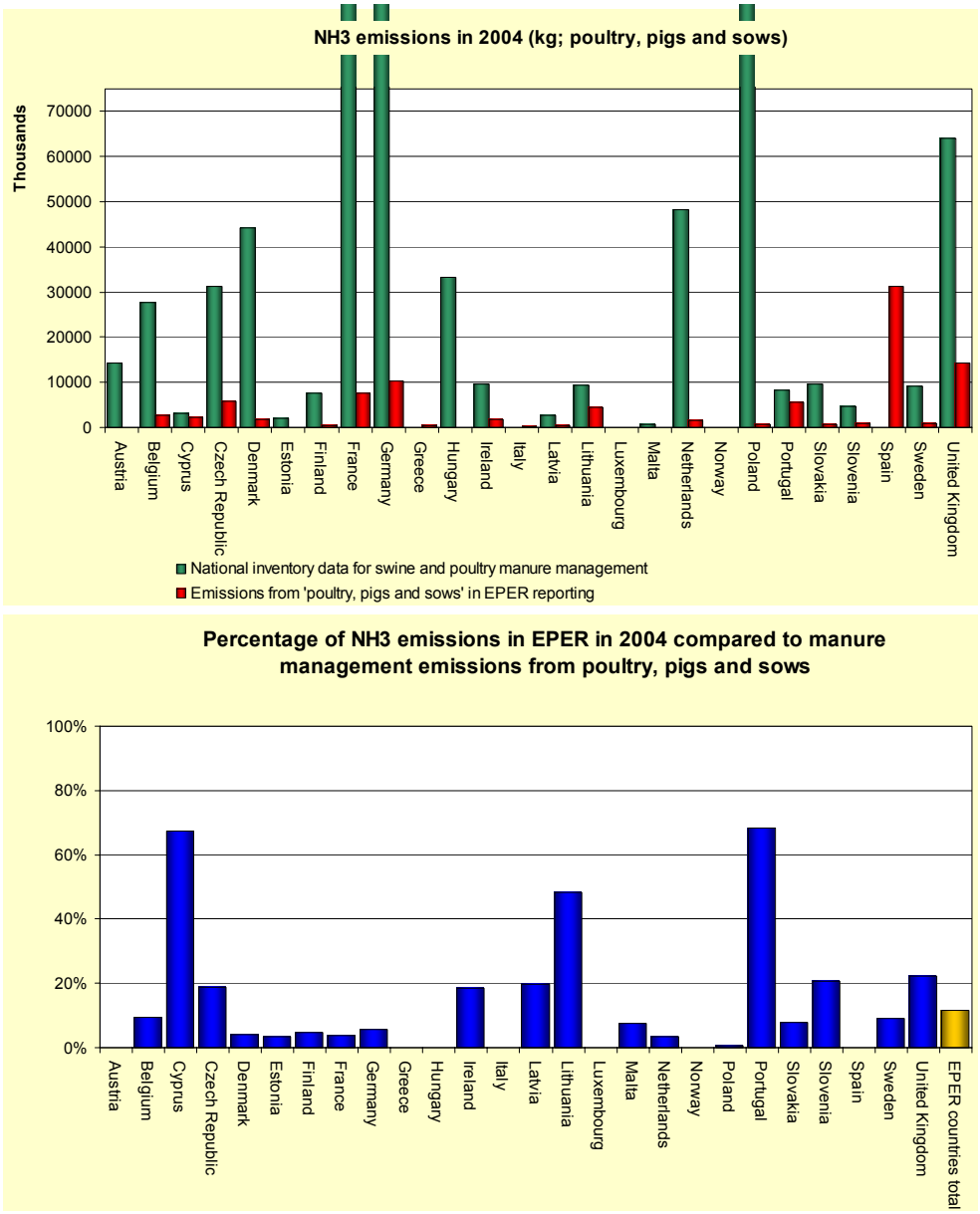


Figure 8-11 NH_3 emissions from the agricultural source Pig and Poultry Farms included in EPER, compared to the detailed data for manure management emissions (swine and poultry) from national emission inventories reported to LRTAP. Absolute values (above) and percentages (below)

8.5 Conclusions

The analyses in this chapter show that generally the correspondence between the EPER reporting and other national emission reports is considered to be fair to good. For some countries and some pollutants, a number of instances have been identified which indicate there might be inconsistencies due to errors or omissions in either the EPER reporting or in the national inventories.

