Industrial and communal sources
Netherlands Emission Inventory

Industrial water emission, statistical estimation

Version dated April 2008

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1 Description of emission source

This fact sheet contains a description of the statistical estimation of water emissions from around 30 industrial activities additional to measured water emissions at individual facilities. Individual emissions records are available for about 700 industrial facilities via the electronic environmental annual reports and additional surveys carried out by the Netherlands Centre for Water Management (WD). These values have been used to extrapolate for the sector as a whole for the business activities listed in table 1. The extrapolation is conducted on the basis of manufacturing data and/or employee data. This data is obtained from Statistics Netherlands manufacturing data. As manufacturing data for individual companies is confidential, Statistics Netherlands (CBS) works out the multiplier factors and calculates the additional estimation. This is not spread out to unregistered companies but submitted to the emissions registration system as a collective figure. These collective figures subsequently underwent spatial allocation in the National Emission Inventory (NEI) database.

Table 1: Industrial activities (emission sources) for which an additional water emission estimation is performed.

Emk code	Process description	target sector
8910000	NACE 15.1: processing and preserving of meat and poultry	Other industries
8910100	NACE 15.2: processing and preserving of fish	Other industries
8910200	NACE 15.3: processing and preserving of fruit and vegetables	Other industries
8910300	NACE 15.4: manufacture of oils and fats	Other industries
8910400	NACE 15.5: operation of dairies and manufacture of cheese and icecream	Other industries
8918000	NACE 15.8: manufacture of food products	Other industries
8911000	NACE 15.84: manufacture of cocoa, chocolate and sugar confectionery	Other industries
N030600	NACE 15.9: manufacture of soft drinks and other beverages	Other industries
8911400	NACE 17.3: finishing of textiles	Other industries
8918100	NACE 17: manufacture of textiles	Other industries
8911700	NACE 19.1: tanning and dressing of leather	Other industries
8912300	NACE 21.2: manufacture of articles of paper and paperboard	Other industries
8912600	NACE 24.12: manufacture of dyes and pigments	Chemical industry
8913000	NACE 24.13: manufacture of other inorganic basic chemicals	Chemical industry
8913001	NACE 24.16: manufacture of plastics in primary forms	Chemical industry
8913100	NACE 24.2: manufacture of pesticides and other agro-chemical products	Chemical industry
8913200	NACE 24.3: manufacture of paints, varnishes and similar coatings, printing ink and mastics	Chemical industry
8901300	NACE 24.5: manufacture of soap and detergents, cleaning and polishing preparations	Chemical industry
8913600	NACE 24.62: manufacture of glues and gelatines	Chemical industry
8913701	NACE 24.66: manufacture of other chemical products	Chemical industry
8901700	NACE 25.1: manufacture of rubber products	Other industries
8913900	NACE 25.2: manufacture of plastic products	Other industries
8914000	NACE 26.1: manufacture and processing of glass, including technical glassware	Other industries
8914703	NACE 27.4: manufacture of non-ferrous metals	Other industries
8914900	NACE 27.5: manufacture of ferrous metals	Other industries
8919900	NACE 28, excluding 28.51: manufacture of metal structures and parts of structures	Other industries
8918200	NACE 28.51: treatment and coating of metals	Other industries
8918300	NACE 29, 31 and 32: manufacture of various machinery, tools, electronic products and components	Other industries
8902400	NACE 34: manufacture of motor vehicles, trailers and semi-trailers	Other industries
8918400	NACE 35.4: manufacture of motorcycles, bicycles, mopeds and invalid carriages	Other industries
0911200	NACE 90022: waste treatment plants, processing	Waste disposal companies

The NACE code is used for process description in table 1. The NACE coding is a hierarchical classification of economic activities [1] based on the international classification of activities (NACE codes).
The National Emission Inventory target sectors Chemical Industry and Other Industries form part of the Environment Ministry's Industry target group, as do Refineries. The entire industry covers NACE codes 15 to 37.
Additional estimations are not performed for all activities in industry. For some sectors it is not necessary or possible, or another method is used. These cases are summarised below.

