

# Country profiles — industrial emissions

## Methodology report



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European Topic Centre  
on Air Pollution and  
Climate Change Mitigation

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# 1 Introduction

The European Environment Agency (EEA), together with the European Topic Centre for Air Pollution and Climate Change Mitigation (ETC/ACM), is developing country profiles on industrial pollution in Europe.

Industrial pollution is a complex matter as it puts pressure on all environmental media (i.e. air, biota, soil and water). These pressures are caused by different types of pollution and different types of industrial processes. This methodology report provides an overview of the industrial pollution within countries, and quantifies the different pressures and describes their origins.

The aim of the country profiles is to provide insights into the key industrial pressures in the EEA member countries and, therefore, contribute to decision making. These country profiles could also be used to inform the research and scientific communities if data issues hinder analysis and clear decision making. The profiles aim to monitor the progress of, and present findings on the state of industrial pollution.

## 2 Scope

Here we outline the scope of categories and pollutants included in the profiles. The scope has been designed to enable the consistent analysis of the air and water pollution related to industrial activities.

### 2.1 *Definition of industry*

Industry is not easily defined, as different definitions depend on particular data sources and perspectives. The questions tackled in this methodology report include whether or not 'industry' should include agriculture, transport associated with the movement of goods, transport associated with employees travelling to work, or waste generation and disposal.

Multiple data sources can be used for the compilation of the profiles. These include the European Pollutant Release and Transfer Register (E-PRTR), Eurostat, and greenhouse gas (GHG) and air pollutant inventories, each of which have their own data categories. As such, it is important to have a clear understanding of how these sources and categories relate to each other, and which categories should be included in 'industry'. The objective is to provide a transparent presentation of the scope of industry within the profiles.

The E-PRTR contains the data reported annually by industrial facilities that exceed capacity thresholds, and covers 65 economic activities within nine industrial sectors. These data cover pollutant releases to air, water and land. This is the main data source for the profiles, because of the detailed level of reporting, the high spatial resolution and the fact that reporting is annual. It should be kept in mind that the data are a subset of total industry emissions, as they cover only emissions above certain thresholds.

Data on economic activities within the European Union (EU) are grouped into categories based on the Statistical classification of economic activities in the European Community (NACE), and are available from Eurostat. NACE coding is hierarchical, and consists of a first-division level with an alphabetical code, and three further levels with two-, three- and four-digit numerical codes, respectively. The economic activities within the E-PRTR are used to select which economic

activities within NACE should be used with regard to industry. Based on these considerations, NACE divisions B, C, D and E are included in industry. As outlined in Table 2.1, this covers mining and quarrying; manufacturing; electricity, gas, steam and air conditioning supply; and water supply, sewerage, waste management and remediation activities.

**Table 2.1 NACE divisions**

NACE division code	NACE division name
B	Mining and quarrying
C	Manufacturing
D	Electricity, gas, steam and air conditioning supply
E	Water supply, sewerage, waste management and remediation activities

National inventories of emissions to air are reported in separate national inventories for GHGs and air pollutants. Air pollutant emissions are reported under the Convention on Long-range Transboundary Air Pollution (CLRTAP) using Nomenclature for Reporting (NFR) categories.

**Box 2.1 What is industry?**

The scope of 'industry' spans multiple data sources and attempts to cover the same activities as those data sources. In summary, these are the energy industry, metal production, cement and lime production, mining and quarrying, the chemical industry, manufacturing, the waste industry (including water and sewage management), and the distribution of electricity, gas, steam and air conditioning.

The energy used for transport related to these industries is not included (except pipelines for the transmission of energy). Agricultural activities are also not included, because of the diffuse and country-specific nature of such data, which makes cross-comparisons inappropriate.

The source codes of the data included are presented in Annex 1. In summary, these include:

- NACE divisions B, C, D and E;
- NFR14 categories 1A1, 1A2 (except 1A2gvii), 1A3e, 1A4ai, 1A4bi 1A4ci, 1A5a, 1B, 2 (except 2A5b, 2D3a) and 5.
- E-PRTR sectors: all except 5f, 7a, 7b

To ensure a consistent approach with regard to the activities included in 'industry', these data sources have been aligned, or 'mapped'. The mapping of industrial sectors from these different data sources has been performed by consolidating two pre-existing mapping tables: one created by Finnish emission experts <sup>(1)</sup> for NACE, NFR and E-PRTR; and one of NACE and E-PRTR codes (ETC/ACM, 2011). 'Gap filling' has been performed using expert judgement. The mapping table of the data sources is available on the European Environment Information and Observation Network

<sup>(1)</sup> [http://www.ceip.at/fileadmin/inhalte/emep/xls/ConversionTableReportingCodes\\_October2015.xlsx](http://www.ceip.at/fileadmin/inhalte/emep/xls/ConversionTableReportingCodes_October2015.xlsx)

(Eionet) Forum <sup>(2)</sup>. The list of codes for these reporting systems included in 'industry' is presented in Annex 1. A summary of what is included in industry is given in Box 2.1. An overview of the data sources used is provided in Table 2.2.

Data for all 33 EEA member countries (the 28 EU Member States (EU28) together with Iceland, Liechtenstein, Norway, Switzerland and Turkey, known collectively as the EEA33) are not always available from these data sources. Alternative data sources in such instances are described in Chapter 3 'Gap filling', and are listed in Table 2.2.

### Exclusions

Within the initial scope of the E-PRTR sectors and NACE divisions B, C, D and E, some sectors have been excluded from the definition of industry. These exclusions are summarised below.

- Common Reporting Format (CRF) and NFR sector 4 — 'Agriculture' — has been excluded. The reasons for this exclusion are as follows: for specific substances (especially nutrients), agricultural discharges will be high but also difficult to quantify, and relatively difficult to compare among the countries because of local conditions, monitoring efforts and different quantification methods.
- E-PRTR sectors 7a and 7b — 'Installations for the intensive rearing of poultry or pigs' and 'Intensive aquaculture' — have been excluded. These were excluded as they mainly relate to the use of manure and fertilisers, and can therefore be considered diffuse sources.
- E-PRTR sector 5f — 'Urban wastewater treatment plants' (UWWTPs) — has been excluded. The UWWTP sector has been excluded because of the special nature of this activity; in this sector, the majority of treated water is urban wastewater, and only a limited amount is industrial wastewater (as, in general, only small and medium enterprises are connected to the sewer system). In all other EU emissions reporting, other than the E-PRTR, UWWTPs are viewed as a separate source category, and not as part of 'industry'.

**Table 2.2 Data sources used for this country profiles**

Data source	Use	Reporting updates	Reference
Eurostat	Economy (GVA)	Annual	Eurostat (2016a)
Eurostat	Energy consumption	Annual	Eurostat (2016b)
Eurostat	Water consumption	Annual	Eurostat (2016c)
Eurostat	Waste generation	Biennial	Eurostat (2016d)
EEA	Emissions to air (CLRTAP)	Annual	EEA (2016a)
EEA	Industry emissions to water and air (E-PRTR)	Annual	EEA (2016b)
International Energy Agency (IEA)	Industry energy consumption (gap-filling data)	Annual	IEA (2016)
World Bank	Industry GVA (gap-filling data)	Annual	World Bank (2016a, 2016b)

<sup>(2)</sup> [http://forum.eionet.europa.eu/etc-acm-consortium/library/subvention-2016/task-deliveries-ap2016/task-1222-industry-country-fiches-and-industrial-emissions-indicator/-first-drafts-approval-eea/industry\\_mappings\\_v10](http://forum.eionet.europa.eu/etc-acm-consortium/library/subvention-2016/task-deliveries-ap2016/task-1222-industry-country-fiches-and-industrial-emissions-indicator/-first-drafts-approval-eea/industry_mappings_v10)

## 2.2 Pollutants considered

The pollutants included in this analysis have been determined based on multiple criteria, and are presented in Tables 2.3 and 2.4 for air and water. The overall focus is on pollutants under specific industrial legislation. Because of this, the profiles do not track emerging pollutants.

### 2.2.1 Air

Four factors were considered with regard to the inclusion of air pollutants. To be included in the profiles, pollutants must first meet the policy-related criteria and then at least one of the subsequent pressures and impacts criteria, and the quality of the data on the pollutant must be acceptable. In summary, for inclusion in the profiles:

1. the pollutant must be covered by the Industrial Emissions Directive (IED) (EC, 2010) or the EU Emissions Trading Directive (EC, 2003);  
**and**
2. more than half of the emissions of the pollutant to air must have occurred within industry for at least one year between 2007 and the year for which the latest data are available, calculated via industry emission data in the E-PRTR, as a percentage of total emissions in national inventories;  
**or**
3. the proportion of the pollutant's emissions to air within industry must be increasing (E-PRTR industry emissions as a percentage of national inventories, since 2007);  
**or**
4. the pollutant must be responsible for the largest aggregate damage-associated costs by industrial facilities (calculated by the EEA (2014) report *Costs of air pollution from European industrial facilities 2008–2012*).

Polychlorinated biphenyls (PCBs) are not included in the profiles because of the poor quality of data reported in the E-PRTR. Table 2.3 summarises the air pollutants that are included in the country profiles.

**Table 2.3 Air pollutants included in the industrial country profiles**

Pollutant	Abbreviation	Group	Reason for inclusion
Nitrous oxides	NO <sub>x</sub>	Air pollutant	1, 3, 4
Ammonia	NH <sub>3</sub>	Air pollutant	1, 3, 4
Non-methane volatile organic compounds	NMVOCS	Air pollutant	1, 3, 4
Particulate matter	PM <sub>10</sub>	Air pollutant	1, 4
Sulphur dioxide	SO <sub>2</sub>	Air pollutant	1, 2, 4
Arsenic	As	Heavy metal	1, 3
Chromium	Cr	Heavy metal	1, 3
Lead	Pb	Heavy metal	1, 3
Mercury	Hg	Heavy metal	1, 2



With regard to the reasons for inclusion, '1' indicates that the pollutant is covered by the IED or the EU emissions trading system (ETS); '2' indicates that more than 50 % of the air emissions of that pollutant result from industry; '3' indicates that the proportion of the pollutant's air emissions within industry is increasing (2007–2013); and '4' indicates that the pollutant is associated with high damage costs related to air pollution.