For the major combustion-related pollutants (CO_2, NO_x, SO_2) the EPER data correspond quite well with the data in the national inventories. Overall, EPER emissions are 20 to 30 % below the respective national totals for the industry. The remaining difference could be partly due to the below threshold emissions (see chapter 7) but also to industrial sectors that are not included in the list of Annex A3 source categories of the EPER Decision in IPPC (e.g. Construction) but which are included within the national inventories. A final reason for the differences may be that countries did not report all facilities and emissions that should have been reported. Instances where this may potentially be the case have been noted in the pollutant-specific sections of the report.

For the other pollutants analysed in this chapter (CO, NMVOC, NH_3, CH_4 and N_2O) the picture is less clear. With some noted exceptions, emissions reported in EPER are generally significantly lower than the emissions reported by countries to the LRTAP Convention. In instances where emissions from EPER exceed those reported by countries in their national inventories, the national inventories for these pollutants might not be complete. This might occur in some cases for explainable reasons: e.g. the emissions from the EPER sources for such pollutants may not be considered key sources in terms of the national totals (NMVOC form industrial processes, methane from waste) in some countries and hence resources are not prioritised in these countries to improve the estimates at a national level. Another potential reason is that certain facilities themselves may overestimate their level of emissions. Robust emission QA/QC and verification activities for both facility and national inventory data within Member States are therefore considered important to ensure confidence in the reported emissions data.

The analysis as presented in this chapter could be a starting point for further analyses on the consistency and quality of data reported under the different emission reporting schemes. Such analyses however would need more detailed information that probably could only be collected in close co-operation and consultation with national experts, both in the EPER reporting process and in the respective international inventorying processes for greenhouse gases and/or air pollutants.

9 References

[Ref 1] COMMISSION DECISION 2000/479/EC of 17 July 2000 on the implementation of a European pollutant emission register (EPER) according to Article 15 of Council Directive 96/61/EC concerning integrated pollution prevention and control (IPPC); Official Journal of the European Communities, L 192/36 (http://eper.cec.eu.int/eper/documents/comission_17072000.pdf)

[Ref 2] Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control; Official Journal L 257 , 10/10/1996 p. 0026 – 0040 (http://ec.europa.eu/environment/ippc/index.htm)

[Ref 3] EPER Review Report, June 2004, URL http://www.eper.cec.eu.int/eper/documents/EPER%20Review%20report,%20final.pdf

[Ref 4] EUROSTAT data downloaded from http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1090,30070682,1090_33076576&_dad=portal&_schema=PORTAL on November 26, 2006

[Ref 5] Weibull, W. (1951) "A statistical distribution function of wide applicability"; *J. Appl. Mech.-Trans. ASME* 18(3), 293-297

[Ref 6] http://curveexpert.webhop.net/

[Ref 7] EPER Guidance Document http://www.eper.cec.eu.int/eper/Gaps.asp?i=

[Ref 8] Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants, OJ L 309 of 27.11.2001, p 22

[Ref 9] UN/ECE Geneva Convention on Long Range Transboundary Air Pollution, 1979

[Ref 10] United Nations Framework Convention on Climate Change, 1992

[Ref 11] Council Decision 280/2004/EC of the European Parliament and of the Council of 11 February 2004 concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol, OJ L 49 of 19.02.2004, p 1

[Ref 12] ETS Community Independent Transaction Log (CITL) of the European Commission as of 10 November 2006 (http://ec.europa.eu/environment/ets/)