Activities where no additional estimation is necessary because comprehensive records are kept
Additional estimation is unnecessary where (almost) all companies are covered by individual registration. This applies to the following sectors:

Flour and starch industry (NACE 156)
Sugar industry (NACE 1583)
Breweries (NACE 1596)
Pulp, paper and cardboard industry (NACE 211)
Refineries and oil processing (NACE 23201)
Organic basic chemistry (NACE 2414)
Artificial fertiliser industry (NACE 2415)
Pharmaceutical industry (NACE 244)
Synthetic fibre and yarn industry (NACE 247)

Activities where additional estimation is not possible
Additional estimation cannot be performed if no, or insufficient, companies are covered by records. Most of these cases relate to 'dry' activities/processes which do not release substantial emissions into water.

Clothing industry (NACE18)
Leather products (NACE192 and 193)
Wood processing (NACE20)
Printing and publishing (NACE22)
Construction material industry excluding glass industry (NACE26 excluding 261)
Manufacture of computers and office equipment (NACE30)
Manufacture of optical, medical and precision instruments, clocks (NACE33)
Other industry not specified above (including manufacture of furniture, toys and musical instruments, NACE36)

Activities where a separate method is used to perform the additional estimation
A collective estimation is performed for emissions caused by the corrosion of stainless steel (SS) process installations and parts of buildings [2] for all industrial activities. A separate method is also used for shipyards (NACE 352).

2 Explanation of calculation method

This chapter contains a brief description of the methodology used. It describes the basic principles by which additional estimations of industrial emissions are performed. See [3] for background information and a more detailed summary.
The methodology applies to **emissions produced between 1995 and the present day.** A different method was used to perform an additional estimation of emissions in 1990. For details, see [4] and the brief explanation underneath this section.

Three different techniques are used when performing additional estimations:
1. Extrapolation of the emissions of all substances with one factor per sector on the basis of production data for companies with more than 20 employees.
2. Refinement: extrapolation of emissions per substance for each sector on the basis of emission factors and production volume.

3. Complementary: extrapolation of the outcome of methods 1 and 2 for companies with fewer than 20 employees; based on employee numbers.

Method 1 is applied to all sectors shown in table 1 except for those sectors and substances referred to under method 2. All these sectors involve relatively homogeneous processes.
Method 2 is applied only in the textile industry and the metal-electro industry with regard to a number of heavy metals, COD and N-Kjeldahl. There are numerous small companies in these sectors carrying out many different processes. The substances listed are measured quite frequently, making it possible for average emission factors per substance to be deduced. This is different from method 1, where all substances are extrapolated using the same factor irrespective of the number of companies for which measurements are available.

Finally, method 3 is also applied to all sectors apart from waste treatment plants (NACE 90022).

There are two important principles underlying the method:
1. Records based on electronic annual environmental reports and the WD survey (among regional water authorities) provide information on all relevant sources of direct discharge in all cases.
2. Many companies that discharge directly have their own waste water treatment plant, while those that discharge indirectly do not have a pre-treatment system.

In order to exclude the distorting effect of emissions from companies with their own treatment system, extrapolation is applied only to emissions from companies that discharge indirectly. The additional estimation for these emissions is therefore attributed entirely to the 'indirect' emission pathway.

The various methods are explained briefly below.

Method 1. Extrapolation of all substances with one factor on the basis of production (value)

The principle can be explained using a simple (fictional) example:
There are 200 companies with over 20 employees in the slaughterhouse and meat processing industry (NACE 151), producing 2,000 million tonnes of meat products altogether. The individual records cover 50 companies, of which 10 discharge directly into surface water and 40 discharge into the sewer system. The former group produces 350 million tonnes of meat products and the latter group produces 1,150 million tonnes.
In the example above, the total emissions per substance produced by the 40 companies that discharge indirectly are therefore extrapolated to a total of 190 (200 minus 10) companies.