### Data sources

1 = EC (2003 and 2010)

2, 3 = EEA (2016a and 2016b)

4 = EEA (2014)

### 2.2.2 Water

Four factors were considered with regard to the inclusion of water pollutants. For inclusion in the profiles, pollutants must first meet the policy-related criteria and then at least one of the subsequent pressures and impacts criteria, and the quality of the data on the pollutant must be acceptable. In summary, for inclusion in the country profiles:

1. the pollutant must be covered by the IED (EC, 2010), the Water Framework Directive (WFD) (EC, 2000) or the OSPAR (Convention for the Protection of the Marine Environment of the North-East Atlantic) list of chemicals for priority action;  
**and**
2. the pollutant must be highlighted as having a potentially significant impact on health in water (determined through the toxicity, bioavailability and bioaccumulation potential);  
**or**
3. the pollutant must have significant eutrophication impacts on water and ecosystems;  
**or**
4. the substance must affect the oxygen balance of water.

The WFD's list of priority substances covers 33 substances or groups of substances, of which 13 are priority hazardous substances (EC, 2000). More recently, the European Commission's proposal (EC, 2011) for a directive amending the WFD suggests further pollutants for consideration as priority substances. Although the E-PRTR covers these, and other, substances, the data quality and consistency of reporting across countries is sufficient for only a small selection of water pollutants. Pollutants outside this selection, including polycyclic aromatic hydrocarbons (PAHs) and dioxins and furans, are not included in the profiles because of the poor quality of the data reported in the E-PRTR. Table 2.4 summarises the water pollutants that are included in the profiles. It must be emphasised that this list of pollutants does not cover numerous organic pollutants, pesticides and emerging compounds, such as pharmaceuticals and microplastics.

**Table 2.4 Water pollutants included in the industrial country profiles**

Pollutant	Abbreviation	Group	Reason for inclusion
Arsenic	As	Heavy metal	1, 2
Cadmium	Cd	Heavy metal	1, 2
Chromium	Cr	Heavy metal	1, 2

Copper	Cu	Heavy metal	1, 2
Lead	Pb	Heavy metal	1, 2
Mercury	Hg	Heavy metal	1, 2
Nickel	Ni	Heavy metal	1, 2
Zinc	Zn	Heavy metal	1, 2
Total nitrogen	Tot-N	Inorganic substances	1, 3
Total phosphorus	Tot-P	Inorganic substances	1, 3
Total organic carbon	TOC	Organic substances	1, 4

With regard to the reasons for inclusion, '1' indicates that the pollutant is covered by the IED, WFD or OSPAR; '2' indicates that the pollutant has potentially significant health impacts; '3' indicates that the pollutant has significant eutrophication impacts in water; and '4' indicates that the pollutant has an unfavourable influence on the oxygen balance of water.

### Data sources

1 = EC (2010); OSPAR (2014); EC (2000),

2 = WHO (2010); OSPAR (2014)

3, 4 = EC (2000)

### 2.2.3 Waste

Waste is defined as 'any substance or object which the holder discards or intends or is required to discard' (EC, 2008). Data concerning industrial waste are grouped into three sectors: hazardous waste, non-hazardous waste, and waste from mining and quarrying. Mining and quarrying waste covers both hazardous and non-hazardous waste resulting from these activities.

Hazardous waste can pose a risk to health or the environment if not managed and disposed of correctly. The properties of waste that render it hazardous are defined in Annex III of the Waste Directive (EC, 2008) and include, inter alia, explosive, flammable, toxic and carcinogenic properties.

Data on waste from mining and quarrying are presented separately, because of the different nature and large volumes of this type of waste. Mining and quarrying waste results from the prospecting, extraction, treatment and storage of mineral resources, and the working of quarries. This category of waste is also addressed by a separate directive on the management of waste from extractive industries (EC, 2006).

### 2.2.4 Soil

Soil pollutants will be defined and included in future versions of the profiles.

## 3 Gap filling

The aim of the country profiles is to cover industrial pollution in all EEA33 countries: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta,

Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom. However, not all of the data sources cover all of the countries. If data are missing, a gap-filling methodology was followed.

### ***Final energy consumption — industry***

No data were available for Switzerland, Iceland or Liechtenstein. Therefore, an alternative data source, the International Energy Agency's (IEA, 2016) energy balances, was used for Switzerland and Iceland. No alternative data source was found for Liechtenstein. The scope of industry with regard to the IEA data is the same as for the Eurostat data, except that construction data are also included in the IEA data. Because of the low level of detail, it was not possible to remove these construction data in order to match the scopes completely.

For these countries, the alternative data are indicated in Figure 3 of the profiles by showing only the allocation to 'Industry (no detail)' and 'Non industry'.

### ***Water consumption by sector***

For almost all countries, the time-series data for water consumption in industrial sectors and total water consumption are incomplete or missing. If there were enough data, a gap-filling methodology was followed. If data for only one or two years were provided, data were gap-filled using the trend obtained from the time-series data for water abstraction in the sector.

### ***Gross value added by sector***

No data at all were available for Liechtenstein, Iceland or Malta, and data on total gross value added (GVA) alone were available for Turkey.

For those countries, for which data were absent or incomplete, an alternative data source, the World Bank, was used. Two indicators were combined to obtain the industry GVA. National gross domestic product (GDP) was obtained from World Bank data (2016a, 2016b) and converted into millions of euros using average annual USD to EUR exchange rates from AMECO (2016). The second data set, industry as a percentage of national GDP, was used to calculate industry GVA in millions of euros. Non-industry GVA was calculated by subtracting this industry GVA from national GDP. The World Bank's definition of industry is the same as Eurostat's, except that construction is also included in the World Bank's definition. 'Industry total' was the most detailed level of data available, so it was not possible to remove these construction data in order to match the scopes completely.

For these countries, the alternative data are indicated in Figure 1 of the profiles by showing only the allocation to 'Industry (no detail)' and 'Non industry'.

For almost all countries, some data are missing for certain years for some of the NACE activities in the Eurostat data. If the missing data relate to the end of a time-series, a linear extrapolation calculation was performed. If the missing data relate to the middle of a time-series, a linear interpolation calculation was performed.

### ***Waste generation data***

Some countries were missing data for 2014 when the rest of the time series was complete. In these cases, the data for the latest year available (2012) was rolled over to 2014.

### ***E-PRTR emissions***

Turkey does not report to the E-PRTR. Croatia, an EU Member State since 2013, reported for the first time to the E-PRTR in 2016, concerning 2014 data. No data were available for Liechtenstein.

### ***CLRTAP emissions***

Liechtenstein did not report emissions to the CLRTAP in 2016. This means that the data are not in the database, and a manual extraction per pollutant from the Centre on Emission Inventories and Projections (CEIP) website was necessary. Greece did not report emissions to the CLRTAP at all in 2016, so data for Greece is for 2013 rather than 2014.

## **4 Data quality**

### ***E-PRTR***

The quality of the data reported to the E-PRTR is the responsibility of operators and national competent authorities. However, the EEA, with the ETC/ACM, has been working on improvements as part of an informal data review of the E-PRTR data set. While the E-PRTR provides a highly detailed level of information on emissions, the completeness and consistency of reporting across countries varies. Improvements in the data quality would increase the robustness of the fact sheet data.

### ***Water***

Although a number of reporting obligations with regard to water pollution exist, none of the current databases cover all relevant sources and pathways of pollutants to water. As such, it is not possible to compare the industrial discharges to water with the total discharges from all sources on a regular basis. For this reason, in Figure 10 of the country profiles, water pollution is compared with total **industrial** water pollution (from the E-PRTR), rather than 'total' water pollution, and, therefore, the significance of industry with regard to water pollution as a whole cannot be assessed.

The WFD's (EC, 2000) list of priority substances covers 33 substances or groups of substances, of which 13 are priority hazardous substances. Some of these have been excluded from the country profiles because of the poor quality of the data reported in the E-PRTR. For a more accurate representation of the state of industrial water pollution, more complete and reliable data in the E-PRTR would be necessary.

## **5 Industrial drivers**

This section highlights how important industry is for each country's economy. The graphs in the country profiles present information on the size of different industrial sectors in each country in terms of GVA, energy consumption and water consumption.

The two key parameters for each driver in this section, using GVA as the example industrial driver, are 'percentage of total economy' and 'percentage of country economy', as summarised below.

### ***Percentage of total economy***

The percentages that the countries' industrial GVA contribute to the EEA33 total GVA, for each industry sector, are summed for all sectors. This aggregation of percentages provides an overview of the significance of industrial GVA across all sectors.

### ***Percentage of country economy***

The percentages that a country's industrial GVA contribute to the country total GVA for each industry sector are summed for all sectors. This aggregation of percentages provides an overview of the significance of industrial GVA across all sectors within the selected country.

## **5.1 Data sources**

The data sources for this chapter are taken from the Eurostat statistics database.

### **Data extraction 1: Gross value added (Eurostat, 2016a)**

- indicator (GVA at basic prices);
- unit (million EUR at prices from the previous year);
- NACE Rev. 2 codes (total, B, C, D and E);
- period (2000–2014);
- country (EU28 countries plus Norway, Switzerland and Turkey).

The GVA values for B, C, D and E cover 'industrial GVA'.

The GVA values for B, C, D and E are subtracted from total GVA for each country and year to obtain 'Non-industry GVA'.

Total GVA covers all economic activity.