10 Glossary

Abbreviation	Explanation	Web site
CITL	Community Independent Transaction Log	http://ec.europa.eu/environment/ets/
CLRTAP	UN-ECEs Convention on Long Range Transboundary Air Pollutants	http://www.unece.org/env/lrtap/
CRF	Common Reporting Format of UNFCCC	can be found at the UNFCCC website
EEA	European Environment Agency	http://www.eea.europa.eu/
EPER	European Pollutant Emissions Register: a PRTR for industrial emissions to air and water	http://www.eper.cec.eu.int/ http://europa.eu.int/comm/environment/ippc/eper/index.htm
ETC-ACC	European Topic Centre on Air and Climate Change	http://air-climate.eionet.europa.eu/
EU	European Union	http://www.europa.eu/
EU ETS	European Union Emissions Tratding System	http://ec.europa.eu/environment/climat/emission.htm
EU MM	European Unioni Monitoring Mechanism	http://ec.europa.eu/environment/climat/gge_leg.htm
GHG	Greenhyouose gases	
IPCC	Intergovernmental Panel on Climate Change	http://www.ipcc.ch
IPPC	Integrated Pollution Prevention and Control; a directive of the European Union	http://ec.europa.eu/environment/ippc/index.htm
MS	European Union Member States	
NEC Directive	European Unions Emission Ceilings Directive	http://europa.eu.int/comm/environment/air/ceilings.htm
NFR	Nomenclature for Reporting; Reporting format required under the LRTAP convention; Alsoused by NEC Directive f the EU	http://www.emep.int/emis2003/reportinginstructions.html
NMVOC	Non-Methane Volatile Organic Compounds	
PM	Particulate matter	
POP	Persistent Organic Pollutant	
PRTR	Pollutant Release and Transfer Register	
UN-ECE	United Nations Economic Committee for Europe	http://www.unece.org/
UNFCCC	United Nations Framework Convention on Climate Change	http://www.unfccc.int

Annex A Questionnaire on Reporting Procedures

A.1 Questionnaire on EPER Reporting procedures for First Time Reporting Countries

Introduction

The questionnaire below is used as a means to collect input from Member States for the review of the second reporting under EPER. The questionnaire contains several segments, partly equivalent to those in the questionnaire for the review of the first reporting:
General questions to identify the Member State and individual to be contacted in case of questions
Questions regarding the legislative aspects of national EPER implementation
Questions regarding the data collection process in the Member State
Questions regarding the quality of the resulting national data set
Questions on the reporting process and the reporting tool
Questions on the functionality and quality of the EPER web site

Instructions

Please complete one questionnaire per Member State.
The questionnaire is published in two versions: one for those Member States reporting only 2004 data (Cyprus, Czech Republic, Estonia, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia) and one for those countries that report the second time (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, United Kingdom).
For countries, reporting for the second time, please relate your responses to the ones in your 2001 questionnaire.
Make reference to the first questionnaire for 2001, if applicable, and state if there are any changes or not. If there has been a change, please explain.
Where quantitative data is requested, please provide an estimate where you did not or were unable to count exact numbers.
The questionnaire is distributed as an MS Word document. Please use this document to complete the questionnaire electronically.
You can also print the questionnaire and answer it by hand.
Please submit the completed questionnaire ***on or before 6th November 2006***
by e-mail or *by fax*
to tinus.pulles@tno.nl *to Tinus Pulles fax +31 55 549 3252*
cc bernd.mehlhorn@ec.europa.eu *cc Bernd Mehlhorn fax +32 2 2988868*
cc anne.wagner@aeat.co.uk

General

	Member State Country: .....
	Name of person to be contacted if there are any questions: ....., e-mail: ..... telephone: ……..

Legal

	Has the EPER Decision been legally implemented in your country? Yes … No … Type of legislation..... Title of legislation .....

Identification of facilities

How were EPER facilities identified in your country (give a short description)?
…….