$$\text{Total emission} = \Sigma\ \text{Emission\_NEI}_i + \text{Emission\_NEI}_s$$

Where:

Emission_NEI_i = Emission measured on individual facilities
Emission_NEI_s = Emission estimated statistically

$$\text{Emission\_NEI}_s = \Sigma\ \text{Emission\_NEI}_i\text{\_indirect} \times (F-1)$$

With an extrapolation factor:

$$F = (\text{Production\_total} - \text{Production\_NEI}_i\text{\_direct}) / \text{Production\_NEI}_i\text{\_indirect}$$

In the NACE 151 example: $F = (2000 - 350)/1150 = 1.43$.

All measured substances in a sector are extrapolated by this factor, irrespective of whether the substance is measured for one company or for all 50 companies. In fact, the extrapolation is based on a weighted average emission factor.

Method 2. Statistical estimation based on emission factors per substance

Principle

Additional estimations are performed on the basis of emission factors for a number of substances (COD, N-Kjeldahl, total P, heavy metals) in the textile industry (NACE 17) and metalware, machinery and electrotechnical companies (NACE 28 to 32). In these sectors, there are numerous small companies carrying out many different processes. It is therefore more appropriate to deduce an emission factor for each of these substances individually in the light of the significance of the processes specifically related to the emission of the substance in question. For example, some but not all surface treatments of metals cause zinc emissions. The emission factor for zinc is worked out for each individually measured company on the basis of zinc emissions and the production volume within that specific company. Here again data for companies that discharge directly are ignored, as the number of such companies is small.

Method

The annual load of a substance for each company is divided by the production volume (NACE 173) or production value (other sectors) for that company. This generates a set of emission factors (kg/kg or kg/euro). The emissions for all companies are displayed in a graph for the production in question, and a linear regression line is calculated per substance and per sector. If the correlation coefficient of the regression line exceeds 0.8, then the slope of the regression line is taken as the emission factor. If this is not the case, then the calculated average value of the emission factors is used. Any outliers are ignored.

The total emission of the sector for substance X is calculated as follows:

$$Emission\_total = Emissie\_NEI_i + EF \times (Production\_total - Production\_NEI_i)$$

Method 3. Statistical estimation for companies with fewer than 20 employees

One limitation on the use of production data in the additional estimation is that this data applies only to companies with more than 20 employees. No physical production data is available for these small companies. That is why the methods described above can only be used to produce statistical estimations for companies with more than 20 employees.
However, in some sectors quite a large number of the businesses are small, and make a substantial contribution to total emissions. In order to take these into account, the total statistical estimation for emissions is extrapolated again on the basis of the number of employees working for small companies. It is assumed that the discharge per employee for small companies will be the same as for their larger counterparts. At the moment this is the only way in which some correction can be applied for small companies.

The extra factor per employee (ep):

Fep = (ep total) / (ep in companies >20ep)

The total emission calculated after extrapolation ($NEI_i + NEI_s$) is extrapolated by this factor.
This statistical step is not carried out for companies in NACE 90022 (waste processing), as the extrapolation factor for method 1 used there already takes account of employee numbers.

Statistical estimation for 1990

The statistical estimation for 1990 was performed differently. The method used then inevitably differed from the methodology described above in the following areas:

1. Extrapolation is based on both direct and indirect emissions. This is because the number of companies with individual records in the base population is much lower. It is almost impossible

to perform an statistical estimation on the basis of indirect emissions alone. Furthermore, it is reasonable to assume that the base records in 1990 did not include all direct emissions.
2. No refinement was applied to the metal-electro industry and the textile finishing industry, mainly because of the paucity of data.
3. The annual loads for some sectors with a very small number of companies were estimated on the basis of emission factors and production volumes. The emission factors were calculated on the basis of emission data for 1995.

See [4] for a detailed description of the method used for 1990.