Data for Liechtenstein, Ireland, Iceland, Croatia, Cyprus, Malta and Turkey are not available from Eurostat (2016a), so alternative data were obtained from the World Bank (2016) and converted into millions of euros using the annual average USD to EUR exchange rates from AMECO (2016). The second data set, industry as a percentage of national GDP, was used to calculate industry GVA in millions of euros. Non-industry GVA is calculated by subtracting this industry GVA from national GDP. The World Bank's definition of industry is the same as Eurostat's, except that construction is also included in the World Bank's definition. No more detailed data are available than industry total, so it is not possible to remove these data so that the scopes match completely. For these countries, the alternative data are indicated in Figure 1 of the country profiles by showing only the allocation to 'Industry (no detail)' and 'Non industry'.

### **Data extraction 2: Final energy consumption — industry (Eurostat, 2016b)**

- indicator (final energy consumption; iron and steel; non-ferrous metals; chemical and petrochemical; non-metallic minerals; mining and quarrying; food and tobacco; textile and leather; paper, pulp and print; transport equipment; machinery; wood and wood products; or non-specified industry);
- product (all products);
- unit (terajoules);
- period (1990–2014);
- country (EU28 countries plus Norway and Turkey).

The industry groups (i.e. indicators) in Data extraction 2 are assigned to sectors for aggregation, as shown in Table 5.1.

**Table 5.1 Energy industry sectors**

<b>Energy group</b>	<b>Sector</b>
Iron and steel	Metal industry
Non-ferrous metals	Metal industry
Chemical and petrochemical	Chemical industry
Non-metallic minerals	Non-metallic minerals
Mining and quarrying	Mining and quarrying
Food and tobacco	Manufacturing
Textile and leather	Manufacturing
Paper, pulp and print	Manufacturing
Transport equipment	Manufacturing
Machinery	Manufacturing
Wood and wood products	Manufacturing
Non-specified (industry)	Other industry
Final energy consumption	Total energy consumption

**Data extraction 3: Water consumption (Eurostat, 2016c)**

- NACE (B, C, 'D2511\_D3513' and 'TOTAL\_HH');
- 'Wat\_Proc' (Public water supply, self and other supply);
- unit (million cubic metres);
- period (1990–2014);
- country (EU28 countries plus Norway, Turkey, Switzerland and Iceland).

**5.2 Figures**

Please note, the figures in this section are numbered as they would appear in the country profiles, not according to the layout of this methodology report.

**Figure 1: GVA of industry as a percentage of the EEA33 economy, and as a percentage of the country's economy**

*Developing the figure (Data extraction 1)*

*Part 1*

Sum the GVA by country and year for NACE divisions B, C, D and E.

Sum all 'total' GVA values across countries, per year, to obtain the EEA33 total GVA.

For each country and year, subtract the sum of the 'industry GVA' (i.e. sum of GVA for NACE divisions B, C, D and E) from the 'total GVA' to obtain 'Non-industry GVA'.

Divide GVA for each NACE division (or non-industry GVA), country and year by the sum of total GVA for all countries for that year. The data obtained should be presented as described below:

- present the data as a stacked bar graph for the latest year;
- show the country names on the Y axis;
- show the 'percentage of total EEA33 economy' on the x-axis;
- colour each bar on the graph by NACE division; non-industry data should be represented in grey.

#### *Part 2*

For each country, year and category (i.e. each NACE division and all non-industry), divide the GVA by country 'Total' GVA. The data obtained should be presented as described below:

- present the data as a pie chart for the latest year for the country highlighted in the bar graph in Part 1;
- the percentage of total country GVA should be shown;
- colour each section of the pie chart by NACE division; non-industry data should be shown in grey.

### **Figure 2: Evolution of the GVA of industry in the relevant country**

*Developing the figure (Data extraction 1)*

Sum the industrial GVA by country, year and NACE division.

Sum the industrial GVA by country and year to obtain total industry GVA.

The data obtained should be presented as described below:

- present the data as a line graph;
- show GVA (million EUR) on the Y axis;
- show the year on the x-axis;
- colour the lines by NACE division; total industry GVA data should be shown in black.

### **Figure 3: Energy consumption of industry as a percentage of EEA33 energy consumption, with country-specific detail**

*Developing the figure (Data extraction 2)*

#### *Part 1*

Sum the industrial energy consumption by assigned sector, as detailed in Table 5.1, per country and year.

Sum all 'Total energy consumption' across countries, per year, to obtain EEA33 total energy consumption.

For each country and year, subtract the sum of the industry energy consumption from the total energy consumption to obtain 'Non-industry energy consumption'.

For each sector group, country and year, divide energy consumption by the total EEA33 energy consumption for that year. The data obtained should be presented as described below:

- present the data as a stacked bar graph;
- show the country names on the Y axis;
- show the 'percentage of total EEA33 energy consumption' on the x-axis
- colour each bar on the graph by energy sector; non-industry data should be represented in grey.

#### *Part 2*

For each country, year and energy sector (and non-industry), divide the energy consumption by country 'Total' energy consumption. The data obtained should be presented as described below:

- present the data as a pie chart for the latest year for the country highlighted in the bar graph in Part 1;

- the percentage of total country energy consumption should be shown;
- colour each section of the pie chart by energy sector; non-industry data should be shown in grey.

In summary, Figure 3 should have the same overall design as Figure 1.

#### **Figure 4: Evolution of the energy consumption of industry in the relevant country**

*Developing the figure (Data extraction 2)*

Sum the industrial energy consumption by country, year and assigned sector, as detailed in Table 5.1. The data obtained should be presented as described below:

- present the data as a line graph;
- show energy consumption (petajoules) on the Y axis;
- show the year on the x-axis;
- colour the lines by NACE division; total country industry energy consumption should be shown in black.

In summary, Figure 4 should have the same overall design as Figure 2.

#### **Figure 5: Water usage by industry as a percentage of EEA33 water usage, with country-specific details**

*Developing the figure (Data extraction 3)*

*Part 1*

Sum 'All NACE activities plus households' across countries, per year, to obtain EEA33 'total water consumption'.

For each country and year, subtract the sum of the 'Industry water consumption' from the 'Total water consumption' to obtain 'Non-industry water consumption'.

For each NACE division, country and year, divide water consumption by the total EEA33 water consumption for that year. The data obtained should be presented as described below:

- present the data as a stacked bar graph;
- show the country names on the Y axis;
- show the 'percentage of total EEA33 water consumption' on the x-axis;
- colour each bar on the graph by NACE division; non-industry data should be shown in grey.

*Part 2*

For each country, year and category (i.e. each NACE division and all non-industry), divide the water consumption by country 'total' water consumption. The data obtained should be presented as described below:

- present the data as a pie chart for the latest year for the country highlighted in the bar graph in Part 1;
- the percentage of total country water consumption;
- colour each section of the pie chart by NACE division; non-industry data should be shown in grey.

In summary, Figure 5 should have the same overall design as Figure 1.

#### **Figure 6: Evolution of industrial water usage in the relevant country**

*Developing the figure (Data extraction 3)*

The data should be presented as described below:

- present the data as a line graph;
- show water consumption (million cubic metres) on the Y axis;
- show the year on the x-axis;



- colour the lines by NACE division; total country industry water consumption should be shown in black.

In summary, Figure 6 should have the same overall design as Figure 2.

## 6 Industrial pollution

Some key parameters are used for all media to provide insights into the state of industrial pollution in the EEA countries.

### ***The percentage of a country's total pollution***

The emissions of a country's industrial activities are calculated as a percentage of the total country emissions of that pollutant from all sources.

### ***Decoupling***

The decoupling of industry emission trends from industry GVA growth can be absolute (i.e. emissions decrease as GVA increases) or relative (i.e. emissions increase at a slower rate than GVA). Both types of decoupling are important with regard to reducing the impact of emissions on the environment without hindering economic development.

### **6.1 Air emissions**

The figures in this section present industry emissions, by sector, as a percentage of total country emissions for that pollutant; the decoupling of industrial pollution from the economy and from energy consumption are also shown.

#### **6.1.1 Data sources**

**Data extraction 1**, as described in section 5.1, is used again in this section.

The data sources related to air emissions in this chapter are the EEA databases for emissions reported to the CLRTAP (EEA, 2016a) and the E-PRTR (EEA, 2016b).

Trends for industry emissions to air are extracted from the E-PRTR. The EEA33 countries' total air emissions, and industrial emissions from the latest year, are extracted from the CLRTAP database.

Data are taken from the E-PRTR. A query is created to link the tables [PollutantRelease], [FacilityReport] and [FacilityID\_Changes] to add the fields 'ReportingYear' [FacilityID\_Changes] and 'NACEMainEconomicActivity' [FacilityReport] to the data in [PollutantRelease], via the field 'FacilityReportID'. This query is filtered on the medium 'Air' for the air pollutants listed in Table 2.3. Only the NACE activities included in the industry definition in the mapping document are included, and are assigned a NACE division code, namely B, C, D or E. The final query sums these emissions by NACE division, country, year and pollutant.

Turkey does not report data to the E-PRTR.

#### **Extraction 4: industrial air emissions**

The following data are selected from the E-PRTR database (EEA, 2016b):

- NACEMainActivityName (B, C, D, E);
- year (2007–latest available);
- pollutant name (of those listed in Table 2.3);
- emissions;
- unit;
- medium (i.e. 'Air' in this case);
- country (of the EU28 countries plus Iceland, Norway, Switzerland and Liechtenstein).

The following data on air pollutants are taken from a database containing information on annual air pollutant emissions submitted by EEA member countries to the CLRTAP. It covers emissions data reported since 1990 by all EEA countries. The emissions are broken down by NFR sector, using the revised 'NFR14' nomenclature <sup>(3)</sup>. Greece and Liechtenstein did not report for 2014, so are not included in the EEA database. Liechtenstein's data are downloaded individually from the CEIP website using the same extraction criteria as shown for extraction 5 below. Greece did not report at all, so their data is the latest available (2013).