Data collection process

Please indicate the pathway of EPER data collection in your country:
Pathway: ……
Validation: ……

Coding	Example
1 Facility,	
2 Local authority	
3 Regional authority	
4 National authority	
5 Ministry for environment	Pathway: If the facility sends data to the local authority and to the national authority, who then reports to the Commission, please indicate as: "1, 2, 4" Validating institutions: If both the local authority and the national authority perform quality checks, please indicate as: "2, 4"

In which period were EPER data delivered by facilities to the authorities?
month/year month/year
Between ...../..... and ...../.....

How were data delivered to the authorities?
electronically ….....%
on paper ….....% (both percentages should add to 100%)

Quality checks

What have the major difficulties been for the IPPC regulated facilities regarding the collection, validation and reporting of the data, from the point of view of the authorities (complaints/comments received by the authorities from IPPC regulated facilities)?
.....

How often did the authorities have to contact facility operators in order to clarify missing data or other shortcomings, given as percentage of facilities?

Number of times	**Percentage of facilities**
0: no contact with facilities	%
1 time	%
2 or 3 times	%
More than 3 times	%
	100%

Percentages should add to 100%
If no precise data are available, please give an expert estimate.

10) What have the major problems been for the authorities in collecting and validating the data?
.....

Resulting data set

11) What is the estimated overall percentage of facilities reporting under EPER compared with all IPPC facilities in your country?

. . . . . %

12) What were the most frequently used reasons given by the facilities for confidentiality?

Reason	**How often?**

13) How many facilities, denoted by their Annex I Code activities, kept their data confidential?

Nr of Facilities	**Annex I Code**

If there are ten or more activities that comprise facilities which claimed confidentiality, please use a table on a separate sheet

14) How many facilities, denoted by their Annex I Code activities, used the "exception clause" of EPER Guidance document, page 81 (emissions to water reported by final non- IPPC waste water treatment plant)?

Nr of Facilities	**Annex I Activity Code**	**Total number of facilities in this activity reporting emissions direct or indirect to water**

Reporting and Reporting tools

15) Did you use the validation tool to create the XML-file for the CDR?
Yes… No …

16) Do you have any proposals on how to improve the validation tool (including the reporting format) and its use with regard to the future use under the E-PRTR?
.....

17) Do you have any proposals on how to improve the delivery and processing of the EPER data in the Central Data Repository (CDR) of the EEA? Likewise do you have proposals on how to better the delivery of data to the CDR for the forthcoming E-PRTR?

.....

The EPER Web site

18) How do you feel the site currently accommodates the different user groups?

	Very well	**Well**	**Sufficiently**	**Poorly**	**Very poorly**
General public					
Governmental experts					
Industry					
Scientific Community					
NGO's					

19) Do you have any other comments or suggestions on future improvements of the reporting website?
.....

Outlook

20) What are the most important issues in the past reporting process that need further attention, looking forward to the E-PRTR reporting?

A.2 Questionnaire on EPER Reporting procedures for Second Time Reporting Countries

Draft Questionnaire on EPER Reporting procedures

Introduction

The questionnaire below is used as a means to collect input from Member States for the review of the second reporting under EPER. The questionnaire contains several segments, partly equivalent to those in the questionnaire for the review of the first reporting:
General questions to identify the Member State and individual to be contacted in case of questions
Questions regarding the legislative aspects of national EPER implementation
Questions regarding the data collection process in the Member State
Questions regarding the quality of the resulting national data set
Questions on the reporting process and the reporting tool
Questions on the functionality and quality of the EPER web site