3 Activity Rates

Table 2 contains a summary of the nature of the AR and the unit of measurement for each sector. The data was taken from the Statistics Netherlands PRODCOM database. These statistics show the physical and monetary value of production per company for all companies with more than 20 employees. The results are shown individually in a detailed list of about 7,000 final products (known as the PRODCOM list). See reference [5]. It should be pointed out that the number of employees is used as the activity rate for NACE 90022 (waste processing).

Table 2: Activity rate per sector (companies with over 20 employees).

Sector	Name	AR	Unit
151	Slaughterhouses/meat processing	meat and meat products	1,000 kg
152	Fish processing	fish and fish products	1,000 kg
1531	Potato processing	potato products	1,000 kg
1533	Vegetable processing	vegetable processing	1,000 kg
154	Oil and fat production	processed oils, fats and margarines	1,000 kg
155	Dairy	milk and dairy products	1,000 kg
1584	Cocoa, chocolate, sweets	cocoa, chocolates and confectionery, sweets	1,000 kg
158 rest	Miscellaneous foodstuffs	miscellaneous foodstuffs	1,000 kg
159 rest	Distilleries, soft drinks	distilleries, liquor, mineral water, soft drinks	1,000 kg
173	Textile finishing	textiles with a specially finished surface	1,000 m2
17 rest	Other textile industry	*production value* of textile products	mln euro
191	Tanneries	various types of leather	m2
212	Paper and cardboard goods	various types of paper and cardboard	1,000 kg
2412	Dyes and paints	dyes and paints	1,000 kg
2413	Inorganic basic chemistry	inorganic basic chemicals	1,000 kg
2416	Primary plastics industry	plastic in primary form	1,000 kg
242	Chemical crop protection products	chemical crop protection products and disinfectants	1,000 kg
243	Paint, ink and varnish industry	paints, varnishes, inks	1,000 kg
245	Soap, cleansing products, cosmetics	soap, wax, cleansing products, perfumes, cosmetics	1,000 kg
2462	Adhesives, artificial resin, etc.	adhesives etc.	1,000 kg
2466	Other chemical products	other chemical products	1,000 kg
251	Rubber (products)	*production value* of rubber (products)	mln euro
252	Plastic products	*production value* of plastic products	mln euro
261	Glass industry	*production value* of glass and glass products	mln euro
274	Production of non-ferrous metals	non-ferrous metals	1,000 kg
275	Metal foundry	metal foundries	1,000 kg
2851	Galvanising industry	*production value* of surface treatment	mln euro
28 rest	Metal products	*production value* of metal products	mln euro
29-31-32	Machinery, equipment, electronic apparatus	*production value* of machinery, equipment, electronic apparatus	mln euro
34	Vehicles and trailers	*production value* of vehicles, trailers, parts	mln euro
354	Bicycle industry	bicycles (number)	number of products
90022	Waste processing	*employees* of waste processing company	number

4 Extrapolation factors and emission factors

Table 3 shows a summary of the extrapolation factors (F) for 1995, 2000, 2004 and 2005, as used for method 1 of the statistical estimation system.

The statistical estimation for each emission is equal to (F-1) times the emission monitored at individual facilities.
So a figure of 2.096 means that the total (indirect) emission for the sector is 2.096 times the measured indirect emissions. The part covered by the statistical estimation is (2.096-1), or 1.096 times the emission monitored at individual facilities.

Table 3 shows that in some cases the extrapolation factors are quite high, for example in the rubber and sheet glass industries (2000). It should however be noted that the emissions from these sectors are very low.