#### **Extraction 5: air pollutant emissions**

The following data are selected from the CLRTAP database (EEA, 2016a):

- country (all EEA33 countries);
- sector code (all at most detailed level available, excluding national totals, memo items, and LULUCF);
- year (latest available);
- pollutant name (of those listed in Table 2.3);
- emissions;
- unit.

Emissions from extraction 5 are grouped into industry sectors as per the mapping document (summarised in Table A1.2 of Annex 1 of this methodology report). Non-industry activities are grouped together, as detailed in Table A1.3.

### **6.1.2 Figures**

Please note, the figures in this section are numbered as they would appear in the country profiles, not according to the layout of this methodology report.

#### **Figure 7: Industrial air emissions as a percentage of total country pollution, by sector origins**

*Developing the figure*

For the latest year in each country, pollutant and sector group, divide the industry emissions by country total industrial emissions for that pollutant (Data extraction 5). The data obtained should be presented as described below:

- present the data as a bar chart of the latest year;
- show the pollutants on the Y axis;
- show the percentage of total pollutant emissions on the x-axis;

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<sup>(3)</sup> [http://www.ceip.at/reporting\\_instructions](http://www.ceip.at/reporting_instructions)

- colour the bars on the graph by sector; non-industry data should be represented in grey.

## **Figures 8 and 9: Industrial air pollution versus economic growth in the relevant country**

### *Developing the figures*

Sum the emissions in each NACE division by year and country to get total air industry emissions for each country by pollutant per year (Data extraction 4).

Divide the industry emissions by 2007 emissions, for each pollutant and country, to normalise the trends.

Divide the sum of GVA for industry sectors for each country and year (Data extraction 1) by 2007 industry GVA. The data obtained should be presented as described below:

- present the data as a line graph;
- show industrial emissions, industry GVA (relative to 2007), on the Y axis;
- show the year on the x-axis;
- colour the lines by pollutant.

Figure 8 shows the industry GVA for the main air pollutants. Figure 9 shows the industry GVA for heavy metals.

## **6.2 Emissions to water**

### **6.2.1 Data sources**

This section uses **Data extractions 1 and 2**, which are described in section 5.1.

Data are taken from the E-PRTR, but the NACE divisions are used rather than the E-PRTR sectors. A query is created to link the tables [PollutantRelease], [FacilityReport], and [FacilityID\_Changes] to add the fields 'ReportingYear' [FacilityID\_Changes] and 'NACEMainEconomicActivity' [FacilityReport] to the data in [PollutantRelease], via the field 'FacilityReportID'. This query is filtered on the medium 'Water' for the water pollutants listed in Table 2.4. Only the NACE activities included in the industry definition in the mapping document are included, and assigned a NACE division code, namely B, C, D or E. The final query sums these emissions by NACE division, year and pollutant.

Turkey does not report data to the E-PRTR.

### **Extraction 6: Industrial water emissions**

The following data are selected from the E-PRTR database (EEA, 2016a):

- NACEMainActivityName (B, C, D, E);
- year (2007–latest available);
- pollutant name (of those listed in Table 2.4);
- emissions;
- unit;
- medium (i.e. 'Water' in this case);
- country (of the EU28 countries plus Iceland, Norway, Switzerland and Liechtenstein).

### **Aggregation by toxicity**

In Figure 11, heavy metal emissions to water are aggregated by toxicity. The aggregation of heavy metals is based on the absolute sums of pollutants released (in kg), weighted by factors

corresponding to the reciprocal predicted no effect concentration (PNEC) values (i.e. 1/PNEC) for each pollutant and made equivalent to one of the metals; in this case, mercury (Hg) was chosen. If the aggregation of heavy metals is made equivalent to another metal, the diagram would look the same but the scaling on the ordinate axis would be different. This weighting was made in order to reflect the differences in the environmental impact of the heavy metals. The PNECs used are presented in Table 6.1.

**Table 6.1 Heavy metal PNECs**

Heavy metal	PNEC (µg/l)
As	0.6
Cd	0.2
Cr	0.6
Cu	2.6
Hg	0.05
Ni	8.6
Pb	1.3
Zn	3.4

Source: OSPAR, 2014.

The total metal equivalent (Hg) released per country, per year, can be calculated as follows:

Total metal equivalent (Hg) release (per country, per year) =  $(L_{As} \times (\text{PNEC Hg}/\text{PNEC As})) + (L_{Cd} \times (\text{PNEC Hg}/\text{PNEC Cd})) + (L_{Cr} \times (\text{PNEC Hg}/\text{PNEC Cr})) + (L_{Cu} \times (\text{PNEC Hg}/\text{PNEC Cu})) + (L_{Hg} \times (\text{PNEC Hg}/\text{PNEC Hg})) + (L_{Ni} \times (\text{PNEC Hg}/\text{PNEC Ni})) + (L_{Pb} \times (\text{PNEC Hg}/\text{PNEC Pb})) + (L_{Zn} \times (\text{PNEC Hg}/\text{PNEC Zn}))$

Based on the values in Table 6.1, the total metal equivalent (Hg) released per country, per year, would be as follows:

Total metal equivalent (Hg) release (per country, per year) =  $(L_{As} \times (0.05/0.6)) + (L_{Cd} \times (0.05/0.2)) + (L_{Cr} \times (0.05/0.6)) + (L_{Cu} \times (0.05/2.6)) + L_{Hg} + (L_{Ni} \times (0.05/8.6)) + (L_{Pb} \times (0.05/1.3)) + (L_{Zn} \times (0.05/3.4))$

In these equations,  $L_{Cd}$ , for example, refers to Cd emissions to water per country and per year.

## 6.2.2 Figures

Please note, the figures in this section are numbered as they would appear in the country profiles, not according to the layout of this methodology report.

### Figure 10: Industrial water releases as a percentage of country E-PRTR industrial pollution, by sector origins

*Developing the figure*

For the latest year in each country, pollutant and NACE activity, divide the industry emissions by country total industrial emissions for that pollutant (Data extraction 6). The data obtained should be presented as described below:

- present the data as a bar chart of the latest year;
- show the pollutants on the Y axis;
- show the percentage of total pollutant emissions on the x-axis;
- colour the bars on the graph by sector; non-industry data should be represented in grey

### **Figures 11 and 12: Industrial water pollution (E-PRTR) versus economic growth**

#### *Developing the figure*

Sum the emissions in each NACE division by year and country to get total water industry emissions for each country by pollutant per year (Data extraction 6).

Aggregate heavy metal emissions by toxicity, as described in section 6.2.1.

Divide the industry emissions by 2007 emissions, for each pollutant (heavy metals aggregated) and country, to normalise the trends.

Divide the sum of GVA for industry sectors for each country and year (Data extraction 1) by 2007 industry GVA. The data obtained should be presented as described below:

- present the data as a line graph;
- show industrial emissions, industry GVA (relative to 2007), on the Y axis;
- show the year on the x-axis;
- colour the lines by pollutant.

Figure 11 shows the industry GVA for the main pollutants and aggregated heavy metals (Hg equivalent). Figure 12 shows the industry GVA for heavy metals (kg).

## **6.3 Waste**

### **6.3.1 Data sources**

This section uses **Data extraction 1**, which is described in section 5.1.

Data are retrieved from the Eurostat statistics database.

#### **Extraction 7: Generation of waste (env\_wasgt) (Eurostat, 2016d)**

- waste type (total);
- NACE Rev. 2 codes (B; C; D; E; 'all NACE activities including households');
- time (all);
- unit (tonnes);
- hazard (Hazardous waste; Non-hazardous waste).

Data are summed by NACE divisions B, C, D and E.

### **6.3.2 Figures**

Please note, the figures in this section are numbered as they would appear in the country profiles, not according to the layout of this methodology report.

### **Figures 13–15: Industrial waste as a percentage of total EEA waste, with waste intensity and percentage of country-specific waste generation**

#### *Part 1. Developing the figure*

Sum the industrial waste by NACE, country and year, for each hazard type (Data extraction 7).  
 Sum total waste for all countries by year, for each hazard type (Data extraction 7).  
 Subtract the sum of industry waste for each country and year from total waste in each country and year, for each hazard type, to obtain non-industry waste by country, hazard type and year.  
 Divide waste by the total EEA33 waste generation for each year.  
 The NACE division percentages are stacked within each country, and countries are ordered on the graph according to the sum of the percentages. The data obtained should be presented as described below:

- present the data as a stacked bar graph for the latest year available;
- show the country names on the Y axis;
- show the 'percentage of total EEA33 waste generation' on the x-axis;
- colour by sector (grouped by type, non-industry is grey).

In the mirror Y axis, add industrial waste intensity, calculated as described below.

### *Part 2. Developing the figure*

For each country and year, sum the GVA of each industrial sector to obtain total industry GVA (Data extraction 1).

For each country, hazard type and year, sum the waste generated (in tonnes) (Data extraction 7).  
 For each country, hazard type and year, divide the first calculation by the second to obtain the intensity of industrial waste, that is, the relationship between the industrial economy and waste generation. The data obtained should be presented as follows:

- present the data as a bar chart;
- show the country names (ordered by total contribution to EEA waste generation) on the Y axis;
- show industry waste intensity on the x-axis.

### *Part 3. Developing the figure*

For each country, year, hazard type and category (NACE divisions and non-industry), divide the waste generation by total country waste generation to obtain the percentage of country-specific waste generation. The data obtained should be presented as follows:

- present the data as a pie chart;
- the size of each section should represent the percentage of waste from each NACE division in the specific country;
- colour each section of the pie chart by NACE division.

Figure 13 shows 'Non-hazardous waste' (NACE divisions C, D and E) data, Figure 14 shows 'Hazardous waste' (NACE divisions C, D and E) data; and Figure 15 shows 'Mining and quarrying' (NACE division B) data.