Instructions

Please complete one questionnaire per Member State.
The questionnaire is published in two versions: one for those Member States reporting only 2004 data (Cyprus, Czech Republic, Estonia, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia) and one for those countries that report the second time (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, United Kingdom).
For countries, reporting for the second time, please relate your responses to the ones in your 2001 questionnaire.
Make reference to the first questionnaire for 2001, if applicable, and state if there are any changes or not. If there has been a change, please explain.
Where quantitative data is requested, please provide an estimate where you did not or were unable to count exact numbers.
The questionnaire is distributed as an MS Word document. Please use this document to complete the questionnaire electronically.
You can also print the questionnaire and answer it by hand. Please submit the completed questionnaire ***on or before 6th November 2006***
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cc bernd.mehlhorn@ec.europa.eu cc Bernd Mehlhorn fax +32 2 2988868
cc anne.wagner@aeat.co.uk

General

	Member State Country: .....
	Name of person to be contacted if there are any questions: ....., e-mail: ..... telephone: ……..

Legal

	Were there any major changes to the legislation or has there been any new legislation that addresses EPER implementation compared to your first reporting? …….

Identification of facilities

Is the identification process of EPER facilities significantly different from the way you reported it in the first review questionnaire? Yes No

If Yes, please give the major reasons for the different approach.
…….

Data collection process

Are the data collection process and the data pathway significantly different from the way you reported it in the first review questionnaire? Yes No

If Yes, please give the major reasons for the different approach.
…….

In which period were EPER data delivered by facilities to the authorities?
month/year month/year
Between ...../..... and ...../.....

How were data delivered to the authorities?
electronically ….....%
on paper ….....% (both percentages should add to 100%)

Quality checks

What have the major difficulties been for the IPPC regulated <u>facilities</u> regarding the collection, validation and reporting of the data, from the point of view of the authorities (complaints/comments received by the authorities from IPPC regulated <u>facilities</u>)?
.....

How often did the authorities have to contact facility operators in order to clarify missing data or other shortcomings, given as a percentage of facilities?

Number of times	**Percentage of facilities**
0: no contact with facilities	%
1 time	%
2 or 3 times	%
More than 3 times	%
	100%

Percentages should add to 100%
If no precise data are available, please give an expert estimate

What have the major problems been for the authorities in collecting and validating the data?
.....

Have there been any major changes (improvements, rationalisation) to the data quality checking process compared to the first review? Yes No

If there have been any, can you identify where and why these major changes occurred?
…….

Resulting data set

What is the estimated overall percentage of facilities reporting under EPER compared with all IPPC facilities in your country?

. . . . . %

What were the most frequently used reasons given by the facilities for confidentiality?

Reason	**How often?**

Is there a tendency to use the issue of confidentiality more / less?
……..

How many facilities, denoted by their Annex I Code activities, kept their data confidential?

Nr of Facilities	**Annex I Code**

If there are ten or more activities that comprise facilities which claimed confidentiality, please use a table on a separate sheet

How many facilities, denoted by their Annex I Code activities, used the "exception clause" of EPER Guidance document, page 81 (emissions to water reported by final non- IPPC waste water treatment plant)?

Nr of Facilities	**Annex I Activity Code**	**Total number of facilities in this activity reporting emissions direct or indirect to water**

Reporting and Reporting tools

Did you use the validation tool to create the XML-file for the CDR?

Yes…No …

Do you have any proposals on how to improve the validation tool (including the reporting format) and its use with regard to the future use under the E-PRTR?

.....

Do you have any proposals on how to improve the delivery and processing of the EPER data in the Central Data Repository (CDR) of the EEA? Likewise do you have proposals on how to improve the delivery of data to the CDR for the forthcoming E-PRTR?

.....

The EPER Web site

How do you feel the site currently accommodates the different user groups?

	Very well	**Well**	**Sufficiently**	**Poorly**	**Very poorly**
General public					
Governmental experts					
Industry					
Scientific Community					
NGO's					

If your judgement above is different to the answers you gave in the first review questionnaire, please state the reasons why you have changed your opinion.

…….

Do you have any other comments or suggestions on future improvements of the reporting website?
.....

Outlook

What are the most important issues in the past reporting process that need further attention, looking forward to the E-PRTR reporting?