Table 3: Extrapolation factors for industrial sectors (method 1)

NACE	Basis on which the factor is calculated:	1995	2000	2005	2006
151	meat and meat products	1.889	1.648	2.096	1.705
152	fish and fish products	4.339	2.270	3.513	5.651
1531	potato products	1.178	1.209	1.166	1.212
1533	vegetable processing	2.370	1.521	2.647	2.479
154	processed oils, fats and margarines	1.112	1.061	1.065	1.157
155	milk and dairy products	1.188	1.088	1.139	1.099
158 rest	miscellaneous foodstuffs	2.850	3.015	2.983	2.872
1584	cocoa, chocolates and confectionery, sweets	1.595	1.388	1.566	1.297
159 rest	distilleries, liquor, mineral water, soft drinks	1.611	1.436	1.159	1.264
17 rest	production value of textile products	1.871	2.220	1.939	2.601
173	textiles with a specially finished surface	1.724	1.572	1.689	1.122
191	various types of leather	1.571	2.082	1.349	1.709
212	various types of paper and cardboard	4.773	2.710	4.582	4.843
2412	dyes and paints	1.060	1.112	1.193	1.427
2413	inorganic basic chemicals	1.577	1.325	1.114	1.129
2416	plastic in primary form	1.526	2.661	1.072	1.068
242	chemical crop protection products and disinfectants	1.512	2.708	2.548	2.487
243	paints, varnishes, inks	2.089	2.086	7.458	7.064
245	soap, wax, cleansing products, perfumes, cosmetics	2.143	2.019	2.623	2.621
2462	adhesives etc.	2.355	1.540	4.655	4.010
2466	other chemical products	1.320	1.073	3.142	1.816
251	production value of rubber (products)	1.885	2.002	15.894	16.050
252	production value of plastic products	4.027	4.581	4.814	3.921
261	production value of glass and glass products	(*)	30.983(**)	2.085	1.806
274	non-ferrous metals	1.844	1.983	2.090	2.323
275	metal foundries	12.262	(*)	2.848	2.557
28 rest	production value of metal products	3.016	4.579	7.440	6.229
2851	production value of surface treatment	1.852	2.807	5.633	6.135
29-31-32	production value of machinery, equipment, electronic apparatus	2.314	3.067	4.948	6.795
34	production value of vehicles, trailers, parts	2.120	1.330	1.346	1.343
354	bicycles (number)	1.935	1.358	4.840	4.043
90022	employees of waste processing companies	2.422	1.996	1.885	2.085

(*): insufficient underlying data to allow a factor to be calculated
(**): deviating factor: applies only to 2612 (production of sheet glass)

Table 4 shows the emission factors for specific substances that were applied to a number of sectors using method 2. The sectors in question are textile finishing (NACE 173), other textile industry (NACE 17 excluding 173), surface treatment of metals (NACE 2851), other metal products industry (NACE 28 excluding 2851) and the mechanical and electronic engineering industry (NACE 29, 31 and 32).

It is difficult to compare the values for each sector over time in respect of the emission factors in table 4. The factor is recalculated every year and is therefore heavily dependent on the composition of the population of companies in a given year and their production. Nevertheless, a slight downward trend in emission factors can be seen for most substances.

Table 4: Substance-specific emission factors for industrial sectors (method 2)