### **Figure 16: Decoupling of industrial waste**

Divide the industry waste generation by 2004 waste for each NACE division, hazard type and country, to normalise the trends (Data extraction 7).

Divide the sum of GVA for industry sectors (Data extraction 1) by industry GVA in 2004 for each country and year. The data obtained should be presented as described below:

- present the data as a line graph;
- show industrial waste generation and industry GVA (relative to 2004) on the Y axis;
- show the year on the x-axis;
- colour the lines by NACE division.

Figure 16 shows 'Non-hazardous waste' data and Figure 17 shows 'Hazardous waste' data.

#### **6.4 Soil**

Industry is a major contributor to soil contamination in Europe. There is a lack of good-quality and comparable quantifiable soil data for countries within the EEA33, which limits the analysis of soil pollution trends (EEA, 2015). The inclusion of soil pollution data will be developed in future versions of the country profiles.

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# Units, abbreviations and acronyms

As	Arsenic
Cd	Cadmium
CLRTAP	Convention on Long-range Transboundary Air Pollution
Cr	Chromium
Cu	Copper
EEA	European Environment Agency
EEA33	The 33 European Environment Agency member countries (the 28 European Union Member States together with Iceland, Liechtenstein, Norway, Switzerland and Turkey)
Eionet	European Environment Information Network
E-PRTR	European Pollutant Release and Transfer Register
ETC/ACM	European Topic Centre for Air Pollution and Climate Change Mitigation
EU	European Union
EU28	The 28 European Union Member States
GDP	Gross domestic product
GHG	Greenhouse gas
GVA	Gross value added
Hg	Mercury
IEA	International Energy Agency
IED	Industrial Emissions Directive
NACE	Statistical classification of economic activities in the European Community
NFR	Nomenclature for Reporting
Ni	Nickel
NMVO	Non-methane volatile organic compound
NO <sub>2</sub>	Nitrogen dioxide
NO <sub>x</sub>	Nitrogen oxides
Pb	Lead
PNEC	Predicted no effect concentration
SO <sub>2</sub>	Sulfur dioxide
SO <sub>x</sub>	Sulfur oxides
TOC	Total organic carbon
Tot-N	Total nitrogen
Tot-P	Total phosphorous
UWWTP	Urban wastewater treatment plant
WFD	Water Framework Directive
Zn	Zinc

## Annex 1 Scope of industry across datasets

Table A1.1 presents the list of codes used to extract data from Eurostat (NACE codes), the E-PRTR and the CLRTAP (NFR codes).

The NACE codes listed are all of those beneath divisions B, C, D and E. There are different levels of activity, for example B05.1 is a subset of B05, but no double counting occurs as each facility reports only one NACE code.

Installations reporting to the E-PRTR include an E-PRTR code and a NACE code. Calculations of industry sectors within the E-PRTR data are performed by NACE divisions after the exclusion of E-PRTR category 5.f, 7.a and 7.b, into the four groups presented in Table 2.1. There is not a one-to-one relationship between E-PRTR codes and NACE codes, hence NACE codes are used for comparability across data sources.

**Table A1.1 Industry codes**

E-PRTR codes	
1a	Mineral oil and gas refineries
1b	Installations for gasification and liquefaction
1c	Thermal power stations and other combustion installations (>50 MW)
1d	Coke ovens
1e	Coal rolling mills
1f	Installations for the manufacture of coal products and solid smokeless fuel
2a	Metal ore roasting or sintering installations
2b	Installations for the production of pig iron or steel (primary or secondary melting) including continuous casting
2c	Installations for the processing of ferrous metals
2d	Ferrous metal foundries
2e	Installations for non-ferrous metals
2f	Installations for surface treatment of metals and plastic materials using an electrolytic or chemical process
3a	Underground mining and related operations
3b	Opencast mining and quarrying
3c	Installations for the production of cement clinker and lime in rotary kilns
3d	Installations for the production of asbestos and the manufacture of asbestos-based products
3e	Installations for the manufacture of glass, incl. Glass fibre
3f	Installations for melting mineral substances, incl. The production of mineral fibres
3g	Installations for the manufacture of ceramic products by firing
4a	Chemical installations for the production on an industrial scale of basic organic chemicals
4b	Chemical installations for the production on an industrial scale of basic inorganic chemicals
4c	Chemical installations for the production on an industrial scale of fertilisers
4d	Installations using a chemical or biological process for the production on an industrial scale of basic plant health products and of biocides
4e	Installations using a chemical or biological process for the production on an industrial scale of basic pharmaceutical products
4f	Installations for the production on an industrial scale of explosives and pyrotechnic products
5a	Installations for the disposal or recovery of hazardous waste
5b	Installations for the incineration of non-hazardous waste
5c	Installations for the disposal of non-hazardous waste
5d	Landfills
5e	Installations for the disposal or recycling of animal carcasses and animal waste

5g	Independently operated industrial wastewater treatment plants
6a	Industrial plants for the production of pulp from timber or similar fibrous materials
6b	Industrial plants for the production of paper and board and other primary wood products
6c	Industrial plants for the preservation of wood and wood products with chemicals
8a	Slaughterhouses
8b	Treatment and processing intended for the production of food and beverage products from animal raw materials other than milk; from vegetable raw materials
8c	Treatment and processing of milk
9a	Plants for the pre-treatment (operations such as washing, bleaching, mercerisation) or dyeing of fibres or textiles
9b	Plants for the tanning of hides and skins
9c	Installations for the surface treatment of substances, objects or products using organic solvents
9d	Installations for the production of carbon (hard-burnt coal) or electrographite by means of incineration or graphitization
9e	Installations for the building of, and painting or removal of paint from ships
<b>Eurostat NACE name</b>	
B05	Mining of coal and lignite
B05.1	Mining of hard coal
B05.2	Mining of lignite
B06	Extraction of crude petroleum and natural gas
B06.1	Extraction of crude petroleum
B06.2	Extraction of natural gas
B07	Mining of metal ores
B07.1	Mining of iron ores
B07.2	Mining of non-ferrous metal ores
B07.21	Mining of uranium and thorium ores
B07.29	Mining of other non-ferrous metal ores
B08	Other mining and quarrying
B08.1	Quarrying of stone, sand and clay
B08.11	Quarrying of ornamental and building stone, limestone, gypsum, chalk and slate
B08.12	Operation of gravel and sand pits; mining of clays and kaolin
B08.9	Mining and quarrying n.e.c.
B08.91	Mining of chemical and fertiliser minerals
B08.92	Extraction of peat
B08.93	Extraction of salt
B08.99	Other mining and quarrying n.e.c.
B09	Mining support service activities
B09.1	Support activities for petroleum and natural gas extraction
B09.9	Support activities for other mining and quarrying
B09.90	Support activities for other mining and quarrying
C10	Manufacture of food products
C10.1	Processing and preserving of meat and production of meat products
C10.11	Processing and preserving of meat
C10.12	Processing and preserving of poultry meat
C10.13	Production of meat and poultry meat products
C10.2	Processing and preserving of fish, crustaceans and molluscs
C10.3	Processing and preserving of fruit and vegetables
C10.31	Processing and preserving of potatoes
C10.32	Manufacture of fruit and vegetable juice
C10.39	Other processing and preserving of fruit and vegetables
C10.4	Manufacture of vegetable and animal oils and fats
C10.41	Manufacture of oils and fats
C10.42	Manufacture of margarine and similar edible fats

C10.5	Manufacture of dairy products
C10.51	Operation of dairies and cheese making
C10.52	Manufacture of ice cream
C10.6	Manufacture of grain mill products, starches and starch products
C10.61	Manufacture of grain mill products
C10.62	Manufacture of starches and starch products
C10.7	Manufacture of bakery and farinaceous products
C10.71	Manufacture of bread; manufacture of fresh pastry goods and cakes
C10.72	Manufacture of rusks and biscuits; manufacture of preserved pastry goods and cakes
C10.73	Manufacture of macaroni, noodles, couscous and similar farinaceous products
C10.8	Manufacture of other food products
C10.81	Manufacture of sugar
C10.82	Manufacture of cocoa, chocolate and sugar confectionery
C10.83	Processing of tea and coffee
C10.84	Manufacture of condiments and seasonings
C10.85	Manufacture of prepared meals and dishes
C10.86	Manufacture of homogenised food preparations and dietetic food
C10.89	Manufacture of other food products n.e.c.
C10.9	Manufacture of prepared animal feeds
C10.91	Manufacture of prepared feeds for farm animals
C10.92	Manufacture of prepared pet foods
C11	Manufacture of beverages
C11.01	Distilling, rectifying and blending of spirits
C11.02	Manufacture of wine from grape
C11.03	Manufacture of cider and other fruit wines
C11.04	Manufacture of other non-distilled fermented beverages
C11.05	Manufacture of beer
C11.06	Manufacture of malt
C11.07	Manufacture of soft drinks; production of mineral waters and other bottled waters
C12	Manufacture of tobacco products
C13	Manufacture of textiles
C13.1	Preparation and spinning of textile fibres
C13.2	Weaving of textiles
C13.3	Finishing of textiles
C13.9	Manufacture of other textiles
C13.91	Manufacture of knitted and crocheted fabrics
C13.92	Manufacture of made-up textile articles, except apparel
C13.93	Manufacture of carpets and rugs
C13.94	Manufacture of cordage, rope, twine and netting
C13.95	Manufacture of non-wovens and articles made from non-wovens, except apparel
C13.96	Manufacture of other technical and industrial textiles
C13.99	Manufacture of other textiles n.e.c.
C14	Manufacture of wearing apparel
C14.1	Manufacture of wearing apparel, except fur apparel
C14.11	Manufacture of leather clothes
C14.12	Manufacture of workwear
C14.13	Manufacture of other outerwear
C14.14	Manufacture of underwear
C14.19	Manufacture of other wearing apparel and accessories
C14.2	Manufacture of articles of fur
C14.3	Manufacture of knitted and crocheted apparel
C14.31	Manufacture of knitted and crocheted hosiery