NACE group	Substance	Unit	1995	2000	2005	2006
173	chromium	kg/mln m2 of finished textile	2.40	*)	*)	*)
173	copper	kg/mln m2 of finished textile	2.13	4.32	5.81	*)
173	lead	kg/mln m2 of finished textile	0.247	*)	*)	*)
173	nickel	kg/mln m2 of finished textile	0.496	*)	*)	*)
173	zinc	kg/mln m2 of finished textile	2.53	2.34	3.57	*)
173	COD	kg/mln m2 of finished textile	6751	21344	22641	*)
173	N-Kjeldahl	kg/mln m2 of finished textile	874	579	467	*)
17 other	chromium	kg/mln euro production value	1.32	0.029	0.144	0.131
17 other	copper	kg/mln euro production value	1.40	1.26	0.599	0.625
17 other	lead	kg/mln euro production value	*)	0.0784	0.0188	0.0100
17 other	nickel	kg/mln euro production value	0.276	0.0366	0.0473	0.0349
17 other	zinc	kg/mln euro production value	2.68	0.582	0.727	0.607
17 other	COD	kg/mln euro production value	8004	7175	5806	4095
17 other	N-Kjeldahl	kg/mln euro production value	202	154	130	139
2851	chromium	kg/mln euro production value	13.0	2.89	0.803	1.638
2851	copper	kg/mln euro production value	3.31	1.35	0.675	0.778
2851	lead	kg/mln euro production value	1.12	0.870	0.0055	0.0328
2851	nickel	kg/mln euro production value	14.0	3.75	0.664	1.780
2851	zinc	kg/mln euro production value	8.01	3.58	0.960	0.951
2851	COD	kg/mln euro production value	2237	670	285	452
2851	N-Kjeldahl	kg/mln euro production value	117	49.1	34.3	33.1
28 other	chromium	kg/mln euro production value	0.522	0.197	0.110	0.085
28 other	copper	kg/mln euro production value	0.393	0.342	0.0674	0.031
28 other	lead	kg/mln euro production value	0.243	0.0125	0.0432	0.0060
28 other	nickel	kg/mln euro production value	1.32	0.257	0.690	0.160
28 other	zinc	kg/mln euro production value	1.62	0.362	0.705	0.243
28 other	COD	kg/mln euro production value	680	1025	496	288
28 other	N-Kjeldahl	kg/mln euro production value	25.3	20.9	19.1	31.2
29-31-32	chromium	kg/mln euro production value	0.204	0.0607	0.0142	0.090
29-31-32	copper	kg/mln euro production value	2.28	0.817	0.978	0.349
29-31-32	lead	kg/mln euro production value	1.18	0.413	0.182	0.156
29-31-32	nickel	kg/mln euro production value	0.995	0.143	0.0797	0.0797
29-31-32	zinc	kg/mln euro production value	2.08	0.136	0.0911	0.156
29-31-32	COD	kg/mln euro production value	1187	2088	6736	6470
29-31-32	N-Kjeldahl	kg/mln euro production value	143	131	504	234

*) Insufficient data to allow a substance-specific emission factor to be calculated

Table 5 shows the factors used to perform the statistical estimation of emissions by companies with fewer than 20 employees (method 3).

Table 5: Factors (F_{ep}) used to perform the statistical estimation for companies with fewer than 20 employees.

NACE	1995	2000	2005	2006
151	1.11	1.15	1.17	1.20
152	1.33	1.34	1.21	1.30
1531	1.04	1.02	1.03	1.04
1533	1.00	1.17	1.10	1.16
154	1.00	1.01	1.03	1.05
155	1.28	1.04	1.05	1.08
158 rest	1.84	1.80	1.52	1.72
1584	1.04	1.10	1.10	1.10
159 rest	1.04	1.04	1.04	1.10
17 rest	1.25	1.30	1.32	1.27
173	1.19	1.24	1.29	1.51
191	1.20	1.27	1.36	1.49
212	1.05	1.07	1.08	1.13
2412	1.05	1.10	2.54	1.17
2413	1.00	1.02	1.00	1.01
2416	1.05	1.04	1.04	1.08
242	1.02	1.05	1.06	1.34
243	1.05	1.08	1.07	1.07
245	1.05	1.12	1.11	1.27
2462	1.04	1.05	1.05	1.06
2466	1.09	1.05	1.07	1.06
251	1.11	1.17	1.16	1.21
252	1.17	1.19	1.18	1.26
2612	(*)	1.14	1.23	1.30
274	1.10	1.03	1.03	1.06
275	(*)	(*)	1.17	1.18
28 rest	1.32	1.36	1.38	1.35
2851	1.61	1.74	1.75	1.58
29-31-32	1.15	1.17	1.18	1.09
34	1.13	1.13	1.12	1.17
354	1.16	1.14	1.11	1.30
90022	n/a	n/a	n/a	n/a

Specimen calculation for slaughterhouses in 2005:
The recorded indirect emission of total P is 20842 kg.
The total indirect emission after performing the statistical estimation for large companies is therefore 20842 x 2.096 = 43684 kg.
The total indirect emission after performing the statistical estimation for small companies is 43684 x 1.17 = 51111.
The total statistical estimation for the emission is 51111 - 20842 = 30296 kg.