C14.39	Manufacture of other knitted and crocheted apparel
C15	Manufacture of leather and related products
C15.1	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery and harness; dressing and dyeing of fur
C15.11	Tanning and dressing of leather; dressing and dyeing of fur
C15.12	Manufacture of luggage, handbags and the like, saddlery and harness
C15.2	Manufacture of footwear
C16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
C16.1	Sawmilling and planing of wood
C16.2	Manufacture of products of wood, cork, straw and plaiting materials
C16.21	Manufacture of veneer sheets and wood-based panels
C16.22	Manufacture of assembled parquet floors
C16.23	Manufacture of other builders' carpentry and joinery
C16.24	Manufacture of wooden containers
C16.29	Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials
C17	Manufacture of paper and paper products
C17.1	Manufacture of pulp, paper and paperboard
C17.11	Manufacture of pulp
C17.12	Manufacture of paper and paperboard
C17.2	Manufacture of articles of paper and paperboard
C17.21	Manufacture of corrugated paper and paperboard and of containers of paper and paperboard
C17.22	Manufacture of household and sanitary goods and of toilet requisites
C17.23	Manufacture of paper stationery
C17.24	Manufacture of wallpaper
C17.29	Manufacture of other articles of paper and paperboard
C18	Printing and reproduction of recorded media
C18.1	Printing and service activities related to printing
C18.11	Printing of newspapers
C18.12	Other printing
C18.13	Pre-press and pre-media services
C18.14	Binding and related services
C18.2	Reproduction of recorded media
C19	Manufacture of coke and refined petroleum products
C19.1	Manufacture of coke oven products
C19.2	Manufacture of refined petroleum products
C20	Manufacture of chemicals and chemical products
C20.1	Manufacture of basic chemicals, fertilisers and nitrogen compounds, plastics and synthetic rubber in primary forms
C20.11	Manufacture of industrial gases
C20.12	Manufacture of dyes and pigments
C20.13	Manufacture of other inorganic basic chemicals
C20.14	Manufacture of other organic basic chemicals
C20.15	Manufacture of fertilisers and nitrogen compounds
C20.16	Manufacture of plastics in primary forms
C20.17	Manufacture of synthetic rubber in primary forms
C20.2	Manufacture of pesticides and other agrochemical products
C20.3	Manufacture of paints, varnishes and similar coatings, printing ink and mastics
C20.4	Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations
C20.41	Manufacture of soap and detergents, cleaning and polishing preparations
C20.42	Manufacture of perfumes and toilet preparations
C20.5	Manufacture of other chemical products

C20.51	Manufacture of explosives
C20.52	Manufacture of glues
C20.53	Manufacture of essential oils
C20.59	Manufacture of other chemical products n.e.c.
C20.6	Manufacture of man-made fibres
C21	Manufacture of basic pharmaceutical products and pharmaceutical preparations
C21.1	Manufacture of basic pharmaceutical products
C21.2	Manufacture of pharmaceutical preparations
C22	Manufacture of rubber and plastic products
C22.1	Manufacture of rubber products
C22.11	Manufacture of rubber tyres and tubes; retreading and rebuilding of rubber tyres
C22.19	Manufacture of other rubber products
C22.2	Manufacture of plastic products
C22.21	Manufacture of plastic plates, sheets, tubes and profiles
C22.22	Manufacture of plastic packing goods
C22.23	Manufacture of builders' ware of plastic
C22.29	Manufacture of other plastic products
C23	Manufacture of other non-metallic mineral products
C23.1	Manufacture of glass and glass products
C23.11	Manufacture of flat glass
C23.12	Shaping and processing of flat glass
C23.13	Manufacture of hollow glass
C23.14	Manufacture of glass fibres
C23.19	Manufacture and processing of other glass, including technical glassware
C23.2	Manufacture of refractory products
C23.3	Manufacture of clay building materials
C23.31	Manufacture of ceramic tiles and flags
C23.32	Manufacture of bricks, tiles and construction products, in baked clay
C23.4	Manufacture of other porcelain and ceramic products
C23.41	Manufacture of ceramic household and ornamental articles
C23.42	Manufacture of ceramic sanitary fixtures
C23.43	Manufacture of ceramic insulators and insulating fittings
C23.44	Manufacture of other technical ceramic products
C23.49	Manufacture of other ceramic products
C23.5	Manufacture of cement, lime and plaster
C23.51	Manufacture of cement
C23.52	Manufacture of lime and plaster
C23.6	Manufacture of articles of concrete, cement and plaster
C23.61	Manufacture of concrete products for construction purposes
C23.62	Manufacture of plaster products for construction purposes
C23.63	Manufacture of ready-mixed concrete
C23.64	Manufacture of mortars
C23.65	Manufacture of fibre cement
C23.69	Manufacture of other articles of concrete, plaster and cement
C23.7	Cutting, shaping and finishing of stone
C23.9	Manufacture of abrasive products and non-metallic mineral products n.e.c.
C23.91	Production of abrasive products
C23.99	Manufacture of other non-metallic mineral products n.e.c.
C24	Manufacture of basic metals
C24.1	Manufacture of basic iron and steel and of ferro-alloys
C24.2	Manufacture of tubes, pipes, hollow profiles and related fittings, of steel
C24.3	Manufacture of other products of first processing of steel

C24.31	Cold drawing of bars
C24.32	Cold rolling of narrow strip
C24.33	Cold forming or folding
C24.34	Cold drawing of wire
C24.4	Manufacture of basic precious and other non-ferrous metals
C24.41	Precious metals production
C24.42	Aluminium production
C24.43	Lead, zinc and tin production
C24.44	Copper production
C24.45	Other non-ferrous metal production
C24.46	Processing of nuclear fuel
C24.5	Casting of metals
C24.51	Casting of iron
C24.52	Casting of steel
C24.53	Casting of light metals
C24.54	Casting of other non-ferrous metals
C25	Manufacture of fabricated metal products, except machinery and equipment
C25.1	Manufacture of structural metal products
C25.11	Manufacture of metal structures and parts of structures
C25.12	Manufacture of doors and windows of metal
C25.2	Manufacture of tanks, reservoirs and containers of metal
C25.21	Manufacture of central heating radiators and boilers
C25.29	Manufacture of other tanks, reservoirs and containers of metal
C25.3	Manufacture of steam generators, except central heating hot water boilers
C25.4	Manufacture of weapons and ammunition
C25.5	Forging, pressing, stamping and roll-forming of metal; powder metallurgy
C25.6	Treatment and coating of metals; machining
C25.61	Treatment and coating of metals
C25.62	Machining
C25.7	Manufacture of cutlery, tools and general hardware
C25.71	Manufacture of cutlery
C25.72	Manufacture of locks and hinges
C25.73	Manufacture of tools
C25.9	Manufacture of other fabricated metal products
C25.91	Manufacture of steel drums and similar containers
C25.92	Manufacture of light metal packaging
C25.93	Manufacture of wire products, chain and springs
C25.94	Manufacture of fasteners and screw machine products
C25.99	Manufacture of other fabricated metal products n.e.c.
C26	Manufacture of computer, electronic and optical products
C26.1	Manufacture of electronic components and boards
C26.11	Manufacture of electronic components
C26.12	Manufacture of loaded electronic boards
C26.2	Manufacture of computers and peripheral equipment
C26.3	Manufacture of communication equipment
C26.4	Manufacture of consumer electronics
C26.5	Manufacture of instruments and appliances for measuring, testing and navigation; watches and clocks
C26.51	Manufacture of instruments and appliances for measuring, testing and navigation
C26.52	Manufacture of watches and clocks
C26.6	Manufacture of irradiation, electromedical and electrotherapeutic equipment
C26.7	Manufacture of optical instruments and photographic equipment



C26.8	Manufacture of magnetic and optical media
C27	Manufacture of electrical equipment
C27.1	Manufacture of electric motors, generators, transformers and electricity distribution and control apparatus
C27.11	Manufacture of electric motors, generators and transformers
C27.12	Manufacture of electricity distribution and control apparatus
C27.2	Manufacture of batteries and accumulators
C27.3	Manufacture of wiring and wiring devices
C27.31	Manufacture of fibre optic cables
C27.32	Manufacture of other electronic and electric wires and cables
C27.33	Manufacture of wiring devices
C27.4	Manufacture of electric lighting equipment
C27.5	Manufacture of domestic appliances
C27.51	Manufacture of electric domestic appliances
C27.52	Manufacture of non-electric domestic appliances
C27.9	Manufacture of other electrical equipment
C28	Manufacture of machinery and equipment n.e.c.
C28.1	Manufacture of general-purpose machinery
C28.11	Manufacture of engines and turbines, except aircraft, vehicle and cycle engines
C28.12	Manufacture of fluid power equipment
C28.13	Manufacture of other pumps and compressors
C28.14	Manufacture of other taps and valves
C28.15	Manufacture of bearings, gears, gearing and driving elements
C28.2	Manufacture of other general-purpose machinery
C28.21	Manufacture of ovens, furnaces and furnace burners
C28.22	Manufacture of lifting and handling equipment
C28.23	Manufacture of office machinery and equipment (except computers and peripheral equipment)
C28.24	Manufacture of power-driven hand tools
C28.25	Manufacture of non-domestic cooling and ventilation equipment
C28.29	Manufacture of other general-purpose machinery n.e.c.
C28.3	Manufacture of agricultural and forestry machinery
C28.4	Manufacture of metal forming machinery and machine tools
C28.41	Manufacture of metal forming machinery
C28.49	Manufacture of other machine tools
C28.9	Manufacture of other special-purpose machinery
C28.91	Manufacture of machinery for metallurgy
C28.92	Manufacture of machinery for mining, quarrying and construction
C28.93	Manufacture of machinery for food, beverage and tobacco processing
C28.94	Manufacture of machinery for textile, apparel and leather production
C28.95	Manufacture of machinery for paper and paperboard production
C28.96	Manufacture of plastics and rubber machinery
C28.99	Manufacture of other special-purpose machinery n.e.c.
C29	Manufacture of motor vehicles, trailers and semi-trailers
C29.1	Manufacture of motor vehicles
C29.2	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers
C29.3	Manufacture of parts and accessories for motor vehicles
C29.31	Manufacture of electrical and electronic equipment for motor vehicles
C29.32	Manufacture of other parts and accessories for motor vehicles
C30	Manufacture of other transport equipment
C30.1	Building of ships and boats
C30.11	Building of ships and floating structures
C30.12	Building of pleasure and sporting boats

C30.2	Manufacture of railway locomotives and rolling stock
C30.3	Manufacture of air and spacecraft and related machinery
C30.4	Manufacture of military fighting vehicles
C30.9	Manufacture of transport equipment n.e.c.
C30.91	Manufacture of motorcycles
C30.92	Manufacture of bicycles and invalid carriages
C30.99	Manufacture of other transport equipment n.e.c.
C31	Manufacture of furniture
C31.01	Manufacture of office and shop furniture
C31.02	Manufacture of kitchen furniture
C31.03	Manufacture of mattresses
C31.09	Manufacture of other furniture
C32	Other manufacturing
C32.1	Manufacture of jewellery, bijouterie and related articles
C32.11	Striking of coins
C32.12	Manufacture of jewellery and related articles
C32.13	Manufacture of imitation jewellery and related articles
C32.2	Manufacture of musical instruments
C32.3	Manufacture of sports goods
C32.4	Manufacture of games and toys
C32.5	Manufacture of medical and dental instruments and supplies
C32.9	Manufacturing n.e.c.
C32.91	Manufacture of brooms and brushes
C32.99	Other manufacturing n.e.c.
C33	Repair and installation of machinery and equipment
C33.1	Repair of fabricated metal products, machinery and equipment
C33.11	Repair of fabricated metal products
C33.12	Repair of machinery
C33.13	Repair of electronic and optical equipment
C33.14	Repair of electrical equipment
C33.15	Repair and maintenance of ships and boats
C33.16	Repair and maintenance of aircraft and spacecraft
C33.17	Repair and maintenance of other transport equipment
C33.19	Repair of other equipment
C33.2	Installation of industrial machinery and equipment
D35.1	Electric power generation, transmission and distribution
D35.11	Production of electricity
D35.12	Transmission of electricity
D35.13	Distribution of electricity
D35.14	Trade of electricity
D35.2	Manufacture of gas; distribution of gaseous fuels through mains
D35.21	Manufacture of gas
D35.22	Distribution of gaseous fuels through mains
D35.23	Trade of gas through mains
D35.3	Steam and air conditioning supply
E36	Water collection, treatment and supply
E37	Sewerage
E38	Waste collection, treatment and disposal activities; materials recovery
E38.1	Waste collection
E38.11	Collection of non-hazardous waste
E38.12	Collection of hazardous waste
E38.2	Waste treatment and disposal

E38.21	Treatment and disposal of non-hazardous waste
E38.22	Treatment and disposal of hazardous waste
E38.3	Materials recovery
E38.31	Dismantling of wrecks
E38.32	Recovery of sorted materials
E39	Remediation activities and other waste management services
<b>NFR14</b>	
1 A 1 a	Public electricity and heat production
1 A 1 b	Petroleum refining
1 A 1 c	Manufacture of solid fuels and other energy industries
1 A 2 a	Stationary combustion in manufacturing industries and construction: Iron and steel
1 A 2 b	Stationary combustion in manufacturing industries and construction: Non-ferrous metals
1 A 2 c	Stationary combustion in manufacturing industries and construction: Chemicals
1 A 2 d	Stationary combustion in manufacturing industries and construction: Pulp, Paper and Print
1 A 2 e	Stationary combustion in manufacturing industries and construction: Food processing, beverages and tobacco
1 A 2 f	Stationary combustion in manufacturing industries and construction: Non-metallic minerals
1 A 2 g viii	Stationary combustion in manufacturing industries and construction: Other (Please specify in your IIR)
1 A 3 e i	Pipeline transport
1 A 3 e ii	Other (please specify)
1 A 4 a i	Commercial/institutional: Stationary
1 A 4 b i	Residential: Stationary
1 A 4 c i	Agriculture/Forestry/Fishing: Stationary
1 A 5 a	Other stationary (including military)
1 B 1 a	Fugitive emission from solid fuels: Coal mining and handling
1 B 1 b	Fugitive emission from solid fuels: Solid fuel transformation
1 B 1 c	Other fugitive emissions from solid fuels
1 B 2 a i	Fugitive emissions oil: Exploration, production, transport
1 B 2 a iv	Fugitive emissions oil: Refining/storage
1 B 2 a v	Distribution of oil products
1 B 2 b	Natural gas (exploration, production, processing, transmission, storage, distribution and other)
1 B 2 c	Venting and flaring (oil, gas, combined)
1 B 2 d	Other fugitive emissions from energy production
2 A 1	Cement production
2 A 2	Lime production
2 A 3	Glass production
2 A 5 a	Quarrying and mining of minerals other than coal
2 A 5 c	Storage, handling and transport of mineral products
2 A 6	Other Mineral products (Please specify the sources included/excluded in the notes column to the right)
2 B 1	Ammonia production
2 B 10 a	Chemical industry: Other (Please specify in the IIR)
2 B 10 b	Storage, handling and transport of chemical products (Please specify in the IIR)
2 B 2	Nitric acid production
2 B 3	Adipic acid production
2 B 5	Carbide production
2 B 6	Titanium dioxide production
2 B 7	Soda ash production
2 C 1	Iron and steel production
2 C 2	Ferroalloys production
2 C 3	Aluminium production
2 C 4	Magnesium Production

2 C 5	Lead production
2 C 6	Zinc production
2 C 7 a	Copper production
2 C 7 b	Nickel production
2 C 7 c	Other metal production (Please specify the sources included/excluded in the notes column to the right)
2 C 7 d	Storage, handling and transport of metal products (Please specify the sources included/excluded in the notes column to the right)
2 D 3 b	Road paving with asphalt
2 D 3 c	Asphalt roofing
2 D 3 d	Coating application
2 D 3 e	Degreasing
2 D 3 f	Dry cleaning
2 D 3 g	Chemical products
2 D 3 i	Other solvent use
2 D 3 h	Printing
2 G	Other product use
2 H 1	Pulp and paper industry
2 H 2	Food and beverages industry
2 I	Wood processing
2 J	Production of POPs
2 K	Consumption of POPs and heavy metals (e.g. electrical and scientific equipment)
2 L	Other production, consumption, storage, transportation or handling of bulk products (Please specify the sources included/excluded in the notes column to the right)
5 A	Biological treatment of waste - Solid waste disposal on land
5 B 1	Biological treatment of waste - Composting
5 B 2	Biological treatment of waste - Anaerobic digestion at biogas facilities
5 C 1 a	Municipal waste incineration
5 C 1 b i	Industrial waste incineration
5 C 1 b ii	Hazardous waste incineration
5 C 1 b iii	Clinical waste incineration
5 C 1 b iv	Sewage sludge incineration
5 C 1 b v	Cremation
5 C 1 b vi	Other Waste incineration (Please specify in the IIR)
5 C 2	Open Burning of Waste
5 D 2	Industrial wastewater handling
5 D 3	Other wastewater handling
5 E	Other waste handling (Please specify in IIR)

Table A1.2 presents the list of codes used in each grouping of air emissions data from the CLRTAP (EEA, 2016a).

**Table A1.2 Industry groupings — CLRTAP**

Group	NFR14 (emissions to air, CLRTAP)
Cement and lime production	1A2f
Cement and lime production	2A1
Cement and lime production	2A2
Cement and lime production	2A6
Chemical industry	2A5c
Chemical industry	2B1
Chemical industry	2B10a

Chemical industry	2B10b
Chemical industry	2B2
Chemical industry	2B3
Chemical industry	2B5
Chemical industry	2B6
Chemical industry	2D3g
Chemical industry	2D3i
Chemical industry	2j
Energy Industry	1A1a
Energy Industry	1A1b
Energy Industry	1A1c
Energy Industry	1A2c
Energy Industry	1A2d
Energy Industry	1A2e
Energy Industry	1A3ei
Energy Industry	1A3eii
Energy Industry	1A4ai
Energy Industry	1A4bi
Energy Industry	1A4ci
Energy Industry	1A5a
Energy Industry	1B1b
Energy Industry	1B2aiv
Energy Industry	1B2av
Energy Industry	1B2b
Energy Industry	1B2c
Food and Drink	2H2
Iron & Steel Manufacturing	1A2a
Iron & Steel Manufacturing	2C1
Iron & Steel Manufacturing	2C7c
Iron & Steel Manufacturing	2C7d
Mining and Quarrying	1B1a
Mining and Quarrying	1B1c
Mining and Quarrying	1B2ai
Mining and Quarrying	1B2d
Mining and Quarrying	2A5a
Non-ferrous metal production	1A2b
Non-ferrous metal production	2C2
Non-ferrous metal production	2C3
Non-ferrous metal production	2C4
Non-ferrous metal production	2C5
Non-ferrous metal production	2C6
Non-ferrous metal production	2C7a
Non-ferrous metal production	2C7b
Other manufacturing	1A2gviii
Other manufacturing	2A3
Other manufacturing	2B7
Other manufacturing	2D3b
Other manufacturing	2D3c
Other manufacturing	2D3d

Other manufacturing	2D3e
Other manufacturing	2D3f
Other manufacturing	2D3h
Other manufacturing	2G
Other manufacturing	2K
Other manufacturing	2L
Pulp paper and wood production	2H1
Pulp paper and wood production	2I
Waste industry	5A
Waste industry	5B1
Waste industry	5B2
Waste industry	5C1a
Waste industry	5C1bi
Waste industry	5C1bii
Waste industry	5C1biii
Waste industry	5C1biv
Waste industry	5C1bv
Waste industry	5C1bvi
Waste industry	5C2
Waste industry	5D2
Waste industry	5D3
Waste industry	5E

Table A1.3 presents the list of codes included in emissions to air data for 'Non-industry' from the CLRTAP (EEA, 2016a).