5 Effects of policy measures

Between 1990 and 2006 most sectors adopted measures to limit indirect emissions as far as possible, but the most significant reductions were achieved in the preceding period, especially with regard to direct emissions. The short character of this document does not allow to list specific measures for all sectors and all substances.
Most of the measures generally where possible by the application of cleaner production methods, alternative raw materials, introducing closed circuits for processing water streams, and in some cases on-site pre-treatment of waste water, although this is less common at companies with indirect emissions (to sewer) than with direct emissions (to surface water).

Emissions are also affected by economic trends. In some sectors, such as the leather industry, many companies have closed down or cut production dramatically. This has resulted in a sharp fall in emissions.

6 Emissions calculated

It is impossible to give a concise overview of emission calculations because of the numerous activities undertaken, the years involved and the substances in question. For further details please visit www.prtr.nl.

7 Release into environmental compartments

All the statistical estimations for emissions are attributed to the indirect water compartment (sewer system).

8 Description of emission pathways to water

The emissions into the sewer system contribute to the total load on surface water via emissions from combined sewer overflows, and via effluents from urban waste water treatment plants. The fact sheet "Effluents from waste water treatment plants and sewer systems" [6] describes this in further detail. All the emissions described above take place as dry weather flow from businesses (dwf-bus).

9 Spatial allocation

Spatial allocation is based on the number of employees per sector and per region.

10 Comments and changes in regard to previous version

A factor based on production value has been calculated for the glass industry (NACE code 261) and is applied for the first time in the 2008 inventory covering the years 2005 and 2006. In previous years the factor was based on physical quantities of sheet glass produced, and a statistical estimation was performed only for NACE 2612. As information is now available for other types of glassmaking companies, the statistical estimation now covers the entire glass industry (NACE 261). As the units of measurement of physical production vary (kg, m2 and number of items), this necessarily involved moving to the value of production. The change in the statistical estimation means that the pattern for the period 2000 to 2005 cannot be validated. It is impossible to remedy this as too little data is available for 2000 to allow the statistical estimation to be re-performed.

Data for 2005 has been recalculated for a number of sectors as new information from individual companies has been added to the National Emission Inventory database. The data in question comes from environmental annual reports that were submitted late or copies of load and/or company information that have now been received.

11 Accuracy and indicated subjects for improvement

The method used in Emission Inventory publications has been followed as far as possible in classifying the quality of information [7]. It is based on the CORINAIR (CORe emission INventories AIR) methodology, which applies the following quality classifications:

A: a value based on a large number of measurements from representative sources;
B: a value based on a number of measurements from some of the sources that are representative of the sector;

C: a value based on a limited number of measurements, together with estimates based on technical knowledge of the process;
D: a value based on a small number of measurements, together with estimates based on assumptions;
E: a value based on a technical calculation on the basis of a number of assumptions.

The volume of the ARs on the basis of production is determined by Statistics Netherlands by means of statistics on industrial production. Almost all companies with more than 20 employees are included in the process, giving an almost complete picture and allowing this element to be classed in category A.
Employee numbers (AR-employees) are also fully determined, which means that this factor also receives a class A grade.
Determination of emission factors is for the most part not substance-specific. Statistical estimations are produced for all substances with the same extrapolation factor except where method 2 is used. The overall reliability of these factors is classed as C.
Distribution among compartments is classed as A: the statistical estimations relates only to indirect emissions to sewer. Assessment of the emission pathway (via effluents or combined sewer overflows) is slightly less accurate and is classed as B.
Spatial allocation is carried out on the basis of a spatial distribution of the number of employees in each sector. The information on this in the National Emission Inventory database is accurate, and this factor is therefore classed as A.

Element of emission calculation	**Reliability classification**
AR-production	A
AR-employees	A
Emission and extrapolation factors	C
Distribution among compartments	A
Emission pathways to water	B
Spatial allocation	A

No areas for improvement have as yet been identified for this method.

12 Request for reactions

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