**Table A1.3 Non-industry groupings — CLRTAP**

<b>NFR14</b>	<b>Non-industry sector name</b>
1A2gvii	Mobile Combustion in manufacturing industries and construction
1A3ai(i)	International aviation LTO (civil)
1A3aii(i)	Domestic aviation LTO (civil)
1A3bi	Road transport: Passenger cars
1A3bii	Road transport: Light duty vehicles
1A3biv	Road transport: Mopeds & motorcycles
1A3bv	Road transport: Gasoline evaporation
1A3bvi	Road transport: Automobile tyre and brake wear
1A3bvii	Road transport: Automobile road abrasion
1A3c	Railways
1A3di(ii)	International inland waterways
1A3dii	National navigation (shipping)
1A4aii	Commercial/institutional: Mobile
1A4bii	Residential: Household and gardening (mobile)
1A4cii	Agriculture/Forestry/Fishing: Off-road vehicles and other machinery
1A4ciii	Agriculture/Forestry/Fishing: National fishing
2A5b	Construction and demolition
2D3a	Domestic solvent use including fungicides
3B1a	Manure management - Dairy cattle
3B1b	Manure management - Non-dairy cattle
3B2	Manure management - Sheep

3B3	Manure management - Swine
3B4a	Manure management - Buffalo
3B4d	Manure management - Goats
3B4e	Manure management - Horses
3B4f	Manure management - Mules and asses
3B4h	Manure management - Other animals
3Da1	Inorganic N-fertilizers (includes also urea application)
3Da2a	Animal manure applied to soils
3Da2c	Other organic fertilisers applied to soils (including compost)
3Dc	Farm-level agricultural operations including storage, handling and transport of agricultural products
3Dd	Off-farm storage, handling and transport of bulk agricultural products
3F	Field burning of agricultural residues
3I	Agriculture other
6A	Other (included in national total for entire territory)

Table A1.4 presents the list of energy consumption sectors from Eurostat (2016b) and the groups they are aggregated to.

**Table A1.4 Industry groupings — energy consumption**

Energy consumption sector	Eurostat Code	Group
Final Energy Consumption	B_101700	Total Energy Consumption
Final Energy Consumption — Industry	B_101800	Total Industry
Iron and Steel	B_101805	Metal Industry
Non-Ferrous Metals	B_101810	Metal Industry
Chemical and Petrochemical	B_101815	Chemical Industry
Non-Metallic Minerals	B_101820	Non-Metallic Minerals
Mining and Quarrying	B_101825	Mining and Quarrying
Food and Tobacco	B_101830	Manufacturing
Textile and Leather	B_101835	Manufacturing
Paper, Pulp and Print	B_101840	Manufacturing
Transport Equipment	B_101846	Manufacturing
Machinery	B_101847	Manufacturing
Wood and Wood Products	B_101851	Manufacturing
Non-specified (Industry)	B_101853	Other Industry

Table A1.5 presents the list of GVA activities and their NACE code from Eurostat (2016a) and the NACE divisions they are aggregated to.

**Table A1.5 Industry groupings — GVA**

GVA NACE activity	NACE code	NACE division code	NACE division name
Total — All NACE activities	TOTAL	Total economy	Total economy
Mining and quarrying	B	B	Mining & Quarrying
Manufacture of food products; beverages and tobacco products	C10-C12	C	Manufacturing

Manufacture of textiles, wearing apparel, leather and related products	C13-C15	C	Manufacturing
Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	C16	C	Manufacturing
Manufacture of paper and paper products	C17	C	Manufacturing
Printing and reproduction of recorded media	C18	C	Manufacturing
Manufacture of coke and refined petroleum products	C19	C	Manufacturing
Manufacture of chemicals and chemical products	C20	C	Manufacturing
Manufacture of basic pharmaceutical products and pharmaceutical preparations	C21	C	Manufacturing
Manufacture of rubber and plastic products	C22	C	Manufacturing
Manufacture of other non-metallic mineral products	C23	C	Manufacturing
Manufacture of basic metals	C24	C	Manufacturing
Manufacture of fabricated metal products, except machinery and equipment	C25	C	Manufacturing
Manufacture of computer, electronic and optical products	C26	C	Manufacturing
Manufacture of electrical equipment	C27	C	Manufacturing
Manufacture of machinery and equipment n.e.c.	C28	C	Manufacturing
Manufacture of motor vehicles, trailers and semi-trailers	C29	C	Manufacturing
Manufacture of other transport equipment	C30	C	Manufacturing
Manufacture of furniture; other manufacturing	C31-C32	C	Manufacturing
Repair and installation of machinery and equipment	C33	C	Manufacturing
Electricity, gas, steam and air conditioning supply	D	D	Electricity, gas, steam, & air conditioning supply
Water collection, treatment and supply	E36	E	Waste management and remediation services
Sewerage, waste management, remediation activities	E37-E39	E	Waste management and remediation services



## **Annex 2 Feedback received from countries on this methodology**

The elaboration of industrial pollution country profiles using a harmonised method at European level is a challenge. Industry is subject to several pieces of legislation that simultaneously tackle different dimensions of environmental pressures. These country profiles aim to provide a Europe-wide standardised information product based on several data sources that are found in various data streams, use various classification mechanisms and cover non-identical scopes.

This methodology explains how these divergences in data sources have been tackled in order to provide an accurate snapshot of industry that benefits from the information available from the data sources. It also takes into account the fact that data are not always available across Europe and, therefore, alternatives have to be applied if possible.

At the beginning of 2016, Eionet was asked to review both the methodology report and the country profiles for each country. Comments from 19 countries and from the European Commission were received. While generally endorsing the product, some countries expressed their concerns about the effect of the diverse nature of the data sources on the outcome.

This annex describes the way in which the products address such issues and the further improvement options that are planned for future implementation.

### ***Definition of the scope of 'industry'***

Countries expressed their concerns about the understanding of 'industry' as a sector, since there is no particular definition used by the various data streams. These country profiles deliberately establish a broad definition of the sector, which is mapped across the different classifications. To improve the readability of this concept, the country profiles' introductions contain a more thorough explanation of this, and, during the preparation of this methodology report, many contributions from countries were taken into account in order to improve its content.

However, it is clear that these country profiles are designed to provide a broad interpretation of what the industrial sector comprises, and other interpretations are also valid.

### ***Comments on the mapping with regard to the mechanism of the NACE classification***

In these country profiles, activities are mapped across the various classifications (a detailed explanation of this is provided in Chapter 2 of this methodology report). The mapping defined in this methodology report uses individual CLRTAP NFR categories, E-PRTR Regulation activities and NACE classes, and assumes that they all relate to the same reality, namely 'industry'.

Countries commented on the use of NACE codes with regard to how they are assigned in the data sets in which they are used or reported (i.e. the E-PRTR and all Eurostat's data streams). While the NFR codes used in the data reported to the CLRTAP identify the exact nature of the emission-releasing activity, the NACE codes are assigned on the basis of the business activity of an organisation. Potentially, this could mean that some installations are classified with two non-equivalent codes in one data stream (CLRTAP) and others use the NACE codes (E-PRTR and Eurostat in the case of the country profiles).

The differences due to different categorisation systems are acknowledged, as inherent uncertainties were inevitably introduced. However, it is considered that the benefits obtained by linking these two systems do outweigh the negative aspects.

### ***Data quality issues***

Various countries highlighted specific cases of data quality issues and, where possible, provided reasoning with regard to the origin of such issues and possible solutions. These country profiles use the data reported by countries to the various official bodies (Eurostat, the EEA, and the EMEP centre) and only minor gap filling was implemented. The data were not quality assured (e.g. by removing outliers) during the elaboration of the country profiles, as this is part of official data collection mechanisms.

Countries also highlighted the fact that the European data were, in some cases, not in line with national data sets. After a thorough verification of all comments received, for all cases in which an error was identified, the country profiles were updated. If the graphs and tables reflected the data actually reported by countries through the various data collection mechanisms, no change was implemented. Because certain countries provided caveats with regard to specific graphs and tables, the EEA included specific disclaimer notes for those graphs affected by such potential errors.

The EEA encourages countries to make use of the re-submission mechanisms of the different reporting obligations in order to further improve data quality.

### ***Water statistics***

Certain countries were concerned about (1) the robustness of Eurostat data on water use and (2) the categories that these country profiles considered relevant in the context of industry.

The EEA encourages countries to use the mechanisms established in order to improve the data on water that Eurostat holds.

With regard to the second issue related to water statistics, namely the specific uses considered relevant to industry in this methodology report, a thorough revision of the comments received led to a revision of the method. Several countries wished to include the category 'self and other supply', as these data are also relevant to industry. The EEA took this comment on board and this has led to a clearer picture as regards water use by industry.

### ***Conceptual suggestions***

Some countries provided several suggestions regarding the general concept of the country profiles. They expressed, among other things, a wish to have a less standardised set of graphs and a deeper assessment of what the figures actually mean in terms of environmental pressures. This would mean introducing tailored text and country-specific information in the product. The EEA will consider these possibilities in the future.

A general wish to further clarify the 'scope' of industry was expressed by various countries. Alternatives for sector breakdowns, data visualisation and data assurance/gap filling were provided. All of these aspects will be considered for future revisions of the country profiles.

The EEA acknowledges the comments received from countries and the European Commission; these comments have led to improvements in the country profiles.